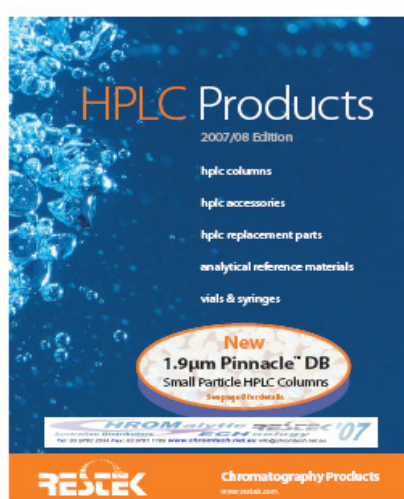
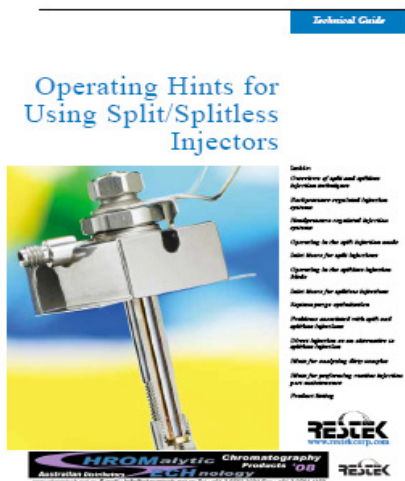


# Restek OEM GC & HPLC Replacement Parts



<b>SRI 8610C</b>		<b>2010 Gas Chromatographs</b>	
<b>PRODUCT INDEX</b>		<b>PeakSimple Data Systems</b>	
<ul style="list-style-type: none"> <li>• GAS CHROMATOGRAPHS</li> <li>• DETECTORS AND STAND-ALONE DETECTORS</li> <li>• INJECTORS</li> <li>• LABOR</li> <li>• DATA SYSTEMS</li> <li>• COLUMNS</li> <li>• ACCESSORIES</li> <li>• PARTS</li> <li>• TRAINING</li> </ul>		With 1, 4, or 8 Channels of Data Acquisition For any Windows™ computer Standard in every SRI GC and HPLC system USB or serial port Available as a stand alone	

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# Operating Hints for Using Split/Splitless Injectors



**Inside:**

*Overviews of split and splitless injection techniques*

*Backpressure-regulated injection systems*

*Headpressure-regulated injection systems*

*Operating in the split injection mode*

*Inlet liners for split injections*

*Operating in the splitless injection Mode*

*Inlet liners for splitless injections*

*Septum purge optimization*

*Problems associated with split and splitless injections*

*Direct injection as an alternative to splitless injection*

*Hints for analyzing dirty samples*

*Hints for performing routine injection port maintenance*

*Product listing*

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## Overview of Split/Splitless Injection Techniques

In capillary and micropacked gas chromatography (GC) there are four primary techniques for vaporizing a sample and transferring it onto the inlet of the analytical column: split, splitless, direct, and on-column injections. Of these, split and splitless injections are the most commonly used techniques. This technical guide focuses on split and splitless injections—their optimization, troubleshooting, and system maintenance.

Split and splitless injections are techniques that introduce the sample into a heated injection port as a liquid, and then rapidly and completely vaporize the sample solvent as well as all of the analytes in the sample. The vaporized sample is transferred to the head of the column.

In the split injection mode, only a fraction of the vaporized sample is transferred onto the head of the column. The remainder of the vaporized sample is removed from the injection port via the split vent line. Split injections should be used only when sample concentrations are high enough to allow a portion of the sample to be discarded during the injection process, while still maintaining a sufficient concentration of analytes at the detector to produce a signal.

When target analyte concentrations are so low that splitting the sample in the injection port will not allow an adequate signal from the detector, the injector should be operated in the splitless injection mode. In the splitless injection mode, most of the vaporized sample is transferred to the head of the column.

The process of performing either a split or splitless injection is controlled by changing the flow path and flow rate of carrier gas through the injection port. The position of a switching valve in the injection port determines the flow path. In split injections, a high carrier gas flow rate rapidly moves the vaporized sample through the injection port liner, past the column (with only a minimal amount directed to the head of the column), and out the split vent. In splitless injections, a relatively slow carrier gas flow rate directs most of the vaporized sample into the head of the column.

Split/splitless injection ports can be either backpressure-regulated or headpressure-regulated systems. Most modern GCs are backpressure regulated. However, some GC manufacturers still find headpressure regulation advantageous and use this design in their split/splitless injectors. It is important for analysts to be familiar with their injection port hardware and the operating principles of their instruments, so that they factor in the variables affecting the accuracy and reproducibility of their results.

## Backpressure-Regulated Injection Systems

Figure 1 illustrates the components of a typical backpressure-regulated split/splitless injection system (e.g., Agilent 5890, 6850, 6890 GCs; Varian 3300, 3400, 3500, 3600, 3800 GCs; Shimadzu 17A GCs). A flow controller, positioned upstream from the injection port, controls the total amount of carrier gas that enters the injection port. A backpressure regulator, located downstream from the injection port body, regulates the pressure inside the injection port. Carrier gas flow rate in the column is determined by the pressure that is maintained in the injection port. The outlet of the backpressure regulator is the outlet of the split vent line. The split vent line outlet is at the ambient pressure of the laboratory. The flow controller and the backpressure regulator work together to determine the column flow rate, septum purge flow rate, and split vent flow rate.

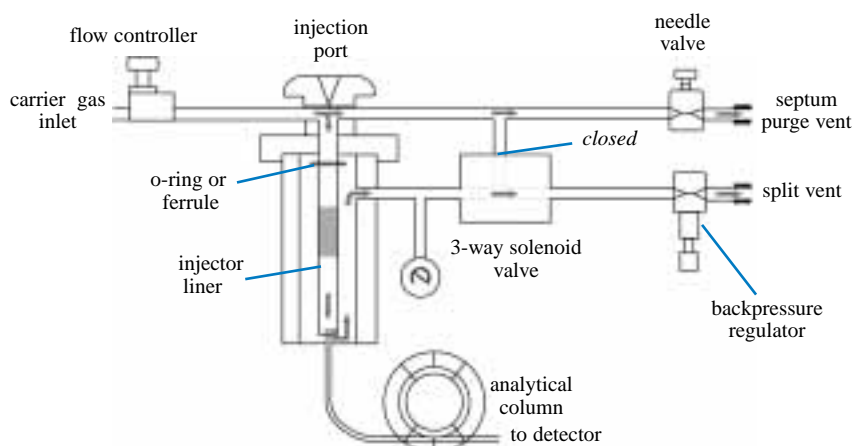
Split and splitless injections in backpressure-regulated systems are controlled by the position of the 3-way solenoid valve. In the split injection mode, the flow path is always open from the injection port body through the 3-way solenoid valve to the split vent line. In the splitless injection mode, the flow path is temporarily closed from the injection port body to the split vent line. The carrier gas flow rate through the injection port liner is simply the column flow rate. Any excess flow is directed through the septum purge line, into the 3-way solenoid valve, and out the split vent line.

In backpressure-regulated systems, the split vent flow rate is changed by adjusting the flow controller. An increase in the total flow being delivered to the injection port will result in a higher split vent flow rate and a higher split ratio. Column flow rate is not affected by changes in the total flow being delivered to the injection port, but by the backpressure regulator. To maintain the same pressure at all times, use the backpressure regulator to compensate for a change in the total flow delivered to the injection port.

A flow-controlled, backpressure-regulated system is beneficial as it gives some measure of protection against a catastrophic loss of carrier gas. If there is a leak at an injection port fitting or a column fitting, the maximum rate of carrier gas loss would be the total flow rate into the injection port as determined by the flow controller. Unlimited flow of carrier gas into the injection port is prevented by having the flow controller at the inlet of the injection port. Leaks are indicated by a failure to maintain split vent flow rate. A common mistake analysts make when they observe a reduced split vent flow rate is to increase the total system flow, rather than check for leaks at the injector and column fittings. By understanding the characteristics of backpressure regulated pneumatics, analysts can detect and correct a leak, to avoid poor chromatography.

**Figure 1.**

*Split injection flowpaths in a typical flow-controlled/backpressure-regulated system.*



**Figure 1.**

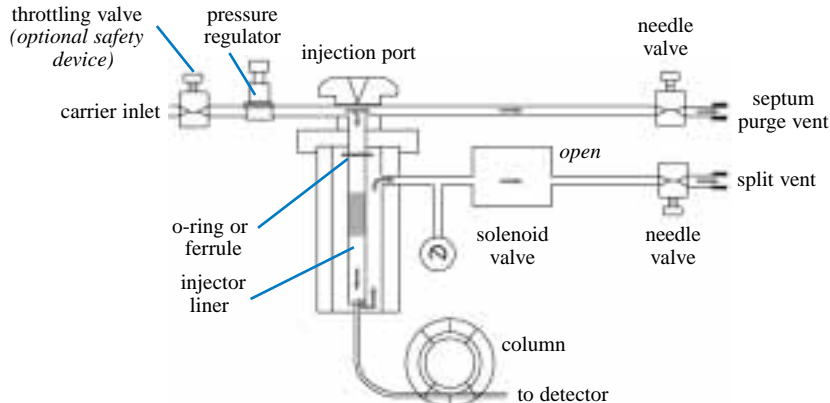
- All carrier gas except septum purge flow directed through injector.
- Column flow (established by backpressure regulator) enters column.
- Solenoid valve open from injector to split vent. Bulk of gas flows out of injector liner, through solenoid valve, out split vent.
- Sample vapor is directed onto column or vented through split vent and is split in the same proportions as for carrier gas.
- Split ratio = portion of sample vented from split vent/portion of sample that enters column.

## Headpressure-Regulated Injection Systems

Figure 2 illustrates the components of a typical headpressure-regulated split/splitless injection system (e.g., PE Autosystem; Shimadzu 9A & 14A; Thermo Finnigan Trace 2000 GCs). A pressure regulator upstream from the injection port regulates or maintains the pressure inside the injection port. The pressure regulator supplies an unlimited flow of carrier gas until the desired pressure is reached. The pressure inside the injection port establishes the carrier gas flow in the column and determines the column flow rate. Flows through the split vent line and the septum purge line are controlled by needle valves or restrictors downstream from the injection port. The outlet pressure of the septum purge and split vent lines is ambient pressure. As long as constant pressure is maintained in the injection port, needle valves and restrictors will give constant flows.

**Figure 2.**

*Split injection flowpaths in a typical headpressure-regulated system.*



**Figure 2.**

- Solenoid valve open: column flow passes into column, split flow exits through split vent.
- Throttling valve guards against loss of carrier gas caused by leaks in injection system.

## Restek Flowmeter 6000



- Calculates linear velocity based on column ID.
- Useful for measuring flows for N<sub>2</sub>, air, He, H<sub>2</sub>, CO<sub>2</sub>, O<sub>2</sub>, Ar, 7.5% CH<sub>4</sub>/Ar.
- Reads flow accurately from 0 to 500mL/min. (0–300mL/min. for CO<sub>2</sub>).
- Accuracy is 0.2mL/min. or +/- 2.5%.
- Usable with inlet pressures up to 25psi.
- Measures split flow and calculates split ratio.
- Automatic shut-off.



Description	qty.	cat.#
Restek Flowmeter 6000 (9-volt battery-operated)	ea.	21622
Recalibration Service for Restek Flowmeter 6000	ea.	24618

## Soap Film Bubble Flowmeters

- 1mL flowmeter measures flows between 0.1 and 10cc/min.
- 50mL flowmeter designed for flows between 10 and 300cc/min.
- Both flowmeters come with a reservoir bulb, twenty-four inches of 1/4-inch ID tubing, adaptor tubes for 1/8-inch tubing and 0.53mm ID capillary columns, and Velcro® fasteners.



Description	qty.	cat.#
1mL Bubble Flowmeter	ea.	20135
50mL Bubble Flowmeter	ea.	20136

An on/off solenoid valve is used in headpressure-regulated systems instead of the 3-way solenoid valve used in backpressure-regulated systems. The position of the solenoid valve determines whether the injection port is operated in the split or splitless injection mode. In the split injection mode, the solenoid valve is always in the open position and the carrier gas is allowed to flow through the injection port liner and out the split vent line. In the splitless injection mode, the solenoid valve is closed and the only flow through the injection port liner is the column flow. The pressure regulator compensates for excess carrier gas flow available when the solenoid valve closes.

The throttling valve upstream from the pressure regulator (Figure 2) is an optional component not typically included by the chromatograph manufacturer. We recommend installing a throttling valve (flow controller or needle valve) to guard against catastrophic loss of carrier gas if a leak occurs at an injection port fitting or a column fitting. To adjust the throttling valve, gradually close the valve, reducing the gas flow until it matches the requirements of the injection system. When the column headpressure begins to decrease, the throttling valve is closed too far.

## Operating in the Split Injection Mode

When operating in the split injection mode (Figures 1 and 2), the solenoid valve is always open along the flowpath from the injection port body to the split vent. With the exception of the septum purge flow, all of the carrier gas entering the injection port flows through the injection port liner and toward the head of the column. At the head of the column, the carrier gas flow is split between two flow paths: a portion of the flow enters the column as the column flow rate, and the remaining carrier gas flow is allowed to escape from the injection port, out the split vent line via the solenoid valve. The amount of flow entering the column is determined by the pressure of the carrier gas inside the injection port and the dimensions of the analytical column. The relative proportions of the split vent flow and the column flow determine the split vent ratio.

Samples completely vaporized in the injection port liner behave in the same fashion as the carrier gas; sample vapors are split in the same proportions as the carrier gas, thereby allowing only a fraction of the sample to be introduced into the head of the column. A 50-to-1 split ratio can be used as a starting point when developing split injection methods. Table I shows the appropriate split vent flow rates for helium and hydrogen carrier gases when using common capillary column IDs.

**Table I.**

*Typical split vent flow rates for 50-to-1 split ratio at optimum linear velocity when using a 30-meter column at 40°C.*

Carrier Gas	Column ID (mm)/Split Vent Flow Rate			
	0.18	0.25	0.32	0.53
helium*	25cc/min.	37.5cc/min.	55cc/min.	135cc/min.
hydrogen**	50cc/min.	75cc/min.	110cc/min.	270cc/min.

\*optimum carrier gas linear velocity=20cm/sec.

\*\*optimum carrier gas linear velocity=40cm/sec.

Equation 1 shows how the split ratio is calculated. Split vent flow rates easily can be measured using a standard electronic flowmeter (cat.# 21622). However, measuring low flow rates (from 0.3 to 5cc/min.) exiting a capillary column can be difficult unless a special low-volume bubblemeter (cat.# 20135) or a sensitive electronic flowmeter is used. If a low flow-measuring device is not available, Equation 2 can be used to determine the approximate column flow.

Calculating the on-column concentration of analytes is necessary to ensure that the column is not overloaded and is operating within its capacity limits. Although quantitative analysis does not require that the on-column concentration be known, exceeding column capacity decreases resolution and reduces quantitative accuracy. Equation 3 illustrates how to calculate the approximate on-column concentration in the split mode.

Setting the injection port temperature properly is critical for obtaining good peak shape and response. Injection port temperature must be hot enough to provide rapid vaporization of all

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**Equation 1.***Calculating the split ratio.*

$$\text{Split ratio} = \frac{\text{column flow} + \text{split vent flow}}{\text{column flow}}$$

**Equation 2.***Calculating the approximate column flow rate.*

$$\text{Flow} = \frac{(\pi) (\text{column radius in cm})^2 (\text{column length in cm})}{\text{dead volume time (min.)}}$$

where  $\pi = 3.14159$ 

For example, a 30m x 0.53mm ID column operated at 20cm/sec. linear velocity (helium) retains methane for 2.50 min., and therefore has a flow rate of 2.65cm<sup>3</sup>/min.:

$$\text{Flow} = \frac{(3.14159) (0.0265\text{cm})^2 (3000\text{cm})}{2.50 \text{ min.}} = 2.65\text{cm}^3/\text{min.}$$

**Equation 3.***Calculating the approximate on-column concentration for split injections.*

$$\text{Concentration} = \frac{\text{concentration in sample } (\mu\text{g}/\mu\text{L}) \times \text{sample vol. injected } (\mu\text{L})}{\text{split ratio}}$$

sample components. In the split injection mode, the residence time of the sample in the injection port is very short because of the high carrier gas flow rate through the injection port liner and out the split vent. As a result, vaporization must be completed as rapidly as possible. However, injection port temperatures must not be so high that they cause sample degradation.

When set up properly, split injections are very reproducible. Samples introduced under constant temperature, pressure, and flow conditions will vaporize and split consistently.

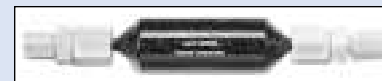
Split injections can be used for both qualitative and quantitative work. Internal or external reference compounds are split under identical conditions compared to analytes in samples. Any variations experienced by the sample also are experienced by the reference compounds when the sample matrix and standard matrix match exactly. In general, split inlet liners are designed to have added surface area to help with sample vaporization. Improved vaporization can be achieved with changes in liner geometry that increase the surface area. Examples include incorporating fused silica or glass wool, CarboFrit™ packing, or using a laminar cup.

**Caution!**

When analyzing hazardous compounds in the split mode, make sure they do not enter the lab atmosphere through the split vent. A small, charcoal-filled split vent trap connected to the split vent protects you from breathing contaminated air (cat. # 20698).

**High-Capacity Split Vent Trap**

- Reduces the release of hazardous materials from the capillary split vent into the lab.
- Lasts one month or 1,500 injections.
- Includes connecting lines and mounting kit.



Description	qty.	cat. #
High-Capacity Split Vent Trap	ea.	20698
High-Capacity Split Vent Trap	5-pk.	20699

For customer service, call  
**800-356-1688, ext. 3**  
 (814-353-1300, ext. 3)  
 or call your local  
 Restek representative.

**Methane Cylinder**

Setting the column flow rate by injecting methane and optimizing linear velocity is a preferred method for establishing reproducible retention times (ASTM Method E1510-93). Measuring the linear velocity of your carrier gas is made easy by using the Scotty® 14 cylinder containing 1% methane in helium. The complete kit includes the Scotty® 14 cylinder, a MINICYL regulator, a syringe adaptor, and a package of twenty septa for the adaptor.

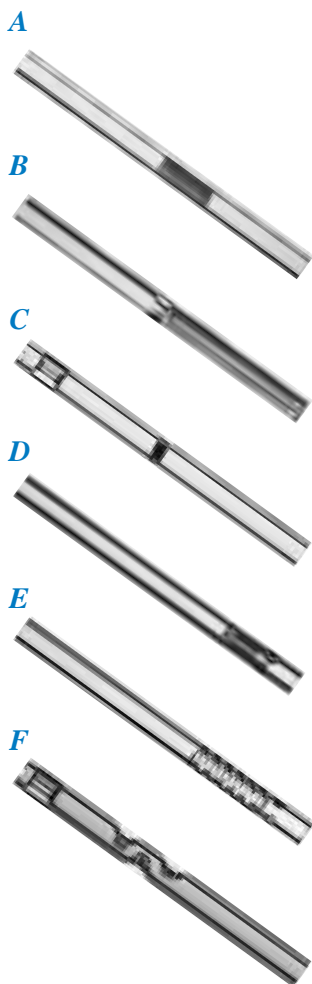
Description	qty.	cat. #
Complete Kit	kit	20197
Replacement Septa	20-pk.	20198
Replacement Cylinder	ea.	20199

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## Inlet Liners for Split Injections

Split liners are designed with mixing chambers and tortuous flow paths, to fully vaporize the sample into a homogeneous vapor cloud before it reaches the split point. All Restek split liners are fully deactivated using a high-temperature silanizing reagent. This caps surface silanol groups so active compounds in the sample do not degrade or adsorb onto the hot glass surface.

To trap non-volatile residue and prevent column contamination when analyzing dirty samples, pack split liners with wool, CarboFrit™ packing, or fused silica beads. Some of the more commonly used inlet liners are described below.



### A) Split Liner with Wool

The wool provides a large surface area to allow rapid vaporization of the sample and deliver a uniform vapor cloud to the split point. The low mass of the wool fiber promotes complete vaporization.

#### Benefits:

- Low cost.
- Reproducible performance.

#### Drawbacks:

- Wool can be adsorptive, especially if fibers are broken.
- High maintenance requirements.

### B) Laminar Cup Splitter

The sample flows through a small opening and encounters the head of the elongated glass cup. It then travels around the outside of the elongated cup before the flow is inverted twice. Larger volume injections are possible because the liquid is trapped at the inner base and cannot escape until vaporized.

#### Benefits:

- Recommended by chromatography expert Dr. Konrad Grob<sup>1</sup>.
- Best splitter liner for high molecular weight compounds.
- Laminar flow profile provides highest resolution.

#### Drawbacks:

- Costly.

### C) Frit Splitter

The sample must pass through the porous ceramic frit. The high surface area and tortuous flow path ensure complete vaporization.

#### Benefits:

- Traps septum particles and residue.

#### Drawbacks:

- Ceramic frit can be active.
- Difficult to clean.

### D) Cup Splitter

The sample flows through a mini funnel and encounters a glass cup. The flow path then inverts twice before reaching the split point.

#### Benefits:

- Tortuous flow path aids in sample vaporization.
- Minimizes molecular weight discrimination.
- Can be packed with wool to trap particles.

#### Drawbacks:

- Difficult to clean.

### E) Cyclosplitter® (Patent #: 5,119,669)

This patented design incorporates a cylindrical glass spiral in the sample pathway, providing a large area for sample vaporization.

#### Benefits:

- Ideal for dirty samples.
- Allows many injections of dirty samples before cleaning is required.
- Easy to clean.

#### Drawbacks:

- Not recommended for large volume injections.

### F) Baffle Splitter

The baffle induces turbulent flow that directs the sample against the wall of the glass liner.

#### Benefits:

- Reproducible performance.

#### Drawbacks:

- Prone to molecular weight discrimination.
- Septum particles and residue can enter column.
- Subject to incomplete vaporization.

all liners are  
**100%**  
deactivated

See page 17.

All Restek liners are deactivated to prevent adsorption of active compounds. Call for information on custom deactivations.

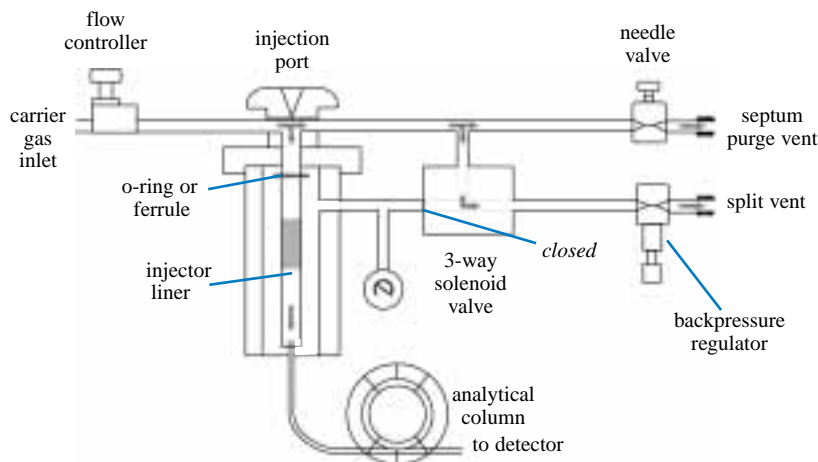
<sup>1</sup>"Injectors Providing Complete Sample Evaporation Above the Column Entrance in Vaporizing GC Injections," K. Grob and C. Wagner, *HRC & CC*, Vol. 16, p. 429.

## Operating in the Splitless Injection Mode

When operating in the splitless injection mode (Figures 3 and 4), the solenoid valve is switched, changing the flow path of the carrier gas. At the beginning of a splitless injection, the solenoid valve is set to prevent the flow of carrier gas from the injection port body through the solenoid valve. When the solenoid valve is in this position, only the column flow moves through the injection port liner. Column flow rate is determined by the pressure of the carrier gas in the injection port as set by the pressure regulator and the analytical column dimensions.

**Figure 3.**

*Splitless injection flowpaths (injector purge off) in a typical flow-controlled/backpressure-regulated system.*

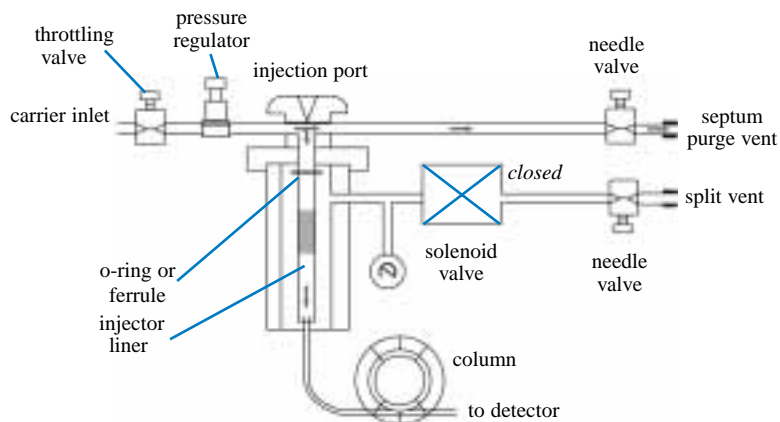


**Figure 3.**

- Solenoid valve closed between injector and split vent: only column flow enters injector; column flow passes into column.
- Needle valve at septum purge vent allows only septum purge flow to exit septum purge vent: most of carrier gas diverted through solenoid valve, out through split vent.
- Sample vapor in injector liner can exit only to column, mixed with column flow of carrier gas.
- Solenoid valve switched to establish flowpaths as in split injection: sample vapor remaining in injection port swept out of split vent.
- Splitless hold time determined by sample composition.

**Figure 4.**

*Splitless injection flowpaths in a typical headpressure-regulated system.*



**Figure 4.**

- Solenoid valve closed: entire carrier gas flow and entire sample directed onto analytical column.
- Carrier gas flow rate into system reduced to enable entire flow to pass through analytical column.

After a carefully determined time (the splitless hold time) the solenoid valve is switched to re-establish the flow paths as used in the split injection mode. This allows any vaporized sample remaining in the injection port to be quickly swept out of the injection port liner through the split vent. A typical splitless hold time is between 60 and 90 seconds. The ideal splitless hold time is long enough to allow most of the vaporized sample in the injection port liner to be transferred to the analytical column. Excessively long splitless hold times can produce tailing peaks and broad peaks. The splitless hold time must be determined through experimentation, and will vary according to sample composition, column length and

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**Table II.** Typical splitless hold times.

Column ID	Hold Time	Column Flow Rate		Sample Transfer Time*	
		He	H <sub>2</sub>	He	H <sub>2</sub>
0.18mm	2 min.	0.3cc/min.	0.6cc/min.	2.7 min.	1.4 min.
0.25mm	1 min.	0.7cc/min.	1.4cc/min.	1.2 min.	0.6 min.
0.32mm	0.75 min.	1.2cc/min.	2.4cc/min.	0.7 min.	0.4 min.
0.53mm	0.5 min.	2.6cc/min.	5.2cc/min.	0.3 min.	0.2 min.

\*2 $\mu$ L of liquid methylene chloride expanded to 0.8mL vapor at 250°C (10psig headpressure).

ID, carrier gas flow rate, and injection port liner configuration. Table II lists approximate splitless hold times for various column IDs when operated with helium or hydrogen. The splitless hold time will decrease as either the column ID or column flow rate increases.

Setting an optimal splitless hold time also is dependent on the choice of sample solvent and the sample size. Use Table III to estimate the volume of vapor produced when using different solvents at different pressures. The volume of vapor cloud formed should be divided by the column flow rate to determine the approximate time needed to keep the solenoid valve closed for complete sample transfer. The calculated splitless hold time also should be evaluated to provide the optimum response for the sample analytes. If the solenoid valve is

**Table III.**  
Solvent expansion volumes.

Solvent	Density (g/mL)	MW	Expansion Volume in $\mu$ L at various column headpressures		
			5psig	10psig	15psig
Heptane	0.68	100	219	174	145
Hexane	0.66	86	245	196	163
Pentane	0.63	72	280	224	186
Toluene	0.87	92	303	242	201
Ethyl acetate	0.90	88	328	261	217
Chloroform	1.49	119	400	319	266
Methylene chloride	1.33	85	500	399	332
Methanol	0.79	32	792	629	525
H <sub>2</sub> O	1.00	18	1776	1418	1179

The expansion volumes were determined using a 1.0 $\mu$ L injection volume, a 250° C injection port temperature, and a headpressure of 5, 10, or 15psig (common operating pressures for 30m columns having IDs of 0.53, 0.32, or 0.25mm, respectively). For 2 $\mu$ L injections, double the expansion volumes.

**Use these formulas to calculate values not listed in Table III:**

$$\text{Expansion volume} = nRT / P$$

n = number of moles of solvent and sample.

$$= [\text{volume (mL)} \times \text{density (g/mL)}] / \text{mol. wt. (g/mole)}$$

R = gas law constant

$$= 82.06 \text{cc atm/mole } ^\circ\text{K}$$

T = absolute temperature of injector (°K)

$$(^\circ\text{K} = ^\circ\text{C} + 273)$$

P = absolute column headpressure = gauge pressure (atm) + 1 atm

$$\text{atm} = \text{psig} \times 0.06804 \text{ atm / psig}$$

$$\text{injector liner volume}^* = \pi r^2 L$$

$$\pi = 3.14$$

r = liner internal radius (cm)

L = liner length (cm)

\*Also use this formula to determine capillary column internal volume.

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opened too quickly, responses will be low. However, if the solenoid valve remains closed too long, the solvent peak will tail and peak resolution will suffer. To help determine the optimal splitless hold time, a series of injections should be made using increasingly longer splitless hold times. When the response for the analytes of interest plateaus, the sample transfer process has been optimized (Figure 5).

Setting the injection port temperature for splitless injections is critical, just as it is for split injections. The injection port temperature must be high enough to completely vaporize the sample, yet not so high that it causes sample degradation. This is especially important because the residence time for a sample in the injection port during splitless injections is longer, compared to split injections.

#### **Solvent Focusing and Analyte Focusing**

The long residence time for samples in the injection port also affects peak shape. In splitless injections, samples are transferred to the head of the column over a longer period of time than in split injections. As a result, initial peak bandwidths can be very broad unless vaporized samples are refocused at the head of the column. Two techniques can be used to refocus vaporized samples at the head of the column: solvent focusing and analyte focusing. The difference between the two methods is the initial temperature of the column oven. For solvent focusing, the initial oven temperature is low enough to allow the solvent to recondense at the head of the column. This forms a zone of liquid solvent that traps all of the vaporized sample analytes in a narrow band at the head of the column. Analyte focusing requires an initial oven temperature that allows the solvent to move through the column as a vapor immediately after injection. Analytes that have a significantly higher boiling point than the solvent are recondensed at the head of the column because of the lower oven temperature.

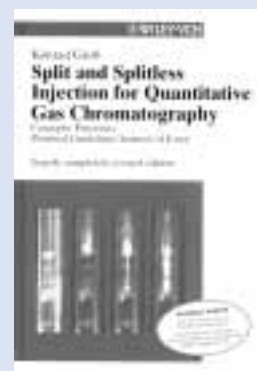
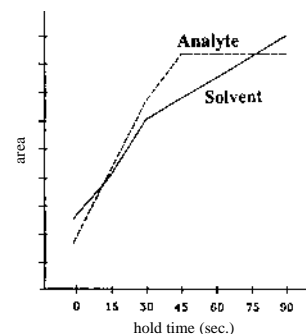
A typical sequence of events for performing a splitless injection using solvent focusing is as follows:

1. Set the initial oven temperature approximately 20°C below the boiling point of the sample solvent.
2. Close the solenoid valve to divert the entire sample onto the head of the column.
3. Inject the sample and hold the oven temperature at the initial temperature to recondense the solvent and focus the sample at the head of the column. The initial oven temperature is typically held for the same amount of time that the solenoid valve is closed.
4. Switch the solenoid valve to open the flow path to the split vent line and rapidly program the oven temperature (10 to 30°C/min.) until the first analyte of interest elutes.
5. Slow the oven program rate to enhance resolution of the remaining analytes of interest.

**Figure 5.**

*Optimization of splitless hold time.*

The splitless hold time is optimized when further increases do not increase analyte response but result in solvent tailing.



#### **Split and Splitless Injection in Capillary GC, 4th Ed.**

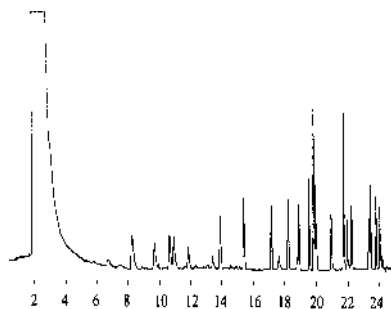
This comprehensive handbook of split and splitless injection techniques has been totally revised and updated, containing information on sample evaporation in the injector, matrix effects, and a new chapter on injector design. It also includes a CD-ROM containing visualization of the evaporation process during split and splitless injection.

*K. Grob, Wiley-VCH, 2001, 460pp., ISBN 3-527-29879-7 cat.# 20451 (ea.)*

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**Figure 6.**

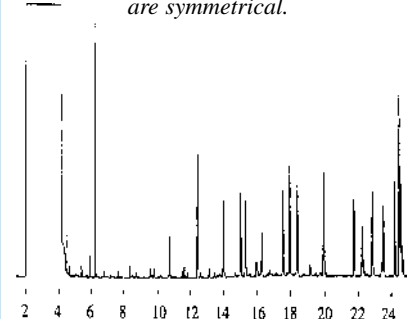
*Initial oven temperature too high for improper solvent focusing: solvent peak and early eluting compounds are tailing.*



30m, 0.25mm ID, 0.25µm Rtx®-5 (cat.# 10223)  
1.0µL splitless injection of a pesticide mix in  
hexane (5ng/µL);  
**Oven temp.:** 150°C to 275°C @ 4°C/min.

**Figure 7.**

*Initial oven temperature at least 20°C below boiling point of earliest eluting analyte: early eluting compounds are symmetrical.*



30m, 0.25mm ID, 0.25µm Rtx®-5 (cat.# 10223)  
1.0µL splitless injection of a pesticide mix in  
hexane (5ng/µL); **Oven temp.:** 40°C to 150°C  
@ 25°C/min. then to 275°C @ 4°C/min.

The sequence of events for analyte focusing is the same, except for the initial oven temperature; instead of starting 20°C below the boiling point of the solvent, the oven temperature is started 60–80°C below the boiling point of the earliest eluting compound.

Figure 6 shows an example of improper solvent focusing. The sample solvent is hexane, which has a boiling point of 69°C. The initial oven temperature is 150°C, or 80°C above the boiling point of hexane. The solvent peak is tailing, and the early-eluting compounds have broad peak shapes and are poorly resolved from one another. Figure 7 illustrates proper solvent focusing. The initial oven temperature, 40°C, is well below the boiling point of hexane. The square solvent peak is a good indicator of proper solvent focusing. Also notice the sharp peak shapes for both early- and late-eluting compounds. When the solvent is not detected or elicits a low response, such as hexane with electron capture detectors (ECDs), the only indication of proper solvent focusing is narrow peaks for early-eluting compounds.

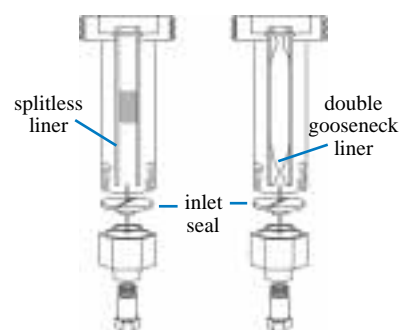
For optimal solvent focusing, choose a solvent that has a boiling point at least 20°C below the boiling point of the earliest eluting target analyte. In some cases, it is not possible to select the perfect solvent to achieve focusing. For example, methylene chloride (boiling point 40°C) is frequently used for splitless work because of sample preparation techniques. Analyses performed with an initial oven temperature of 40°C will not allow the solvent to recondense at the head of the column and will not refocus the sample analytes. Ideally, analysts would start the oven temperature at 20°C when using methylene chloride as the sample solvent, but because this is not practical, they must rely more on analyte focusing to refocus sample analytes at the head of the column.

An important part of solvent focusing is the ability of the solvent to “wet” the stationary phase in the column. Non-polar solvents should be used for splitless injections on non-polar stationary phases (e.g., use hexane or isooctane for injections on Rtx®-1 and Rtx®-5 columns). Non-polar solvents are more soluble in non-polar stationary phases and will form a more efficient zone of recondensed solvent in the column. Polar solvents are not as soluble in non-polar stationary phases and will bead up on the stationary phase rather than forming an even layer of recondensed solvent at the head of the column. Mismatches between the polarity of the solvent and the polarity of the stationary phase can cause band broadening, peak splitting, and poor resolution.

Once again, the same basic procedures are followed for analyte focusing, except the initial oven temperature is 60–80°C below the boiling point of the earliest eluting compound, instead of 20°C below the boiling point of the solvent, as with solvent focusing.

A unique situation with Agilent 5890 and 6890/6850 split/splitless inlets makes a double gooseneck liner highly desirable for samples that contain compounds prone to catalytic degradation through contact with hot metal surfaces. Agilent splitless inlets contain a metal seal at the base of the inlet (just under the liner outlet). Because the column is installed only a few millimeters above the seal surface, the sample contacts the seal while it is being slowly drawn into the column. A double gooseneck inlet liner minimizes contact between the sample and the metal seal. A dirty seal increases the breakdown of endrin (a pesticide prone to decomposition) from 6% to 12.8% in an Agilent 5890 inlet when a 4mm straight inlet liner is installed. However, when a double gooseneck inlet liner is used, the breakdown remains at 2% regardless of whether the seal is clean or dirty. (For more information, see page 24 of this guide for a description of our Vespel® Ring Inlet Seal.)

*Double gooseneck inlet liner minimizes the catalytic effects of sample contact with the metal disk in an Agilent inlet.*



Liner Type	Endrin Breakdown	
	Clean Seal	Dirty Seal
Splitless with Wool	6.0%	12.8%
Double Gooseneck	2.0%	2.4%

## Inlet Liners for Splitless Injections

The residence time of the sample in a splitless liner is between 0.5 and 2 minutes, so splitless inlet liners do not require large surface areas for efficient vaporization (unless you are using a rapid-injecting autosampler). Splitless liners usually are designed as straight tubes. Alternative splitless liner designs, such as gooseneck restrictions, help contain the sample cloud in the injector and minimize the breakdown of compounds sensitive to catalytic decomposition on metal inlet parts. Splitless liners should be packed with wool or fused silica beads to help with vaporization, trap non-volatile residue, and prevent column contamination when analyzing dirty samples. Some of the more commonly used splitless liners are described below.

### A) Straight Tube

Use for samples containing a narrow molecular weight distribution and for those not prone to thermal decomposition. Packing with wool is recommended. Wool aids in vaporization of high molecular weight compounds and minimizes discrimination.

#### Benefits:

- Low cost.

#### Drawbacks:

- Potential decomposition of active compounds such as endrin and phenols when packed with wool.
- Prone to high molecular weight discrimination.
- Sample exposed to metal surface below liner.

### B) Gooseneck

#### C) Recessed Gooseneck

##### Benefits:

- Increases splitless efficiency.
- Decreases breakdown of active compounds such as endrin and DDT.
- Chamber contains sample vaporization cloud.
- Can be packed with wool.

##### Drawbacks:

- No known drawbacks.

### D) Double Gooseneck

#### E) Recessed Double Gooseneck

Best liner for catalytically labile or high molecular weight compounds. Isolates sample from metal injection port parts. Use the cyclo-version for dirty samples.

##### Benefits:

- Highest splitless efficiency.
- Breakdown of active compounds decreased.
- Chamber contains vaporization cloud.

##### Drawbacks:

- Higher cost than straight splitless liners.
- Only recessed double goosenecks can be packed with wool.

**Note:** Recessed gooseneck liners offer the same benefits as single or double gooseneck liners, but the base of the recessed gooseneck can be packed with wool and the liner can be used for dual-column analysis with a two-hole ferrule.

### F) Drilled Uniliner®

This direct injection liner features a hole drilled into the inlet end that reduces sample discrimination, compared to typical splitless injections.

#### Benefits:

- Excellent transfer of analytes to column.
- Decreases injection port discrimination.
- Removes excess solvent vapor.
- Eliminates the need for wool.
- No sample contact with metal parts below liner, less adsorption.

#### Drawbacks:

- Higher amounts of non-volatile materials transferred to column.

### G) 4mm Splitless with Fused Silica Wool

The wool provides a large surface area to allow rapid vaporization of the sample and deliver a uniform vapor cloud to the split point. The low mass of the wool fiber promotes complete vaporization.

#### Benefits:

- Low cost.
- Reproducible performance.

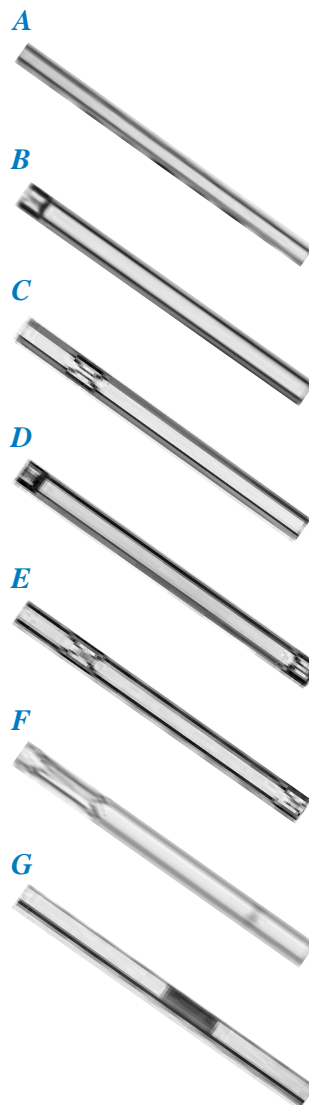
#### Drawbacks:

- Wool can be adsorptive, especially if fibers are broken.
- High maintenance requirements.

all liners are  
**100%**  
deactivated

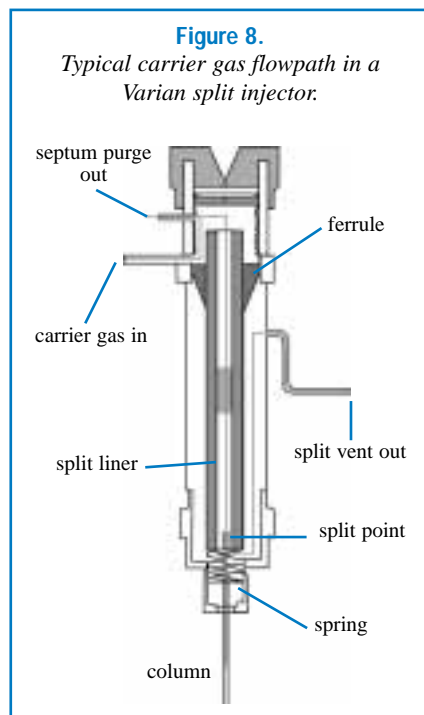
See page 17.

All Restek liners are deactivated to prevent adsorption of active compounds. Call for information on custom deactivations.



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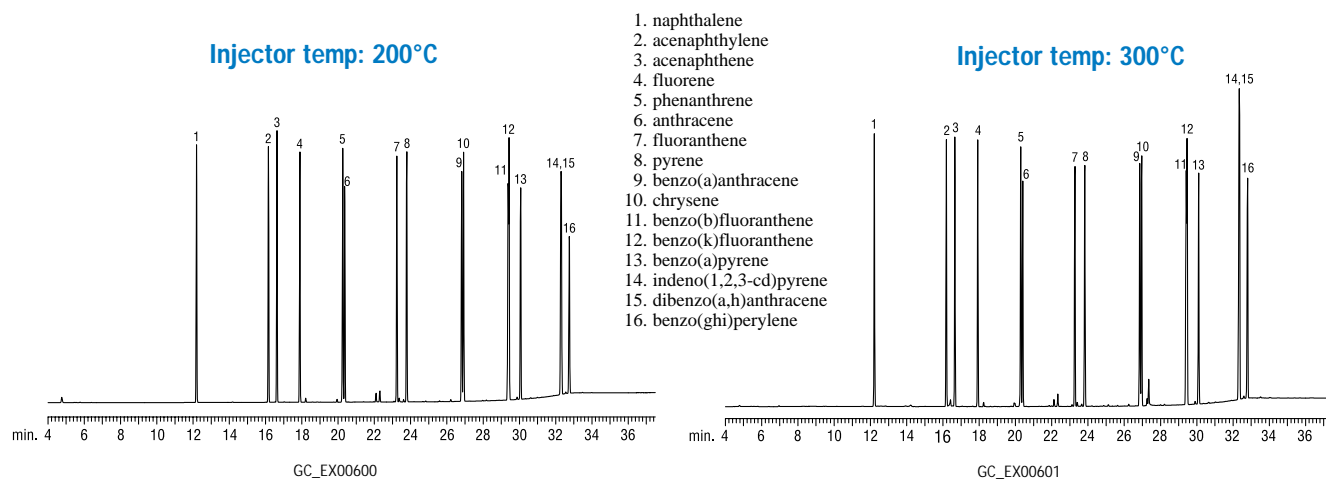
## Septum Purge Optimization



The septum purge (Figure 8) serves two functions: to sweep septum bleed volatiles out of the system and to reduce the potential for sample backflash contaminating the carrier gas inlet line. Optimization of the septum purge flow rate is important, especially when the inlet is operated in the splitless mode. Most GC manufacturers recommend that the septum purge flow rate be set between 3 and 5cc/min. Flow rates exceeding 5cc/min. should not be used because highly volatile sample components could be preferentially purged from the inlet liner buffer volume after vaporization. Flow rates lower than 3cc/min. can allow septum bleed to enter the inlet liner and cause ghost peaks to appear on the chromatogram.

The septum purge flow rate must be readjusted each time the injection pressure is changed by more than 5psig. Most GCs have a low-flow needle valve that makes septum purge adjustments easy.

**Figure 9.**  
*Injector temperature affects the recovery of higher molecular weight compounds.*



Rtx®-5 15m, 0.32mm ID, 1.50µm (cat.# 10266)  
Sample: 50µg/mL PAH standard (cat.#31011 ) in hexane  
Inj.: 1.0µL splitless (hold 2 min.),  
4mm single gooseneck inlet liner w/FSwool (cat.# 22405)  
Inj. temp.: 200°C  
Carrier gas: helium, constant pressure  
Linear velocity: 76cm/sec. @ 40°C  
Oven temp.: 40°C(hold 4min.) to 325°C @10°C/min. (hold 5 min.)  
Det.: FID @350°C

**Figure 10.**

*The Donike Test illustrates the importance of injector temperature when a sample contains thermally labile compounds.*

1. TMS tetracosanoate (thermolabile)
2. *n*-triacontane (stable)
3. TMS hexacosanoate (thermolabile)

15m x 0.32mm ID fused silica coated with 0.25µm bonded methyl silicone  
 Sample: 1µL each of TMS *n*-tetracosanoate, TMS *n*-hexacosanoate, and *n*-triacontane in *n*-nonane at 2ng/µL each component.

GC: 3000 Series Varian gas chromatograph with 1077 split/splitless injector, FID and autosampler.

Split/splitless injector:

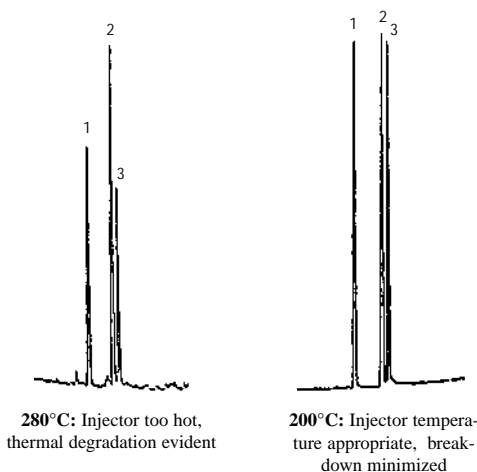
Run 1: SPI held at 280° C

Run 2: SPI held at 200° C

Carrier gas: helium at 47cm/sec.

Oven: 130° to 280° C 20° C/min. (hold 2 min.)

FID: 300° C, 32 x 10<sup>-12</sup>



Chromatograms courtesy of Varian Instrument Co.

## Problems Associated with Split and Splitless Injections

When performed properly, split and splitless injections are easy to automate, produce narrow peaks, and yield consistent run-to-run peak areas. However, split and splitless injections have inherent limitations associated with vaporizing the sample in a hot injection port.

**Thermal Decomposition:** The injection port temperature is a critical factor in optimizing hot vaporization injection techniques. If the injection port temperature is too low, high molecular weight analytes will not vaporize completely and will not be transferred to the head of the column efficiently (as shown by peaks 14, 15 and 16 in Figure 9). If the injection port temperature is too high, thermally labile compounds can break down inside the injection port before reaching the column. Figure 10 shows the effect of temperature on thermally labile TMS derivatives of fatty acids. When the injection port temperature is set at 280°C, the response for the TMS derivatives is reduced. When the injection port temperature is lowered to 200°C, the response for the TMS derivatives is comparable to triacontane at equivalent sample concentrations. Careful optimization of injection port temperatures will maximize sample vaporization while minimizing sample decomposition.

**Active Compounds:** Active compounds can be problematic in split or splitless injections. The high surface area and heat needed to uniformly vaporize the sample can cause these compounds to break down or be adsorbed onto the surface of the injection port liner. Deactivated inlet liners, and Silcosteel®-treated or gold-plated inlet seals can help minimize active sites in the injection port. If tailing peaks and poor response for active compounds cannot be corrected by using properly deactivated inlet liners and treated inlet seals, other injection techniques such as cold on-column or temperature-programmed injections should be considered.

**Molecular Weight Discrimination:** In hot vaporization injections, one injection port temperature is used to vaporize all of the analytes in one sample injection. Compounds spanning a range of molecular weights and boiling points will exhibit differences in response for equal concentrations of analyte. High molecular weight, high boiling point analytes will have a noticeably reduced response when compared to lower molecular weight, lower boiling point analytes. This effect is more pronounced when analyzing samples that have a broad range of molecular weights and boiling points. Samples containing analytes that are more closely grouped by molecular weight and boiling point show less molecular weight discrimination.

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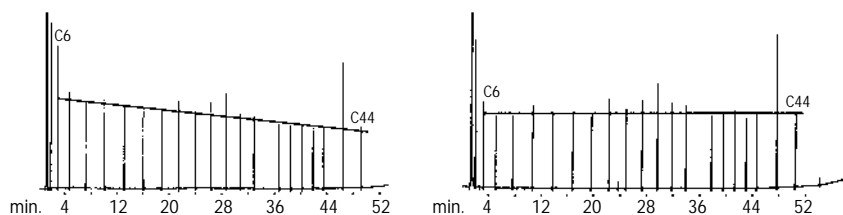
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**Figure 11.***Splitter discrimination typical of split and splitless injections.*

Splitter discrimination is evident from relatively enhanced peak heights for the early-eluting compounds and diminished peak heights for the later-eluting higher molecular weight compounds. The same sample analyzed by cold on-column injection shows no discrimination; the peak heights for low and high molecular weight compounds are truly representative of this sample.



**Discrimination typical of a split or splitless injector. Injector temperature: 340°C**

30m, 0.32mm ID, 0.25µm Rt<sup>®</sup>-1 (cat.# 10124)  
 Inj. volume: 0.2µL  
 On-column conc.: 15ng.  
 Oven temp.: 40°C to 340°C @ 5°C/min.

**Cold on-column injection provides accurate information. Injector temperature: 40°C.**

Det. (FID) temp.: 340°C  
 Linear velocity: 50cm/sec., hydrogen  
 Attenuation: 8x10<sup>-11</sup> AFS

Figure 11 demonstrates the molecular weight discrimination experienced when analyzing a series of hydrocarbons with a broad range of molecular weights (C6 through C44). Alternative injection techniques, such as cold on-column injection, can be used to minimize molecular weight discrimination.

Molecular weight discrimination is usually very repeatable. In split and splitless injections, if the same injection port temperature, carrier gas pressure, sample size and sample solvent are used for every injection, sample vaporization should be a reproducible process. Any molecular weight discrimination experienced should be the same from one injection to the next. Because of this consistency, many analysts choose to ignore molecular weight discrimination unless it compromises overall sensitivity. To help compensate for differences in response due to molecular weight discrimination, multiple internal standards can be used to mimic the range of molecular weights and boiling points for the analytes in the sample.

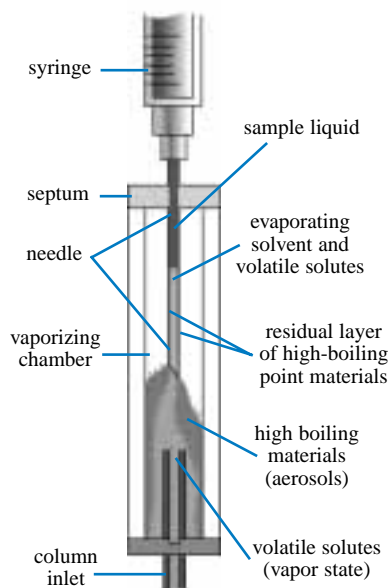
Molecular weight discrimination can be minimized by choosing an injection port liner that ensures the sample is completely and uniformly vaporized. Inadequate vaporization causes the sample to approach the head of the column in both the aerosol and vapor states. Aerosol droplets, consisting predominantly of high molecular weight compounds, can be driven past the head of the column by the momentum of the carrier gas and will be preferentially swept out of the injection port and through the split vent. Injection port liners that are packed with glass wool or that incorporate a flow diverting device within their bore assist in vaporizing the sample and transferring a homogeneous representation to the head of the column.

**Needle Discrimination:** During sample injections, the syringe needle undergoes some degree of heating in the injection port. The temperature reached by the needle can influence the relative response for low and high molecular weight analytes. During the process of expelling the sample from the syringe, the contents in the needle are not completely transferred to the injection port. As the needle begins to heat, low molecular weight analytes begin to vaporize from the needle while higher molecular weight analytes remain inside the needle. Therefore, the lower molecular weight analytes will show enhanced response compared to higher weight analytes (Figure 12). Three techniques can be used to minimize needle discrimination in split and splitless injections.

The first technique is to inject the sample as rapidly as possible. Rapid injections minimize the amount of time the needle spends in the injection port and reduces the amount of heating the needle experiences. When making rapid injections in straight injection port liners for split or splitless analysis, the sample can be propelled beyond the inlet of the column and onto the injector base fitting. Always pack injection port liners with deactivated glass wool or CarboFrit<sup>™</sup> packing, or use a flow diverting device like a laminar cup to assist in sample

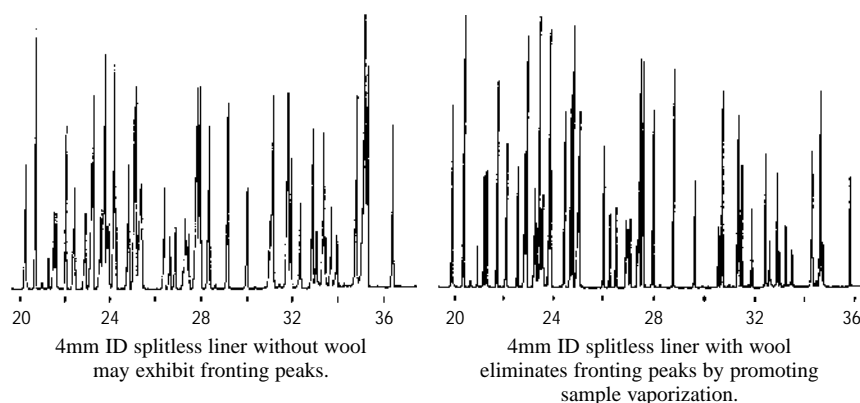
**Figure 12.**

*Factors in discrimination: high molecular weight material clinging to the syringe needle and non-homogeneous vaporization of the sample in the inlet liner.*



**Figure 13.**

*Always pack splitless inlet liners with wool when using rapid injection autosamplers.*



vaporization. Figure 13 shows the improvement in peak shape when an HP autosampler is used with an injection port liner packed with wool, versus a liner without wool.

The second technique is to use hot needle injection. Hot needle injections are performed by drawing the sample all the way into the syringe barrel, leaving the needle empty. When the needle is introduced into the injection port the injection is delayed for a short period of time (3–5 seconds, for example) to allow the needle to heat completely. Then the syringe plunger is depressed and the sample is expelled into the injection port liner.

The third technique is to use a solvent flush with each injection. This technique involves drawing a small amount of solvent into the syringe, followed by a small amount of air, followed by the desired amount of sample. All of the solvent, air, and sample are then drawn into the barrel of the syringe, just as in a hot needle injection. The needle is preheated, as in the hot needle injection, and the contents of the syringe are expelled into the injection port liner. The solvent that was first drawn into the syringe acts to flush the syringe barrel and needle, and completely transfers all of the sample during the injection process.

**Backflash:** Backflash occurs when the volume of the vaporized sample exceeds the volume inside the injection port liner. Most of the excess vaporized sample escapes out the top of the injection port liner. Some of it is swept down the septum purge line. Another portion of it can back up into the carrier gas supply line, and some of it can be re-introduced into the injection port. Backflash can cause poor peak area reproducibility, tailing peaks, split peaks, and poor resolution.

Table III (page 8) shows the estimated expansion volumes for 1 $\mu$ L injections of a variety of solvents. When using an injection port temperature of 250°C and a carrier gas pressure of 10psig, most solvents will vaporize and expand to a volume that exceeds the capacity of a 2mm ID injection port liner (approximately 240 $\mu$ L, see Table IV). In order to minimize backflash, injection port parameters must be carefully optimized. Injection port temperature, carrier gas pressure, sample size, and rate of injection all should be adjusted to ensure the vaporized sample remains inside the liner prior to being transferred to the head of the column.

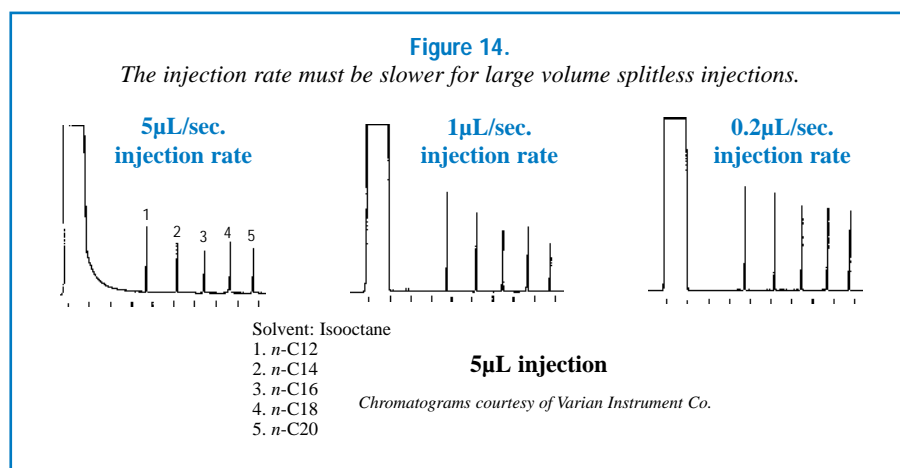
**Sample Size and Injection Port Temperature:** As the equation in Table III shows, the volume of vaporized sample produced is directly related to the size of the liquid sample (n) and the temperature of the injection port (T). A decrease in either of these values will translate into a smaller vaporized sample volume. If the injection port temperature cannot be decreased because of vaporization problems and the sample size cannot be decreased because of sensitivity issues, backflash must be minimized by optimizing the rate of injection or by adjusting the carrier gas pressure.

**Table IV.**  
*Liner Volumes.*

	Theoretical*	Effective
1.0mm ID =	59 $\mu$ L	30 $\mu$ L
2.0mm ID =	236 $\mu$ L	118 $\mu$ L
3.0mm ID =	530 $\mu$ L	265 $\mu$ L
4.0mm ID =	942 $\mu$ L	471 $\mu$ L

*\*Liner volume actually available for vaporization with carrier gas present is  $\leq 1/2$  theoretical, due to the presence of carrier gas in the liner.*

*From Split and Splitless Injection in Capillary GC, 3rd Ed., K. Grob, Wiley-VCH, 2001.*



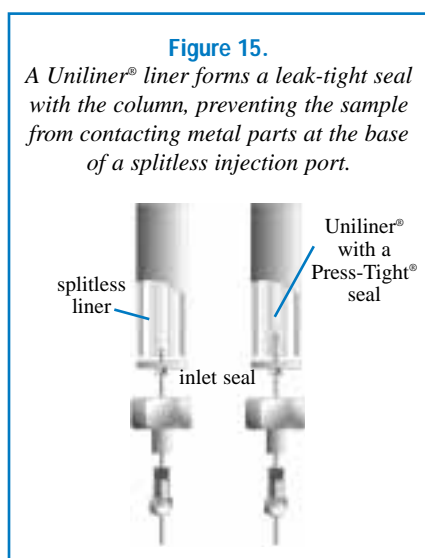
**Optimizing the Rate of Injection:** Figure 14 shows the effect of varying rates of injection for a 5µL sample. When a rapid injection (5µL/sec.) is made, the solvent peak tails and the responses for equal concentrations of each analyte are not reproducible. A 1µL/sec. injection rate improves the solvent peak shape, but the response for each analyte still is not proportional to the concentration of each analyte. Only when the injection rate is slowed to 0.2µL/sec. does the response for each analyte become consistent with the amount injected.

Some autosamplers are capable of slowing the injection rate to minimize backflash, but most autosamplers use a rapid injection sequence. If large-volume injections must be made rapidly, adjustments to the carrier gas pressure must be used to control sample expansion.

**Pressure Programming:** Pressure (P) is in the denominator of the equation in Table III (page 8). Any increase in carrier gas pressure will help to reduce sample expansion volume. Most of the latest models of GCs incorporate electronic pressure control (EPC) of the carrier gas pressure. Pressure can be time-programmed so that the carrier gas pressure initially is very high, then is reduced after the injection to optimize carrier gas flow rate for best resolution. Setting the initial carrier gas pressure to a high value will reduce the amount of sample expansion that occurs at the point of injection and will speed up the transfer of the vaporized sample from the liner to the head of the column.

## Direct Injection as an Alternative to Splitless Injection

Direct injections are an alternative approach for injecting samples with low concentrations of analytes. Direct injections vaporize the entire sample in a heated injection port, just like split and splitless injections. However, in direct injections, there is only one flow path through the injection port. All of the carrier gas is directed into the column and, hence, the entire vaporized sample is directed into the column as well. This can be accomplished by using a specially designed injection port liner. Unliner® injection port liners have an internal taper in one end that allows a direct connection between the liner and the capillary column. With this connection, the flow path from the injection port body through the split vent is blocked and all of the carrier gas flow is directed into the capillary column. Figure 15 illustrates how a Unliner® injection port liner with a Press-Tight® seal forms a leak-free connection between the liner and the column.



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Because all of the carrier gas flow and the entire vaporized sample is directed into the capillary column, direct injections give comparable performance to splitless injections. Faster carrier gas flow rates usually are used to speed up the sample transfer process, and improve peak shapes and resolution. Direct injections can be used as another option to minimize molecular weight discrimination and loss of active compounds.

A Uniliner® inlet liner can be used as a direct replacement for a splitless liner. It can be installed in the same manner as a splitless liner, except that the system must be operated continuously with the solenoid valve closed. Uniliner® inlet liners are designed to accommodate 0.32 or 0.53mm ID columns. Request Restek's *Guide to Direct On-Column Vaporization Injection* (lit. cat.# 59882) for more information on how to perform and optimize direct injections.

#### **Standard Gooseneck Uniliner® Inlet Liner**



The buffer volume chamber contains the sample vaporization cloud and prevents analyte contact with metal injector parts. Peak tailing is reduced and larger injections can be made.

#### **Cyclo-Uniliner® Inlet Liner**



The glass cyclo spiral provides an excellent vaporization surface for high and low molecular weight samples. Particles are trapped on the first turn of the spiral, reducing subsequent residue/sample interaction. In comparison to liners packed with wool, Cyclo-Uniliner® liners accept up to five times as many injections of dirty samples before calibration curves degrade. Because they are deactivated, they are ideal for active samples.

#### **Open-top Uniliner® Inlet Liner**



Open-top Uniliner® liners are ideal for extremely dirty samples because they can be packed with fused silica wool to trap dirt and sample residue. Contaminated wool is easily replaced and the liner can be cleaned with a nylon brush or pipe cleaner.

#### **Drilled Uniliner® Inlet Liner**



A specially modified injection port liner, developed by Restek chemists, reduces sample contact with active metal parts in split/splitless injection ports. The Drilled Uniliner® liner gives the benefits of both direct injection and splitless injection. The column is connected to the liner by a press-fit connection, thus preventing the sample from contacting the metal at the bottom of the injection port. The hole on the side of the liner allows the purge flow to escape from the liner when the injection mode is switched from splitless to split.

## **Deactivation**

#### **Siltek™ Deactivation**

- Revolutionary deactivation lowers endrin breakdown to less than 1%.
- Inertness retained over a wide range of sample pH.
- Minimal bleed.
- Recommended for difficult matrix and reactive compound analysis.
- Ideal for chlorinated pesticide analysis.
- Recommended for use with Rtx®-CLPesticides, Stx-CLPesticides, Stx-IHT, and Rtx®-TNT columns.

#### **Base-Deactivation**

- Provides excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

#### **Intermediate Polarity (IP) Deactivation**

Our standard deactivation for liners. Phenylmethyl-deactivated surface provides optimum compatibility for both polar and non-polar compounds.

In most cases, the standard IP deactivation should be chosen. The IP surface contains methyl groups, as well as phenyl groups, making this surface compatible with most common solvents.

For customer service, call  
**800-356-1688, ext. 3**

(814-353-1300, ext. 3)

or call your local  
Restek representative.

[www.restekcorp.com](http://www.restekcorp.com)

## Guard Columns

**Guard columns protect analytical columns in several ways:**

Guard columns trap non-volatile residues, preventing them from collecting at the analytical column inlet. These residues may be very high molecular weight organic compounds, inorganic salts, or particles. If these contaminants enter the analytical column, they can cause adsorption of active compounds, loss of resolution, and poor peak symmetry. When this contamination begins to affect sample analysis, a small section of the analytical column must be removed to restore proper performance. Each time a column section is removed, retention times change, and some resolution is lost. By using a guard column and removing contaminated loops from it instead of from the analytical column, analytical column length and inertness remain intact.

Guard columns also allow more injections to be made before contamination interferes with analytical results.

Because there is no stationary phase coated on a guard column, the amount of time the sample spends in the guard column is minimal. This reduces the interaction between sample components and contamination from non-volatile residue in the guard column.

For more information on selecting a guard column for your analysis, request our *Fast Facts* GC Capillary Column Guard Columns (lit. cat.# 59319).

## Mini Wool Puller/Inserter

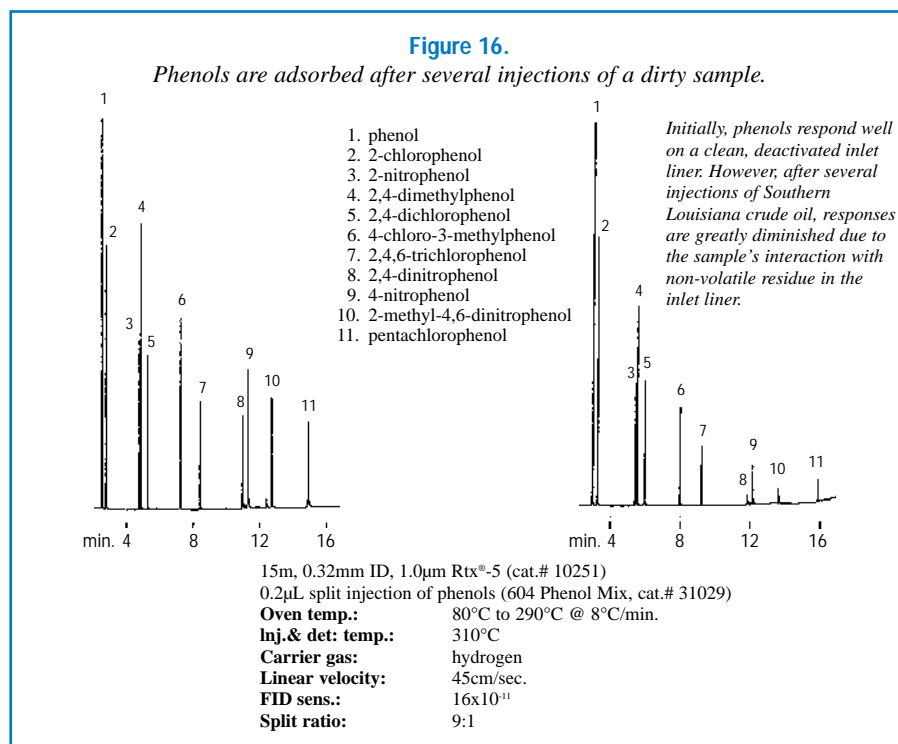
Makes inserting and removing wool easy. Not recommended for double gooseneck liners.



Description	qty.	cat. #
Mini Wool Puller/Inserter	2-pk.	20114

## Hints for Analyzing Dirty Samples

When injecting dirty samples, non-volatile contaminants such as high molecular weight compounds, septum particles, derivatization reagents, salts, and pyrolyzed samples adhere to the interior wall of the injection port liner after the sample solvent and sample analytes have been vaporized. As this layer of residue thickens, it can cause loss of response for active compounds. Figure 16 illustrates this effect when highly active phenols are analyzed on a clean and a dirty inlet liner. In this example, responses are reduced because of adsorptive effects in the liner.



Non-volatile contamination can be trapped in the injection port liner by using a small plug of deactivated fused silica or glass wool. Usually a 1cm plug of wool, positioned in the center of the injection port liner, is sufficient to provide a surface for non-volatile contamination to collect. Some instrument manufacturers provide specific instructions on packing injection port liners to maximize quantitative accuracy and minimize discrimination. If fused silica wool or glass wool is used in an injection port liner, it should be replaced as part of the routine maintenance schedule for the injection port. Regular replacement of the wool in the injection port liner will extend the lifetime of the injection port liner as well as prevent chromatographic problems from extensive non-volatile contaminant build up. When replacing the wool during routine maintenance, minimize handling of the wool by using a wool puller tool (cat.# 20114).

If fused silica or glass wool is not an effective mode of trapping non-volatile contamination under your conditions, injection port liners with a "cyclo" or glass frit design can be used to trap non-volatile contamination. While these types of injection port liners may provide effective trapping of non-volatile contamination, they are harder to clean than straight injection port liners packed with wool.

In the past, some instruments were supplied with injection port liners that were packed with a small amount of packed column packing material. We do not recommend using this type of injection port liner. Diatomites used in packed column GC packings often are active and contain impurities that increase adsorptive effects for active compounds. Also, the stationary phases that are used in these packings can produce significant bleed when used in injection ports at elevated temperatures.

In addition to using a clean and deactivated injection port liner, we recommend using a five-meter deactivated guard column when analyzing dirty samples. Routine maintenance of the liner and the guard column will prevent dirty samples from contaminating the analytical column, and will help ensure reproducible and accurate analytical results.

## Hints for Performing Routine Injection Port Maintenance

Injection port maintenance should be performed prior to installing any capillary column. Maintenance of the injection port after a column is installed should be performed periodically, based on the number of injections made and the cleanliness of the samples. Maintenance includes cleaning, deactivating, or replacing injection port liners, and replacing critical inlet seals and the septum. Review the instrument manual inlet diagram prior to disassembling the inlet.

### Cleaning and Deactivating Injector Liners

For optimum column performance, the injection port liner must be free of septum particles, sample residue, and ferrule fragments. Use a deactivated injection port liner when analyzing samples with compounds that are active or prone to decomposition or adsorption on untreated glass surfaces. Table V illustrates the importance of a deactivated injection port liner when analyzing active compounds. The response factors (RF) for all three of these active compounds were much lower with non-deactivated inlet liners.

**Table V.**

*Deactivated inlet liners show higher response factors for active components.*

Compound	RF Deactivated Liner	RF Undeactivated Liner	RF relative to naphthalene; N=3
2,4-dinitrophenol	0.248	0.185	
pentachlorophenol	0.240	0.188	
benzidine	0.327	0.234	

If the injection port liner is deactivated and is not excessively dirty, cleaning with organic solvents usually is enough to restore original performance. Most organic solvents will not affect the integrity of the surface deactivation. First, remove septum particles that adhere to the inside wall of the injection port liner by rinsing with methanol or isopropanol. Next, use pentane, methylene chloride or toluene to remove sample residue. Do not use laboratory detergents, acids, or bases to clean injection port liners. Harsh cleaning agents will remove or damage the deactivation layer and the liner will require re-deactivation. Nylon brushes and pipe cleaners (cat.# 20108) can be used for mild abrasive cleaning of injection port liners.

### Replacing Critical Seals

Replace critical seals prior to installing an injection port liner (see the instrument manual for seal locations). In most capillary injection ports, an o-ring or ferrule made of rubber or graphite is used to seal the injection port liner into the injection port body. It is critical that the seal fits tightly around the liner, to prevent the carrier gas from leaking around the outside of the liner. Check for leaks with a thermal conductivity-type leak detector (e.g., Leak Detective™ II, cat.# 20413).

### Changing Septa

Always use a high-quality, low-bleed septum. We recommend replacing the septum frequently, to prevent leaks and fragmentation. Multiple injections and continuous exposure to hot injection port surfaces will decompose the septum and cause particles to fall into the injection port liner. Septum particles are a potential source of ghost peaks, loss of inertness, and carrier gas flow occlusion. It is best to install a new septum at the end of an analytical sequence so that it can condition in the injector and reduce the incidence of ghost peaks. To avoid contamination, always use forceps when handling septa. Restek's high quality, low-bleed Thermolite® septa are available for most common models of capillary GCs. For more information, request a copy of Restek's *Guide to Minimizing Septa Problems* (lit. cat.# 59886).

For additional hints for analyzing dirty samples, request a copy of Restek's *A Guide When Injecting Dirty Samples* (lit. cat.# 59881).

## Nylon Tube Brushes and Pipe Cleaner

Use to remove small septum fragments and residue from dirty glass inlet liners. Brushes are 1/8-, 3/16-, and 1/4-inch in diameter; pipe cleaner is one foot long.



Description	qty.	cat.#
Nylon Tube Brushes and Pipe Cleaner	set	20108

## Leak Detective™ II Leak Detector

- Affordable thermal conductivity leak detector—every analyst can have one.\*
- Compact, ergonomic design is easy to hold and operate with one hand.
- Helium, hydrogen, and nitrogen can be detected at  $1 \times 10^{-4}$  cc/sec. or at an absolute concentration as low as 100ppm.\*\*
- Fast results—responds in less than 2 seconds to trace leaks of gases with thermal conductivities different than air.
- Micro-chip design improves sensitivity and response time over previous models.
- Auto zeroing with the touch of a button.
- Battery-operated for increased portability (one 9-volt).



Description	qty.	cat.#
Leak Detective™ II Leak Detector (9 volt, Battery-Operated)	ea.	20413

\*Never use liquid leak detectors on a capillary system because liquids can be drawn into the column.

\*\*Caution: NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks in possibly hazardous conditions.

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featuring  
**Siltek™**  
deactivation

## Siltek™ Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.

Restek offers the next generation of deactivation. The Siltek™ deactivation process (patent pending) produces a highly-inert glass surface, which features high temperature stability, extreme durability, and low bleed. Try Siltek™ liners, guard columns, wool, and connectors for better recovery of sample analytes.

**For Siltek™ inlet liners, add the corresponding suffix number to your liner catalog number.**

qty.	Siltek™	Siltek™ with Siltek™ wool	Siltek™ with CarboFrit™
each	-214.1 addl. cost	-213.1 addl. cost	-216.1 addl. cost
5-pk.	-214.5 addl. cost	-213.5 addl. cost	-216.5 addl. cost
25-pk.	-214.25 addl. cost	-213.25 addl. cost	-216.25 addl. cost

## Deactivation—Which Should You Choose?

### Siltek™ Deactivation

- Revolutionary deactivation lowers endrin breakdown to less than 1%.
- Inertness retained over a wide range of sample pH.
- Minimal bleed.
- Recommended for difficult matrix and reactive compound analysis.
- Ideal for chlorinated pesticide analysis.
- Recommended for use with Rtx®-CLPesticides, Stx-CLPesticides, Stx-1HT, and Rtx®-TNT columns.

### Base-Deactivation

- Provides excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

## Base-Deactivated Inlet Liners for Agilent GCs

If you do not see the deactivated liner you need, you can order it on a custom basis by adding the appropriate suffix number to the liner catalog number. For base deactivation: each (-210.1), 5-pack (-210.5), 25-pack (-210.25). For base-deactivated liners packed with base-deactivated wool: each (-211.1), 5-pack (-211.5), 25-pack (-211.25).

ea.	5-pk.	25-pk.
	<b>4mm Split Straight w/ Wool</b>	
20781-211.1	20782-211.5	20783-211.25
	<b>Cycloplitter®</b>	
20706-210.1	20707-210.5	—
	<b>4mm Splitless Straight</b>	
20772-210.1	20773-210.5	20774-210.25
	<b>2mm Gooseneck</b>	
20795-210.1	20796-210.5	20797-210.25
	<b>4mm Gooseneck</b>	
20798-210.1	20799-210.5	20800-210.25

## Prepacked Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

Prepacked Inlet Liners Suffix Numbers				
qty.	FS Wool	FS Beads	Glass Wool	CarboFrit™†
ea.	-200.1	-201.1	-202.1	-209.1
5-pk.	-200.5	-201.5	-202.5	-209.5
25-pk.	-200.25	-201.25	-202.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.



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[www.chromtech.net.au](http://www.chromtech.net.au) E-mail : [info@chromtech.net.au](mailto:info@chromtech.net.au) Tel : +61 3 9762 2034 Fax : +61 3 9761 1169

## Liners for Agilent/Finnigan GCs

deactivated

Splitless Liners  
for Agilent/Finnigan GCs

Benefits/Uses:


ID\*\*/OD &  
Length (mm)

Similar to  
Agilent part #

ea.

cat.#  
5-pk.

25-pk.



2mm Splitless

trace samples <2µL


2.0 ID  
6.5 OD x 78.5

18740-80220  
5181-8818

20712

20713

20714



4mm Splitless

trace samples >2µL


4.0 ID  
6.5 OD x 78.5

19251-60540

20772

20773

20774



featuring  
**Siltek™**  
deactivation

Siltek™ 4mm Splitless

trace samples >2µL


4.0 ID  
6.5 OD x 78.5

19251-60540

20772-214.1

20773-214.5

20774-214.25



4mm Splitless w/ FS Wool

trace samples >2µL


4.0 ID  
6.5 OD x 78.5

19251-60540

22400

22401

22402



2mm Splitless (quartz)

trace samples <2µL

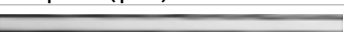
2.0 ID  
6.5 OD x 78.5

18740-80220  
5181-8818

20914

20915

-



4mm Splitless (quartz)

trace samples >2µL

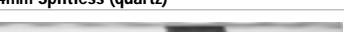
4.0 ID  
6.5 OD x 78.5

18740-80220  
5181-8818

20912

20913

-



4mm Splitless (quartz) w/ FS Wool

trace samples >2µL

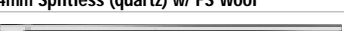
4.0 ID  
6.5 OD x 78.5

18740-80220  
5181-8818

22403

22404

-



Gooseneck Splitless (2mm)

trace samples <2µL

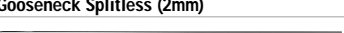
2.0 ID  
6.5 OD x 78.5

5181-3316\*\*\*

20795

20796

20797



featuring  
**Siltek™**  
deactivation

Siltek™ Gooseneck Splitless (2mm)

trace samples <2µL

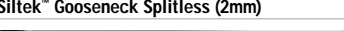
2.0 ID  
6.5 OD x 78.5

5181-3316\*\*\*

20795-214.1

20796-214.5

20797-214.25



Gooseneck Splitless (4mm)†

trace samples >2µL

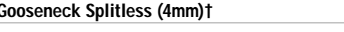
4.0 ID  
6.5 OD x 78.5

5181-3316

20798

20799

20800



featuring  
**Siltek™**  
deactivation

Siltek™ Gooseneck Splitless (4mm)†

trace samples >2µL


4.0 ID  
6.5 OD x 78.5

5181-3316

20798-214.1

20799-214.5

20800-214.25



Gooseneck Splitless (4mm) w/ FS Wool†

trace samples >2µL


4.0 ID  
6.5 OD x 78.5

5062-3587

22405

22406

22407



featuring  
**Siltek™**  
deactivation

Siltek™ Gooseneck Splitless (4mm) w/ Siltek™ Glass Wool†

trace samples >2µL


4.0 ID  
6.5 OD x 78.5

5062-3587

22405-213.1

22406-213.5

22407-213.25



Double Gooseneck Splitless (4mm)

trace, active samples >2µL


4.0 ID  
6.5 OD x 78.5

5181-3315

20784

20785

20786



featuring  
**Siltek™**  
deactivation

Siltek™ Double Gooseneck Splitless (4mm)

trace, active samples >2µL


4.0 ID  
6.5 OD x 78.5

5181-3315

20784-214.1

20785-214.5

20786-214.25



Cyclo Double Gooseneck (2mm)

trace, active, dirty samples <2µL

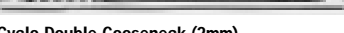
2.0 ID  
6.5 OD x 78.5

-

20907

20908

-



Cyclo Double Gooseneck (4mm)

trace, active, dirty samples >2µL


4.0 ID  
6.5 OD x 78.5

-

20895

20896

20997



featuring  
**Siltek™**  
deactivation

Siltek™ Cyclo Double Gooseneck (4mm)

trace, active, dirty samples >2µL


4.0 ID  
6.5 OD x 78.5

-

20895-214.1

20896-214.5

20997-214.25



Recessed Gooseneck (2mm)\*

base easily packs with wool for dirty samples <2µL


2.0 ID  
6.5 OD x 78.5

-

20980

20981

20982



Recessed Gooseneck (4mm)\*

base easily packs with wool for dirty samples >2µL


4.0 ID  
6.5 OD x 78.5

-

20983

20984

20985



featuring  
**Siltek™**  
deactivation

Siltek™ Recessed Gooseneck (4mm)\*

base easily packs with wool for dirty samples >2µL


4.0 ID  
6.5 OD x 78.5

-

20983-214.1

20984-214.5

20985-214.25



Recessed Gooseneck (4mm)\* w/ FS Wool

base easily packs with wool for dirty samples > 2µL


4.0 ID  
6.5 OD x 78.5

-

22408

22409

22410



Recessed Double Gooseneck (4mm)\*

base easily packs with wool for dirty, active samples > 2µL

4.0 ID  
6.5 OD x 78.5

-

20986

20987

20988

*\*Use with two-hole ferrule for dual-column analysis.*

**\*\*Nominal ID at syringe needle expulsion point.**

**\*\*\*Restek design changes improve performance over the original Agilent liner.**





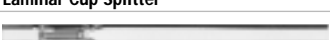


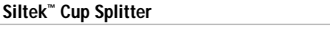








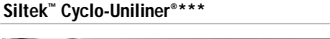



†Use this liner for increased sensitivity.

**www.restekcorp.com**

all liners are  
**100%**  
deactivated

## Liners for Agilent/Finnigan GCs

C O L U M N S T A L L S T H I S E N D

Split Liners for Agilent/Finnigan GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Agilent part#	ea.	cat.# 5-pk.	25-pk.
	1mm Split†	for purge & trap inlet splitting or sample <1µL	1.0 ID 6.3 OD x 78.5	–	20972	20973	–
	4mm Split with Wool*	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	19251-60540	20781	20782	20783
	Siltek™ 4mm Split w/ Siltek™ Glass Wool	featuring Siltek™ deactivation universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	19251-60540	20781-213.1	20782-213.5	20783-213.25
	Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 78.5	18740-80190	20801	20802	–
	mini-Lam™ Split	high MW compounds	4.0 ID 6.3 OD x 78.5	–	20990	20991	–
	Cup Splitter	high & low MW compounds	4.0 ID 6.3 OD x 78.5	18740-80190	20709	20710	–
	Siltek™ Cup Splitter	featuring Siltek™ deactivation high & low MW compounds	4.0 ID 6.3 OD x 78.5	18740-80190	20709-214.1	20710-214.5	–
	Cycloplitter®	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 78.5	–	20706	20707	20708
	4mm Split Precision Liner	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	–	21022	21023	20979
	Siltek™ 4mm Split Precision Liner w/ Siltek™ Glass Wool	featuring Siltek™ deactivation dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	–	21022-213.1	21023-213.5	20979-213.25
Split/Splitless Liners for Agilent 6890 GCs		Benefits/Uses	ID**/OD & Length (mm)	Similar to Agilent part #	cat.# ea.	cat.# 5-pk.	
	Low Pressure Drop Liner w/ Wool	universal, use with Agilent 6890 GCs	4.0 ID 6.3 OD x 78.5	5183-4647	21032	21033	
DI Liners for Agilent/Finnigan GCs (For 0.32/0.53mm ID Columns)		Benefits/Uses:	ID**/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
	Siltek™ 1mm Uniliner****	featuring Siltek™ deactivation trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052-214.1	21053-214.5	
	Uniliner****	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20335	20336	
	Siltek™ Uniliner****	featuring Siltek™ deactivation trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20335-214.1	20336-214.5	
	Cyclo-Uniliner****	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337	20338	
	Siltek™ Cyclo-Uniliner****	featuring Siltek™ deactivation trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337-214.1	20338-214.5	
	Open-top Uniliner® with Wool***	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20843	20844	
DI Liners for Agilent 5890 & 6890 GCs (For 0.25/0.32/0.53mm ID Columns)		Benefits/Uses:	ID**/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
	Drilled Uniliner®	Hole makes direct injection possible with EPC- equipped Agilent 6890 GCs!	allows direct injection when using an EPC-equipped GC		4.0 ID 6.3 OD x 78.5	21054	21055
	Siltek™ Drilled Uniliner®	featuring Siltek™ deactivation allows direct injection when using an EPC-equipped GC	allows direct injection when using an EPC-equipped GC		4.0 ID 6.3 OD x 78.5	21054-214.1	21055-214.5
	Siltek™ 1mm Drilled Uniliner®	featuring Siltek™ deactivation allows direct injection when using an EPC-equipped GC	allows direct injection when using an EPC-equipped GC		1.0 ID 6.3 OD x 78.5	21390-214.1	21391-214.5

\*Use with two-hole ferrule for dual-column analysis.

\*\*Nominal ID at syringe needle expulsion point.

\*\*\*Restek design changes improve performance over the original Agilent liner.

†Use this liner for increased sensitivity.

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## O-Rings

### Viton® O-Rings

- For Agilent and PE AutoSys GCs.
- Viton® O-rings fit split (6.3mm OD) or splitless (6.5mm OD) liners.
- Graphite O-rings have excellent thermal stability.

Description	Max. temp.	Similar to Agilent part #	qty.	Restek cat.#
Viton® (fluorocarbon) O-rings	350°C	5180-4182	25-pk.	20377



### Graphite O-Rings

- For Agilent and Varian 1177 GCs.
- Excellent thermal stability at injection port temperature up to 450°C!

Description	Max. temp.	Similar to Agilent part #	Restek cat.#
6.35mm ID Graphite O-rings for split liners	450°C	5180-4168	10-pk. 20296 50-pk. 20297
6.5mm ID Graphite O-rings for splitless liners	450°C	5180-4173	10-pk. 20298 50-pk. 20299



### High-Temperature O-Rings

- Stable to 400°C.
- Will not crack or melt.
- Softer and easier to use than graphite.

Description	Max. temp.	qty.	cat.#
High-temperature O-rings	400°C	5-pk.	20437



## Inlet and FID Maintenance Kits for Agilent GCs

- Kits include the most common consumable supplies.
- All parts meet or exceed instrument manufacturer's specifications.
- Includes parts list that makes reordering easy.

#### Inlet kits include:

- 0.4, 0.5, and 0.8mm ID graphite ferrules.
- Viton® o-rings.
- Capillary nuts.
- Inlet seals.
- Reducing nut.
- Scoring wafer.
- 11mm Thermolite® septa.
- 4.0mm single gooseneck liner.
- 4.0mm split liner with wool.
- Capillary column caps.
- 1/4- to 5/16-inch wrench.
- Septum puller.
- Installation gauge.
- Wire cleaning brush.
- Jet reamers/ferrule removers.
- Inlet liner removal tool.

#### FID kits include:

- 1/4-Inch, 0.4, 0.5, and 0.8mm ID graphite
- FID/NPD capillary adaptor.
- Capillary nuts.
- Jet reamers/ferrule removers.
- 1/4-Inch nut.
- Scoring wafer.
- Capillary column caps.
- Ignitor for either Agilent 5890 or 6890/€
- FID flow measuring adaptor.
- 1/4- to 5/16-inch wrench.
- Installation gauge.
- Wire cleaning brush.
- High-performance Silcosteel®-treated FID jet for either Agilent 5890 or 6890/6850 GCs.
- 1/4-Inch nut driver for jet removal.



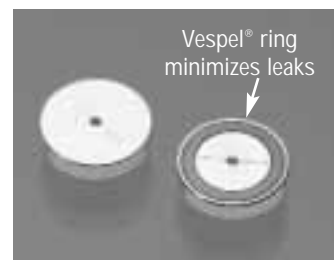
Description	qty.	cat.#
Inlet Maintenance Kit for Agilent 5890/6890/6850 GCs	kit	21069
FID Maintenance Kit for Agilent 5890 GCs	kit	21070
FID Maintenance Kit for Agilent 6890/6850 GCs	kit	21071

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## Vespel® Ring Inlet Seals for Agilent 5890/6890 and 6850 GCs

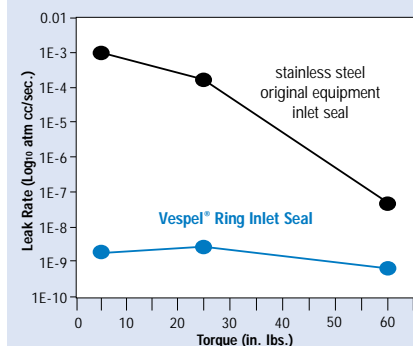
- Easy-to-use, patent-pending design makes a better seal, easily.
- Prevents oxygen from damaging your columns.
- Reduces wear on the injection port body.

In Agilent split/splitless injection ports, it can be difficult to make and maintain a good seal with a conventional metal inlet disk. The metal-to-metal seal dictates that the analyst apply considerable torque to the reducing nut, and, based on our testing, this does not ensure a leak-tight seal. Over the course of oven temperature cycling, metal seals are prone to leaks, which ultimately can degrade the capillary column, and cause other analytical difficulties.



**Figure 1**

*The Vespel® Ring Inlet Seal achieves leak-tight seals even at low torque, reducing the chance of leaks.*



Our Vespel® Ring Inlet Seal greatly improves injection port performance—it seals even after repeated temperature cycles and without retightening the reducing nut! This seal features a Vespel® ring embedded into its face. This soft Vespel® ring will not harm the critical seal on the injector body, and is outside the sample flow path. Tests using a high sensitivity helium leak detector indicate the Vespel® Ring Inlet Seal seals equally effectively at torques of 5lb. or 60lb. (Figure 1).

Why trust a metal-to-metal seal when you can make leak-tight seals quickly and easily—and more reliably—with the Restek Vespel® Ring Inlet Seal? Use the stainless steel seal for analysis of unreactive compounds. To reduce breakdown and adsorption of active compounds, use the gold-plated or Silcosteel®-treated seals. The gold surface offers better inertness than standard stainless steel; Silcosteel® treatment provides inertness similar to that of fused silica capillary columns.

## Vespel® Ring Inlet Seals for Agilent 5890/6890/6850 GCs

0.8mm ID Vespel® Ring Inlet Seal (washers included)	2-pk.	10-pk.
Gold-Plated	21562	21563
Silcosteel®	21564	21565
Stainless Steel	21560	21561
1.2mm ID Vespel® Ring Inlet Seal (washers included)	2-pk.	10-pk.
Gold-Plated	21568	21569
Silcosteel®	21570	21571
Stainless Steel	21566	21567



**Achieve a better seal!**

## Re-Threading Tool

- Repair worn or damaged threads.
- Multiple uses (injection ports, fittings, etc.).
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction.
- 3) Unscrew the tool and inspect the threads, repeat as necessary, and, when done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Re-threading Tool for 1/8" compression fitting for Agilent split/splitless injection ports	ea.	23018

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## Replacement Inlet Seals

- Special grade of stainless steel that is softer and deforms more easily, ensuring a completely leak-free seal.
- Increases column lifetime because oxygen cannot permeate into the carrier gas.
- Reduced noise benefits high-sensitivity detectors (e.g., ECDs, MSDs).
- Silcosteel® seal offers the inertness of glass.
- All seals include washers.

### Replacement Inlet Seals for Agilent 5890/6890/6850 Split/Splitless Injection Ports

The inlet seal at the base of the Agilent 5890/6890 GC injection port contacts the sample and must be changed frequently to prevent adsorption of active compounds. In addition, septum fragments and sample residue accumulate on the disk surface, requiring disk replacement.

The inlet seal design increases column lifetime because oxygen cannot permeate into the carrier gas. Detector noise also is reduced with high-sensitivity detectors (e.g., ECDs or MSDs). To reduce breakdown and adsorption of active compounds, use the gold-plated or Silcosteel® seals. The gold surface offers better inertness than standard stainless steel, and the Silcosteel® treatment offers inertness similar to that of fused silica capillary columns.

Single-Column Installation, Opening Size 0.8mm ID*		0.25/0.32mm ID Dual-Column Installation, Opening Size 1.2mm ID		0.53mm ID Dual-Column Installation Opening Size (1/16-inch hole)	
2-pk.	10-pk.	2-pk.	10-pk.	2-pk.	10-pk.
<b>Stainless Steel Inlet Seal</b>					
21315	21316	20390	20391	20392	20393
<b>Gold-Plated Inlet Seal</b>					
21317	21318	21305	21306	—	—
<b>Silcosteel® Inlet Seal</b>					
21319	21320	21307	21308	—	—

\*0.8mm ID stainless steel inlet seal is equivalent to Agilent part #18740-20880,  
0.8mm ID gold-plated inlet seal is equivalent to Agilent part #18740-20885.



## Replacement Inlet Cross-Disk Seal for Agilent GCs

- Ideal for high-flow split applications on Agilent 5890 GCs.
- All seals include washers.

(Similar to Agilent part # 5182-9652.)




















0.8mm ID Cross-Disk Inlet Seal for Agilent GCs		2-pk.	10-pk.
Gold-Plated		20477	20476
Silcosteel®		20475	20474
1.2mm ID Cross-Disk Inlet Seal for Agilent GCs		2-pk.	10-pk.
Gold-Plated		21009	21010
Silcosteel®		21011	21012



all liners are  
**100%**  
deactivated

## Liners for Varian GCs

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Splitless Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	2mm Splitless	trace samples <2µL	2.0 ID 6.3 OD x 74	01-900109-05	20721	20722	20723
	4mm Splitless	trace samples >2µL	4.0 ID 6.3 OD x 74	01-900109-05	20904	20905	20906
	Double Gooseneck	trace, active samples up to 4µL	4.0 ID 6.3 OD x 74	-	20847	20848	20849
	Cyclo Double Gooseneck	trace, dirty, active samples up to 4µL	4.0 ID 6.3 OD x 74	-	20897	20898	-
Split Liners for 1075/1077 Varian GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap inlet splitting or samples <1µL	1.0 ID 6.3 OD x 72	-	20970	20971	-
	Splitter with Wool*	universal, use with rapid autosamplers	4.0 ID 6.3 OD x 72	01-900109-01	20792	20793	20794
	Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 72	01-900109-02	20803	20804	-
	Cup Splitter	high & low MW compounds	4.0 ID 6.3 OD x 72	-	20724	20725	-
	Cyclosplitter*	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 72	-	20727	20728	-
	Frit Splitter	dirty samples, non-active compounds	4.0 ID 6.3 OD x 72	01-900109-03	20715	20716	20717
	Baffle Splitter	close boiling compounds	4.0 ID 6.3 OD x 72	01-900109-04	20718	20719	20720
	Split Precision™ Liner	dirty samples, active samples	4.0 ID 6.3 OD x 72	-	21030	21031	-
DI Liners for Varian 1075/1077 GCs (0.32/0.53mm ID)		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	Uniliner®	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	-	20345	20346	-
	Cyclo-Uniliner®	trace, dirty, high MW, active samples, linearity	4.0 ID 6.3 OD x 72	-	20347	20348	-
	Open-top Uniliner® with Wool*	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	-	20845	20846	-
SPI Liners for Varian GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	01-900109-06	20775	20776	20777
	Siltek™ 0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	01-900109-06	20775-214.1	20776-214.5	20777-214.25
	0.8mm SPI	high linearity for 0.53mm ID columns	0.80 ID 4.6 OD x 54	01-900109-07	20778	20779	20780
	SPI with Buffer	dirty samples >1µL, fits 0.25, 0.32 & 0.53mm ID columns	2.4 ID 4.6 OD x 54	01-900109-08	20850	20851	20852

featuring  
**Siltek™**  
deactivation




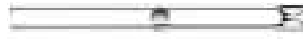
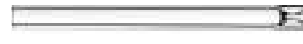



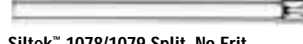

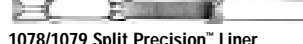
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\*Prepacked with fused silica wool. For glass wool instead, add the suffix "-202" to the liner catalog number.  
\*\*Nominal ID at syringe needle expulsion point.

all liners are  
**100%**  
deactivated

## Liners for Varian GCs

COLUMN INSTALLS THIS END

Liners for Varian 1177 GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	4mm Split	universal	4.0 ID 6.3 OD x 78.5	39-26119-36	21045	21046	-
	2mm Splitless w/wool*	trace samples <2µL	2.0 ID 6.5 OD x 78.5	39-26119-38	-	21077	-
	4mm Split w/wool*	universal	4.0 ID 6.3 OD x 78.5	39-26119-37	-	21079	-
1078/1079 Liners for Varian GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	1078/1079 Split	dirty samples, non-active compounds	3.4 ID 5.0 OD x 54	03-918464-00	21708	21709	-
	1078/1079 Splitless	trace samples <2µL	2.0 ID 5.0 OD x 54	03-918466-00	21711	21712	-
	Siltek™ 1078/1079 Splitless	trace samples <2µL	2.0 ID 5.0 OD x 54	03-918466-00	21711-214.1	21712-214.5	-
	Open 0.5mm ID	trace samples <1µL	0.5 ID 5.0 OD x 54	03-925331-00	20992	20993	-
	1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	03-918464-00	20859	20901	20909
	Siltek™ 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	03-918464-00	20859-214.1	20901-214.5	20909-214.25
	Open 0.75mm ID	trace, low volume samples	0.75 ID 5.0 OD x 54	03-925330-00	21714	21715	21716
	1078/1079 Split Precision™ Liner	trace samples, dirty samples	3.4 ID 5.0 OD x 54	-	21024	21025	-

\*Packed with fused silica wool. For glass wool instead, add the suffix "-202" to the liner catalog number.

\*\*Nominal ID at syringe needle expulsion point.

## Inlet Liner Seals for Varian 1177 Injectors

Meets original equipment specifications.

(Similar to Varian part # 39-26119-40.)

Description	qty.	cat.#
Inlet Liner Seals for Varian 1177 Injectors	10-pk.	20298

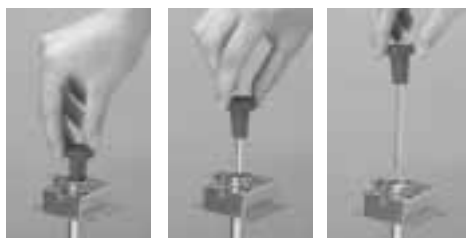
## 5mm Liner Seals for Varian 1078/1079 GCs

Description	qty.	cat.#
5mm Liner Seals for Varian 1078/1079 GCs	10-pk.	22683

## Inlet Liner Removal Tool

- Easily remove liners from injectors.
- Made from high-temperature silicone.
- Won't chip or crack the liner.

Description	qty.	cat.#
Inlet Liner Removal Tool	3-pk.	20181







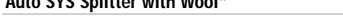




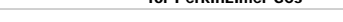




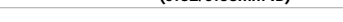


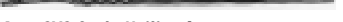

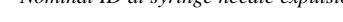
*No more burned fingers!*

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deactivated

## Liners for PerkinElmer GCs

C O L U M N S T A L L S T H I S E N D

Split Liners for PerkinElmer GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
	<b>Baffle Splitter</b>	universal, for most common analyses	3.5 ID 5.0 OD x 100	0330-5181	20736	20737	-
	<b>Cup Splitter</b>	high & low MW compounds	3.5 ID 5.0 OD x 100	-	20739	20740	-
	<b>Cyclo splitter®</b>	dirty samples, max. injections before cleaning required	3.5 ID 5.0 OD x 100	-	20745	20746	-
	<b>Laminar Cup Splitter</b>	high MW compounds	3.5 ID 5.0 OD x 100	-	20805	20806	-
	<b>Auto SYS Splitter with Wool*</b>	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6101052	20832	20833	20834
	<b>Siltek™ Auto SYS Splitter w/ Siltek™ Glass Wool</b> <small>featuring Siltek™ deactivation</small>	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6101052	20832-213.1	20833-213.5	20834-213.25
	<b>Auto SYS Cup Splitter</b>	high & low MW compounds	4.0 ID 6.2 OD x 92.1	-	20835	20836	-
	<b>Auto SYS Cyclo splitter®</b>	dirty samples, max. injections before cleaning required	4.0 ID 6.2 OD x 92.1	-	20910	20911	-
	<b>Auto SYS Laminar Cup Splitter</b>	high MW compounds	4.0 ID 6.2 OD x 92.1	-	20827	20828	-
	<b>Auto SYS Split Precision™ Liner</b>	dirty samples, trace samples	4.0 ID 6.2 OD x 92.1	-	21026	21027	-
Splitless Liners for PerkinElmer GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
	<b>Splitless (2mm ID)</b>	trace samples	2.0 ID 5.0 OD x 100	0330-5180	20730	20731	20732
	<b>Auto SYS Splitless w/Wool (2mm ID)*</b>	trace samples	2.0 ID 6.2 OD x 92.1	N6101372	20829	20830	20831
	<b>Siltek™ Auto SYS Splitless w/Siltek Glass Wool (2mm ID)</b> <small>featuring Siltek™ deactivation</small>	trace samples	2.0 ID 6.2 OD x 92.1	N6101372	20829-213.1	20830-213.5	20831-213.25
	<b>Auto SYS Double Gooseneck</b>	trace, active samples up to 4µL	4.0 ID 6.2 OD x 92.1	-	20853	20854	-
	<b>Auto SYS Cyclo Double Gooseneck</b>	trace, dirty, active samples, up to 4µL	4.0 ID 6.2 OD x 92.1	-	20899	20900	-
DI Liners for PerkinElmer GCs (0.32/0.53mm ID)		Benefits/Uses:	ID**/OD & Length (mm)	Similar to PE part#	ea.	cat.# 5-pk.	25-pk.
	<b>Uniliner®</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 100	-	20855	20856	-
	<b>Cyclo-Uniliner®</b>	trace, dirty, active samples, high linearity	3.5 ID 5.0 OD x 100	-	20857	20858	-
	<b>Auto SYS Open-top Uniliner® w/Wool*</b>	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	-	20837	20838	-
	<b>Auto SYS Cyclo-Uniliner®</b>	trace, dirty, high MW active samples, high linearity	4.0 ID 6.2 OD x 92.1	-	20839	20840	-
	<b>Auto SYS Drilled Uniliner®</b>	allows direct injection when using an EPC-equipped GC	4.0 ID 6.2 OD x 92.1	-	20819	20822	-

\*Packed with fused silica wool. For glass wool instead, add the suffix "-202" to the liner catalog number.














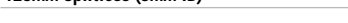



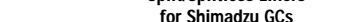


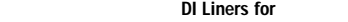
\*\*Nominal ID at syringe needle expulsion point.

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## Liners for Shimadzu GCs

E N D E S T A L L S I N N M U L T I C O L U M N

Split Liners for Shimadzu GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	17A 1mm Split	purge & trap & fast GC	1.0 ID 5.0 OD x 95	-	20976	20977	20978
	128mm Split	universal, for most common analyses	3.5 ID 5.0 OD x 128	221-25822-01	20751	20752	20753
	128mm Cycloplitter®	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 128	-	20754	20755	-
	128mm Cup Splitter	high & low MW compounds	3.5 ID 5.0 OD x 128	-	20757	20758	-
	128mm Laminar Cup Splitter	high MW compounds	3.5 ID 5.0 OD x 128	-	20807	20808	-
	99mm Split	universal, for most common analyses	3.5 ID 5.0 OD x 99	221-32544-01	20860	20861	20862
	99mm Cycloplitter®	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 99	-	20870	20871	-
	99mm Cup Splitter	high MW compounds	3.5 ID 5.0 OD x 99	-	20866	20867	-
	99mm Laminar Cup Splitter	high MW compounds	3.5 ID 5.0 OD x 99	-	20868	20869	-
	17A Split Precision™ Liner	trace samples, dirty samples	3.5 ID 5.0 OD x 95	-	21020	21021	-
Splitless Liners for Shimadzu GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	128mm Splitless (3mm ID)	trace samples	3.5 ID 5.0 OD x 128	221-25440-03	20748	20749	20750
	99mm Splitless (3mm ID)	trace samples	3.5 ID 5.0 OD x 99	221-32544-00	20863	20864	20865
	17A 95mm Double Gooseneck	reduces backflash and catalytic decomposition	3.5 ID 5.0 OD x 95	-	20958	20959	20960
	17A 95mm Single Gooseneck	reduces backflash, also operates in DI mode	3.5 ID 5.0 OD x 95	221-41599-00	20961	20962	20963
Split/Splitless Liners for Shimadzu GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	17A 95mm Split/Splitless with Wool*	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-00	20955	20956	20957
	Siltek™ 95mm Split/Splitless w/ Siltek™ Glass Wool	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-00	20955-213.1	20956-213.5	20957-213.25
DI Liners for Shimadzu GCs (0.32/0.53mm ID)		Benefits/Uses:	ID**/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	128mm Uniliner®	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 128	-	20872	20873	-
	128mm Cyclo-Uniliner®	trace, dirty, high MW active samples, high linearity	3.5 ID 5.0 OD x 128	-	20874	20875	-
	99mm Uniliner®	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	-	20876	20877	-
	99mm Cyclo-Uniliner®	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	-	20893	20894	-
	95mm Uniliner® with Wool*	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	-	21713	21719	-

\*This liner is prepacked with fused silica wool. To order glass wool instead, add the suffix "-202" to the liner catalog number.

















\*\*Nominal ID at syringe needle expulsion point.

all liners are

100%  
deactivated

## Liners for Thermo Finnigan

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Split Liners for 5000-6000 Series GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
	Laminar Cup Splitter	high MW compounds	4.0 ID 5.4 OD x 79.5	-	20809	20810	-
	Cyclosplitter*	dirty samples, many injections before cleaning required	4.0 ID 5.4 OD x 79.5	-	20817	20818	-
	Cup Splitter Gooseneck	high & low MW compounds	4.0 ID 5.4 OD x 79.5	-	20885	20886	-
Splitless Liners for 5000-6000 Series GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
	Splitless (2mm ID)	trace samples	2.0 ID 5.4 OD x 79.5	-	20811	20812	20813
	Splitless (4mm ID)	trace samples	4.0 ID 5.4 OD x 79.5	-	20814	20815	20816
DI Liners for 5000-6000 Series GCs (0.32/0.53 ID)		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
	Open-top Uniliner* w/Wool*	trace, dirty, active samples, high recovery & linearity	4.0 ID 5.4 OD x 79.5	-	20841	20842	-
Split Liners for 8000 & TRACE™ Series GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap & fast GC	1.0 ID 8.0 OD x 105	453 20075	20916	20917	-
	3mm Split	universal	3.0 ID 8.0 OD x 105	453 20031	20936	20937	20938
	5mm Split	universal	5.0 ID 8.0 OD x 105	453 20030	20939	20940	20941
	Laminar Cup Splitter	high MW compounds	4.0 ID 8.0 OD x 105	-	20948	20949	-
	Cup Splitter	high & low MW compounds	4.0 ID 8.0 OD x 105	-	20950	20951	-
	5mm Split Precision™ Liner	trace samples, dirty samples	5.0 ID 8.0 OD x 105	-	21028	21029	-
Splitless Liners for 8000 & TRACE™ Series GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
	Splitless (3mm ID)	trace samples	3.0 ID 8.0 OD x 105	453 20032	20942	20943	20944
	Siltek™ Splitless (3mm ID)	trace samples <small>featuring Siltek™ deactivation</small>	3.0 ID 8.0 OD x 105	453 20032	20942-214.1	20943-214.5	20944-214.25
	Splitless (5mm ID)	trace samples	5.0 ID 8.0 OD x 105	453 20033	20945	20946	20947
	Double Gooseneck	trace active samples up to 4µL	4.0 ID 8.0 OD x 105	-	20952	20953	-




\*Prepacked with fused silica wool. For glass wool instead, add the suffix "-202" to the liner catalog number.

\*\*Nominal ID at syringe needle expulsion point.

all liners are  
**100%**  
deactivated

## Liners for Thermo Finnigan

COLUMN INSTALLS THIS END

DI Liners for 8000 & TRACE™ Series GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
 Uniliner® w/Wool		trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	-	21005	21006	-
Split Liners for TRACE™ 2000 GCs		Benefits/Uses:	ID**/OD & Length (mm)	Similar to TF part #	ea.	cat.# 5-pk.	25-pk.
 1mm ID Trace 2000 Glass Liner		trace samples, high recovery & linearity	1mm ID 2.95 OD x 120	-	21114	21115	-
 2mm ID Trace 2000 Glass Liner		universal	2mm ID 2.95 OD x 120	-	21116	21117	-

\*\*Nominal ID at syringe needle expulsion point.

### Inlet Liner Seal for TRACE™ 2000 GCs

Description	qty.	cat.#
Inlet Liner Seal	2-pk.	21392



### Graphite Sealing Ring and Washer for 8000 Series and TRACE™ GC Inlet Liners

(Similar to Thermo Finnigan part # 290-03406)

Description	qty.	cat.#
Graphite Sealing Ring and Washer	ea.	21898
Graphite Sealing Rings and Washers	2-pk.	21899



### Graphite Ferrules for M4 Fittings

- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.



### Graphite Ferrules for M4 Fittings for QCQ Thermo Finnigan 8000 & TRACE™ 2000

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.4mm*	0.18–0.25mm	20280	20281
0.5mm*	0.28/0.32mm	20282	20283
0.8mm*	0.45/0.50 & 0.53mm	20284	20285

\*0.4mm ID ferrule is similar to Thermo Finnigan part #290-13488, 0.5mm ID ferrule is similar to Thermo Finnigan part #290-13487, and 0.8mm ID ferrule is similar to Thermo Finnigan part #290-13486.

## handy Septum Size Chart

Instrument	Septum Size
Agilent (HP)	
5880A, 5890, 6890, 6850	11mm
5700, 5880	9.5/10mm
On-Column Injection	5mm
CE Instruments (TMO)	
TRACE GC	17mm
Finnigan (TMO)	
GC 9001	9.5mm
GCO	9.5mm
GCO w/TRACE	17mm
QCO™	9.5mm
TRACE 2000	9.5mm
Fisons/Carlo Erba (TMO)	
8000 series	17mm
Gow-Mac	
6890 series	11mm
All other models	9.5mm
PerkinElmer	
Sigma series	11mm
900, 990	11mm
8000 series	11mm
Auto SYS	11mm
Auto SYS XL	11mm
Pye/Unicam	
All models	7mm
Shimadzu	
All models	Plug
SRI	
All models	Plug
Tracor	
540	11.5mm
550, 560	9.5mm
220, 222	12.5mm
Varian	
Injector type:	
Packed column	9.5/10mm
Split/splitless	
1078/1079	10/11mm
1177	9mm
1075/1077	11mm

### Thermolite® Septa

- Usable to 340°C inlet temperatures.
- Each batch tested on FIDs, ECDs, and MSDs to ensure lowest bleed.
- Excellent puncturability.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.



Septum Diameter	25-pk.	50-pk.	100-pk.
5mm (3/16")	20351	20352	20353
6mm (1/4")	20355	20356	20357
7mm	20381	20382	20383
8mm	20370	20371	—
9mm	20354	20358	20362
9.5mm (3/8")	20359	20360	20361
10mm	20378	20379	20380
11mm (7/16")	20363	20364	20365
11.5mm	22385	22386	22387
12.5mm (1/2")	20367	20368	20369
17mm	20384	20385	20386
Shimadzu Plug	20372	20373	20374

### InfraRed™ Septa

- Usable to 325°C inlet temperatures.
- Preconditioned and ready to use.
- Excellent puncturability.
- Do not adhere to hot metal surfaces.
- Low bleed.
- Packaged in non-contaminating glass jars.



Septum Diameter	25-pk.	50-pk.	100-pk.
9mm	21417	21418	21419
9.5mm (3/8")	21421	21422	21423
10mm	21424	21425	21426
11mm (7/16")	21427	21428	21429
11.5mm	21430	21431	21432
12.5mm (1/2")	21433	21434	21435
17mm	21436	21437	21438
Shimadzu Plug	21439	21440	21441

### IceBlue™ Septa

- Usable to 250°C inlet temperatures.
- General-purpose septa.
- Excellent puncturability.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.
- Ideal for SPME.



Septum Diameter	50-pk.	100-pk.
9mm	22381	22382
9.5mm (3/8")	22388	22389
10mm	22390	22391
11mm (7/16")	22392	22393
11.5mm	22383	22384
12.5mm (1/2")	22394	22395
17mm	22396	22397
Shimadzu plug	22398	22399

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## Siltek™ Press-Tight® Connectors

- Siltek™ deactivation for inert pathways to maintain sample integrity.
- Ideal for connecting guard columns to analytical columns.
- Angled Press-Tight® connector designed at an angle approximating the curvature of a capillary column to reduce strain on column-end connections.
- Fits 0.18, 0.25, 0.32, & 0.53mm ID columns.

### Siltek™ Press-Tight™ Connectors

Press-Tight® Connector	ea.	3-pk.	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connector	—	—	20480	20449	20481
Universal Angled Press-Tight® Connector	—	—	20482	20483	20484
Universal "Y" Press-Tight® Connector	20485	20486	—	—	—
Universal Angled "Y" Press-Tight® Connector	20487	20469	—	—	—

## Universal Angled Press-Tight® Connectors

- Designed at an angle approximating the curvature of a capillary column.
- Reduces strain on column-end connections.
- Ideal for connecting guard columns to analytical columns.
- Seals all common sizes of fused silica tubing (0.18 to 0.53mm ID, outside diameters from 0.3 to 0.75mm).
- Made from inert fused silica.

Description	qty.	cat.#
Universal Angled Press-Tight® Connectors	5-pk.	20446
Universal Angled Press-Tight® Connectors	25-pk.	20447
Universal Angled Press-Tight® Connectors	100-pk.	20448

## Universal Press-Tight® Connectors

- Connect guard columns to analytical columns.
- Repair broken columns.
- Connect column outlets to transfer lines.

Description	qty.	cat.#
Universal Press-Tight® Connectors	5-pk.	20400
Universal Press-Tight® Connectors	25-pk.	20401
Universal Press-Tight® Connectors	100-pk.	20402

## Deactivated, Universal Press-Tight® Connectors

- High-temperature silanization for excellent inertness.
- Ideal for trace analysis of active compounds.
- Ideal for analysis of pesticides, semivolatile pollutants, or clinical/forensic samples.

Description	qty.	cat.#
Deactivated, Universal Press-Tight® Connectors	5-pk.	20429
Deactivated, Universal Press-Tight® Connectors	25-pk.	20430
Deactivated, Universal Press-Tight® Connectors	100-pk.	20431

## Universal "Y" Press-Tight® Connectors

- Split sample flow onto two columns.
- Split a single column flow into two detectors—perform confirmational analysis with a single injection.
- Fit 0.18, 0.25, 0.32, & 0.53mm ID columns.

Description	qty.	cat.#
Universal "Y" Press-Tight® Connector	ea.	20405
Universal "Y" Press-Tight® Connectors	3-pk.	20406



*Siltek™—the most inert deactivation available!*



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.
- 350°C maximum operating temperature.



Description	qty.	cat.#
Polyimide Resin	5 grams	20445

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Use for fused silica-to-fused silica or  
fused silica-to-metal connections!

### MXT®-Union Connector Kits—For Fused Silica Columns

- Low-dead-volume, leak-free connection.
- Reusable.
- Silcosteel® treatment ensures maximum inertness.
- Ideal for connecting guard columns and transfer lines.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

Previously, easy-to-use MXT® connectors could only be used with metal tubing. Now MXT® connectors can be used with fused silica capillary columns, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows capillary columns to slide into and be locked in place simply by loosening and tightening the MXT® union 1/32-inch fitting.

### MXT®-Union Connector Kits—For Fused Silica Columns

Each kit contains the MXT® union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

### MXT® “Y”-Union Connector Kits—For Fused Silica Columns

Each kit contains the MXT® union, three 1/32" nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

### 1/32-Inch Replacement Nut

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

### Valco® Connectors—One-Piece Fused Silica Adaptor Ferrule

We recommend a one-piece adaptor ferrule for use in fittings where the ferrule will not be removed. Connections are made and disconnected by loosening the fitting nut and sliding the tube out. Fused silica adaptor ferrules are available in Valcon polyimide for use up to 350°C. Valcon polyimide is a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at high temperatures. The determining factor in adaptor ferrule size selection is the fused silica tubing outer diameter (OD).

### 1/32-Inch Adaptor Ferrule

Tubing OD	Tubing ID	Valco® #	Valcon Polyimide	cat.#
<0.25–0.4mm	0.25mm	FS.4-5	5-pk.	20137
0.4–0.5mm	0.32mm	FS.5-5	5-pk.	20140
0.5–0.8mm	0.53mm	FS.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

### Gerstel GRAPHPACK® 3D/2 Connectors

GRAPHPACK® technology provides a complete system that quickly and reliably makes leak-free, low-dead-volume connections. The central component is a metal-jacketed graphite ferrule—the ideal seal for GC applications. GRAPHPACK® ferrules eliminate all the disadvantages and shortcomings associated with previous sealing systems.

Description	qty.	cat.#
GRAPHPACK® 3D/2 Connector** (0.25mm to 0.32mm ID)	ea.	20272
GRAPHPACK® 3D/2 Connector** (0.45mm to 0.7mm ID)	ea.	20273

\*\*Use only with GRAPHPACK® 3D/2 ferrules.

### GRAPHPACK® 3D/2 Ferrules

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	20271
0.5mm	0.32mm	10-pk.	20270
0.8mm	0.45/0.53mm	10-pk.	20274



Ideal for MXT® stainless steel to fused  
silica capillary connections!

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## Intermediate-Polarity Deactivated Guard Columns & Transfer Lines

- Useful for a wide range of applications.
- Compatible with most common solvents.

### Fused Silica Guard Columns/Transfer Lines

Nominal ID	Nominal OD	1-Meter	5-Meter	5-Meter/6-pk.
0.025mm*	0.363 ± 0.012mm	10097		
0.05mm	0.363 ± 0.012mm	10098	10040	10040-600
0.075mm*	0.363 ± 0.012mm	10099		
0.10mm	0.363 ± 0.012mm	10100	10041	
0.15mm	0.363 ± 0.012mm	10101	10042	
0.18mm	0.37 ± 0.04mm	10102	10046	
0.25mm	0.37 ± 0.04mm		10043	10043-600
0.28mm	0.37 ± 0.04mm		10003	10003-600
0.32mm	0.45 ± 0.04mm		10044	10044-600
0.45mm	0.69 ± 0.04mm		10005	10005-600
0.53mm	0.69 ± 0.05mm		10045	10045-600

Nominal ID	Nominal OD	10-Meter	10-Meter/6-pk.	30-Meter**	60-Meter***†
0.25mm	0.37 ± 0.04mm	10049	10049-600	10012	10013
0.32mm	0.45 ± 0.04mm	10048	10048-600	10022	10023
0.53mm	0.69 ± 0.05mm	10047		10032	10033

### MXT® Guard Columns/Transfer Lines

Nominal ID	Nominal OD	5-Meter	5-Meter/6-pk.	10-Meter
0.28mm	0.53 ± 0.025mm	70044	70044-600	70046
0.53mm	0.74 ± 0.025mm	70045	70045-600	70047

## Siltek™-Deactivated Guard Columns

- Revolutionary deactivation process lowers analyte breakdown to less than 1%.
- Minimizes bleed.
- Ideal for chlorinated pesticide analysis.
- Analyze tough samples quickly and accurately.
- Maximum temperature of 380°C.

### Siltek™-Deactivated Guard Columns

Nominal ID	Nominal OD	5-Meter	10-Meter
0.25mm	0.37 ± 0.04mm	10026	10036
0.32mm	0.45 ± 0.04mm	10027	10037
0.53mm	0.69 ± 0.05mm	10028	10038

## Let Restek Make the Connection for You!

Restek will connect a Siltek™ guard column to any analytical column using a universal Siltek™ Press-Tight® connector and polyimide sealing resin. To order a preconnected guard column, add the three-digit suffix from the chart below to any analytical column catalog number when ordering.

### 5m Siltek™ Guard Column/Transfer Line

ID	cat.# suffix
0.25mm	-364
0.32mm	-365
0.53mm	-366

### Example:

A 5m, 0.32mm ID Siltek™ guard column connected to a 30m, 0.32mm ID, 1.0µm Rtx®-5 column is cat.# 10254-365.

\*Not tested with the Grob test mix because of a high pressure drop.

\*\*30- and 60-meter lengths are banded in 5-meter sections.

†Recommendation: Cut 60m guard columns into shorter lengths. Using full length may cause peak distortion.

**Restek Trademarks:** Siltek, Press-Tight, MXT, CarboFrit, Rtx, Uniliner, Silcosteel, Stx, Leak Detective, Stabilwax, Cyclosplitter, mini-Lam, Precision, InfraRed, IceBlue, Plus 1.

**Other Trademarks:** Valco (Valco Instruments Co., Inc.), GRAPHPACK (Gerstel GmbH), Carbowax (Union Carbide Corp.), TRACE (ThermoQuest Corp.), Velcro (Velcro Industries BV), Scotty (Scott Specialty Gases, Inc.), Viton & VESPEL (E.I du Pont de Nemours & Co., Inc.).

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# Reach for Restek

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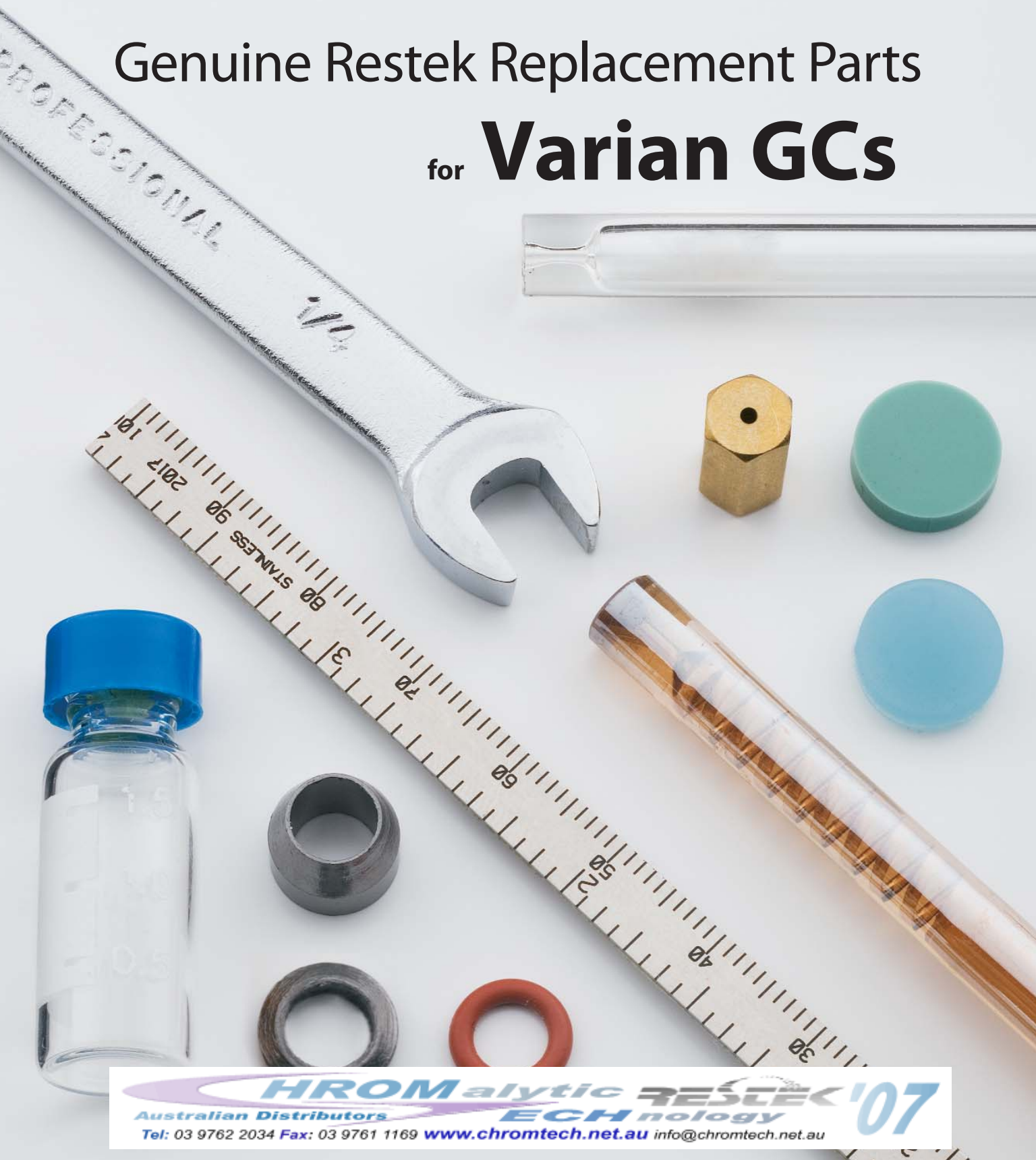
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**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a fact

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.



Small, compact unit—easy to hold and operate.

## Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

## How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

## tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

## Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

## Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks with the adaptor fitting.



Leak Detector is easily accessed when stored in the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

## tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner with Wool		Siltek® Liner with CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/ Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)



## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339



Eliminates user variation!



### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

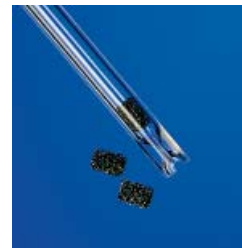
**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!











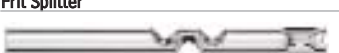









Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners
















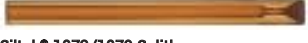



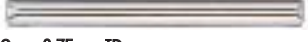

COLUMN INSTALLS THIS END

Splitless Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	2mm Splitless	trace samples <2μL	2.0 ID 6.3 OD x 74	01-900109-05	20721	20722	20723
	4mm Splitless	trace samples >2μL	4.0 ID 6.3 OD x 74	01-900109-05	20904	20905	20906
	Double Gooseneck	trace, active samples up to 4μL	4.0 ID 6.3 OD x 74	—	20847	20848	20849
	Cyclo Double Gooseneck	trace, dirty, active samples up to 4μL	4.0 ID 6.3 OD x 74	—	20897	20898	—
Split Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap inlet splitting or samples <1μL	1.0 ID 6.3 OD x 72	—	20970	20971	—
	Splitter w/ Wool	universal, use with rapid autosamplers	4.0 ID 6.3 OD x 72	01-900109-01	20792	20793	20794
	Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 72	01-900109-02	20803	20804	—
	Cup Splitter	high & low MW compounds	4.0 ID 6.3 OD x 72	—	20724	20725	—
	Cycloplitter*	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 72	—	20727	20728	—
	Frit Splitter	dirty samples, non-active compounds	4.0 ID 6.3 OD x 72	01-900109-03	20715	20716	20717
	Baffle Splitter	compounds with close boiling points	4.0 ID 6.3 OD x 72	01-900109-04	20718	20719	20720
	Split Precision* Liner w/ Wool	dirty samples, active samples	4.0 ID 6.3 OD x 72	—	21030	21031	—
DI Liners for Varian 1075/1077 GCs (0.32/0.53mm ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	Uniliner*	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	—	20345	20346	—
	Cyclo-Uniliner*	trace, dirty, high MW, active samples, linearity	4.0 ID 6.3 OD x 72	—	20347	20348	—
	Open-top Uniliner* w/ Wool	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	—	20845	20846	—
SPME Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	SPME Liner	ideal for low-volume SPME applications	0.75 ID 6.30 OD x 74	—	21112	21113	—
SPI Liners for Varian GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	01-900109-06	20775	20776	20777
	Siltek* 0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	—	20775-214.1	20776-214.5	20777-214.25
	0.8mm SPI	high linearity for 0.53mm ID columns	0.80 ID 4.6 OD x 54	01-900109-07	20778	20779	20780
	SPI with Buffer	dirty samples >1μL, fits 0.25, 0.32 & 0.53mm ID columns	2.4 ID 4.6 OD x 54	01-900109-08	20850	20851	20852

\*Nominal ID at syringe needle expulsion point.


All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Liners for Varian 1177 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
 4mm Split w/Glass Frit	universal	4.0 ID 6.3 OD x 78.5	39-26119-36	21045	21046	—
 4mm Split w/ Wool	universal	4.0 ID 6.3 OD x 78.5	39-26119-34	—	21079	—
 4mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	20759	20762	—
 Low Pressure Drop Precision™ Liner w/ Wool	trace samples <2μL, dirty samples	2.0 ID 6.3 OD x 78.5	—	22421	22422	—
 Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20765	20768	—
 2mm Splitless w/ Wool	trace samples <2μL	2.0 ID 6.5 OD x 78.5	39-26119-38	—	21077	—
 Gooseneck Splitless (4mm)	trace samples <2μL	4.0 ID 6.5 OD x 78.5	39-26119-27	21896	21897	—
 Siltek® Gooseneck Splitless (4mm)	trace samples <2μL	4.0 ID 6.5 OD x 78.5	—	21896-214.1	21897-214.5	—
 Gooseneck Splitless (4mm) w/ Wool	trace samples <2μL	4.0 ID 6.5 OD x 78.5	39-26119-36	21896-200.1	21897-200.5	—
 Siltek® Gooseneck Splitless (4mm) w/ Wool	trace samples <2μL	4.0 ID 6.5 OD x 78.5	—	21896-213.1	21897-213.5	—
 Double Gooseneck Splitless (4mm)	trace, active samples <2μL	4.0 ID 6.5 OD x 78.5	—	21891	21892	—
DI Liners for Varian 1177 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.	
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21470	21471	
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21468	21469	
Liners for Varian 1078/1079 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
 1078/1079 Split w/ Frit	dirty samples, non-active compounds	3.4 ID 5.0 OD x 54	03-918464-00	21708	21709	—
 1078/1079 Splitless	trace samples <2μL	2.0 ID 5.0 OD x 54	03-918466-00	21711	21712	—
 Siltek® 1078/1079 Splitless	trace samples <2μL	2.0 ID 5.0 OD x 54	—	21711-214.1	21712-214.5	—
 Open 0.5mm ID	trace samples <1μL	0.5 ID 5.0 OD x 54	03-925331-00	20992	20993	—
 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	392611945	20859	20901	20909
 Siltek® 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	—	20859-214.1	20901-214.5	20909-214.25
 Open 0.75mm ID	trace, low volume samples	0.75 ID 5.0 OD x 54	03-925330-00	21714	21715	21716
 1078/1079 Split Precision™ Liner w/ Wool	dirty samples, trace samples	3.4 ID 5.0 OD x 54	—	21024	21025	—

\*Nominal ID at syringe needle expulsion point.

ordering **note**For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.All liners are  
**100%**  
deactivatedAll liners are shipped intermediate polarity (IP)  
deactivated unless otherwise requested.

DI Liners for Varian 1078/1079 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.
	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 54	—	22280	22281

Drilled Uniliner® (hole on bottom)

\*Nominal ID at syringe needle expulsion point.

## tech tip

## DI Liners for Varian 1078/1079 GCs (for 0.25/0.32/0.53mm ID Columns)

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

## Siltek® Treated Metal Inlet Liners for Varian GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (3.8mm ID x 5.0mm OD x 54mm)	qty.	cat.#
Split/Splitless	5-pk.	20711
Splitless Gooseneck	5-pk.	21002

## Inlet Liner Seals for Varian 1177 Injectors

- Meets or exceeds OEM performance.

Description	Max. temp.	Similar to Varian part #	Restek cat.# 10-pk.	50-pk.
6.35mm ID Graphite O-rings for split liners	450°C	—	20296	20297
6.5mm ID Graphite O-rings for splitless liners	450°C	39-26119-40	20298	20299

## Liner Seals for Varian 1078/1079

Description	Max. temp.	Similar to Varian part #	qty.	cat.#
5mm Graphite Liner Seals for Varian 1078/1079 GCs	450°C	392611919 392534201	10-pk.	22683

## Septa for Varian GCs

- Precision molding assures consistent, accurate fit.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.

Septum Diameter	25-pk.	50-pk.	100-pk.
<b>Thermolite® Septa (useable to 340°C inlet temp.)</b>			
9mm	27132	27133	27134
9.5mm (7/8")	27135	27136	27137
10mm	27138	27139	27140
11mm (7/16")	27141	27142	27143

<b>IceBlue™ Septa (useable to 250°C inlet temp.)</b>			
9mm	—	27156	27157
9.5mm (7/8")	—	27158	27159
10mm	—	27160	27161
11mm (7/16")	—	27162	27163

<b>BTO® Septa (useable to 400°C inlet temp.)</b>			
9mm CenterGuide™	—	27104	27105
9.5mm (7/8")	—	27106	27107
10mm	—	27108	27109
11mm (7/16") CenterGuide™	—	27110	27111

HANDY  
septum size chart

Injector Type	Septum Diameter (mm)
Packed Column	9.5/10
Split/Splitless 1078/1079	10/11
1177	9
1075/1077	11

### Stainless Steel Septum Nuts for Varian GCs

- Maintain a sharper knife edge longer than the original equipment aluminum design.
- Greatly minimize septum fragmentation and increase septum lifetime.

Description	Similar to Varian part #*	qty.	cat.#
26 Gauge Needle Guide Septum Nut	03-949666-01	ea.	21310
Standard Stainless Steel Septum Nut	03-949666-01	ea.	21304

\*Similar to Varian part # 03-949666-01, except Restek nuts are not equipped with remote-start capabilities.



### Capillary Nuts for Varian GCs

- Choose brass (<200°C) or stainless steel (>200°C) replacement nuts.

Description	Similar to Varian part #	qty.	cat.#
Brass Capillary Nuts	03-949551-00	2-pk.	20881
Stainless Steel Capillary Nuts	03-949551-00	2-pk.	20882



### Siltek® Treated Inlet Support Springs for Varian 1075/1077 Split Injectors

- Siltek® treated to eliminate sample adsorption.

Description	Similar to Varian part #	qty.	cat.#
Siltek® Treated Inlet Support Springs for Varian	03-949786-00	3-pk.	21690



### Capillary Installation Gauge for Varian GCs for use with 1/16" ferrules

- Seats ferrule\* onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Description	qty.	cat.#
Capillary Installation Gauge for Varian GCs for use with 1/16" ferrules	ea.	22335

\*Recommended for use with graphite ferrules.

### MLE Capillary Tool Kit for Varian GCs

Includes:

- capillary installation gauge for Varian GCs
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insert tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat.#
MLE Capillary Tool Kit for Varian GCs	kit	22184

## EZ No-Vent™ GC Column Connector

restek  
innovation!

Change columns in minutes—without venting!

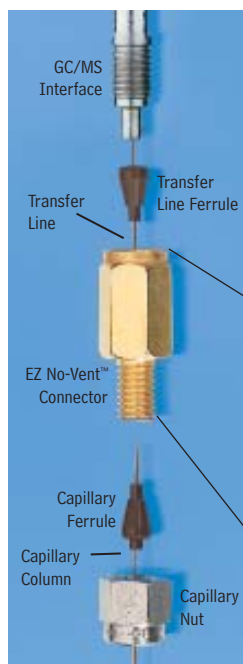
### EZ No-Vent™ GC Column-Mass Spectrometer Connector

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- For Varian Saturn 2000 Series Mass Spectrometers.

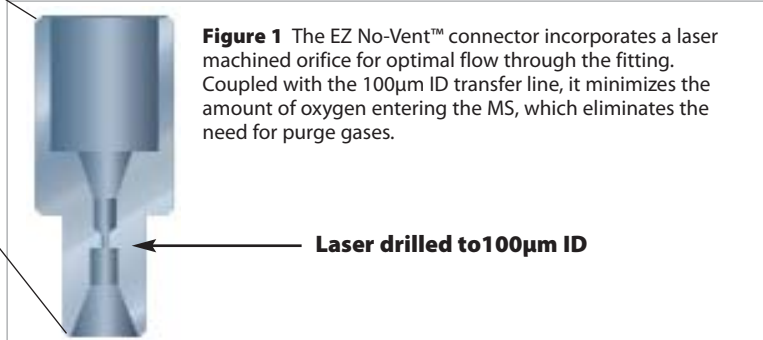
We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing.



**Kelli Steindl**  
GC Accessories Associate  
Product Marketing  
Manager  
2+ years of service!



Kit installs easily,  
without special tools  
or plumbing.



**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Description	qty.	cat.#
EZ No-Vent™ Connector Kit for Varian Saturn 2000 Series MSs Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.	kit	22423
Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:		
0.4mm ID (Polyimide)	2-pk.	21015
0.5mm ID (Polyimide)	2-pk.	21016
Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID	2-pk.	21043
Replacement 100µm deactivated transfer line	3 ft.	21018
Replacement EZ No-Vent™ Column Nut	5-pk.	21900
Replacement EZ No-Vent™ Plug	2-pk.	21915
Open-End Wrenches (1/4" x 5/16")	2-pk.	20110

**Capillary Inlet Guide Kit for Varian GCs**

- Use as a replacement for Varian 1075 and 1077 split/splitless injectors.
- Use inexpensive 1/16-inch fittings instead of a non-standard nut.
- Quick and simple installation.
- Ideal for two-hole ferrule installation.

Two 0.25 or 0.32mm ID capillary columns can be inserted into a standard 1/16-inch type capillary fitting. The two-hole ferrule positions the column squarely inside 2 or 4mm ID splitless liners. (Use recessed-taper double-gooseneck liners for dual column analysis.) Complete kit includes splitter guide, 1/4-inch nut, 1/4-inch Vespel®/graphite ferrule, and a 1/16-inch nut and ferrule.

Description	Similar to Varian part #	qty.	cat.#
Inlet Guide Kit	03-908358-00	kit	20502



Save time and money with Restek's inlet splitter guide for Varian GCs!

**Low-Volume Injector for Varian Split/Splitless Inlets**

- Attaches to the GC inlet without cutting existing injection port lines.
- Allows injections from a syringe onto the column for purge & trap troubleshooting or calibration.
- Siltek® treatment eliminates adsorption of active compounds.
- Order capillary ferrules separately.

Description	qty.	cat.#
Low-Volume Injector for Varian Split/Splitless GC Inlets	kit	21693

**Rethreading Tool**

- Repair worn or damaged threads.
- Multiple uses (injection ports, fittings, etc.).
- Built-in guide to prevent cross-threading.



Description	qty.	cat.#
Rethreading Tool for 7/16" compression fitting (Varian injection ports)	ea.	23019
Rethreading Tool for 1/4" Varian-style capillary column fittings	ea.	21893



Make your injection port threads like new!

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### qty.

kit

### cat.#

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**High-Temperature String**

- Withstands temperatures to 400°C.
- Use to restraining capillary columns, attach column connectors to column cages, or hold a column in the GC oven.

Description	qty.	cat.#
High-Temperature String	10m	20109
High-Temperature String	450m	20618

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ " )	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ " )	2-pk.	22455

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.

Description	qty.	cat.#
Septum Puller	ea.	20117

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124



## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.



Vespel® ferrules

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/16"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespal®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217



## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespal®/Graphite
1/16"	no hole	10-pk.	20240



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/4"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespal® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespal®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespal®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespal®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

## Vu2 Union™ Column Connectors



Patent pending.

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

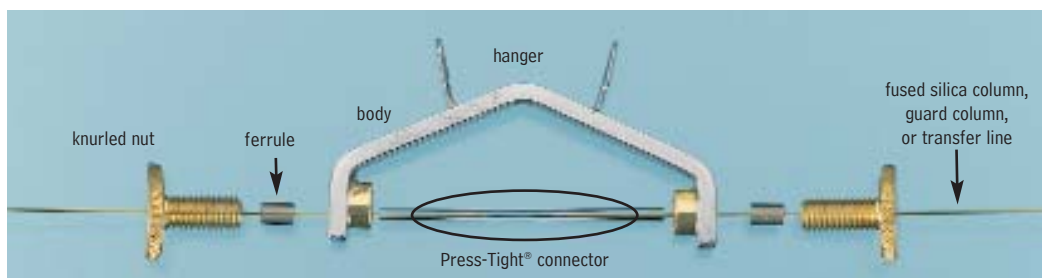
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors

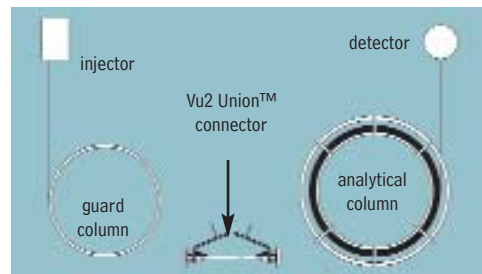
Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

A guard column connected to an analytical column by a Vu2 Union™ connector.



Secure, reliable  
column-to-column  
connections!



restek  
innovation!

### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

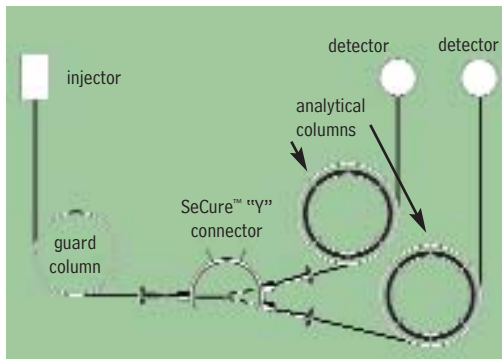
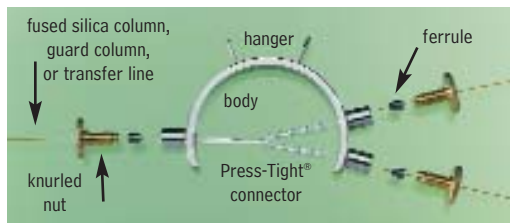
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



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## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481



## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



## Universal Angled "Y" Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled "Y" Press-Tight® Connector	20403	20404
Deactivated Universal Angled "Y" Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487	20469



## Universal "X" Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "X" Press-Tight® Connector	20407	20408
Deactivated Universal "X" Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal "X" Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat.#
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146



# Super-Clean™ Gas Filter System



## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

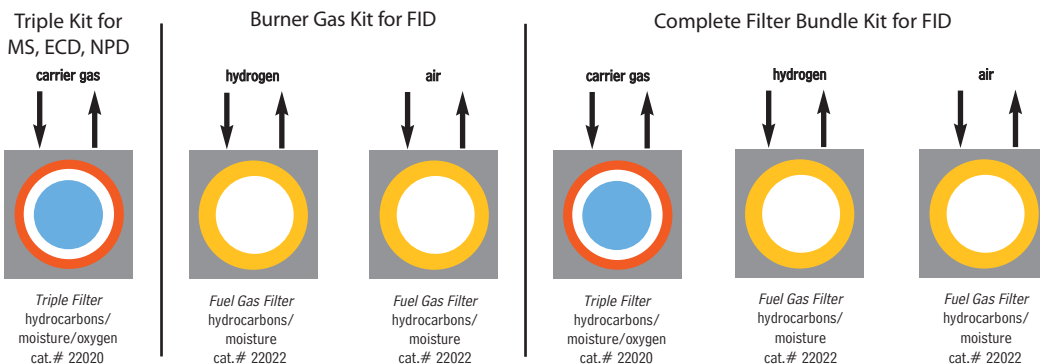
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure:  
10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>" (27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

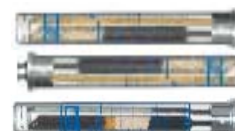
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833





## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## please note

NOTE: Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel		
Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b> Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481





Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 22) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

## VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa) inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

## it's a fact

The nitrogen module is excellent for LC/MS systems.

### Gas-Specific Purifier Module

	qty.	1/4-inch		Compression Tube Fittings		1/8-inch	
		cat.#		qty.		cat.#	
Helium Purifier Module	ea.	22600		ea.		22601	
Hydrogen Purifier Module	ea.	22602		ea.		22603	
Nitrogen Purifier Module*	ea.	22604		ea.		22605	
Air Purifier Module	ea.	22606		ea.		22607	

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

## Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011

## High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600

## High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

## Ultra-High-Purity Chrome-Plated Brass Line Regulator

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20psi or more.
- Same purity protection as high-pressure cylinder regulators.

Inlet connections: 1/4" FPT  
 Outlet assembly: 1/4" FPT port

Fitting	Outlet Gauge	Outlet Pressure	qty.	cat.#
1/4" female NPT ports*	30" - 0 to 100psig	0-50psig	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig	0-100psig	ea.	22452

\*Order appropriate male connector, pipe-to-tube fittings.

## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
ID (in.)	OD (in.)	25 Feet	26–100 Feet	> 100 Feet*
0.01" ID	1/16" OD	cat.# 21500	cat.# 21501	cat.# 21502
0.02" ID	1/16" OD	cat.# 21503	cat.# 21504	cat.# 21505
0.03" ID	1/16" OD	cat.# 21506	cat.# 21507	cat.# 21508
0.04" ID	1/16" OD	cat.# 21509	cat.# 21510	cat.# 21511
0.085" ID	1/8" OD	cat.# 21512	cat.# 21513	cat.# 21514
0.21" ID	1/4" OD	cat.# 21515	cat.# 21516	cat.# 21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592



## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

## GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.

Description	qty.	cat.#
GC Installation Kit	kit	21325



## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.

Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185



## Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.

Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012



## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134



## Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

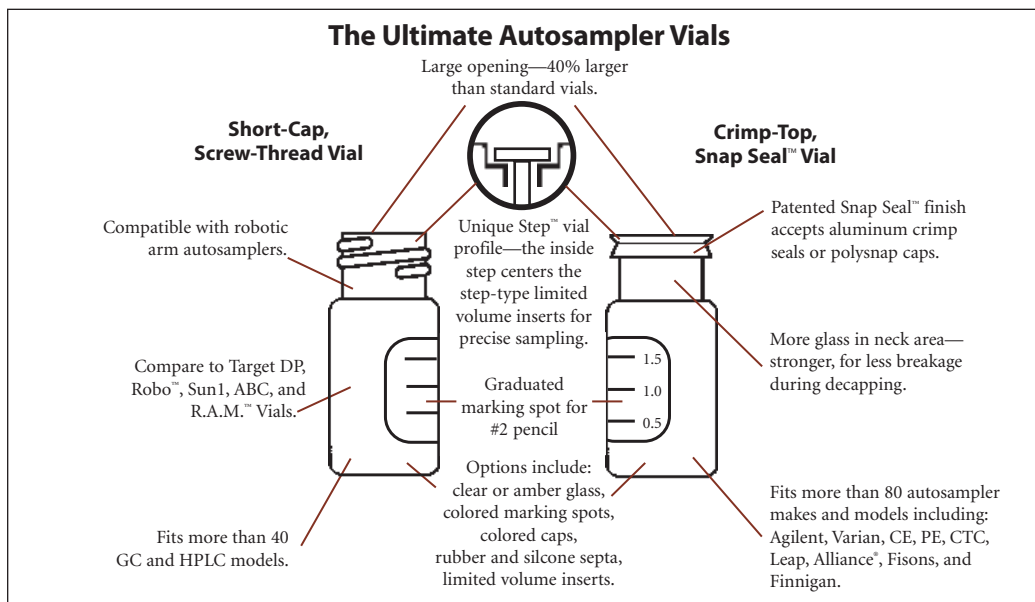


## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.

Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193





#### For a highly inert surface, we recommend Siltek® deactivation for your vials:

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

#### instrument reference

Varian/Rainin / Varian Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	Headspace	8mm Screw-Thread	10mm Screw-Thread
Dynamax AI-1A, AI-200, Dynamax AI-3	X				
DynamaxAI-3AI-1A, AI-2W				X	
8100/8200	X	X		X	X
Marathon	X	X		X	
9100/9090/9095	X			X	
8035, 8000 series, 8055, 8085, 3800 GC					X
Genesis			X		

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 32** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

instrument **reference****For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Varian/Rainin	Dynamax AI-IA, AI-200, Dynamax AI-3
Varian	8100/8200, 9100/9090/9095, Marathon

## 8mm Screw-Thread Vials



8mm (2.0mL) Screw-Thread Vial

### Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread

#### Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

#### Screw-Thread Vials—12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

#### 8mm Pre-Assembled Caps and Septa

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

#### Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"*	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"*	24636	24637

\*Best fit for Varian.

#### Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately

##### (Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195

#### 8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177

#### Septa for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
8mm x 0.045" Red PTFE/Silicone	21178	21179
8mm x 0.065" Red PTFE/White Silicone	21795	21147

#### Limited Volume Inserts for 8mm/425 Screw-Thread Vials

Description	100-pk.	1000-pk.
100µL Glass w/ Polypropylene Bottom Spring	24508	21775
250µL Glass, Flat Bottom	—	24510
250µL Glass, Flat Bottom w/ ID Ring	—	24691
100µL Polypropylene, No Spring	24511	—
100µL Polypropylene, Bottom Spring	24512	—



Limited Volume Insert

#### Limited Volume Vials, 12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
100µL Polypropylene	24623	24624
100µL Glass Insert/Clear Plastic Vial*	24625	—

\*Amber glass/clear plastic available on request (1000 packs only).



Limited Volume Vial

## instrument reference

### For 8mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Varian/Rainin	Dynamax AI-3AI-IA, AI-2W
Varian	8100/8200, 8035, 8000 Series, Marathon, 8055, 8085, 9100/9090/9095, 3800 GC

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

instrument **reference****For 9mm Short-Cap, Screw-Thread Vials**

Manufacturer	Instrument/Model #
Varian	8100/8200, Marathon

**Screw-Thread Vials, 12 x 32mm, 10mm/425 Thread, Big Mouth Step™ Design**

- 40% larger opening than other vials.
- Step™ profile automatically centers glass flange limited volume inserts.
- Pre-assembled caps with septa, with or without vials.
- Designed for Waters Alliance® autosamplers.

The Big Mouth Step™ Vial System has a larger ID than conventional vials and incorporates a neck finish that is uniquely designed to allow the insert to be precisely aligned in the center of the vial. This precise alignment provides maximum sample withdrawal and eliminates any chance of missed injections. All vials with the large opening are designed with the Step™ Vial System.

**Big Mouth Step™ Screw-Thread Vials (12 x 32mm, 10mm/425 Thread)**

Description	100-pk.	1000-pk.
2.0mL Clear Step™ Vial, White Graduated Marking Spot	24626	24627
2.0mL Amber Step™ Vial, White Graduated Marking Spot	24628	24629

**10mm Pre-Assembled Big Mouth Step™ Vial Kits (w/Black Cap)**

Caps attached to vials.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, PTFE/Silicone/Red PTFE Septa, 0.040"	24675	24676
2.0mL Clear Vial, Red PTFE/Silicone Septa, 0.065"	24642	24643
2.0mL Amber Vial, Red PTFE/Silicone Septa, 0.065"	24644	24645

instrument **reference****For 10mm Screw-Thread Vials**

Manufacturer	Instrument/Model #
Varian	8100/8200



Ideal for autosamplers that process 12 x 32mm crimp-top vials.





## Headspace Vials

### Headspace Autosampler Vials

Description	100-pk.	1000-pk.
10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Rounded Bottom	21162	21163

## instrument [reference](#)

### For Headspace Vials

Manufacturer	Instrument/Model #
Varian	Genesis

## 20mm Aluminum Seals w/Septa, Assembled

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.

## Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.



Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.

### Decapping has never been easier!

one...



two...



three!



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

## Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

## did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

## Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

## Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

## Autosampler Syringes for Varian 8000 Series GCs

### Guide to Needle Termination Codes

#### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

#### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip



Hamilton 10µL Autosampler Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
<b>Varian 8100/8200 Syringes</b>								
10µL	RN	26s	1.99"	5	701 Varian	202880	ea.	24956



SGE 10µL Autosampler Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
<b>Varian 8000 Syringes</b>								
10µL	R	25	50mm	Dome	10R-VA80-II	002926	ea.	24850

### Varian 8035, 8100, & 8200 Syringes

10µL	F	25	53mm	S/Hole	10F-VA8X-11	002923	ea.	24851
10µL	R	25	53mm	S/Hole	10R-VA8X-II	002924	ea.	24852
100µL	R	25	53mm	S/Hole	100R-VA8X	005921	ea.	24853

### Varian CP 8400, CP8410 Syringes

10µL	F	26	50mm	Cone	10F-C/F-5/0.47C	002980	ea.	24922
10µL	F	26	50mm	Bevel	10F-VA8400-5/0.47	002950	ea.	21202

## Replacement Needles for Varian 8000 Series Autosampler Syringes



### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
10µL	23	53mm	S/Hole	037779	2-pk.	24857
10µL	25	53mm	S/Hole*	037780	ea.	24858
10µL	25	53mm	S/Hole**	037777	ea.	24854
10µL	25	53mm	2	037776	2-pk.	24855

\*straight needle shaft, 0.20mm ID needle, for use with viscous samples

\*\*tapered needle shaft, 0.12mm ID needle

**Standard Microliter Volume Syringes**

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek cat. #
					Model	cat. #		
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek cat. #
					Model	cat. #		
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713



\*For replacement RN/R needles, see page 37.

\*\*With plunger protection.

## Teflon® Tip, Gas-Tight Syringes

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

### Guide to Needle Termination Codes

#### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

#### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		Restek
					Model	cat. #	cat. #
10µL	N	26s	2"/51mm	2	1701	80000	24557
10µL	RN	26s	2"/51mm	2	1701	80030	24558
25µL	N	22s	2"/51mm	2	1702	80200	24559
25µL	RN	22s	2"/51mm	2	1702	80230	24560
50µL	N	22s	2"/51mm	2	1705	80900	24561
50µL	RN	22s	2"/51mm	2	1705	80930	24562
100µL	N	22s	2"/51mm	2	1710	81000	24563
100µL	RN	22s	2"/51mm	2	1710	81030	24564
250µL	N	22s	2"/51mm	2	1725	81100	24567
250µL	RN	22s	2"/51mm	2	1725	81130	24568
500µL	LTN	22	2"/51mm	2	1750	81217	24571
500µL	RN	22	2"/51mm	2	1750	81230	24572
1mL	LTN	22	2"/51mm	2	1001	81317	24575
1mL	RN	22	2"/51mm	2	1001	81330	24576
1mL	TLL	*	—	w/out slots	1001	81320	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	24582
2.5mL	N	22	2"/51mm	2	1002	81417	24581
5mL	TLL	*	—	w/out slots	1005	81520	20178
10mL	TLL	*	—	w/out slots	1010	81620	20179
25mL	TLL	*	—	w/out slots	1025	82520	24591
50mL	TLL	*	—	w/out slots	1050	85020	24717



SGE Gas-Tight Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		Restek
					Model	cat. #	cat. #
10µL	F	26	50mm	2	10F-GT	002200	24725
10µL	R	26	50mm	2	10R-GT	002250	24726
25µL	F	25	50mm	2	25F-GT	003200	24727
25µL	R	25	50mm	2	25R-GT	003250	24728
50µL	F	25	50mm	2	50F-GT	004200	24729
50µL	R	25	50mm	2	50R-GT	004250	24730
100µL	F	25	50mm	2	100F-GT	005200	24734
100µL	R	25	50mm	2	100R-GT	005250	24735
100µL	LL	*	—	—	100F-LL-GT	005230	24737
250µL	F	25	50mm	2	250F-GT	006200	24738
250µL	R	25	50mm	2	250R-GT	006250	24739
250µL	LL	*	—	—	250F-LL-GT	006230	24741
500µL	F	25	50mm	2	500F-GT	007200	24742
500µL	R	25	50mm	2	500R-GT	007250	24743
1mL	R	23	50mm	2	1MR-GT	008100	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	24762

\*Needles sold separately. See page 37.

**Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes**

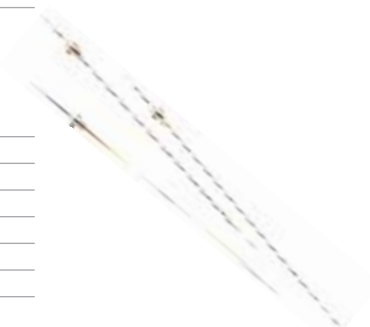
Materials: stainless steel needle, nickel plated brass hub

**Needles for Hamilton Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

**Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

**Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes****Needles for Hamilton Syringes**

Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

**Needles for SGE Syringes**

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

## Experience Restek

We're the most dedicated chromatography company you'll ever do business with.

**[www.restek.com](http://www.restek.com)**

#### Restek Trademarks:

Alumaseal, CarboFrit, Cyclosplitter, EZ No-Vent, IceBlue, MXT, Precision, Press-Tight, Rtx, SeCure, Silcosteel, Silcote, Siltek, Stabilwax, Stx, Sulfinert, Thermolite, Uniliner, Vu-Union, Vu2 Union, Restek logo.

#### Other Trademarks:

Kel-F (3M Co.); BTO, CenterGuide (Chromatography Research Supplies, Inc.); Teflon, Viton, Vespel (E. I. du Pont de Nemours & Co., Inc.); R.A.M., Snap Seal, Step (J.G. Finneran Associates, Inc.); Rheodyne (Rheodyne LP); Ridgid (Ridgid, Inc.); Shortix, Super-Clean (SGT Middleburg BV); Versapak (The Black & Decker Corporation); Mat/Sen (UOP LLC); Valco, VICI (Valco Instruments Co, Inc.); Alliance (Waters Associates, Inc.); Robo (XX sys Technologies, Inc.)



# Genuine Restek Replacement Parts

for Agilent GCs

**HRMalytic RESTEK '07 ECH nology**

Australian Distributors  
Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

Chromatography Products

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# Chromatography Products

# From Injector to Detector

Restek is your #1 source for consumables and supplies for Agilent GC and GC/MS systems!

Restek designs, develops, and markets OEM-equivalent parts and supplies for Agilent systems—even difficult-to-find parts for older models. A team of Restek chemists and engineers is dedicated to creating innovative tools to make your work easier, your system work faster, your analyses more reproducible, and your data more accurate. And, as always, we back our products with friendly, knowledgeable technical service and customer service.

We also offer an extensive selection of capillary, packed, micropacked, and PLOT columns to use in your Agilent system, plus analytical reference materials, vials, syringes, and much more. We also manufacture HPLC columns and accessories. If you don't have a copy of our current catalog, simply call us and ask for one—or request one from our website. Whether you want to order a product, discuss an application or chromatography in general, we look forward to talking with you.



**Donna Lidgett**  
Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active (e.g., sulfur) compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinit®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinit® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.

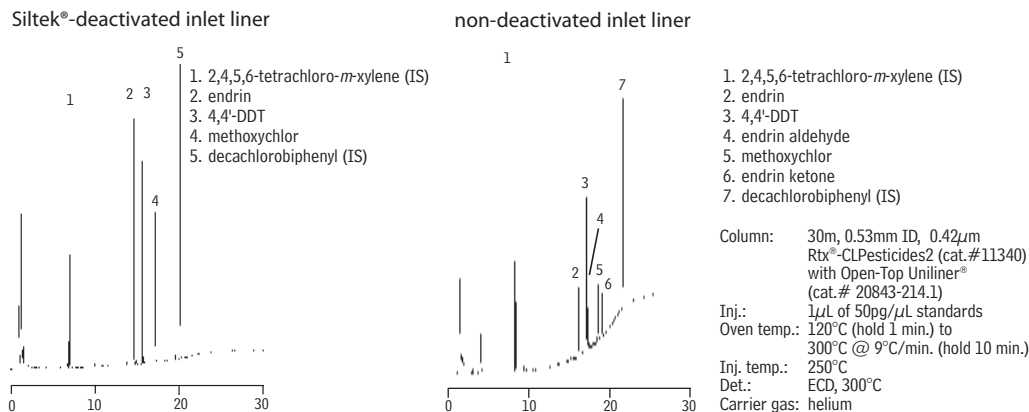
## Siltek® Surface Deactivation

- Eliminate activity by using the most advanced surface treatment available.
- Increase component lifetime—the non-stick surface cleans easily with solvent sonication.
- Ideal for acidic conditions. Siltek® treatment will improve reproducibility and protect hardware.
- Stable to 600°C. A no-bleed deactivation treatment, ideal for all analytical methods.
- Custom service available.

Endrin is more prone to break down on glass surfaces than metal, and DDT is more prone to break down on metal surfaces. Siltek® deactivation of sample-contacting surfaces minimizes endrin and DDT breakdown, to less than 1%!

In addition to our many stock Siltek®-treated products, custom coating service is available. Contact our Technical Service Team at 800-356-1688 or 814-353-1300, ext. 4, or contact your Restek representative.

### A Siltek®-deactivated Uniliner® inlet liner reduces endrin breakdown to less than 1%; DDT and methoxychlor breakdown are undetectable.



### Industries currently benefiting from the reliability of Restek's performance coatings include:

- petroleum, petrochemical, and refineries
- analytical instrument manufacturers
- analytical labs



Silcosteel® is a general purpose passivation for metals.



Silcosteel®-CR treatment improves the corrosion resistance of stainless steel 10X or more.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.



A Sulfinit® layer on metal components is required when analyzing for parts-per-billion levels of organosulfur compounds.



Small, compact unit—  
easy to hold and operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly



**Mike Goss**

Instrument Innovations  
Specialist  
7+ years of service!

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner with Wool		Siltek® Liner with CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner with Base-Deactivated Wool		Base Deactivated Liner with CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for amines and basic compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Liner Packing Materials & Accessories



**Matt Lininger**  
Instrument Innovations  
Engineer  
2+ years of service!

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.



### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324

### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999



### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

Not recommended for use with double gooseneck liners.



### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

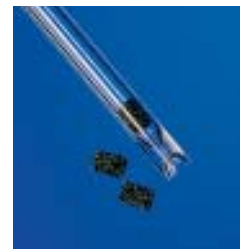
**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™ packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*  
**Dr. Konrad Grob**, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.


























No more burned fingers!

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.








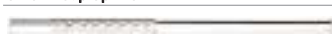

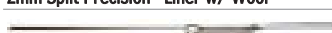








Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 <b>2mm Splitless</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	5181-8818 (ea.) 5183-4703 (5-pk.) 5183-4704 (25-pk.)	20712	20713	20714
 <b>4mm Splitless</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	210-3003 (ea.) 210-3003-5 (5-pk.)	20772	20773	20774
 <b>Siltek® 4mm Splitless</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20772-214.1	20773-214.5	20774-214.25
 <b>4mm Splitless w/ Wool</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	19251-60540 (ea.) 5183-4691 (5-pk.) 5183-4692 (25-pk.)	22400	22401	22402
 <b>2mm Splitless (quartz)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	18740-80220 (ea.) 5183-4707 (5-pk.)	20914	20915	—
 <b>4mm Splitless (quartz)</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20912	20913	—
 <b>4mm Splitless (quartz) w/ Wool</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22403	22404	—
 <b>Gooseneck Splitless (2mm)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795	20796	20797
 <b>Siltek® Gooseneck Splitless (2mm)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795-214.1	20796-214.5	20797-214.25
 <b>Gooseneck Splitless (4mm)†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	5181-3316 (ea.) 5183-4695 (5-pk.) 5183-4696 (25-pk.)	20798	20799	20800
 <b>Siltek® Gooseneck Splitless (4mm)†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20798-214.1	20799-214.5	20800-214.25
 <b>Gooseneck Splitless (4mm) w/ Wool†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	5062-3587 (ea.) 5183-4693 (5-pk.) 5183-4694 (25-pk.)	22405	22406	22407
 <b>Siltek® Gooseneck Splitless (4mm) w/ Wool†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22405-213.1	22406-213.5	22407-213.25
 <b>Double Gooseneck Splitless (4mm)</b>	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	5181-3315 (ea.) 5183-4705 (5-pk.) 5183-4706 (25-pk.)	20784	20785	20786
 <b>Siltek® Double Gooseneck Splitless (4mm)</b>	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	20784-214.1	20785-214.5	20786-214.25
 <b>Cyclo Double Gooseneck (2mm)</b>	trace, active, dirty samples <2µL	2.0 ID 6.5 OD x 78.5	—	20907	20908	—
 <b>Cyclo Double Gooseneck (4mm)</b>	trace, active, dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20895	20896	20997
 <b>Siltek® Cyclo Double Gooseneck (4mm)</b>	trace, active, dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20895-214.1	20896-214.5	20997-214.25
 <b>Recessed Gooseneck (2mm)**</b>	base easily packs with wool for dirty samples <2µL	2.0 ID 6.5 OD x 78.5	—	20980	20981	20982
 <b>Recessed Gooseneck (4mm)**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20983	20984	20985
 <b>Siltek® Recessed Gooseneck (4mm)**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20983-214.1	20984-214.5	20985-214.25
 <b>Recessed Gooseneck (4mm) w/ Wool**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	22408	22409	22410
 <b>Recessed Double Gooseneck (4mm)**</b>	base easily packs with wool for dirty, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	20986	20987	20988

\*Nominal ID at syringe needle expulsion point.

\*\*Use with two-hole ferrule for dual-column analysis.

†Use this liner for increased sensitivity.

All liners are  
**100%**  
deactivatedAll liners are shipped intermediate  
polarity (IP) deactivated unless  
otherwise requested.

Split Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#	ea.	cat.# 5-pk.	25-pk.
 <b>1mm Split**</b>	for purge & trap inlet splitting or sample <1µL	1.0 ID 6.3 OD x 78.5	18740-80200 (ea.) 5183-4709 (5-pk.)	20972	20973	—
 <b>4mm Split w/ Wool</b>	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	19251-60540 (ea.) 5183-4691 (5-pk.) 5183-4692 (25-pk.)	20781	20782	20783
 <b>Siltek® 4mm Split w/ Wool</b>	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	—	20781-213.1	20782-213.5	20783-213.25
 <b>Laminar Cup Splitter</b>	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20801	20802	—
 <b>mini-Lam™ Split</b>	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20990	20991	—
 <b>Cup Splitter</b>	high & low MW compounds	4.0 ID 6.3 OD x 78.5	18740-80190 (ea.) 5183-4699 (5-pk.)	20709	20710	—
 <b>Siltek® Cup Splitter</b>	high & low MW compounds	4.0 ID 6.3 OD x 78.5	—	20709-214.1	20710-214.5	—
 <b>Cyclosplitter*</b>	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 78.5	—	20706	20707	20708
 <b>2mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	2.0 ID 6.3 OD x 78.5	—	20823	20824	—
 <b>4mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	210-4004-5 (5-pk.)	21022	21023	20979
 <b>Siltek® 4mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	21022-213.1	21023-213.5	20979-213.25
Split/Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 <b>Low Pressure Drop Liner w/ Wool</b>	universal, use with Agilent 6890 GCs	4.0 ID 6.3 OD x 78.5	5183-4647 (ea.) 5183-4701 (5-pk.)	21032	21033	—
 <b>Low Pressure Drop Liner w/ Wool</b>	universal, use with Agilent 6850 GCs	4.0 ID 6.3 OD x 78.5	5183-4711 (ea.) 5183-4712 (5-pk.) 5183-4713 (25-pk.)	20994	20995	20996
CIS4 and PTV Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#		cat.# 10-pk.	
 <b>Straight Glass</b>	general use	2.0 ID 3.0 OD x 71	5183-2036		21157	
 <b>Baffled Glass</b>	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	5183-2037		21704	
 <b>Siltek® Baffled Glass</b>	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	—		21704-214.10	
 <b>Glass w/ Wool</b>	large volume injections	2.0 ID 3.0 OD x 71	5183-2038		21156	
SPME Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
 <b>SPME Liner</b>	ideal for low-volume SPME applications	0.75 ID 6.35 OD x 78.5		21110	21111	

\*Nominal ID at syringe needle expulsion point.

\*\*Use this liner for increased sensitivity.















## tech tip

### Injector Maintenance

Approximately ninety percent of “bad” chromatography is traceable to problems in the injection port. These problems include contaminated carrier gas, incorrect injector flows, active or dirty sites on inlet seals and liners, improper use of wool, leaks, backflash, discrimination, incorrect injector temperature, poor column installation, and use of the wrong injection technique. To minimize injection port problems, set up a routine maintenance schedule and be sure to investigate the injector first when troubleshooting.

## ordering note

For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.

DI Liners for Agilent GCs (For 0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
 1mm Uniliner***†	trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052	21053	
 Siltek® 1mm Uniliner***†	trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052-214.1	21053-214.5	
 Uniliner***	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20335	20336	
 Siltek® Uniliner***	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	<div>All liners are</div> <div>100% deactivated</div> <div>All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.</div>	20335-214.1	20336-214.5	
 Cyclo-Uniliner***	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337	20338	
 Siltek® Cyclo-Uniliner***	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337-214.1	20338-214.5	
 Open-top Uniliner® w/ Wool**	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5			20843	20844
 Siltek® Open-top Uniliner® w/ Wool**	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20843-213.1	20844-213.5	
DI Liners for Agilent 5890 & 6890 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses***	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054	21055	20998
 Siltek® Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054-214.1	21055-214.5	20998-214.25
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	G1544-80730	20756	20771	—
 Double Gooseneck Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	20508	20509	—
 Double Gooseneck Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	G1544-80700	20954	20989	—
 Siltek® 1mm Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	1.0 ID 6.3 OD x 78.5	—	21390-214.1	21391-214.5	—
†Hole in Drilled Uniliner makes direct injection possible with EPC-equipped 6890 GCs!						
				*Nominal ID at syringe needle expulsion point		

\*Hole in Drilled Uniliner® makes direct injection possible with EPC-equipped 6890 GCs!

\*Nominal ID at syringe needle expulsion point.

\*\*These Uniliner® liners are for split/splitless injection ports.

†This liner for use with 0.25, 0.32, or 0.53mm ID columns.

## tech tip

### Drilled Uniliner®

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.



### Siltek® Metal Inlet Liners for Agilent GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (5.2mm ID x 6.3mm OD x 78.5mm)	5-pk.	25-pk.
Cyclo/Single Gooseneck	20974	20975
Single Gooseneck	21702	21703
Cycloplitter®	20726	20729
Split/Splitless w/Wool	21700	21701

**Viton® O-Rings for Agilent GCs**

- Fit split (6.3mm OD) or splitless (6.5mm OD) liners.

Description	Max. temp.	Similar to Agilent part #	qty.	cat.#
Viton® O-Rings for Agilent GCs	250°C	5180-4182	25-pk.	20377

**Graphite O-Rings for Agilent and Varian 1177 GCs**

- Excellent thermal stability at injection port temperatures up to 450°C!

Description	Max. temp.	Similar to Agilent part #	Restek cat.# 10-pk.	50-pk.
6.35mm ID Graphite O-rings for split liners	450°C	5180-4168	20296	20297
6.5mm ID Graphite O-rings for splitless liners	450°C	5180-4173	20298	20299

**Liner Seals for CIS4 and PTV**

Description	Max. temp.	Similar to Agilent part #	Similar to Gerstel part #	qty.	cat.#
Liner Seals for CIS4 and PTV	450°C	5182-9749	007541-005-00	5-pk.	22684



### HANDY septum size chart

Agilent Instrument	Septum Diameter (mm)
5880A, 5890, 6890, 6850, PTV	11
5700, 5880	9.5/10
On-Column Injection	5

**Thermolite® Septa for Agilent GCs**

- Usable to 340°C inlet temperature; precision molded for consistent fit.

Septum Diameter	25-pk.	50-pk.	100-pk.
5mm ( $\frac{1}{16}$ " )	27120	27121	27122
9.5mm ( $\frac{3}{8}$ " )	27135	27136	27137
10mm	27138	27139	27140
11mm ( $\frac{7}{16}$ " )	27141	27142	27143

**IceBlue™ Septa for Agilent GCs**

- Usable to 250°C inlet temperature; precision molded for consistent fit.

Septum Diameter	50-pk.	100-pk.
9.5mm ( $\frac{3}{8}$ " )	27158	27159
10mm	27160	27161
11mm ( $\frac{7}{16}$ " )	27162	27163

**BTO® Septa for Agilent GCs**

- Usable to 400°C inlet temperature; precision molded for consistent fit.

Septum Diameter	50-pk.	100-pk.
5mm CenterGuide™	27100	27101
9.5mm ( $\frac{3}{8}$ " )	27106	27107
10mm	27108	27109
11mm ( $\frac{7}{16}$ " ) CenterGuide™	27110	27111

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



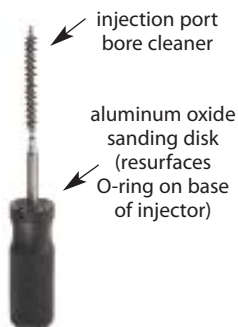
Description	qty.	cat.#
Septum Puller	ea.	20117





## tech tip

Always use the Manual Injection Septum Nut (for 26-gauge needles) for on-column injections.



Make your injection port threads like new!

## Knurled Septum Nuts for Agilent 5890/6890/6850 GC Split/Splitless Injectors

- Tighten easily without the use of a wrench.
- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Thread design and needle guide allow easy penetration and prevent premature septum coring.
- High-quality stainless steel construction.

Description	qty.	cat.#
Knurled Septum Nut, Autosampler (for 23-gauge needles)	ea.	21479
Knurled Septum Nut, Manual Injection (for 26-gauge needles)	ea.	21478

## Septum Nuts for use with Agilent 5890/6890/6850 Split/Splitless Injectors

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Thread design and needle guide allow easy penetration and prevent premature septum coring.
- Manual injection septum nut allows use of 26-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat.#
Autosampler & PTV Septum Nut (for 23-gauge needles)	18740-60835	ea.	20631
Manual Injection Septum Nut (for 26-gauge needles)	18740-60835	ea.	21309

## Septum Nut Removal Tool for Agilent 5890/6890/6850 GCs

- Easily remove the septum nut without touching the heated nut—no more burned fingers!
- Unique, ergonomic handle—easy to grip.

Description	qty.	cat.#
Septum Nut Removal Tool for Agilent 5890/6890/6850 GCs	ea.	24918

## Injector Wrench for Agilent 5890/6890/6850 GCs

- Use to remove the septum nut and weldments during GC maintenance.
- High-quality stainless steel construction.
- Meets original equipment performance.



Use the smaller end to remove the septum nut.



Use the larger end to tighten the split/splitless weldment nut.

Description	Similar to Agilent part #	qty.	cat.#
Injector Wrench for Agilent 5890/6890/6850 GCs	19251-00100	ea.	22065

## Injection Port Repair Tool for Agilent Split/Splitless Injection Ports

- Remove contaminants, achieve a better seal.
- Resurface critical inlet seal areas.



Description	qty.	cat.#
Injection Port Repair Tool for Agilent Split/Splitless Injection Ports	ea.	21393
Replacement Sanding Disks (5 fine & 5 medium)	10-pk.	22689
Replacement Bore Brushes (one 6.5mm & one 7mm)	2-pk.	21353

## Rethreading Tool

- Repair worn or damaged threads in injection ports, fittings, etc.
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction. Unscrew the tool and inspect the threads, repeat as necessary. When done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Rethreading Tool for 1/4" compression fittings (Agilent split/splitless injection ports)	ea.	23018

## Capillary Column Nuts for Agilent 5890/6890 GCs

Available in brass or stainless steel.



for use with "compact"  
Agilent-style ferrules



for use with standard ferrules

Description	Similar to Agilent part #	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.</b>			
Stainless Steel Capillary Column Nut	5181-8830	2-pk.	21884
Brass Capillary Column Nut	5181-8830	2-pk.	21878
<b>For use with standard 1/16"-type ferrules.*</b>			
Stainless Steel Capillary Column Nut	05921-21170	2-pk.	20883
Brass Capillary Column Nut	05921-21170	2-pk.	21879

\*Designed to fit a wider variety of 1/16" ferrules

## Capillary Column Nuts for Agilent 6850 GCs

- Meet or exceed original equipment performance.
- High-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat.#
Capillary Column Nuts for Agilent 6850 GCs	5183-4732	2-pk.	21882



## Finger-Tight Capillary Column Nut

- Rapidly tighten without wrenches; avoid stripped threads.
- Either version can be used with 0.25, 0.32, or 0.53mm ID columns.

Description	Similar to Agilent part #	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.*</b>			
Finger-Tight Capillary Column Nut	5020-8293	ea.	21311
	5020-8292	ea.	21311
<b>For use with standard ferrules.</b>			
Finger-Tight Capillary Column Nut	5020-8293	ea.	21312

\*Similar to Agilent part # 5020-8293 and 5020-8292, except that the Restek nut can be used with Vespe® ferrules.



also **available**

### Ferrules

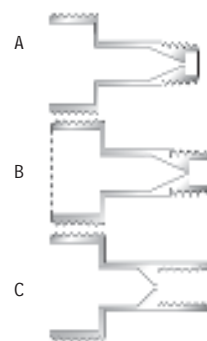
See **pages 31-32** for our listing of ferrules.

## Finger-Tight Capillary Column Nuts

- Allow wrench-free column installations.
- Work with standard or compact (Agilent-style) ferrules.
- Made from high-quality stainless steel.



Description	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.</b>		
A) Finger-Tight Capillary Column Nuts	2-pk.	21040
<b>For use with standard 1/16"-type ferrules.</b>		
B) Finger-Tight Capillary Column Nuts	2-pk.	21041
<b>For use with standard 1/16" compression fittings</b>		
C) Finger-Tight Capillary Column Nuts	2-pk.	21042



## Capillary Installation Gauge

- Seats graphite\* ferrules onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



A

B



Thread...



...tighten...



...done.

Easily seat ferrules for  
consistent  
installations!

Description	qty.	cat.#
A) Capillary Installation Gauge for Agilent-style fittings (compact ferrules)	ea.	21034
B) Capillary Installation Gauge for 1/16" fittings (1/16" ferrules)	ea.	21399

\*Recommended for use with graphite ferrules.



A Dual VespeL® Ring Inlet Seal eliminates the need for a washer!



## Dual VespeL® Ring Inlet Seals

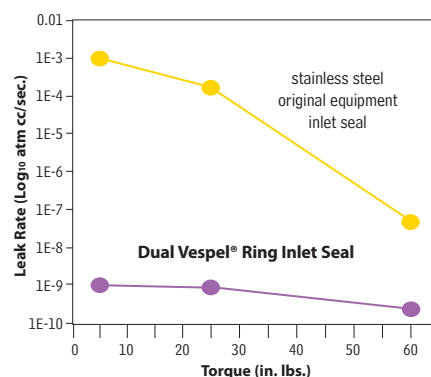
- VespeL® ring embedded in bottom surface eliminates need for washer.
- VespeL® ring embedded in top surface reduces operator variability by requiring minimal torque to seal.
- Prevents oxygen from permeating into the carrier gas, increasing column lifetime.

In Agilent split/splitless injection ports, it can be difficult to make and maintain a good seal with a conventional metal inlet disk. The metal-to-metal seal dictates that you apply considerable torque to the reducing nut, and, based on our testing, this does not ensure a leak-tight seal. Over the course of oven temperature cycling, metal seals are prone to leaks, which ultimately can degrade the capillary column and cause other analytical difficulties.

Our Dual VespeL® Ring Inlet Seal greatly improves injection port performance—it stays sealed, even after repeated temperature cycles, without retightening the reducing nut! This seal features two soft VespeL® rings, one embedded in its top surface and the other embedded in its bottom surface. These rings eliminate the need for a washer, and ensure very little torque is needed to make a leak-tight seal. The rings will not harm the critical seal in the injector body, or any other surface, and are outside the sample flow path. Tests using a high sensitivity helium leak detector show Dual VespeL® Ring Inlet Seals will seal equally effectively at torques from 5 in. lb. to 60 in. lb. (Figure 1).

Why trust a metal-to-metal seal when you can make leak-tight seals quickly and easily—and more reliably—without a washer, with a Restek Dual VespeL® Ring Inlet Seal. Use a stainless steel seal for analyses of unreactive compounds. To reduce breakdown and adsorption of active compounds, use a gold-plated or Siltek®-treated seal. The gold surface offers better inertness than untreated stainless steel; Siltek® treatment provides inertness similar to that of a fused silica capillary column.

**Figure 1** The Dual VespeL® Ring Inlet Seal achieves leak-tight seals even at low torque, reducing the chance of leak-related problems.



Dual VespeL® Ring Inlet Seals are available in gold plating, stainless steel, and Siltek® treated.



Patent pending.

0.8mm ID Dual VespeL® Ring Inlet Seal	2-pk.	10-pk.
Gold-Plated	21240	21241
Siltek® Treated	21242	21243
Stainless Steel	21238	21239
1.2mm ID Dual VespeL® Ring Inlet Seal	2-pk.	10-pk.
Gold-Plated	21246	21247
Siltek® Treated	21248	21249
Stainless Steel	21244	21245

**Replacement Inlet Seals with Washers**

- Special grade of stainless steel that is softer and deforms more easily, creating a better seal.
- Increases column lifetime because oxygen cannot permeate into the carrier gas.
- Reduced noise benefits high-sensitivity detectors (e.g., ECDs, MSDs).
- Siltek® treatment provides inertness similar to fused silica.
- All seals include washers.

**Replacement Inlet Seals for Agilent 5890/6890/6850 Split/Splitless Injection Ports**

The inlet seal at the base of the Agilent 5890/6890 GC injection port contacts the sample and must be changed frequently to prevent adsorption of active compounds. In addition, septum fragments and sample residue accumulate on the disk surface, requiring disk replacement.

The Restek inlet seal design increases column lifetime because oxygen cannot permeate into the carrier gas. Detector noise also is reduced with high-sensitivity detectors (e.g., ECDs or MSDs). To reduce breakdown and adsorption of active compounds, use Siltek® or gold-plated seals.



Note: The 1.2mm inlet seal is recommended for use with Vespel®/graphite ferrules or when installing two columns using a two-hole ferrule.

Single-Column Installation, 0.8mm Opening*		0.25/0.32mm ID Dual-Column Installation, 1.2mm Opening		0.53mm ID Dual-Column Installation ( $\frac{1}{16}$ -inch opening)	
2-pk.	10-pk.	2-pk.	10-pk.	2-pk.	10-pk.
<b>Stainless Steel Inlet Seal</b>					
21315	21316	20390	20391	20392	20393
<b>Gold-Plated Inlet Seal</b>					
21317	21318	21305	21306	—	—
<b>Siltek® Treated Inlet Seal</b>					
21319	21320	21307	21308	—	—

\*0.8mm ID stainless steel inlet seal is similar to Agilent part #18740-20880,

0.8mm ID gold-plated inlet seal is similar to Agilent part #18740-20885.

All seals include washers.

**Replacement Inlet Seal Washers**

Description	Similar to Agilent part #	qty.	cat.#
Replacement Inlet Seal Washers	5061-5869	15-pk.	21710

**Replacement Inlet Cross-Disk Seal for Agilent GCs**

- Ideal for high-flow split applications on Agilent 5890 GCs.
- All seals include washers.

0.8mm ID Cross-Disk Inlet Seal for Agilent GCs	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	5182-9652	20477	20476
Siltek® Treated	—	20475	20474
1.2mm ID Cross-Disk Inlet Seal for Agilent GCs	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	—	21009	21010
Siltek® Treated	—	21011	21012

**Silver PTV Seals for Agilent 6890 GCs**

Description	Similar to Agilent part #	qty.	cat.#
Silver PTV Seals for Agilent 6890 GCs	5182-9763	5-pk.	21409



**Direct Replacement and Siltek® Treated Split/Splitless Injection Ports for Agilent GCs**

Would you like better performance from your injector? Our Siltek® treated split/splitless injector is a direct replacement for Agilent 5890 and 6890/6850 GCs, but Siltek® treatment passivates the metal surface to ensure an inert pathway for the sample, delivering increased performance. The injector is manufactured from high-quality stainless steel and meets or exceeds Agilent original equipment performance.

**Direct Replacement and Siltek® Treated Split/Splitless Injection Port for Agilent 5890 GCs**

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Weldment*	19251-60575	ea.	20265
-Siltek® Weldment**	19251-60575	ea.	20267
-B) Replacement Shell Weldment	19251-80570	ea.	20266
-Siltek® Shell Weldment**	19251-80570	ea.	20268
-O-rings for Agilent Trap Fittings	5180-4181	25-pk.	22064

**Direct Replacement and Siltek® Treated Split/Splitless Injection Port for Agilent 6890/6850 GCs**

Description	Similar to Agilent part #	qty.	cat.#
C) Replacement Weldment with EPC	G1544-60575	ea.	22674
Siltek® Weldment with EPC**	G1544-60575	ea.	22672
D) Replacement Weldment*	19251-60575	ea.	20265
Siltek® Weldment**	19251-60575	ea.	20267
E) Replacement Shell Weldment	G1544-80570	ea.	22673
Siltek® Shell Weldment**	G1544-80570	ea.	22671
F) Optional Split/Splitless Weldment (for use with large canister type filter)	G1544-60585	ea.	22686
Siltek® Optional Split/Splitless Weldment**	G1544-60585	ea.	22670

\*For use with large canister type filter on Agilent 5890 GCs. For use with manual flow only on Agilent 6890/6850 GCs.

\*\*Treated with Restek's exclusive Siltek® treatment for increased inertness.

**Replacement Chemical Traps for Agilent GCs**

- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moisture and hydrocarbons.

Description	Similar to Agilent part #	qty.	cat.#
G) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
H) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032

**Injection Port Weldments for Agilent GCs for use with Purge and Trap Systems**

Easily attach your purge and trap with pre-installed low dead volume fittings.

**For Agilent GCs with Tekmar Purge and Trap Systems**

Description	qty.	cat.#
I) Weldment for Agilent 6890 GCs	ea.	22664
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22668
Weldment for Agilent 5890 GCs	ea.	22666

**For Agilent GCs with OI Purge and Trap Systems**

Description	qty.	cat.#
J) Weldment for Agilent 6890 GCs	ea.	22665
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22669
Weldment for Agilent 5890 GCs	ea.	22667

**tech tip****Installing a New Weldment**

To eliminate possible leaks and damage to the weldment, always replace the split vent line, nut, and ferrule when installing a new shell weldment.



**EPC Test Kit for Agilent 6890 GCs**

- Kit includes 3 O-rings, 2 plugs, 1 mounting screw and 1 test block.

Description	Similar to Agilent part #	qty.	cat.#
EPC Test Kit for Agilent 6890 GCs	G1530-60960*	kit	24323

\*Similar to, but not exact equivalent. Kits differ in parts.

**Heater Cartridge & PRT Sensor for Agilent 5890 GCs**

- Use with 5890 FID and split/splitless weldments.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
A + B) Injector/FID Heater + Injector/FID PRT Sensor	05890-61140	ea.	22068
A) Injector/FID Heater	19231-60620	ea.	22069
B) Injector/FID PRT Sensor	19231-60660	ea.	23035

**Heat Sink for Agilent 5890 GC Split/Splitless Injector**

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Heat Sink for Agilent 5890 GCs	18740-20940	ea.	20409

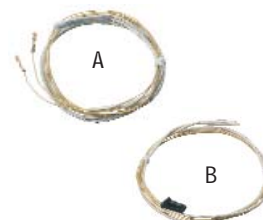
**Heater Block Retaining Nuts for Agilent GC Split/Splitless Injectors**

- Aluminum construction.
- Meet or exceed OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Heater Block Retaining Nut for Agilent 5890 GCs	19251-20620	ea.	22080
Heater Block Retaining Nut for Agilent 6890/6850 GCs	G1544-20590	ea.	23042

**Oven Temp Sensor Assembly**

Description	Similar to Agilent part #	qty.	cat.#
A) Oven Temp Sensor for Agilent 5890 GC	05890-61030	ea.	23040
B) Oven Temp Sensor for Agilent 6890 GC	G1530-61030	ea.	23039

**60psig Backpressure Regulator Kit**

Increase the versatility of your Agilent 5890/6890 GC by replacing the existing 30psig backpressure regulator and gauge with our 60psig regulator. Enables you to use longer 60m and 105m columns as well as shorter 10-meter columns. Includes complete instructions.

Description	Similar to Agilent part #	qty.	cat.#
Backpressure Regulator Kit	19246-60630	kit	20634

**Replacement Chemical Traps for Agilent GCs**

- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moisture and hydrocarbons.

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Chemical Trap for Agilent 6890/6850 GCs	G1544-80550	ea.	22820
B) Replacement Chemical Trap for Agilent 5890 GCs	05890-61260	ea.	21610
C) Replacement Chemical Trap for Agilent 5880 GCs	19362-60500	ea.	21158
D) Split Vent Line for Agilent GCs (32-inch) (Includes all installation hardware.)	19251-80525 G1544-20620	2-pk.	22800
E) O-rings for Agilent Trap Fittings	5180-4181	25-pk.	22064
F) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
G) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032





### Dual-Column *mini-Lam*™ Direct Injection Tee

(for 1/4-inch packed column inlets)

The inverted cup design offers complete sample vaporization and permits larger sample volumes. It incorporates a Press-Tight® taper in each outlet leg, to make a perfect, dead-volume-free connection to each analytical column (ODs ranging from 0.4 to 0.8mm). Allows visual confirmation of the column connection. The open-top design makes it easy to pack with glass wool, keeping sample residue from contaminating the cup.

Description	qty.	cat.#
<i>mini-Lam</i> ™ DI Tee Kit (Includes all fittings and ferrules)	kit	20436
Replacement 4mm <i>mini-Lam</i> ™ DI Tee	ea.	20435

### Low-Volume Injector for Agilent Split/Splitless Injectors

- Attaches to the GC inlet without cutting existing injection port lines.
- Allows injections from a syringe onto the column for purge & trap troubleshooting or calibration.
- Siltek® treatment eliminates adsorption of active compounds.

Our low-volume injector can be installed in a matter of minutes. Remove the septum nut or splitless weldment and insert the Restek low-volume injector through the split injector. Tighten the base nut and you're ready! Includes a 1/16-inch nut, a 1/16-inch ferrule, a base nut and 1/4-inch Vespel®/graphite ferrule, a 1/16-inch capillary nut, a 5-pack of low-bleed plug septa, and a low-mass septum nut. Order appropriate capillary ferrules separately.



Description	qty.	cat.#
Low-Volume Injector for Agilent Split/Splitless Injectors	kit	21692



### Siltek® Septum Packed Purge Port Weldment for Agilent 5890 GCs

Siltek® treatment eliminates adsorption of sensitive compounds (e.g., DDT and endrin). Order Viton® O-rings (below) and appropriate septa (page 9) separately.

Description	Similar to Agilent part #	qty.	cat.#
Siltek® Septum Packed Purge Port Weldment for Agilent 5890 GCs	19243-80570	ea.	21691
Viton® Replacement O-rings	5080-8898	10-pk.	21685

## tech tip

### Minimizing Injector Discrimination

When an injected sample is not completely vaporized, lower percentages of compounds that are less volatile (i.e., compounds with high boiling points or high molecular weights) are transferred into the analytical column. As a result, these later-eluting compounds will have progressively decreased peak areas. You can minimize injector discrimination by reducing injector flows, increasing the injector temperature, using pressure pulse injection or a fast autosampler, or using an injector liner that aids in vaporization (e.g., a laminar cup splitter or a liner packed with wool).

## Direct Injection (DI) Inserts and Liner Adaptor for 1/4-Inch Packed Column Injection Ports (for 0.25, 0.32, & 0.53mm ID columns)

### DI Glass Inserts for Agilent 5890 Packed Column GC

- Tolerances closely controlled.
- Can be removed from the septum nut weldment.



Description	Similar to Agilent part #	qty.	cat.#
DI Glass Inserts for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	5-pk.	20967

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

**SILTEK**<sup>®</sup>  
version available.

### DI Uniliner<sup>®</sup> Liners for Agilent 5890 Packed Column GC

- Press-Tight<sup>®</sup> taper forms dead-volume-free connection to column.
- Minimizes solvent and peak tailing.
- Use with 0.25, 0.32, and 0.53mm ID capillary columns.
- Can be removed from the septum nut weldment.



Description	Fits same liner adaptor as Agilent part #	qty.	cat.#
DI Uniliner <sup>®</sup> Liner for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	ea.	20964
DI Uniliner <sup>®</sup> Liners for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	5-pk.	20965
DI Uniliner <sup>®</sup> Liners for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	25-pk.	20966

### DI Liner Adaptor for Agilent 5890 Packed Column GC

- Uses standard 1/16-inch capillary nut and ferrules.
- Convenient wrench pad at base.
- Includes 1/4-inch graphite ferrule and stainless steel nut.
- Use with Agilent or Restek DI glass inserts or Restek DI Uniliner<sup>®</sup> liners for an Agilent 5890 packed column GC.

Description	Similar to Agilent part #	qty.	cat.#
DI Liner Adaptor for Agilent 5890 Packed Column GC	19244-80540	ea.	21303





For use with 0.25/0.32mm ID columns.

### 1/16-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.25 or 0.32mm ID capillary columns)

We have specially engineered a high-precision, 1/16-inch split/splitless fitting that accepts standard, two-hole capillary ferrules. Our design makes it easier to install capillary columns because the nut protrudes farther from the insulated injection port chamber. The column insertion depth is the same as the original equipment.

Kit includes adaptor fitting, capillary nut, stainless steel inlet seal, washer, and one 0.4mm ID ferrule.

Description	qty.	cat.#
1/16-Inch Capillary Inlet Adaptor Fitting Kit	kit	20633
Replacement Inlet Seal (1.2mm hole)	2-pk.	20390
Replacement Inlet Seal (1.2mm hole)	10-pk.	20391



For use with 0.53mm ID columns.

### 1/8-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.53mm ID capillary columns)

Our specially engineered high-precision, 1/8-inch split/splitless fitting accepts standard two-hole capillary ferrules and a standard 1/8-inch nut. This design makes column installation easy because the nut protrudes farther from the insulated injection port chamber. The column insertion depth is the same as the original equipment.

Kit includes adaptor fitting, capillary nut, stainless steel inlet seal, washer, and one 0.8mm ID two-hole ferrule.

Description	qty.	cat.#
1/8-Inch Capillary Inlet Adaptor Fitting Kit	kit	20645
0.53mm ID Dual-Column Installation (1/16-inch opening)	2-pk.	20392
0.53mm ID Dual-Column Installation (1/16-inch opening)	10-pk.	20393



### Direct Replacement Reducing Nut

- Made from high-quality stainless steel.
- Meets original equipment performance.

Description	Similar to Agilent part #	qty.	cat.#
Reducing Nut	18740-20800	ea.	22078



### Replacement Ferrules for Dual-Column Confirmational Analysis

Use 1/16-inch, two-hole ferrules with the 1/16-Inch Capillary Inlet Adaptor Fitting Kit (cat.# 20633); and 1/8-inch, two-hole ferrules with the 1/8-Inch Capillary Inlet Adaptor Fitting Kit (cat.# 20645).

Two-Hole Ferrule Size	Fits Nut	Fits Column ID	qty.	Vespe <sup>®</sup> / Graphite cat.#
0.4mm (1/16")	1/16"	0.25/0.28mm	5-pk.	20241
0.5mm (1/16")	1/16"	0.32mm	5-pk.	20242
0.8mm (1/8")	1/8"	0.45/0.53mm	5-pk.	20246



### Dual-Column Direct Injection Tee

(for 1/4-inch packed column inlets)

The tee is designed with a glass spiral to promote sample vaporization and to provide even sample distribution to the two columns. The glass spiral also traps sample residue and minimizes the need for guard columns. A Press-Tight<sup>®</sup> taper in each outlet leg facilitates a perfect dead-volume-free connection to each analytical column (OD 0.4 to 0.8mm) and allows visual confirmation of the column connection.

Description	qty.	cat.#
DI Tee Kit (includes all fittings/ferrules)	kit	20412
Replacement Tee	ea.	20411

**Air Diverters for Agilent GCs**

- Divert GC exhaust heat away from the lab bench.
- Meet OEM performance.
- Easy to install—no tools required.

Description	Similar to Agilent part #	qty.	cat.#
Air Diverter for Agilent 5890/6890 GCs	19247-60510	ea.	22076
Air Diverter for Agilent 6850 GCs	G2630-60710	ea.	20926

**MLE Capillary Tool Kit for Agilent GCs**

Includes:

- capillary installation gauge for Agilent GCs
- injector wrench for Agilent GCs
- septum nut removal tool
- $\frac{1}{8}$ ",  $\frac{3}{16}$ ", and  $\frac{1}{4}$ " nylon brushes
- $\frac{1}{4}$ ",  $\frac{3}{8}$ ", and  $\frac{3}{16}$ " stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- $\frac{1}{4}$ " x  $\frac{5}{16}$ " open end wrench
- $\frac{3}{8}$ " x  $\frac{7}{16}$ " open end wrench
- $\frac{7}{16}$ " x  $\frac{1}{2}$ " open end wrench
- $\frac{1}{2}$ " x  $\frac{9}{16}$ " open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insertor tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



new!

Description	qty.	cat.#
MLE Capillary Tool Kit for Agilent GCs	kit	22186



### Injector Wrench for Agilent 5890/6890/6850 GCs

- Use to remove the septum nut and weldments during GC maintenance.
- High-quality stainless steel construction.
- Meets original equipment performance.



Use the smaller end to remove the septum nut.



Use the larger end to tighten the split/splitless weldment nut.

Description	Similar to Agilent part #	qty.	cat.#
Injector Wrench for Agilent 5890/6890/6850 GCs	19251-00100	ea.	22065



Make your injection port threads like new!

### Rethreading Tool

- Repair worn or damaged threads in injection ports, fittings, etc.
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction. Unscrew the tool and inspect the threads, repeat as necessary. When done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Rethreading Tool for 1/4" compression fittings (Agilent split/splitless injection ports)	ea.	23018

### FID/Injector Cleaning Kit

The FID/Injector Cleaning Kit includes:

- Nylon tube brushes (1/8", 3/16", 1/4").
- Pipe cleaner.
- Stainless steel tube brushes (3/8", 3/16", 1/4").
- Stainless steel surface brush.
- Stainless steel jet reamers.
- Emery cloth.



Use Restek's Cleaning Kit with ANY injection port!

Description	qty.	cat.#
FID/Injector Cleaning Kit	kit	20120

### Inlet Liner Removal Tool

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!



Description	qty.	cat.#
Inlet Liner Removal Tool	3-pk.	20181

new!

### Flashlight with Swivel Head

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).



Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187



### Injection Port Split/Splitless Weldment Retaining Ring Pliers

- Easily removes snap ring on split/splitless weldment assemblies.
- Use with Agilent 5890/6890/6850 GCs.

Description	qty.	cat.#
Injection Port Split/Splitless Weldment Retaining Ring Pliers	ea.	26186

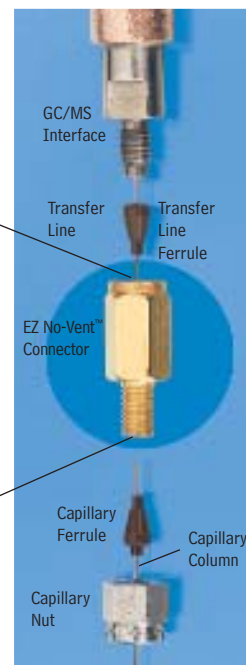
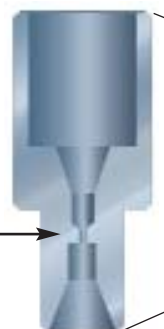
**EZ No-Vent™ GC Column-Mass Spectrometer Connector**

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- Available for Agilent GCs with 5971/5972 or 5973 GC/MS.

We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing. Figure 1 shows the internal structure of the connector.

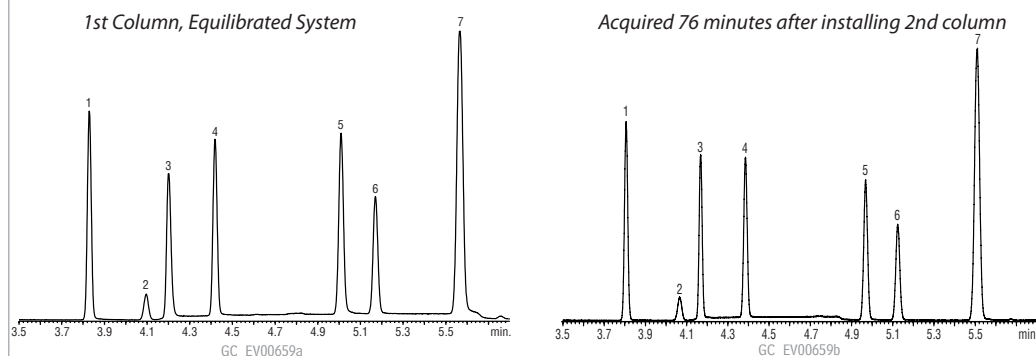
**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

**Laser drilled to 100µm ID**



Change columns in minutes—without venting!

**Figure 2** Sharp, symmetric peaks for gases show the EZ No-Vent™ connector does not add dead volume and allows rapid column changes.



Rtx®-624 60m, 0.25mm ID, 1.4µm (cat# 10969), column direct to source.

Rtx®-624 60m, 0.25mm ID, 1.4µm (cat# 10969) using EZ No-Vent™.

1. dichlorodifluoromethane
2. 1,2-dichlorotetrafluoroethene (Freon® 114)
3. chloromethane
4. vinyl chloride
5. bromomethane
6. chloroethane
7. trichlorofluoromethane

Sample: Volatile Gas Mix 502.2  
Calibration Mix#1 (gases)  
cat# 30042  
Inj.: Purge & Trap  
GC: Agilent 6890  
Inj. temp.: 300°C  
Carrier gas: helium, constant flow  
Flow rate: 1.0mL/min.

Oven temp.: 60°C isothermal  
Det: Agilent 5973 GC/MS  
Transfer line temp.: 280°C  
Scan range: 35-550 amu  
Tune: BFB  
Ionization: EI

Kit installs easily, without special tools or plumbing.

**Description**

EZ No-Vent™ Connector Kit for Agilent 5971/5972 and 5973 GC/MS

Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.

Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:

0.4mm ID (Polyimide)

0.5mm ID (Polyimide)

Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID

Replacement 100µm deactivated transfer line

Replacement EZ No-Vent™ Column Nut

Replacement EZ No-Vent™ Plug

Open-End Wrenches (7/4" x 5/16")

qty.

cat.#

kit 21323

2-pk. 21015

2-pk. 21016

2-pk. 21043

3 ft. 21018

5-pk. 21900

2-pk. 21915

2-pk. 20110

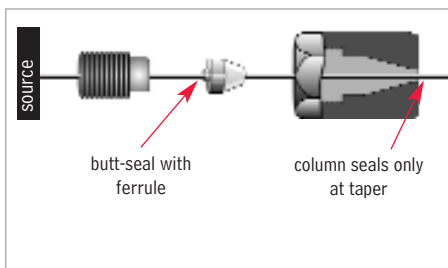


Agilent's MSD interface uses a butt-seal to simultaneously seal the MSD source to the capillary column. This system is prone to leakage. Restek's MSD conversion fitting is designed with two separate seals to reduce the chance of leaks: a crunch washer seals the MSD conversion fitting to the source; a ferrule seals the capillary tubing to the conversion fitting.

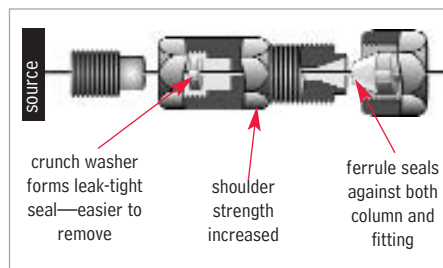
### MSD Conversion Fitting

- A flat, soft aluminum sealing ring deforms and butt-seals against the MSD interface.
- A standard Vespel® ferrule seals the column and 1/16-inch stainless steel nut.
- Fitting is constructed of nickel-plated brass for longevity and softness.
- Use any standard Vespel® or Vespel®/graphite 1/16-inch ferrule.
- Includes a 1/16-inch stainless steel nut and two replacement sealing rings. Order ferrules separately.

**Agilent Design**



**Improved Restek Design**



Description	qty.	cat.#
MSD Conversion Fitting	ea.	21314
Replacement Ring Seal for MSD Conversion Fitting	2-pk.	21313

Improved design!



### MSD Source Nut

- 1.2mm nut bore permits easy removal of ferrules with a standard tapered-needle file (cat.# 20106).
- Made of brass to prevent thread-stripping on the transfer line.
- Improved design enhances ease of threading onto the transfer line and improves overall lifetime.

Description	Similar to Agilent part #	qty.	cat.#
(Detector) MSD Source Nut	05988-20066	2-pk.	20643

### Capillary Installation Gauge for Agilent 5973/5975 MS

- Seats ferrules onto column for consistent installations.
- Made from high-quality stainless steel.



Install the nut and ferrule onto the column, then insert the column through the installation tool, exposing several centimeters at the exit end. Tighten the nut.



Score and remove the exposed end of the column, then loosen the nut.



The ferrule will be properly seated and should remain in place when light force is applied. Install the column into the GC/MS interface.

Description	Similar to Agilent part #	qty.	cat.#
Capillary Installation Gauge for Agilent 5973/5975 MS	G1099-20030	ea.	21894



### Gold Tip Transfer Line

- For use with Agilent 5971/5972 MS Systems.
- Gold-plated for inertness.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Gold Tip Transfer Line	05971-20305	ea.	24699

**Replacement Interface with Bellows for Agilent 5971/5972 MS**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Interface with Bellows for Agilent 5971/5972 MS	05971-60302	ea.	22659

**Replacement Interface Guide Tube for Agilent 5971/5972 MS**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Interface Guide Tube for Agilent 5971/5972 MS	05971-20307	ea.	22660

**Replacement Cold Sensor for Agilent 5971/5972 MS Diffusion Pump**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Cold Sensor for Agilent 5971/5972 MS Diffusion Pump	3103-0145	ea.	22661

**Replacement Diffusion Pump Fan Assemblies for Agilent 5971/5972 MS**

- 110/120 VAC

Description	Similar to Agilent part #	qty.	cat. #
Replacement Diffusion Pump Fan Assembly for Agilent 5971 MS	05971-60540	ea.	22662
Replacement Diffusion Pump Fan Assembly for Agilent 5972 MS	05972-60540	ea.	22663

**Rough Pump Oil #19 for MSD Pumps, Oil Vacuum Pump**

- Formulated from crude oil stocks known for their durability and line lubricating qualities.
- Use in Agilent 5973/5972/5971 and GCD mass spec systems, or in other manufacturers' MSD systems that require rough pump oil.
- Under average use, the oil in the foreline rough pump should be replaced every six months.

Description	Similar to Agilent part #	qty.	cat. #
Rough Pump Oil for MSD Pumps	6040-0834	1 liter	22687

**Ion Source Cleaning Powder**

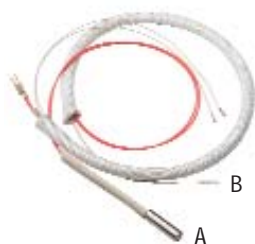
- Use this aluminium oxide powder to clean surfaces that contact the sample or ion beam when you encounter poor sensitivity and inadequate abundances at high masses.

Description	Similar to Agilent part #	qty.	cat. #
Ion Source Cleaning Powder	8660-0791	1 kg.	22685



## Heater Cartridge & PRT Sensor for Agilent 5890 GCs

- Use with 5890 FID and split/splitless weldments.
- Meets or exceeds OEM performance.



Description	Similar to Agilent part #	qty.	cat.#
A + B) Injector/FID Heater + Injector/FID PRT Sensor	05890-61140	ea.	22068
A) Injector/FID Heater	19231-60620	ea.	22069
B) Injector/FID PRT Sensor	19231-60660	ea.	23035

## FID Collector Housing Kits for Agilent GCs

- Meets or exceeds OEM performance.



Description	Similar to Agilent part #	qty.	cat.#
FID Collector Housing Kit for Agilent 5890 GCs (includes collector body, spanner nut, and silicone washer—order mount separately)	19231-20920	kit	23037
FID Collector Housing Kit for Agilent 6890 GCs (includes collector body, silicone washer, nut, and mount)	G1531-20550	kit	23045
FID Collector Housing for Agilent 6890 GCs	G1531-20740	ea.	23044
Replacement Silicone Washers for FID Collector Housing for Agilent 5890/6890 GCs	5180-4165	12-pk.	23064



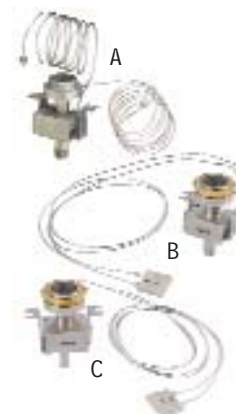
## FID Collector Mount for Agilent GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
A) FID Collector Mount for Agilent 5890 GCs	19231-20930	ea.	23036
B) FID Collector Mount for Agilent 6890 GCs	G1531-20550	ea.	23043

## FID Base Weldment for Agilent GCs

- Meets or exceeds OEM performance.
- Includes brass nut.



Description	Similar to Agilent part #	qty.	cat.#
A) FID Base Weldment for Agilent 5890 GCs	19231-80580	ea.	23041
B) FID Base Weldment, Pack Column FID, for Agilent 6850/6890 GCs	G1531-80580	ea.	23052
C) FID Base Weldment, Capillary Column FID, for Agilent 6850/6890 GCs	G1531-80630	ea.	23053

## Spanner Wrench for Agilent 5890/6890/6850 FID Collector Assemblies

- Easily remove the nut from the FID collector without damaging the nut.
- Unique, ergonomic handle—easy to grip.



Remove FID ignitor castle.



Easily loosen the nut by aligning the two pins on the bottom of the wrench with the two open slots on the nut...



...then turn counterclockwise...



...and remove.

Description	Similar to Agilent part #	qty.	cat.#
Spanner Wrench for Agilent 5890/6890/6850 FID Collector Assembly	19231-00130	ea.	22329

### Direct Replacement FID Collector Assembly for Agilent 5890 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Collector Assembly (includes insulators)	19231-60690	kit	23010
FID Collector Assembly w/Siltek® Ignitor Castle	—	kit	21131

### Replacement FID Parts for Agilent 5890 GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
	19231-20970		
	19231-20960		
A) FID Collector (includes insulators)	19231-20950	ea.	21138
	19231-20940		
B) FID Collector Nut and Washer	5181-3311	set	21136
C) FID Ignitor*	19231-60680	ea.	21001
D) FID Ignitor Castle	19231-20910	ea.	21137
Siltek® FID Ignitor Castle	—	ea.	21135

\*Also fits OI Analytical 4410 detector (similar to OI part # 191833).



**SILTEK®**  
versions available.

### Direct Replacement FID Collector Assembly for Agilent 6890/6850 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Collector Assembly (includes insulator)	G1531-60690	kit	21699
FID Collector Assembly w/Siltek® Ignitor Castle	—	kit	21132

### Replacement FID Parts for Agilent 6890/6850 GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
	G1531-20690		
A) FID Collector (includes insulators)	G1531-20700	ea.	21139
	19231-20940		
B) FID Collector Nut and Washer	5181-3311	set	21136
C) FID Ignitor*	19231-60680	ea.	21001
D) FID Ignitor Castle	19231-20910	ea.	21137
Siltek® FID Ignitor Castle	—	ea.	21135

\*Also fits OI Analytical 4410 detector (similar to OI part # 191833).



### Direct Replacement FID Flow Measuring Adaptor for Agilent 5890/6890/6850 GCs

- Makes setting flows easy.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Flow Measuring Adaptor	19301-60660	ea.	21000



## Replacement Jets

### Standard Version

- Engineered with a fluted tip to guide the capillary column into the jet.
- Threads specially coated for easy installation and removal.
- Special processing ensures the highest degree of cleanliness.

### High-Performance Version

- Similar to the standard version, but Siltek® treated.
- Extremely inert, use with active compounds.

### Capillary Adaptable FID Replacement Jet for Agilent 5890/6890/6850 GCs (0.011-inch ID tip)

Description	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	19244-80560	ea.	20670	3-pk.	20671
High-Performance Siltek® Treated	19244-80560	ea.	20672	3-pk.	20673

### Capillary Dedicated FID Replacement Jet for Agilent 6890/6850 GCs

0.011-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	G1531-80560	ea.	21621	3-pk.	21682
High-Performance Siltek® Treated	G1531-80560	ea.	21620	3-pk.	21683

### Packed Column Replacement Jets for Agilent 5890/6890/6850 GCs

0.018-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	18710-20119	ea.	21694	3-pk.	21695
High-Performance Siltek® Treated	18710-20119	ea.	21696	3-pk.	21697

0.030-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	18789-80070	ea.	21688	3-pk.	21689
High-Performance Siltek® Treated	18789-80070	ea.	21686	3-pk.	21687

## tech tip

### Which FID Jet Should I Use?

There are two FID jet configurations for Agilent GCs. The longer "adaptable" jet fits both 5890 and 6890 GCs, and can be used with capillary or packed columns. The shorter "dedicated" jet is for the FID in the 6890 GC that is designed only for use with capillary columns.

restek  
innovation!

### FID Jet Removal Tool for Agilent 5890/6890/6850 FIDs

- Securely grips jet in socket for easy removal or installation.
- Unique, ergonomic handle—easy to hold.



Slip tool  
over FID  
jet...



...loosen  
jet...



...and  
remove.

Description	qty.	cat.#
FID Jet Removal Tool for Agilent 5890/6890/6850 FIDs	ea.	22328

### Torx® Screwdriver Set

- Set includes TR-10, TR-15, and TR-20.
- Ideal for performing routine maintenance on Agilent 6890 GCs.

Description	qty.	cat.#
Torx® Screwdriver Set	set	23034

### Detector Plug Nut

Use Restek's detector plug nut to cap off a detector for thermal cleaning, to check detector or make-up gas flow rates, or to prevent hydrogen from accidentally diffusing into the oven from an unused detector base.

Description	Similar to Agilent part #	qty.	cat. #
Detector Plug Nut	5020-8294	2-pk.	21883



### FID/NPD Adaptor Fitting

- Easy to use, sturdy, compact stainless steel fitting.
- 1/16-inch nut uses standard graphite or Vespel®/graphite ferrules.
- Wrench pad won't turn when installing a capillary column.
- Includes 1/4- and 1/16-inch stainless steel nuts, and 1/4-inch Vespel® and 0.4mm ID graphite ferrules.

Description	qty.	cat. #
FID/NPD Adaptor Fitting	kit	20884



### FID/NPD Capillary Adaptor Fitting for Agilent 5890/6890/6850 GCs

- High-quality stainless steel construction.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID/NPD Capillary Adaptor Fitting	19244-80610	ea.	22077



### TCD Adaptor Fitting

Description	Similar to Agilent part #	qty.	cat. #
TCD Adaptor Fitting	19302-80020 G1532-80540	ea.	20269



### ECD/FID Dual-Purpose Make-Up Gas Kit

Incorporates a better make-up gas flow profile and a straight section of inert Siltek® tubing as the capillary guide. To add make-up gas to an FID, remove the tubing guide and insert an FID jet tail. A direct replacement fitting with a special end connector is available for GCs factory-equipped with make-up gas. A complete kit is available for plumbing GCs that are not factory-equipped with make-up gas. Complete kit includes make-up gas fitting, Siltek® treated guide, 1/4" nut and ferrules, 1/16" nut, 0.4mm ID graphite ferrule, and fine metering valve.

Description	qty.	cat. #
ECD/FID Dual-Purpose Make-Up Gas Kit	kit	21300
ECD/FID Replacement Fitting for Restek Make-up Gas Kit	ea.	21324
Replacement ECD/FID Siltek® Guide	2-pk.	21302
ECD/FID Direct Replacement Fitting (includes 1/4" nut, Vespel®/graphite ferrule, 1/16" nut, 0.4mm ID graphite ferrule)	ea.	21301



Rugged design!

### FID Gauge Pack for Agilent 5890 GCs

Pressure regulators and gauges for air & hydrogen. The 1/8-inch bulkhead allows easy hookup to instrument. Rated for inlet pressures to 250psi, outlet pressures of 0 to 60psi.

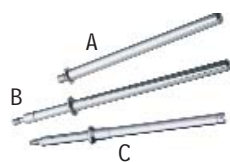
Description	qty.	cat. #
FID Gauge Pack for Agilent 5890 GCs	ea.	22071



## Autosampler Parts

### Replacement Parts for Agilent Autosamplers

- All parts meet or exceed OEM performance.



### Injector Mounting Posts for Agilent Autosamplers

Description	Similar to Agilent part #	qty.	cat.#
A) Injector Mounting Post for Agilent 7673 Series Autosamplers for use with 5890 GCs	18597-60805	ea.	21236
B) Injector Mounting Post for Agilent 7673 Series Autosamplers for use with 6890 GCs	07673-21140	ea.	21237
C) Injector Mounting Post for Agilent 7683 Series Autosamplers	G2613-20500	ea.	21172



### Turret Tray Assembly for Agilent 5890/6890 GC

- Holds sample, waste and solvent vials.

Description	qty.	cat.#
Turret Tray Assembly for Agilent 5890/6890 GC	ea.	22855



### Autosampler Plunger Carrier Belt

Description	Similar to Agilent part #	qty.	cat.#
Autosampler Plunger Carrier Belt for Agilent 7673A and 7673B	07673-61275	ea.	22695



### Carriage Motor Belt

Description	Similar to Agilent part #	qty.	cat.#
Carriage Motor Belt for Agilent 7673A and 7673B	1500-0676	ea.	22692

new!



### Z-Belt for Agilent 7673B Autosampler

Description	Similar to Agilent part #	qty.	cat.#
Z-Belt for Agilent 7673B Autosampler	1500-0803	ea.	22332



### Carriage Motor

Description	Similar to Agilent part #	qty.	cat.#
Carriage Motor for Agilent 7673A and 7673B	07673-60890	ea.	22693



new!

### Injector Turret Motor for Agilent 7673A & 7673B Injectors

Description	Similar to Agilent part #	qty.	cat.#
Injector Turret Motor for Agilent 7673A & 7673B Injectors	07673-60810	ea.	22337

## Replacement Cables

### (for Agilent GCs, Integrators, & Autosamplers)

- Priced less than original equipment.
- Instructions and wiring diagrams included.
- Manufactured with only the highest-quality components.

Connect an Agilent 5890 GC to an Agilent integrator (for second Inet integrator).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60610	6 ft.	ea.	20650
Replacement Cables	35900-60610	6 ft.	2-pk.	20651

## did you know?

Restek provides  
pin schematics.



Connect an Agilent 5890 GC to an Agilent 3396 integrator to enable remote starts (non-Inet connection from GC to integrator).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	03394-60560	6 ft.	ea.	20654



Connect an Agilent 3396 integrator to remote-start another piece of equipment or to start the Agilent 3396 integrator from that other piece of equipment.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	03394-60540	6 ft.	ea.	20655
Replacement Cables	03394-60540	6 ft.	2-pk.	20656



Connect an Agilent 5890 GC to a non-Agilent integrator or standard strip chart recorder.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	05890-60800	6 ft.	ea.	20652
Replacement Cables	05890-60800	6 ft.	2-pk.	20653



Connect an Agilent 5890 GC to remote-start another piece of equipment or to start the Agilent 5890 GC from that piece of equipment.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	05890-61080	6 ft.	ea.	20657



Connect an Agilent 3396 integrator to a non-Agilent GC.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60630	6 ft.	ea.	20658
Replacement Cables	35900-60630	6 ft.	2-pk.	20659



Connect an Agilent 5890 GC to an Agilent 35900C Interface or to an Agilent 7673A Autosampler to enable remote starts.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60700	6 ft.	ea.	20660
Replacement Cables	35900-60700	6 ft.	2-pk.	20661



Automatic liquid sampler stop/start cable for Agilent GCs.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	G1530-60930	7 ft.	ea.	20929



Connect an Agilent 6890 GC to a PC 9F/9F (RS232).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	G1530-60600	6 ft.	ea.	22694





### GC Racer by Zip Scientific

- Saves time and money by increasing throughput.
- Makes fast GC possible with any capillary GC column.
- Easy to operate and install—truly a “plug and use” accessory.

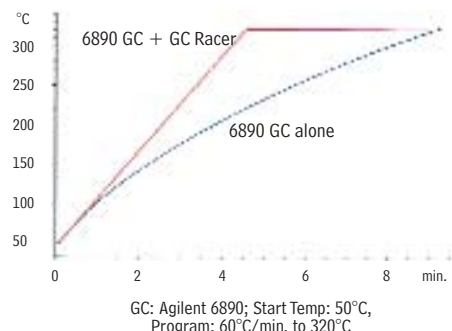
Fast gas chromatographic temperature programs can speed up elution of high boiling point compounds and late eluters, but often are not used to maximum advantage. The Agilent 5890 has a maximum temperature program rate of 70°C/min., but the factory heating elements in the 5890 only allow this maximum rate to be maintained up to a temperature of 100°C. The Agilent 6890 allows a maximum ramp rate of 75°C/min. at starting temperatures of 50–70°C and 20°C/min. at starting temperatures of 300–450°C.\* For analysts trying to push temperature ramps as fast as possible, these restricted program rates can lead to longer analysis time and broader peaks.

The GC Racer system will maintain a temperature program rate of 70°C/min. up to 350°C or 60°C/min. to temperatures as high as 450°C in an Agilent 5890 or a rate of 70°C/min. up to 400°C in an Agilent 6890.

Restek and Zip Scientific have teamed up to bring you the GC Racer temperature programmer, a system that enhances conventional ovens with an auxiliary heater that is controlled by the GC. The GC Racer consists of a control unit and a resistive heating element that is placed on the floor of the GC oven. The heating element is connected to the controller, which is plugged into the main PC board of the GC and into a 120V standard grounded wall outlet. When the GC Racer controller detects that the factory heating elements are not keeping up with the programmed heating rate, the GC Racer heater is brought into the circuit to augment the heat being supplied to the oven.

The auxiliary heater design is similar to that of the original GC heater. At no time during the installation of the GC Racer system is the column removed from the oven, or disconnected from the detector or injection port.

**Figure 1** Faster temperature programs increase sample throughput.



### a plus 1 story

“We tried a GC Racer Temperature Programmer from Restek and now we want more! With the GC Racer, we can perform high

speed temperature programming to get the results we need, and we can use conventional columns and fittings. This is a great time and cost savings for us. Not only that, but, with this system, we don’t experience any leaks at the fittings, so we can use it with our mass spectrometer. All this for an economical price.”

**Josh Hildabrand**, Chemist, and **William Mock**, Lab Manager, Environmental Science Corporation

The simplicity of its components and installation make the Zip Scientific GC Racer system a valuable tool in the quest for high-speed GC, and a must-have add-on accessory for every 5890 or 6890 GC. The speed of analysis that can be achieved and the ease of installation will lead to direct savings of time and money by decreasing run time and increasing sample throughput.

### for more info

GC Racer brochure  
(lit. cat.# 59297) and  
Applications Note  
(lit. cat.# 59457)

Download your free printable  
pdfs from our website.



Description	voltage	qty.	cat.#
GC Racer for Agilent 5890 Series II (only) GC	120 volt	ea.	23024
GC Racer for Agilent 5890A (only) GC	120 volt	ea.	23025
GC Racer for Agilent 6890 (only) GC	120 volt	ea.	23028

\*Use of high voltage and amperage or a special insert purchased with the GC will allow slightly higher ramp rates.

**Vespel® Ferrules**

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

**Graphite Ferrules**

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

**Vespel®/Graphite Ferrules**

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.



Vespel® ferrules

**Capillary Ferrules—For 1/16-Inch Compression-Type Fittings**

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

**Encapsulated Ferrules—For 1/16-Inch Compression Fittings**

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.

Ferrule ID	Fits Column ID	qty.	cat. #
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038



Reusable!

**Compact Ferrules—For Agilent 5890/6890/6850 GCs**

Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
0.4mm	0.25/0.28mm	10-pk.	20250	20238
0.4mm	0.25/0.28mm	50-pk.	20251	20239
0.5mm	0.32mm	10-pk.	21007	20248
0.5mm	0.32mm	50-pk.	21008	20249
0.8mm	0.45/0.53mm	10-pk.	20252	20263
0.8mm	0.45/0.53mm	50-pk.	20253	20264
1.0mm	0.75mm*	10-pk.	21059	21056
1.6mm	1.00mm*	10-pk.	21061	21057



\*For micropacked columns.

\*\*For 0.28mm MXT® columns.

## Standard Ferrules—For 1/16", 1/8", and 1/4-Inch Fittings



Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223

## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings



Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246

## Reducing Ferrules



Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings



Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.



Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## tech tip

### Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference. Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas. Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespel®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles. Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

**Universal Press-Tight® Connectors**

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

**Universal Angled Press-Tight® Connectors**

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484

**Universal “Y” Press-Tight® Connectors**

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

**Universal Angled “Y” Press-Tight® Connectors**

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469

**Universal “X” Press-Tight® Connectors**

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266

**Polyimide Resin**

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat.#
Polyimide Resin	350°C	5 grams	20445





Patent pending.

Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

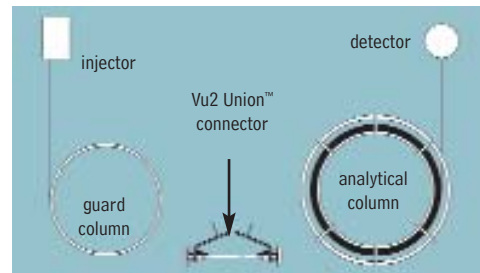
- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

#### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

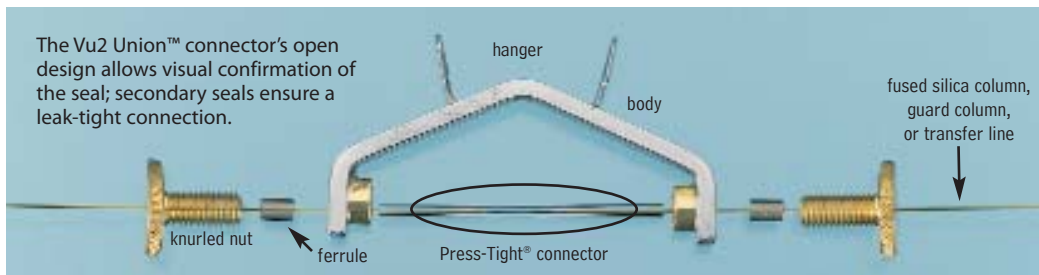
A guard column connected to an analytical column by a Vu2 Union™ connector.



#### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or our website).



Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors



Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.



Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

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• 34 •

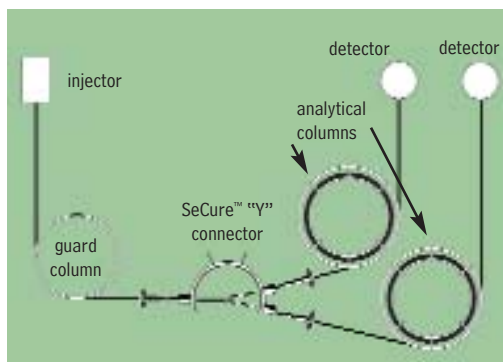
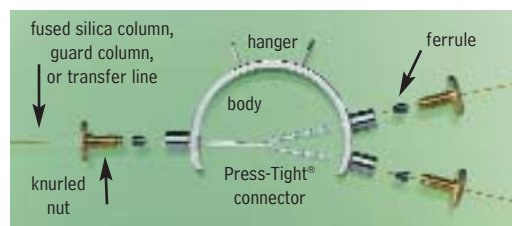
**SeCure™ “Y” Connector Kits**

- Connect two analytical columns to a transfer line or guard column.
- Use standard “Y” Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

Combine the simplicity of a “Y” Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ “Y” Connector’s open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.

Dual-column confirmational analysis with a single injection—one of the SeCure™ “Y” connector’s many uses.



Patent pending.

Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ “Y” connector body, 3 knurled nuts, “Y” Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ “Y” Connector Kit	0.25/0.28mm	kit	20276
SeCure™ “Y” Connector Kit	0.32mm	kit	20277
SeCure™ “Y” Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

**Universal “Y” Press-Tight® Connectors**

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

**Graphite Ferrules for SeCure™ “Y” Connectors**

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



## please note

Use for fused silica-to-fused silica or fused silica-to-metal connections.

**MXT™ Low-Dead-Volume Connector Kits for Metal Columns are also available.** See our general catalog or our website.

### MXT™-Union Connector Kits for Fused Silica Columns

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.



### MXT™-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384



### MXT™ “Y”-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

### 1/32-Inch Replacement Nut

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

### Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.



### 1/32-Inch Adaptor Ferrule (Valcon Polyimide)

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

### 1/4-Inch–3/16-Inch Open-End Wrenches

High-quality miniature wrenches to use with MXT™ low-dead-volume connectors.



Description	qty.	cat.#
1/4"-3/16" Open-End Wrenches	2-piece set	20388

## tech tip

### Coupling GC Columns

An MXT™ connector is a good alternative to a glass connector when coupling GC columns. This connector is constructed from stainless steel and will not break; it uses ferrules for sealing. The design ensures low dead volume, and Siltek® treatment ensures the MXT™ connector is inert—both features help minimize peak tailing. MXT™ connectors can be used to connect metal to metal, metal to fused silica, or fused silica to fused silica tubing. When connecting metal tubing, use 1/32-inch stainless steel ferrules (see our general catalog or visit [www.restek.com](http://www.restek.com)); for fused silica tubing, use Valcon polyimide adaptor ferrules (see above).

**Thermal Gas Purifier\***

- Removes oxygen, water, carbon monoxide, carbon dioxide, hydrocarbons (except methane) to ppb levels—pure enough for MS.
- Packed with reactor-grade, pure getter material for maximum efficiency and no contamination.
- Welded end-fittings on getter tubes eliminate leaks.
- Each tube has 12L oxygen and 35L water vapor capacity.
- Maximum flow: 1 liter/minute.

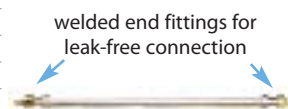
The getter material in Restek's re-engineered line of thermal gas purifiers reacts chemically with impurities in the carrier gas stream. Because the reaction is non-reversible, there is no possibility of contaminants breaking through the thermal gas purifier.

Gas purification is very economical when you use a thermal gas purifier. Getter tubes normally require changing only once per year; heavy use or very impure feed gas may require more frequent getter tube replacement.

<b>Restek Single-Tube Thermal Gas Purifier, 110 Volt (1 tube included)**</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings	ea.	21496
1/4" Fittings	ea.	21497
<b>Restek Dual-Tube Thermal Gas Purifier, 110 Volt (2 tubes included)**</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings	ea.	21498
1/4" Fittings	ea.	21499
<b>Replacement Getter Tube</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings (Similar to Supelco part# 2-2396)	ea.	21661
1/4" Fittings (Similar to Supelco part# 2-2398)	ea.	21660

\*Use with helium or nitrogen carrier gas only. Do not use with hydrogen, oxygen, or air—a violent reaction and/or fire will occur.

\*\*Single-tube model dimensions: 15" x 7" x 6" (38 x 17.8 x 15.2 cm). Dual-tube model dimensions: 15" x 10" x 6" (38 x 25.4 x 15.2 cm).

**Single-Tube Model****Dual-Tube Model**

Dimensions: 13" x 1/2"  
(33 x 1.3 cm)

**Pressure Gauge Kit**

- Use an in-line pressure gauge to indicate when the Thermal Gas Purifier getter tube should be replaced.
- Includes 1/8" tee and 0–100 psi gauge.

<b>Description</b>	<b>qty.</b>	<b>cat.#</b>
In-line Pressure Gauge Kit for Thermal Gas Purifiers	kit	21657



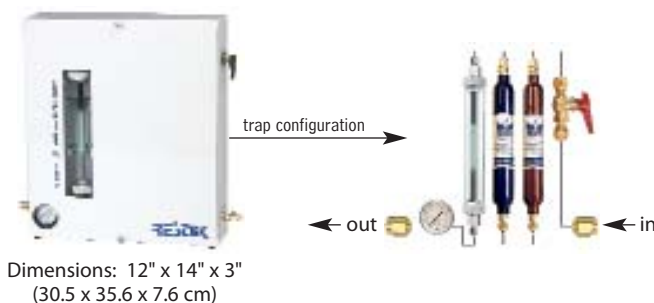
Always know the status of the Thermal Gas Purifier getter tube: change tube when pressure drops below 10psi.

**Restek Gas Management System**

- Removes moisture, hydrocarbons, and oxygen from carrier gas, extending column lifetime.
- Produces high-purity carrier gas for most applications.
- Includes one each: moisture, hydrocarbon, and indicating oxygen trap.
- Replacing traps is safe and easy.
- Maximum flow: 1 liter/minute.

**did you know?**

The Restek Gas Management System removes water vapor (to 10ppb), hydrocarbons (to 0.1ppm), and oxygen (to less than 0.1ppm) with three traps housed in one unit.



<b>Description</b>	<b>qty.</b>	<b>cat.#</b>
Restek Gas Management System (includes fittings for 1/8" and 1/4" gas line)	ea.	21999
<b>Replacement Traps</b>	<b>qty.</b>	<b>cat.#</b>
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010



## did you know?

All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

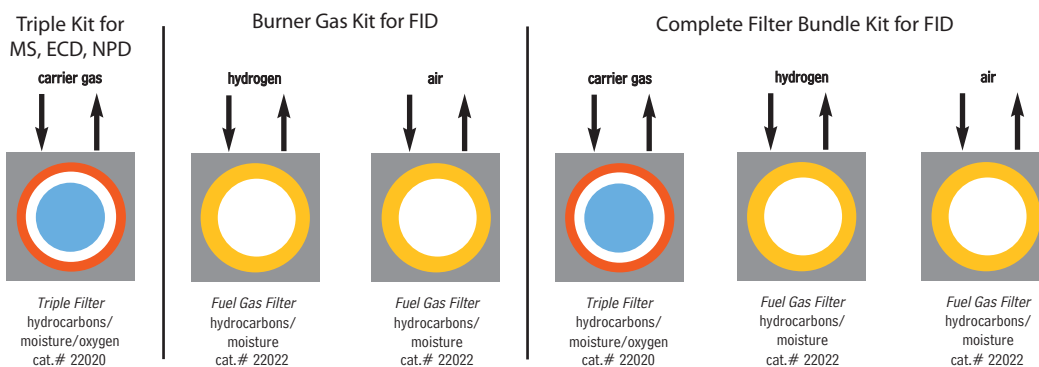
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure or Maximum Flow Rates	Use for:	Indicator Color Change	H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Capacity Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.# 22028	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>3</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>3</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>3</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	> 99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>3</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

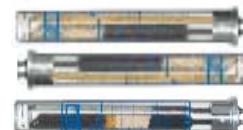
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

- Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

- Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

- Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

- Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

- To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833





**Kelli Steindl**  
GC Accessories Associate  
Product Marketing  
Manager  
2+ years of service!

### Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters (page 39), Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.



Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

NOTE: Super-Clean™ Gas Filters are recommended for purifying non corrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

### Click-On Inline Super-Clean™ Traps and Connector Kits



Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463

**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat.#
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat.#
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat.#
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat.#
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat.#
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



**Dual-Stage Ultra-High-Purity Brass Regulators**

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

**Single-Stage Ultra-High-Purity Brass Regulators**

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)



Produce zero air and pure hydrogen from one unit!

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**ordering note**

For **international orders**, please add the appropriate power cord suffix from the table below.

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)!

lit. cat.# 580051

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge FID Gas Station Maintenance Kit	ea.	21671
Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge. *Zero air inlet requires minimum of 10psig compressed air pressure.	ea.	24915

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat.# suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555

[www.restek.com](http://www.restek.com)

### Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/16" OD	21500	21501	21502
0.02" ID	1/8" OD	21503	21504	21505
0.03" ID	1/8" OD	21506	21507	21508
0.04" ID	1/8" OD	21509	21510	21511
0.085" ID	1/4" OD	21512	21513	21514
0.21" ID	1/2" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.



### ordering note

Required length in meters  
x 3.2808 = length in feet.

### ordering note

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item

### Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Chromatographically free of background contamination.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### cleaned

All tubing is cleaned and ready to use.

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.

Description	qty.	cat.#
GC Installation Kit	kit	21325



### tech tip

#### Plumbing a GC

It is essential to use clean chromatographic-grade tubing to plumb a GC. Standard-grade tubing contains residual hydrocarbon contaminants from the drawing process. These contaminants migrate into the gas stream, elevating background noise and causing down time.

For the *ultimate*  
in inertness, use

**SILTEK®**  
tubing.

See our catalog or  
website.



## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.

Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185



## Ridgid™ Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.

Description	qty.	cat.#
Ridgid™ Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012



## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134



CE

8" x 6 1/4" x 4 1/4"  
(20.3 x 15.9 x 10.8 cm)  
Weight: 11 lbs. (5.0 kg)

## SSI TC-20 Tube Cutting Machine

- Cuts 1/16", 1/8", or 1/4" tubing with inside diameter as small as 0.008".
- Electrically operated bench-top model.
- Handy dressing tool on the swing arm removes burrs and reams tubing.
- Voltage selectable 110–120/220–240 volts, 50–60Hz.\*

Description	qty.	cat.#
SSI Tubing Cutter Machine	ea.	23029
SSI Replacement Cutting Wheels	3-pk.	23030

\*Unit shipped set for 110–120 operating voltage. Switch to 220–240 volts by using alternate fuse and power cord (included).

## Tubing Dressing Tool

- Same tool as included with the SSI tube cutting machine.



Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

## Tubing Bender

- Bends 1/8-inch, 3/16-inch, or 1/4-inch tubing.
- Accurate left-hand, right-hand, or offset bends.



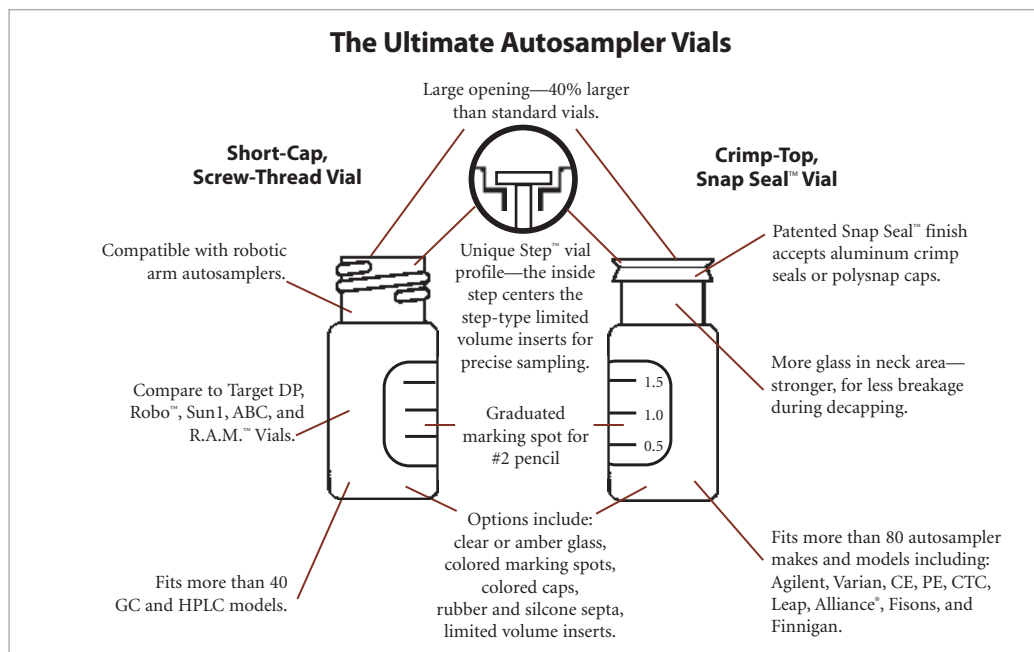
Description	qty.	cat.#
Tubing Bender	ea.	23009



## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.

Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



### Snap Seal™ Vials: The Versatile Crimp Top Vial

- Purchase only one vial type, but use any crimp capping system.
- Seal securely with a standard aluminum crimp seal, a Poly Crimp™ Seal, or a variety of Snap-Top Cap™ designs.
- Crimp tightly—the neck finish provides a tighter seal when using the new Poly Crimp™ Seal, Snap-Top Cap™ or aluminum crimp seal.
- Seal tightly—the unique design seals securely using septum of proper thickness.
- 40% larger opening than standard crimp-top vials.
- Autosampler compatible—the unique Step™ vial design precisely centers a limited-volume insert in the vial neck. This ensures dependable, reliable use with autosamplers—even autosamplers with robotic arms.
- Less breakage—more glass in the neck area minimizes breakage during decapping.
- Bags of mixed color caps aid in coding special samples, controls, or standards.



### Catalog Number Cross-Reference: Vials for Agilent Autosamplers

Similar to Agilent Part #	Restek Cat. #	Description	Page
5181-1210	21174	Aluminum Crimp Seals, PTFE/Rubber, 100-pk.	46
5181-1270	24513	50µL Polypropylene Spring Inserts, 100-pk.	46
5181-3376	24385	2mL Amber Crimp-Top Vials, 100-pk.	46
5181-3377	24517	350µL Glass Flat Bottom Inserts, 1000-pk.	46
5182-0543	24383	2mL Clear Crimp-Top Vials, 100-pk.	46
5182-0549	24518	250µL Polypropylene Bottom Spring Inserts, 100-pk.	46
5182-0552	24359	Aluminum Crimp Seals, PTFE/Silicone, 100-pk.	46
5182-0714	21154	2mL Clear Screw-Top Vials - No Marking Spot, 100-Pk.	47
5182-0715	21140	2mL Clear Screw-Top Vials, 100-pk.	47
5182-0716	21142	2mL Amber Screw-Top Vials, 100-pk.	47
5182-0717	24473	9mm Screw-Top Closures, PTFE/Rubber, 100-pk.	47
5182-0720	24485	9mm Screw-Top Closures, PTFE/Silicone, 100-pk.	47
5182-0723	24497	9mm Screw-Top Closures, PTFE/Silicone/PTFE, 100-pk.	47
5183-2068	21141	2mL Clear Screw-Top Vials, 1000-pk.	47
5183-2069	21143	2mL Amber Screw-Top Vials, 1000-pk.	47
5183-4492	24384	2mL Clear Crimp-Top Vials, 1000-pk.	46
5183-4493	24386	2mL Amber Crimp-Top Vials, 1000-pk.	46
5183-4498	21175	Aluminum Crimp Seals, PTFE/Rubber, 1000-pk.	46
5183-4500	24360	Aluminum Crimp Seals, PTFE/Silicone, 1000-pk.	46
9301-0978	24651	100µL Polypropylene Limited Volume Vials, 100-pk.	46
9301-0977	24653	100µL Glass/Plastic Limited Volume Vials, 100-pk.	46

← cross-reference

## 11mm Vials



### Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish

#### Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153



for **more** info

see **page 48** for crimpers and decappers.

#### 11mm Aluminum Crimp Seals with Septa

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370



#### Convenience Kits: Vials, Caps, & Septa

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649



#### Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.



#### Limited Volume Vials, 11mm Crimp-Top

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

Agilent Compatible!

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

Ideal for Agilent 7673 & other autosamplers that process 12 x 32mm crimp-top vials.

**Headspace Vials****Headspace Autosampler Vials**

Description	100-pk.	1000-pk.
6mL Clear Vial	21166	21167
10mL Clear Vial, Flat Bottom	24683	24684
10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Flat Bottom	24685	24686
20mL Clear Vial, Rounded Bottom	21162	21163
27mL Clear Vial	21160	21161

**20mm Aluminum Seals w/Septa, Assembled**

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.



new!

Safer than removing caps with pliers, knife or screwdriver blades!



### Aluminum Seal Crimpers and Decappers

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!



Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738

### Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

### Decapping has never been easier!

one...



two...



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

**Standard MICROLITER™ Syringes for Agilent 7673, 7683, and 6850 Autosamplers**

- Hamilton and SGE syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are designed to withstand multiple, rapid injections through a septum.

for **more** info

See **page 52** for Needle Gauge Chart and Needle Point Style drawings.



Hamilton 10µL, Autosampler Cemented Needle for  
Agilent 7673, 7683, 6850 Autosamplers

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton			Restek
					Model	cat.#	qty.	cat.#
0.5µL	ASRN	23s	1.71"	Agilent	7000.5	86276	ea.	24895
0.5µL	ASRN	26s	1.71"	Agilent	7000.5	86274	ea.	21221
5µL	ASRN	23s	1.71"	Agilent	75	87957	ea.	20172
5µL	ASN	23s	1.71"	Agilent	75	87987	ea.	20168
5µL	ASN	23s	1.71"	Agilent	75	87990	6-pk.	20170
5µL	ASN	26s	1.71"	Agilent	75	87988	ea.	24592
5µL	ASN	26s	1.71"	Agilent	75	87989	6-pk.	21230
5µL	ASRN	23s-26s	1.71"	Agilent	75	87959	ea.	21223
5µL	ASN	23s-26s	1.71"	Agilent	75	87993	ea.	24593
5µL	ASN	23s-26s	1.71"	Agilent	75	87994	6-pk.	24594
10µL	ASRN	23s	1.71"	Agilent	701	80357	ea.	20171
10µL	ASN	23s	1.71"	Agilent	701	80387	ea.	20167
10µL	ASN	23s	1.71"	Agilent	701	80390	6-pk.	20169
10µL	ASRN	26s	1.71"	Agilent	701	80358	ea.	24597
10µL	ASN	26s	1.71"	Agilent	701	80388	ea.	24595
10µL	ASN	26s	1.71"	Agilent	701	80389	6-pk.	24599
10µL	ASRN	23s-26s	1.71"	Agilent	701	80359	ea.	24598
10µL	ASN	23s-26s	1.71"	Agilent	701	80393	ea.	24596
10µL	ASN	23s-26s	1.71"	Agilent	701	80391	6-pk.	24600



SGE Removable Needle for Agilent 7673, 7683,  
6850 Autosamplers

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE			Restek
					Model	cat.#	qty.	cat.#
0.5µL	R	23	42mm	Cone	0.5BR-HP-0.63	000410	ea.	24791
0.5µL	R	26	42mm	Cone	0.5BR-HP-0.47	000400	ea.	24790
5µL	R	23	42mm	Cone	5R-HP-0.63	001815	ea.	24793
5µL	F	23	42mm	Cone	5F-HP-0.63	001810	ea.	24781
5µL	F	23	42mm	Cone	SK-5F-HP-0.63	001814	6-pk.	24783
5µL	R	26	42mm	Cone	5R-HP-0.47	001805	ea.	24792
5µL	F	26	42mm	Cone	5F-HP-0.47	001800	ea.	24780
5µL	F	26	42mm	Cone	SK-5F-HP-0.47	001804	6-pk.	24782
5µL	R	23-26s	42mm	Cone	5R-HP-0.63/0.47	001825	ea.	21211
5µL	F	23-26s	42mm	Cone	5F-HP-0.63/0.47	001821	ea.	21210
5µL	F	23-26s	42mm	Cone	SK-5F-HP-0.63/0.47	001822	6-pk.	21214
10µL	R	23	42mm	Cone	10R-HP-0.63	002815	ea.	24795
10µL	F	23	42mm	Cone	10F-HP-0.63	002810	ea.	24785
10µL	F	23	42mm	Cone	SK-10F-HP-0.63	002814	6-pk.	24787
10µL	R	26	42mm	Cone	10R-HP-0.47	002805	ea.	24794
10µL	F	26	42mm	Cone	10F-HP-0.47	002800	ea.	24784
10µL	F	26	42mm	Cone	SK-10F-HP-0.47	002804	6-pk.	24786
10µL	R	23-26s	42mm	Cone	10R-HP-0.63/0.47	002825	ea.	21213
10µL	F	23-26s	42mm	Cone	10F-HP-0.63/0.47	002821	ea.	21212
10µL	F	23-26s	42mm	Cone	SK-10F-HP-0.63/0.47	002822	6-pk.	21215

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler Cemented Needle  
(ASRN) Autosampler Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

## GASTIGHT® Teflon®-Tipped Syringes for Agilent 7673, 7683, and 6850 Autosamplers



Hamilton 10µL Gas-Tight Syringe

## Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
5µL	ASN	23s	1.71"	Agilent	175	80074	ea.	24893
10µL	ASN	23s	1.71"	Agilent	1701	80080	ea.	24894
10µL	ASRN	23s	1.71"	Agilent	1701	80087	ea.	21224
10µL	ASRN	26s	1.71"	Agilent	1701	80088	ea.	21228
10µL	ASRN	23s–26s	1.71"	Agilent	1701	80089	ea.	21229

## SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	23	42mm	Cone	10F-HP-GT-0.63	002812	ea.	24789
10µL	R	23	42mm	Cone	10R-HP-GT-0.63	002818	ea.	24797
10µL	R	23–26	42mm	Cone	10R-HP-GT-0.63/0.47	002829	ea.	21220

## Guide to Needle Termination Codes

## Hamilton:

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

## SGE:

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

## Large Volume Syringes for Agilent 7673, 7683, and 6850 Autosamplers

## SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
25µL	R	23	42mm	Cone	25R-HP-0.63	003665	ea.	24798
50µL	R	23	42mm	Cone	50R-HP-0.63	004665	ea.	24799
100µL	R	23	42mm	Cone	100R-HP-0.63	005665	ea.	24800
250µL	R	23	42mm	Cone	250R-HP-0.63	006665	ea.	24801

## Replacement Needles for Agilent 7673, 7683, and 6850 Autosampler Syringes



## Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–10µL	23s	1.71"	Agilent	7786-01	6-pk.	20164
5–10µL	26s	1.71"	Agilent	7786-02	6-pk.	20165
5–10µL	23s–26s	1.71"	Agilent	7785-01	6-pk.	20166

## Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	42mm	Cone	033715	ea.	24821
5µL	23	42mm	Cone	036720	2-pk.	24823
5µL	26	42mm	Cone	036710	2-pk.	24822
10µL	23	42mm	Cone	037717	2-pk.	24825
10µL	26	42mm	Cone	037715	2-pk.	24824
25–250µL	23	42mm	Cone	038717	2-pk.	24826

**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.

for **more** info

See **page 52** for Needle Gauge Chart and Needle Point Style drawings.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek cat.#
					Model	cat.#		
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek cat.#
					Model	cat.#		
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 52.

## Gas-Tight Syringes

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub



#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944



#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

## did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

#### Needle Point Style



**Point Style 2, BV:** Beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

## Part Number Cross Reference

Similar to Agilent Part #	Restek Part #	Page	Product Name	Similar to Agilent Part #	Restek Part #	Page	Product Name
G1099-20030	21894	22	Capillary Installation Gauge	500-2114	20250	31	Compact Ferrules
G1530-60600	22694	29	Replacement Cable	5020-8292	21311, 21312	11	Finger-Tight Capillary Column Nuts
G1530-60930	20929	29	Replacement Cable	5020-8293	21311, 21312	11	Finger-Tight Capillary Column Nuts
G1530-60960	24323	15	EPC Test Kit	5020-8294	21883	27	Detector Plug Nut
G1530-61030	23039	15	Oven Temp Sensor	5061-5869	21710	13	Replacement Inlet Seal Washers (15-pk.)
G1530-80650	22076	19	Air Diverter	5062-3506	20212	31	Capillary Ferrules
G1531-20550	23043	24	FID Collector Mount	5062-3508	20211	31	Capillary Ferrules
G1531-20550	23045	24	FID Collector Housing Kit	5062-3538	20213	31	Capillary Ferrules
G1531-20690	21139	25	FID Collector	5062-3580	20241	18, 32	Replacement Ferrules
G1531-20700	21139	25	FID Collector	5062-3581	20242	18, 32	Replacement Ferrules
G1531-20740	23044	24	FID Collector Housing	5062-3587	22405	6	Gooseneck Splitless Liner (4mm) w/ Wool
G1531-60690	21699	25	FID Collector Assembly	5080-8732	20964, 20965	17	DI Uniliner Liners for Packed Column GC
G1531-80560	21620, 21621	26	FID Jets (.011")		20966, 20967		
	21682, 21683			5080-8773	20252	31	Compact Ferrules
G1531-80580	23052	24	FID Base Weldment, Pack Column FID	5080-8898	21685	16	Viton Replacement O-rings (10-pk.)
G1531-80630	23053	24	FID Base Weldment, Capillary Column FID	5180-4165	23064	24	Replacement Silicone Washers for FID Collector Housing
G1532-80540	20269	27	TCD Adaptor Fitting	5180-4168	20296, 20297	9	Graphite O-rings for split liners
G1544-20590	23042	15	Heater Block Retaining Nut	5180-4173	20298, 20299	9	Graphite O-rings for splitless liners
G1544-20620	22800	15	Split Vent Line for Agilent GCs (32-inch)	5180-4181	22064	14, 15	O-rings for Agilent Trap Fittings (25-pk.)
G1544-60575	22672, 22674	14	Weldment with EPC	5180-4182	20377	9	Viton O-Rings for Agilent GCs (25-pk.)
G1544-60585	22670, 22686	14	Optional Split/Splitless Weldment	5181-1210	21174	46	Aluminum Seals, Silver Seal, PTFE/Natural Rubber Septa
G1544-60610	23031	14, 15	Optional Split Vent Trap Assembly	5181-1267	21212, 24596	49	10µL Standard Microliter Syringes
G1544-80530	23032	14, 15	Replacement Traps and O-rings	5181-1270	24513	46	50µL Glass, Big Mouth, Bottom Spring Vial Inserts
G1544-80550	22820	15	Replacement Chemical Trap	5181-1273	21210, 24593	49	5µL Standard Microliter Syringes
G1544-80570	22671, 22673	14	Shell Weldment	5181-3311	21136	25	FID Collector Nut and Washer
G1544-80700	20954, 20989	8	Double Gooseneck Drilled Unliners	5181-3315	20784	6	Double Gooseneck Splitless Liner (4mm)
G1544-80730	20756, 20771	8	Drilled Unliners	5181-3316	20798	6	Gooseneck Splitless Liner (4mm)
G2613-20500	21172	28	Injector Mounting Post	5181-3319	20166	50	Needles for 5-10µL Syringes (6-pk.)
G2630-60710	20926	19	Air Diverter	5181-3321	21213, 24598	49	10µL Standard Microliter Syringes
03394-60540	20655, 20656	29	Replacement Cable	5181-3360	21215, 24600	49	10µL Standard Microliter Syringes (6-pk.)
03394-60560	20654	29	Replacement Cable	5181-3376	24385	46	2.0mL Amber Glass Vial
05890-60800	20652, 20653	29	Replacement Cable	5181-3377	24517	46	350µL Glass, Flat Bottom Vial Insert
05890-61030	23040	15	Oven Temp Sensor	5181-3382	20964, 20965	17	DI Uniliner Liners for Packed Column GC
05890-61080	20657	29	Replacement Cable		20966, 20967		
05890-61140	22068	15, 24	Injector/FID Heater + Injector/FID PRT Sensor	5181-3395	20400	33	Press-Tight Connector
05890-61260	21610	15	Replacement Chemical Trap	5181-3396	20429	33	Deactivated Press-Tight Connector
05921-21170	20883, 21879	11	Capillary Column Nuts (2-pk.)	5181-3397	20405	33	"Y" Press-Tight Connector
05971-20305	24699	22	Gold Tip Transfer Line	5181-3398	20405-261	33	Deactivated "Y" Press-Tight Connector
05971-20307	22660	23	Replacement Interface Guide Tube	5181-8809	24789, 24894	50	10µL Gas-Tight Syringes
05971-60302	22659	23	Replacement Interface with Bellows	5181-8811	20164	50	Needles for 5-10µL Syringes
05971-60540	22662	23	Replacement Diffusion Pump Fan Assembly		24825		
05972-60540	22663	23	Replacement Diffusion Pump Fan Assembly	5181-8813	21224, 24797	50	10µL Gas-Tight Syringes
05988-20066	20643	22	(Detector) MSD Source Nut (2-pk.)	5181-8818	20712	6	2mm Splitless Liner
07673-21140	21237	28	Injector Mounting Post	5181-8830	21878, 21884	11	Capillary Column Nuts (2-pk.)
07673-60810	22337	28	Injector Turret Motor	5182-0543	24383	46	2.0mL Clear Glass Vials
07673-60890	22693	28	Carriage Motor	5182-0549	24518	46	250µL Polypropylene Vial Inserts
07673-61275	22695	28	Autosampler Plunger Carrier Belt	5182-0552	24359	46	Silver Seal, PTFE/Silicone Septa Vials
1500-0676	22692	28	Carriage Motor Belt	5182-0714	21154	47	2.0mL Clear Vial
1500-0803	22332	28	Z-Belt	5182-0715	21140	47	2.0mL Clear Vial
18597-60805	21236	28	Injector Mounting Post	5182-0716	21142	47	2.0mL Amber Vial
18710-20119	21694, 21695	26	FID Jets (.018")	5182-0717	24473	47	9mm Screw-Top Caps, Blue Cap, PTFE/Natural Rubber Liner
	21696, 21697			5182-0720	24485	47	9mm Screw-Top Caps, Blue Cap, PTFE/Silicone Liner
18740-20800	22078	18	Reducing Nut	5182-0723	24497	47	9mm Screw-Top Caps, Blue Cap, PTFE/Silicone/PTFE Liner
18740-20880	21315, 21316	13	Replacement Inlet Seal (0.8mm hole)	5182-0830	24821	50	Needles for 0.5µL Syringes
18740-20885	21317, 21318	13	Replacement Inlet Seal (0.8mm hole)	5182-0834	20172, 24793	49	5µL Microliter Syringes
18740-20940	20409	15	Heat Sink	5182-0835	21211, 21223	49	5µL Microliter Syringes
18740-60835	20631, 21309	10	Septum Nuts	5182-0875	20170, 24783	49	5µL Microliter Syringes (6-pk.)
18740-80190	20709	7	Cup Splitter Liner	5182-9652	20476, 20477	13	Replacement Inlet Seals (0.8mm ID)
18740-80200	20972	7	1mm Split Liner	5182-9749	22684	9	Liner Seals for C15A and PTV (5-pk.)
18740-80220	20914	6	2mm Splitless Liner (quartz)	5182-9763	21409	13	Silver PTV Seals (5-pk.)
18789-80070	21686, 21687	26	FID Jets (.030")	5183-2036	21157	7	Straight Glass Liner (10-pk.)
	21688, 21689			5183-2037	21704	7	Baffled Glass Liner (10-pk.)
19231-00130	22329	24	Spanner Wrench for FID Collector Assembly	5183-2038	21156	7	Glass Liner w/ Wool (10-pk.)
19231-20910	21137	25	FID Ignitor Castle	5183-2068	21141	47	2.0mL Clear Vial
19231-20920	23037	24	FID Collector Housing Kit	5183-2069	21143	47	2.0mL Amber Vial
19231-20930	23036	24	FID Collector Mount	5183-4492	24384	46	2.0mL Clear Glass Vial
19231-20940	21136	25	FID Collector Nut and Washer	5183-4493	24386	46	2.0mL Amber Glass Vial
19231-20950	21138	25	FID Collector	5183-4498	21175	46	11mm Aluminum Seals, Silver Seal, PTFE/Natural Rubber Septa
19231-20960	21138	25	FID Collector				
19231-20970	21138	25	FID Collector	5183-4500	24360	46	11mm Crimp Seals, Silver Seal, PTFE/Silicone Septa
19231-60620	22069	15, 24	Injector/FID Heater	5183-4647	21032	7	Low Pressure Drop Liner w/ Wool
19231-60660	23035	15, 24	Injector/FID PRT Sensor	5183-4691	22401, 20782	6, 7	4mm Split and Splitless Liners w/ Wool (5-pk.)
19231-60680	21001	25	FID Ignitor	5183-4692	22402, 20783	6, 7	4mm Split and Splitless Liners w/ Wool (25-pk.)
19231-60690	23010	25	FID Collector Assembly	5183-4693	22406	6	Gooseneck Splitless Liner (4mm) w/ Wool (5-pk.)
19231-80580	23041	24	FID Base Weldment	5183-4694	22407	6	Gooseneck Splitless Liner (4mm) w/ Wool (25-pk.)
19243-80570	21691	16	Septum Packed Purge Port Weldment	5183-4695	20799	6	Gooseneck Splitless Liner (4mm) (5-pk.)
19244-80540	21303	17	DI Liner Adaptor for Packed Column GC	5183-4696	20800	6	Gooseneck Splitless Liner (4mm) (25-pk.)
19244-80560	20670, 20671	26	FID Jets	5183-4699	20710	7	Cup Splitter Liner (5-pk.)
	20672, 20673			5183-4701	21033	7	Low Pressure Drop Liner w/ Wool (5-pk.)
19244-80610	22077	27	FID/NPD Capillary Adaptor Fitting	5183-4703	20713	6	2mm Splitless Liner (5-pk.)
19246-60630	20634	15	Backpressure Regulator Kit	5183-4704	20714	6	2mm Splitless Liner (25-pk.)
19247-60510	22076	19	Air Diverter	5183-4705	20785	6	Double Gooseneck Splitless Liner (4mm) (5-pk.)
19251-00100	22065	10, 20	Injector Wrench	5183-4706	20786	6	Double Gooseneck Splitless Liner (4mm) (25-pk.)
19251-20620	22080	15	Heater Block Retaining Nut	5183-4707	20915	6	2mm Splitless Liner (quartz) (5-pk.)
19251-60540	22400, 20781	6, 7	4mm Split and Splitless Liners w/ Wool	5183-4709	20973	7	1mm Split Liner (5-pk.)
19251-60575	20265, 20267	14	Weldment	5183-4711	20994	7	Low Pressure Drop Liner w/ Wool
19251-80525	22800	15	Split Vent Line for Agilent GCs (32-inch)	5183-4712	20995	7	Low Pressure Drop Liner w/ Wool (5-pk.)
19251-80570	20266, 20268	14	Shell Weldment	5183-4713	20996	7	Low Pressure Drop Liner w/ Wool (25-pk.)
19301-60660	21000	25	FID Flow Measuring Adaptor	5183-4732	21882	11	Capillary Column Nut (2-pk.)
19302-80020	20269	27	TCD Adaptor Fitting	6040-0834	22687	23	Rough Pump Oil for MSD Pumps
19362-60500	21158	15	Replacement Chemical Trap	8660-0791	22685	23	Ion Source Cleaning Powder
210-3003	20772	6	4mm Splitless Liner	9301-0713	20167, 24785	49	10µL Standard Microliter Syringes
210-3003-5	20773	6	4mm Splitless Liner (5-pk.)	9301-0714	24595, 24784	49	10µL Standard Microliter Syringes
210-4004-5	21023	7	4mm Split Precision Liner w/ Wool (5-pk.)	9301-0725	20169, 24787	49	10µL Standard Microliter Syringes (6-pk.)
3103-0145	22661	23	Replacement Cold Sensor for MS Diffusion Pump	9301-0891	24592, 24780	49	5µL Standard Microliter Syringes
35900-60610	20650, 20651	29	Replacement Cables	9301-0892	20168, 24781	49	5µL Standard Microliter Syringes
35900-60630	20658, 20659	29	Replacement Cables	9301-0977	24653	46	100µL Glass Insert/Clear Plastic Vial
35900-60700	20660, 20661	29	Replacement Cables	9301-0978	24651	46	100µL Polypropylene Vial
500-1210	20445	33	Polyimide Resin				

# Restek is here for **you**



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

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# Genuine Restek Replacement Parts for Thermo Scientific GCs

A collection of Restek replacement parts for Thermo Scientific GCs, including a large glass syringe, a metal band, two circular filters (one teal, one orange), a small metal band, a metal ring, a metal pin, a metal tube, a metal cap, and a small brown vial with a white cap.

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## Chromatography Products

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# From Injector to Detector

Restek is your #1 source for consumables and supplies for Thermo Scientific GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—  
easy to hold and  
operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks with the adaptor fitting.



Leak Detector is easily accessed when stored in the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

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## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for amines and basic compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

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## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

	qty.	Wool	FS Beads	CarboFrit™†
	ea.	-200.1	-201.1	-209.1
	5-pk.	-200.5	-201.5	-209.5
	25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

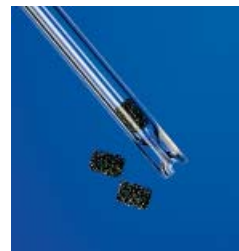
**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-insertor tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Insertor Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Insertor Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181



No more burned fingers!















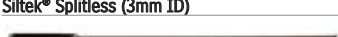


**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to

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## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for Thermo Scientific 4000-5000-6000 Series GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Laminar Cup Splitter	high MW compounds	4.0 ID 5.4 OD x 79.5	—	20809	20810	—
	Cyclosplitter*	dirty samples, many injections before cleaning required	4.0 ID 5.4 OD x 79.5	—	20817	20818	—
	Cup Splitter Gooseneck	high & low MW compounds	4.0 ID 5.4 OD x 79.5	—	20885	20886	—
Splitless Liners for Thermo Scientific 4000-5000-6000 Series GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Splitless (2mm ID)	trace samples	2.0 ID 5.4 OD x 79.5	—	20811	20812	20813
	Splitless (4mm ID)	trace samples	4.0 ID 5.4 OD x 79.5	—	20814	20815	20816
DI Liners for Thermo Scientific 4000-5000-6000 Series GCs (0.32/0.53 ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Open-top Uniliner* w/ Wool	trace, dirty, active samples, high recovery & linearity	4.0 ID 5.4 OD x 79.5	—	20841	20842	—
Split Liners for Thermo Scientific TRACE™ and Focus SSL		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap & fast GC	1.0 ID 8.0 OD x 105	453 20075	20916	20917	—
	3mm Split	universal	3.0 ID 8.0 OD x 105	453 20030	20936	20937	20938
	5mm Split	universal	5.0 ID 8.0 OD x 105	453 20031	20939	20940	20941
	Laminar Cup Splitter	high MW compounds	4.0 ID 8.0 OD x 105	—	20948	20949	—
	Cup Splitter	high & low MW compounds	4.0 ID 8.0 OD x 105	—	20950	20951	—
	5mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	5.0 ID 8.0 OD x 105	—	22288	22289	—
Splitless Liners for Thermo Scientific TRACE™ and Focus SSL		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Splitless (3mm ID)	trace samples	3.0 ID 8.0 OD x 105	453 20032	20942	20943	20944
	Siltek® Splitless (3mm ID)	trace samples	3.0 ID 8.0 OD x 105	—	20942-214.1	20943-214.5	20944-214.25
	Splitless (5mm ID)	trace samples	5.0 ID 8.0 OD x 105	453 20033	20945	20946	20947
	Double Gooseneck	trace, active samples up to 4µL	4.0 ID 8.0 OD x 105	—	20952	20953	—
	5mm Splitless Precision™ Liner w/ Wool	dirty samples, trace samples	5.0 ID 8.0 OD x 105	—	21028	21029	—








\*Nominal ID at syringe needle expulsion point.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

ordering **note**

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Split Liners for Thermo Scientific TRACE™ PTV	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
 1mm ID Glass Liner	trace samples, high recovery & linearity	1.0 ID 2.75 OD x 120	453 22054	21114	21115	—
 2mm ID Glass Liner	universal	2.0 ID 2.75 OD x 120	453 22045	21116	21117	—
 Baffle Liner	trace samples	2.0 ID 2.75 OD x 120	—	22074	22075	—
 Siltek® Baffle Liner	trace samples	2.0 ID 2.75 OD x 120	—	22074-214.1	22075-214.5	—
DI Liners for Thermo Scientific TRACE™ and Focus SSL (0.32 & 0.53mm ID columns)	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
 Uniliner® w/ Wool	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	21005	21006	—
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	22411	22412	—
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	22413	22414	—

\*Nominal ID at syringe needle expulsion point.

## tech tip

### DI Liners for Thermo Scientific TRACE™ & Focus SSL

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

## Siltek® Treated Metal Inlet Liners for Thermo Scientific GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (5.0mm ID x 8.0mm OD x 105mm)	ea.	5-pk.
5mm ID Split/Splitless Siltek® Treated Metal Inlet Liners w/Wool	—	21004
Liner Type (2.75mm OD x 120mm)	ea.	5-pk.
1mm ID Split/Splitless Siltek® Treated Metal Inlet Liners*	21080	21081
2mm ID Split/Splitless Siltek® Treated Metal Inlet Liners*	21082	21083
Liner Type (0.8mm ID x 2.75mm OD x 120mm)	ea.	5-pk.
SPME Siltek® Treated Metal Inlet Liner for TRACE™ 2000 GCs & PTV Inlets	22598	22599

\*Works with PTV injectors.



## Inlet Liner Seals for TRACE™ PTV

Description	Max. temp.	Similar to TS part #	qty.	cat.#
Inlet Liner Seals for TRACE™ PTV	450°C	29013417	2-pk.	21392



## Graphite Sealing Ring for TRACE™ and Focus SSL Instruments

Description	Max. temp.	Similar to TS part #	qty.	cat.#
Graphite Sealing Ring for TRACE™ and Focus SSL Instruments	450°C	290-334-06	ea.	21898
Graphite Sealing Rings for TRACE™ and Focus SSL Instruments	450°C	290-334-06	2-pk.	21899



**Silver Seals for TRACE™ and Focus SSL**

Description	Similar to TS part #	qty.	cat.#
A) Silver Seal for Split/Splitless Injector	29033629	10-pk.	23057
A) Silver Seal for Split/Splitless Injector	29033629	20-pk.	23058
B) Silver Seal for Capillary Detector Base Body	29037100	10-pk.	23059
B) Silver Seal for Capillary Detector Base Body	29037100	20-pk.	23060

**Adapters for Capillary Columns on TRACE™ 2000 Series**

- Use standard 1/16" ferrules.
- Use same installation distance as OEM adapters with M4 ferrules.
- Made of high-quality stainless steel.



Description	Similar to TS part #	qty.	cat.#
Adapter for Capillary Column on Detector Base	347-254-36	ea.	24916
Adapter for Capillary Column on Split/Splitless Injector	347-054-51	ea.	24917

**Graphite Ferrules—For M4 Fittings for TRACE™ and Focus SSL**

Ferrule ID	Fits Column ID	Similar to TS part #	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	—	22221	22222
0.4mm	0.18/0.28mm	290-13488	20280	20281
0.5mm	0.32mm	290-13487	20282	20283
0.8mm	0.45/0.53mm	290-13486	20284	20285

**17mm Septa for TRACE™ and Focus SSL**

- Precision molded, for consistent, accurate fit.



Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27150	50-pk.	27168	50-pk.	27116
50-pk.	27151	100-pk.	27169	100-pk.	27117
100-pk.	27152				

**9.5mm Septa for TRACE™ 2000 Series**

- Precision molded, for consistent, accurate fit.



Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27135	50-pk.	27158	50-pk.	27106
50-pk.	27136	100-pk.	27159	100-pk.	27107
100-pk.	27137				

**Septum Holder Kit for TRACE™ 2000 Series**

- Includes septum support and holder.
- Made from high-quality stainless steel.



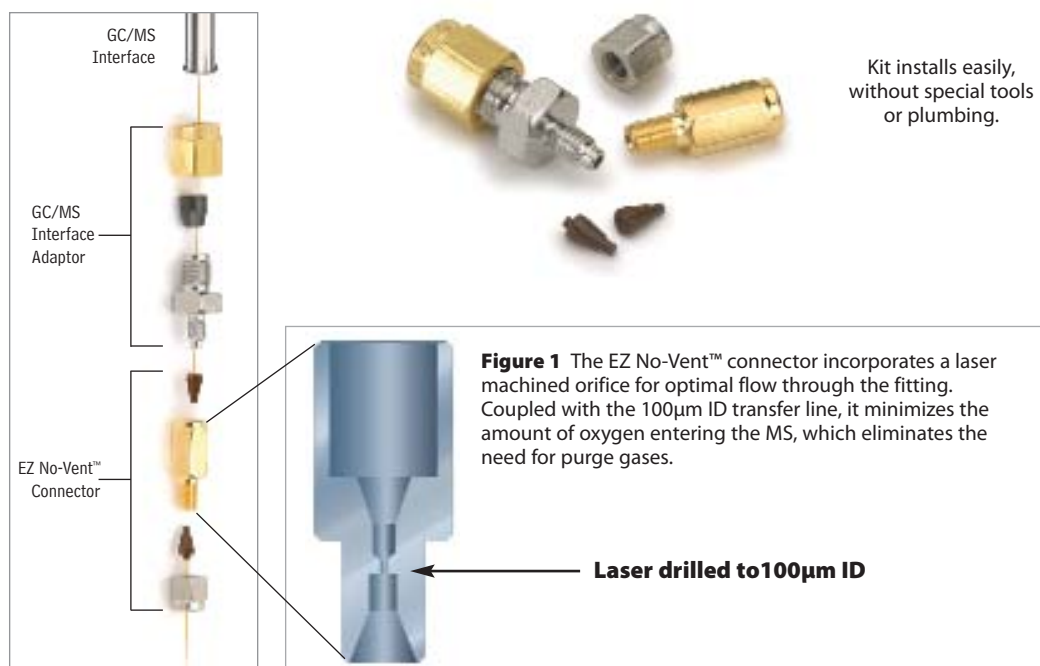
Description	Similar to TS part #	qty.	cat.#
	23303015		
Septum Holder Kit for TRACE™ 2000 Series	350054335	ea.	21299

**EZ No-Vent™ GC Column-Mass Spectrometer Connector**

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- For Thermo Scientific Focus DSQ GC Mass Spectrometers.

Change columns in minutes—without venting!

We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing.



**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Laser drilled to 100µm ID

Description	qty.	cat.#
EZ No-Vent™ Connector Kit for Thermo Scientific Focus DSQ GC Mass Spectrometers Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut. Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:	kit	22454
0.4mm ID (Polyimide)	2-pk.	21015
0.5mm ID (Polyimide)	2-pk.	21016
Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID	2-pk.	21043
Replacement 100µm deactivated transfer line	3 ft.	21018
Replacement EZ No-Vent™ Column Nut	5-pk.	21900
Replacement EZ No-Vent™ Plug	2-pk.	21915
Open-End Wrenches (7/8" x 5/16")	2-pk.	20110
Open-End Wrenches (7/8" x 7/16")	2-pk.	22455

**Transfer Line Reducing Kit for Thermo TRACE™ and Focus DSQ Mass Spectrometers**

- Meets or exceeds OEM performance.

Description	Similar to TS part #	qty.	cat.#
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Column Installation Tools

Capillary Installation Gauge for TRACE™ and Focus SSL (M4 Ferrules)

- Seats ferrule onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Install nut and ferrule onto column. Cut column end squarely. Slide column into installation gauge to recommended insertion distance. Finger-tighten column nut.



Tighten assembly to ensure a properly seated ferrule. Loosen assembly and remove column and column nut.



The ferrule will be properly seated, and should remain in place when light force is applied. If it slides loosely on the column, repeat procedure.

Description	qty.	cat.#
Capillary Installation Gauge for TRACE™ & Focus SSL (M4 ferrules)	ea.	22330



Metric Wrench Set

High-quality 6 x 7mm, 8 x 10mm, and 16 x 17mm wrenches for tightening a wide variety of fittings.

Description	qty.	cat.#
Metric Wrench Set	set	22997



Metric 9 Piece Ball-Point Hex Key Set

Includes 9 metric hex keys (Allen wrenches): 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm.

Description	qty.	cat.#
Metric 9 Piece Ball-Point Hex Key Set	set	22999



Jet Removing Tool for Thermo Scientific GCs:  
Focus GC / TRACE™ GC / Ultra/TRACE™ GC x GC

- Unique, ergonomic handle—easy to grip.
- Easily loosens the FID jet.



Remove FID cell assembly.



Slip tool over FID jet.



Turn counterclockwise to loosen jet.



Use tweezers (cat. #20101) to remove jet.

Description	Similar to TS part #	qty.	cat.#
Jet Removing Tool for Thermo Scientific GCs	205-019-00	ea.	24936

**Liner Cap Removing Tool for Thermo Scientific GCs:****Focus GC / TRACE™ GC / Ultra/TRACE™ GC x GC**

- Easily loosens the liner cap from the injector.
- Unique, ergonomic handle—easy to grip.



Remove septum cap, septum holder, septum, and septum support.



Place tool on liner cap. Align two pins on bottom of tool with two open slots on liner cap.



Turn counterclockwise to loosen liner cap.



Use tweezers (cat. #20101) to remove liner cap.



Description	Similar to TS part #	qty.	cat. #
Liner Cap Removing Tool for Thermo Scientific GCs	205-070-10	ea.	24937

**MLE Capillary Tool Kit for Thermo Scientific GCs**

## Includes:

- capillary installation gauge for Thermo Scientific GCs
- liner cap removing tool for Thermo Scientific GCs
- $\frac{1}{8}$ ",  $\frac{3}{16}$ ", and  $\frac{1}{4}$ " nylon brushes
- $\frac{1}{4}$ ",  $\frac{3}{8}$ ", and  $\frac{3}{16}$ " stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- $\frac{1}{4}$ " x  $\frac{5}{16}$ " open end wrench
- $\frac{3}{8}$ " x  $\frac{7}{16}$ " open end wrench
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insertor tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat. #
MLE Capillary Tool Kit for Thermo Scientific GCs	kit	22183

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### qty.

kit

### cat.#

23027



## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.

### Description

Capillary Column Caps

### qty.

10 ea.

### cat.#

21044

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**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat.#
Septum Puller	ea.	20117

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124





VespeL® ferrules

## VespeL® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## VespeL®/Graphite Ferrules

- 60%/40% VespeL®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.



## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	VespeL®	Graphite	VespeL®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



Reusable!

## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038



## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	VespeL®	Graphite	VespeL®/Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	VespeL®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20243

## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## Graphite Ferrules—For M4 Fittings for TRACE™ and Focus SSL

Ferrule ID	Fits Column ID	Similar to TF part #	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	—	22221	22222
0.4mm	0.18/0.28mm	290-13488	20280	20281
0.5mm	0.32mm	290-13487	20282	20283
0.8mm	0.45/0.53mm	290-13486	20284	20285



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or

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## Vu2 Union™ Column Connectors



Patent pending.

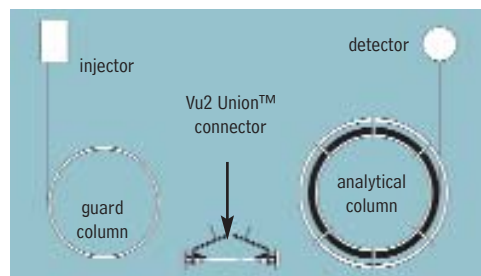
Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

A guard column connected to an analytical column by a Vu2 Union™ connector.



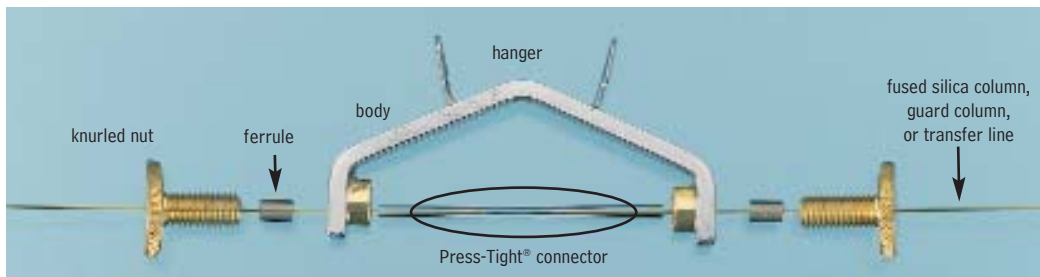
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108



### Universal Press-Tight® Connectors

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.



Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281

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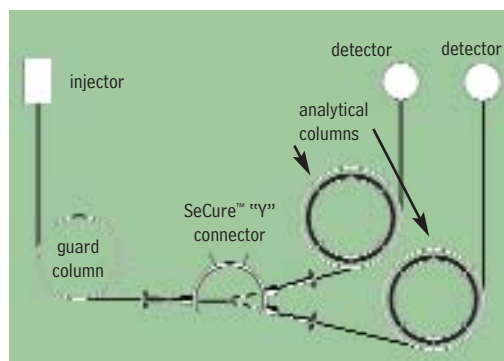
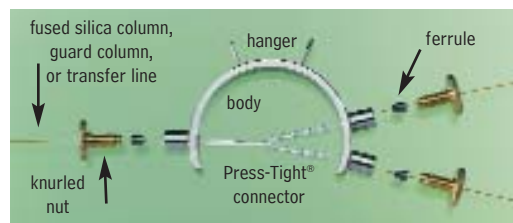
**SeCure™ "Y" Connector Kits**

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.

Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

**Universal "Y" Press-Tight® Connectors**

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

**Graphite Ferrules for SeCure™ "Y" Connectors**

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224





## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal “Y” Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486



## Universal Angled “Y” Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469



## Universal “X” Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	mtv.	cat. #

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146





## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

## did you know?

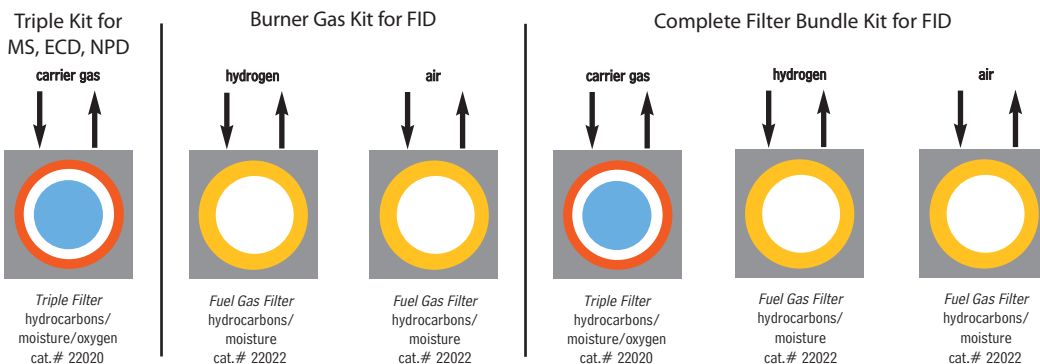
All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup>	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow to clear	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons,

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure:  
10 5/8" x 1 3/4" (27 x 4.4 cm)  
Each baseplate unit  
measures: 4" x 4" x 1 7/8"  
(10.2 x 10.2 x 4.8 cm)

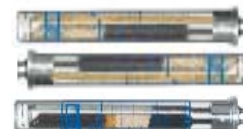
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description



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## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

## please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463

**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat.#
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat.#
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

did you **know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat.#
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat.#
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat.#
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

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replacement o-rings for click-on inline super-clean connectors

2-pk. ea.

## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat. # 22029, pg. 21) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa)	
inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

### it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific Purifier Module

	Compression Tube Fittings			
	1/8-inch		1/4-inch	
	qty.	cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

Specifications	
Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/2" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)



CE

Produce zero air and pure hydrogen from one unit!

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

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AUSTRALIAN Distributors ECHnology [www.chromtech.net.au](http://www.chromtech.net.au)

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.



Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648



## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

**cleaned**

All tubing is cleaned and ready to use.

## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	
16 to 30	
31 to 75	
76 to 99	
100 to 200	

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/16" OD	21500	21501	21502
0.02" ID	1/16" OD	21503	21504	21505
0.03" ID	1/16" OD	21506	21507	21508
0.04" ID	1/16" OD	21509	21510	21511
0.085" ID	1/8" OD	21512	21513	21514
0.21" ID	1/4" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

### 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

### Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

### Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

### Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

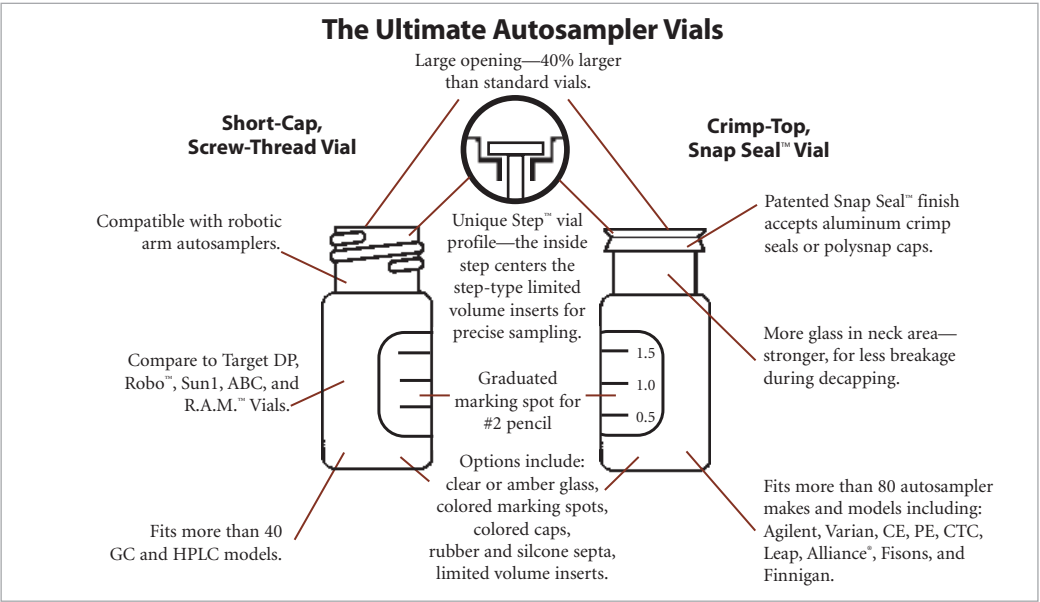


### 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



**For a highly inert surface, we recommend Siltek® deactivation for your vials:**

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

instrument **reference**

Thermo Scientific Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	8mm Crimp-Top
TRACE™ GC 2000, AS2000	X	X	X

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**instrument reference****For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Thermo Scientific	TRACE™ GC 2000, AS2000

## 9mm Short-Cap, Screw-Thread Vials / 8mm Crimp-Top Vials

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

### 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
Thermo Scientific	A200S



### 8mm Crimp-Top Vials, 0.8mL, 8 x 30mm

#### 0.8mL Crimp-Top Vials (8 x 30mm, 8mm Crimp)

Description	100-pk.	1000-pk.
0.8mL Clear Flat Bottom Vials	24695	24696

### 8mm Aluminum Seals w/Septa

Description	100-pk.	1000-pk.
Silver Seals w/Clear PTFE/Natural Rubber Septa	21757	21758

### 8mm Crimper and Decapper

Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736



## instrument reference

### For 8mm Crimp-Top Vials, 8 x 30mm

Manufacturer	Instrument/Model #
Thermo Scientific	A200S

**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one. . .



two. . .



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK



## Syringe Overview

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for Thermo Scientific GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 10µL Autosampler Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	3.15"	AS	701SN	80318	ea.	24962



SGE 10µL Autosampler Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	80mm	Cone	10F-C/F-8/0-0.47C	002992	ea.	24924
10µL	R	26	80mm	Cone	10R-C/F-8/0-0.47C	002993	ea.	24934

**Replacement Needles for Thermo Scientific Autosampler Syringes****Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
10µL	26	80mm	Cone	031535	3-pk.	24935

**instrument reference****Autosampler Syringes for Thermo Scientific GCs**

Autosampler syringes for TriPlus, AS3000, AS2000, AS200/800 GCs.

**SGE Syringes**

TriPlus	AS3000	AS2000	AS200/800	Restek cat.#
*	*			24928
*	*			24926
*	*	*	*	24923
*	*	*	*	24932
*		*		24924
*	*	*	*	24934
*	*	*	*	24922
*	*	*		24930

**Replacement Needles for SGE Syringes for Thermo Scientific GCs**

TriPlus	AS3000	AS2000	AS200/800	Restek cat.#
*	*			24929
*	*			24927
*	*	*	*	24933
*	*	*		24931
*	*	*	*	24935

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

## Autosampler Syringes

### Autosampler Syringes for CTC/LEAP GCs

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



#### Hamilton Syringes

Hamilton 10µL Autosampler Syringe

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	cat.#	qty.	Restek cat.#
1.2µL	N	26	2"/51mm	AS	7701.2N	203185	ea.	22755
5µL	N	26s	2"/51mm	AS	75N	203189	ea.	22756
10µL	N	23s	2"/51mm	AS	701N	203361	ea.	22757
10µL	N	23s-26s	2"/51mm	AS	701N	203362	ea.	22758
10µL	N	23s	2"/51mm	2	701N	203363	ea.	22759
10µL	N	26s	2"/51mm	2	701N Slim Line	203072	ea.	22760
10µL	N	26s	2"/51mm	AS	701N	203205	ea.	22761
10µL	N	26s	2"/51mm	2	701N	203269	6-pk.	22762
25µL*	N	26s	2"/51mm	AS	1702N	203043	ea.	22763
25µL*	N	26s	2"/51mm	AS	1702N Slim Line**	203074	ea.	22764
100µL*	N	26s	2"/51mm	AS	1710N Slim Line**	203076	ea.	22765

\*GASTIGHT syringe.

\*\*Barrel O.D. = 6.7mm; all other 25µL and 100µL syringes have a 7.9mm barrel O.D.

### also available

Replacement plunger assemblies for these syringes are available on request.



SGE 10µL Autosampler Syringe

#### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	cat.#	qty.	Restek cat.#
0.5µL	R	23	50mm	Cone	0.5BNR-C/F-0.63	000492	ea.	24928
0.5µL	R	26	50mm	Cone	0.5BNR-C/F-0.47	000490	ea.	24926
5µL	F	23	50mm	Cone	5F-C/F-5/0.63	001981	ea.	24921
5µL	F	26	50mm	Cone	5F-C/F-5/0.47	001982	ea.	24920
10µL	F	23	50mm	Cone	10F-C/F-0.63	002981	ea.	24923
10µL	R	23	50mm	Cone	10R-C/F-0.63	002984	ea.	24932
10µL	F	26	50mm	Cone	10F-C/F-5/0.47C	002980	ea.	24922
10µL	F	26	50mm	Cone	SK10F-C/F-5/0.47C	002986	6-pk.	24925
10µL	R	26	50mm	Cone	10R-C/F-5/0.47C	002982	ea.	24930
10µL*	F	23	50mm	Cone	10F-C/T-GT-5/0.63C	002987	ea.	22749
25µL	F	26	50mm	Cone	25F-C/T-5/0.47C	003980	ea.	22750
25µL*	F	23	50mm	Cone	25F-C/T-GT-5/0.63C	003987	ea.	22751
25µL*	R	26	50mm	S-hole	25R-C/T-GT-5/0.47H	003988	ea.	22752
100µL*	F	23	50mm	Cone	100F-C/T-GT-5/0.63C	005335	ea.	22753
100µL*	R	26	50mm	Cone	100R-C/T-GT-5/0.47C	005333	ea.	22754

\*Gas-Tight syringe.

#### Guide to Needle Termination Codes

##### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler Cemented Needle  
(ASRN) Autosampler Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented Needle

##### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

### Replacement Needles for CTC/LEAP Autosampler Syringes



#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	50mm	Cone	033772	ea.	24929
10µL	23	50mm	Cone	037787	2-pk.	24933
10µL	26	50mm	Cone	037785	2-pk.	24931

**Standard Microliter Volume Syringes**

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 37.

\*\*With plunger protection.



## Teflon® Tip, Gas-Tight Syringes

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

#### Guide to Needle Termination Codes

##### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

##### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip



SGE Gas-Tight Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760

## Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944



### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807



## Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

### Needles for Hamilton Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609



### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

## Experience Restek

We're the most dedicated chromatography company you'll ever do business with.

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# Genuine Restek Replacement Parts for Agilent GCs



**HRMalytic RESTEK '07**  
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Chromatography Products

# From Injector to Detector

Restek is your #1 source for consumables and supplies for Agilent GC and GC/MS systems!

Restek designs, develops, and markets OEM-equivalent parts and supplies for Agilent systems—even difficult-to-find parts for older models. A team of Restek chemists and engineers is dedicated to creating innovative tools to make your work easier, your system work faster, your analyses more reproducible, and your data more accurate. And, as always, we back our products with friendly, knowledgeable technical service and customer service.

We also offer an extensive selection of capillary, packed, micropacked, and PLOT columns to use in your Agilent system, plus analytical reference materials, vials, syringes, and much more. We also manufacture HPLC columns and accessories. If you don't have a copy of our current catalog, simply call us and ask for one—or request one from our website. Whether you want to order a product, discuss an application or chromatography in general, we look forward to talking with you.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active (e.g., sulfur) compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinit®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinit® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.

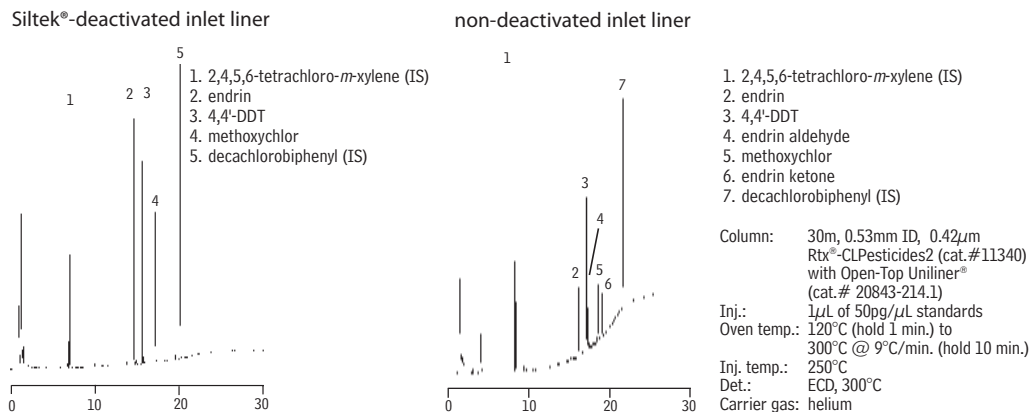
## Siltek® Surface Deactivation

- Eliminate activity by using the most advanced surface treatment available.
- Increase component lifetime—the non-stick surface cleans easily with solvent sonication.
- Ideal for acidic conditions. Siltek® treatment will improve reproducibility and protect hardware.
- Stable to 600°C. A no-bleed deactivation treatment, ideal for all analytical methods.
- Custom service available.

Endrin is more prone to break down on glass surfaces than metal, and DDT is more prone to break down on metal surfaces. Siltek® deactivation of sample-contacting surfaces minimizes endrin and DDT breakdown, to less than 1%!

In addition to our many stock Siltek®-treated products, custom coating service is available. Contact our Technical Service Team at 800-356-1688 or 814-353-1300, ext. 4, or contact your Restek representative.

### A Siltek®-deactivated Uniliner® inlet liner reduces endrin breakdown to less than 1%; DDT and methoxychlor breakdown are undetectable.



### Industries currently benefiting from the reliability of Restek's performance coatings include:

- petroleum, petrochemical, and refineries
- analytical instrument manufacturers
- analytical labs



Silcosteel® is a general purpose passivation for metals.



Silcosteel®-CR treatment improves the corrosion resistance of stainless steel 10X or more.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.



A Sulfinit® layer on metal components is required when analyzing for parts-per-billion levels of organosulfur compounds.



Small, compact unit—  
easy to hold and operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly



**Mike Goss**

Instrument Innovations  
Specialist  
7+ years of service!

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner with Wool		Siltek® Liner with CarboFrit™	
		addl. cost		addl. cost		addl. cost
each	-214.1		-213.1		-216.1	
5-pk.	-214.5		-213.5		-216.5	
25-pk.	-214.25		-213.25		-216.25	

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner with Base-Deactivated Wool		Base Deactivated Liner with CarboFrit™	
		addl. cost		addl. cost		addl. cost
each	-210.1		-211.1		-229.1	
5-pk.	-210.5		-211.5		-229.5	
25-pk.	-210.25		-211.25		-229.25	

← Ideal for amines and basic compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Liner Packing Materials & Accessories



**Matt Lininger**  
Instrument Innovations  
Engineer  
2+ years of service!

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.



### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324

### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999



### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

Not recommended for use with double gooseneck liners.



### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller- inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™ packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*  
**Dr. Konrad Grob**, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.


























No more burned fingers!

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.








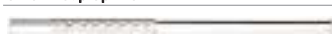

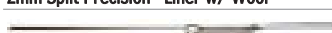








Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 <b>2mm Splitless</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	5181-8818 (ea.) 5183-4703 (5-pk.) 5183-4704 (25-pk.)	20712	20713	20714
 <b>4mm Splitless</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	210-3003 (ea.) 210-3003-5 (5-pk.)	20772	20773	20774
 <b>Siltek® 4mm Splitless</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20772-214.1	20773-214.5	20774-214.25
 <b>4mm Splitless w/ Wool</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	19251-60540 (ea.) 5183-4691 (5-pk.) 5183-4692 (25-pk.)	22400	22401	22402
 <b>2mm Splitless (quartz)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	18740-80220 (ea.) 5183-4707 (5-pk.)	20914	20915	—
 <b>4mm Splitless (quartz)</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20912	20913	—
 <b>4mm Splitless (quartz) w/ Wool</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22403	22404	—
 <b>Gooseneck Splitless (2mm)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795	20796	20797
 <b>Siltek® Gooseneck Splitless (2mm)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795-214.1	20796-214.5	20797-214.25
 <b>Gooseneck Splitless (4mm)†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	5181-3316 (ea.) 5183-4695 (5-pk.) 5183-4696 (25-pk.)	20798	20799	20800
 <b>Siltek® Gooseneck Splitless (4mm)†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20798-214.1	20799-214.5	20800-214.25
 <b>Gooseneck Splitless (4mm) w/ Wool†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	5062-3587 (ea.) 5183-4693 (5-pk.) 5183-4694 (25-pk.)	22405	22406	22407
 <b>Siltek® Gooseneck Splitless (4mm) w/ Wool†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22405-213.1	22406-213.5	22407-213.25
 <b>Double Gooseneck Splitless (4mm)</b>	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	5181-3315 (ea.) 5183-4705 (5-pk.) 5183-4706 (25-pk.)	20784	20785	20786
 <b>Siltek® Double Gooseneck Splitless (4mm)</b>	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	20784-214.1	20785-214.5	20786-214.25
 <b>Cyclo Double Gooseneck (2mm)</b>	trace, active, dirty samples <2µL	2.0 ID 6.5 OD x 78.5	—	20907	20908	—
 <b>Cyclo Double Gooseneck (4mm)</b>	trace, active, dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20895	20896	20997
 <b>Siltek® Cyclo Double Gooseneck (4mm)</b>	trace, active, dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20895-214.1	20896-214.5	20997-214.25
 <b>Recessed Gooseneck (2mm)**</b>	base easily packs with wool for dirty samples <2µL	2.0 ID 6.5 OD x 78.5	—	20980	20981	20982
 <b>Recessed Gooseneck (4mm)**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20983	20984	20985
 <b>Siltek® Recessed Gooseneck (4mm)**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20983-214.1	20984-214.5	20985-214.25
 <b>Recessed Gooseneck (4mm) w/ Wool**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	22408	22409	22410
 <b>Recessed Double Gooseneck (4mm)**</b>	base easily packs with wool for dirty, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	20986	20987	20988

\*Nominal ID at syringe needle expulsion point.

\*\*Use with two-hole ferrule for dual-column analysis.

†Use this liner for increased sensitivity.

All liners are  
**100%**  
deactivatedAll liners are shipped intermediate  
polarity (IP) deactivated unless  
otherwise requested.

Split Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#	ea.	cat.# 5-pk.	25-pk.
 <b>1mm Split**</b>	for purge & trap inlet splitting or sample <1µL	1.0 ID 6.3 OD x 78.5	18740-80200 (ea.) 5183-4709 (5-pk.)	20972	20973	—
 <b>4mm Split w/ Wool</b>	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	19251-60540 (ea.) 5183-4691 (5-pk.) 5183-4692 (25-pk.)	20781	20782	20783
 <b>Siltek® 4mm Split w/ Wool</b>	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	—	20781-213.1	20782-213.5	20783-213.25
 <b>Laminar Cup Splitter</b>	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20801	20802	—
 <b>mini-Lam™ Split</b>	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20990	20991	—
 <b>Cup Splitter</b>	high & low MW compounds	4.0 ID 6.3 OD x 78.5	18740-80190 (ea.) 5183-4699 (5-pk.)	20709	20710	—
 <b>Siltek® Cup Splitter</b>	high & low MW compounds	4.0 ID 6.3 OD x 78.5	—	20709-214.1	20710-214.5	—
 <b>Cyclosplitter®</b>	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 78.5	—	20706	20707	20708
 <b>2mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	2.0 ID 6.3 OD x 78.5	—	20823	20824	—
 <b>4mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	210-4004-5 (5-pk.)	21022	21023	20979
 <b>Siltek® 4mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	21022-213.1	21023-213.5	20979-213.25
Split/Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 <b>Low Pressure Drop Liner w/ Wool</b>	universal, use with Agilent 6890 GCs	4.0 ID 6.3 OD x 78.5	5183-4647 (ea.) 5183-4701 (5-pk.)	21032	21033	—
 <b>Low Pressure Drop Liner w/ Wool</b>	universal, use with Agilent 6850 GCs	4.0 ID 6.3 OD x 78.5	5183-4711 (ea.) 5183-4712 (5-pk.) 5183-4713 (25-pk.)	20994	20995	20996
CIS4 and PTV Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#		cat.# 10-pk.	
 <b>Straight Glass</b>	general use	2.0 ID 3.0 OD x 71	5183-2036		21157	
 <b>Baffled Glass</b>	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	5183-2037		21704	
 <b>Siltek® Baffled Glass</b>	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	—		21704-214.10	
 <b>Glass w/ Wool</b>	large volume injections	2.0 ID 3.0 OD x 71	5183-2038		21156	
SPME Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
 <b>SPME Liner</b>	ideal for low-volume SPME applications	0.75 ID 6.35 OD x 78.5		21110	21111	

\*Nominal ID at syringe needle expulsion point.

\*\*Use this liner for increased sensitivity.















## tech tip

### Injector Maintenance

Approximately ninety percent of “bad” chromatography is traceable to problems in the injection port. These problems include contaminated carrier gas, incorrect injector flows, active or dirty sites on inlet seals and liners, improper use of wool, leaks, backflash, discrimination, incorrect injector temperature, poor column installation, and use of the wrong injection technique. To minimize injection port problems, set up a routine maintenance schedule and be sure to investigate the injector first when troubleshooting.

## ordering note

For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.

DI Liners for Agilent GCs (For 0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
 1mm Uniliner***†	trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052	21053	
 Siltek® 1mm Uniliner***†	trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052-214.1	21053-214.5	
 Uniliner***	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20335	20336	
 Siltek® Uniliner***	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	<div>All liners are</div> <div>100% deactivated</div> <div>All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.</div>	20335-214.1	20336-214.5	
 Cyclo-Uniliner***	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337	20338	
 Siltek® Cyclo-Uniliner***	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337-214.1	20338-214.5	
 Open-top Uniliner® w/ Wool**	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5			20843	20844
 Siltek® Open-top Uniliner® w/ Wool**	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20843-213.1	20844-213.5	
<div><div>DI Liners for Agilent 5890 &amp; 6890 GCs (For 0.25/0.32/0.53mm ID Columns)</div><div>Benefits/Uses***</div><div>ID*/OD &amp; Length (mm)</div><div>Similar to Agilent part #</div><div>ea.</div><div>cat.# 5-pk.</div><div>25-pk.</div></div>						
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054	21055	20998
 Siltek® Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054-214.1	21055-214.5	20998-214.25
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	G1544-80730	20756	20771	—
 Double Gooseneck Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	20508	20509	—
 Double Gooseneck Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	G1544-80700	20954	20989	—
 Siltek® 1mm Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	1.0 ID 6.3 OD x 78.5	—	21390-214.1	21391-214.5	—
<div>†Hole in Drilled Uniliner makes direct injection possible with EPC-equipped 6890 GCs!</div> <div>*Nominal ID at syringe needle expulsion point</div>						

\*Hole in Drilled Uniliner® makes direct injection possible with EPC-equipped 6890 GCs!

\*Nominal ID at syringe needle expulsion point.

\*\*These Uniliner® liners are for split/splitless injection ports.

†This liner for use with 0.25, 0.32, or 0.53mm ID columns.

## tech tip

### Drilled Uniliner®

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.



### Siltek® Metal Inlet Liners for Agilent GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (5.2mm ID x 6.3mm OD x 78.5mm)	5-pk.	25-pk.
Cyclo/Single Gooseneck	20974	20975
Single Gooseneck	21702	21703
Cycloplitter®	20726	20729
Split/Splitless w/Wool	21700	21701

**Viton® O-Rings for Agilent GCs**

- Fit split (6.3mm OD) or splitless (6.5mm OD) liners.

Description	Max. temp.	Similar to Agilent part #	qty.	cat.#
Viton® O-Rings for Agilent GCs	250°C	5180-4182	25-pk.	20377

**Graphite O-Rings for Agilent and Varian 1177 GCs**

- Excellent thermal stability at injection port temperatures up to 450°C!

Description	Max. temp.	Similar to Agilent part #	Restek cat.# 10-pk.	50-pk.
6.35mm ID Graphite O-rings for split liners	450°C	5180-4168	20296	20297
6.5mm ID Graphite O-rings for splitless liners	450°C	5180-4173	20298	20299

**Liner Seals for CIS4 and PTV**

Description	Max. temp.	Similar to Agilent part #	Similar to Gerstel part #	qty.	cat.#
Liner Seals for CIS4 and PTV	450°C	5182-9749	007541-005-00	5-pk.	22684

**HANDY  
septum size  
chart**

Agilent Instrument	Septum Diameter (mm)
5880A, 5890, 6890, 6850, PTV	11
5700, 5880	9.5/10
On-Column Injection	5

**Thermolite® Septa for Agilent GCs**

- Usable to 340°C inlet temperature; precision molded for consistent fit.

Septum Diameter	25-pk.	50-pk.	100-pk.
5mm ( $\frac{1}{16}$ " )	27120	27121	27122
9.5mm ( $\frac{3}{8}$ " )	27135	27136	27137
10mm	27138	27139	27140
11mm ( $\frac{7}{16}$ " )	27141	27142	27143

**IceBlue™ Septa for Agilent GCs**

- Usable to 250°C inlet temperature; precision molded for consistent fit.

Septum Diameter	50-pk.	100-pk.
9.5mm ( $\frac{3}{8}$ " )	27158	27159
10mm	27160	27161
11mm ( $\frac{7}{16}$ " )	27162	27163

**BTO® Septa for Agilent GCs**

- Usable to 400°C inlet temperature; precision molded for consistent fit.

Septum Diameter	50-pk.	100-pk.
5mm CenterGuide™	27100	27101
9.5mm ( $\frac{3}{8}$ " )	27106	27107
10mm	27108	27109
11mm ( $\frac{7}{16}$ " ) CenterGuide™	27110	27111

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Description	qty.	cat.#
Septum Puller	ea.	20117





## Knurled Septum Nuts for Agilent 5890/6890/6850 GC Split/Splitless Injectors

- Tighten easily without the use of a wrench.
- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Thread design and needle guide allow easy penetration and prevent premature septum coring.
- High-quality stainless steel construction.

Description	qty.	cat.#
Knurled Septum Nut, Autosampler (for 23-gauge needles)	ea.	21479
Knurled Septum Nut, Manual Injection (for 26-gauge needles)	ea.	21478



## tech tip

Always use the Manual Injection Septum Nut (for 26-gauge needles) for on-column injections.

## Septum Nuts for use with Agilent 5890/6890/6850 Split/Splitless Injectors

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Thread design and needle guide allow easy penetration and prevent premature septum coring.
- Manual injection septum nut allows use of 26-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat.#
Autosampler & PTV Septum Nut (for 23-gauge needles)	18740-60835	ea.	20631
Manual Injection Septum Nut (for 26-gauge needles)	18740-60835	ea.	21309



## Septum Nut Removal Tool for Agilent 5890/6890/6850 GCs

- Easily remove the septum nut without touching the heated nut—no more burned fingers!
- Unique, ergonomic handle—easy to grip.

Description	qty.	cat.#
Septum Nut Removal Tool for Agilent 5890/6890/6850 GCs	ea.	24918



## Injector Wrench for Agilent 5890/6890/6850 GCs

- Use to remove the septum nut and weldments during GC maintenance.
- High-quality stainless steel construction.
- Meets original equipment performance.



Use the smaller end to remove the septum nut.



Use the larger end to tighten the split/splitless weldment nut.

Description	Similar to Agilent part #	qty.	cat.#
Injector Wrench for Agilent 5890/6890/6850 GCs	19251-00100	ea.	22065



injection port bore cleaner

aluminum oxide sanding disk (resurfaces O-ring on base of injector)

## Injection Port Repair Tool for Agilent Split/Splitless Injection Ports

- Remove contaminants, achieve a better seal.
- Resurface critical inlet seal areas.



Description	qty.	cat.#
Injection Port Repair Tool for Agilent Split/Splitless Injection Ports	ea.	21393
Replacement Sanding Disks (5 fine & 5 medium)	10-pk.	22689
Replacement Bore Brushes (one 6.5mm & one 7mm)	2-pk.	21353



Make your injection port threads like new!

## Rethreading Tool

- Repair worn or damaged threads in injection ports, fittings, etc.
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction. Unscrew the tool and inspect the threads, repeat as necessary. When done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Rethreading Tool for 1/4" compression fittings (Agilent split/splitless injection ports)	ea.	23018

## Capillary Column Nuts for Agilent 5890/6890 GCs

Available in brass or stainless steel.



for use with "compact"  
Agilent-style ferrules



for use with standard ferrules

Description	Similar to Agilent part #	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.</b>			
Stainless Steel Capillary Column Nut	5181-8830	2-pk.	21884
Brass Capillary Column Nut	5181-8830	2-pk.	21878
<b>For use with standard 1/16"-type ferrules.*</b>			
Stainless Steel Capillary Column Nut	05921-21170	2-pk.	20883
Brass Capillary Column Nut	05921-21170	2-pk.	21879

\*Designed to fit a wider variety of 1/16" ferrules

## Capillary Column Nuts for Agilent 6850 GCs

- Meet or exceed original equipment performance.
- High-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat.#
Capillary Column Nuts for Agilent 6850 GCs	5183-4732	2-pk.	21882



## Finger-Tight Capillary Column Nut

- Rapidly tighten without wrenches; avoid stripped threads.
- Either version can be used with 0.25, 0.32, or 0.53mm ID columns.

Description	Similar to Agilent part #	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.*</b>			
Finger-Tight Capillary Column Nut	5020-8293	ea.	21311
	5020-8292	ea.	21311
<b>For use with standard ferrules.</b>			
Finger-Tight Capillary Column Nut	5020-8293	ea.	21312

\*Similar to Agilent part # 5020-8293 and 5020-8292, except that the Restek nut can be used with Vespe!® ferrules.



also available

### Ferrules

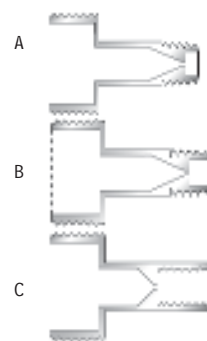
See pages 31-32 for our listing of ferrules.

## Finger-Tight Capillary Column Nuts

- Allow wrench-free column installations.
- Work with standard or compact (Agilent-style) ferrules.
- Made from high-quality stainless steel.



Description	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.</b>		
A) Finger-Tight Capillary Column Nuts	2-pk.	21040
<b>For use with standard 1/16"-type ferrules.</b>		
B) Finger-Tight Capillary Column Nuts	2-pk.	21041
<b>For use with standard 1/16" compression fittings</b>		
C) Finger-Tight Capillary Column Nuts	2-pk.	21042



## Capillary Installation Gauge

- Seats graphite\* ferrules onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



A

B



Thread . . .



. . . tighten. . .



. . . done.

Easily seat ferrules for  
consistent  
installations!

Description	qty.	cat.#
A) Capillary Installation Gauge for Agilent-style fittings (compact ferrules)	ea.	21034
B) Capillary Installation Gauge for 1/16" fittings (1/16" ferrules)	ea.	21399

\*Recommended for use with graphite ferrules.



A Dual VespeL® Ring Inlet Seal eliminates the need for a washer!



## Dual VespeL® Ring Inlet Seals

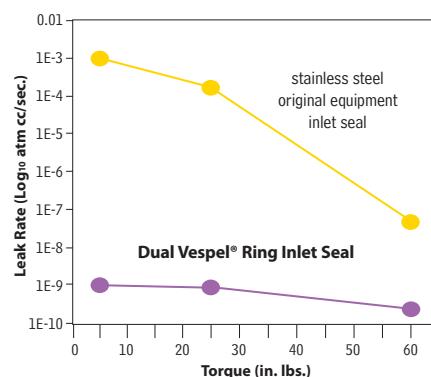
- VespeL® ring embedded in bottom surface eliminates need for washer.
- VespeL® ring embedded in top surface reduces operator variability by requiring minimal torque to seal.
- Prevents oxygen from permeating into the carrier gas, increasing column lifetime.

In Agilent split/splitless injection ports, it can be difficult to make and maintain a good seal with a conventional metal inlet disk. The metal-to-metal seal dictates that you apply considerable torque to the reducing nut, and, based on our testing, this does not ensure a leak-tight seal. Over the course of oven temperature cycling, metal seals are prone to leaks, which ultimately can degrade the capillary column and cause other analytical difficulties.

Our Dual VespeL® Ring Inlet Seal greatly improves injection port performance—it stays sealed, even after repeated temperature cycles, without retightening the reducing nut! This seal features two soft VespeL® rings, one embedded in its top surface and the other embedded in its bottom surface. These rings eliminate the need for a washer, and ensure very little torque is needed to make a leak-tight seal. The rings will not harm the critical seal in the injector body, or any other surface, and are outside the sample flow path. Tests using a high sensitivity helium leak detector show Dual VespeL® Ring Inlet Seals will seal equally effectively at torques from 5 in. lb. to 60 in. lb. (Figure 1).

Why trust a metal-to-metal seal when you can make leak-tight seals quickly and easily—and more reliably—without a washer, with a Restek Dual VespeL® Ring Inlet Seal. Use a stainless steel seal for analyses of unreactive compounds. To reduce breakdown and adsorption of active compounds, use a gold-plated or Siltek®-treated seal. The gold surface offers better inertness than untreated stainless steel; Siltek® treatment provides inertness similar to that of a fused silica capillary column.

**Figure 1** The Dual VespeL® Ring Inlet Seal achieves leak-tight seals even at low torque, reducing the chance of leak-related problems.



Dual VespeL® Ring Inlet Seals are available in gold plating, stainless steel, and Siltek® treated.



Patent pending.

0.8mm ID Dual VespeL® Ring Inlet Seal	2-pk.	10-pk.
Gold-Plated	21240	21241
Siltek® Treated	21242	21243
Stainless Steel	21238	21239
1.2mm ID Dual VespeL® Ring Inlet Seal	2-pk.	10-pk.
Gold-Plated	21246	21247
Siltek® Treated	21248	21249
Stainless Steel	21244	21245

**Replacement Inlet Seals with Washers**

- Special grade of stainless steel that is softer and deforms more easily, creating a better seal.
- Increases column lifetime because oxygen cannot permeate into the carrier gas.
- Reduced noise benefits high-sensitivity detectors (e.g., ECDs, MSDs).
- Siltek® treatment provides inertness similar to fused silica.
- All seals include washers.

**Replacement Inlet Seals for Agilent 5890/6890/6850 Split/Splitless Injection Ports**

The inlet seal at the base of the Agilent 5890/6890 GC injection port contacts the sample and must be changed frequently to prevent adsorption of active compounds. In addition, septum fragments and sample residue accumulate on the disk surface, requiring disk replacement.

The Restek inlet seal design increases column lifetime because oxygen cannot permeate into the carrier gas. Detector noise also is reduced with high-sensitivity detectors (e.g., ECDs or MSDs). To reduce breakdown and adsorption of active compounds, use Siltek® or gold-plated seals.



Note: The 1.2mm inlet seal is recommended for use with Vespel®/graphite ferrules or when installing two columns using a two-hole ferrule.

Single-Column Installation, 0.8mm Opening*		0.25/0.32mm ID Dual-Column Installation, 1.2mm Opening		0.53mm ID Dual-Column Installation ( $\frac{1}{16}$ -inch opening)	
2-pk.	10-pk.	2-pk.	10-pk.	2-pk.	10-pk.
<b>Stainless Steel Inlet Seal</b>					
21315	21316	20390	20391	20392	20393
<b>Gold-Plated Inlet Seal</b>					
21317	21318	21305	21306	—	—
<b>Siltek® Treated Inlet Seal</b>					
21319	21320	21307	21308	—	—

\*0.8mm ID stainless steel inlet seal is similar to Agilent part #18740-20880,

0.8mm ID gold-plated inlet seal is similar to Agilent part #18740-20885.

All seals include washers.

**Replacement Inlet Seal Washers**

Description	Similar to Agilent part #	qty.	cat.#
Replacement Inlet Seal Washers	5061-5869	15-pk.	21710

**Replacement Inlet Cross-Disk Seal for Agilent GCs**

- Ideal for high-flow split applications on Agilent 5890 GCs.
- All seals include washers.

0.8mm ID Cross-Disk Inlet Seal for Agilent GCs	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	5182-9652	20477	20476
Siltek® Treated	—	20475	20474
1.2mm ID Cross-Disk Inlet Seal for Agilent GCs	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	—	21009	21010
Siltek® Treated	—	21011	21012

**Silver PTV Seals for Agilent 6890 GCs**

Description	Similar to Agilent part #	qty.	cat.#
Silver PTV Seals for Agilent 6890 GCs	5182-9763	5-pk.	21409



**Direct Replacement and Siltek® Treated Split/Splitless Injection Ports for Agilent GCs**

Would you like better performance from your injector? Our Siltek® treated split/splitless injector is a direct replacement for Agilent 5890 and 6890/6850 GCs, but Siltek® treatment passivates the metal surface to ensure an inert pathway for the sample, delivering increased performance. The injector is manufactured from high-quality stainless steel and meets or exceeds Agilent original equipment performance.

**Direct Replacement and Siltek® Treated Split/Splitless Injection Port for Agilent 5890 GCs**

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Weldment*	19251-60575	ea.	20265
-Siltek® Weldment**	19251-60575	ea.	20267
-B) Replacement Shell Weldment	19251-80570	ea.	20266
-Siltek® Shell Weldment**	19251-80570	ea.	20268
-O-rings for Agilent Trap Fittings	5180-4181	25-pk.	22064

**Direct Replacement and Siltek® Treated Split/Splitless Injection Port for Agilent 6890/6850 GCs**

Description	Similar to Agilent part #	qty.	cat.#
C) Replacement Weldment with EPC	G1544-60575	ea.	22674
Siltek® Weldment with EPC**	G1544-60575	ea.	22672
D) Replacement Weldment*	19251-60575	ea.	20265
Siltek® Weldment**	19251-60575	ea.	20267
E) Replacement Shell Weldment	G1544-80570	ea.	22673
Siltek® Shell Weldment**	G1544-80570	ea.	22671
F) Optional Split/Splitless Weldment (for use with large canister type filter)	G1544-60585	ea.	22686
Siltek® Optional Split/Splitless Weldment**	G1544-60585	ea.	22670

\*For use with large canister type filter on Agilent 5890 GCs. For use with manual flow only on Agilent 6890/6850 GCs.

\*\*Treated with Restek's exclusive Siltek® treatment for increased inertness.

**Replacement Chemical Traps for Agilent GCs**

- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moisture and hydrocarbons.

Description	Similar to Agilent part #	qty.	cat.#
G) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
H) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032

**Injection Port Weldments for Agilent GCs for use with Purge and Trap Systems**

Easily attach your purge and trap with pre-installed low dead volume fittings.

**For Agilent GCs with Tekmar Purge and Trap Systems**

Description	qty.	cat.#
I) Weldment for Agilent 6890 GCs	ea.	22664
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22668
Weldment for Agilent 5890 GCs	ea.	22666

**For Agilent GCs with OI Purge and Trap Systems**

Description	qty.	cat.#
J) Weldment for Agilent 6890 GCs	ea.	22665
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22669
Weldment for Agilent 5890 GCs	ea.	22667

**tech tip****Installing a New Weldment**

To eliminate possible leaks and damage to the weldment, always replace the split vent line, nut, and ferrule when installing a new shell weldment.



**EPC Test Kit for Agilent 6890 GCs**

- Kit includes 3 O-rings, 2 plugs, 1 mounting screw and 1 test block.

Description	Similar to Agilent part #	qty.	cat.#
EPC Test Kit for Agilent 6890 GCs	G1530-60960*	kit	24323

\*Similar to, but not exact equivalent. Kits differ in parts.

**Heater Cartridge & PRT Sensor for Agilent 5890 GCs**

- Use with 5890 FID and split/splitless weldments.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
A + B) Injector/FID Heater + Injector/FID PRT Sensor	05890-61140	ea.	22068
A) Injector/FID Heater	19231-60620	ea.	22069
B) Injector/FID PRT Sensor	19231-60660	ea.	23035

**Heat Sink for Agilent 5890 GC Split/Splitless Injector**

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Heat Sink for Agilent 5890 GCs	18740-20940	ea.	20409

**Heater Block Retaining Nuts for Agilent GC Split/Splitless Injectors**

- Aluminum construction.
- Meet or exceed OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Heater Block Retaining Nut for Agilent 5890 GCs	19251-20620	ea.	22080
Heater Block Retaining Nut for Agilent 6890/6850 GCs	G1544-20590	ea.	23042

**Oven Temp Sensor Assembly**

Description	Similar to Agilent part #	qty.	cat.#
A) Oven Temp Sensor for Agilent 5890 GC	05890-61030	ea.	23040
B) Oven Temp Sensor for Agilent 6890 GC	G1530-61030	ea.	23039

**60psig Backpressure Regulator Kit**

Increase the versatility of your Agilent 5890/6890 GC by replacing the existing 30psig backpressure regulator and gauge with our 60psig regulator. Enables you to use longer 60m and 105m columns as well as shorter 10-meter columns. Includes complete instructions.

Description	Similar to Agilent part #	qty.	cat.#
Backpressure Regulator Kit	19246-60630	kit	20634

**Replacement Chemical Traps for Agilent GCs**

- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moisture and hydrocarbons.

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Chemical Trap for Agilent 6890/6850 GCs	G1544-80550	ea.	22820
B) Replacement Chemical Trap for Agilent 5890 GCs	05890-61260	ea.	21610
C) Replacement Chemical Trap for Agilent 5880 GCs	19362-60500	ea.	21158
D) Split Vent Line for Agilent GCs (32-inch) (Includes all installation hardware.)	19251-80525 G1544-20620	2-pk.	22800
E) O-rings for Agilent Trap Fittings	5180-4181	25-pk.	22064
F) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
G) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032





### Dual-Column *mini-Lam*™ Direct Injection Tee

(for 1/4-inch packed column inlets)

The inverted cup design offers complete sample vaporization and permits larger sample volumes. It incorporates a Press-Tight® taper in each outlet leg, to make a perfect, dead-volume-free connection to each analytical column (ODs ranging from 0.4 to 0.8mm). Allows visual confirmation of the column connection. The open-top design makes it easy to pack with glass wool, keeping sample residue from contaminating the cup.

Description	qty.	cat.#
<i>mini-Lam</i> ™ DI Tee Kit (Includes all fittings and ferrules)	kit	20436
Replacement 4mm <i>mini-Lam</i> ™ DI Tee	ea.	20435

### Low-Volume Injector for Agilent Split/Splitless Injectors

- Attaches to the GC inlet without cutting existing injection port lines.
- Allows injections from a syringe onto the column for purge & trap troubleshooting or calibration.
- Siltek® treatment eliminates adsorption of active compounds.

Our low-volume injector can be installed in a matter of minutes. Remove the septum nut or splitless weldment and insert the Restek low-volume injector through the split injector. Tighten the base nut and you're ready! Includes a 1/16-inch nut, a 1/16-inch ferrule, a base nut and 1/4-inch Vespel®/graphite ferrule, a 1/16-inch capillary nut, a 5-pack of low-bleed plug septa, and a low-mass septum nut. Order appropriate capillary ferrules separately.



Description	qty.	cat.#
Low-Volume Injector for Agilent Split/Splitless Injectors	kit	21692



### Siltek® Septum Packed Purge Port Weldment for Agilent 5890 GCs

Siltek® treatment eliminates adsorption of sensitive compounds (e.g., DDT and endrin). Order Viton® O-rings (below) and appropriate septa (page 9) separately.

Description	Similar to Agilent part #	qty.	cat.#
Siltek® Septum Packed Purge Port Weldment for Agilent 5890 GCs	19243-80570	ea.	21691
Viton® Replacement O-rings	5080-8898	10-pk.	21685

## tech tip

### Minimizing Injector Discrimination

When an injected sample is not completely vaporized, lower percentages of compounds that are less volatile (i.e., compounds with high boiling points or high molecular weights) are transferred into the analytical column. As a result, these later-eluting compounds will have progressively decreased peak areas. You can minimize injector discrimination by reducing injector flows, increasing the injector temperature, using pressure pulse injection or a fast autosampler, or using an injector liner that aids in vaporization (e.g., a laminar cup splitter or a liner packed with wool).

## Direct Injection (DI) Inserts and Liner Adaptor for 1/4-Inch Packed Column Injection Ports (for 0.25, 0.32, & 0.53mm ID columns)

### DI Glass Inserts for Agilent 5890 Packed Column GC

- Tolerances closely controlled.
- Can be removed from the septum nut weldment.

Description	Similar to Agilent part #	qty.	cat.#
DI Glass Inserts for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	5-pk.	20967

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

**SILTEK**®  
version available.

### DI Uniliner® Liners for Agilent 5890 Packed Column GC

- Press-Tight® taper forms dead-volume-free connection to column.
- Minimizes solvent and peak tailing.
- Use with 0.25, 0.32, and 0.53mm ID capillary columns.
- Can be removed from the septum nut weldment.

Description	Fits same liner adaptor as Agilent part #	qty.	cat.#
DI Uniliner® Liner for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	ea.	20964
DI Uniliner® Liners for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	5-pk.	20965
DI Uniliner® Liners for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	25-pk.	20966

### DI Liner Adaptor for Agilent 5890 Packed Column GC

- Uses standard 1/16-inch capillary nut and ferrules.
- Convenient wrench pad at base.
- Includes 1/4-inch graphite ferrule and stainless steel nut.
- Use with Agilent or Restek DI glass inserts or Restek DI Uniliner® liners for an Agilent 5890 packed column GC.

Description	Similar to Agilent part #	qty.	cat.#
DI Liner Adaptor for Agilent 5890 Packed Column GC	19244-80540	ea.	21303





For use with 0.25/0.32mm ID columns.

### 1/16-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.25 or 0.32mm ID capillary columns)

We have specially engineered a high-precision, 1/16-inch split/splitless fitting that accepts standard, two-hole capillary ferrules. Our design makes it easier to install capillary columns because the nut protrudes farther from the insulated injection port chamber. The column insertion depth is the same as the original equipment.

Kit includes adaptor fitting, capillary nut, stainless steel inlet seal, washer, and one 0.4mm ID ferrule.

Description	qty.	cat.#
1/16-Inch Capillary Inlet Adaptor Fitting Kit	kit	20633
Replacement Inlet Seal (1.2mm hole)	2-pk.	20390
Replacement Inlet Seal (1.2mm hole)	10-pk.	20391



For use with 0.53mm ID columns.

### 1/8-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.53mm ID capillary columns)

Our specially engineered high-precision, 1/8-inch split/splitless fitting accepts standard two-hole capillary ferrules and a standard 1/8-inch nut. This design makes column installation easy because the nut protrudes farther from the insulated injection port chamber. The column insertion depth is the same as the original equipment.

Kit includes adaptor fitting, capillary nut, stainless steel inlet seal, washer, and one 0.8mm ID two-hole ferrule.

Description	qty.	cat.#
1/8-Inch Capillary Inlet Adaptor Fitting Kit	kit	20645
0.53mm ID Dual-Column Installation (1/16-inch opening)	2-pk.	20392
0.53mm ID Dual-Column Installation (1/16-inch opening)	10-pk.	20393



### Direct Replacement Reducing Nut

- Made from high-quality stainless steel.
- Meets original equipment performance.

Description	Similar to Agilent part #	qty.	cat.#
Reducing Nut	18740-20800	ea.	22078



### Replacement Ferrules for Dual-Column Confirmational Analysis

Use 1/16-inch, two-hole ferrules with the 1/16-Inch Capillary Inlet Adaptor Fitting Kit (cat.# 20633); and 1/8-inch, two-hole ferrules with the 1/8-Inch Capillary Inlet Adaptor Fitting Kit (cat.# 20645).

Two-Hole Ferrule Size	Fits Nut	Fits Column ID	qty.	Vespal®/Graphite cat.#
0.4mm (1/16")	1/16"	0.25/0.28mm	5-pk.	20241
0.5mm (1/16")	1/16"	0.32mm	5-pk.	20242
0.8mm (1/8")	1/8"	0.45/0.53mm	5-pk.	20246



### Dual-Column Direct Injection Tee

(for 1/4-inch packed column inlets)

The tee is designed with a glass spiral to promote sample vaporization and to provide even sample distribution to the two columns. The glass spiral also traps sample residue and minimizes the need for guard columns. A Press-Tight® taper in each outlet leg facilitates a perfect dead-volume-free connection to each analytical column (OD 0.4 to 0.8mm) and allows visual confirmation of the column connection.

Description	qty.	cat.#
DI Tee Kit (includes all fittings/ferrules)	kit	20412
Replacement Tee	ea.	20411

**Air Diverters for Agilent GCs**

- Divert GC exhaust heat away from the lab bench.
- Meet OEM performance.
- Easy to install—no tools required.

Description	Similar to Agilent part #	qty.	cat.#
Air Diverter for Agilent 5890/6890 GCs	19247-60510	ea.	22076
Air Diverter for Agilent 6850 GCs	G2630-60710	ea.	20926

**MLE Capillary Tool Kit for Agilent GCs**

Includes:

- capillary installation gauge for Agilent GCs
- injector wrench for Agilent GCs
- septum nut removal tool
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 3/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insertor tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



new!

Description	qty.	cat.#
MLE Capillary Tool Kit for Agilent GCs	kit	22186



### Injector Wrench for Agilent 5890/6890/6850 GCs

- Use to remove the septum nut and weldments during GC maintenance.
- High-quality stainless steel construction.
- Meets original equipment performance.



Use the smaller end to remove the septum nut.



Use the larger end to tighten the split/splitless weldment nut.

Description	Similar to Agilent part #	qty.	cat.#
Injector Wrench for Agilent 5890/6890/6850 GCs	19251-00100	ea.	22065



Make your injection port threads like new!

### Rethreading Tool

- Repair worn or damaged threads in injection ports, fittings, etc.
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction. Unscrew the tool and inspect the threads, repeat as necessary. When done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Rethreading Tool for 1/4" compression fittings (Agilent split/splitless injection ports)	ea.	23018

### FID/Injector Cleaning Kit

The FID/Injector Cleaning Kit includes:

- Nylon tube brushes (1/8", 3/16", 1/4").
- Pipe cleaner.
- Stainless steel tube brushes (3/8", 3/16", 1/4").
- Stainless steel surface brush.
- Stainless steel jet reamers.
- Emery cloth.



Use Restek's Cleaning Kit with ANY injection port!

Description	qty.	cat.#
FID/Injector Cleaning Kit	kit	20120

### Inlet Liner Removal Tool

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!



Description	qty.	cat.#
Inlet Liner Removal Tool	3-pk.	20181

new!

### Flashlight with Swivel Head

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).



Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187



### Injection Port Split/Splitless Weldment Retaining Ring Pliers

- Easily removes snap ring on split/splitless weldment assemblies.
- Use with Agilent 5890/6890/6850 GCs.

Description	qty.	cat.#
Injection Port Split/Splitless Weldment Retaining Ring Pliers	ea.	26186

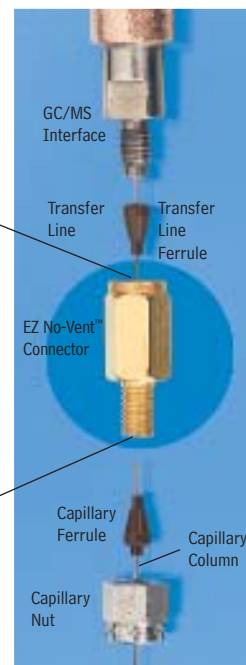
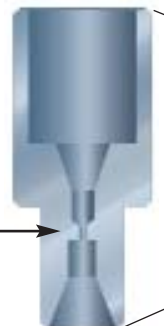
**EZ No-Vent™ GC Column-Mass Spectrometer Connector**

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- Available for Agilent GCs with 5971/5972 or 5973 GC/MS.

We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing. Figure 1 shows the internal structure of the connector.

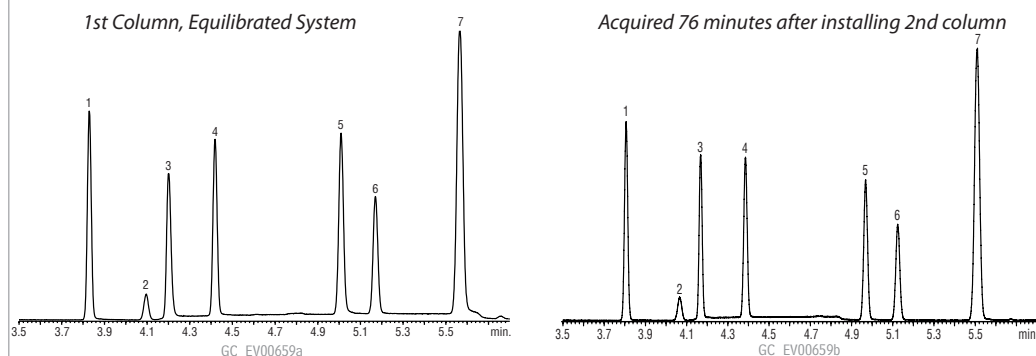
**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

**Laser drilled to 100µm ID**



Change columns in minutes—without venting!

**Figure 2** Sharp, symmetric peaks for gases show the EZ No-Vent™ connector does not add dead volume and allows rapid column changes.



Rtx®-624 60m, 0.25mm ID, 1.4µm (cat# 10969), column direct to source.

Rtx®-624 60m, 0.25mm ID, 1.4µm (cat# 10969) using EZ No-Vent™.

1. dichlorodifluoromethane
2. 1,2-dichlorotetrafluoroethene (Freon® 114)
3. chloromethane
4. vinyl chloride
5. bromomethane
6. chloroethane
7. trichlorofluoromethane

Sample: Volatile Gas Mix 502.2  
Calibration Mix#1 (gases)  
cat# 30042  
Inj.: Purge & Trap  
GC: Agilent 6890  
Inj. temp.: 300°C  
Carrier gas: helium, constant flow  
Flow rate: 1.0mL/min.

Oven temp.: 60°C isothermal  
Det: Agilent 5973 GC/MS  
Transfer line temp.: 280°C  
Scan range: 35-550 amu  
Tune: BFB  
Ionization: EI

Kit installs easily, without special tools or plumbing.

**Description**

EZ No-Vent™ Connector Kit for Agilent 5971/5972 and 5973 GC/MS

Kit includes: EZ No-Vent™ Connector; two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.

Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:

0.4mm ID (Polyimide)

0.5mm ID (Polyimide)

Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID

Replacement 100µm deactivated transfer line

Replacement EZ No-Vent™ Column Nut

Replacement EZ No-Vent™ Plug

Open-End Wrenches (7/16" x 5/16")

qty.

cat.#

kit 21323

2-pk. 21015

2-pk. 21016

2-pk. 21043

3 ft. 21018

5-pk. 21900

2-pk. 21915

2-pk. 20110

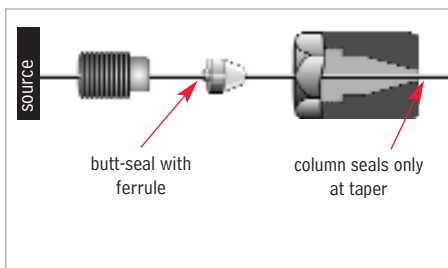


Agilent's MSD interface uses a butt-seal to simultaneously seal the MSD source to the capillary column. This system is prone to leakage. Restek's MSD conversion fitting is designed with two separate seals to reduce the chance of leaks: a crunch washer seals the MSD conversion fitting to the source; a ferrule seals the capillary tubing to the conversion fitting.

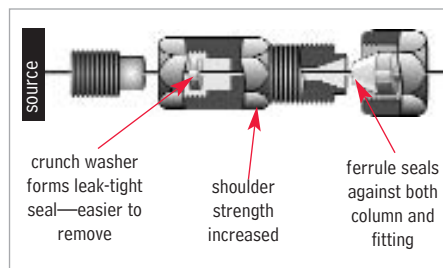
### MSD Conversion Fitting

- A flat, soft aluminum sealing ring deforms and butt-seals against the MSD interface.
- A standard Vespel® ferrule seals the column and 1/16-inch stainless steel nut.
- Fitting is constructed of nickel-plated brass for longevity and softness.
- Use any standard Vespel® or Vespel®/graphite 1/16-inch ferrule.
- Includes a 1/16-inch stainless steel nut and two replacement sealing rings. Order ferrules separately.

**Agilent Design**



**Improved Restek Design**



Description	qty.	cat.#
MSD Conversion Fitting	ea.	21314
Replacement Ring Seal for MSD Conversion Fitting	2-pk.	21313

Improved design!



### MSD Source Nut

- 1.2mm nut bore permits easy removal of ferrules with a standard tapered-needle file (cat.# 20106).
- Made of brass to prevent thread-stripping on the transfer line.
- Improved design enhances ease of threading onto the transfer line and improves overall lifetime.

Description	Similar to Agilent part #	qty.	cat.#
(Detector) MSD Source Nut	05988-20066	2-pk.	20643

### Capillary Installation Gauge for Agilent 5973/5975 MS

- Seats ferrules onto column for consistent installations.
- Made from high-quality stainless steel.



Install the nut and ferrule onto the column, then insert the column through the installation tool, exposing several centimeters at the exit end. Tighten the nut.



Score and remove the exposed end of the column, then loosen the nut.



The ferrule will be properly seated and should remain in place when light force is applied. Install the column into the GC/MS interface.

Description	Similar to Agilent part #	qty.	cat.#
Capillary Installation Gauge for Agilent 5973/5975 MS	G1099-20030	ea.	21894



### Gold Tip Transfer Line

- For use with Agilent 5971/5972 MS Systems.
- Gold-plated for inertness.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Gold Tip Transfer Line	05971-20305	ea.	24699

**Replacement Interface with Bellows for Agilent 5971/5972 MS**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Interface with Bellows for Agilent 5971/5972 MS	05971-60302	ea.	22659

**Replacement Interface Guide Tube for Agilent 5971/5972 MS**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Interface Guide Tube for Agilent 5971/5972 MS	05971-20307	ea.	22660

**Replacement Cold Sensor for Agilent 5971/5972 MS Diffusion Pump**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Cold Sensor for Agilent 5971/5972 MS Diffusion Pump	3103-0145	ea.	22661

**Replacement Diffusion Pump Fan Assemblies for Agilent 5971/5972 MS**

- 110/120 VAC

Description	Similar to Agilent part #	qty.	cat. #
Replacement Diffusion Pump Fan Assembly for Agilent 5971 MS	05971-60540	ea.	22662
Replacement Diffusion Pump Fan Assembly for Agilent 5972 MS	05972-60540	ea.	22663

**Rough Pump Oil #19 for MSD Pumps, Oil Vacuum Pump**

- Formulated from crude oil stocks known for their durability and line lubricating qualities.
- Use in Agilent 5973/5972/5971 and GCD mass spec systems, or in other manufacturers' MSD systems that require rough pump oil.
- Under average use, the oil in the foreline rough pump should be replaced every six months.

Description	Similar to Agilent part #	qty.	cat. #
Rough Pump Oil for MSD Pumps	6040-0834	1 liter	22687

**Ion Source Cleaning Powder**

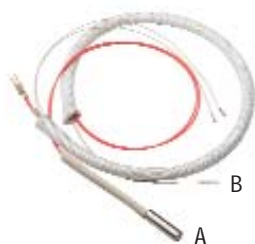
- Use this aluminium oxide powder to clean surfaces that contact the sample or ion beam when you encounter poor sensitivity and inadequate abundances at high masses.

Description	Similar to Agilent part #	qty.	cat. #
Ion Source Cleaning Powder	8660-0791	1 kg.	22685



## Heater Cartridge & PRT Sensor for Agilent 5890 GCs

- Use with 5890 FID and split/splitless weldments.
- Meets or exceeds OEM performance.



Description	Similar to Agilent part #	qty.	cat.#
A + B) Injector/FID Heater + Injector/FID PRT Sensor	05890-61140	ea.	22068
A) Injector/FID Heater	19231-60620	ea.	22069
B) Injector/FID PRT Sensor	19231-60660	ea.	23035

## FID Collector Housing Kits for Agilent GCs

- Meets or exceeds OEM performance.



Description	Similar to Agilent part #	qty.	cat.#
FID Collector Housing Kit for Agilent 5890 GCs (includes collector body, spanner nut, and silicone washer—order mount separately)	19231-20920	kit	23037
FID Collector Housing Kit for Agilent 6890 GCs (includes collector body, silicone washer, nut, and mount)	G1531-20550	kit	23045
FID Collector Housing for Agilent 6890 GCs	G1531-20740	ea.	23044
Replacement Silicone Washers for FID Collector Housing for Agilent 5890/6890 GCs	5180-4165	12-pk.	23064

new!



## FID Collector Mount for Agilent GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
A) FID Collector Mount for Agilent 5890 GCs	19231-20930	ea.	23036
B) FID Collector Mount for Agilent 6890 GCs	G1531-20550	ea.	23043

## FID Base Weldment for Agilent GCs

- Meets or exceeds OEM performance.
- Includes brass nut.



Description	Similar to Agilent part #	qty.	cat.#
A) FID Base Weldment for Agilent 5890 GCs	19231-80580	ea.	23041
B) FID Base Weldment, Pack Column FID, for Agilent 6850/6890 GCs	G1531-80580	ea.	23052
C) FID Base Weldment, Capillary Column FID, for Agilent 6850/6890 GCs	G1531-80630	ea.	23053

## Spanner Wrench for Agilent 5890/6890/6850 FID Collector Assemblies

- Easily remove the nut from the FID collector without damaging the nut.
- Unique, ergonomic handle—easy to grip.



Remove FID ignitor castle.



Easily loosen the nut by aligning the two pins on the bottom of the wrench with the two open slots on the nut...



...then turn counterclockwise...



...and remove.

Description	Similar to Agilent part #	qty.	cat.#
Spanner Wrench for Agilent 5890/6890/6850 FID Collector Assembly	19231-00130	ea.	22329

### Direct Replacement FID Collector Assembly for Agilent 5890 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Collector Assembly (includes insulators)	19231-60690	kit	23010
FID Collector Assembly w/Siltek® Ignitor Castle	—	kit	21131

### Replacement FID Parts for Agilent 5890 GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
	19231-20970		
	19231-20960		
A) FID Collector (includes insulators)	19231-20950	ea.	21138
	19231-20940		
B) FID Collector Nut and Washer	5181-3311	set	21136
C) FID Ignitor*	19231-60680	ea.	21001
D) FID Ignitor Castle	19231-20910	ea.	21137
Siltek® FID Ignitor Castle	—	ea.	21135

\*Also fits OI Analytical 4410 detector (similar to OI part # 191833).



**SILTEK®**  
versions available.

### Direct Replacement FID Collector Assembly for Agilent 6890/6850 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Collector Assembly (includes insulator)	G1531-60690	kit	21699
FID Collector Assembly w/Siltek® Ignitor Castle	—	kit	21132

### Replacement FID Parts for Agilent 6890/6850 GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
	G1531-20690		
A) FID Collector (includes insulators)	G1531-20700	ea.	21139
	19231-20940		
B) FID Collector Nut and Washer	5181-3311	set	21136
C) FID Ignitor*	19231-60680	ea.	21001
D) FID Ignitor Castle	19231-20910	ea.	21137
Siltek® FID Ignitor Castle	—	ea.	21135

\*Also fits OI Analytical 4410 detector (similar to OI part # 191833).



### Direct Replacement FID Flow Measuring Adaptor for Agilent 5890/6890/6850 GCs

- Makes setting flows easy.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Flow Measuring Adaptor	19301-60660	ea.	21000



## Replacement Jets

### Standard Version

- Engineered with a fluted tip to guide the capillary column into the jet.
- Threads specially coated for easy installation and removal.
- Special processing ensures the highest degree of cleanliness.

### High-Performance Version

- Similar to the standard version, but Siltek® treated.
- Extremely inert, use with active compounds.

### Capillary Adaptable FID Replacement Jet for Agilent 5890/6890/6850 GCs (0.011-inch ID tip)

Description	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	19244-80560	ea.	20670	3-pk.	20671
High-Performance Siltek® Treated	19244-80560	ea.	20672	3-pk.	20673

### Capillary Dedicated FID Replacement Jet for Agilent 6890/6850 GCs

0.011-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	G1531-80560	ea.	21621	3-pk.	21682
High-Performance Siltek® Treated	G1531-80560	ea.	21620	3-pk.	21683

### Packed Column Replacement Jets for Agilent 5890/6890/6850 GCs

0.018-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	18710-20119	ea.	21694	3-pk.	21695
High-Performance Siltek® Treated	18710-20119	ea.	21696	3-pk.	21697

0.030-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	18789-80070	ea.	21688	3-pk.	21689
High-Performance Siltek® Treated	18789-80070	ea.	21686	3-pk.	21687

## tech tip

### Which FID Jet Should I Use?

There are two FID jet configurations for Agilent GCs. The longer "adaptable" jet fits both 5890 and 6890 GCs, and can be used with capillary or packed columns. The shorter "dedicated" jet is for the FID in the 6890 GC that is designed only for use with capillary columns.

restek  
innovation!

### FID Jet Removal Tool for Agilent 5890/6890/6850 FIDs

- Securely grips jet in socket for easy removal or installation.
- Unique, ergonomic handle—easy to hold.



Slip tool  
over FID  
jet...



...loosen  
jet...



...and  
remove.

Description	qty.	cat.#
FID Jet Removal Tool for Agilent 5890/6890/6850 FIDs	ea.	22328

### Torx® Screwdriver Set

- Set includes TR-10, TR-15, and TR-20.
- Ideal for performing routine maintenance on Agilent 6890 GCs.

Description	qty.	cat.#
Torx® Screwdriver Set	set	23034

### Detector Plug Nut

Use Restek's detector plug nut to cap off a detector for thermal cleaning, to check detector or make-up gas flow rates, or to prevent hydrogen from accidentally diffusing into the oven from an unused detector base.

Description	Similar to Agilent part #	qty.	cat. #
Detector Plug Nut	5020-8294	2-pk.	21883



### FID/NPD Adaptor Fitting

- Easy to use, sturdy, compact stainless steel fitting.
- 1/16-inch nut uses standard graphite or Vespel®/graphite ferrules.
- Wrench pad won't turn when installing a capillary column.
- Includes 1/4- and 1/16-inch stainless steel nuts, and 1/4-inch Vespel® and 0.4mm ID graphite ferrules.

Description	qty.	cat. #
FID/NPD Adaptor Fitting	kit	20884



### FID/NPD Capillary Adaptor Fitting for Agilent 5890/6890/6850 GCs

- High-quality stainless steel construction.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID/NPD Capillary Adaptor Fitting	19244-80610	ea.	22077



### TCD Adaptor Fitting

Description	Similar to Agilent part #	qty.	cat. #
TCD Adaptor Fitting	19302-80020 G1532-80540	ea.	20269



### ECD/FID Dual-Purpose Make-Up Gas Kit

Incorporates a better make-up gas flow profile and a straight section of inert Siltek® tubing as the capillary guide. To add make-up gas to an FID, remove the tubing guide and insert an FID jet tail. A direct replacement fitting with a special end connector is available for GCs factory-equipped with make-up gas. A complete kit is available for plumbing GCs that are not factory-equipped with make-up gas. Complete kit includes make-up gas fitting, Siltek® treated guide, 1/4" nut and ferrules, 1/16" nut, 0.4mm ID graphite ferrule, and fine metering valve.

Description	qty.	cat. #
ECD/FID Dual-Purpose Make-Up Gas Kit	kit	21300
ECD/FID Replacement Fitting for Restek Make-up Gas Kit	ea.	21324
Replacement ECD/FID Siltek® Guide	2-pk.	21302
ECD/FID Direct Replacement Fitting (includes 1/4" nut, Vespel®/graphite ferrule, 1/16" nut, 0.4mm ID graphite ferrule)	ea.	21301



Rugged design!

### FID Gauge Pack for Agilent 5890 GCs

Pressure regulators and gauges for air & hydrogen. The 1/8-inch bulkhead allows easy hookup to instrument. Rated for inlet pressures to 250psi, outlet pressures of 0 to 60psi.

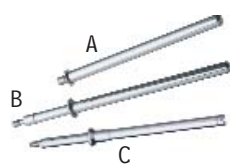
Description	qty.	cat. #
FID Gauge Pack for Agilent 5890 GCs	ea.	22071



## Autosampler Parts

### Replacement Parts for Agilent Autosamplers

- All parts meet or exceed OEM performance.



### Injector Mounting Posts for Agilent Autosamplers

Description	Similar to Agilent part #	qty.	cat.#
A) Injector Mounting Post for Agilent 7673 Series Autosamplers for use with 5890 GCs	18597-60805	ea.	21236
B) Injector Mounting Post for Agilent 7673 Series Autosamplers for use with 6890 GCs	07673-21140	ea.	21237
C) Injector Mounting Post for Agilent 7683 Series Autosamplers	G2613-20500	ea.	21172



### Turret Tray Assembly for Agilent 5890/6890 GC

- Holds sample, waste and solvent vials.

Description	qty.	cat.#
Turret Tray Assembly for Agilent 5890/6890 GC	ea.	22855



### Autosampler Plunger Carrier Belt

Description	Similar to Agilent part #	qty.	cat.#
Autosampler Plunger Carrier Belt for Agilent 7673A and 7673B	07673-61275	ea.	22695



### Carriage Motor Belt

Description	Similar to Agilent part #	qty.	cat.#
Carriage Motor Belt for Agilent 7673A and 7673B	1500-0676	ea.	22692

new!



### Z-Belt for Agilent 7673B Autosampler

Description	Similar to Agilent part #	qty.	cat.#
Z-Belt for Agilent 7673B Autosampler	1500-0803	ea.	22332



### Carriage Motor

Description	Similar to Agilent part #	qty.	cat.#
Carriage Motor for Agilent 7673A and 7673B	07673-60890	ea.	22693



new!

### Injector Turret Motor for Agilent 7673A & 7673B Injectors

Description	Similar to Agilent part #	qty.	cat.#
Injector Turret Motor for Agilent 7673A & 7673B Injectors	07673-60810	ea.	22337



## Replacement Cables

### (for Agilent GCs, Integrators, & Autosamplers)

- Priced less than original equipment.
- Instructions and wiring diagrams included.
- Manufactured with only the highest-quality components.

Connect an Agilent 5890 GC to an Agilent integrator (for second Inet integrator).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60610	6 ft.	ea.	20650
Replacement Cables	35900-60610	6 ft.	2-pk.	20651

## did you know?

Restek provides  
pin schematics.



Connect an Agilent 5890 GC to an Agilent 3396 integrator to enable remote starts (non-Inet connection from GC to integrator).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	03394-60560	6 ft.	ea.	20654



Connect an Agilent 3396 integrator to remote-start another piece of equipment or to start the Agilent 3396 integrator from that other piece of equipment.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	03394-60540	6 ft.	ea.	20655
Replacement Cables	03394-60540	6 ft.	2-pk.	20656



Connect an Agilent 5890 GC to a non-Agilent integrator or standard strip chart recorder.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	05890-60800	6 ft.	ea.	20652
Replacement Cables	05890-60800	6 ft.	2-pk.	20653



Connect an Agilent 5890 GC to remote-start another piece of equipment or to start the Agilent 5890 GC from that piece of equipment.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	05890-61080	6 ft.	ea.	20657



Connect an Agilent 3396 integrator to a non-Agilent GC.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60630	6 ft.	ea.	20658
Replacement Cables	35900-60630	6 ft.	2-pk.	20659



Connect an Agilent 5890 GC to an Agilent 35900C Interface or to an Agilent 7673A Autosampler to enable remote starts.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60700	6 ft.	ea.	20660
Replacement Cables	35900-60700	6 ft.	2-pk.	20661



Automatic liquid sampler stop/start cable for Agilent GCs.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	G1530-60930	7 ft.	ea.	20929



Connect an Agilent 6890 GC to a PC 9F/9F (RS232).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	G1530-60600	6 ft.	ea.	22694





### GC Racer by Zip Scientific

- Saves time and money by increasing throughput.
- Makes fast GC possible with any capillary GC column.
- Easy to operate and install—truly a “plug and use” accessory.

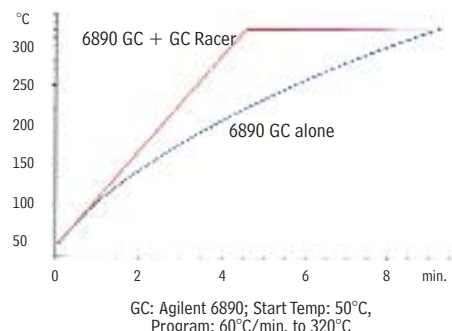
Fast gas chromatographic temperature programs can speed up elution of high boiling point compounds and late eluters, but often are not used to maximum advantage. The Agilent 5890 has a maximum temperature program rate of 70°C/min., but the factory heating elements in the 5890 only allow this maximum rate to be maintained up to a temperature of 100°C. The Agilent 6890 allows a maximum ramp rate of 75°C/min. at starting temperatures of 50–70°C and 20°C/min. at starting temperatures of 300–450°C.\* For analysts trying to push temperature ramps as fast as possible, these restricted program rates can lead to longer analysis time and broader peaks.

The GC Racer system will maintain a temperature program rate of 70°C/min. up to 350°C or 60°C/min. to temperatures as high as 450°C in an Agilent 5890 or a rate of 70°C/min. up to 400°C in an Agilent 6890.

Restek and Zip Scientific have teamed up to bring you the GC Racer temperature programmer, a system that enhances conventional ovens with an auxiliary heater that is controlled by the GC. The GC Racer consists of a control unit and a resistive heating element that is placed on the floor of the GC oven. The heating element is connected to the controller, which is plugged into the main PC board of the GC and into a 120V standard grounded wall outlet. When the GC Racer controller detects that the factory heating elements are not keeping up with the programmed heating rate, the GC Racer heater is brought into the circuit to augment the heat being supplied to the oven.

The auxiliary heater design is similar to that of the original GC heater. At no time during the installation of the GC Racer system is the column removed from the oven, or disconnected from the detector or injection port.

**Figure 1** Faster temperature programs increase sample throughput.



### a plus 1 story

“We tried a GC Racer Temperature Programmer from Restek and now we want more! With the GC Racer, we can perform high

speed temperature programming to get the results we need, and we can use conventional columns and fittings. This is a great time and cost savings for us. Not only that, but, with this system, we don’t experience any leaks at the fittings, so we can use it with our mass spectrometer. All this for an economical price.”

**Josh Hildabrand**, Chemist, and **William Mock**, Lab Manager, Environmental Science Corporation

The simplicity of its components and installation make the Zip Scientific GC Racer system a valuable tool in the quest for high-speed GC, and a must-have add-on accessory for every 5890 or 6890 GC. The speed of analysis that can be achieved and the ease of installation will lead to direct savings of time and money by decreasing run time and increasing sample throughput.

### for more info

GC Racer brochure  
(lit. cat.# 59297) and  
Applications Note  
(lit. cat.# 59457)

Download your free printable  
pdfs from our website.



Description	voltage	qty.	cat.#
GC Racer for Agilent 5890 Series II (only) GC	120 volt	ea.	23024
GC Racer for Agilent 5890A (only) GC	120 volt	ea.	23025
GC Racer for Agilent 6890 (only) GC	120 volt	ea.	23028

\*Use of high voltage and amperage or a special insert purchased with the GC will allow slightly higher ramp rates.

**Vespel® Ferrules**

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

**Graphite Ferrules**

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

**Vespel®/Graphite Ferrules**

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.



Vespel® ferrules

**Capillary Ferrules—For 1/16-Inch Compression-Type Fittings**

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

**Encapsulated Ferrules—For 1/16-Inch Compression Fittings**

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.

Ferrule ID	Fits Column ID	qty.	cat. #
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038



Reusable!

**Compact Ferrules—For Agilent 5890/6890/6850 GCs**

Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
0.4mm	0.25/0.28mm	10-pk.	20250	20238
0.4mm	0.25/0.28mm	50-pk.	20251	20239
0.5mm	0.32mm	10-pk.	21007	20248
0.5mm	0.32mm	50-pk.	21008	20249
0.8mm	0.45/0.53mm	10-pk.	20252	20263
0.8mm	0.45/0.53mm	50-pk.	20253	20264
1.0mm	0.75mm*	10-pk.	21059	21056
1.6mm	1.00mm*	10-pk.	21061	21057



\*For micropacked columns.

\*\*For 0.28mm MXT® columns.

## Standard Ferrules—For 1/16", 1/8", and 1/4-Inch Fittings



Fitting Size	Ferrule ID	qty.	Vespe <sup>®</sup>	Graphite	Vespe <sup>®</sup> /Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223

## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings



Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespe <sup>®</sup> /Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246

## Reducing Ferrules



Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespe <sup>®</sup> /Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings



Fitting Size	Ferrule ID	qty.	Vespe <sup>®</sup> /Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespe<sup>®</sup> or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.



Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## tech tip

### Choosing the Right Ferrule

Although graphite and Vespe<sup>®</sup>/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference. Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas. Vespe<sup>®</sup>/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespe<sup>®</sup>/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles. Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

**Universal Press-Tight® Connectors**

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

**Universal Angled Press-Tight® Connectors**

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484

**Universal “Y” Press-Tight® Connectors**

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

**Universal Angled “Y” Press-Tight® Connectors**

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469

**Universal “X” Press-Tight® Connectors**

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266

**Polyimide Resin**

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat.#
Polyimide Resin	350°C	5 grams	20445





Patent pending.

Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

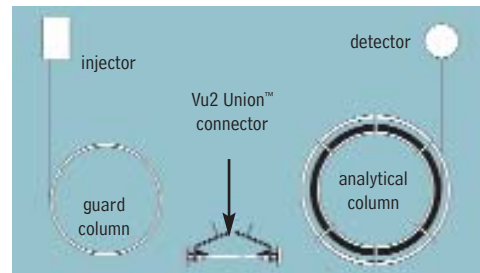
- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

#### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

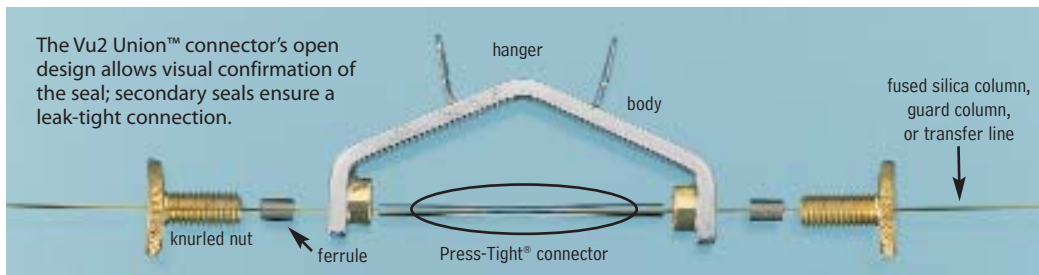
A guard column connected to an analytical column by a Vu2 Union™ connector.



#### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or our website).



Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors



Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.



Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

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• 34 •

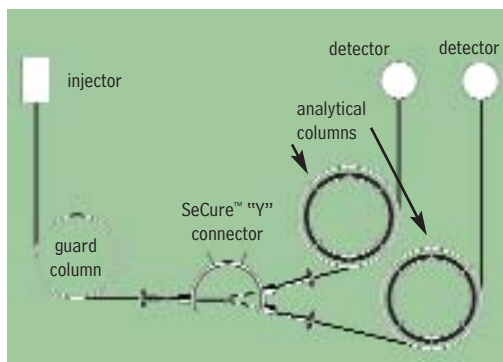
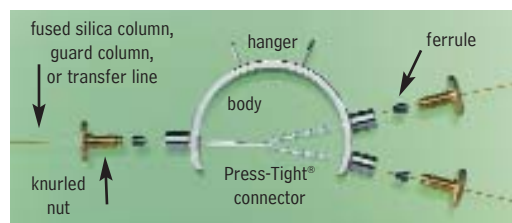
**SeCure™ “Y” Connector Kits**

- Connect two analytical columns to a transfer line or guard column.
- Use standard “Y” Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

Combine the simplicity of a “Y” Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ “Y” Connector’s open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.

Dual-column confirmational analysis with a single injection—one of the SeCure™ “Y” connector’s many uses.



Patent pending.

Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ “Y” connector body, 3 knurled nuts, “Y” Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ “Y” Connector Kit	0.25/0.28mm	kit	20276
SeCure™ “Y” Connector Kit	0.32mm	kit	20277
SeCure™ “Y” Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

**Universal “Y” Press-Tight® Connectors**

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

**Graphite Ferrules for SeCure™ “Y” Connectors**

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



## please note

Use for fused silica-to-fused silica or fused silica-to-metal connections.

**MXT™ Low-Dead-Volume Connector Kits for Metal Columns are also available.** See our general catalog or our website.

### MXT™-Union Connector Kits for Fused Silica Columns

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.



### MXT™-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384



### MXT™ “Y”-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

### 1/32-Inch Replacement Nut

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

### Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.



### 1/32-Inch Adaptor Ferrule (Valcon Polyimide)

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389



### 1/4-Inch–3/16-Inch Open-End Wrenches

High-quality miniature wrenches to use with MXT™ low-dead-volume connectors.

Description	qty.	cat.#
1/4"-3/16" Open-End Wrenches	2-piece set	20388

## tech tip

### Coupling GC Columns

An MXT™ connector is a good alternative to a glass connector when coupling GC columns. This connector is constructed from stainless steel and will not break; it uses ferrules for sealing. The design ensures low dead volume, and Siltek® treatment ensures the MXT™ connector is inert—both features help minimize peak tailing. MXT™ connectors can be used to connect metal to metal, metal to fused silica, or fused silica to fused silica tubing. When connecting metal tubing, use 1/32-inch stainless steel ferrules (see our general catalog or visit [www.restek.com](http://www.restek.com)); for fused silica tubing, use Valcon polyimide adaptor ferrules (see above).

**Thermal Gas Purifier\***

- Removes oxygen, water, carbon monoxide, carbon dioxide, hydrocarbons (except methane) to ppb levels—pure enough for MS.
- Packed with reactor-grade, pure getter material for maximum efficiency and no contamination.
- Welded end-fittings on getter tubes eliminate leaks.
- Each tube has 12L oxygen and 35L water vapor capacity.
- Maximum flow: 1 liter/minute.

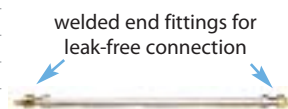
The getter material in Restek's re-engineered line of thermal gas purifiers reacts chemically with impurities in the carrier gas stream. Because the reaction is non-reversible, there is no possibility of contaminants breaking through the thermal gas purifier.

Gas purification is very economical when you use a thermal gas purifier. Getter tubes normally require changing only once per year; heavy use or very impure feed gas may require more frequent getter tube replacement.

<b>Restek Single-Tube Thermal Gas Purifier, 110 Volt (1 tube included)**</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings	ea.	21496
1/4" Fittings	ea.	21497
<b>Restek Dual-Tube Thermal Gas Purifier, 110 Volt (2 tubes included)**</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings	ea.	21498
1/4" Fittings	ea.	21499
<b>Replacement Getter Tube</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings (Similar to Supelco part# 2-2396)	ea.	21661
1/4" Fittings (Similar to Supelco part# 2-2398)	ea.	21660

\*Use with helium or nitrogen carrier gas only. Do not use with hydrogen, oxygen, or air—a violent reaction and/or fire will occur.

\*\*Single-tube model dimensions: 15" x 7" x 6" (38 x 17.8 x 15.2 cm). Dual-tube model dimensions: 15" x 10" x 6" (38 x 25.4 x 15.2 cm).

**Single-Tube Model****Dual-Tube Model**

Dimensions: 13" x 1/2"  
(33 x 1.3 cm)

**Pressure Gauge Kit**

- Use an in-line pressure gauge to indicate when the Thermal Gas Purifier getter tube should be replaced.
- Includes 1/8" tee and 0–100 psi gauge.

<b>Description</b>	<b>qty.</b>	<b>cat.#</b>
In-line Pressure Gauge Kit for Thermal Gas Purifiers	kit	21657



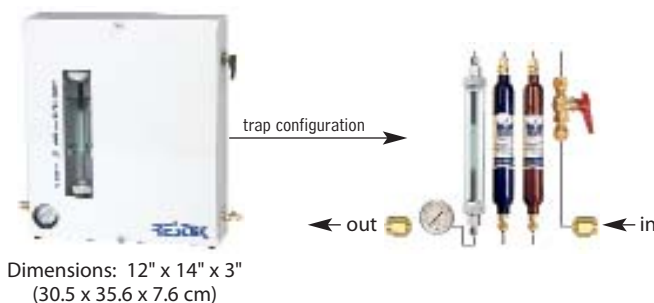
Always know the status of the Thermal Gas Purifier getter tube: change tube when pressure drops below 10psi.

**Restek Gas Management System**

- Removes moisture, hydrocarbons, and oxygen from carrier gas, extending column lifetime.
- Produces high-purity carrier gas for most applications.
- Includes one each: moisture, hydrocarbon, and indicating oxygen trap.
- Replacing traps is safe and easy.
- Maximum flow: 1 liter/minute.

**did you know?**

The Restek Gas Management System removes water vapor (to 10ppb), hydrocarbons (to 0.1ppm), and oxygen (to less than 0.1ppm) with three traps housed in one unit.



<b>Description</b>	<b>qty.</b>	<b>cat.#</b>
Restek Gas Management System (includes fittings for 1/8" and 1/4" gas line)	ea.	21999
<b>Replacement Traps</b>	<b>qty.</b>	<b>cat.#</b>
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010



## did you know?

All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

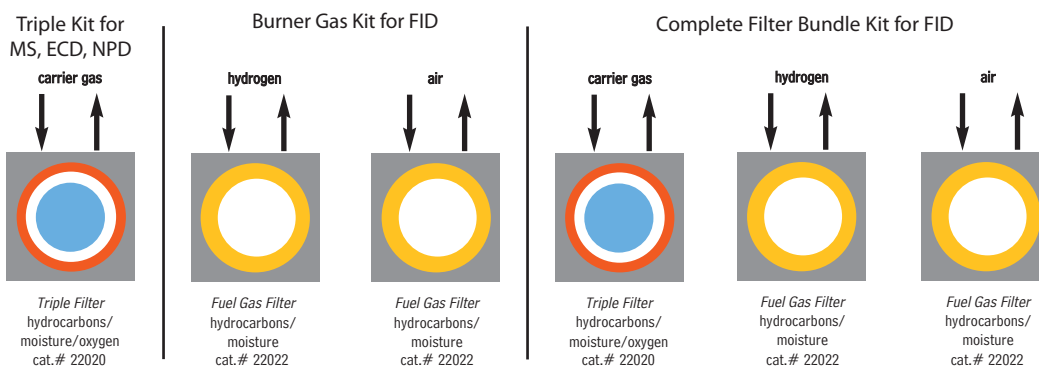
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure or Maximum Flow Rates	Use for:	Indicator Color Change	H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Capacity Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.# 22028	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>3</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>3</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>3</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	> 99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>3</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

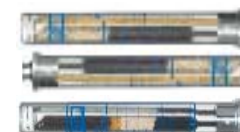
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

- Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

- Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

- Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

- Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

- To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833





**Kelli Steindl**  
GC Accessories Associate  
Product Marketing  
Manager  
2+ years of service!

### Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters (page 39), Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.



Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

NOTE: Super-Clean™ Gas Filters are recommended for purifying non corrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

### Click-On Inline Super-Clean™ Traps and Connector Kits



Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463

**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat.#
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat.#
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat.#
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat.#
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat.#
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



**Dual-Stage Ultra-High-Purity Brass Regulators**

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve,  
 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

**Single-Stage Ultra-High-Purity Brass Regulators**

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve,  
 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)



Produce zero air and pure hydrogen from one unit!

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**ordering note**

For **international orders**, please add the appropriate power cord suffix from the table below.

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)!

lit. cat.# 580051

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge FID Gas Station Maintenance Kit	ea.	21671
Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge.	ea.	24915

\*Zero air inlet requires minimum of 10psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat.# suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555

[www.restek.com](http://www.restek.com)

### Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/16" OD	21500	21501	21502
0.02" ID	1/8" OD	21503	21504	21505
0.03" ID	1/8" OD	21506	21507	21508
0.04" ID	1/8" OD	21509	21510	21511
0.085" ID	1/4" OD	21512	21513	21514
0.21" ID	1/2" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.



### ordering note

Required length in meters  
x 3.2808 = length in feet.

### ordering note

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item

### Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Chromatographically free of background contamination.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### cleaned

All tubing is cleaned and ready to use.

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.

Description	qty.	cat.#
GC Installation Kit	kit	21325



### tech tip

#### Plumbing a GC

It is essential to use clean chromatographic-grade tubing to plumb a GC. Standard-grade tubing contains residual hydrocarbon contaminants from the drawing process. These contaminants migrate into the gas stream, elevating background noise and causing down time.

For the *ultimate*  
in inertness, use

**SILTEK®**  
tubing.

See our catalog or  
website.



## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.

Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185



## Ridgid™ Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.

Description	qty.	cat.#
Ridgid™ Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012



## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134



CE

8" x 6 1/4" x 4 1/4"  
(20.3 x 15.9 x 10.8 cm)  
Weight: 11 lbs. (5.0 kg)

## SSI TC-20 Tube Cutting Machine

- Cuts 1/16", 1/8", or 1/4" tubing with inside diameter as small as 0.008".
- Electrically operated bench-top model.
- Handy dressing tool on the swing arm removes burrs and reams tubing.
- Voltage selectable 110–120/220–240 volts, 50–60Hz.\*

Description	qty.	cat.#
SSI Tubing Cutter Machine	ea.	23029
SSI Replacement Cutting Wheels	3-pk.	23030

\*Unit shipped set for 110–120 operating voltage. Switch to 220–240 volts by using alternate fuse and power cord (included).

## Tubing Dressing Tool

- Same tool as included with the SSI tube cutting machine.



Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

## Tubing Bender

- Bends 1/8-inch, 3/16-inch, or 1/4-inch tubing.
- Accurate left-hand, right-hand, or offset bends.



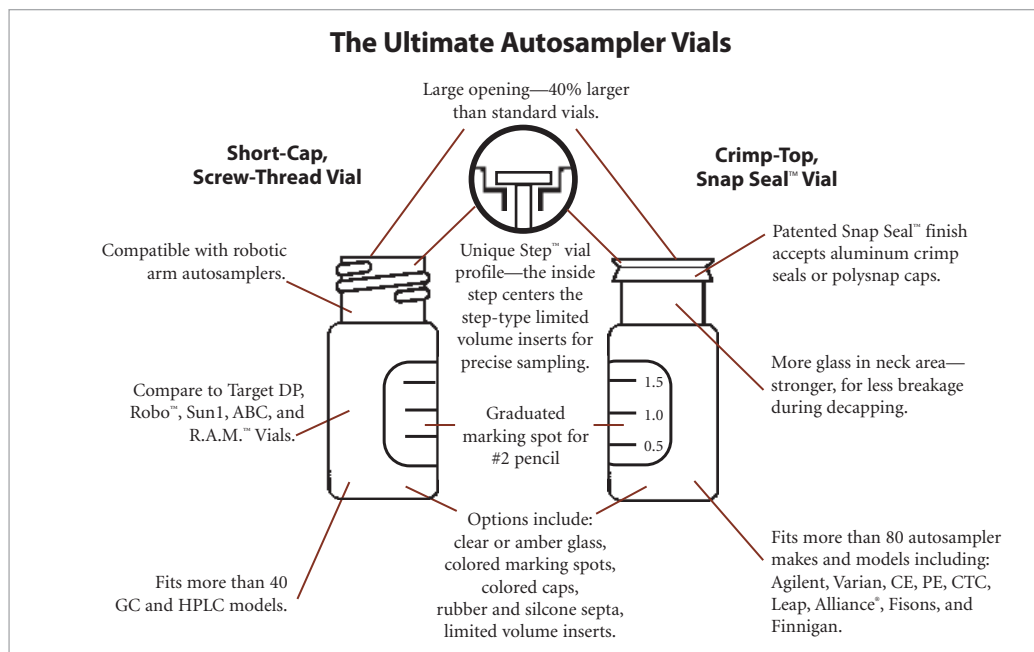
Description	qty.	cat.#
Tubing Bender	ea.	23009



## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.

Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



### Snap Seal™ Vials: The Versatile Crimp Top Vial

- Purchase only one vial type, but use any crimp capping system.
- Seal securely with a standard aluminum crimp seal, a Poly Crimp™ Seal, or a variety of Snap-Top Cap™ designs.
- Crimp tightly—the neck finish provides a tighter seal when using the new Poly Crimp™ Seal, Snap-Top Cap™ or aluminum crimp seal.
- Seal tightly—the unique design seals securely using septum of proper thickness.
- 40% larger opening than standard crimp-top vials.
- Autosampler compatible—the unique Step™ vial design precisely centers a limited-volume insert in the vial neck. This ensures dependable, reliable use with autosamplers—even autosamplers with robotic arms.
- Less breakage—more glass in the neck area minimizes breakage during decapping.
- Bags of mixed color caps aid in coding special samples, controls, or standards.



### Catalog Number Cross-Reference: Vials for Agilent Autosamplers

Similar to Agilent Part #	Restek Cat. #	Description	Page
5181-1210	21174	Aluminum Crimp Seals, PTFE/Rubber, 100-pk.	46
5181-1270	24513	50µL Polypropylene Spring Inserts, 100-pk.	46
5181-3376	24385	2mL Amber Crimp-Top Vials, 100-pk.	46
5181-3377	24517	350µL Glass Flat Bottom Inserts, 1000-pk.	46
5182-0543	24383	2mL Clear Crimp-Top Vials, 100-pk.	46
5182-0549	24518	250µL Polypropylene Bottom Spring Inserts, 100-pk.	46
5182-0552	24359	Aluminum Crimp Seals, PTFE/Silicone, 100-pk.	46
5182-0714	21154	2mL Clear Screw-Top Vials - No Marking Spot, 100-Pk.	47
5182-0715	21140	2mL Clear Screw-Top Vials, 100-pk.	47
5182-0716	21142	2mL Amber Screw-Top Vials, 100-pk.	47
5182-0717	24473	9mm Screw-Top Closures, PTFE/Rubber, 100-pk.	47
5182-0720	24485	9mm Screw-Top Closures, PTFE/Silicone, 100-pk.	47
5182-0723	24497	9mm Screw-Top Closures, PTFE/Silicone/PTFE, 100-pk.	47
5183-2068	21141	2mL Clear Screw-Top Vials, 1000-pk.	47
5183-2069	21143	2mL Amber Screw-Top Vials, 1000-pk.	47
5183-4492	24384	2mL Clear Crimp-Top Vials, 1000-pk.	46
5183-4493	24386	2mL Amber Crimp-Top Vials, 1000-pk.	46
5183-4498	21175	Aluminum Crimp Seals, PTFE/Rubber, 1000-pk.	46
5183-4500	24360	Aluminum Crimp Seals, PTFE/Silicone, 1000-pk.	46
9301-0978	24651	100µL Polypropylene Limited Volume Vials, 100-pk.	46
9301-0977	24653	100µL Glass/Plastic Limited Volume Vials, 100-pk.	46

← cross-reference

## 11mm Vials



### Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish

#### Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153



for **more** info

see **page 48** for crimpers and decappers.

#### 11mm Aluminum Crimp Seals with Septa

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370



#### Convenience Kits: Vials, Caps, & Septa

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649



#### Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.



#### Limited Volume Vials, 11mm Crimp-Top

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

Agilent Compatible!

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

Ideal for Agilent 7673 & other autosamplers that process 12 x 32mm crimp-top vials.

**Headspace Vials****Headspace Autosampler Vials**

Description	100-pk.	1000-pk.
6mL Clear Vial	21166	21167
10mL Clear Vial, Flat Bottom	24683	24684
10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Flat Bottom	24685	24686
20mL Clear Vial, Rounded Bottom	21162	21163
27mL Clear Vial	21160	21161

**20mm Aluminum Seals w/Septa, Assembled**

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.



new!

Safer than removing caps with pliers, knife or screwdriver blades!



### Aluminum Seal Crimpers and Decappers

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!



Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738

### Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

### Decapping has never been easier!

one...



two...



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

**Standard MICROLITER™ Syringes for Agilent 7673, 7683, and 6850 Autosamplers**

- Hamilton and SGE syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are designed to withstand multiple, rapid injections through a septum.

for **more** info

See **page 52** for Needle Gauge Chart and Needle Point Style drawings.



Hamilton 10µL, Autosampler Cemented Needle for  
Agilent 7673, 7683, 6850 Autosamplers

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton			Restek
					Model	cat.#	qty.	cat.#
0.5µL	ASRN	23s	1.71"	Agilent	7000.5	86276	ea.	24895
0.5µL	ASRN	26s	1.71"	Agilent	7000.5	86274	ea.	21221
5µL	ASRN	23s	1.71"	Agilent	75	87957	ea.	20172
5µL	ASN	23s	1.71"	Agilent	75	87987	ea.	20168
5µL	ASN	23s	1.71"	Agilent	75	87990	6-pk.	20170
5µL	ASN	26s	1.71"	Agilent	75	87988	ea.	24592
5µL	ASN	26s	1.71"	Agilent	75	87989	6-pk.	21230
5µL	ASRN	23s-26s	1.71"	Agilent	75	87959	ea.	21223
5µL	ASN	23s-26s	1.71"	Agilent	75	87993	ea.	24593
5µL	ASN	23s-26s	1.71"	Agilent	75	87994	6-pk.	24594
10µL	ASRN	23s	1.71"	Agilent	701	80357	ea.	20171
10µL	ASN	23s	1.71"	Agilent	701	80387	ea.	20167
10µL	ASN	23s	1.71"	Agilent	701	80390	6-pk.	20169
10µL	ASRN	26s	1.71"	Agilent	701	80358	ea.	24597
10µL	ASN	26s	1.71"	Agilent	701	80388	ea.	24595
10µL	ASN	26s	1.71"	Agilent	701	80389	6-pk.	24599
10µL	ASRN	23s-26s	1.71"	Agilent	701	80359	ea.	24598
10µL	ASN	23s-26s	1.71"	Agilent	701	80393	ea.	24596
10µL	ASN	23s-26s	1.71"	Agilent	701	80391	6-pk.	24600



SGE Removable Needle for Agilent 7673, 7683,  
6850 Autosamplers

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE			Restek
					Model	cat.#	qty.	cat.#
0.5µL	R	23	42mm	Cone	0.5BR-HP-0.63	000410	ea.	24791
0.5µL	R	26	42mm	Cone	0.5BR-HP-0.47	000400	ea.	24790
5µL	R	23	42mm	Cone	5R-HP-0.63	001815	ea.	24793
5µL	F	23	42mm	Cone	5F-HP-0.63	001810	ea.	24781
5µL	F	23	42mm	Cone	SK-5F-HP-0.63	001814	6-pk.	24783
5µL	R	26	42mm	Cone	5R-HP-0.47	001805	ea.	24792
5µL	F	26	42mm	Cone	5F-HP-0.47	001800	ea.	24780
5µL	F	26	42mm	Cone	SK-5F-HP-0.47	001804	6-pk.	24782
5µL	R	23-26s	42mm	Cone	5R-HP-0.63/0.47	001825	ea.	21211
5µL	F	23-26s	42mm	Cone	5F-HP-0.63/0.47	001821	ea.	21210
5µL	F	23-26s	42mm	Cone	SK-5F-HP-0.63/0.47	001822	6-pk.	21214
10µL	R	23	42mm	Cone	10R-HP-0.63	002815	ea.	24795
10µL	F	23	42mm	Cone	10F-HP-0.63	002810	ea.	24785
10µL	F	23	42mm	Cone	SK-10F-HP-0.63	002814	6-pk.	24787
10µL	R	26	42mm	Cone	10R-HP-0.47	002805	ea.	24794
10µL	F	26	42mm	Cone	10F-HP-0.47	002800	ea.	24784
10µL	F	26	42mm	Cone	SK-10F-HP-0.47	002804	6-pk.	24786
10µL	R	23-26s	42mm	Cone	10R-HP-0.63/0.47	002825	ea.	21213
10µL	F	23-26s	42mm	Cone	10F-HP-0.63/0.47	002821	ea.	21212
10µL	F	23-26s	42mm	Cone	SK-10F-HP-0.63/0.47	002822	6-pk.	21215

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler Cemented Needle  
(ASRN) Autosampler Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

## GASTIGHT® Teflon®-Tipped Syringes for Agilent 7673, 7683, and 6850 Autosamplers



Hamilton 10µL Gas-Tight Syringe

## Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
5µL	ASN	23s	1.71"	Agilent	175	80074	ea.	24893
10µL	ASN	23s	1.71"	Agilent	1701	80080	ea.	24894
10µL	ASRN	23s	1.71"	Agilent	1701	80087	ea.	21224
10µL	ASRN	26s	1.71"	Agilent	1701	80088	ea.	21228
10µL	ASRN	23s–26s	1.71"	Agilent	1701	80089	ea.	21229

## SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	23	42mm	Cone	10F-HP-GT-0.63	002812	ea.	24789
10µL	R	23	42mm	Cone	10R-HP-GT-0.63	002818	ea.	24797
10µL	R	23–26	42mm	Cone	10R-HP-GT-0.63/0.47	002829	ea.	21220

## Guide to Needle Termination Codes

## Hamilton:

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

## SGE:

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

## Large Volume Syringes for Agilent 7673, 7683, and 6850 Autosamplers

## SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
25µL	R	23	42mm	Cone	25R-HP-0.63	003665	ea.	24798
50µL	R	23	42mm	Cone	50R-HP-0.63	004665	ea.	24799
100µL	R	23	42mm	Cone	100R-HP-0.63	005665	ea.	24800
250µL	R	23	42mm	Cone	250R-HP-0.63	006665	ea.	24801

## Replacement Needles for Agilent 7673, 7683, and 6850 Autosampler Syringes



## Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–10µL	23s	1.71"	Agilent	7786-01	6-pk.	20164
5–10µL	26s	1.71"	Agilent	7786-02	6-pk.	20165
5–10µL	23s–26s	1.71"	Agilent	7785-01	6-pk.	20166

## Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	42mm	Cone	033715	ea.	24821
5µL	23	42mm	Cone	036720	2-pk.	24823
5µL	26	42mm	Cone	036710	2-pk.	24822
10µL	23	42mm	Cone	037717	2-pk.	24825
10µL	26	42mm	Cone	037715	2-pk.	24824
25–250µL	23	42mm	Cone	038717	2-pk.	24826

**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.

for **more** info

See **page 52** for Needle Gauge Chart and Needle Point Style drawings.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek
					Model	cat.#		cat.#
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek
					Model	cat.#		cat.#
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 52.

## Gas-Tight Syringes

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub



#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944



#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

## did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

#### Needle Point Style



**Point Style 2, BV:** Beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

## Part Number Cross Reference

Similar to Agilent Part #	Restek Part #	Page	Product Name	Similar to Agilent Part #	Restek Part #	Page	Product Name
G1099-20030	21894	22	Capillary Installation Gauge	500-2114	20250	31	Compact Ferrules
G1530-60600	22694	29	Replacement Cable	5020-8292	21311, 21312	11	Finger-Tight Capillary Column Nuts
G1530-60930	20929	29	Replacement Cable	5020-8293	21311, 21312	11	Finger-Tight Capillary Column Nuts
G1530-60960	24323	15	EPC Test Kit	5020-8294	21883	27	Detector Plug Nut
G1530-61030	23039	15	Oven Temp Sensor	5061-5869	21710	13	Replacement Inlet Seal Washers (15-pk.)
G1530-80650	22076	19	Air Diverter	5062-3506	20212	31	Capillary Ferrules
G1531-20550	23043	24	FID Collector Mount	5062-3508	20211	31	Capillary Ferrules
G1531-20550	23045	24	FID Collector Housing Kit	5062-3538	20213	31	Capillary Ferrules
G1531-20690	21139	25	FID Collector	5062-3580	20241	18, 32	Replacement Ferrules
G1531-20700	21139	25	FID Collector	5062-3581	20242	18, 32	Replacement Ferrules
G1531-20740	23044	24	FID Collector Housing	5062-3587	22405	6	Gooseneck Splitless Liner (4mm) w/ Wool
G1531-60690	21699	25	FID Collector Assembly	5080-8732	20964, 20965	17	DI Uniliner Liners for Packed Column GC
G1531-80560	21620, 21621, 21682, 21683	26	FID Jets (.011")		20966, 20967		
G1531-80580	23052	24	FID Base Weldment, Pack Column FID	5080-8773	20252	31	Compact Ferrules
G1531-80630	23053	24	FID Base Weldment, Capillary Column FID	5080-8898	21685	16	Viton Replacement O-rings (10-pk.)
G1532-80540	20269	27	TCD Adaptor Fitting	5180-4165	23064	24	Replacement Silicone Washers for FID Collector Housing
G1544-20590	23042	15	Heater Block Retaining Nut	5180-4168	20296, 20297	9	Graphite O-rings for split liners
G1544-20620	22800	15	Split Vent Line for Agilent GCs (32-inch)	5180-4173	20298, 20299	9	Graphite O-rings for splitless liners
G1544-60575	22672, 22674	14	Weldment with EPC	5180-4181	22064	14, 15	O-rings for Agilent Trap Fittings (25-pk.)
G1544-60585	22670, 22686	14	Optional Split/Splitless Weldment	5180-4182	20377	9	Viton O-Rings for Agilent GCs (25-pk.)
G1544-60610	23031	14, 15	Optional Split Vent Trap Assembly	5181-1210	21174	46	Aluminum Seals, Silver Seal, PTFE/Natural Rubber Septa
G1544-80530	23032	14, 15	Replacement Traps and O-rings	5181-1267	21212, 24596	49	10µL Standard Microliter Syringes
G1544-80550	22820	15	Replacement Chemical Trap	5181-1270	24513	46	50µL Glass, Big Mouth, Bottom Spring Vial Inserts
G1544-80570	22671, 22673	14	Shell Weldment	5181-1273	21210, 24593	49	5µL Standard Microliter Syringes
G1544-80700	20954, 20989	8	Double Gooseneck Drilled Unliners	5181-3311	21136	25	FID Collector Nut and Washer
G1544-80730	20756, 20771	8	Drilled Unliners	5181-3315	20784	6	Double Gooseneck Splitless Liner (4mm)
G2613-20500	21172	28	Injector Mounting Post	5181-3316	20798	6	Gooseneck Splitless Liner (4mm)
G2630-60710	20926	19	Air Diverter	5181-3319	20166	50	Needles for 5-10µL Syringes (6-pk.)
03394-60540	20655, 20656	29	Replacement Cable	5181-3321	21213, 24598	49	10µL Standard Microliter Syringes
03394-60560	20654	29	Replacement Cable	5181-3360	21215, 24600	49	10µL Standard Microliter Syringes (6-pk.)
05890-60800	20652, 20653	29	Replacement Cable	5181-3376	24385	46	2.0mL Amber Glass Vial
05890-61030	23040	15	Oven Temp Sensor	5181-3377	24517	46	350µL Glass, Flat Bottom Vial Insert
05890-61080	20657	29	Replacement Cable	5181-3382	20964, 20965	17	DI Uniliner Liners for Packed Column GC
05890-61140	22068	15, 24	Injector/FID Heater + Injector/FID PRT Sensor		20966, 20967		
05890-61260	21610	15	Replacement Chemical Trap	5181-3395	20400	33	Press-Tight Connector
05921-21170	20883, 21879	11	Capillary Column Nuts (2-pk.)	5181-3396	20429	33	Deactivated Press-Tight Connector
05971-20305	24699	22	Gold Tip Transfer Line	5181-3397	20405	33	"Y" Press-Tight Connector
05971-20307	22660	23	Replacement Interface Guide Tube	5181-3398	20405-261	33	Deactivated "Y" Press-Tight Connector
05971-60302	22659	23	Replacement Interface with Bellows	5181-8809	24789, 24894	50	10µL Gas-Tight Syringes
05971-60540	22662	23	Replacement Diffusion Pump Fan Assembly	5181-8811	20164	50	Needles for 5-10µL Syringes
05972-60540	22663	23	Replacement Diffusion Pump Fan Assembly		24825		
05988-20066	20643	22	(Detector) MSD Source Nut (2-pk.)	5181-8813	21224, 24797	50	10µL Gas-Tight Syringes
07673-21140	21237	28	Injector Mounting Post	5181-8818	20712	6	2mm Splitless Liner
07673-60810	22337	28	Injector Turret Motor	5181-8830	21878, 21884	11	Capillary Column Nuts (2-pk.)
07673-60890	22693	28	Carriage Motor	5182-0543	24383	46	2.0mL Clear Glass Vials
07673-61275	22695	28	Autosampler Plunger Carrier Belt	5182-0549	24518	46	250µL Polypropylene Vial Inserts
1500-0676	22692	28	Carriage Motor Belt	5182-0552	24359	46	Silver Seal, PTFE/Silicone Septa Vials
1500-0803	22332	28	Z-Belt	5182-0714	21154	47	2.0mL Clear Vial
18597-06805	21236	28	Injector Mounting Post	5182-0715	21140	47	2.0mL Clear Vial
18710-20119	21694, 21695, 21696, 21697	26	FID Jets (.018")	5182-0716	21142	47	2.0mL Amber Vial
				5182-0717	24473	47	9mm Screw-Top Caps, Blue Cap, PTFE/Natural Rubber Liner
				5182-0720	24485	47	9mm Screw-Top Caps, Blue Cap, PTFE/Silicone Liner
18740-20800	22078	18	Reducing Nut	5182-0723	24497	47	9mm Screw-Top Caps, Blue Cap, PTFE/Silicone/PTFE Liner
18740-20880	21315, 21316	13	Replacement Inlet Seal (0.8mm hole)	5182-0830	24821	50	Needles for 0.5µL Syringes
18740-20885	21317, 21318	13	Replacement Inlet Seal (0.8mm hole)	5182-0834	20172, 24793	49	5µL Microliter Syringes
18740-20940	20409	15	Heat Sink	5182-0835	21211, 21223	49	5µL Microliter Syringes
18740-60835	20631, 21309	10	Septum Nuts	5182-0875	20170, 24783	49	5µL Microliter Syringes (6-pk.)
18740-80190	20709	7	Cup Splitter Liner	5182-9652	20476, 20477	13	Replacement Inlet Seals (0.8mm ID)
18740-80200	20972	7	1mm Split Liner	5182-9749	22684	9	Liner Seals for C15 and PTV (5-pk.)
18740-80220	20914	6	2mm Splitless Liner (quartz)	5182-9763	21409	13	Silver PTV Seals (5-pk.)
18789-80070	21686, 21687, 21688, 21689	26	FID Jets (.030")	5183-2036	21157	7	Straight Glass Liner (10-pk.)
				5183-2037	21704	7	Baffled Glass Liner (10-pk.)
19231-00130	22329	24	Spanner Wrench for FID Collector Assembly	5183-2038	21156	7	Glass Liner w/ Wool (10-pk.)
19231-20910	21137	25	FID Ignitor Castle	5183-2068	21141	47	2.0mL Clear Vial
19231-20920	23037	24	FID Collector Housing Kit	5183-2069	21143	47	2.0mL Amber Vial
19231-20930	23036	24	FID Collector Mount	5183-4492	24384	46	2.0mL Clear Glass Vial
19231-20940	21136	25	FID Collector Nut and Washer	5183-4493	24386	46	2.0mL Amber Glass Vial
19231-20950	21138	25	FID Collector	5183-4498	21175	46	11mm Aluminum Seals, Silver Seal, PTFE/Natural Rubber Septa
19231-20960	21138	25	FID Collector				
19231-20970	21138	25	FID Collector	5183-4500	24360	46	11mm Crimp Seals, Silver Seal, PTFE/Silicone Septa
19231-60620	22069	15, 24	Injector/FID Heater	5183-4647	21032	7	Low Pressure Drop Liner w/ Wool
19231-60660	23035	15, 24	Injector/FID PRT Sensor	5183-4691	22401, 20782	6, 7	4mm Split and Splitless Liners w/ Wool (5-pk.)
19231-60680	21001	25	FID Ignitor	5183-4692	22402, 20783	6, 7	4mm Split and Splitless Liners w/ Wool (25-pk.)
19231-60690	23010	25	FID Collector Assembly	5183-4693	22406	6	Gooseneck Splitless Liner (4mm) w/ Wool (5-pk.)
19231-80580	23041	24	FID Base Weldment	5183-4694	22407	6	Gooseneck Splitless Liner (4mm) w/ Wool (25-pk.)
19243-80570	21691	16	Septum Packed Purge Port Weldment	5183-4695	20799	6	Gooseneck Splitless Liner (4mm) (5-pk.)
19244-80540	21303	17	DI Liner Adaptor for Packed Column GC	5183-4696	20800	6	Gooseneck Splitless Liner (4mm) (25-pk.)
19244-80560	20670, 20671, 20672, 20673	26	FID Jets	5183-4699	20710	7	Cup Splitter Liner (5-pk.)
				5183-4701	21033	7	Low Pressure Drop Liner w/ Wool (5-pk.)
19244-80610	22077	27	FID/NPD Capillary Adaptor Fitting	5183-4703	20713	6	2mm Splitless Liner (5-pk.)
19246-60630	20634	15	Backpressure Regulator Kit	5183-4704	20714	6	2mm Splitless Liner (25-pk.)
19247-60510	22076	19	Air Diverter	5183-4705	20785	6	Double Gooseneck Splitless Liner (4mm) (5-pk.)
19251-00100	22065	10, 20	Injector Wrench	5183-4706	20786	6	Double Gooseneck Splitless Liner (4mm) (25-pk.)
19251-20620	22080	15	Heater Block Retaining Nut	5183-4707	20915	6	2mm Splitless Liner (quartz) (5-pk.)
19251-60540	22400, 20781	6, 7	4mm Split and Splitless Liners w/ Wool	5183-4709	20973	7	1mm Split Liner (5-pk.)
19251-60575	20265, 20267	14	Weldment	5183-4711	20994	7	Low Pressure Drop Liner w/ Wool
19251-80525	22800	15	Split Vent Line for Agilent GCs (32-inch)	5183-4712	20995	7	Low Pressure Drop Liner w/ Wool (5-pk.)
19251-80570	20266, 20268	14	Shell Weldment	5183-4713	20996	7	Low Pressure Drop Liner w/ Wool (25-pk.)
19301-60660	21000	25	FID Flow Measuring Adaptor	5183-4732	21882	11	Capillary Column Nut (2-pk.)
19302-80020	20269	27	TCD Adaptor Fitting	6040-0834	22687	23	Rough Pump Oil for MSD Pumps
19362-60500	21158	15	Replacement Chemical Trap	8660-0791	22685	23	Ion Source Cleaning Powder
210-3003	20772	6	4mm Splitless Liner	9301-0713	20167, 24785	49	10µL Standard Microliter Syringes
210-3003-5	20773	6	4mm Splitless Liner (5-pk.)	9301-0714	24595, 24784	49	10µL Standard Microliter Syringes
210-4004-5	21023	7	4mm Split Precision Liner w/ Wool (5-pk.)	9301-0725	20169, 24787	49	10µL Standard Microliter Syringes (6-pk.)
3103-0145	22661	23	Replacement Cold Sensor for MS Diffusion Pump	9301-0891	24592, 24780	49	5µL Standard Microliter Syringes
35900-60610	20650, 20651	29	Replacement Cables	9301-0892	20168, 24781	49	5µL Standard Microliter Syringes
35900-60630	20658, 20659	29	Replacement Cables	9301-0977	24653	46	100µL Glass Insert/Clear Plastic Vial
35900-60700	20660, 20661	29	Replacement Cables	9301-0978	24651	46	100µL Polypropylene Vial
500-1210	20445	33	Polyimide Resin				

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

### Feature

### Benefit

Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—easy to hold and operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe assembly

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks with the adaptor fitting.



Leak Detector is easily accessed when stored in the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for amines and basic compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

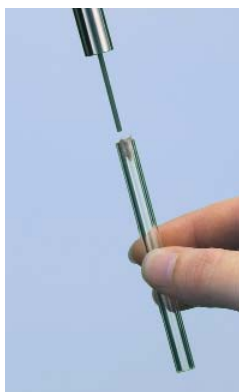
Insert and remove wool plugs easily. Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.



Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

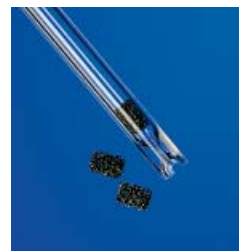
**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller- inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!












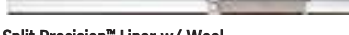

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for Shimadzu 9A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Split</b>	universal, for most common analyses	3.5 ID 5.0 OD x 128	221-25822-01	20751	20752	20753
		dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 128	—	20754	20755	—
	<b>Cycloplitter®</b>	high & low MW compounds	3.5 ID 5.0 OD x 128	—	20757	20758	—
<b>Cup Splitter</b>							
Splitless Liners for Shimadzu 9A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>3.5mm Splitless</b>	trace samples	3.5 ID 5.0 OD x 128	221-25440-03	20748	20749	20750
DI Liners for Shimadzu 9A GCs (0.32/0.53mm ID)		Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Uniliner®</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 128	—	20872	20873	—
Split Liners for Shimadzu 14A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Split</b>	universal, for most common analyses	3.5 ID 5.0 OD x 99	221-32544-01	20860	20861	20862
		dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 99	—	20870	20871	—
	<b>Cycloplitter®</b>	high MW compounds	3.5 ID 5.0 OD x 99	—	20868	20869	—
<b>Laminar Cup Splitter</b>							
Splitless Liners for Shimadzu 14A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>3.5mm Splitless</b>	trace samples	3.5 ID 5.0 OD x 99	221-32544-00	20863	20864	20865
DI Liners for Shimadzu 14A GCs (0.32/0.53mm ID)		Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Uniliner®</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	—	20876	20877	—
	<b>Cyclo-Uniliner®</b>	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	—	20893	20894	—
Split Liners for Shimadzu 17A, 2010, and 2014 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>1mm Split</b>	purge & trap, fast GC	1.0 ID 5.0 OD x 95	—	20976	20977	20978
	<b>3.5mm Split</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-01	22283	22284	22285
	<b>Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	3.5 ID 5.0 OD x 95	—	21020	21021	—
	<b>Cycloplitter®</b>	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 95	<b>new!</b>	22072	22073	—












\*Nominal ID at syringe needle expulsion point.

### ordering note

For descriptions of liner deactivations, packings, and tools, see [pages 3-5](#).

All liners are  
**100% deactivated**



All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>3.5mm Splitless</b>	universal, trace samples	3.5 ID 5.0 OD x 95	221-48335-01	22286	22287	—
 <b>Double Gooseneck</b>	reduces backflash and catalytic decomposition	3.5 ID 5.0 OD x 95	—	20958	20959	20960
 <b>Single Gooseneck</b>	reduces backflash, also operates in DI mode	3.5 ID 5.0 OD x 95	221-41599-00	20961	20962	20963
Split/Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Split/Splitless w/ Wool</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-00	20955	20956	20957
 <b>Siltek® Split/Splitless w/ Wool</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	—	20955-213.1	20956-213.5	20957-213.25
SPME Liner for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>SPME Liner</b>	ideal for low volume SPME applications	.75 ID 5.0 OD x 95	<b>new!</b>	22278	22279	—
DI Liners for Shimadzu 17A, 2010, and 2014 GCs (0.32/0.53mm ID)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Uniliner® w/ Wool</b>	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21713	21719	—
 <b>Open-top Drilled Uniliner® (hole on top)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21285	21286	—
 <b>Open-top Drilled Uniliner® (hole on bottom)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21287	21288	—
 <b>Gooseneck Drilled Uniliner® (hole on top)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21289	21290	—
 <b>Gooseneck Drilled Uniliner® (hole on bottom)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21291	21292	—

## tech tip

### DI Liners for Shimadzu GCs

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

Liner for Shimadzu 17A PTV GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>17A PTV Liner w/ Wool</b>	trace, dirty, high & low MW active samples	1.6 ID 4.0 OD x 95	225-09212-01	21705	21706	21707
Make-up Liner for Shimadzu GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Detector Make-up Liner</b>	FIDs, ECDs & misc. detectors	1.0 ID 5.0 OD x 75	—	20760	20761	—

\*Nominal ID at syringe needle expulsion point.

## Siltek® Treated Metal Inlet Liners for Shimadzu GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

**SILTEK®**  
deactivation



Liner Type (3.5mm ID x 5.0mm OD x 95mm)	qty.	cat.#
95mm Split/Splitless Siltek® Treated Metal Inlet Liners w/Wool	5-pk.	21003

**Viton® O-Rings for Shimadzu 17A, 2010, and 2014 GCs**

Description	Max. temp.	Similar to Shimadzu part #	qty.	cat.#
Viton® O-Rings for Shimadzu 17A, 2010, and 2014 GCs	250°C	036-11203-84	10-pk.	21477

**Graphite O-Rings for Shimadzu 17A, 2010, and 2014 GCs**

Description	Max. temp.	Similar to Shimadzu part #	qty.	cat.#
Graphite O-Rings for Split Liners	450°C	221-48393-91	5-pk.	20243
Graphite O-Rings for Splitless Liners	450°C	221-47222-91	5-pk.	20244

**Plug Septa for Shimadzu GCs**

Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27153	50-pk.	27170	50-pk.	27118
50-pk.	27154	100-pk.	27171	100-pk.	27119
100-pk.	27155				

**Septum Nut for Shimadzu 17A, 2010, and 2014 GCs**

- One piece design for ease of installation and removal.
- Made of clear anodized aluminum and high-quality stainless steel.

Description	Similar to Shimadzu part #	qty.	cat.#
	221-41286-00		
Septum Nut for Shimadzu 17A, 2010, and 2014 GCs	221-44584-00	ea.	22079

**Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs**

- Includes 17A injector nut, 0.4mm graphite ferrule, and 1/16-inch stainless steel capillary nut.

Description	qty.	cat.#
Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs	kit	21895
Siitek® Treated Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs	kit	22331

**Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs**

- Meets OEM performance.

Description	Similar to Shimadzu part #	qty.	cat.#
Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41533-00	2-pk.	22688

**Restek Enhanced Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs**

- Restek's design eliminates the slot, increasing lifetime and durability.
- Meets or exceeds OEM performance.

Description	Similar to Shimadzu part #	qty.	cat.#
Restek Enhanced Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41533-00	2-pk.	20375

**5mm Ferrules for Shimadzu 17A GCs**

- For use with packed columns.
- Graphite composition.

Description	qty.	cat.#
5mm Ferrules for Shimadzu 17A GCs	10-pk.	21121

**5mm Stainless Steel Uniliner® Liner Adaptor Fitting for Shimadzu Packed Column GCs**

Shimadzu GCs do not require a standard 1/4" Uniliner® liner adaptor because the injection port cavity will accept 5mm Uniliner® liners. This specially-designed fitting allows a Shimadzu packed column injection port to accept 0.53mm ID columns. Use a Shimadzu 5mm nut and ferrule to install the adaptor fitting into the injection port. Includes a 1/16-inch nut and 0.8mm ID graphite ferrule.

Description	qty.	cat.#
5mm Stainless Steel Uniliner® Liner Adaptor for Shimadzu Packed Column GCs (required for installing Uniliner® liners in 1/4" injection ports)	ea.	20312

**Injector Wrench for Shimadzu 17A, 2010, and 2014 GCs**

- Designed specifically for removing Shimadzu injection ports.
- High-quality stainless steel construction.



Description	Similar to Shimadzu part #	qty.	cat. #
Injector Wrench for Shimadzu 17A, 2010, and 2014 GCs	221-46977-00	ea.	21159

**Capillary Installation Gauge for Shimadzu 17A, 2010, & 2014 GCs**

- Seats ferrule onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Description	qty.	cat. #
Capillary Installation Gauge for Shimadzu 17A, 2010, and 2014 GCs	ea.	22333

**Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge**

Description	qty.	cat. #
1/4" x 5/16" and 10mm x 11mm Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge	ea.	22334

**MLE Capillary Tool Kit for Shimadzu GCs**

Includes:

- capillary installation gauge for Shimadzu GCs
- injector wrench for Shimadzu GCs
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insert tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat. #
MLE Capillary Tool Kit for Shimadzu GCs	kit	22182

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### kit

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat.#
Septum Puller	ea.	20117

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge**

Description	qty.	cat.#
$\frac{1}{4}$ " x $\frac{5}{16}$ " and 10mm x 11mm Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge	ea.	22334

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124





Vespel® ferrules

## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/16"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## 5mm Ferrules for Shimadzu 17A GCs

- For use with packed columns.
- Graphite composition.

Description	qty.	cat.#
5mm Ferrules for Shimadzu 17A GCs	10-pk.	21121



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespel®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.



## Vu2 Union™ Column Connectors



Patent pending.

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

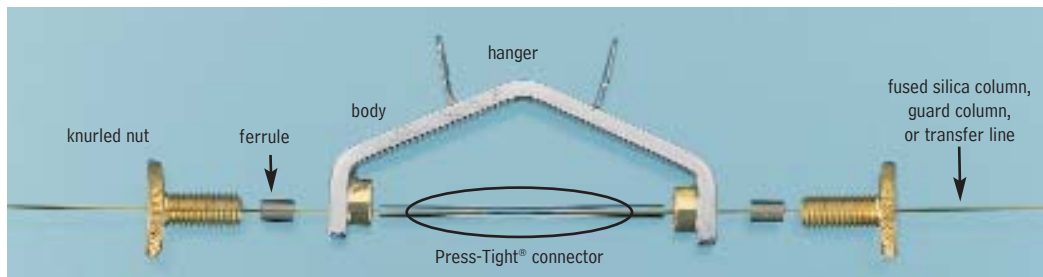
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors

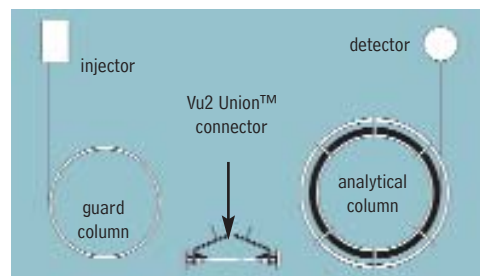
Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

A guard column connected to an analytical column by a Vu2 Union™ connector.



Secure, reliable  
column-to-column  
connections!

NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).



restek  
innovation!

### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

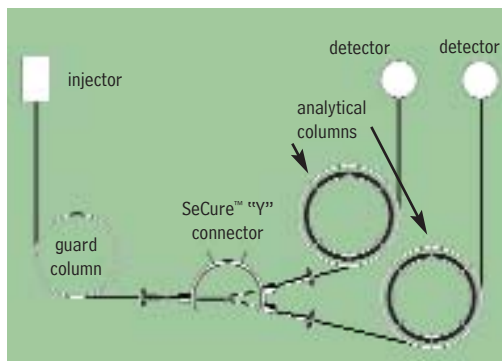
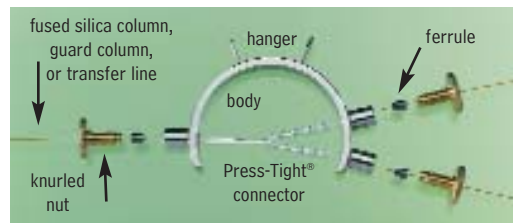
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



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## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481



## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



## Universal Angled "Y" Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled "Y" Press-Tight® Connector	20403	20404
Deactivated Universal Angled "Y" Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487	20469



## Universal "X" Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "X" Press-Tight® Connector	20407	20408
Deactivated Universal "X" Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal "X" Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat. #
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat. #
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat. #
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat. #
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat. #
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat. #
Ferrule Removal Kit	FRK1	kit	20146



## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.



## did you know?

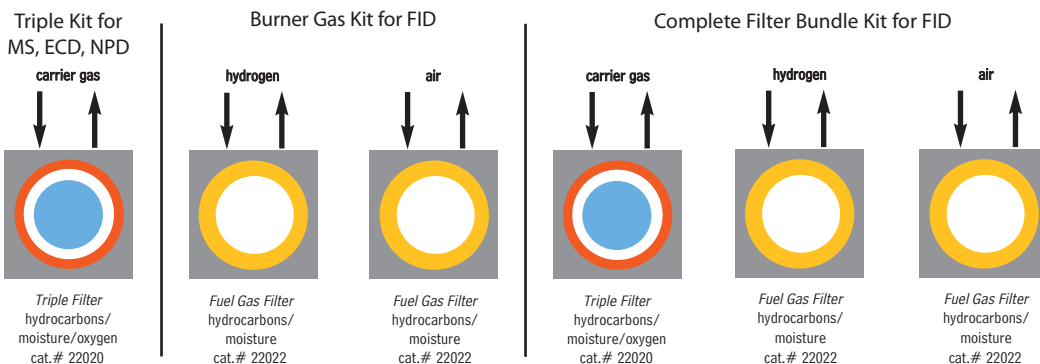
All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

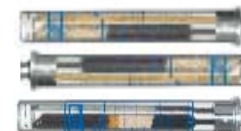
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833



## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.



Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

## please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel		
Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On  
Inline Super-Clean™ Trap and  
Kits are designed specifically  
for purification of helium in  
GC/MS systems!

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**tech tip**

Install an indicator after the  
Click-On inline filter so there is  
no confusion about when to  
replace the traps.

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 19) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa)	
inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

## it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific Purifier Module

	qty.	1/4-inch Compression Tube Fittings		1/8-inch
		cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat.#
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat.#
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

Specifications	
Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat.#
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913
<b>Replacement Components for FID Gas Stations</b>		
Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat.# suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat.# 580051



## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648



## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

## cleaned

All tubing is cleaned and ready to use.

## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

Tubing Dimensions		25 Feet	Length (per-foot pricing on 26 feet or more)	
ID (in.)	OD (in.)	cat.#	26–100 Feet	> 100 Feet*
0.01" ID	1/32" OD	21500	21501	21502
0.02" ID	1/32" OD	21503	21504	21505
0.03" ID	1/32" OD	21506	21507	21508
0.04" ID	1/32" OD	21509	21510	21511
0.085" ID	1/8" OD	21512	21513	21514
0.21" ID	1/4" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

### 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

### Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

### Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

### Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

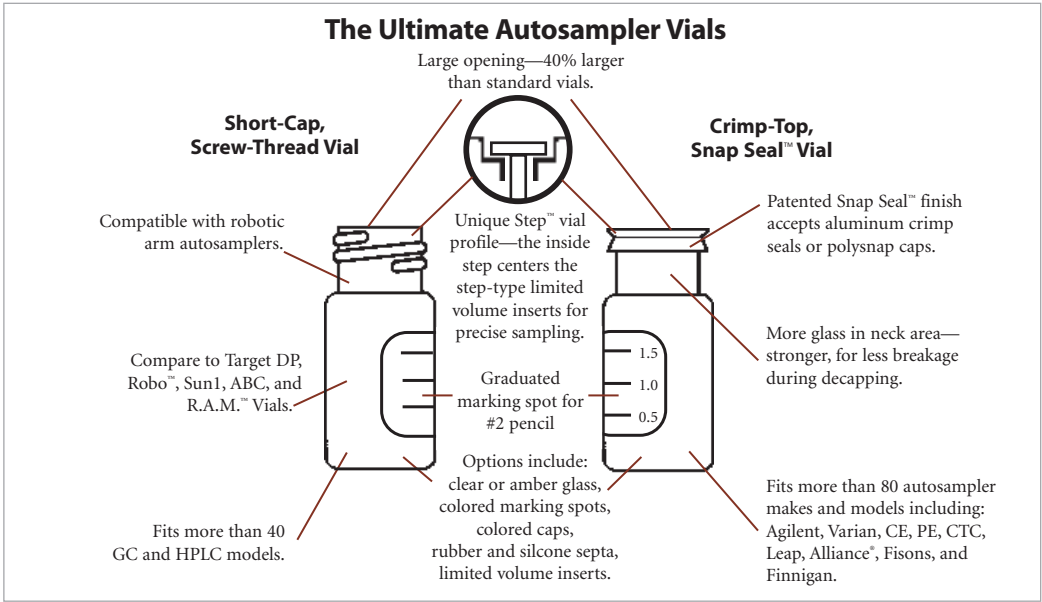


### 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



**For a highly inert surface, we recommend Siltek® deactivation for your vials:**

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

instrument **reference**

Shimadzu Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	Headspace	8mm Screw-Thread	10mm Screw-Thread	WISP™ 48 Style
SIL-10A, 10Ai, 10AxL	X	X		X	X	
AOC-8B/9, SIL-6A, SIL-6B, -9A, -8A				X		
AOC-14/1400, AOC-17				X		X
SIL-2AS						X
HSS-2B			X			

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for new electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**instrument **reference******For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10AxL

## 8mm Screw-Thread Vials



8mm (2.0mL)  
Screw-Thread Vial

### Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread

#### Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

#### Screw-Thread Vials—12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

#### 8mm Pre-Assembled Caps and Septa

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

#### Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"*	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"*	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24636	24637

\*Best fit for Shimadzu.

#### Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately

#### (Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195



#### 8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177

#### Septa for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
8mm x 0.045" Red PTFE/Silicone	21178	21179
8mm x 0.065" Red PTFE/White Silicone	21795	21147

#### Limited Volume Inserts for 8mm/425 Screw-Thread Vials

Description	100-pk.	1000-pk.
100µL Glass w/ Polypropylene Bottom Spring	24508	21775
250µL Glass, Flat Bottom	—	24510
250µL Glass, Flat Bottom w/ ID Ring	—	24691
100µL Polypropylene, No Spring	24511	—
100µL Polypropylene, Bottom Spring	24512	—

#### Limited Volume Vials, 12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
100µL Polypropylene	24623	24624
100µL Glass Insert/Clear Plastic Vial*	24625	—

\*Amber glass/clear plastic available on request (1000 packs only).



Flat Bottom Limited  
Volume Insert w/ ID Ring

## instrument reference

### For 8mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	AOC-8B/9, SIL-6A, AOC14/1400, AOC-17, SIL-6B, -9A, -8A, SIL-10A, 10Ai, 10AxL

## 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

### Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

## 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

## 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10Axi

## Screw-Thread Vials, 12 x 32mm, 10mm/425 Thread, Big Mouth Step™ Design

- 40% larger opening than other vials.
- Step™ profile automatically centers glass flange limited volume inserts.
- Pre-assembled caps with septa, with or without vials.
- Designed for Waters Alliance® autosamplers.

The Big Mouth Step™ Vial System has a larger ID than conventional vials and incorporates a neck finish that is uniquely designed to allow the insert to be precisely aligned in the center of the vial. This precise alignment provides maximum sample withdrawal and eliminates any chance of missed injections. All vials with the large opening are designed with the Step™ Vial System.

## Big Mouth Step™ Screw-Thread Vials (12 x 32mm, 10mm/425 Thread)

Description	100-pk.	1000-pk.
2.0mL Clear Step™ Vial, White Graduated Marking Spot	24626	24627
2.0mL Amber Step™ Vial, White Graduated Marking Spot	24628	24629



## 10mm Pre-Assembled Big Mouth Step™ Vial Kits (w/Black Cap)

Caps attached to vials.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, PTFE/Silicone/Red PTFE Septa, 0.040"	24675	24676
2.0mL Clear Vial, Red PTFE/Silicone Septa, 0.065"	24642	24643
2.0mL Amber Vial, Red PTFE/Silicone Septa, 0.065"	24644	24645

## instrument reference

### For 10mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10Axi



4.0mL Clear Step™ Vial

**Screw-Thread Step™ Vials, 4.0mL, WISP™ 48 Style, 13mm/425 Screw-Thread****WISP™ 48 Screw-Thread Step™ Vials (15 x 45mm, 13/425 Screw-Thread)**

Description	100-pk.	1000-pk.
4.0mL Clear Step™ Vial, White Grad. Marking Spot	24654	24655
4.0mL Amber Step™ Vial, White Grad. Marking Spot	24656	24657

**Caps and Septa**

Description	100-pk.	1000-pk.
Top Hat™, PTFE/Silicone Septa	21745	21746
Pre-Assembled, Red PTFE/Silicone, 0.065"	21743	21744
Caps, Black, Polypropylene, Open-Hole	21741	21742
Septa, Red PTFE/Silicone, 0.040"	21751	21752
Septa, Red PTFE/Silicone, 0.060"	21749	21750

**Limited Volume Inserts**

Description	100-pk.	1000-pk.
500µL, Glass, WISP™, Flat Bottom*	21787	21788

\*Also fit 4.0mL Snap Seal™ Vials (see our general catalog or website).

**instrument reference****For WISP™ 48 Style Vials**

Shimadzu AOC-14/1400, AOC-17, SIL-2AS

Manufacturer	Instrument/Model #
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**Headspace Vials****Headspace Autosampler Vials**

Description	100-pk.	1000-pk.
2mL Clear Vial	21160	21161

**For Headspace Vials**

Manufacturer	Instrument/Model #
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Shimadzu HSS-2B

**20mm Aluminum Seals w/Septa, Assembled**

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.



**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one. . .



two. . .



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK



## Syringe Overview

### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for Shimadzu GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 10µL Autosampler Syringe

**Hamilton Syringes for Shimadzu AOC 9 GCs**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		Restek
					Model	cat.#	cat.#
5µL	RN	26s	2"/51mm	2	75RN	87930	24617
5µL	N	26s	2"/51mm	2	75N	87900	24938
10µL	RN	26s	2"/51mm	2	701RN	80330	24530



SGE 5µL Autosampler Syringe

**SGE Syringes for Shimadzu AOC 14, 17, 20, and 20i GCs**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		Restek
					Model	cat.#	cat.#
0.5µL	R	23	42mm	Cone	0.5BR-S-0.63	000445	24841
0.5µL	R	26	42mm	Cone	0.5BR-S-0.47	000440	24840
5µL	F	23	42mm	Cone	5F-S-0.63	001988	24843
5µL	F	26	42mm	Cone	5F-S-0.47	001987	24842
10µL	R	23	42mm	Cone	10R-S-0.63	002898	24845
10µL*	R	23	42mm	Cone	10R-S-GT-0.63	002902	24846
10µL	R	26	42mm	Cone	10R-S-0.47	002897	24844
250µL*	F	23	42mm	Cone	250F-S-GT-0.63	006682	24847

\*Gas-Tight

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

**Replacement Needles for Shimadzu Autosampler Syringes****Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	42mm	Cone	033745	ea.	24747
0.5µL	26	42mm	Cone	033738	ea.	24746
10µL	23	42mm	Cone	037747	2-pk.	24749
10µL	26	42mm	Cone	037745	2-pk.	24748

## Standard Microliter Volume Syringes

### Standard Microliter Volume Syringes

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

#### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek
					Model	cat.#		cat.#
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

#### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek
					Model	cat.#		cat.#
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 36.

\*\*With plunger protection.



**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler  
 Cemented Needle  
 (ASRN) Autosampler  
 Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented  
 Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 36.

## Gas-Tight Syringe Replacement Needles

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

### Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

#### Needles for Hamilton Syringes

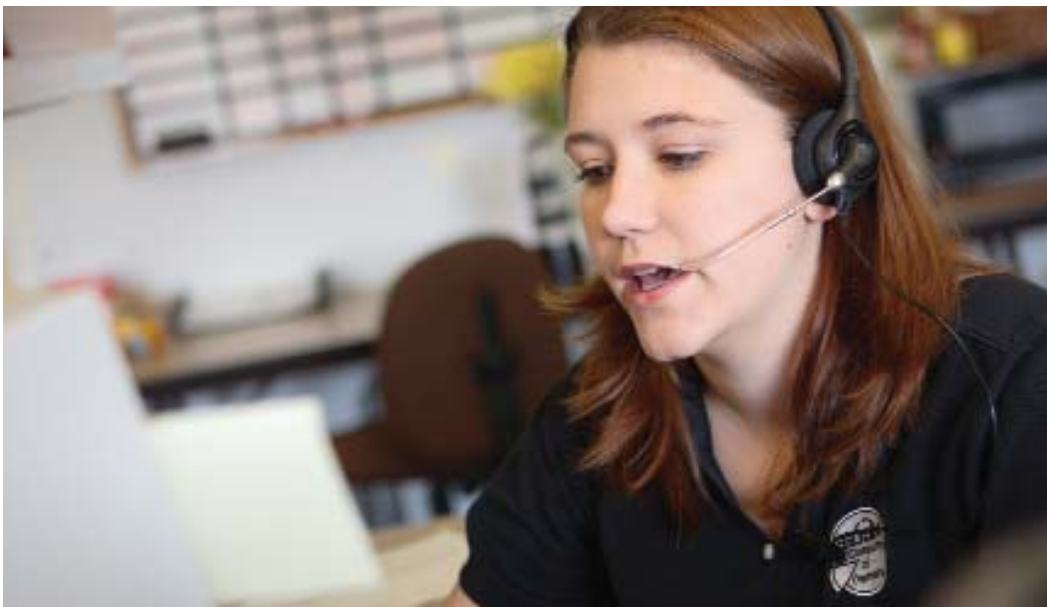
Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

#### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.



## In the U.S.

**Call:** 800-356-1688 (ext. 3) or 814-353-1300 (ext. 3)  
Monday–Friday 8:00 a.m.–6:00 p.m.  
Eastern Standard Time

**Fax:** 814-353-1309—24-hours a day

**Online:** [www.restek.com](http://www.restek.com)—24-hours a day

## Outside the U.S.

**Contact your Restek representative:**

Refer to our website at [www.restek.com](http://www.restek.com)



## Restek Subsidiaries

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phone: 33 01 60 78 32 10

fax: 33 01 60 78 70 90

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### **Restek Ireland**

phone: 44 2890 814576

fax: 44 2890 814576

e-mail: [restekeurope@aol.com](mailto:restekeurope@aol.com)

### **Thames Restek U.K. LTD**

phone: 44 1494 563377

fax: 44 1494 564990

e-mail: [sales@thamesrestek.co.uk](mailto:sales@thamesrestek.co.uk)

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

## Experience Restek

We're the most dedicated chromatography company you'll ever do business with.

**www.restek.com**

#### Restek Trademarks:

Alumaseal, CarboFrit, Cyclosplitter, IceBlue, MXT, Precision, Press-Tight, Rtx, SeCure, Silcosteel, Silcote, Siltek, Stabilwax, Stx, Sulfinert, Thermolite, Uniliner, Vu-Union, Vu2 Union, Restek logo.

#### Other Trademarks:

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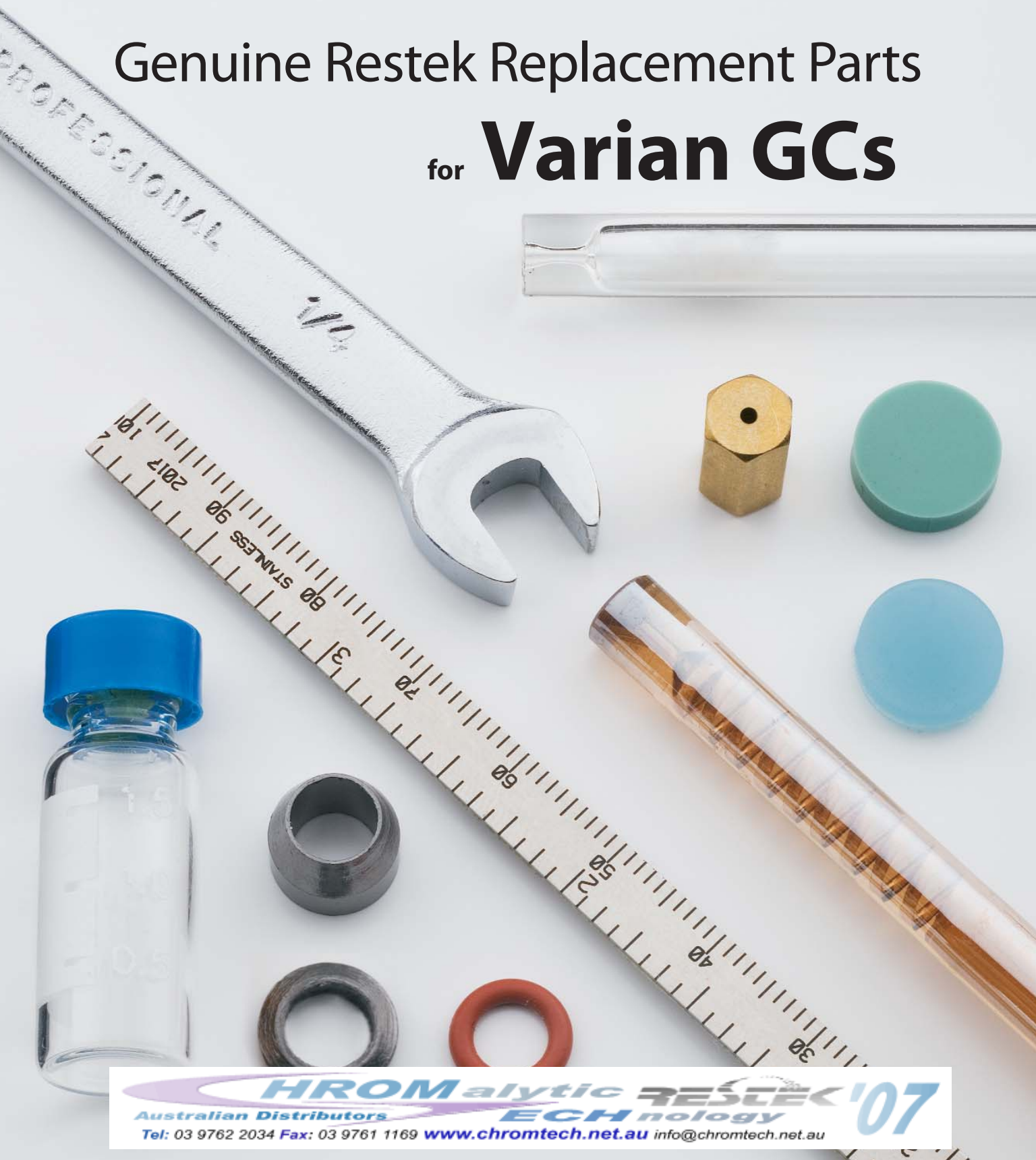


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# Genuine Restek Replacement Parts for **Varian GCs**



**HRMalytic RESTEK '07**  
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# From Injector to Detector

Restek is your #1 source for consumables and supplies for Varian GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a fact

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.



Small, compact unit—  
easy to hold and  
operate.

## Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

## How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

## tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

## Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

## Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

## tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner with Wool		Siltek® Liner with CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/ Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)



## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.

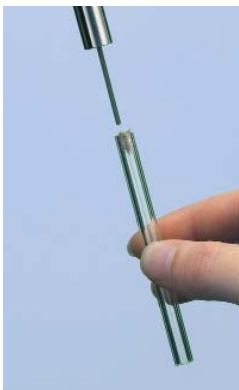


Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339



Eliminates user variation!



### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-insertor tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

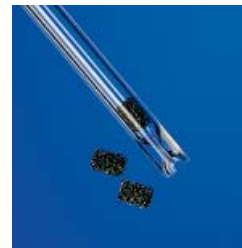
**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Insertor Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Insertor Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!











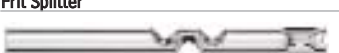









Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners
















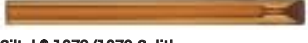



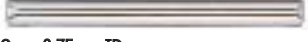

COLUMN INSTALLS THIS END

Splitless Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	2mm Splitless	trace samples <2µL	2.0 ID 6.3 OD x 74	01-900109-05	20721	20722	20723
	4mm Splitless	trace samples >2µL	4.0 ID 6.3 OD x 74	01-900109-05	20904	20905	20906
	Double Gooseneck	trace, active samples up to 4µL	4.0 ID 6.3 OD x 74	—	20847	20848	20849
	Cyclo Double Gooseneck	trace, dirty, active samples up to 4µL	4.0 ID 6.3 OD x 74	—	20897	20898	—
Split Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap inlet splitting or samples <1µL	1.0 ID 6.3 OD x 72	—	20970	20971	—
	Splitter w/ Wool	universal, use with rapid autosamplers	4.0 ID 6.3 OD x 72	01-900109-01	20792	20793	20794
	Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 72	01-900109-02	20803	20804	—
	Cup Splitter	high & low MW compounds	4.0 ID 6.3 OD x 72	—	20724	20725	—
	Cycloplitter*	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 72	—	20727	20728	—
	Frit Splitter	dirty samples, non-active compounds	4.0 ID 6.3 OD x 72	01-900109-03	20715	20716	20717
	Baffle Splitter	compounds with close boiling points	4.0 ID 6.3 OD x 72	01-900109-04	20718	20719	20720
	Split Precision* Liner w/ Wool	dirty samples, active samples	4.0 ID 6.3 OD x 72	—	21030	21031	—
DI Liners for Varian 1075/1077 GCs (0.32/0.53mm ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	Uniliner*	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	—	20345	20346	—
	Cyclo-Uniliner*	trace, dirty, high MW, active samples, linearity	4.0 ID 6.3 OD x 72	—	20347	20348	—
	Open-top Uniliner* w/ Wool	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	—	20845	20846	—
SPME Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	SPME Liner	ideal for low-volume SPME applications	0.75 ID 6.30 OD x 74	—	21112	21113	—
SPI Liners for Varian GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	01-900109-06	20775	20776	20777
	Siltek* 0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	—	20775-214.1	20776-214.5	20777-214.25
	0.8mm SPI	high linearity for 0.53mm ID columns	0.80 ID 4.6 OD x 54	01-900109-07	20778	20779	20780
	SPI with Buffer	dirty samples >1µL, fits 0.25, 0.32 & 0.53mm ID columns	2.4 ID 4.6 OD x 54	01-900109-08	20850	20851	20852

\*Nominal ID at syringe needle expulsion point.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.


Liners for Varian 1177 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
 4mm Split w/Glass Frit	universal	4.0 ID 6.3 OD x 78.5	39-26119-36	21045	21046	—
 4mm Split w/ Wool	universal	4.0 ID 6.3 OD x 78.5	39-26119-34	—	21079	—
 4mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	20759	20762	—
 Low Pressure Drop Precision™ Liner w/ Wool	trace samples <2μL, dirty samples	2.0 ID 6.3 OD x 78.5	—	22421	22422	—
 Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20765	20768	—
 2mm Splitless w/ Wool	trace samples <2μL	2.0 ID 6.5 OD x 78.5	39-26119-38	—	21077	—
 Gooseneck Splitless (4mm)	trace samples <2μL	4.0 ID 6.5 OD x 78.5	39-26119-27	21896	21897	—
 Siltek® Gooseneck Splitless (4mm)	trace samples <2μL	4.0 ID 6.5 OD x 78.5	—	21896-214.1	21897-214.5	—
 Gooseneck Splitless (4mm) w/ Wool	trace samples <2μL	4.0 ID 6.5 OD x 78.5	39-26119-36	21896-200.1	21897-200.5	—
 Siltek® Gooseneck Splitless (4mm) w/ Wool	trace samples <2μL	4.0 ID 6.5 OD x 78.5	—	21896-213.1	21897-213.5	—
 Double Gooseneck Splitless (4mm)	trace, active samples <2μL	4.0 ID 6.5 OD x 78.5	—	21891	21892	—
DI Liners for Varian 1177 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.	
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21470	21471	
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21468	21469	
Liners for Varian 1078/1079 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
 1078/1079 Split w/ Frit	dirty samples, non-active compounds	3.4 ID 5.0 OD x 54	03-918464-00	21708	21709	—
 1078/1079 Splitless	trace samples <2μL	2.0 ID 5.0 OD x 54	03-918466-00	21711	21712	—
 Siltek® 1078/1079 Splitless	trace samples <2μL	2.0 ID 5.0 OD x 54	—	21711-214.1	21712-214.5	—
 Open 0.5mm ID	trace samples <1μL	0.5 ID 5.0 OD x 54	03-925331-00	20992	20993	—
 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	392611945	20859	20901	20909
 Siltek® 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	—	20859-214.1	20901-214.5	20909-214.25
 Open 0.75mm ID	trace, low volume samples	0.75 ID 5.0 OD x 54	03-925330-00	21714	21715	21716
 1078/1079 Split Precision™ Liner w/ Wool	dirty samples, trace samples	3.4 ID 5.0 OD x 54	—	21024	21025	—

\*Nominal ID at syringe needle expulsion point.

## ordering note

For descriptions of liner deactivations, packings, and tools, see pages 3-5.

All liners are  
**100%**  
deactivatedAll liners are shipped intermediate polarity (IP)  
deactivated unless otherwise requested.

DI Liners for Varian 1078/1079 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.
	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 54	—	22280	22281

Drilled Uniliner® (hole on bottom)

\*Nominal ID at syringe needle expulsion point.

## tech tip

### DI Liners for Varian 1078/1079 GCs (for 0.25/0.32/0.53mm ID Columns)

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

### Siltek® Treated Metal Inlet Liners for Varian GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (3.8mm ID x 5.0mm OD x 54mm)	qty.	cat.#
Split/Splitless	5-pk.	20711
Splitless Gooseneck	5-pk.	21002

### Inlet Liner Seals for Varian 1177 Injectors

- Meets or exceeds OEM performance.

Description	Max. temp.	Similar to Varian part #	Restek cat.# 10-pk.	Restek cat.# 50-pk.
6.35mm ID Graphite O-rings for split liners	450°C	—	20296	20297
6.5mm ID Graphite O-rings for splitless liners	450°C	39-26119-40	20298	20299

### Liner Seals for Varian 1078/1079

Description	Max. temp.	Similar to Varian part #	qty.	cat.#
5mm Graphite Liner Seals for Varian 1078/1079 GCs	450°C	392611919 392534201	10-pk.	22683

### Septa for Varian GCs

- Precision molding assures consistent, accurate fit.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.

Septum Diameter	25-pk.	50-pk.	100-pk.
<b>Thermolite® Septa (useable to 340°C inlet temp.)</b>			
9mm	27132	27133	27134
9.5mm (7/8")	27135	27136	27137
10mm	27138	27139	27140
11mm (7/16")	27141	27142	27143

<b>IceBlue™ Septa (useable to 250°C inlet temp.)</b>			
9mm	—	27156	27157
9.5mm (7/8")	—	27158	27159
10mm	—	27160	27161
11mm (7/16")	—	27162	27163

<b>BTO® Septa (useable to 400°C inlet temp.)</b>			
9mm CenterGuide™	—	27104	27105
9.5mm (7/8")	—	27106	27107
10mm	—	27108	27109
11mm (7/16") CenterGuide™	—	27110	27111

**HANDY**  
septum size chart

Injector Type	Septum Diameter (mm)
Packed Column	9.5/10
Split/Splitless 1078/1079	10/11
1177	9
1075/1077	11

**Stainless Steel Septum Nuts for Varian GCs**

- Maintain a sharper knife edge longer than the original equipment aluminum design.
- Greatly minimize septum fragmentation and increase septum lifetime.

Description	Similar to Varian part #*	qty.	cat.#
26 Gauge Needle Guide Septum Nut	03-949666-01	ea.	21310
Standard Stainless Steel Septum Nut	03-949666-01	ea.	21304

\*Similar to Varian part # 03-949666-01, except Restek nuts are not equipped with remote-start capabilities.

**Capillary Nuts for Varian GCs**

- Choose brass (<200°C) or stainless steel (>200°C) replacement nuts.

Description	Similar to Varian part #	qty.	cat.#
Brass Capillary Nuts	03-949551-00	2-pk.	20881
Stainless Steel Capillary Nuts	03-949551-00	2-pk.	20882

**Siltek® Treated Inlet Support Springs for Varian 1075/1077 Split Injectors**

- Siltek® treated to eliminate sample adsorption.

Description	Similar to Varian part #	qty.	cat.#
Siltek® Treated Inlet Support Springs for Varian	03-949786-00	3-pk.	21690

**Capillary Installation Gauge for Varian GCs for use with 1/16" ferrules**

- Seats ferrule\* onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Description	qty.	cat.#
Capillary Installation Gauge for Varian GCs for use with 1/16" ferrules	ea.	22335

\*Recommended for use with graphite ferrules.

**MLE Capillary Tool Kit for Varian GCs**

Includes:

- capillary installation gauge for Varian GCs
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insert tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat.#
MLE Capillary Tool Kit for Varian GCs	kit	22184

restek  
innovation!

Change columns in  
minutes—without  
venting!

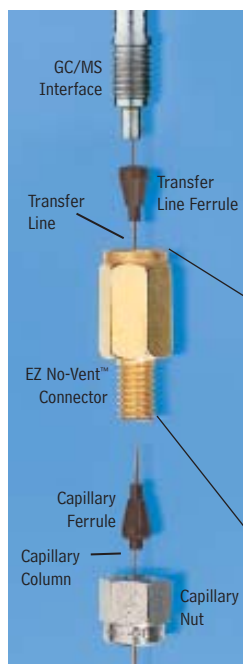
### EZ No-Vent™ GC Column-Mass Spectrometer Connector

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- For Varian Saturn 2000 Series Mass Spectrometers.

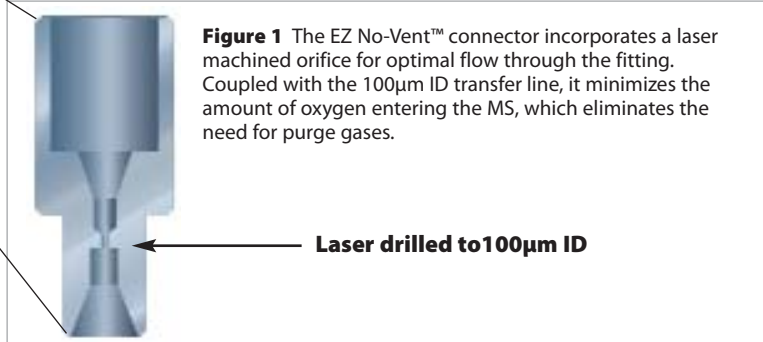
We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing.



**Kelli Steindl**  
GC Accessories Associate  
Product Marketing  
Manager  
2+ years of service!



Kit installs easily,  
without special tools  
or plumbing.



**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Description	qty.	cat.#
EZ No-Vent™ Connector Kit for Varian Saturn 2000 Series MSs Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.	kit	22423
Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:		
0.4mm ID (Polyimide)	2-pk.	21015
0.5mm ID (Polyimide)	2-pk.	21016
Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID	2-pk.	21043
Replacement 100µm deactivated transfer line	3 ft.	21018
Replacement EZ No-Vent™ Column Nut	5-pk.	21900
Replacement EZ No-Vent™ Plug	2-pk.	21915
Open-End Wrenches (1/4" x 5/16")	2-pk.	20110

**Capillary Inlet Guide Kit for Varian GCs**

- Use as a replacement for Varian 1075 and 1077 split/splitless injectors.
- Use inexpensive 1/16-inch fittings instead of a non-standard nut.
- Quick and simple installation.
- Ideal for two-hole ferrule installation.

Two 0.25 or 0.32mm ID capillary columns can be inserted into a standard 1/16-inch type capillary fitting. The two-hole ferrule positions the column squarely inside 2 or 4mm ID splitless liners. (Use recessed-taper double-gooseneck liners for dual column analysis.) Complete kit includes splitter guide, 1/4-inch nut, 1/4-inch Vespel®/graphite ferrule, and a 1/16-inch nut and ferrule.

Description	Similar to Varian part #	qty.	cat.#
Inlet Guide Kit	03-908358-00	kit	20502



Save time and money with Restek's inlet splitter guide for Varian GCs!

**Low-Volume Injector for Varian Split/Splitless Inlets**

- Attaches to the GC inlet without cutting existing injection port lines.
- Allows injections from a syringe onto the column for purge & trap troubleshooting or calibration.
- Siltek® treatment eliminates adsorption of active compounds.
- Order capillary ferrules separately.

Description	qty.	cat.#
Low-Volume Injector for Varian Split/Splitless GC Inlets	kit	21693

**Rethreading Tool**

- Repair worn or damaged threads.
- Multiple uses (injection ports, fittings, etc.).
- Built-in guide to prevent cross-threading.



Description	qty.	cat.#
Rethreading Tool for 7/16" compression fitting (Varian injection ports)	ea.	23019
Rethreading Tool for 1/4" Varian-style capillary column fittings	ea.	21893



Make your injection port threads like new!

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### qty.

kit

### cat.#

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**High-Temperature String**

- Withstands temperatures to 400°C.
- Use to restraining capillary columns, attach column connectors to column cages, or hold a column in the GC oven.

Description	qty.	cat.#
High-Temperature String	10m	20109
High-Temperature String	450m	20618

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.

Description	qty.	cat.#
Septum Puller	ea.	20117

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124



## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.



Vespel® ferrules

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/16"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespe <sup>®</sup> /Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217



## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespe <sup>®</sup> /Graphite
1/16"	no hole	10-pk.	20240

Teflon<sup>®</sup> Ferrules

- Upper temperature limit 250°C.
- 100% Teflon<sup>®</sup>; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/4"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128

Alumaseal<sup>™</sup> Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespe<sup>®</sup> or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespe<sup>®</sup>/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespe<sup>®</sup>/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespe<sup>®</sup>/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal<sup>™</sup> ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

## Vu2 Union™ Column Connectors



Patent pending.

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

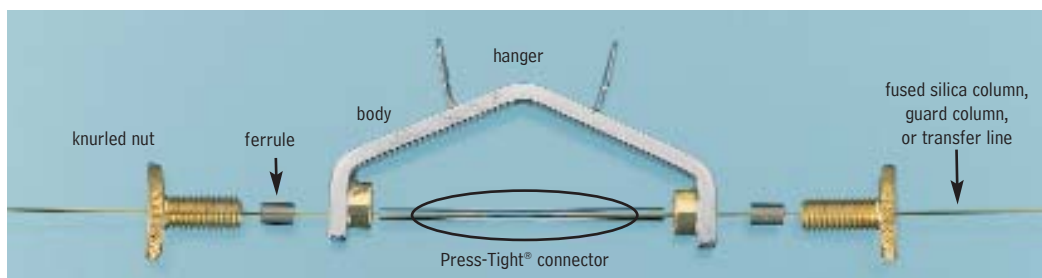
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat. #
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors

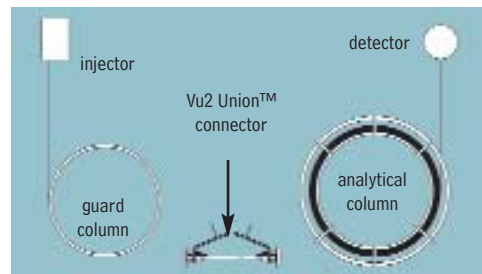
Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

A guard column connected to an analytical column by a Vu2 Union™ connector.



Secure, reliable  
column-to-column  
connections!



restek  
innovation!

### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

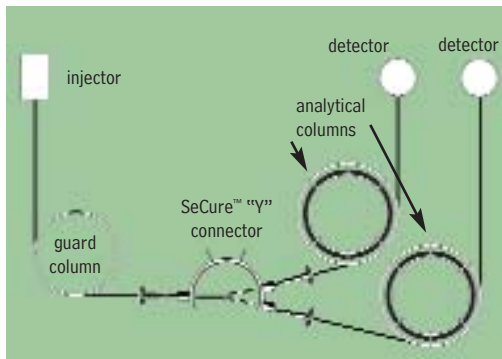
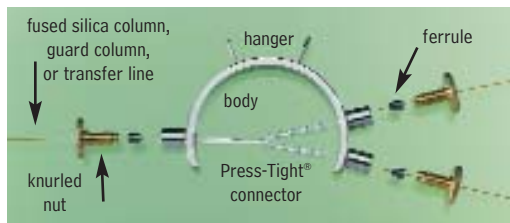
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



**HROMalytic** **RESTEK** '07  
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## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481



## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



## Universal Angled "Y" Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled "Y" Press-Tight® Connector	20403	20404
Deactivated Universal Angled "Y" Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487	20469



## Universal "X" Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "X" Press-Tight® Connector	20407	20408
Deactivated Universal "X" Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal "X" Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat.#
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146



# Super-Clean™ Gas Filter System



## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

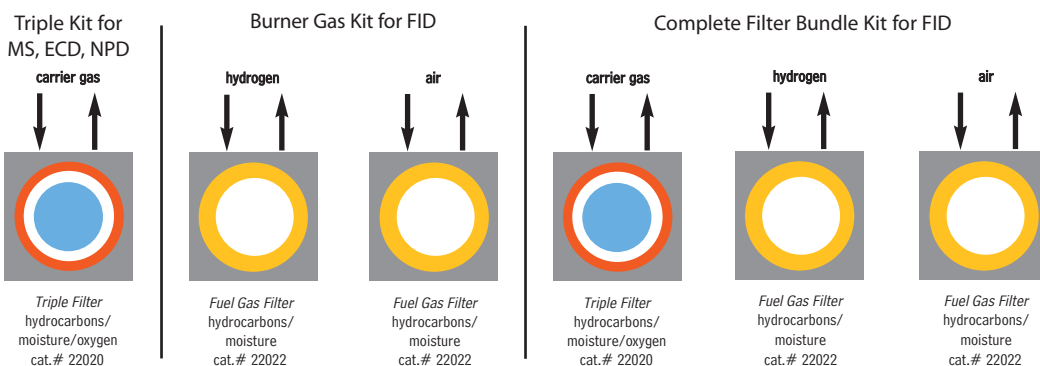
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure:  
10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>" (27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833





## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## please note

NOTE: Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel		
Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat.#
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat.#
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b> Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat.#
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat.#
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat.#
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481





Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 22) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

## VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa) inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

## it's a fact

The nitrogen module is excellent for LC/MS systems.

### Gas-Specific Purifier Module

	qty.	1/4-inch		Compression Tube Fittings	
		cat.#		qty.	1/8-inch cat.#
Helium Purifier Module	ea.	22600		ea.	22601
Hydrogen Purifier Module	ea.	22602		ea.	22603
Nitrogen Purifier Module*	ea.	22604		ea.	22605
Air Purifier Module	ea.	22606		ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

## Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011

## High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600

## High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

## Ultra-High-Purity Chrome-Plated Brass Line Regulator

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20psi or more.
- Same purity protection as high-pressure cylinder regulators.

Inlet connections: 1/4" FPT  
 Outlet assembly: 1/4" FPT port

Fitting	Outlet Gauge	Outlet Pressure	qty.	cat.#
1/4" female NPT ports*	30" - 0 to 100psig	0-50psig	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig	0-100psig	ea.	22452

\*Order appropriate male connector, pipe-to-tube fittings.

## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
ID (in.)	OD (in.)	25 Feet	26–100 Feet	> 100 Feet*
0.01" ID	1/16" OD	cat.# 21500	cat.# 21501	cat.# 21502
0.02" ID	1/16" OD	cat.# 21503	cat.# 21504	cat.# 21505
0.03" ID	1/16" OD	cat.# 21506	cat.# 21507	cat.# 21508
0.04" ID	1/16" OD	cat.# 21509	cat.# 21510	cat.# 21511
0.085" ID	1/8" OD	cat.# 21512	cat.# 21513	cat.# 21514
0.21" ID	1/4" OD	cat.# 21515	cat.# 21516	cat.# 21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592



## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

## GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

## Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

## Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.



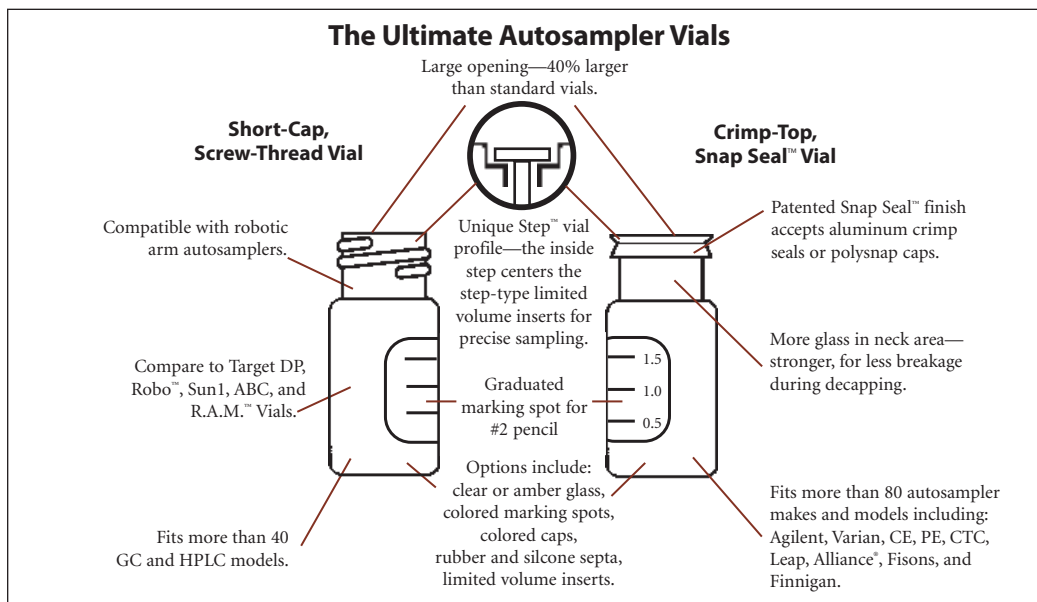
Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



#### For a highly inert surface, we recommend Siltek® deactivation for your vials:

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

#### instrument reference

Varian/Rainin / Varian Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	Headspace	8mm Screw-Thread	10mm Screw-Thread
Dynamax AI-1A, AI-200, Dynamax AI-3	X				
DynamaxAI-3AI-1A, AI-2W				X	
8100/8200	X	X		X	X
Marathon	X	X		X	
9100/9090/9095	X			X	
8035, 8000 series, 8055, 8085, 3800 GC					X
Genesis			X		

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 32** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

instrument **reference****For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Varian/Rainin	Dynamax AI-IA, AI-200, Dynamax AI-3
Varian	8100/8200, 9100/9090/9095, Marathon

## 8mm Screw-Thread Vials



8mm (2.0mL) Screw-Thread Vial

### Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread

#### Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

#### Screw-Thread Vials—12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

#### 8mm Pre-Assembled Caps and Septa

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

#### Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"*	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"*	24636	24637

\*Best fit for Varian.

#### Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately

##### (Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195

#### 8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177

#### Septa for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
8mm x 0.045" Red PTFE/Silicone	21178	21179
8mm x 0.065" Red PTFE/White Silicone	21795	21147

#### Limited Volume Inserts for 8mm/425 Screw-Thread Vials

Description	100-pk.	1000-pk.
100µL Glass w/ Polypropylene Bottom Spring	24508	21775
250µL Glass, Flat Bottom	—	24510
250µL Glass, Flat Bottom w/ ID Ring	—	24691
100µL Polypropylene, No Spring	24511	—
100µL Polypropylene, Bottom Spring	24512	—



Limited Volume Insert

#### Limited Volume Vials, 12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
100µL Polypropylene	24623	24624
100µL Glass Insert/Clear Plastic Vial*	24625	—

\*Amber glass/clear plastic available on request (1000 packs only).



Limited Volume Vial

## instrument reference

### For 8mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Varian/Rainin	Dynamax AI-3AI-IA, AI-2W
Varian	8100/8200, 8035, 8000 Series, Marathon, 8055, 8085, 9100/9090/9095, 3800 GC

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

instrument **reference****For 9mm Short-Cap, Screw-Thread Vials**

Manufacturer	Instrument/Model #
Varian	8100/8200, Marathon

**Screw-Thread Vials, 12 x 32mm, 10mm/425 Thread, Big Mouth Step™ Design**

- 40% larger opening than other vials.
- Step™ profile automatically centers glass flange limited volume inserts.
- Pre-assembled caps with septa, with or without vials.
- Designed for Waters Alliance® autosamplers.

The Big Mouth Step™ Vial System has a larger ID than conventional vials and incorporates a neck finish that is uniquely designed to allow the insert to be precisely aligned in the center of the vial. This precise alignment provides maximum sample withdrawal and eliminates any chance of missed injections. All vials with the large opening are designed with the Step™ Vial System.

**Big Mouth Step™ Screw-Thread Vials (12 x 32mm, 10mm/425 Thread)**

Description	100-pk.	1000-pk.
2.0mL Clear Step™ Vial, White Graduated Marking Spot	24626	24627
2.0mL Amber Step™ Vial, White Graduated Marking Spot	24628	24629

**10mm Pre-Assembled Big Mouth Step™ Vial Kits (w/Black Cap)**

Caps attached to vials.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, PTFE/Silicone/Red PTFE Septa, 0.040"	24675	24676
2.0mL Clear Vial, Red PTFE/Silicone Septa, 0.065"	24642	24643
2.0mL Amber Vial, Red PTFE/Silicone Septa, 0.065"	24644	24645

instrument **reference****For 10mm Screw-Thread Vials**

Manufacturer	Instrument/Model #
Varian	8100/8200



Ideal for autosamplers that process 12 x 32mm crimp-top vials.





## Headspace Vials

### Headspace Autosampler Vials

Description	100-pk.	1000-pk.
10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Rounded Bottom	21162	21163

## instrument **reference**

### For Headspace Vials

Manufacturer	Instrument/Model #
Varian	Genesis

### 20mm Aluminum Seals w/Septa, Assembled

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.

### Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.



Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.

### Decapping has never been easier!

one...



two...



three!



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

## Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

## did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

## Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

## Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

## Autosampler Syringes for Varian 8000 Series GCs

### Guide to Needle Termination Codes

#### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

#### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip



Hamilton 10µL Autosampler Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
<b>Varian 8100/8200 Syringes</b>								
10µL	RN	26s	1.99"	5	701 Varian	202880	ea.	24956



SGE 10µL Autosampler Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
<b>Varian 8000 Syringes</b>								
10µL	R	25	50mm	Dome	10R-VA80-II	002926	ea.	24850

### Varian 8035, 8100, & 8200 Syringes

10µL	F	25	53mm	S/Hole	10F-VA8X-11	002923	ea.	24851
10µL	R	25	53mm	S/Hole	10R-VA8X-II	002924	ea.	24852
100µL	R	25	53mm	S/Hole	100R-VA8X	005921	ea.	24853

### Varian CP 8400, CP8410 Syringes

10µL	F	26	50mm	Cone	10F-C/F-5/0.47C	002980	ea.	24922
10µL	F	26	50mm	Bevel	10F-VA8400-5/0.47	002950	ea.	21202

## Replacement Needles for Varian 8000 Series Autosampler Syringes



### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
10µL	23	53mm	S/Hole	037779	2-pk.	24857
10µL	25	53mm	S/Hole*	037780	ea.	24858
10µL	25	53mm	S/Hole**	037777	ea.	24854
10µL	25	53mm	2	037776	2-pk.	24855

\*straight needle shaft, 0.20mm ID needle, for use with viscous samples

\*\*tapered needle shaft, 0.12mm ID needle

**Standard Microliter Volume Syringes**

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek
					Model	cat.#		cat.#
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek
					Model	cat.#		cat.#
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713



\*For replacement RN/R needles, see page 37.

\*\*With plunger protection.

## Teflon® Tip, Gas-Tight Syringes

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

### Guide to Needle Termination Codes

#### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

#### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat. #	qty.	Restek cat. #
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717



SGE Gas-Tight Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat. #	qty.	Restek cat. #
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 37.

**Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes**

Materials: stainless steel needle, nickel plated brass hub

**Needles for Hamilton Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

**Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

**Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes****Needles for Hamilton Syringes**

Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

**Needles for SGE Syringes**

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

## Experience Restek

We're the most dedicated chromatography company you'll ever do business with.

**www.restek.com**

#### Restek Trademarks:

Alumaseal, CarboFrit, Cyclosplitter, EZ No-Vent, IceBlue, MXT, Precision, Press-Tight, Rtx, SeCure, Silcosteel, Silcote, Siltek, Stabilwax, Stx, Sulfinert, Thermolite, Uniliner, Vu-Union, Vu2 Union, Restek logo.

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# Genuine Restek Replacement Parts for **PerkinElmer GCs**



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# From Injector to Detector

Restek is your #1 source for consumables and supplies for PerkinElmer GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.



Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.

### it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—  
easy to hold and  
operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)



## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.



Description	qty.	cat. #
Deactivated Wool	10 grams	24324

### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat. #
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

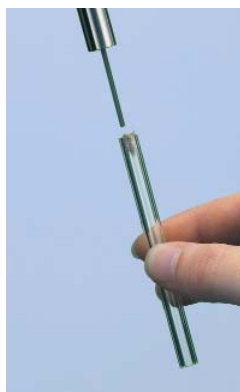
Insert and remove wool plugs easily. Order a spare pack so you'll always have one available.



Description	qty.	cat. #
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.



Eliminates user variation!



Description	qty.	cat. #
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

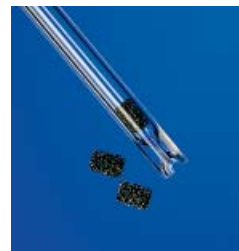
Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-inserter tool listed below.\*



Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™ packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!





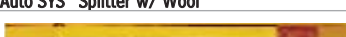




Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181




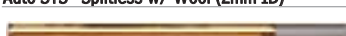


**tech tip****Use of Packings with Splitless Liners**



We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 <b>Baffle Splitter</b>	universal, for most common analyses	3.5 ID 5.0 OD x 100	N6502008	20736	20737	—
 <b>Cup Splitter</b>	high & low MW compounds	3.5 ID 5.0 OD x 100	—	20739	20740	—
 <b>Cycloplitter®</b>	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 100	—	20745	20746	—
 <b>Auto SYS™ Splitter w/ Wool</b>	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6502009	20832	20833	20834
 <b>Siltek® Auto SYS™ Splitter w/ Wool</b>	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6502010	20832-213.1	20833-213.5	20834-213.25
 <b>Auto SYS™ Cup Splitter</b>	high & low MW compounds	4.0 ID 6.2 OD x 92.1	N6502011	20835	20836	—
 <b>Auto SYS™ Cycloplitter®</b>	dirty samples, many injections before cleaning required	4.0 ID 6.2 OD x 92.1	N6502012	20910	20911	—
 <b>Auto SYS™ Laminar Cup Splitter</b>	high MW compounds	4.0 ID 6.2 OD x 92.1	—	20827	20828	—
 <b>Auto SYS™ Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.2 OD x 92.1	N6121020	21026	21027	—

Splitless Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 <b>Splitless (2mm ID)</b>	trace samples	2.0 ID 5.0 OD x 100	N6502007	20730	20731	20732
 <b>Auto SYS™ Splitless</b>	headspace & purge & trap	1.0 ID 6.2 OD x 92.1	N6502006	21272	21273	21274
 <b>Auto SYS™ Splitless w/ Wool (2mm ID)</b>	trace samples	2.0 ID 6.2 OD x 92.1	N6121021	20829	20830	20831
 <b>Siltek® Auto SYS™ Splitless w/ Wool (2mm ID)</b>	trace samples	2.0 ID 6.2 OD x 92.1	N6502004	20829-213.1	20830-213.5	20831-213.25
 <b>Auto SYS™ Double Gooseneck</b>	trace, active samples up to 4µL	4.0 ID 6.2 OD x 92.1	N6502003	20853	20854	—
 <b>Auto SYS™ Cyclo Double Gooseneck</b>	trace, dirty, active samples, up to 4µL	4.0 ID 6.2 OD x 92.1	N6502005	20899	20900	—

PSS Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 <b>PSS Split/Splitless (1mm ID)</b>	trace samples	1.0 ID 4.0 OD x 86.2	N6121006	20738	20741	—
 <b>Auto SYS™ XL PSS Split/Splitless w/ Wool</b>	most common analyses	2.0 ID 4.0 OD x 86.2	N6121004	21717	21718	—













\*Nominal ID at syringe needle expulsion point.

### ordering note

For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate  
polarity (IP) deactivated unless  
otherwise requested.

Zero Dilution Liners for PerkinElmer Auto SYS™ and Clarus GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
		headspace analysis	1.0 ID 2.0 OD x 73	N1011446	22990	22991	<b>new!</b>
<b>Zero Dilution Inner Liner</b>							
		headspace analysis	2.5 ID 6.2 OD x 90	N1011445	22992	22993	<b>new!</b>
<b>Zero Dilution Outer Liner</b>							
PTV Liners for PerkinElmer GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
		high linearity for 0.25, 0.32, & 0.53mm ID columns	1.0 ID 2.0 OD x 88	—	20733	20734	20735
<b>PTV Press-Tight®</b>							
		high linearity	1.0 ID 2.0 OD x 88	—	20742	20743	20744
<b>PTV Injector</b>							
DI Liners for PerkinElmer GCs (0.32/0.53mm ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
		trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 100	N6502018	20855	20856	—
<b>Uniliner®</b>							
		trace, dirty, active samples, high linearity	3.5 ID 5.0 OD x 100	N6502019	20857	20858	—
<b>Cyclo-Uniliner®</b>							
		trace, dirty, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502016	20837	20838	—
<b>Auto SYS™ Open-top Uniliner® w/ Wool</b>							
		trace, dirty, high MW active samples, high linearity	4.0 ID 6.2 OD x 92.1	N6502017	20839	20840	—
<b>Auto SYS™ Cyclo-Uniliner®</b>							
DI Liners for PerkinElmer GCs (For 0.32/0.53mm ID Columns)		Benefits/Uses	ID*/OD & Length (mm)	Similar to PE part #	cat.# ea.	cat.# 5-pk.	
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6121022	20819	20822	
<b>Auto SYS™ Drilled Uniliner® (hole on top)</b>							
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502013	21293	21294	
<b>Auto SYS™ Drilled Uniliner® (hole on bottom)</b>							
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502014	21295	21296	
<b>Auto SYS™ Gooseneck Drilled Uniliner® (hole on top)</b>							
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502015	21297	21298	
<b>Auto SYS™ Gooseneck Drilled Uniliner® (hole on bottom)</b>							

\*Nominal ID at syringe needle expulsion point.

## tech tip

### DI Liners for PerkinElmer GCs

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

## Graphite O-Rings for PerkinElmer Auto SYS™ XL PSS

Description	Max. temp.	Similar to PE part #	qty.	cat.#
Graphite O-Rings for PerkinElmer Auto SYS™ XL PSS	450°C	N610-1751	10-pk.	21475
Graphite O-Rings for PerkinElmer Auto SYS™ XL PSS	450°C	N610-1751	25-pk.	21476



## Viton® O-Rings for PerkinElmer PSS

Description	Max. temp.	Similar to PE part #	qty.	cat.#
Viton® O-Rings for PerkinElmer PSS	250°C	N6101747	10-pk.	20366



## Silicone O-Rings for PerkinElmer Auto SYS™ GCs

Description	Max. temp.	Similar to PE part #	qty.	cat.#
Silicone O-Rings for PerkinElmer Auto SYS™ GCs	250°C	N6101374	10-pk.	20262





### 11mm Septa for PerkinElmer GCs

- Precision molded, for consistent, accurate fit.

Thermolite® Septa (useable to 340°C inlet temp.)	
qty.	cat.#
25-pk.	27141
50-pk.	27142
100-pk.	27143

IceBlue™ Septa (useable to 250°C inlet temp.)	
qty.	cat.#
50-pk.	27162
100-pk.	27163

BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#
50-pk.	27110
100-pk.	27111

### HANDY septum size chart

PE Instrument	Septum Diameter (mm)
Sigma series	11
900,990	11
8000 series	11
Auto SYS™	11
Auto SYS™ XL	11



### Septum Cap for PerkinElmer Auto SYS™ XL

- Made of clear anodized aluminum and high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to PE part #	qty.	cat.#
Septum Cap for PerkinElmer Auto SYS™ XL	N6100153	ea.	22322

### Injector Adaptor for PerkinElmer Auto SYS™ XL

- Made of high-quality stainless steel.
- Meets or exceeds OEM performance.
- Siltek® treated version available for increased inertness.



Description	Similar to PE part #	qty.	cat.#
<b>A) For use with PE style capillary nuts</b>			
Injector Adaptor for PerkinElmer Auto SYS™ XL	N6100157	ea.	22318
Siltek® Treated Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22320
<b>B) For use with 1/8" compression style nuts</b>			
Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22319
Siltek® Treated Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22321

### FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL

- Made of high-quality stainless steel.
- Meets or exceeds OEM performance.



Description	Similar to PE part #	qty.	cat.#
<b>A) For use with PE style capillary nuts</b>			
FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL	N6120020	ea.	22608
<b>B) For use with 1/8" compression style nuts</b>			
FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22609

**FID Replacement Parts for PerkinElmer Auto SYS™ XL and Clarus 500**

- Made of high-quality stainless steel.
- Meet or exceed OEM performance.



Description	Similar to PE part #	qty.	cat.#
FID Jet for PerkinElmer Auto SYS™ XL and Clarus 500	N6100361	ea.	23038
	N6103167		
Auto-Ignite FID Replacement Part Kit for PerkinElmer Auto SYS™ XL and Clarus 500	N6103175	kit	23061
	N6101085		
	N6001204		
	09912223		
Nozzle Insulator for PerkinElmer Auto SYS™ XL and Clarus 500	N6101085	ea.	23062
FID Body for PerkinElmer Auto SYS™ XL and Clarus 500	N6100364	ea.	23063

**MLE Capillary Tool Kit for PerkinElmer GCs**

Includes:

- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/inserter tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat.#
MLE Capillary Tool Kit for PerkinElmer GCs	kit	22185

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.



Maintenance Kit for Shortix®  
Capillary GC Column Cutter

### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

kit

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

## Flashlight with Swivel Head

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).



### Description

Flashlight with Swivel Head

### qty.

ea.

### cat.#

22187

### Septum Puller

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat. #
Septum Puller	ea.	20117

### Slide-Lock Tweezers and 15cm Compact Steel Ruler

- “Lock” capillary columns to the correct insertion distance recommended by the instrument manufacturer during installation.
- Useful for many laboratory tasks.



Description	qty.	cat. #
Slide-Lock Tweezers and 15cm Compact Steel Ruler	set	20101

### High-Temperature String

- Withstands temperatures to 400°C.
- Use to restring capillary columns, attach column connectors to column cages, or hold a column in the GC oven.

Description	qty.	cat. #
High-Temperature String	10m	20109
High-Temperature String	450m	20618



### Stainless Steel Jet Reamers

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat. #
Stainless Steel Jet Reamers	6-piece set	20113



### Stainless Steel Tube Brushes/Surface Brush

Unlike brass brushes that can leave a metal residue, these stainless steel tube brushes ( $\frac{3}{8}$ -,  $\frac{3}{16}$ -, and  $\frac{1}{4}$ -inch) work well for cleaning dirty collectors, injector ports, and detector ports. The surface brush can be used to remove residue that builds up on metal detector jets and electronic contacts.

Description	qty.	cat. #
Stainless Steel Tube Brushes/Surface Brush	4-piece set	20112



### Open-End Wrench Set

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat. #
Open-End Wrench Set	set	20387



### Open-End Wrenches

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat. #
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ " )	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ " )	2-pk.	22455



### Pocket Magnifier

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat. #
Pocket Magnifier	ea.	20124



## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.



Vespel® ferrules

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223

## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217



## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240



## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespel®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

## Vu2 Union™ Column Connectors



Patent pending.

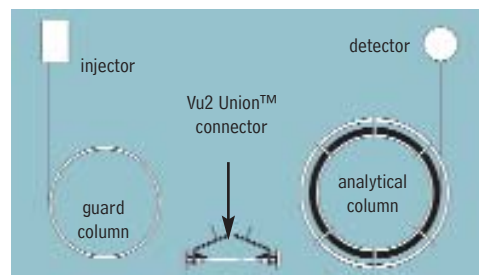
Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

A guard column connected to an analytical column by a Vu2 Union™ connector.



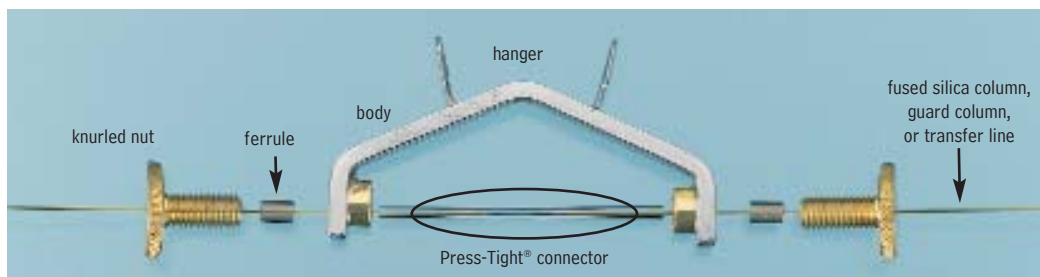
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108



### Universal Press-Tight® Connectors

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.



Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

restek  
innovation!

### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

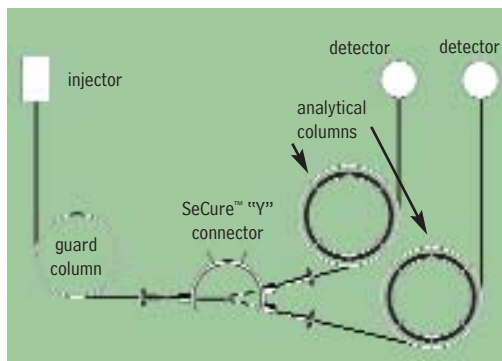
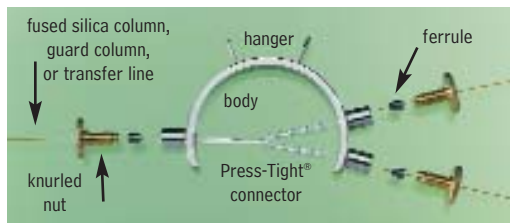
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### a plus 1 story

"Restek is a great corp. that keeps us operating on a daily basis with your GC supplies. We really love the new SeCure™ "Y" Connector. It has worked wonders for us."

**Eric A. Lorge**, Project Manager,  
Major Equipment Manufacturer,  
Environmental Lab

### Universal "Y" Press-Tight® Connectors

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



**HRMalytic RESTEK '07**  
Australian Distributors **ECH nology**  
Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)



## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal “Y” Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486



## Universal Angled “Y” Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469



## Universal “X” Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat. #
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146





## did you know?

All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

### Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

### Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

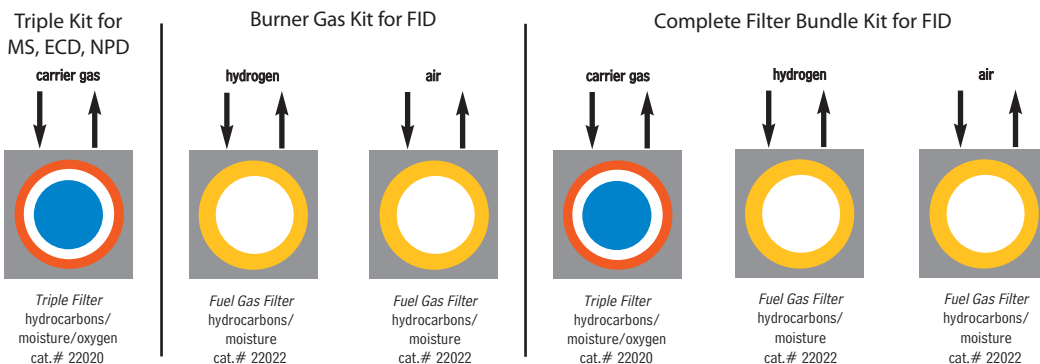
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

### High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	> 99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat. #
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)

Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

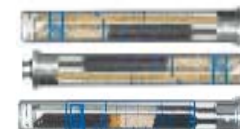
**Replacement Filters**

Description	qty.	cat. #
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat. #
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat. #
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat. #
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat. #
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat. #
1/8" to 1/4" Tube-End Unions	5-pk.	21833



## Super-Clean™ Gas Filter Systems



### Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

### please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

### Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b> Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 19) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa) inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

### it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific

##### Purifier Module

	Compression Tube Fittings			
	1/4-inch		1/8-inch	
	qty.	cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015



Dimensions: 13" x 2"  
(33 x 5.1 cm)

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane
	FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our FID Gas Stations Fact Facts from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting



Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

## Ultra-High-Purity Chrome-Plated Brass Line Regulator

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20psi or more.
- Same purity protection as high-pressure cylinder regulators.

Inlet connections: 1/4" FPT  
 Outlet assembly: 1/4" FPT port



Fitting	Outlet Gauge	Outlet Pressure	qty.	cat.#
1/4" female NPT ports*	30" - 0 to 100psig	0-50psig	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig	0-100psig	ea.	22452

\*Order appropriate male connector, pipe-to-tube fittings.

## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.



### ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/32" OD	21500	21501	21502
0.02" ID	1/16" OD	21503	21504	21505
0.03" ID	1/8" OD	21506	21507	21508
0.04" ID	3/16" OD	21509	21510	21511
0.085" ID	3/8" OD	21512	21513	21514
0.21" ID	1/2" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

### 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

### Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

### Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

### Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/4" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

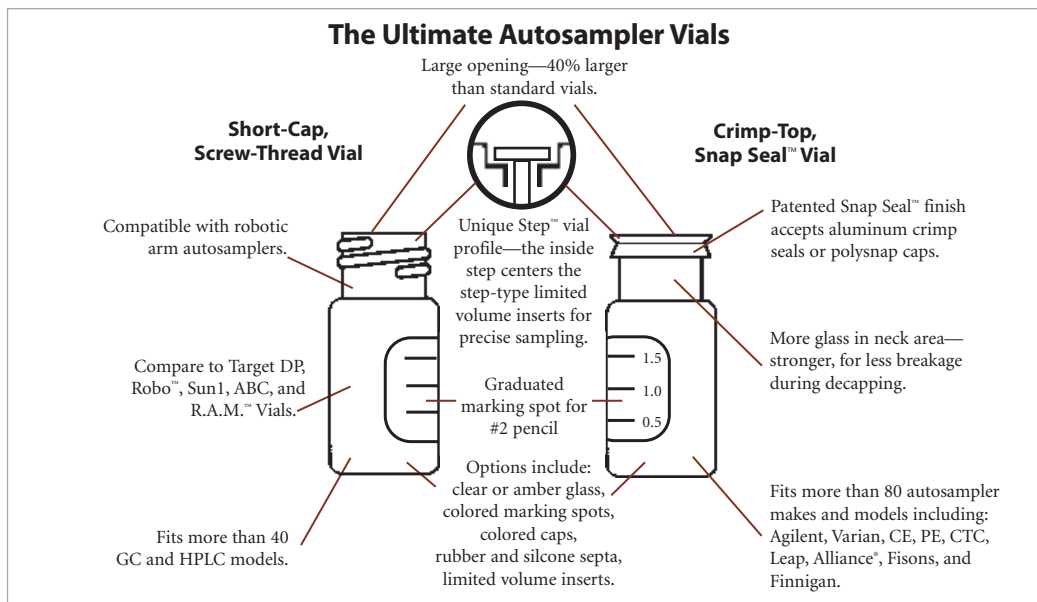


### 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



### For a highly inert surface, we recommend Siltek® deactivation for your vials:

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

### instrument reference

PerkinElmer Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	8mm Crimp-Top 8 x 30mm	Headspace	8mm Screw-Thread
AI-1	X	X	X		
ISS 100, LC 600 42 vial tray	X	X			
ISS 200	X	X		X	
Integral 4000	X			X	
Autosystem GC	X			X	X
420/B, 4900	X				X
F40, F45, HS 6, HS 40				X	
LC 600 (60), AS100/B, 300, 8300, AS2000, LC 30, 2000, B 2000			X		

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

instrument **reference****For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
PerkinElmer	Autosystem GC, AI-1, Integral 4000, ISS 100, ISS 200, LC 600 42 vial tray, 420/B, 4900

## 9mm Screw-Thread Vials / 8mm Crimp-Top Vials

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

### 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
PerkinElmer	AI-1, ISS 100, ISS 200, LC 600 42 vial tray

### 8mm Crimp-Top Vials, 0.8mL, 8 x 30mm

#### 0.8mL Crimp-Top Vials—8 x 30mm, 8mm Crimp

Description	100-pk.	1000-pk.
0.8mL Clear Flat Bottom Vials	24695	24696

#### 8mm Aluminum Seals w/Septa

Description	100-pk.	1000-pk.
Silver Seals w/Clear PTFE/Natural Rubber Septa	21757	21758

### 8mm Crimper and Decapper

Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736

### For 8mm Crimp-Top Vials, 8 x 30mm

Manufacturer	Instrument/Model #
PerkinElmer	LC 600 (60), AS100/B, 300, 8300, AI-1, AS2000, LC 30, 2000, B 2000

**Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread****Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.**

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

**Screw-Thread Vials—12 x 32mm, 8mm/425 Thread**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

**8mm Pre-Assembled Caps and Septa**

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

**Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps**

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24636	24637

**Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately****(Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195

**8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials**

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177



8mm (2.0mL)  
Screw-Thread Vial

**instrument reference****For 8mm Screw-Thread Vials**

Manufacturer	Instrument/Model #
PerkinElmer	Autosystem GC, 420/B, 4900

## Headspace Vials



### Headspace Autosampler Vials\*

Description	100-pk.	1000-pk.
a) 6mL Clear Vial	21166	21167
10mL Clear Vial, Flat Bottom	24683	24684
b) 10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Flat Bottom	24685	24686
c) 20mL Clear Vial, Rounded Bottom	21162	21163
27mL Clear Vial	21160	21161

\*a) - c) designated in instrument reference chart below.

### 20mm Aluminum Seals w/Septa, Assembled



Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.

## instrument reference

### For Headspace Vials

Manufacturer	Instrument/Model #
a) PerkinElmer	ISS 200
b) PerkinElmer	Autosystem GC, F40, F45, HS 6, Integral 4000, HS 40
c) PerkinElmer	Autosystem GC, F40, F45, HS 6, Integral 4000, HS 40

### Aluminum Seal Crimpers and Decappers

Safer than removing caps with pliers, knife or screwdriver blade!



Decapper



Crimper

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!

Description	qty.	cat. #
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738



**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one...



two...



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK



### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for PerkinElmer Autosystem™ and Clarus 500 GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 5µL Autosampler Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
5µL	ASN	23	2.756"	3	75ASN/PE	88035	ea.	24953
5µL	ASN	26	2.756"	3	75ASN/PE	88040	ea.	24952



SGE 5µL Autosampler Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
0.5µL	R	23	70mm	Cone	0.5BR-PE-0.63	000478	ea.	24811
0.5µL	R	26	70mm	Cone	0.5BR-PE-0.47	000475	ea.	24810
5µL	F	23	70mm	Cone	5F-PE-0.63	001954	ea.	24813
5µL	F	23	70mm	Cone	5F-PE-GT-0.63*	001957	ea.	24815
5µL	F	26	70mm	Cone	5F-PE-0.47	001953	ea.	24812
5µL	F	26	70mm	Cone	5F-PE-GT-0.47*	001955	ea.	24814
50µL	F	23	70mm	Cone	50F-PE-0.63	004670	ea.	24816

\*Gas-tight.

**Guide to Needle Termination Codes****Hamilton:**

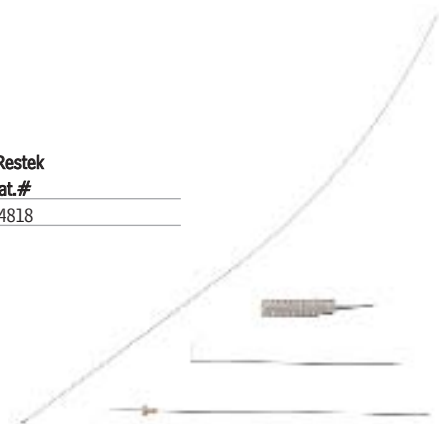
(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

**Replacement Needles for PerkinElmer Autosampler Syringes****Needle and Plunger Kits**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	70mm	Cone	033765	kit	24818



## Standard Microliter Volume Syringes

### Standard Microliter Volume Syringes

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

#### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat. #	qty.	Restek cat. #
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

#### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat. #	qty.	Restek cat. #
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 36.

\*\*With plunger protection.



**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton			Restek
					Model	cat.#	qty.	cat.#
10 $\mu$ L	N	26s	2"/51mm	2	1701	80000	ea.	24557
10 $\mu$ L	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25 $\mu$ L	N	22s	2"/51mm	2	1702	80200	ea.	24559
25 $\mu$ L	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50 $\mu$ L	N	22s	2"/51mm	2	1705	80900	ea.	24561
50 $\mu$ L	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100 $\mu$ L	N	22s	2"/51mm	2	1710	81000	ea.	24563
100 $\mu$ L	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250 $\mu$ L	N	22s	2"/51mm	2	1725	81100	ea.	24567
250 $\mu$ L	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500 $\mu$ L	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500 $\mu$ L	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler  
 Cemented Needle  
 (ASRN) Autosampler  
 Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented  
 Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE			Restek
					Model	cat.#	qty.	cat.#
10 $\mu$ L	F	26	50mm	2	10F-GT	002200	ea.	24725
10 $\mu$ L	R	26	50mm	2	10R-GT	002250	ea.	24726
25 $\mu$ L	F	25	50mm	2	25F-GT	003200	ea.	24727
25 $\mu$ L	R	25	50mm	2	25R-GT	003250	ea.	24728
50 $\mu$ L	F	25	50mm	2	50F-GT	004200	ea.	24729
50 $\mu$ L	R	25	50mm	2	50R-GT	004250	ea.	24730
100 $\mu$ L	F	25	50mm	2	100F-GT	005200	ea.	24734
100 $\mu$ L	R	25	50mm	2	100R-GT	005250	ea.	24735
100 $\mu$ L	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250 $\mu$ L	F	25	50mm	2	250F-GT	006200	ea.	24738
250 $\mu$ L	R	25	50mm	2	250R-GT	006250	ea.	24739
250 $\mu$ L	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500 $\mu$ L	F	25	50mm	2	500F-GT	007200	ea.	24742
500 $\mu$ L	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 36.

## Gas-Tight Syringe Replacement Needles

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

### Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

#### Needles for Hamilton Syringes

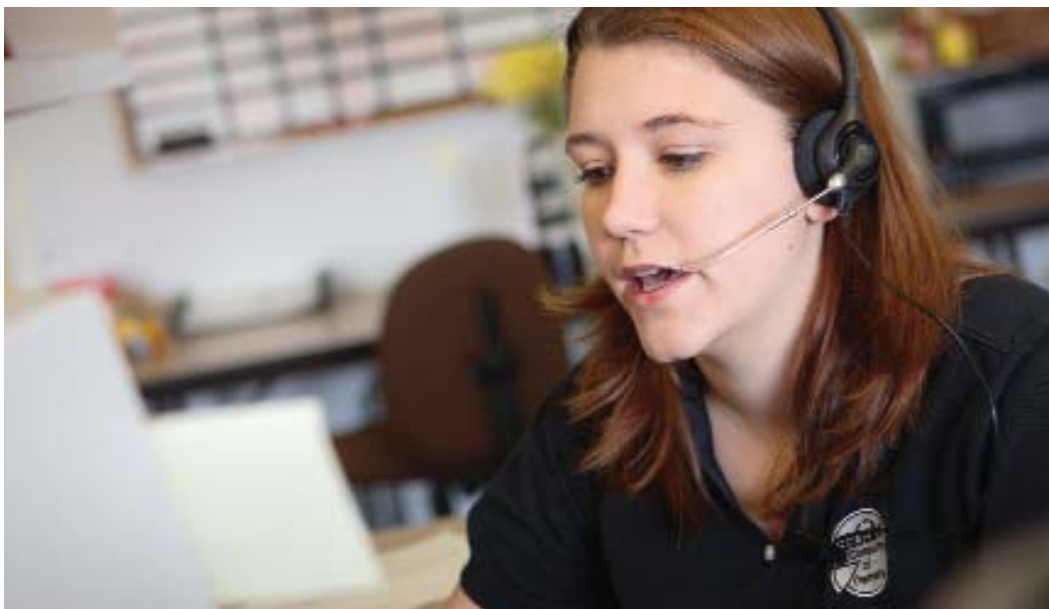
Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

\*For Waters U6K injection valve.

#### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*\*For Rheodyne®/Valco® valves.



## In the U.S.

**Call:** 800-356-1688 (ext. 3) or 814-353-1300 (ext. 3)  
Monday–Friday 8:00 a.m.–6:00 p.m.  
Eastern Standard Time

**Fax:** 814-353-1309—24-hours a day

**Online:** [www.restek.com](http://www.restek.com)—24-hours a day

## Outside the U.S.

**Contact your Restek representative:**

Refer to our website at [www.restek.com](http://www.restek.com)



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### Thames Restek U.K. LTD

phone: 44 1494 563377

fax: 44 1494 564990

e-mail: [sales@thamesrestek.co.uk](mailto:sales@thamesrestek.co.uk)

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

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We're the most dedicated chromatography company you'll ever do business with.

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Lit. Cat.# 580038

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# Genuine Restek Replacement Parts for Thermo Scientific GCs



The image displays a variety of Restek replacement parts for Thermo Scientific GCs. The central component is a large, clear, graduated syringe with orange markings and a needle. To its right are two circular filters, one teal and one orange. Below the syringe is a small, clear vial with a silver cap and a label showing 0.5, 1.0, and 1.5. Other parts include a metal band, a metal ring, a metal clip, and several small metal fittings.

**CHROMALYTIC** +61(0)3 9762 2034 09  
AUSTRALIAN Distributors **ECHnology** www.chromtech.net.au

## Chromatography Products

Website : [www.chromtech.net.au](http://www.chromtech.net.au) E-mail : [infor@chromtech.net.au](mailto:infor@chromtech.net.au) TelNo : 03 9762 2034 . . . in AUSTRALIA

# From Injector to Detector

Restek is your #1 source for consumables and supplies for Thermo Scientific GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—  
easy to hold and  
operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks with the adaptor fitting.



Leak Detector is easily accessed when stored in the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

**CHROMalytic** +61(0)3 9762 2034 09  
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## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for amines and basic compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

	qty.	Wool	FS Beads	CarboFrit™†
	ea.	-200.1	-201.1	-209.1
	5-pk.	-200.5	-201.5	-209.5
	25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

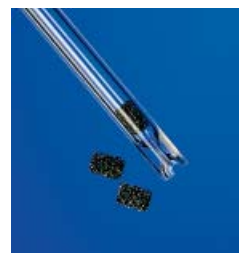
**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-insertor tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Insertor Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Insertor Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181



No more burned fingers!















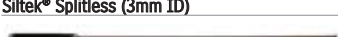


**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to

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## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for Thermo Scientific 4000-5000-6000 Series GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Laminar Cup Splitter	high MW compounds	4.0 ID 5.4 OD x 79.5	—	20809	20810	—
	Cyclosplitter®	dirty samples, many injections before cleaning required	4.0 ID 5.4 OD x 79.5	—	20817	20818	—
	Cup Splitter Gooseneck	high & low MW compounds	4.0 ID 5.4 OD x 79.5	—	20885	20886	—
Splitless Liners for Thermo Scientific 4000-5000-6000 Series GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Splitless (2mm ID)	trace samples	2.0 ID 5.4 OD x 79.5	—	20811	20812	20813
	Splitless (4mm ID)	trace samples	4.0 ID 5.4 OD x 79.5	—	20814	20815	20816
DI Liners for Thermo Scientific 4000-5000-6000 Series GCs (0.32/0.53 ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Open-top Uniliner® w/ Wool	trace, dirty, active samples, high recovery & linearity	4.0 ID 5.4 OD x 79.5	—	20841	20842	—
Split Liners for Thermo Scientific TRACE™ and Focus SSL		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap & fast GC	1.0 ID 8.0 OD x 105	453 20075	20916	20917	—
	3mm Split	universal	3.0 ID 8.0 OD x 105	453 20030	20936	20937	20938
	5mm Split	universal	5.0 ID 8.0 OD x 105	453 20031	20939	20940	20941
	Laminar Cup Splitter	high MW compounds	4.0 ID 8.0 OD x 105	—	20948	20949	—
	Cup Splitter	high & low MW compounds	4.0 ID 8.0 OD x 105	—	20950	20951	—
	5mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	5.0 ID 8.0 OD x 105	—	22288	22289	—
Splitless Liners for Thermo Scientific TRACE™ and Focus SSL		Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
	Splitless (3mm ID)	trace samples	3.0 ID 8.0 OD x 105	453 20032	20942	20943	20944
	Siltek® Splitless (3mm ID)	trace samples	3.0 ID 8.0 OD x 105	—	20942-214.1	20943-214.5	20944-214.25
	Splitless (5mm ID)	trace samples	5.0 ID 8.0 OD x 105	453 20033	20945	20946	20947
	Double Gooseneck	trace, active samples up to 4µL	4.0 ID 8.0 OD x 105	—	20952	20953	—
	5mm Splitless Precision™ Liner w/ Wool	dirty samples, trace samples	5.0 ID 8.0 OD x 105	—	21028	21029	—








\*Nominal ID at syringe needle expulsion point.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

ordering **note**

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Split Liners for Thermo Scientific TRACE™ PTV	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
 1mm ID Glass Liner	trace samples, high recovery & linearity	1.0 ID 2.75 OD x 120	453 22054	21114	21115	—
 2mm ID Glass Liner	universal	2.0 ID 2.75 OD x 120	453 22045	21116	21117	—
 Baffle Liner	trace samples	2.0 ID 2.75 OD x 120	—	22074	22075	—
 Siltek® Baffle Liner	trace samples	2.0 ID 2.75 OD x 120	—	22074-214.1	22075-214.5	—
DI Liners for Thermo Scientific TRACE™ and Focus SSL (0.32 & 0.53mm ID columns)	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	ea.	cat.# 5-pk.	25-pk.
 Uniliner® w/ Wool	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	21005	21006	—
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	22411	22412	—
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	22413	22414	—

\*Nominal ID at syringe needle expulsion point.

## tech tip

### DI Liners for Thermo Scientific TRACE™ & Focus SSL

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

## Siltek® Treated Metal Inlet Liners for Thermo Scientific GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (5.0mm ID x 8.0mm OD x 105mm)	ea.	5-pk.
5mm ID Split/Splitless Siltek® Treated Metal Inlet Liners w/Wool	—	21004
Liner Type (2.75mm OD x 120mm)	ea.	5-pk.
1mm ID Split/Splitless Siltek® Treated Metal Inlet Liners*	21080	21081
2mm ID Split/Splitless Siltek® Treated Metal Inlet Liners*	21082	21083
Liner Type (0.8mm ID x 2.75mm OD x 120mm)	ea.	5-pk.
SPME Siltek® Treated Metal Inlet Liner for TRACE™ 2000 GCs & PTV Inlets	22598	22599

\*Works with PTV injectors.



## Inlet Liner Seals for TRACE™ PTV

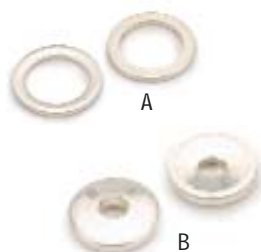
Description	Max. temp.	Similar to TS part #	qty.	cat.#
Inlet Liner Seals for TRACE™ PTV	450°C	29013417	2-pk.	21392



## Graphite Sealing Ring for TRACE™ and Focus SSL Instruments

Description	Max. temp.	Similar to TS part #	qty.	cat.#
Graphite Sealing Ring for TRACE™ and Focus SSL Instruments	450°C	290-334-06	ea.	21898
Graphite Sealing Rings for TRACE™ and Focus SSL Instruments	450°C	290-334-06	2-pk.	21899



**Silver Seals for TRACE™ and Focus SSL**

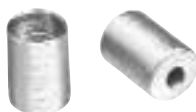
Description	Similar to TS part #	qty.	cat.#
A) Silver Seal for Split/Splitless Injector	29033629	10-pk.	23057
A) Silver Seal for Split/Splitless Injector	29033629	20-pk.	23058
B) Silver Seal for Capillary Detector Base Body	29037100	10-pk.	23059
B) Silver Seal for Capillary Detector Base Body	29037100	20-pk.	23060

**Adapters for Capillary Columns on TRACE™ 2000 Series**

- Use standard 1/16" ferrules.
- Use same installation distance as OEM adapters with M4 ferrules.
- Made of high-quality stainless steel.



Description	Similar to TS part #	qty.	cat.#
Adapter for Capillary Column on Detector Base	347-254-36	ea.	24916
Adapter for Capillary Column on Split/Splitless Injector	347-054-51	ea.	24917

**Graphite Ferrules—For M4 Fittings for TRACE™ and Focus SSL**

Ferrule ID	Fits Column ID	Similar to TS part #	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	—	22221	22222
0.4mm	0.18/0.28mm	290-13488	20280	20281
0.5mm	0.32mm	290-13487	20282	20283
0.8mm	0.45/0.53mm	290-13486	20284	20285

**17mm Septa for TRACE™ and Focus SSL**

- Precision molded, for consistent, accurate fit.



Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27150	50-pk.	27168	50-pk.	27116
50-pk.	27151	100-pk.	27169	100-pk.	27117
100-pk.	27152				

**9.5mm Septa for TRACE™ 2000 Series**

- Precision molded, for consistent, accurate fit.



Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27135	50-pk.	27158	50-pk.	27106
50-pk.	27136	100-pk.	27159	100-pk.	27107
100-pk.	27137				

**Septum Holder Kit for TRACE™ 2000 Series**

- Includes septum support and holder.
- Made from high-quality stainless steel.



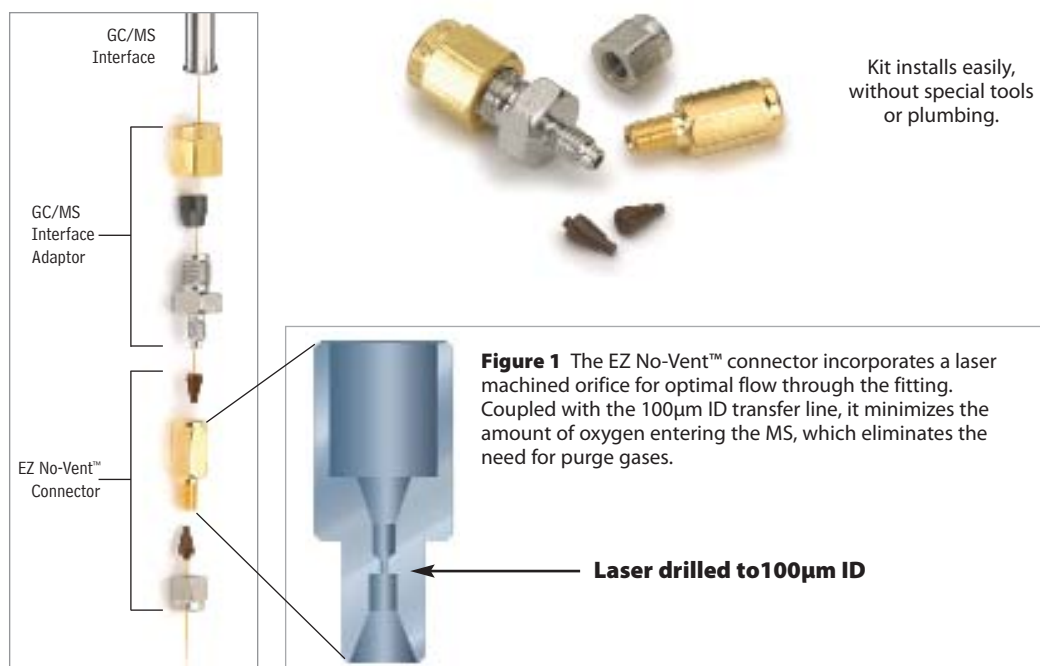
Description	Similar to TS part #	qty.	cat.#
	23303015		
Septum Holder Kit for TRACE™ 2000 Series	350054335	ea.	21299

**EZ No-Vent™ GC Column-Mass Spectrometer Connector**

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- For Thermo Scientific Focus DSQ GC Mass Spectrometers.

Change columns in minutes—without venting!

We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing.



**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Laser drilled to 100µm ID

Description	qty.	cat.#
EZ No-Vent™ Connector Kit for Thermo Scientific Focus DSQ GC Mass Spectrometers Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut. Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:	kit	22454
0.4mm ID (Polyimide)	2-pk.	21015
0.5mm ID (Polyimide)	2-pk.	21016
Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID	2-pk.	21043
Replacement 100µm deactivated transfer line	3 ft.	21018
Replacement EZ No-Vent™ Column Nut	5-pk.	21900
Replacement EZ No-Vent™ Plug	2-pk.	21915
Open-End Wrenches (7/8" x 5/16")	2-pk.	20110
Open-End Wrenches (7/8" x 7/16")	2-pk.	22455

**Transfer Line Reducing Kit for Thermo TRACE™ and Focus DSQ Mass Spectrometers**

- Meets or exceeds OEM performance.

Description	Similar to TS part #	qty.	cat.#
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74400-001A

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Column Installation Tools

Capillary Installation Gauge for TRACE™ and Focus SSL (M4 Ferrules)

- Seats ferrule onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Install nut and ferrule onto column. Cut column end squarely. Slide column into installation gauge to recommended insertion distance. Finger-tighten column nut.



Tighten assembly to ensure a properly seated ferrule. Loosen assembly and remove column and column nut.



The ferrule will be properly seated, and should remain in place when light force is applied. If it slides loosely on the column, repeat procedure.

Description	qty.	cat.#
Capillary Installation Gauge for TRACE™ & Focus SSL (M4 ferrules)	ea.	22330



Metric Wrench Set

High-quality 6 x 7mm, 8 x 10mm, and 16 x 17mm wrenches for tightening a wide variety of fittings.

Description	qty.	cat.#
Metric Wrench Set	set	22997



Metric 9 Piece Ball-Point Hex Key Set

Includes 9 metric hex keys (Allen wrenches): 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10mm.

Description	qty.	cat.#
Metric 9 Piece Ball-Point Hex Key Set	set	22999



Jet Removing Tool for Thermo Scientific GCs:  
Focus GC / TRACE™ GC / Ultra/TRACE™ GC x GC

- Unique, ergonomic handle—easy to grip.
- Easily loosens the FID jet.



Remove FID cell assembly.



Slip tool over FID jet.



Turn counterclockwise to loosen jet.



Use tweezers (cat. #20101) to remove jet.

Description	Similar to TS part #	qty.	cat.#
Jet Removing Tool for Thermo Scientific GCs	205-019-00	ea.	24936

**Liner Cap Removing Tool for Thermo Scientific GCs:****Focus GC / TRACE™ GC / Ultra/TRACE™ GC x GC**

- Easily loosens the liner cap from the injector.
- Unique, ergonomic handle—easy to grip.



Remove septum cap, septum holder, septum, and septum support.



Place tool on liner cap. Align two pins on bottom of tool with two open slots on liner cap.



Turn counterclockwise to loosen liner cap.



Use tweezers (cat. #20101) to remove liner cap.



Description	Similar to TS part #	qty.	cat. #
Liner Cap Removing Tool for Thermo Scientific GCs	205-070-10	ea.	24937

**MLE Capillary Tool Kit for Thermo Scientific GCs**

Includes:

- capillary installation gauge for Thermo Scientific GCs
- liner cap removing tool for Thermo Scientific GCs
- $\frac{1}{8}$ ",  $\frac{3}{16}$ ", and  $\frac{1}{4}$ " nylon brushes
- $\frac{1}{4}$ ",  $\frac{3}{8}$ ", and  $\frac{3}{16}$ " stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- $\frac{1}{4}$ " x  $\frac{5}{16}$ " open end wrench
- $\frac{3}{8}$ " x  $\frac{7}{16}$ " open end wrench
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insertor tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat. #
MLE Capillary Tool Kit for Thermo Scientific GCs	kit	22183

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

kit

23027



## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.

### Description

Capillary Column Caps

### qty.

10 ea.

### cat.#

21044

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**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat.#
Septum Puller	ea.	20117

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124





VespeL® ferrules

## VespeL® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## VespeL®/Graphite Ferrules

- 60%/40% VespeL®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.



## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	VespeL®	Graphite	VespeL®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



Reusable!

## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038



## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	VespeL®	Graphite	VespeL®/Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	VespeL®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20243

## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## Graphite Ferrules—For M4 Fittings for TRACE™ and Focus SSL

Ferrule ID	Fits Column ID	Similar to TF part #	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	—	22221	22222
0.4mm	0.18/0.28mm	290-13488	20280	20281
0.5mm	0.32mm	290-13487	20282	20283
0.8mm	0.45/0.53mm	290-13486	20284	20285



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or

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## Vu2 Union™ Column Connectors



Patent pending.

Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

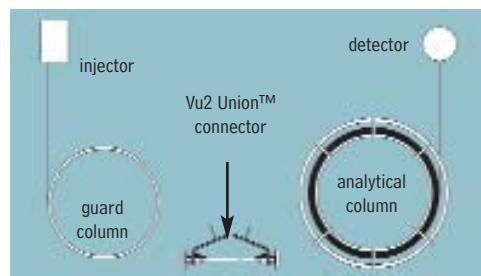
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

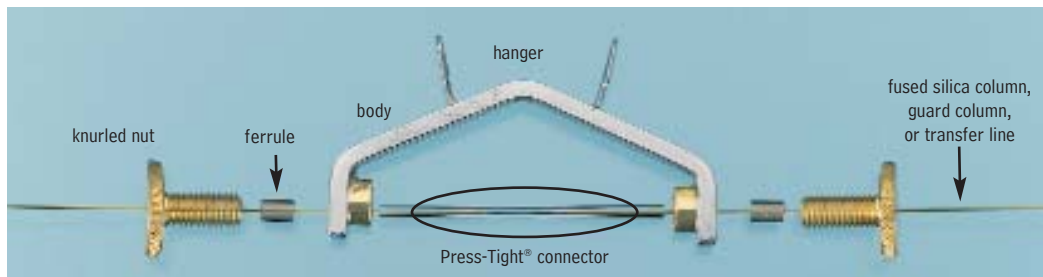
### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

A guard column connected to an analytical column by a Vu2 Union™ connector.



The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108



### Universal Press-Tight® Connectors

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281



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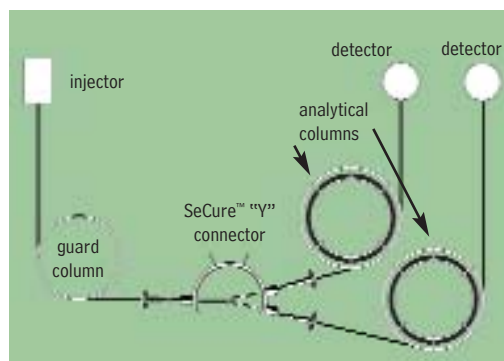
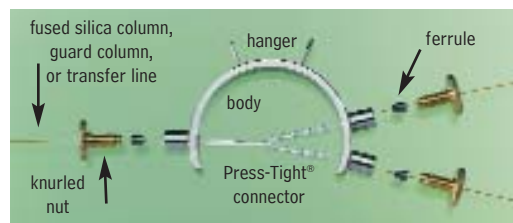
**SeCure™ "Y" Connector Kits**

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.

Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

**Universal "Y" Press-Tight® Connectors**

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

**Graphite Ferrules for SeCure™ "Y" Connectors**

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224





## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484

## Universal “Y” Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

## Universal Angled “Y” Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469

## Universal “X” Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266

## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	mtv.	cat. #
Universal “X” Press-Tight® Connector			20407
Deactivated Universal “X” Press-Tight® Connector			20407-261
Siltek® Treated Universal “X” Press-Tight® Connector			20407-266



**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146





## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

## did you know?

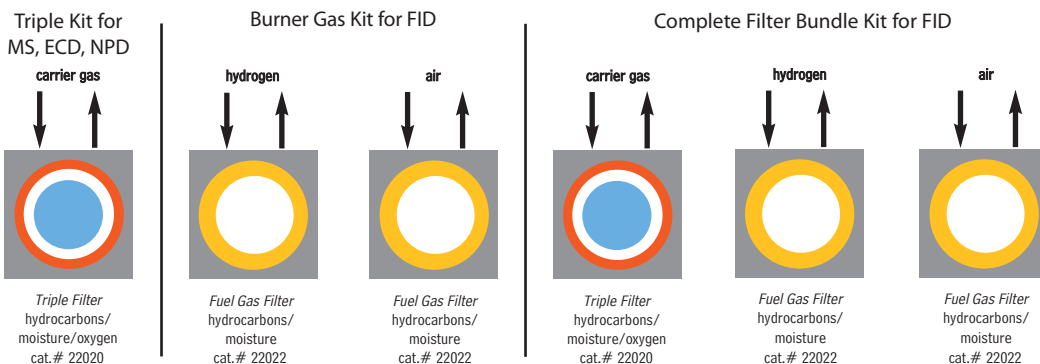
All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup>	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow to clear	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons,

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure:  
10 5/8" x 1 3/4" (27 x 4.4 cm)  
Each baseplate unit  
measures: 4" x 4" x 1 7/8"  
(10.2 x 10.2 x 4.8 cm)

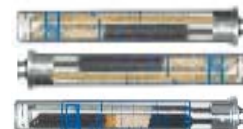
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description



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## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

## please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463

**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat.#
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat.#
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

did you **know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat.#
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat.#
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat.#
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

**HRMalytic** +61(0)3 9762 2034 09  
 AUSTRALIAN Distributors **ECHnology** www.chromtech.net.au

replacement o-rings for click-on inline super-clean connectors

2-pk. ea.

## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat. # 22029, pg. 21) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa)	
inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

### it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific Purifier Module

	Compression Tube Fittings			
	1/8-inch		1/4-inch	
	qty.	cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

Specifications	
Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/2" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)



CE

Produce zero air and pure hydrogen from one unit!

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

**HRMalytic** +61(0)3 9762 2034 09  
AUSTRALIAN Distributors **ECHnology** [www.chromtech.net.au](http://www.chromtech.net.au)

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.



Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648



## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

**cleaned**

All tubing is cleaned and ready to use.

## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	
16 to 30	
31 to 75	
76 to 99	
100 to 200	

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/16" OD	21500	21501	21502
0.02" ID	1/16" OD	21503	21504	21505
0.03" ID	1/16" OD	21506	21507	21508
0.04" ID	1/16" OD	21509	21510	21511
0.085" ID	1/8" OD	21512	21513	21514
0.21" ID	1/4" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

### 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

### Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

### Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

### Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

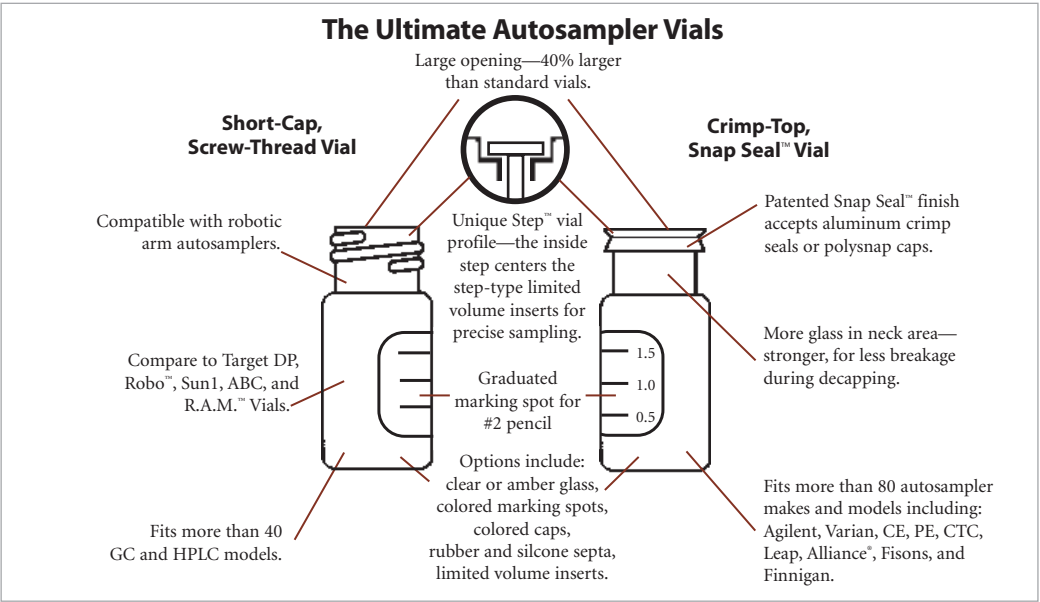


### 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



**For a highly inert surface, we recommend Siltek® deactivation for your vials:**

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

instrument **reference**

Thermo Scientific Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	8mm Crimp-Top
TRACE™ GC 2000, AS2000	X	X	X

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**instrument reference****For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Thermo Scientific	TRACE™ GC 2000, AS2000

## 9mm Short-Cap, Screw-Thread Vials / 8mm Crimp-Top Vials

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

### 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
Thermo Scientific	A200S



### 8mm Crimp-Top Vials, 0.8mL, 8 x 30mm

#### 0.8mL Crimp-Top Vials (8 x 30mm, 8mm Crimp)

Description	100-pk.	1000-pk.
0.8mL Clear Flat Bottom Vials	24695	24696

### 8mm Aluminum Seals w/Septa

Description	100-pk.	1000-pk.
Silver Seals w/Clear PTFE/Natural Rubber Septa	21757	21758

### 8mm Crimper and Decapper

Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736



## instrument reference

### For 8mm Crimp-Top Vials, 8 x 30mm

Manufacturer	Instrument/Model #
Thermo Scientific	A200S

**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one. . .



two. . .



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK



## Syringe Overview

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for Thermo Scientific GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 10µL Autosampler Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	3.15"	AS	701SN	80318	ea.	24962



SGE 10µL Autosampler Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	80mm	Cone	10F-C/F-8/0.47C	002992	ea.	24924
10µL	R	26	80mm	Cone	10R-C/F-8/0.47C	002993	ea.	24934

**Replacement Needles for Thermo Scientific Autosampler Syringes****Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
10µL	26	80mm	Cone	031535	3-pk.	24935

**instrument reference****Autosampler Syringes for Thermo Scientific GCs**

Autosampler syringes for TriPlus, AS3000, AS2000, AS200/800 GCs.

**SGE Syringes**

TriPlus	AS3000	AS2000	AS200/800	Restek cat.#
*	*			24928
*	*			24926
*	*	*	*	24923
*	*	*	*	24932
*		*		24924
*	*	*	*	24934
*	*	*	*	24922
*	*	*		24930

**Replacement Needles for SGE Syringes for Thermo Scientific GCs**

TriPlus	AS3000	AS2000	AS200/800	Restek cat.#
*	*			24929
*	*			24927
*	*	*	*	24933
*	*	*		24931
*	*	*	*	24935

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

## Autosampler Syringes

### Autosampler Syringes for CTC/LEAP GCs

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



#### Hamilton Syringes

Hamilton 10µL Autosampler Syringe

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	cat.#	qty.	Restek cat.#
1.2µL	N	26	2"/51mm	AS	7701.2N	203185	ea.	22755
5µL	N	26s	2"/51mm	AS	75N	203189	ea.	22756
10µL	N	23s	2"/51mm	AS	701N	203361	ea.	22757
10µL	N	23s-26s	2"/51mm	AS	701N	203362	ea.	22758
10µL	N	23s	2"/51mm	2	701N	203363	ea.	22759
10µL	N	26s	2"/51mm	2	701N Slim Line	203072	ea.	22760
10µL	N	26s	2"/51mm	AS	701N	203205	ea.	22761
10µL	N	26s	2"/51mm	2	701N	203269	6-pk.	22762
25µL*	N	26s	2"/51mm	AS	1702N	203043	ea.	22763
25µL*	N	26s	2"/51mm	AS	1702N Slim Line**	203074	ea.	22764
100µL*	N	26s	2"/51mm	AS	1710N Slim Line**	203076	ea.	22765

\*GASTIGHT syringe.

\*\*Barrel O.D. = 6.7mm; all other 25µL and 100µL syringes have a 7.9mm barrel O.D.

### also available

Replacement plunger assemblies for these syringes are available on request.



SGE 10µL Autosampler Syringe

#### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	cat.#	qty.	Restek cat.#
0.5µL	R	23	50mm	Cone	0.5BNR-C/F-0.63	000492	ea.	24928
0.5µL	R	26	50mm	Cone	0.5BNR-C/F-0.47	000490	ea.	24926
5µL	F	23	50mm	Cone	5F-C/F-5/0.63	001981	ea.	24921
5µL	F	26	50mm	Cone	5F-C/F-5/0.47	001982	ea.	24920
10µL	F	23	50mm	Cone	10F-C/F-0.63	002981	ea.	24923
10µL	R	23	50mm	Cone	10R-C/F-0.63	002984	ea.	24932
10µL	F	26	50mm	Cone	10F-C/F-5/0.47C	002980	ea.	24922
10µL	F	26	50mm	Cone	SK10F-C/F-5/0.47C	002986	6-pk.	24925
10µL	R	26	50mm	Cone	10R-C/F-5/0.47C	002982	ea.	24930
10µL*	F	23	50mm	Cone	10F-C/T-GT-5/0.63C	002987	ea.	22749
25µL	F	26	50mm	Cone	25F-C/T-5/0.47C	003980	ea.	22750
25µL*	F	23	50mm	Cone	25F-C/T-GT-5/0.63C	003987	ea.	22751
25µL*	R	26	50mm	S-hole	25R-C/T-GT-5/0.47H	003988	ea.	22752
100µL*	F	23	50mm	Cone	100F-C/T-GT-5/0.63C	005335	ea.	22753
100µL*	R	26	50mm	Cone	100R-C/T-GT-5/0.47C	005333	ea.	22754

\*Gas-Tight syringe.

#### Guide to Needle Termination Codes

##### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler Cemented Needle  
(ASRN) Autosampler Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented Needle

##### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

### Replacement Needles for CTC/LEAP Autosampler Syringes



#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	50mm	Cone	033772	ea.	24929
10µL	23	50mm	Cone	037787	2-pk.	24933
10µL	26	50mm	Cone	037785	2-pk.	24931

**Standard Microliter Volume Syringes**

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat. #	qty.	Restek cat. #
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat. #	qty.	Restek cat. #
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 37.

\*\*With plunger protection.



## Teflon® Tip, Gas-Tight Syringes

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

#### Guide to Needle Termination Codes

##### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

##### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip



SGE Gas-Tight Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760

## Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944



### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807



## Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

### Needles for Hamilton Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609



### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

## Experience Restek

We're the most dedicated chromatography company you'll ever do business with.

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# HPLC Products

2007/08 Edition

hplc columns

hplc accessories

hplc replacement parts

analytical reference materials

vials & syringes

**New**

**1.9µm Pinnacle™ DB**

Small Particle HPLC Columns

See page 8 for details.

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**Chromatography Products**

[www.restek.com](http://www.restek.com)

# New 1.9 $\mu$ m Pinnacle™ DB

Small Particle HPLC Columns

See page 8 for details.



# What's New

## HPLC Columns

**Small particle HPLC columns:**

our popular Pinnacle™ DB packings in 1.9µm particle size. Pages 8-9.

**Capillary HPLC columns** for micro LC. Page 11.

**pHidelity™ C18 columns:** pH stable columns—up to pH 12. Page 10.

**Allure® Biphenyl columns:** enhanced selectivity for unsaturated compounds. Now in both 3µm & 5µm particle sizes. Page 20.

**Allure® AK columns:** resolve 13 carbonyl compounds in 15 minutes. Page 21.

**New phases on Viva Wide Pore silica: Viva Biphenyl and Viva PFP Propyl HPLC columns,** Restek manufactured wide pore Viva silica. Page 30.

**Restek is now your primary source for all Kromasil® columns and packings.** Pages 32-33.

## HPLC Accessories

**Outlet cap, outlet cap & gold seal assembly, and connecting tubing** for Agilent instruments. Page 41.

**Capillary assemblies** for Agilent systems. Page 40.

**Syringes for CTC/Leap instruments.** Page 65.

**Two-way, three-way, prime/purge, and check valves.** Page 45.

**Restek Pack in a Box Kit:**

everything you need to pack your own analytical HPLC columns. Page 59.

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## Column Selection

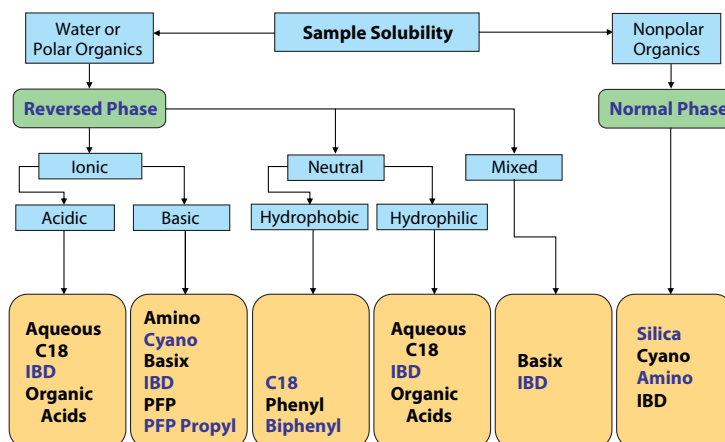


**Becky Wittrig**  
HPLC Products  
Marketing Manager  
6+ years of service!

### Selecting an HPLC Column

Choosing the best column for your application requires consideration of stationary phase chemistry, retention capacity, particle size, and column dimensions. Identifying the best stationary phase for your separation is the most critical step of column selection, and your decision should be based on sample solubility and the chemical differences among the compounds of interest. Figure 1 is a handy tool for stationary phase selection.

**Figure 1** Stationary phase selection.



Reversed phase columns (e.g. alkyl, phenyl, cyano) work well for water-soluble hydrophobic compounds. Some stationary phases incorporate both polar and nonpolar functionality and can be used in either reversed phase or normal phase modes (e.g. Ultra IBD, Allure® Basix, and Allure® PFP Propyl). While straight chain alkyl (e.g. C18) stationary phases are historically the most commonly used, many newer phases provide better separations. Alkyl phases are best suited for analyzing neutral compounds with a high ratio of carbon:heteroatoms where the major distinction among analytes is their hydrophobicity. However, for analyzing compounds that are highly polar, aromatic, or halogenated, nonalkyl stationary phases often provide significantly better selectivity (Figure 2).

Retention capacity is another important consideration and is influenced by surface area and carbon load (% carbon in the packing material). Allure® columns were designed for maximum retention using a high density of ligands bonded to a large surface area silica. Ultra, Kromasil®, Pinnacle™ II and Pinnacle™ DB columns have the same high ligand density, but are more moderately retentive due to their lower surface areas. Surface area is inversely proportional to pore size; thus, larger pore sizes result in less retention. However, wide pore (e.g. 300Å) packings, such as Viva, are ideal when analyzing larger molecules, as a larger pore size is necessary to allow the analytes to 'fit' into the pores.

Particle size and column dimensions also influence column choice. In selecting a particle size, the primary consideration is efficiency (plates/meter) versus column pressure. A 3µm column will have approximately 50% more efficiency than a 5µm column, if all other conditions are constant for both columns. As particle size is further decreased (e.g. <2µm), theoretically, efficiencies will increase proportionally, based on the Van Deemter equation (and the usable flow rate range is much wider). Please note that column backpressure also increases as particle size decreases. Column dimensions include internal diameter and length, where the most commonly used internal diameter (ID) for HPLC columns is 4.6mm. In theory, resolution and pressure should be independent of column ID as long as flow rate is adjusted to maintain the same mobile phase linear velocity (flow rate is proportional to column cross-sectional area). Table I shows the approximate optimum flow rates for four column IDs.

**Table I** Approximate optimum flow rates for various analytical column IDs.

ID (mm)	5µm Particles Optimum Flow Rate (mL/min.)	3µm Particles Optimum Flow Rate (mL/min.)
4.6	1.00	1.5
3.2	0.50	0.73
2.1	0.20	0.31
1.0	0.05	0.07

### ordering note

For assistance in selecting an HPLC column, please contact Restek Technical Service at 814-353-1300 or 800-356-1688 (ext. 4) or support@restek.com.

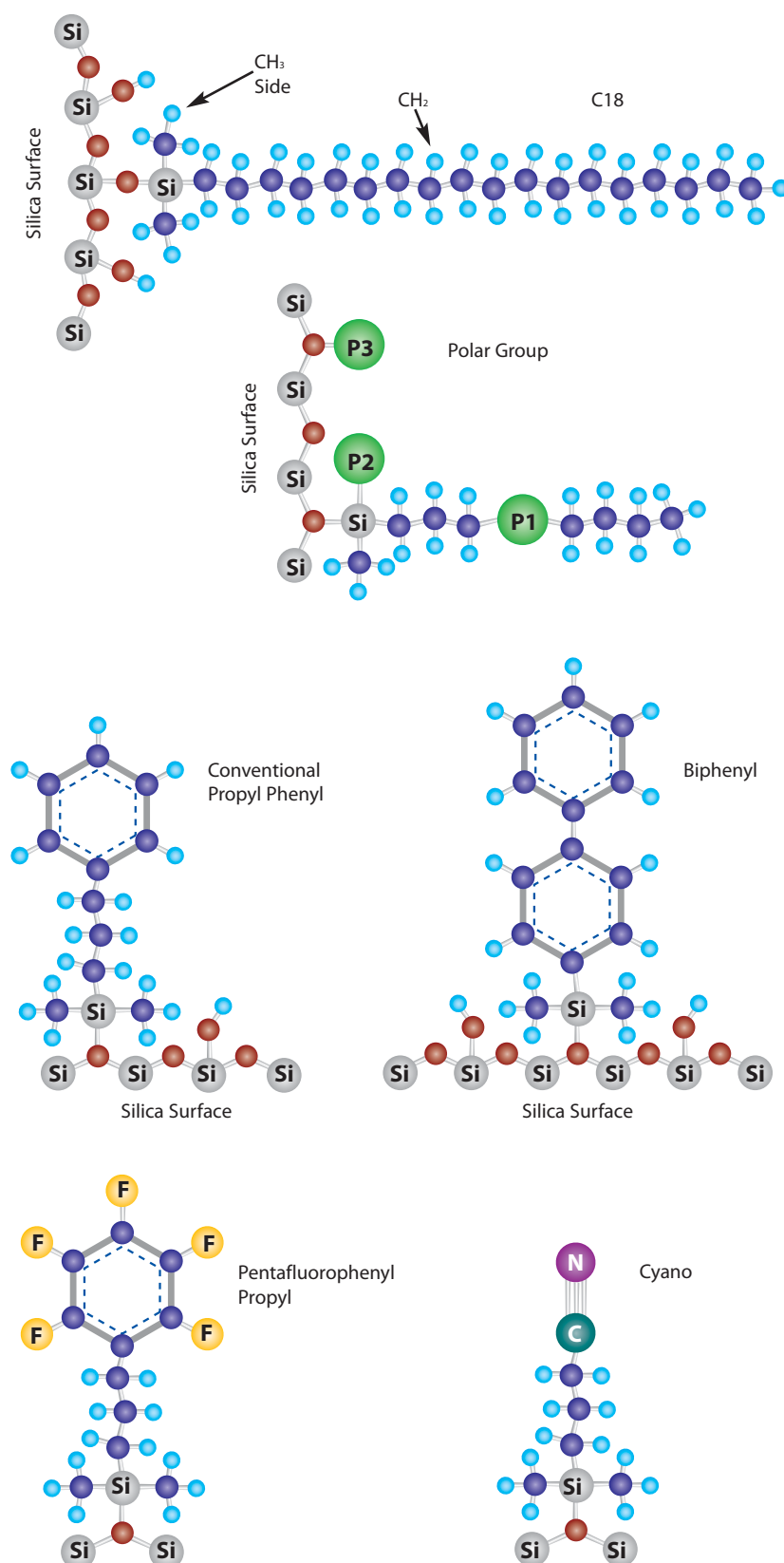


### HPLC Tech Tips Wall Chart

Almost everything you need to remember about HPLC, condensed into 3 feet by 2 feet: mobile phase basics, buffers (types, pK<sub>a</sub> values, pH ranges, formula masses, more), miscibility and solubility chart (invaluable!), system setup and optimization, detector tips, pressure conversion factors, most-used chromatographic equations, column storage essentials.

(lit. cat.# 59894A)



**Figure 2** Stationary phase comparison.

## Physical Characteristics of Restek HPLC Columns

Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications
Pinnacle™ DB C18	Y	140	11	Hydrophobic C18 phase suitable for analyses of a wide range of compounds, from acidic through slightly basic.
Pinnacle™ DB C8	Y	140	6	Applications similar to Pinnacle™ DB C18, but with less hydrophobic retention. Less retention can be useful for shortening analysis time, if resolution is adequate.
Pinnacle™ DB Cyano	Y	140	4	Suitable for a wide range of compounds, from acidic through slightly basic. Also useful for confirmation of analyses on a C18 or C8 column. Can be used in normal phase or reversed phase mode of separation.
Pinnacle™ DB Phenyl	Y	140	5.3	Suitable for polar aromatic compounds, fatty acids, purines and pyrimidines.
Pinnacle™ DB Silica	NA	140	NA	Normal phase mode of separation.
Pinnacle™ II C18	Y	110	13	Superior general purpose C18 for non-basic analytes.
Pinnacle™ II PAH	Y	110	—	Maximum resolution of polynuclear aromatic hydrocarbons.
Pinnacle™ II C8	Y	110	7	Superior general purpose C8 for non-basic analytes.
Pinnacle™ II Cyano	Y	110	4	Superior general purpose cyano for weakly-basic analytes. Used in either normal or reversed phase analyses.
Pinnacle™ II Phenyl	Y	110	6	Superior general purpose phenyl for neutral analytes.
Pinnacle™ II Amino	N	110	2	Excellent general purpose amino phase. Excellent choice for carbohydrate analysis.
Pinnacle™ II Biphenyl	Y	110	—	Multiple aromatic ring structures; excellent for explosives.
Pinnacle™ II Silica	NA	110	NA	Ideal for polar analytes.
Allure® C18	Y	60	27	Ideal for MS and light-scattering detection of neutral to slightly polar solutes. Separates basic compounds, showing good deactivation; excellent for explosives or steroids.
Allure® Aqueous C18	N	60	—	Ideal for analyses that require >90% water in the mobile phase. Excellent for highly water soluble or poorly organic soluble compounds. Excellent for water-soluble vitamins and organic acids. More retention than Ultra Aqueous columns.
Allure® AK	Y	60	—	Ideal for the analysis of aldehydes and ketones as DNPH derivatives.
Allure® Basix	Y	60	12	Ideal for LC/MS of basic solutes. Excellent for basic pharmaceuticals or other amine-containing compounds.
Allure® PFP Propyl	Y	60	17	Ideal for MS, ELSD, or NPD detection of nucleosides, nucleotides, purines, pyrimidines, or halogenated compounds.
Allure® Organic Acids	N	60	NA	Excellent resolution of challenging organic acids.
Allure® Biphenyl	Y	60	23	Multiple ring structure; excellent for aromatic and unsaturated compounds. Increased retention over traditional phenyl phases.
Allure® Silica	NA	60	NA	Highly retentive phase for normal phase separation.
Ultra C18	Y	100	20	Ideal for anilines, barbiturates, carbonyls, fat-soluble vitamins, fatty acids, glycerides, phthalates, PTH amino acids, steroids, other acids.
Ultra Aqueous C18	N	100	15	Ideal for analyses that require >90% water in the mobile phase. Excellent for highly water soluble or poorly organic soluble compounds. Excellent for water-soluble vitamins and organic acids.
Ultra IBD	N	100	12	A polar group assists in deactivating surface silanols and contributes to unique separation selectivities for acids, bases, zwitterions, and other polar compounds.
Ultra C8	Y	100	12	Selectivity and peak shape similar to Ultra C18, but less hydrophobic retention.
Ultra C4	Y	100	9	Ideal for peptides and small proteins.
Ultra C1	NA	100	5	Alternative selectivity to Ultra C18 or C8 columns, especially for polar analytes. Shortest chain alkyl phase available for reversed phase separations.
Ultra Cyano	Y	100	8	Excellent for basic pharmaceuticals, steroids (normal or reversed phase conditions), or other basic compounds.
Ultra Phenyl	Y	100	10	Ideal for fatty acids, polynuclear aromatic hydrocarbons, purines and pyrimidines, and polar aromatics.
Ultra Amino	N	100	2	Superior general purpose amino phase. Ideal for carbohydrates.

pH ranges and temperature limits: see product listings on pages listed here.

Column lifetime will be shorter when operating at pH and/or temperature extremes.

# Physical Characteristics of Restek HPLC Columns

5

HPLC COLUMNS

Chromatographic Properties	Similar Phases	USP Code	Page #
Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding.	Hypersil® BDS C18, Zorbax® Eclipse XDB-C18	L1	12
Highly base-deactivated spherical silica manufactured by Restek. Monomeric C8 bonding. Similar to Pinnacle™ DB C18, but the shorter alkyl chain provides less hydrophobic retention.	Hypersil® BDS C8	L7	12
Highly base-deactivated spherical silica manufactured by Restek. Cyano bonding.	Hypersil® BDS Cyano, Zorbax® Eclipse XDB-CN	L10	13
Highly base-deactivated spherical silica manufactured by Restek. Phenyl bonding.	Hypersil® BDS Phenyl, Zorbax® Eclipse XDB-Phenyl	L11	13
Highly base-deactivated spherical silica manufactured by Restek.	—	L3	13
Intermediate carbon load and surface area, suitable for a wide range of neutral to acidic compounds. Silica manufactured by Restek.	Hypersil® ODS, Spherisorb® ODS	L1	14
Proprietary stationary phase; resolves 16 PAHs in US EPA Method 610. Silica manufactured by Restek.	Unique	—	14
Provides shorter retention times for hydrophobic compounds than C18. Silica manufactured by Restek.	Hypersil® C8, Spherisorb® C8	L7	15
More rugged than bare silica for normal phase analyses. Silica manufactured by Restek.	Hypersil® CPS, Spherisorb® Cyano	L10	15
Offers unique selectivity versus traditional alkyl chain phases, especially for aromatic compounds. Silica manufactured by Restek.	Hypersil® Phenyl, Spherisorb® Phenyl	L11	16
Silica manufactured by Restek.	Hypersil® APS 2 Amino, Spherisorb® Amino	L8	16
Silica manufactured by Restek. Unique biphenyl phase.	Unique	L11	17
Superior value phase for normal phase separation of polar analytes. Lower retention than Ultra C18. Silica manufactured by Restek.	Hypersil® Silica	L3	17
Most retentive phase for hydrophobic and slightly polar analytes. Mobile phase containing higher percentage of organic modifier contributes to higher sensitivity in ESI-based LC/MS.	Ultracarb® C18, BetaMax® Neutral, Discovery® C18	L1	18
Highly retentive and selective for reversed phase separations of polar analytes. Highly base deactivated. Compatible with highly aqueous (up to 100%) mobile phases.	—	L1	19
Highly retentive, highly selective phase, developed specifically for the analysis of aldehydes and ketones as DNPH derivatives.	Unique	—	21
Highly retentive phase for analytes containing amino functionality.	BetaMax® Base, Maxsil™ CN	L10	18
A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. Excellent for beta-blockers, halogenated compounds, nucleosides, nucleotides, pyridines, pyrimidines, tricyclic antidepressants.	Discovery® HS F5	—	19
Single 30cm column performs equally to two C18 columns in series. (AOAC Method 986.13)	Unique	—	20
High purity, highly retentive phase for aromatic and unsaturated compounds.	Unique	L11	20
High purity, highly retentive phase for normal phase separation of polar analytes. Very high surface area.	Maxsil™ Si	L3	21
A very retentive, high-purity phase that exhibits excellent peak shape for a wide range of compounds. Recommended as a general purpose reversed phase column.	Discovery® C18, Symmetry® C18, Hypersil® Gold C18, Luna® C18, Zorbax® C18, Kromasil® C18, LiChrospher® RP-18, Inertsil® ODS-2, Develosil® C18	L1	22
Highly retentive and selective for reversed phase separations of polar analytes. Highly base deactivated. Compatible with highly aqueous (up to 100%) mobile phases.	AQUA® C18, Aquasil C18, Hypersil® Gold AQ, YMC® ODS-Aq	L1	23
One of a group of intrinsically base-deactivated (IBD) phases, with a polar group within, or intrinsic to, the alkyl bonded phase. Provides unique selectivity and high level of base deactivation while reducing or eliminating the need for mobile phase additives.	SymmetryShield™, Discovery® ABZ & ABZ+, Prism™	—	22
Very retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds.	Luna® C8, Symmetry® C8, Hypersil® Gold C8	L7	23
Exceptionally stable C4 packing, with high bonding coverage and silanol base-deactivation. Exhibits shorter retention than C18 or C8 phases.	Supelcosil™ Butyl (C4), Delta-Pak™ C4	L26	24
Exceptionally stable C1 packing resists hydrolysis, even under acidic mobile phase conditions. Least retentive reversed phase hydrocarbon packing.	Spherisorb® C1	L13	24
High-purity cyano phase with reduced silanol activity. Often a better choice than C18 for basic pharmaceuticals. Cyano is the most stable bonded phase for normal phase mode.	Platinum™ CN, Develosil® Cyano, Luna® CN, Hypersil® Gold CN	L10	25
High-purity, highly retentive, base-deactivated phase with alternate selectivity to hydrocarbon phases, especially for aromatic analytes.	Platinum™ Phenyl, Supelcosil™ Phenyl, Betasil® Phenyl	L11	25
Recommended for normal phase analyses of mono- and disaccharides and other similar compounds. Can also serve as a weak anion exchanger, with aqueous buffers.	Platinum™ Amino, Develosil® NH2	L8	26

Continued on next page. . .

# Physical Characteristics of HPLC Columns; USP Descriptions

Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications
Ultra PFP	Y	100	7	Ideal for taxol and precursors, or halogenated compounds, amines, esters, or ketones.
Ultra Silica	NA	100	NA	Ideal for normal phase applications.
Ultra Carbamate		100		Rapid analysis of carbamates.
Ultra Quat	—	100	—	Proprietary phase for the analysis of paraquat and diquat and other quaternary amines.
Kromasil® C18	Y	100	20	
Kromasil® C8	Y	100	12	
Kromasil® C4	Y	100	8	
Kromasil® C1	Y	100	—	
Kromasil® Phenyl	Y	100	14	
Kromasil® Amino	Y	100	1.7% nitrogen	
Kromasil® Silica	—	100	—	
Viva Wide Pore C18	Y	300	9	Proteins and other higher molecular weight compounds.
Viva Wide Pore C8	Y	300	5	Proteins and other higher molecular weight compounds. Less retentive than C18 phase.
Viva Wide Pore C4	Y	300	3.5	Proteins and other higher molecular weight compounds. Less retentive than C18 and C8 phases.
Viva Wide Pore Biphenyl	Y	300	6.7	Exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays.
Viva Wide Pore PFP Propyl	Y	300	5	Exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.
Viva Wide Pore Silica	—	300	—	Normal phase applications for highly retained high molecular weight compounds.
pHidelity® C18	NA	200	—	Hydrophobic C18 phase suitable for analyzing a wide range of compounds; enhanced stability under basic and acidic conditions.

pH ranges and temperature limits: see product listings on pages listed here.

Column lifetime will be shorter when operating at pH and/or temperature extremes.

## US Pharmacopoeia Cross Reference

<b>L1</b>	Octadecyl silane chemically bonded to porous silica or ceramic microparticles, 1.7 to 10µm in diameter, or a monolithic rod. <i>Allure® C18 (p. 18), Pinnacle™ DB C18 (p. 12), Pinnacle™ II C18 (p. 14), Ultra C18 (p. 22), Allure® Aqueous C18 (p. 19), Ultra Aqueous C18 (p. 23), Viva C18 (p. 29), Kromasil® C18 (p. 32)</i>
<b>L3</b>	Porous silica particles, 5 to 10µm in diameter. <i>Allure® Silica (p. 21), Pinnacle™ DB Silica (p. 13), Pinnacle™ II Silica (p. 17), Ultra Silica (p. 27), Viva Silica (p. 31), Kromasil® Silica (p. 33)</i>
<b>L7</b>	Octylsilane chemically bonded to totally porous silica particles, 1.7 to 10µm in diameter. <i>Pinnacle™ DB C8 (p. 12), Pinnacle™ II C8 (p. 15), Ultra C8 (p. 22), Viva C8 (p. 29), Kromasil® C8 (p. 33)</i>
<b>L8</b>	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 3 to 10µm in diameter. <i>Pinnacle™ II Amino (p. 16), Ultra Amino (p. 26), Kromasil® Amino (p. 33)</i>
<b>L10</b>	Nitrile groups chemically bonded to porous silica particles, 3 to 10µm in diameter. <i>Pinnacle™ DB Cyano (p. 13), Pinnacle™ II Cyano (p. 15), Ultra Cyano (p. 25), Allure® Basix (p. 18)</i>
<b>L11</b>	Phenyl groups chemically bonded to porous silica particles, 1.7 to 10µm in diameter. <i>Pinnacle™ DB Phenyl (p. 13), Pinnacle™ II Phenyl (p. 16), Ultra Phenyl (p. 25), Allure® Biphenyl (p. 20), Pinnacle™ II Biphenyl (p. 17), Viva Biphenyl (p. 30), Kromasil® Phenyl (p. 33)</i>
<b>L13</b>	Trimethylsilane chemically bonded to porous silica particles, 3 to 10µm in diameter. <i>Ultra C1 (p. 24), Kromasil® C1 (p. 33)</i>
<b>L26</b>	Butyl silane chemically bonded to totally porous silica particles, 3 to 10µm in diameter. <i>Ultra C4 (p.24), Viva C4 (p.30), Kromasil® C4 (p.32)</i>
<b>L43</b>	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10µm in diameter. <i>Allure® PFP Propyl (p. 19), Ultra PFP (p. 26), Viva PFP Propyl (p. 30)</i>

Chromatographic Properties	Similar Phases	USP Code	Page #
A pentafluorophenyl phase. Unique selectivity by interaction with functional groups of organohalogenes or other basic analytes.	Fluophase® PFP, Fluosep®-RP Phenyl, Curosil™ PFP	L43	26
High purity, high surface area.	—	L3	27
Proprietary stationary phase can process up to twice as many samples per hour, compared to a conventional C18 phase.	Unique	—	27
High purity silica.	Unique	—	28
High purity phase with excellent peak shape for a wide range of compounds. Good general purpose reversed phase column.	Discovery® C18, Symmetry® C18, Hypersil® Gold C18, Luna® C18, Zorbax® C18, LiChrospher® RP-18, Inertsil® ODS-2, Develosil® C18	L1	32
High purity, reversed phase packing for a wide range of compounds.	Luna® C8, Symmetry® C8, Hypersil® Gold C8	L7	33
High purity, reversed phase packing for a wide range of compounds. Less retentive than C18 and C8.	Supelcosil™ Butyl (C4), Delta-Pak™ C4	L26	32
High purity, reversed phase packing for a wide range of compounds. Less retentive than C18, C8, and C4.	Spherisorb® C1	L13	33
High purity, base deactivated reversed phase packing. Alternate selectivity to alkyl phases.	Platinum™ Phenyl, Supelcosil™ Phenyl, Betasil® Phenyl	L11	33
High purity, base deactivated reversed phase packing. Alternate selectivity to alkyl phases.	Platinum™ Amino, Develosil® NH2	L8	33
High purity, base deactivated packing.	—	L3	33
Silica manufactured by Restek.	BioBasic® 18, Symmetry® 300 C18, Jupiter® 300 C18, Zorbax® 300 OSB C18, Synchronapak® C18, 208 TP C18	L1	29
Silica manufactured by Restek.	BioBasic® 8, Zorbax® 300 OSB C8, Synchronapak® C8, 208 TP C8	L7	29
Silica manufactured by Restek.	BioBasic® 4, Symmetry® 300 C4, Jupiter® 300 C4, Synchronapak® C4, 208 TP C4	L26	30
Silica manufactured by Restek.	Unique	L11	30
Silica manufactured by Restek.	Unique	L43	30
Silica manufactured by Restek.	—	L3	31
Excellent stability under extreme pH conditions. True C18 selectivity in a silica-based stationary phase.	Unique	—	10

## tech tip

### Managing High Backpressure

High backpressure is one of the most common problems encountered in HPLC analyses. Normal column backpressure is observed after a new column has been installed and equilibrated with mobile phase. Unfortunately, this pressure often will increase as the column is used because particles collect on the column inlet frit. These particles can be sample impurities, mobile phase contaminants, or materials from the injector or autosampler rotor seal.

In addition to increasing backpressure, particles on the frit can cause split peaks, peak tailing, and, eventually, over-pressure shut-down. In some circumstances, these problems can be corrected by back-flushing the column. However, in many cases the result is an unusable column.

To minimize backpressure problems, all samples and mobile phase solvents must be filtered before use, and rotor seals should be changed on a routine basis. Along with these preventive measures, it is advisable to use precolumn filters such as the Trident™ guard column protection system. Particles build up on the inexpensive, replaceable frit in the filter, instead of on the permanent frit at the column inlet.



## Free Literature

### HPLC Column Selection Guide

A useful chart to keep with your workbooks, or post on a wall. Quickly scan important characteristics of Restek HPLC columns. Includes brief, practical guidelines for choosing stationary phase, particle size, pore diameter, and column dimensions. Also includes USP designations for each phase and lists similar phases from other suppliers. (lit. cat.# 59454C)

# New 1.9 $\mu$ m Pinnacle™ DB C18

## Small Particle HPLC Columns

### free literature

#### HPLC Small Particle Columns

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat.# 580147A

**Restek's popular Pinnacle™ DB HPLC columns are now available in a <2 $\mu$ m particle size.**

Ruggedness and reproducibility are guaranteed, as we control every step in the process, from base silica to bonded phase to final packed column. The silica particles are classified and selected to give an exceptionally tight distribution around 1.9 $\mu$ m, while eliminating <1 $\mu$ m particles that can contribute to a poorly packed bed. Highly base-deactivated Pinnacle™ DB stationary phases are an excellent choice when analyzing a wide range of compounds, from acidic to basic. To optimize your ultra high pressure HPLC methods, reach for Restek small particle HPLC columns!



### 1.9 $\mu$ m Pinnacle™ DB C18 HPLC Columns

#### Physical Characteristics:

particle size: 1.9 $\mu$ m

pore size: 140Å

carbon load: 11%

endcap: yes

pH range: 2.5 - 10

temperature limit: 80°C

#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding.

Length	2.1mm ID cat.#
1.9 $\mu$ m Columns	
30mm	9414232
50mm	9414252
100mm	9414212

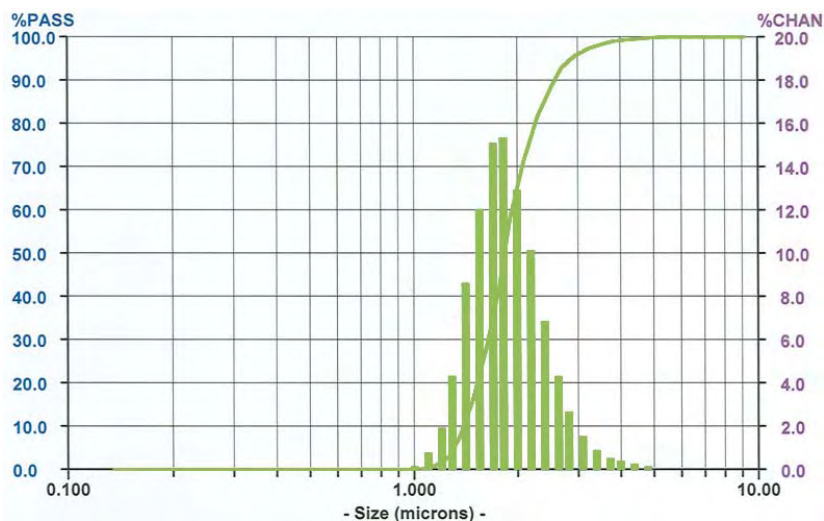
**Additional phases available June 2007!**

Visit [www.restek.com](http://www.restek.com) or call Restek Technical Service for a full listing of our available phases.



Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

**Figure 1**—Pinnacle™ DB silica particle size distribution chart shows an exceptionally tight, symmetrical distribution around 1.9µm with no <1µm particles.



**Rick Lake**  
Innovations Chemist  
2+ years of service!

**Figure 2**—Excellent peak symmetry and efficiency on a 1.9µm Pinnacle™ DB C18 column, using a reversed phase test mix.

**Peak List:**

1. uracil	3.00 mg/mL
2. benzene	0.02 mg/mL
3. naphthalene	0.50 mg/mL
4. biphenyl	0.06 mg/mL

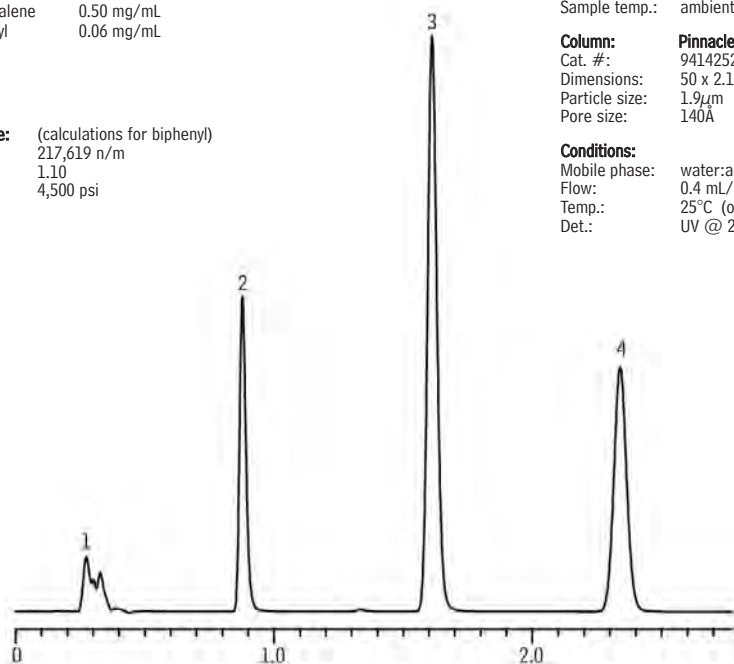
**Performance:** (calculations for biphenyl)  
Efficiency: 217,619 n/m  
Asymmetry: 1.10  
Pressure: 4,500 psi

**Sample:**

Inj.: 2µL  
Sample diluent: water:methanol (25:75)  
Sample temp.: ambient

**Column:** Pinnacle™ DB C18  
Cat. #: 9414252  
Dimensions: 50 x 2.1mm  
Particle size: 1.9µm  
Pore size: 140Å

**Conditions:**  
Mobile phase: water:acetonitrile (45:55)  
Flow: 0.4 mL/min.  
Temp.: 25°C (or ambient)  
Det.: UV @ 254nm



LC\_EX0427

**pHidelity® C18 Columns**

- Stable under extreme pH conditions.
- Patented technology protects the silica particle from dissolution.
- True C18 selectivity.

Application	Page #
Basic Drugs .....	94
Serotonin Reuptake Inhibitors .....	90

Restek is pleased to offer pHidelity® C18 columns, designed for analyses that require extreme pH conditions. Using technology patented by Selerity Technologies (US Patent 2005/0191503A1), pHidelity® silica-based columns have exceptional stability under aggressive pH conditions.

In pHidelity® columns, a polycarbosilane barrier layer protects the silica particle from extremely basic conditions. This layer, with multiple points of attachment to the silica particle, yields a modified surface with enhanced stability. A second layer is then attached, providing the functional group (C18). Using this approach to shield the silica surface, a highly durable stationary phase is created.

Even after 50 hours of exposure to base (pH 10) at 60°C, a pHidelity® column maintains its original column efficiency. (A decrease in column efficiency indicates the dissolution of support silica and loss from the column.) This exceptional performance ensures pHidelity® columns offer greater resolution under harsh mobile phase conditions and will continue to resolve your target compounds over a long column lifetime. A pHidelity® column also maintains a very consistent capacity factor,  $k'$ , after exposure to pH 10 and 60°C. Under extremely basic conditions, a decrease in retention time indicates loss of both support silica and bonded phase. Backpressure in the pHidelity® C18 column is very stable, indicating little or no degradation of the packing material.

The patented process used to protect the support silica in pHidelity® columns ensures more consistent retention times over the lifetime of the column.

**pHidelity® C18 Columns****Physical Characteristics:**particle size: 3 $\mu$ m

pore size: 140Å

pH limit: up to 12

temperature limit: 80°C

**Chromatographic Properties:**

Excellent stability under extreme pH conditions. True C18 selectivity in a silica-based stationary phase.

	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#
<b>3<math>\mu</math>m Columns</b>			
30mm	9579332	9579333	9579335
50mm	9579352	9579353	9579355
100mm	9579312	9579313	9579315
150mm	9579362	9579363	9579365

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

## Restek Capillary HPLC Columns

- High quality, Restek manufactured packing materials.
- Superior packing technology ensures rugged, reproducible columns.
- Wide range of phases and dimensions available—please inquire.

new!



**Bruce Albright**  
HPLC Innovations Chemist  
4+ years of service!



### Physical Characteristics:

#### Allure® Basix:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 12%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Ultra Aqueous C18:

particle size: 3µm, spherical  
pore size: 100Å  
endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Allure® Biphenyl:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 23%  
endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Ultra C18:

particle size: 3µm, spherical  
pore size: 100Å  
carbon load: 20%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Allure® PFP Propyl:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 17%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Viva C18:

particle size: 3µm, spherical  
pore size: 300Å  
carbon load: 9%  
endcap: yes  
pH range: 2.5 to 10  
temperature limit: 80°C

### Chromatographic Properties:

Available in a wide variety of stationary phases for acidic to basic compounds. Columns are suitable for small molecules using Allure® and Ultra phases and large biomolecules using Viva C18.

Length	0.3mm ID cat. #
<b>Allure® Basix 3µm Capillary Columns</b>	
50mm	916135B
150mm	916136B
<b>Allure® Biphenyl 3µm Capillary Columns</b>	
50mm	916635B
150mm	916636B
<b>Allure® PFP Propyl 3µm Capillary Columns</b>	
50mm	916935B
150mm	916936B
<b>Ultra Aqueous C18 3µm Capillary Columns</b>	
50mm	917835B
150mm	917836B
<b>Ultra C18 3µm Capillary Columns</b>	
50mm	917435B
150mm	917436B
<b>Viva C18 3µm Capillary Columns</b>	
50mm	951435B
150mm	951436B

### ordering note

Looking for another stationary phase or capillary dimension?

Please contact Restek Technical Service at 814-353-1300 or 800-356-1688 (ext. 4) or support@restek.com to inquire.

# Pinnacle™ DB C18 and C8 Columns

## Pinnacle™ DB Columns: 3 or 5µm particle sizes; 140Å pore size

Prepared using a highly base-deactivated silica support; ideal for analyses of basic compounds, or bases mixed with acids/neutrals. Silica manufactured at Restek, for total control of quality and reproducibility.

### Pinnacle™ DB C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: yes  
pore size: 140Å      pH range: 2.5 - 10  
carbon load: 11%      temperature limit: 80°C

#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding. Hydrophobic C18 phase suitable for analyses of a wide range of compounds, from acidic through slightly basic. Replaces Hypersil® BDS C18 and Pinnacle™ ODS Amine.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9414331	9414332	9414333	9414335
50mm	9414351	9414352	9414353	9414355
100mm	9414311	9414312	9414313	9414315
<b>5µm Columns</b>				
30mm	9414531	9414532	9414533	9414535
50mm	9414551	9414552	9414553	9414555
100mm	9414511	9414512	9414513	9414515
150mm	9414561	9414562	9414563	9414565
200mm	9414521	9414522	9414523	9414525
250mm	9414571	9414572	9414573	9414575



also available

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### Pinnacle™ DB C8 Columns (USP L7)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: yes  
pore size: 140Å      pH range: 2.5 - 10  
carbon load: 6%      temperature limit: 80°C

#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C8 bonding. Similar to Pinnacle™ DB C18, but the shorter alkyl chain provides less hydrophobic retention. Less retention can be useful for shortening analysis time, if resolution is adequate. Replaces Hypersil® BDS C8 and Pinnacle™ C8 Amine.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9413331	9413332	9413333	9413335
50mm	9413351	9413352	9413353	9413355
100mm	9413311	9413312	9413313	9413315
<b>5µm Columns</b>				
30mm	9413531	9413532	9413533	9413535
50mm	9413551	9413552	9413553	9413555
100mm	9413511	9413512	9413513	9413515
150mm	9413561	9413562	9413563	9413565
200mm	9413521	9413522	9413523	9413525
250mm	9413571	9413572	9413573	9413575



## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add “-700” to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Pinnacle™ DB Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 140Å  
carbon load: 4%

endcap: yes  
pH range: 2.5 - 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated spherical silica manufactured by Restek. Cyano bonding. Suitable for analyses of a wide range of compounds, from acidic through slightly basic. Also useful for confirmation of analyses on a C18 or C8 column. Can be used in normal phase or reversed phase mode of separation. Replaces Hypersil® BDS Cyano and Pinnacle™ Cyano Amine.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9416531	9416532	9416533	9416535
50mm	9416551	9416552	9416553	9416555
100mm	9416511	9416512	9416513	9416515
150mm	9416561	9416562	9416563	9416565
200mm	9416521	9416522	9416523	9416525
250mm	9416571	9416572	9416573	9416575

**Pinnacle™ DB Phenyl Columns (USP L11)****Physical Characteristics:**

particle range: 5µm, spherical  
pore size: 140Å  
carbon load: 5.3%

endcap: yes  
pH range: 2.5 - 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated spherical silica manufactured by Restek. Pinnacle™ DB Phenyl columns offer alternate selectivity to straight chain hydrocarbon phases, especially for aromatic analytes. Replaces Hypersil® BDS Phenyl and Pinnacle™ Phenyl Amine.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9415531	9415532	9415533	9415535
50mm	9415551	9415552	9415553	9415555
100mm	9415511	9415512	9415513	9415515
150mm	9415561	9415562	9415563	9415565
200mm	9415521	9415522	9415523	9415525
250mm	9415571	9415572	9415573	9415575

**Pinnacle™ DB Silica Columns (USP L3)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 140Å  
carbon load: none

endcap: no  
pH range: 2.5 - 10  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated spherical silica manufactured by Restek. Useful for normal phase separations. Replaces Hypersil® BDS and Pinnacle™ Amine.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9410531	9410532	9410533	9410535
50mm	9410551	9410552	9410553	9410555
100mm	9410511	9410512	9410513	9410515
150mm	9410561	9410562	9410563	9410565
200mm	9410521	9410522	9410523	9410525
250mm	9410571	9410572	9410573	9410575

# Pinnacle™ II C18 and PAH Columns

## Pinnacle™ II Columns: 3µm or 5µm particles; 110Å pore size

Silica manufactured at Restek, for total control of quality and reproducibility. Excellent replacement for the original Hypersil® material. Physical and chromatographic properties similar to our original Pinnacle™ materials, but with greater lot-to-lot uniformity.

Application	Page #
Allicin .....	77
Capsaicinoids .....	79
Morphine Sulfate .....	85
Phenolic Antioxidants .....	77, 79

### Pinnacle™ II C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 13%

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Excellent choice as a general purpose C18 column. Intermediate carbon loading and surface area, suitable for a wide range of acidic to neutral hydrophobic compounds. Replaces Hypersil® ODS and Pinnacle™ C18.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9214331	9214332	9214333	—	9214335
50mm	9214351	9214352	9214353	—	9214355
100mm	9214311	9214312	9214313	—	9214315
<b>5µm Columns</b>					
30mm	9214531	9214532	9214533	—	9214535
50mm	9214551	9214552	9214553	—	9214555
100mm	9214511	9214512	9214513	9214514	9214515
150mm	9214561	9214562	9214563	9214564	9214565
200mm	9214521	9214522	9214523	—	9214525
250mm	9214571	9214572	9214573	—	9214575

### Pinnacle™ II PAH Columns

#### Physical Characteristics:

particle size: 4µm, spherical  
pore size: 110Å

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Developed specifically for challenging analyses of polynuclear aromatic hydrocarbons. The Pinnacle™ II PAH stationary phase incorporates a proprietary C18 bonding that enables unique shape selectivity to resolve to baseline all 16 PAHs listed in US EPA Method 610. Every lot of Pinnacle™ II PAH bonded phase material is tested to ensure baseline resolution of the Method 610 PAHs, using a simple water/acetonitrile mobile phase gradient. Further, because we make Pinnacle™ II PAH columns using our own silica, we have greater control over quality and reproducibility. Replaces Pinnacle™ PAH columns.

If you are analyzing PAHs, Pinnacle™ II PAH columns are the reliable, cost-effective columns you need.

Application	Page #
PAHs .....	76

	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#
<b>4µm Columns</b>			
50mm	9219452	9219453	9219455
100mm	9219412	9219413	9219415
150mm	9219462	9219463	9219465
200mm	9219422	9219423	9219425
250mm	9219472	9219473	9219475

## a plus 1 story

"The Pinnacle™ II PAH column gives an excellent separation of the 18 target PAHs that we commonly analyze. Column lifetime far exceeded our expectations—after more than 5000 injections, the columns still maintain resolution and peak shape. Other PAH columns typically had lifetimes of 2000 to 2500 injections. We actually had one Pinnacle™ II PAH column last for more than 10,000 injections!"

Norm Farmer, Technical Director, Accutest Laboratories



Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

new and  
Improved!

**Pinnacle™ II C8 Columns (USP L7)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 7%

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C

**Chromatographic Properties:**

Reliable performance and symmetrical peaks for neutral to acidic compounds. Provides shorter retention times for hydrophobic compounds, compared to C18 phases. Replaces Hypersil® C8 and Pinnacle™ C8.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9213331	9213332	9213333	—	9213335
50mm	9213351	9213352	9213353	—	9213355
100mm	9213311	9213312	9213313	—	9213315
<b>5µm Columns</b>					
30mm	9213531	9213532	9213533	—	9213535
50mm	9213551	9213552	9213553	—	9213555
100mm	9213511	9213512	9213513	9213514	9213515
150mm	9213561	9213562	9213563	9213564	9213565
200mm	9213521	9213522	9213523	—	9213525
250mm	9213571	9213572	9213573	—	9213575

Application	Page #
Parabens .....	78

**Pinnacle™ II Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 4%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Can be used in either reversed phase or normal phase mode. More rugged than bare silica for normal phase applications. Replaces Hypersil® Cyano and Pinnacle™ CN.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9216331	9216332	9216333	9216335
50mm	9216351	9216352	9216353	9216355
100mm	9216311	9216312	9216313	9216315
<b>5µm Columns</b>				
30mm	9216531	9216532	9216533	9216535
50mm	9216551	9216552	9216553	9216555
100mm	9216511	9216512	9216513	9216515
150mm	9216561	9216562	9216563	9216565
200mm	9216521	9216522	9216523	9216525
250mm	9216571	9216572	9216573	9216575

Application	Page #
Corticosteroids .....	91
Piperine .....	79

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**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

# Pinnacle™ II Phenyl and Amino Columns

## Pinnacle™ II Phenyl Columns (USP L11)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 6%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

The Pinnacle™ II Phenyl phase offers unique selectivity versus traditional alkyl chain phases, especially for aromatic compounds. Replaces Hypersil® Phenyl and Pinnacle™ Phenyl.

Restek  
Manufactured  
Silica

Application	Page #
Parabens .....	78
Sorbic & Benzoic Acids ...	79

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9215331	9215332	9215333	9215335
50mm	9215351	9215352	9215353	9215355
100mm	9215311	9215312	9215313	9215315
<b>5µm Columns</b>				
30mm	9215531	9215532	9215533	9215535
50mm	9215551	9215552	9215553	9215555
100mm	9215511	9215512	9215513	9215515
150mm	9215561	9215562	9215563	9215565
200mm	9215521	9215522	9215523	9215525
250mm	9215571	9215572	9215573	9215575

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available!

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our annual product catalog.

## Pinnacle™ II Amino Columns (USP L8)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 2%  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

HPLC analysis using an amino-based stationary phase is the most popular technique for routine analyses of simple sugars, using isocratic elution (e.g., acetonitrile:water, 75:25) and a refractive index detector (RID) or an evaporative light scattering detector (ELSD). The Pinnacle™ II Amino column is ideal for mono- and disaccharide analyses. Replaces Hypersil® Amino and Pinnacle™ Amino.

Restek  
Manufactured  
Silica

Application	Page #
Lactulose Concentrate .....	95
Maple Syrup .....	81
Sugars .....	81

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9217331	9217332	9217333	9217335
50mm	9217351	9217352	9217353	9217355
100mm	9217311	9217312	9217313	9217315
<b>5µm Columns</b>				
30mm	9217531	9217532	9217533	9217535
50mm	9217551	9217552	9217553	9217555
100mm	9217511	9217512	9217513	9217515
150mm	9217561	9217562	9217563	9217565
200mm	9217521	9217522	9217523	9217525
250mm	9217571	9217572	9217573	9217575

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add “-700” to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.



## Pinnacle™ II Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 110Å

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



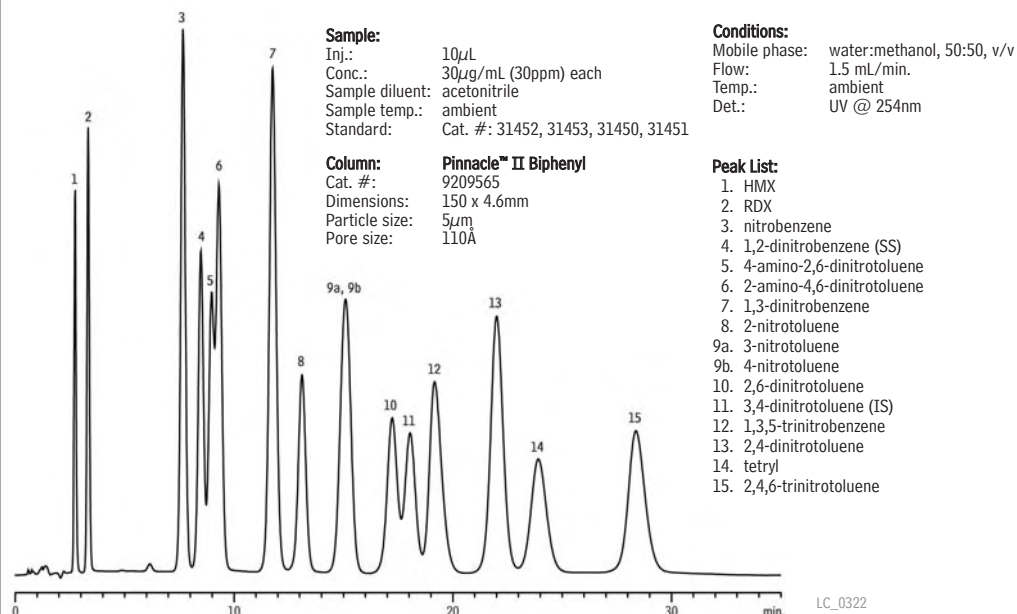
### Chromatographic Properties:

The Pinnacle™ II Biphenyl phase offers alternate selectivity to straight-chain hydrocarbon phases, and enhanced selectivity and retention for unsaturated compounds, compared to traditional phenyl phases. An excellent confirmation column for explosive compounds, as in EPA method 8330.

Application	Page #
Explosives	.....17, 70

Length	4.6mm ID cat.#
5µm Column	
150mm	9209565
250mm	9209575

### Explosives by US EPA Method 8330 on a Pinnacle™ II Biphenyl column.



## Pinnacle™ II Silica Columns (USP L3)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: none

endcap: no  
pH range: 2.5 to 10  
temperature limit: 80°C



### Chromatographic Properties:

Good general purpose packing for normal phase separations. Moderate surface area. Replaces Hypersil® and Pinnacle™ Silica.

Application	Page #
Hydrocodone Bitartrate	...85
Tocopherols	.....77

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9210331	9210332	9210333	9210335
50mm	9210351	9210352	9210353	9210355
100mm	9210311	9210312	9210313	9210315
<b>5µm Columns</b>				
30mm	9210531	9210532	9210533	9210535
50mm	9210551	9210552	9210553	9210555
100mm	9210511	9210512	9210513	9210515
150mm	9210561	9210562	9210563	9210565
200mm	9210521	9210522	9210523	9210525
250mm	9210571	9210572	9210573	9210575

## Allure® C18 and Basix Columns

### Allure® Columns: 3µm or 5µm particles; 60Å pore size

Small pore size in a high-purity, Type B silica provides a large surface area. High carbon loads, highly retentive. An excellent choice for light scattering (ELSD) and MS detectors, in which more organic solvent in the mobile phase gives better sensitivity.

Application	Page #
Antibiotics .....	.89
Herbicides .....	.73
Pesticides .....	.74

### Allure® C18 Columns (USP L1)

#### Excellent Columns for LC/MS and ELSD

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical	endcap: fully endcapped
pore size: 60Å	pH range: 2.5 to 7.5
carbon load: 27%	temperature limit: 80°C

##### Chromatographic Properties:

Most retentive of our alkyl stationary phases due to large surface area of the base silica and high-density bondings. Provides excellent peak shapes for a wide range of compounds.

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9164331	9164332	9164333	9164335
50mm	9164351	9164352	9164353	9164355
100mm	9164311	9164312	9164313	9164315
<b>5µm Columns</b>				
30mm	9164531	9164532	9164533	9164535
50mm	9164551	9164552	9164553	9164555
100mm	9164511	9164512	9164513	9164515
150mm	9164561	9164562	9164563	9164565
200mm	9164521	9164522	9164523	9164525
250mm	9164571	9164572	9164573	9164575

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Application	Page #
Acetaminophen/Narcotic Analgesics .....	.84
Acetaminophen, Pseudoephedrine & Caffeine .....	.96
Antiarrhythmics .....	.86, 87
Antidepressants .....	.89
Albuterol .....	.91
Herbicides .....	.72
Ibuprofen & Pseudoephedrine .....	.96
Sedatives .....	.95
Steroid Hormones .....	.94
Sulfamethoxazole .....	.89

### Allure® Basix Columns (USP L10)

#### Excellent Columns for LC/MS and ELSD

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical	endcap: fully endcapped
pore size: 60Å	pH range: 2.5 to 7.5
carbon load: 12%	temperature limit: 80°C

##### Chromatographic Properties:

Highly retentive propyl cyano phase. Excellent choice for basic compounds and for analytes containing amine group functionality.

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9161331	9161332	9161333	9161335
50mm	9161351	9161352	9161353	9161355
100mm	9161311	9161312	9161313	9161315
<b>5µm Columns</b>				
30mm	9161531	9161532	9161533	9161535
50mm	9161551	9161552	9161553	9161555
100mm	9161511	9161512	9161513	9161515
150mm	9161561	9161562	9161563	9161565
200mm	9161521	9161522	9161523	9161525
250mm	9161571	9161572	9161573	9161575

## Allure® PFP Propyl Columns (USP L43)

### Excellent Columns for LC/MS and ELSD

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: fully endcapped  
pore size: 60Å      pH range: 2.5 to 7.5  
carbon load: 17%      temperature limit: 80°C

#### Chromatographic Properties:

A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. An excellent phase for separating nucleosides, nucleotides, purines, pyrimidines, halogenated compounds, β-blockers, and tricyclic antidepressants.

Application	Page #
Catecholamines .....	.68
Cocaine/Ecgonine Methyl Ester .....	.67
Nucleic Acid Bases .....	.66
Pesticides .....	.74

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9169331	9169332	9169333	9169335
50mm	9169351	9169352	9169353	9169355
100mm	9169311	9169312	9169313	9169315
<b>5µm Columns</b>				
30mm	9169531	9169532	9169533	9169535
50mm	9169551	9169552	9169553	9169555
100mm	9169511	9169512	9169513	9169515
150mm	9169561	9169562	9169563	9169565
200mm	9169521	9169522	9169523	9169525
250mm	9169571	9169572	9169573	9169575

## Allure® Aqueous C18 Columns (USP L1)

### Excellent Columns for LC/MS and ELSD

#### Physical Characteristics:

particle size: 5µm spherical      endcap: no  
pore size: 60Å      pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Highly retentive and selective phase for separating polar analytes, including polar acidic compounds. Compatible with highly aqueous (up to 100%) mobile phases. Highly base deactivated. An excellent choice when analyzing a wide range of compounds, as in LC/MS screening methods.

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9168531	9168532	9168533	9168535
50mm	9168551	9168552	9168553	9168555
100mm	9168511	9168512	9168513	9168515
150mm	9168561	9168562	9168563	9168565
200mm	9168521	9168522	9168523	9168525
250mm	9168571	9168572	9168573	9168575

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

# Allure® Biphenyl and Organic Acids Columns

## Allure® Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 60Å  
carbon load: 23%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**new!**

### Chromatographic Properties:

Highly retentive and selective for aromatic and unsaturated compounds. Increased retention and selectivity, compared to phenyl phases. Excellent selectivity for steroids, tetracyclines, explosives, and other unsaturated compounds.

## free literature

### Allure® Biphenyl HPLC Columns Flyer

Analyses of corticosteroids, contraceptive steroids, and endogenous steroid hormones show the unique separation mechanism of the Allure® Biphenyl phase - pi-pi interactions - provides markedly better selectivity, relative to a C18 or phenyl phase, for molecules that differ in the number or positions of multiple bonds. For saturated analytes the Allure® Biphenyl phase has retention and selectivity similar to a C18 phase, but superior to a phenyl phase.

Download your free copy from [www.restek.com!](http://www.restek.com!)

lit. cat.# 580015

Application	Page #
Carboxylic Acids .....	.80
Fruit Juice Acids .....	.81

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9166331	9166332	9166333	9166335
50mm	9166351	9166352	9166353	9166355
100mm	9166311	9166312	9166313	9166315
<b>5µm Columns</b>				
30mm	9166531	9166532	9166533	9166535
50mm	9166551	9166552	9166553	9166555
100mm	9166511	9166512	9166513	9166515
150mm	9166561	9166562	9166563	9166565
200mm	9166521	9166522	9166523	9166525
250mm	9166571	9166572	9166573	9166575

## Allure® Organic Acids Columns

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Allure® Organic Acids columns provide enhanced retention and selectivity for polar organic acids, allowing the separation to be performed on a single 30cm column. An Allure® Organic Acids column effectively resolves key organic acids such as tartaric and quinic acids, using the chromatographic conditions specified in AOAC method 986.13. Retention is stable and reproducible, even with the 100% aqueous mobile phase specified in the AOAC method.

Length	3.2mm ID	4.6mm ID
	cat.#	cat.#
<b>5µm Column</b>		
150mm	9165563	9165565
250mm		9165575
300mm		9165585

Note: Other dimensions available on request.

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Allure® Silica Columns (USP L3)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly retentive phase for normal phase separations. Very high surface area, Type B silica packing.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9160331	9160332	9160333	9160335
50mm	9160351	9160352	9160353	9160355
100mm	9160311	9160312	9160313	9160315
<b>5µm Columns</b>				
30mm	9160531	9160532	9160533	9160535
50mm	9160551	9160552	9160553	9160555
100mm	9160511	9160512	9160513	9160515
150mm	9160561	9160562	9160563	9160565
200mm	9160521	9160522	9160523	9160525
250mm	9160571	9160572	9160573	9160575

**Allure® AK Columns****new!****Physical Characteristics:**

particle size: 5µm  
pore size: 60Å

endcap: yes  
pH range: 2.5 - 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

This highly retentive, highly selective phase, unique to Restek, was developed specifically for the analysis of aldehydes and ketones as DNPH derivatives. Allure® AK is a reversed phase HPLC material that has the unique ability to separate all thirteen carbonyl compounds specified in California Air Resources Board (CARB) Method # 1004, using a simple acetonitrile/water gradient, in less than 15 minutes. Other columns require long analysis times or the use of tetrahydrofuran.

Application	Page #
Carbonyls .....	21, 69

Length	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns with Trident™ Integral Inlet Fittings</b>		
200mm	9159523-700	9159525-700

**Carbonyls by CARB Method 1004 on an Allure® AK column.**

**Sample:**  
Sample: dinitrophenylhydrazine (DNPH)  
derivatives of aldehydes/ketones  
Inj.: 10µL  
Conc.: 3µg/mL each analyte, as  
aldehyde/ketone  
Sample diluent: acetonitrile

**Column:**  
Allure® AK  
Cat.#: 9159525-700  
Dimensions: 200 x 4.6mm  
Particle size: 5µm  
Pore size: 60Å

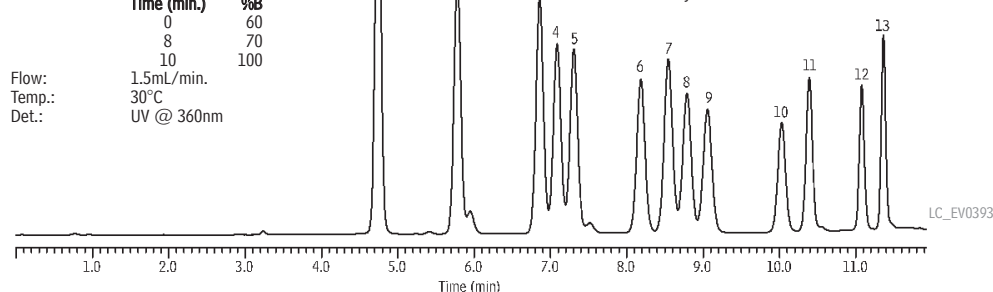
**Conditions:**  
Mobile phase: A) water : B) acetonitrile  
Time (min.) %B  
0 60  
8 70  
10 100

Flow: 1.5mL/min.  
Temp.: 30°C  
Det.: UV @ 360nm

**Peak**

DNPH derivative of:

Peak	Ret. Time (min.)
1. formaldehyde	4.74
2. acetaldehyde	5.78
3. acrolein	6.86
4. acetone	7.09
5. propionaldehyde	7.31
6. crotonaldehyde	8.19
7. methacrolein	8.55
8. butyraldehyde	8.79
9. methylethylketone	9.06
10. benzaldehyde	10.03
11. valeraldehyde	10.39
12. m-tolualdehyde	11.08
13. hexaldehyde	11.36



**Frank Dorman**  
Director of Technical  
Development  
11+ years of service!

# Ultra C18 and C8 Columns

## Ultra Columns: 3µm or 5µm particles; 100Å pore size

Our broadest selection of stationary phases, including unique phases. High density bondings, for maximum retention. High-purity, Type B silica gives excellent peak shapes for a wide range of compounds.

### Ultra C18 Columns (USP L1)

#### Excellent for a wide range of analyses

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: fully endcapped  
pore size: 100Å      pH range: 2.5 to 7.5  
carbon load: 20%      temperature limit: 80°C

##### Chromatographic Properties:

A retentive, high-purity packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose reversed phase column.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9174331	9174332	9174333	—	9174335
50mm	9174351	9174352	9174353	—	9174355
100mm	9174311	9174312	9174313	—	9174315
<b>5µm Columns</b>					
30mm	9174531	9174532	9174533	—	9174535
50mm	9174551	9174552	9174553	—	9174555
100mm	9174511	9174512	9174513	9174514	9174515
150mm	9174561	9174562	9174563	9174564	9174565
200mm	9174521	9174522	9174523	—	9174525
250mm	9174571	9174572	9174573	—	9174575

### Ultra C8 Columns (USP L7)

#### Excellent for a wide range of analyses

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: fully endcapped  
pore size: 100Å      pH range: 2.5 to 7.5  
carbon load: 12%      temperature limit: 80°C

##### Chromatographic Properties:

A retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds. Less retention for neutral, hydrophobic compounds, compared to the Ultra C18 column.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9103331	9103332	9103333	—	9103335
50mm	9103351	9103352	9103353	—	9103355
100mm	9103311	9103312	9103313	—	9103315
<b>5µm Columns</b>					
30mm	9103531	9103532	9103533	—	9103535
50mm	9103551	9103552	9103553	—	9103555
100mm	9103511	9103512	9103513	9103514	9103515
150mm	9103561	9103562	9103563	9103564	9103565
200mm	9103521	9103522	9103523	—	9103525
250mm	9103571	9103572	9103573	—	9103575

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Vanillin & Ethyl Vanillin	82



**Heather Johnson**  
Special Events  
Coordinator  
10+ years of service!

## Ultra Aqueous C18 Columns (USP L1)

## Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

## Chromatographic Properties:

Highly retentive and selective for reversed phase separations of polar analytes. Highly base-deactivated. Compatible with highly aqueous (up to 100%) mobile phases.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9178331	9178332	9178333	9178335
50mm	9178351	9178352	9178353	9178355
100mm	9178311	9178312	9178313	9178315
<b>5µm Columns</b>				
30mm	9178531	9178532	9178533	9178535
50mm	9178551	9178552	9178553	9178555
100mm	9178511	9178512	9178513	9178515
150mm	9178561	9178562	9178563	9178565
200mm	9178521	9178522	9178523	9178525
250mm	9178571	9178572	9178573	9178575

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our annual product catalog.

## Ultra IBD Columns

## Specialized Columns for Mixed Polar and Nonpolar Compounds

## Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 12%

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

## Chromatographic Properties:

An intrinsically base-deactivated (IBD) phase, containing a polar group within, or intrinsic to, the hydrocarbon bonded phase. Unique selectivity and a high level of base deactivation, while reducing or eliminating the need for mobile phase additives.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9175331	9175332	9175333	9175335
50mm	9175351	9175352	9175353	9175355
100mm	9175311	9175312	9175313	9175315
<b>5µm Columns</b>				
30mm	9175531	9175532	9175533	9175535
50mm	9175551	9175552	9175553	9175555
100mm	9175511	9175512	9175513	9175515
150mm	9175561	9175562	9175563	9175565
200mm	9175521	9175522	9175523	9175525
250mm	9175571	9175572	9175573	9175575

Application	Page #
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Glyburide .....	91
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ordering **note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

## Ultra C4 and C1 Columns

### Ultra C4 Columns (USP L26)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 9%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Exceptionally stable C4 packing, with high bonding coverage and base deactivation. Less retention than C18 or C8 phases.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>3µm Columns</b>								
30mm	9102331		9102332		9102333		9102335	
50mm	9102351		9102352		9102353		9102355	
100mm	9102311		9102312		9102313		9102315	
<b>5µm Columns</b>								
30mm	9102531		9102532		9102533		9102535	
50mm	9102551		9102552		9102553		9102555	
100mm	9102511		9102512		9102513		9102515	
150mm	9102561		9102562		9102563		9102565	
200mm	9102521		9102522		9102523		9102525	
250mm	9102571		9102572		9102573		9102575	

also available

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### Ultra C1 Columns (USP L13)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 5%

pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Exceptionally stable C1 phase. Least retentive reversed phase hydrocarbon packing.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>3µm Columns</b>								
30mm	9101331		9101332		9101333		9101335	
50mm	9101351		9101352		9101353		9101355	
100mm	9101311		9101312		9101313		9101315	
<b>5µm Columns</b>								
30mm	9101531		9101532		9101533		9101535	
50mm	9101551		9101552		9101553		9101555	
100mm	9101511		9101512		9101513		9101515	
150mm	9101561		9101562		9101563		9101565	
200mm	9101521		9101522		9101523		9101525	
250mm	9101571		9101572		9101573		9101575	

### ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Ultra Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 8%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

Application	Page #
Antiarrhythmics .....	85

**Chromatographic Properties:**

High-purity cyano phase with few silanol sites. Often a better choice than C18 phases for basic pharmaceuticals, especially regarding peak shape and selectivity. Cyano phases are more rugged than bare silica for normal phase analyses because they are less sensitive to small amounts of water in the mobile phase.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat. #	cat. #	cat. #	cat. #
<b>3µm Columns</b>				
30mm	9106331	9106332	9106333	9106335
50mm	9106351	9106352	9106353	9106355
100mm	9106311	9106312	9106313	9106315
<b>5µm Columns</b>				
30mm	9106531	9106532	9106533	9106535
50mm	9106551	9106552	9106553	9106555
100mm	9106511	9106512	9106513	9106515
150mm	9106561	9106562	9106563	9106565
200mm	9106521	9106522	9106523	9106525
250mm	9106571	9106572	9106573	9106575

**Ultra Phenyl Columns (USP L11)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 10%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

Application	Page #
Guaifenesin/Codeine .....	96

**Chromatographic Properties:**

High-purity, highly retentive, base-deactivated phase with alternative selectivity to straight chain hydrocarbon phases, especially for aromatic analytes.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat. #	cat. #	cat. #	cat. #
<b>3µm Columns</b>				
30mm	9105331	9105332	9105333	9105335
50mm	9105351	9105352	9105353	9105355
100mm	9105311	9105312	9105313	9105315
<b>5µm Columns</b>				
30mm	9105531	9105532	9105533	9105535
50mm	9105551	9105552	9105553	9105555
100mm	9105511	9105512	9105513	9105515
150mm	9105561	9105562	9105563	9105565
200mm	9105521	9105522	9105523	9105525
250mm	9105571	9105572	9105573	9105575



**Vernon Bartlett**  
HPLC Senior Innovations  
Chemist  
9+ years of service!

**a plus 1 story**

"After the disaster of 9/11, Diazald®, a highly explosive compound used in herbicide analysis, was immediately controlled by the U.S. government which made shipment impossible. Restek was instrumental in helping me to develop an isocratic HPLC method that did not require the use of Diazald®. This method is not only safer, but it saves us time and money. Thanks, Restek!"

**Chris Domaradzki**, Organics Manager, Environmental Testing Laboratories

# Ultra Amino and PFP Columns

## Ultra Amino Columns (USP L8)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 2%

pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Recommended for normal phase analyses of mono- and disaccharides, or similar compounds.

also available

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	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9107331	9107332	9107333	9107335
50mm	9107351	9107352	9107353	9107355
100mm	9107311	9107312	9107313	9107315
<b>5µm Columns</b>				
30mm	9107531	9107532	9107533	9107535
50mm	9107551	9107552	9107553	9107555
100mm	9107511	9107512	9107513	9107515
150mm	9107561	9107562	9107563	9107565
200mm	9107521	9107522	9107523	9107525
250mm	9107571	9107572	9107573	9107575

## Ultra PFP Columns (USP L43)

### Unique Selectivity

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 7%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

A pentafluorophenyl phase. Unique selectivity for compounds containing organohalogens or other basic functional groups.

Application	Page #
Digitalis Extract . . . . .	.86
Levothyroxine . . . . .	.94
Purines/Pyrimidines . . . . .	.67

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9176331	9176332	9176333	9176335
50mm	9176351	9176352	9176353	9176355
100mm	9176311	9176312	9176313	9176315
<b>5µm Columns</b>				
30mm	9176531	9176532	9176533	9176535
50mm	9176551	9176552	9176553	9176555
100mm	9176511	9176512	9176513	9176515
150mm	9176561	9176562	9176563	9176565
200mm	9176521	9176522	9176523	9176525
250mm	9176571	9176572	9176573	9176575



**Randy Romesberg**  
HPLC Senior Innovations  
Chemist  
12+ years of service!

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Ultra Silica Columns (USP L3)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: none

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

High surface area, Type B silica packing.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9100331	9100332	9100333	9100335
50mm	9100351	9100352	9100353	9100355
100mm	9100311	9100312	9100313	9100315
<b>5µm Columns</b>				
30mm	9100531	9100532	9100533	9100535
50mm	9100551	9100552	9100553	9100555
100mm	9100511	9100512	9100513	9100515
150mm	9100561	9100562	9100563	9100565
200mm	9100521	9100522	9100523	9100525
250mm	9100571	9100572	9100573	9100575

**Ultra Carbamate Columns****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

restek  
**exclusive!**

Application	Page #
Pesticides (Carbamates) . . .	73

**Chromatographic Properties:**

Restek chemists developed the Ultra Carbamate column specifically for carbamates analysis. The unique packing separates 10 target carbamates in just over 10 minutes. The column is compatible with fluorescence or LC/MS detection.\* An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column. In addition to increased sample throughput, this much faster analysis will significantly reduce solvent usage—and the costs of disposing of solvent waste.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
50mm	9177351	9177352	9177353	9177354	9177355
100mm	9177311	9177312	9177313	—	9177315
<b>5µm Columns</b>					
250mm	—	—	—	—	9177575

\*For post-column derivatization / fluorescence detection applications for a 4.6mm ID column the total system dead volume, including the post-column reactor, must be less than 650µL. For standard post-column reactor systems, we recommend a 250 x 4.6mm, 5µm column. Call Restek technical service for more information.

restek  
**innovation!**

Faster analyses and reduced solvent use!  
An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column.



also **available**

We also have syringe filters!  
See [www.restek.com](http://www.restek.com)

# Ultra Quat Columns

restek  
innovation!

An Ultra Quat column and Ultra Quat Reagent Solution eliminate the need for ion pairing reagents in paraquat/diquat analysis.

## Ultra Quat Columns

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

restek  
exclusive!

### Chromatographic Properties:

A retentive, high-purity, base deactivated reversed phase packing. Ideal for the analysis of paraquat and diquat or other quaternary amines when used with Ultra Quat Reagent Solution mobile phase additive (cat. # 32441).

Length	4.6mm ID
5µm Column	cat. #
150mm	9181565

Application	Page #
Paraquat/Diquat	.....28, 75

## Ultra Quat Reagent Solution

Use with Ultra Quat HPLC column. Dilute to 1 liter mobile phase, per instructions.

In water, 20mL/bottle

cat. # 32441 (ea.)

## Paraquat & Diquat Calibration Mix

diquat dibromide      paraquat dichloride  
1,000µg/mL each in water, 1mL/ampul  
cat. # 32437 (ea.)

## for more info

For more information about the Ultra Quat system, review Restek Advantage 2004 vol. 3 at [www.restek.com](http://www.restek.com).

## free literature

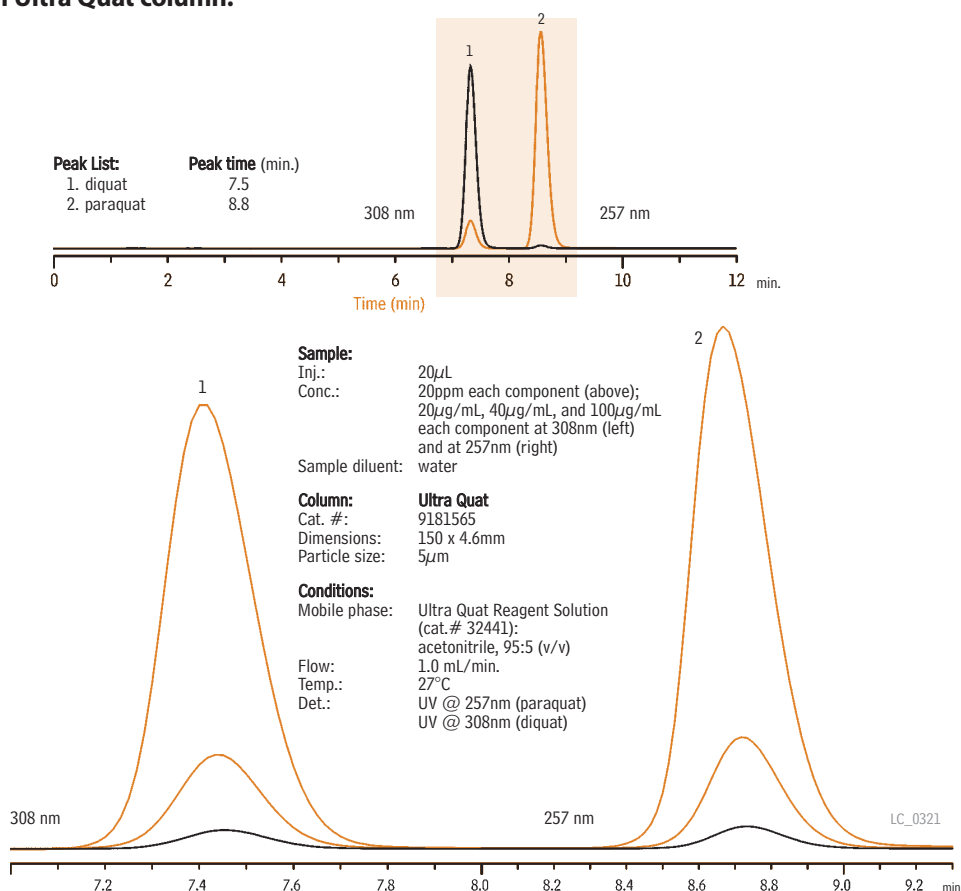
### Simple, Sensitive HPLC/UV Analysis for Paraquat and Diquat

These highly charged quaternary amines are poorly retained on alkyl stationary phases. Using only acetonitrile, water, and a solvation-blocking reagent, our separation system alters the interactions among analyte, mobile phase, and stationary phase, and promotes solubility of the analytes in the stationary phase. In our system, the detection limit is 6ppb for either herbicide, and the analysis is completed in less than 10 minutes. An optimized solid phase extraction cartridge concentrates the herbicides for the analysis.

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat. # 580006

## Consistent resolution, retention times, and peak symmetry for paraquat and diquat on an Ultra Quat column.



RESTEK

HRMalytic  
Australian Distributors

RESTEK  
ECH nology

Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

'07

**Viva Wide Pore HPLC Columns: 3µm or 5µm particles; 300Å pore size**

- Excellent for separating peptides or proteins.
- Rugged, spherical particles, with 300Å pore size.
- High proportion of pore/surface area available to large molecules.

Viva columns are based on a wide pore material we designed for optimal large molecule separations. In developing Viva silica, we found that although many commercial wide-pore silicas meet the standard 300Å mean pore size, most have very broad distributions about this mean, with a significant portion of their pore volume falling below 150Å. This means a large portion of the surface area is unavailable to larger molecules. Viva columns have a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation.

**Viva C18 Columns (USP L1)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical	endcap: yes
pore size: 300Å	pH range: 2.5 to 10
carbon load: 9%	temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose column for analyzing large molecules and biomolecules.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9514331	9514332	9514333	9514335
50mm	9514351	9514352	9514353	9514355
100mm	9514311	9514312	9514313	9514315
150mm	9514361	9514362	9514363	9514365
<b>5µm Columns</b>				
30mm	9514531	9514532	9514533	9514535
50mm	9514551	9514552	9514553	9514555
100mm	9514511	9514512	9514513	9514515
150mm	9514561	9514562	9514563	9514565
200mm	9514521	9514522	9514523	9514525
250mm	9514571	9514572	9514573	9514575

**Viva C8 Columns (USP L7)****Physical Characteristics:**

particle size: 5µm, spherical	endcap: yes
pore size: 300Å	pH range: 2.5 to 7.5
carbon load: 5%	temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Less retention in reversed phase assays than Viva C18.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>5µm Columns</b>				
30mm	9513531	9513532	9513533	9513535
50mm	9513551	9513552	9513553	9513555
100mm	9513511	9513512	9513513	9513515
150mm	9513561	9513562	9513563	9513565
200mm	9513521	9513522	9513523	9513525
250mm	9513571	9513572	9513573	9513575

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**restek  
innovation!**

Viva silica has a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation of large molecules and biomolecules.

Application	Page #
Peptides .....	.68
Proteins .....	.68

← **new!****ordering note**

If you need another column dimension or phase, please call for a quote.

**also available**

3µm particles are available for all Viva phases—please inquire.



**Tawnya Childs**  
Call Center Manager  
10+ years of service!

# Viva C4, Biphenyl and PFP Propyl Columns



**Tim Herring**  
Technical Service  
Specialist  
3+ years of service!

## Viva C4 Columns (USP L26)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 3.5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Less retention in reversed phase assays than Viva C18 or Viva C8.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>5µm Columns</b>								
30mm	9512531		9512532		9512533		9512535	
50mm	9512551		9512552		9512553		9512555	
100mm	9512511		9512512		9512513		9512515	
150mm	9512561		9512562		9512563		9512565	
200mm	9512521		9512522		9512523		9512525	
250mm	9512571		9512572		9512573		9512575	

**new!**

## Viva Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 5µm  
pore size: 300Å  
carbon load: 6.7%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

restek  
**exclusive!**

### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays. Highly retentive and selective phase for aromatic and unsaturated compounds, with increased retention, relative to phenyl phases.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>5µm Columns</b>								
30mm	9516531		9516532		9516533		9516535	
50mm	9516551		9516552		9516553		9516555	
100mm	9516511		9516512		9516513		9516515	
150mm	9516561		9516562		9516563		9516565	
200mm	9516521		9516522		9516523		9516525	
250mm	9516571		9516572		9516573		9516575	

for **more info**

For more information,  
request our Viva Wide Pore  
HPLC Columns flyer.  
lit. cat.# 59939

also **available**

3µm particles are available  
for all Viva phases—please  
inquire.

**new!**

## Viva PFP Propyl Columns (USP L43)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>5µm Columns</b>								
30mm	9519531		9519532		9519533		9519535	
50mm	9519551		9519552		9519553		9519555	
100mm	9519511		9519512		9519513		9519515	
150mm	9519561		9519562		9519563		9519565	
200mm	9519521		9519522		9519523		9519525	
250mm	9519571		9519572		9519573		9519575	



**Viva Silica Columns (USP L3)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 300Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds in normal phase separations.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>5µm Columns</b>				
30mm	9510531	9510532	9510533	9510535
50mm	9510551	9510552	9510553	9510555
100mm	9510511	9510512	9510513	9510515
150mm	9510561	9510562	9510563	9510565
200mm	9510521	9510522	9510523	9510525
250mm	9510571	9510572	9510573	9510575

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Fast LC Method Development Kits**

Fast, efficient separations in an economical cartridge format. The design allows rapid substitution of one cartridge for another. The holder is available with either standard fittings or with a universal PEEK® tip fitting. The universal fitting gives the user the option of threading the column directly into the detector inlet, reducing system dwell volume. The cartridges are 30mm long, with either 2.1mm or 4.0mm ID. The 2.1mm and 4.0mm ID cartridges have the same outside diameter, so the holder will accept either.

Each kit includes four 3µm Fast LC Cartridges: Ultra C18 (USP L1), Ultra Aqueous C18 (USP L1), Ultra Cyano (USP L10), Ultra PFP (USP L43), and a Fast LC cartridge holder.

**Fast LC Development Kits**

Description	qty.	cat.#
Fast LC Development Kit, four 30 x 2.1mm columns	kit	25296
Fast LC Development Kit, four 30 x 4.0mm columns	kit	25297

**3µm Fast LC Cartridges**

Description	Length	2.1mm ID	4.0mm ID
Ultra C18 Fast LC Cartridge	30mm	91743320	91743340
Ultra Aqueous C18 Fast LC Cartridge	30mm	91783320	91783340
Ultra Cyano Fast LC Cartridge	30mm	91063320	91063340
Ultra PFP Fast LC Cartridge	30mm	91763320	91763340

**Fast LC Cartridge Holders**

Description	qty.	cat.#
Fast LC Cartridge Holder with PEEK® Tip	ea.	25298
Fast LC Cartridge Holder with Standard Fittings	ea.	25299



Fast LC saves time and conserves solvent.

**also available**

Additional column kits and Fast LC cartridges are available. Please call for more information.

**Kromasil® Chromatography Products**

- Perfectly spherical, totally porous HPLC silica products from Kromasil.
- Wide range of bonded phases and particle sizes.
- Excellent chemical purity and stability, for highly efficient, reproducible separations.

Kromasil® HPLC silica products consist of highly spherical, porous particles in sizes from 3.5µm to 16µm and larger. The surface properties of the silica have been optimized, and include a narrow pore size distribution and a well-defined pore structure. For chromatographic separations, these properties ensure higher efficiencies, lower pressure drops, and excellent lot-to-lot reproducibility.

Kromasil® spherical silicas are produced using a sol-gel technique, which yields a mechanically strong particle with a large surface area (330m<sup>2</sup>/g for 100Å silica). Metal impurities are carefully monitored, as trace metals in the silica structure increase the surface acidity and can lead to tailing peaks for basic or chelating compounds. Typical metal content for Kromasil® silicas is shown in Table I.

**Table I** Typical chemical purity for Kromasil® spherical silicas.

Metal	Content (ppm)
Na	<20
Al	<10
Fe	<10

Values based on AAS or ICP measurements.

Kromasil® bonded phases are manufactured using monofunctional silanes, for higher surface coverage and greater reproducibility. Bonding is followed by an end-capping procedure, which further increases chemical stability.

Restek offers all Kromasil® phases, in a full range of column dimensions and silica particle sizes. A sampling of our product offering is shown here. For further information about Kromasil® products available from Restek, please contact Restek technical service at 800-356-1688, ext. 4, 814-353-1300, ext. 4, or support@restek.com

**Kromasil® HPLC Columns****Physical Characteristics:**

particle size: 3.5µm or 5µm, spherical  
pore size: 100Å

endcap: fully endcapped  
pH range: 1.5 to 10

**Kromasil® C18 Columns (USP L1)**

average carbon load: 20%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3.5µm Columns</b>			
30mm	9204332	—	9204335
50mm	9204352	—	9204355
100mm	9204312	—	9204315
150mm	9204362	—	9204365
<b>5µm Columns</b>			
30mm	9204532	9204533	9204535
50mm	9204552	9204553	9204555
100mm	9204512	9204513	9204515
150mm	9204562	9204563	9204565
200mm	9204522	9204523	9204525
250mm	9204572	9204573	9204575

**also available**

For guard cartridges for these columns, see page 39.

**Kromasil® C4 Columns (USP L26)**

average carbon load: 8%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
30mm	9202532	9202533	9202535
50mm	9202552	9202553	9202555
100mm	9202512	9202513	9202515
150mm	9202562	9202563	9202565
200mm	9202522	9202523	9202525
250mm	9202572	9202573	9202575

**Kromasil® C8 Columns (USP L7)**

average carbon load: 12%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3.5µm Columns</b>			
30mm	9203332	—	9203335
50mm	9203352	—	9203355
100mm	9203312	—	9203315
150mm	9203362	—	9203365
<b>5µm Columns</b>			
30mm	9203532	9203533	9203535
50mm	9203552	9203553	9203555
100mm	9203512	9203513	9203515
150mm	9203562	9203563	9203565
200mm	9203522	9203523	9203525
250mm	9203572	9203573	9203575



**Sean Nolan**  
Materials Manager  
7+ years of service!

**Kromasil® C1 Columns (USP L13)**

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
30mm	9201532	9201533	9201535
50mm	9201552	9201553	9201555
100mm	9201512	9201513	9201515
150mm	9201562	9201563	9201565
200mm	9201522	9201523	9201525
250mm	9201572	9201573	9201575

**Kromasil® Phenyl Columns (USP L11)**

average carbon load: 14%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
50mm	9205552	9205553	9205555
150mm	9205562	9205563	9205565
250mm	9205572	9205573	9205575

**Kromasil® Amino Columns (USP L8)**

nitrogen load: 1.7%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
50mm	9207552	9207553	9207555
150mm	9207562	9207563	9207565
250mm	9207572	9207573	9207575

**Kromasil® Silica Columns (USP L3)**

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
30mm	9200532	9200533	9200535
50mm	9200552	9200553	9200555
100mm	9200512	9200513	9200515
150mm	9200562	9200563	9200565
200mm	9200522	9200523	9200525
250mm	9200572	9200573	9200575

**also available**

Other Kromasil® column dimensions, phases, and particle sizes are available. Please contact Technical Service at 800-356-1688 or 814-353-1300, ext. 4, to inquire.

**free literature****Kromasil® Columns & Bulk Packings**

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat.# 580089

## Prep Columns



Supersize without surprise!

### HPLC Prep Columns

- Easy scale-up from Restek analytical columns.
- Popular bonded phases.

Restek makes it easy to scale up your separations. We offer a wide range of semi-preparative and preparative-scale columns packed with many of our popular Ultra, Allure®, Pinnacle™ DB, and Pinnacle™ II bonded phases on a 5µm spherical silica. Other stationary phases and particle sizes are available—if you need a phase on 7µm, 10µm or 15µm particles, please call.

### Pinnacle™ DB HPLC Prep Columns

Dimensions	Pinnacle™ DB C18	Pinnacle™ DB C8	Pinnacle™ DB Cyano	Pinnacle™ DB Silica
Length x ID	cat.#	cat.#	cat.#	cat.#
50 x 10mm	9414557	9413557	9416557	9410557
50 x 21.2mm	9414558	9413558	9416558	9410558
50 x 30mm	9414559	9413559	9416559	9410559
50 x 50mm	9414550	9413550	9416550	9410550
100 x 10mm	9414517	9413517	9416517	9410517
100 x 21.2mm	9414518	9413518	9416518	9410518
100 x 30mm	9414519	9413519	9416519	9410519
100 x 50mm	9414510	9413510	9416510	9410510
150 x 10mm	9414567	9413567	9416567	9410567
150 x 21.2mm	9414568	9413568	9416568	9410568
150 x 30mm	9414569	9413569	9416569	9410569
150 x 50mm	9414560	9413560	9416560	9410560
250 x 10mm	9414577	9413577	9416577	9410577
250 x 21.2mm	9414578	9413578	9416578	9410578
250 x 30mm	9414579	9413579	9416579	9410579
250 x 50mm	9414570	9413570	9416570	9410570

### Pinnacle™ II HPLC Prep Columns

Dimensions	Pinnacle™ II C18	Pinnacle™ II C8	Pinnacle™ II Cyano	Pinnacle™ II Silica
Length x ID	cat.#	cat.#	cat.#	cat.#
50 x 10mm	9214557	9213557	9216557	9210557
50 x 21.2mm	9214558	9213558	9216558	9210558
50 x 30mm	9214559	9213559	9216559	9210559
50 x 50mm	9214550	9213550	9216550	9210550
100 x 10mm	9214517	9213517	9216517	9210517
100 x 21.2mm	9214518	9213518	9216518	9210518
100 x 30mm	9214519	9213519	9216519	9210519
100 x 50mm	9214510	9213510	9216510	9210510
150 x 10mm	9214567	9213567	9216567	9210567
150 x 21.2mm	9214568	9213568	9216568	9210568
150 x 30mm	9214569	9213569	9216569	9210569
150 x 50mm	9214560	9213560	9216560	9210560
250 x 10mm	9214577	9213577	9216577	9210577
250 x 21.2mm	9214578	9213578	9216578	9210578
250 x 30mm	9214579	9213579	9216579	9210579
250 x 50mm	9214570	9213570	9216570	9210570

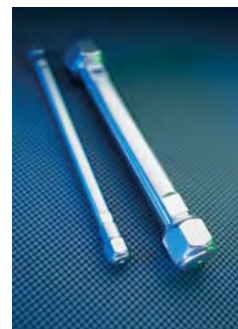


### ordering note

We strongly recommend ordering a semi-prep or prep column only after scouting the desired separation on an equivalent analytical-scale column. Because we cannot re-use a column or the silica it contains once it has left our facility, we cannot accept returns of large-scale columns (except in cases of our error).

## Allure® HPLC Prep Columns

Dimensions Length x ID	Allure® C18 cat. #	Allure® Basix cat. #	Allure® PFP Propyl cat. #	Allure® Silica cat. #
50 x 10mm	9164557	9161557	—	9160557
50 x 21.2mm	9164558	9161558	—	9160558
50 x 30mm	9164559	9161559	—	9160559
50 x 50mm	9164550	9161550	—	9160550
100 x 10mm	9164517	9161517	—	9160517
100 x 21.2mm	9164518	9161518	—	9160518
100 x 30mm	9164519	9161519	—	9160519
100 x 50mm	9164510	9161510	—	9160510
150 x 10mm	9164567	9161567	—	9160567
150 x 21.2mm	9164568	9161568	9169568	9160568
150 x 30mm	9164569	9161569	9169569	9160569
150 x 50mm	9164560	9161560	—	9160560
250 x 10mm	9164577	9161577	—	9160577
250 x 21.2mm	9164578	9161578	—	9160578
250 x 30mm	9164579	9161579	—	9160579
250 x 50mm	9164570	9161570	—	9160570



## Ultra HPLC Prep Columns

Dimensions Length x ID	Ultra C18 cat. #	Ultra Aqueous C18 cat. #	Ultra C8 cat. #	Ultra IBD cat. #	Ultra Cyano cat. #	Ultra Phenyl cat. #	Ultra PFP cat. #	Ultra Silica cat. #
50 x 10mm	9174557	9178557	9103557	9175557	9106557	9105557	9176557	9100557
50 x 21.2mm	9174558	9178558	9103558	9175558	9106558	9105558	9176558	9100558
50 x 30mm	9174559	9178559	9103559	9175559	9106559	9105559	9176559	9100559
50 x 50mm	9174550	9178550	9103550	9175550	9106550	9105550	9176550	9100550
100 x 10mm	9174517	9178517	9103517	9175517	9106517	9105517	9176517	9100517
100 x 21.2mm	9174518	9178518	9103518	9175518	9106518	9105518	9176518	9100518
100 x 30mm	9174519	9178519	9103519	9175519	9106519	9105519	9176519	9100519
100 x 50mm	9174510	9178510	9103510	9175510	9106510	9105510	9176510	9100510
150 x 10mm	9174567	9178567	9103567	9175567	9106567	9105567	9176567	9100567
150 x 21.2mm	9174568	9178568	9103568	9175568	9106568	9105568	9176568	9100568
150 x 30mm	9174569	9178569	9103569	9175569	9106569	9105569	9176569	9100569
150 x 50mm	9174560	9178560	9103560	9175560	9106560	9105560	9176560	9100560
250 x 10mm	9174577	9178577	9103577	9175577	9106577	9105577	9176577	9100577
250 x 21.2mm	9174578	9178578	9103578	9175578	9106578	9105578	9176578	9100578
250 x 30mm	9174579	9178579	9103579	9175579	9106579	9105579	9176579	9100579
250 x 50mm	9174570	9178570	9103570	9175570	9106570	9105570	9176570	9100570

## ordering note

We strongly recommend ordering a semi-prep or prep column only after scouting the desired separation on an equivalent analytical-scale column. Because we cannot re-use a column or the silica it contains once it has left our facility, we cannot accept returns of large-scale columns (except in cases of our error).

## Kromasil® Prep Columns

Dimensions Length x ID	Kromasil® C18 cat. #	Kromasil® C8 cat. #
50 x 10mm	9204557	9203557
50 x 21.2mm	9204558	9203558
50 x 30mm	9204559	9203559
150 x 10mm	9204567	9203567
150 x 21.2mm	9204568	9203568
150 x 30mm	9204569	9203569
250 x 10mm	9204577	9203577
250 x 21.2mm	9204578	9203578
250 x 30mm	9204579	9203579

new!

## Bulk Packing Materials

### Bulk Packing Materials

#### Use our bulk packing materials to pack your own columns!

Restek is among the small group of column manufacturers capable of producing their own high purity silica. We offer our Pinnacle™ II and Pinnacle™ DB silica and bonded phases in bulk. Pinnacle™ II is an excellent replacement for Hypersil® silica. Pinnacle™ DB is a highly base-deactivated material for analyses of basic compounds and an excellent alternative to Hypersil® BDS silica. Bonded phases from our Ultra, Allure®, and Viva lines also are available in bulk.

Our extensive QC program ensures the high quality and reproducibility of these silicas. Each lot of material is tested for mean particle size and distribution, pore diameter, surface area, and total metals analysis. You can be confident that you are getting consistent, high quality product.

Use these materials for easy scale up to preparative scale chromatography, or for packing your own columns.

### Bulk Packing Materials

Description	min. qty.	cat. #	5-99 grams	100-499 grams	500-999 grams	≥1000 grams
<b>3µm Pinnacle™ II Bulk Packing Materials</b>						
Pinnacle™ II C8 Bulk Packing	5g	92133				
Pinnacle™ II C18 Bulk Packing	5g	92143				
Pinnacle™ II Cyano Bulk Packing	5g	92163				
Pinnacle™ II Phenyl Bulk Packing	5g	92153				
<b>5µm Pinnacle™ II Bulk Packing Materials</b>						
Pinnacle™ II Amino Bulk Packing	5g	92175				
Pinnacle™ II C8 Bulk Packing	5g	92135				
Pinnacle™ II C18 Bulk Packing	5g	92145				
Pinnacle™ II Cyano Bulk Packing	5g	92165				
Pinnacle™ II Phenyl Bulk Packing	5g	92155				
<b>5µm Pinnacle™ DB Bulk Packing Materials</b>						
Pinnacle™ DB C18 Bulk Packing	5g	94145				
Pinnacle™ DB C8 Bulk Packing	5g	94135				
Pinnacle™ DB Cyano Bulk Packing	5g	94165				
Description	qty.	cat. #	1-9 bottles	10-49 bottles	50-99 bottles	≥100 bottles
<b>5µm Ultra Bulk Packing Materials</b>						
Ultra C1 Bulk Packing	10g/btl.	91015				
Ultra C4 Bulk Packing	10g/btl.	91025				
Ultra C8 Bulk Packing	10g/btl.	91035				
Ultra C18 Bulk Packing	10g/btl.	91745				
Ultra Amino Bulk Packing	10g/btl.	91075				
Ultra Cyano Bulk Packing	10g/btl.	91065				
Ultra Phenyl Bulk Packing	10g/btl.	91055				

### Silica Bulk Materials

Description	min. qty.	cat. #	5-99 grams	100-499 grams	500-999 grams	≥1000 grams
<b>Silica Bulk Materials</b>						
Pinnacle™ II Silica Bulk Packing, 3µm	5g	92103				
Pinnacle™ II Silica Bulk Packing, 5µm	5g	92105				
Pinnacle™ DB Silica Bulk Packing, 5µm	5g	94105				
	qty.	cat. #	1-9 bottles	10-49 bottles	50-99 bottles	≥100 bottles
Ultra Silica Bulk Packing, 5µm	10g/btl.	91005				

new!

### Kromasil® Bulk Packings

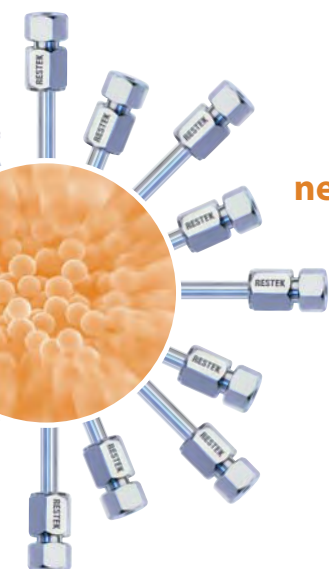
- High-purity packing materials in 10 and 16µm.
- All Kromasil® phases available, please inquire.

Description	min. qty.	cat. #	200-499 grams	500-999 grams	≥1000 grams
Kromasil® 100Å Silica, 10µm	200g	92000			
Kromasil® 100Å Silica, 16µm	200g	92001			
Kromasil® 100Å C8, 10µm	200g	92030			
Kromasil® 100Å C8, 16µm	200g	92031			
Kromasil® 100Å C18, 10µm	200g	92040			
Kromasil® 100Å C18, 16µm	200g	92041			
Kromasil® 100Å Chiral DMB, 10µm	200g	92080			
Kromasil® 100Å Chiral DMB, 16µm	200g	92081			
Kromasil® 100Å Chiral TBB, 10µm	200g	91990			
Kromasil® 100Å Chiral TBB, 16µm	200g	91991			



### also available

Other stationary phases and particle sizes are available; please inquire.



## Restek's Exclusive Trident™ Integral System

- Convenient and economical leak-free guard cartridge system, extremely easy to install.
- Versatile configuration protects against all levels of contamination.
- Integral design eliminates troublesome tubing connections.

The system's foundation consists of the analytical column configured with our exclusive Trident™ end fitting and XF fitting. This configuration contains the standard internal frit as well as a replaceable cap frit, which easily can be changed without disturbing the packed bed. Changing the external frit can reverse the effects of accumulated particles, such as high backpressure or peak distortion. To obtain this basic configuration, simply order any Restek HPLC column, and add the suffix -700 to the catalog number for the column. (Nominal additional charge. )

For maximum protection against contaminants and particulate matter, the system can be configured with an integral guard cartridge holder (XG-XF), a guard cartridge, and a replaceable external frit. To obtain this configuration, simply order any Restek HPLC column, add the suffix -700 to the catalog number for the column, and order the appropriate XG-XF male fitting (cat.# 25026 or 25062, below) and Trident™ guard cartridges (page 39).

Description	qty.	cat.#
XG-XF Fitting for 10mm Guard Cartridge	ea.	25026
XG-XF Fitting for 20mm Guard Cartridge	ea.	25062
Replacement XF Filter Fitting	ea.	25024
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023
Replacement Cap Frits: 2mm, 2.0µm	5-pk.	25057

## Trident™ Integral Guard System



Assembled column with Trident™ integral guard system



Column with Trident™ Integral Inlet Fitting (to order add "-700" to catalog number of column) and guard cartridge, XG-XF fitting, cap frit, and XF end fitting.



Remove the XF end fitting and install the guard cartridge in the end of the column.



Add the XG-XF fitting (order cat.#25026 for 10mm guard cartridges, cat.#25062 for 20mm guard cartridges).



Re-install the XF end fitting with cap frit.



The cap frit can be easily replaced if it becomes contaminated/plugged.



**Lori McGarry**  
Environmental  
Health & Safety Officer  
1+ year of service!

# Trident™ Direct Guard Cartridge System / Cartridge Holders



**Trident™ Direct**  
provides three levels  
of protection



**Trident™ Direct**  
high-pressure filter  
Protection against  
particulate matter.



**Trident™ Direct 10mm**  
guard cartridge holder  
with filter

Protection against  
particulate matter and  
moderate protection  
against irreversibly  
adsorbed compounds.



**Trident™ Direct 20mm**  
guard cartridge holder  
with filter

Protection against  
particulate matter and  
maximum protection  
against irreversibly  
adsorbed compounds.

## Trident™ Direct Guard Cartridge System

Easy to Use, Low Dead Volume—The Ultimate Combination of Convenience and Column Protection  
Unlike “one size fits all” guard systems, the Trident™ Direct system gives you the power to select the right level of protection for your analysis. The system offers three levels of protection and guard cartridges in four dimensions, with a variety of bonded phases to match your analytical column. The economical, leak-free cartridge design provides an unprecedented combination of convenience, economy, and reliability. The foundation of the Trident™ Direct system is a reusable direct connect holder that easily attaches to any HPLC column using CPI- or Waters-style end fittings.\* The system is available in configurations to match different protection level needs: in-line filter, in-line filter with holder for 10mm guard cartridge, and in-line filter with holder for 20mm guard cartridge. The guard cartridges are available in 2.1 and 4.0mm ID and are interchangeable within the appropriate length holder.

\*The standard PEEK™ tip in Trident™ Direct systems is compatible with Parker®, Upchurch®, Valco®, and other CPI-style fittings. To use Trident™ Direct systems with Waters-style end fittings, replace the tip with cat.# 25088.

Description	qty.	cat.#
High-pressure filter	ea.	25082
10mm guard cartridge holder without filter	ea.	25083
10mm guard cartridge holder with filter	ea.	25084
20mm guard cartridge holder without filter	ea.	25085
20mm guard cartridge holder with filter	ea.	25086
Connection tip for Waters-style end fittings	ea.	25088
PEEK™ tip standard fittings	ea.	25087
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023
Replacement Cap Frits: 2mm, 2.0µm	5-pk.	25057



Cap frits

## Trident™ HPLC In-Line Guard Cartridge Holders

A Trident™ in-line guard cartridge holder can be used with almost any HPLC column by connecting it with a short piece of 1/16" tubing, appropriate nuts and ferrules, or finger-tight fittings. The system can be used with Restek columns, or with columns from other manufacturers. Holders are available for either 10mm or 20mm guard cartridges. Either size can be purchased with or without a prefilter, which provides added protection against the particles that can shorten the lifetime of the guard cartridge.

Description	qty.	cat.#
Holder for 10mm guard cartridge	ea.	25021
Holder with filter for 10mm guard cartridge	ea.	25040
Holder for 20mm guard cartridge	ea.	25061
Holder with filter for 20mm guard cartridge	ea.	25060
Replacement Cap Frits: 4mm, 2.0µm*	5-pk.	25022
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023
Replacement Cap Frits: 2mm, 2.0µm*	5-pk.	25057

\*Standard porosity.



Holder for 10mm  
guard cartridge



Holder with filter for  
10mm guard cartridge



Holder for 20mm  
guard cartridge



Holder with filter for  
20mm guard cartridge

## Trident™ HPLC Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1mm)	3-pk. (10 x 4.0mm)	2-pk. (20 x 2.1mm)	2-pk. (20 x 4.0mm)
Allure® AK <b>new!</b>	—	915950210	—	—
Allure® Basix	916150212	916150210	916150222	916150220
Allure® C18	916450212	916450210	916450222	916450220
Allure® PFP Propyl	916950212	916950210	916950222	916950220
Allure® Silica	916050212	916050210	916050222	916050220
Allure® Organic Acids	916550212	916550210	916550222	916550220
Allure® Aqueous C18	916850212	916850210	916850222	916850220
Allure® Biphenyl	916650212	916650210	916650222	916650220
pHidelity® C18	957930212	957930210	957930222	957930220
Pinnacle™ II Amino	921750212	921750210	921750222	921750220
Pinnacle™ II C8	921350212	921350210	921350222	921350220
Pinnacle™ II C18	921450212	921450210	921450222	921450220
Pinnacle™ II Cyano	921650212	921650210	921650222	921650220
Pinnacle™ II PAH	921950212	921950210	921950222	921950220
Pinnacle™ II Phenyl	921550212	921550210	921550222	921550220
Pinnacle™ II Biphenyl	—	920950210	—	920950220
Pinnacle™ II Silica	921050212	921050210	921050222	921050220
Pinnacle™ DB C8	941350212	941350210	941350222	941350220
Pinnacle™ DB C18	941450212	941450210	941450222	941450220
Pinnacle™ DB Cyano	941650212	941650210	941650222	941650220
Pinnacle™ DB Phenyl	941550212	941550210	941550222	941550220
Pinnacle™ DB Silica	941050212	941050210	941050222	941050220
Ultra Amino	910750212	910750210	910750222	910750220
Ultra Aqueous C18	917850212	917850210	917850222	917850220
Ultra C1	910150212	910150210	910150222	910150220
Ultra C4	910250212	910250210	910250222	910250220
Ultra C8	910350212	910350210	910350222	910350220
Ultra C18	917450212	917450210	917450222	917450220
Ultra Carbamate	917750212	917750210	917750222	917750220
Ultra Cyano	910650212	910650210	910650222	910650220
Ultra IBD	917550212	917550210	917550222	917550220
Ultra PFP	917650212	917650210	917650222	917650220
Ultra Phenyl	910550212	910550210	910550222	910550220
Ultra Silica	910050212	910050210	910050222	910050220
Ultra Quat	918150212	918150210	918150222	918150220
Viva C18	951450212	951450210	951450222	951450220
Viva C8	951350212	951350210	951350222	951350220
Viva C4	951250212	951250210	951250222	951250220
Viva PFP Propyl <b>new!</b>	951950212	951950210	951950222	951950220
Viva Biphenyl <b>new!</b>	951650212	951650210	951650222	951650220
Viva Silica	951050212	951050210	951050222	951050220
Kromasil® C1	920150212	920150210	—	920150220
Kromasil® C4	920250212	920250210	—	920250220
Kromasil® C8	920350212	920350210	—	920350220
Kromasil® C18	920450212	920450210	—	920450220
Kromasil® Amino	920750212	920750210	920750222	920750220
Kromasil® Phenyl	920550212	920550210	920550222	920550220
Kromasil® Silica	920050212	920050210	—	920050220



10 & 20mm Guard Cartridges

# Replacement Parts

## Restek Replacement Parts for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#
Preventive Maintenance Kit (Includes: rotor seal, needle seat, needle assembly, seat cap)	1050	01078-68721	kit	25259
Autosampler Preventive Maintenance Kit (Includes: rotor seal, needle assembly, needle seat)	1100	G1313-68709	kit	25271
Pump Maintenance Kit (Includes: PTFE frit, outlet cap, active inlet cartridge, gold disk seal, 2 piston seals, glass solvent filter)	1050 & 1100	G1311-68710	kit	25270
Outlet Ball Valve, Binary Pump	1100	G1312-60012	ea.	25267
Outlet Ball Valve	1050 & 1100	G1311-60012	ea.	25276
Sieves for Outlet Valve	1050 & 1100	5063-6505	10-pk.	25266
Check Valve Cartridge Assembly	1090	79835-67101	ea.	25344
Piston Seals, Teflon® w/Graphite	1050 & 1100	5063-6589	2-pk.	22482
Piston Seals, Teflon® w/Graphite	1050 & 1100	5063-6589	10-pk.	22483
Piston Seals (Black)	1090	5062-2494	4-pk.	25347
Seal Wash Kit, Binary Pump (4 seals, 4 gaskets)	1100	—	kit	25268
Seal Wash Kit (2 seals, 2 gaskets)	1100	—	kit	25269
Wash Seal	1050 & 1100	0905-1175	ea.	25277
Sapphire Piston	1050 & 1100	5063-6586	ea.	25273
Sapphire Piston	1090	6980-0672	ea.	25345
Needle Seat	1050	79846-67101	ea.	25258
Needle Seat	1090	79846-67101	ea.	25348
Needle Seat Assembly	1100	G1313-87101	ea.	25265
Needle Assembly	1100	G1313-87201	ea.	25278
Rotor Seal (not for use with 7125 injection valve)	1050	0101-0626	ea.	25272
Rotor Seal	1100	0100-1853	ea.	25275
Rotor Seal (Rheodyne®-style)	1090	0101-0623	ea.	25349
Frits, PTFE	1050 & 1100	01018-22707	5-pk.	25466
Seal, Gold Disk (outlet)	1050 & 1100	5001-3707	ea.	25467
Outlet Cap	1050 & 1100	5062-2485	4-pk.	25139
Outlet Cap & Gold Seal Assembly	1050 & 1100	—	2-pk.	25140
Connecting Tube	1050 & 1100	G1311-67304	ea.	25058
Bottle Head Assembly	—	G1311-60003	ea.	25059
Detector Lamp, 1090 DA, 1050 VW/DA/MWD	1090, 1050	79883-60002	ea.	25260
Lamp, DAD G1315A, G1365A	1100	2140-0590	ea.	25261
Lamp, VWD G1314A	1100	G1314-60100	ea.	25262
8453 Deuterium Lamp	—	2140-0605	ea.	25263
G1321 Fluorescence Detector Flash Lamp	—	2140-0600	ea.	25264
Lamp, DAD Long Life Deuterium (2000 hours)	1100	5181-1530	ea.	25399



Outlet Ball Valve



Needle Seat Assembly



Lamp, VWD G1314A

new!

## Capillary Stainless Steel Tubing Assemblies for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#
Capillary SS Tubing, 130mm x 0.17mm ID, with fittings	1090	01090-87305	ea.	26525
Capillary SS Tubing, 800mm x 0.17mm ID, with fittings	1050	01078-87305	ea.	26526
Capillary SS Tubing, 180mm x 0.17mm ID, with fittings	1100	G1313-87305	ea.	26527
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01018-67305	ea.	26528
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01078-87306	ea.	26529
Seat Capillary, SS Tubing, 0.17mm ID	1050	01078-87303	ea.	26530
Capillary SS Tubing, 105mm x 0.17mm ID	—	5021-1816	ea.	26531
Mixing Capillary Assembly	1100	G1312-67302	ea.	26532
Capillary SS Tubing, Valve to Metering Head	1100	G1313-87301	ea.	26533
Capillary SS Tubing, 150mm x 0.17mm ID	—	5021-1817	ea.	26534
Capillary SS Tubing, 280mm x 0.17mm ID	—	5021-1818	ea.	26535
Capillary SS Tubing, 400mm x 0.17mm ID	—	5021-1819	ea.	26536
1/16" SS Fitting, Front and Back Ferrules	—	5062-2418	10-pk.	26537



Capillary SS Tubing with fittings



Mixing Capillary Assembly

## Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

Easily install the gold seal into the outlet cap.

**new!**



Put Outlet Cap on male part of Assembly Tool.

Push the Assembly Tool together.

Hold onto Outlet Cap and pull Assembly Tool apart.

Put Gold Seal over pin on male part of Assembly Tool.

Push the Assembly Tool together and press the Gold Seal in the Outlet Cap.

Pull the Assembly Tool apart and remove assembled Outlet Cap and Gold Seal.



### Description

Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

qty.

ea.

cat.#

24989

## Restek Replacement Parts for Beckman HPLC Systems

Description	Model #	Similar to Beckman part #	qty.	cat.#
Inlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240720	ea.	25439
Outlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240721	ea.	25440
Inlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240620	ea.	25441
Outlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240621	ea.	25442
Guide Sleeve for Graphite Plunger Guide	110 Series Pumps	243713	ea.	25444
Outlet Check Filter Frit Assembly	110 Series Pumps	240619	ea.	25445
Piston Guide Assembly	110 Series and 112 Pumps	243045	ea.	25446
Plunger	110 Series and 112 Pumps	243053	ea.	25447
Plunger Seal	110 Series Pumps	887138	ea.	25448
Plunger Seal	112 Pumps	236797	ea.	25449
	114M, 116, 118, 125, 126, 127, 128 Pumps			
Sapphire Plunger		240714	ea.	25450
Plunger Seal	114M, 116, 118, 126, 127, 128 Pumps	241037	ea.	25451
Pump Seal, Gold*	114, 116, 125, 126, 127, 128 Pumps	241037	ea.	25452
Plunger Wash Seal	125, 126, 127, 128 Pumps	728772	ea.	25453
Deuterium Lamp	DU60, 62, 64, 65	596791	ea.	25454

\*Ultra-high molecular weight polyethylene (UHMWPE).



Outlet Check Valve Assembly



Sapphire Plunger

## Restek Replacement Parts for Hitachi HPLC Systems

Description	Model #	Similar to Hitachi part #	qty.	cat.#
SS Check Valve Cartridges (1/16" Ruby Ball)	655/6000/6200	AN0-085	2-pk.	25455
Inlet Check Valve Assembly	655/6000/6200	AN0-0833	ea.	25456
Outlet Check Valve Assembly	655/6000/6200	AN0-0834	ea.	25457
Plunger Assembly	655, 6000, 6200, 7100	810-1033	ea.	25458
Plunger Seal	L655A, 6000, 6200, 7100	655-1080	ea.	25459
Plunger Seal, Gold	655, 6000, 6200, 7100	655-1080	ea.	25460
Inlet Check Valve Assembly	L-7100	AN0-0836	ea.	25461
Outlet Check Valve Assembly	L-7100	AN0-0837	ea.	25462
Rotor Assembly for Dilutor Valve	AS-7200 Autosampler	810-3085	ea.	25463
Rotor Seal Kit	AS-7200, AS-7250 Injection Valve	AN0-0818	ea.	25464
Deuterium Lamp, Preamplified	L4000, L4200, L4250, L7400	885-3570	ea.	25465



# Replacement Parts

## Restek Replacement Parts for PerkinElmer HPLC Systems



Description	Model #	Similar to PerkinElmer part #	qty.	cat.#
Inlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540177	ea.	25438
Outlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540197	ea.	25437
High Pressure Seal Kit	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	2540275	ea.	25433
Standard High Pressure Seal	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	9907324	ea.	25434
Low Pressure Seal	PE Series 200 Pumps	9907339	ea.	25435
Needle	PE Series 200 Pumps	N2930023	ea.	25432
Deuterium Lamp	PE Lambda--2, 5, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 40, 800, 900	B0160917	ea.	25436
Deuterium Lamp	PE 200/785A	N2920149	ea.	25431

## Restek Replacement Parts for Shimadzu HPLC Systems



Description	Model #	Similar to Shimadzu part #	qty.	cat.#
Inlet Check Valve	LC-6A, LC-10AS	228-12353-91	ea.	25287
Inlet Check Valve	LC-600, LC-9A, LC-10AD	228-18522-91	ea.	25295
Inlet Check Valve	LC-10ADvp	228-39093-92	ea.	24984
Inlet Check Valve	LC-10AT, LC-10ATvp	228-32166-91	ea.	26521
Outlet Check Valve	LC-6A, LC-10AS	228-09054-93	ea.	25288
Outlet Check Valve Rebuild Kit	LC-6A, LC-10AS	228-11200-91	2-pk.	25289
Outlet Check Valve	LC-600, LC-9A, LC-10AD, LC-10AT	228-18522-92	ea.	25282
Outlet Check Valve	LC-10ADvp, LC-10ATvp	228-34976-91	ea.	24983
Plunger Seal	LC-6A	228-11999-00	ea.	25285
Plunger Seal, Polyethylene	LC-10AS, LC-10AT, LC-10ATvp	228-21975-00	ea.	25290
Plunger Seal	LC-600, LC-9A, LC-10AD	228-18745-00	ea.	25293
Plunger Seal	LC-10ADvp	228-35146-00	ea.	24980
Plunger Seal, Gold	LC-10ADvp	228-32628-00	ea.	24981
Plunger Seal	SIL-10ADvp, LC-10ATvp	228-35145-00	ea.	24985
Plunger Rinse Seal	LC-10AS	228-28499-00	ea.	25292
Sapphire Plunger	LC-6A	228-12904-93	ea.	25286
Sapphire Plunger	LC-10AS	228-17019-93	ea.	25291
Sapphire Plunger	LC-600, LC-9A, LC-10AD	228-18523-91	ea.	25294
Needle Seal	SIL-10A, 10XL, 10ADvp	228-33355-04	ea.	25468
Rotor Seal	SIL-10ADvp	228-21217-97	ea.	24986
Rotor Seal Assembly	SIL-10A, 10AXL	228-21217-91	ea.	25469
Stator Assembly	SIL-10A, 10AXL	228-21220-91	ea.	25470
Syringe, 500µL	SIL-10A, 10AXL	228-25237-04	ea.	25471
Plunger Assembly, Ceramic	LC-10ADvp	228-35601-91	ea.	25472
Plunger Assembly, Ceramic	LC-10ATvp	228-35009-92	ea.	25473
Plunger Assembly, Sapphire	LC-10ADvp	228-35601-92	ea.	24982
Deuterium Lamp	SPD-6A	062-65056-02	ea.	25283
Deuterium Lamp	SPD-10A, 10AV, M20A	228-34016-02	ea.	25284



**Julie Kowalski**  
Innovations Chemist  
2+ years of service!

## Restek Replacement Parts for Thermo Separation HPLC Systems

Description	Model #	Similar to SP/TSP part #	qty.	cat.#
Inlet Check Valve Assembly	SP8800 & P-Series Pumps	A3495-010	ea.	25474
Outlet Check Valve Assembly	SP8800 Series Pumps	A3490-010	ea.	25475
Piston	SP8800 & P-Series Pumps	A3102-010	ea.	25476
Back-up Seal	SP8800 & P-Series Pumps	A2963-010	ea.	25477
Plunger Seal, Gold Superseal	SP8800 & P-Series Pumps	A2962-010	ea.	25478
Check Valve and Transducer Assembly	P-Series Pumps	A3990-010	ea.	25479
Kel-F® Washer	P-Series Pumps	A2973-010	ea.	25480
Rotor Seal Assembly, Rheodyne® 7010	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	7010-039	ea.	25481
	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	A3588-020	ea.	25482
Syringe Assembly, 250µL	8800 Series	3301-0100	ea.	25483
Lamp, UV	Linear UV-200, 203, 204, 205, 206, and UV 100, 150, 1000, and 2000 Detectors	9551-0023	ea.	25484



Piston



Syringe Assembly, 250µL



Lamp, UV

Description	Model #	Similar to TSP part #	qty.	cat.#
Check Valve Cartridge	LDC Constametric Pumps	900946	ea.	25485
Sapphire Plunger	LDC Constametric Pumps	801306	ea.	25486
Plunger Seal Kit, Gold	LDC Constametric Pumps	31-36-00754	ea.	25487
Plunger Seal, Black	LDC Constametric Pumps	206129001	ea.	25488
Plunger Seal, Gold	LDC Constametric Pumps	206156001	ea.	25489
Lamp, Deuterium	LDC SM-I, II, III, 3000, 3100, 3100X, and 4000 Detectors	108035	ea.	25490
Lamp, Deuterium Pre-aligned	LDC 3200 and 4100 Detectors	900918001	ea.	25491

## Restek Rheodyne® Style Replacement Parts for Waters HPLC Systems

Description	Similar to Rheodyne® part #	qty.	cat.#
7010 Vespel® Rotor Seal	7010-039	ea.	25279
7125 Vespel® Rotor Seal	7125-047	ea.	25280
Isolation Seal, 7010	7010-015	ea.	25281

For easy access to Rheodyne® fittings, use a ValvTool Wrench—see page 54.



## Restek Replacement Parts for Waters Detectors

Description	Model #	Similar to Waters part #	qty.	cat.#
Window Gasket	484, 486, 490	80335	ea.	25423
Lamp Side Gasket	484, 486, 490	80336	ea.	25424
Quartz Lens	486	80687	ea.	25427
Xenon Lamp (w/o holder or mirror)	470	—	ea.	25404
Xenon Lamp	474	—	ea.	25405
Deuterium Lamp (UV/Vis)	480, 481	99499	ea.	25403
Deuterium Lamp (UV/Vis)	484	80357	ea.	25406
Deuterium Lamp (UV/Vis)	486	80678	ea.	25407
Deuterium Lamp	996, 2996	WAT052586	ea.	25408
Deuterium Lamp	2487	WAS081142	ea.	25409
Deuterium Lamp, long life (2000 hours)*	486	80678	ea.	25410

\*Standard lamps have nominal 1000 hour life.

also available

HPLC autosampler syringes.  
See pages 64-65.

# Replacement Parts

## Restek Replacement Parts for Waters HPLC Systems



Preventative Maintenance Kit for 717 Autosampler

new!



Inlet Check Valve Assembly



717 Seal Pack (Rebuilt) with Needle

new!

Description	Model #	Similar to Waters part #	qty.	cat. #
Preventative Maintenance Kit Includes: sparge diffuser, filter insert, compression screws, SS ferrule, battery for 2690/717, 250µL WISP™ syringe, seal wash plunger seal kits (2), wash tube seal kits (4), 2690 seal pack rebuild kit (steel bodies not included), 2690 head plunger seal kits (2), solvent reservoir 20µm filters (4), Alliance® check valve cartridges (2), Alliance® plunger assemblies (2), 2690 face seals (4)	Alliance® 2690, 2695	WAT270944	kit	25143
Preventative Maintenance Kit Includes: PerformancePLUS™ cartridges (2), sparge diffusers (4), Super Seals™ (2), solvent reservoir 20µm filters (2), sapphire plungers (2), reference valve rebuild kit, inlet manifold kit	600 Pump	WAT052675	kit	25144
Preventative Maintenance Kit Includes: 717 seal pack with needle, filter insert, 250µL WISP™ syringe	717 Autosampler	WAT052669	kit	25145
Preventative Maintenance Kit Includes: 616/326/625 plunger assemblies (2), pump seal kit, sparge diffusers (4), solvent reservoir 20µm filters (4), 616 cartridge assemblies (4)	616 Pump	WAT052672	kit	25146
Preventative Maintenance Kit Includes: PerformancePLUS™ check valves (2), sparge diffuser, solvent 10µm filter, sapphire plungers (2), plunger seals (2)	515 Pump	WAT052587	kit	26519
Inlet Check Valve Assembly	M6KA, 501, 510, 515, 590, 600E	33679, 25214	ea.	25360
Inlet Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	25203	ea.	25361
Inlet Check Valve Rebuild Kit	M6KA, 501, 510, 515, 590, 600E	60495	2-pk.	25362
Outlet Check Valve Assembly (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25030	ea.	25363
Outlet Check Valve Housing (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25212	ea.	25364
Outlet Check Valve Rebuild Kit (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	26016	2-pk.	25365
Outlet Check Valve Assembly (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25216	ea.	25366
Outlet Check Valve Housing (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25207	ea.	25367
Outlet Check Valve Rebuild Kit (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	26014	2-pk.	25368
Inlet Check Valve Assembly, 225µL (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	60307	ea.	25369
PerformancePLUS™ Check Valve Cartridge	M6KA, 501, 510, 515, 590, 600E	700000254	2-pk.	25370
Check Valve Rebuild Kit (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	88223	2-pk.	25371
PerformancePLUS™ Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	—	ea.	25372
Check Valve Cartridges	Alliance®	WAT270941	2-pk.	25373
Super Seal™ for Analytical Heads	M6KA, 501, 510, 515, 590, 600E	22946, 22934	ea.	25374
Plunger Seal, Gold for Analytical Heads*	M6KA, 501, 510, 515, 590, 600E	22934	ea.	25375
Plunger Seal, Black for graphite-filled Teflon®	M6KA, 501, 510, 515, 590, 600E	26613	ea.	25378
Plunger Seal, Black for EF Heads	510, 590, 600E	26644	ea.	25379
Plunger Seal, Gold for EF Heads	510, 590, 600E	26644	ea.	25380
Seal Wash Plunger Seal	Alliance®	WAT271018	2-pk.	25386
Head Plunger Seal Kit	Alliance®	WAT270938	2-pk.	25387
Head Plunger Seal Kit (Black)	Alliance®	WAT271066	2-pk.	25388
Insert Seal Parts Kit	M6KA, 501, 510, 515, 590, 600E	60012	kit	25389
Sapphire Plunger	M6KA, 510, 590, 600	25656	ea.	25381
Sapphire Plunger (Extended Flow)	510, 590, 600E	60304	ea.	25382
Sapphire Plunger	M45, M501	26524	ea.	25383
Sapphire Plunger Assembly Kit	M515	WAS207069	ea.	25384
Sapphire Plunger	616, 625, 626	31788	ea.	25420
Sapphire Plunger	Alliance®	WAT270959	ea.	25385
Pressure Transducer	M6KA, M45, 501, 510, 590, 600E	WAT060329	ea.	25391
Draw-Off Tube Assembly	510, 515, 600, 610	25470	ea.	25392
Inlet Manifold Kit	M45, 501, 510, 590, 600E	60448	kit	25412
Ferrule, Stainless Steel	515	22330	ea.	25417
Wash Face Seal	Alliance® 2690	WAT271017	ea.	25428
Wash Tube Seal Kit	Alliance® 2690	WAT270940	4-pk.	25429
Rebuild Kit, Reference Valve	600 Pump	25746	ea.	25492
Compression Screws, Stainless Steel	Alliance® 2690	—	2-pk.	25493
Battery	Alliance® 2690, 717, 486, 484	—	ea.	25494
Seal Pack Rebuild Kit, without Seal Wash Tube Assembly	Alliance® 2690	WAT271019	ea.	25495
717 Seal Pack (Rebuilt) with Needle	717 Autosampler	4559	ea.	25496
Seal Kit, Pump	616 Pump, 626, 625	31790	ea.	25497
Cartridge Assembly, Stainless Steel	616 Pump	24960	ea.	25498

\*Ultra-high molecular weight polyethylene (UHMWPE).

### ASI Piston Seals for Agilent HPLC Systems

Over time the piston seal in every HPLC system becomes worn and must be replaced. Our piston seals are constructed of Teflon® material with an additive that reduces their tendency to “cold flow” and improves their wear characteristics. Teflon® seals are more resistant to any HPLC solvent than UHMWPE seals, but they are less wear resistant and rugged. For Agilent 1050 and 1100 HPLC systems.

Description	qty.	cat.#
ASI Piston Seal	ea.	25175
ASI Piston Seal	10-pk.	25176



### ASI Check Valves

ASI subjects each valve to a rigorous series of tests, including self-priming capability, which means you typically won't need a syringe or draw-off valves to prime your pump. A high-pressure test ensures that the valve will not leak, even at pressures up to 12,000psi (82,737kPa). A low-pressure test verifies that the valve closes properly, even without a high backpressure force. The cartridge design allows easy, convenient replacement of worn or damaged valves.

#### ASI Check Valves for Agilent 1050 & 1100

Description	Material	qty.	cat.#
Outlet Check Valve (cartridge and housing)	Sapphire & Ruby Ball & Seat	ea.	25170
Outlet Check Valve (cartridge and housing)	Ceramic Ball & Seat	ea.	25173
Outlet Cartridges	Sapphire & Ruby Ball & Seat	ea.	25171
Outlet Cartridges	Ceramic Ball & Seat	ea.	25174
Outlet Housing	—	ea.	25172



Inlet and Outlet Check Valves for Waters Instruments

#### ASI Check Valves for Waters Alliance® Model 2690

Description	Material	qty.	cat.#
Inlet and Outlet Cartridges	Sapphire & Ruby Ball & Seat	ea.	25160
Inlet and Outlet Cartridges	Ceramic Ball & Seat	ea.	25162

### Valves for HPLC

Our valves have low internal volumes and are rated to 15,000psi (103,421kPa). They feature a 2-piece stem assembly in which the rotating upper shank is coupled through a ball joint to a static lower stem. Only fingertight torque is required to make the seal.

Description	qty.	cat.#
Two-Way Through Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26400
Two-Way Angle Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26401
Three-Way Bottom Vent Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26402
Side Vent Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26403
Dual Stem Three Way Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26404
Prime/Purge Valve for HPLC, 1/4-28 Flanged Seat, Stainless Steel, with Tubing and Fittings	ea.	26406
Prime/Purge Valve Repair Kit for Prime/Purge Valve	kit	26407

new!



Side Vent Valve

### In-Line Check Valves for HPLC

Our 316 stainless steel in-line check valves have a soft seat and 1/16" fittings. Nuts and ferrules are included.

Description	qty.	cat.#
Check Valve, Soft Seat, for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26405

new!





### High-Pressure Frit-Type In-Line Filter

Restek's high-pressure in-line filter is a stand-alone version of the Trident™ column protection system, specifically designed for ease of use, low dead-volume, and flexibility. The filter has a replaceable, PEEK™ encapsulated 316 stainless steel frit with a surface area of 12mm². The standard frit with 2.0µm porosity may be replaced with an optional 0.5µm porosity frit. Use of this filter can greatly extend column life, thereby reducing costs and saving maintenance time. Tubing OD 1/16"; connectors—CPI.

Description	Porosity	qty.	cat.#
Frit-Type In-Line Filter	2.0µm	ea.	25041
Replacement Cap Frits: 4mm	0.5µm	5-pk.	25023
Replacement Cap Frits: 4mm	2.0µm	5-pk.	25022



### High-Pressure Cup-Type In-Line Filter

This high-pressure cup-type filter can be used in fluid streams operating to 15,000psi (103,421kPa). The cup-shaped filter elements have a large (2.5 cm²) surface area to give long operating lifetime. Mounted in screw-type adapters, they are easily removed for cleaning. Normally, backflushing and cleaning in an ultrasonic bath with an appropriate solvent will restore them. If they become permanently clogged, replacement elements are available.

Housings and all wetted parts are 316 stainless steel. Filters are packaged with gland nuts and ferrules. A bulkhead type fitting is available for thru-panel mounting. Tubing OD 1/16"; connectors—CPI.

Description	Porosity	qty.	cat.#
Cup-Type In-Line Filter	0.5µm	ea.	25000
Cup-Type In-Line Filter	2.0µm	ea.	25001
Replacement Filter Elements & Seals	0.5µm	2-pk.	25002
Replacement Filter Elements & Seals	2.0µm	2-pk.	25003



### Low-Pressure Slip-On Inlet Filter for Mobile Phase Reservoir

A type 316 stainless steel tip with a Tefzel® collar seals to a corrosion-resistant type 316 stainless steel filter element. The slip-on filter easily attaches to the pump inlet line, without the use of wrenches. The universal tip accommodates standard Teflon® tubing inner diameters. The cylindrical filter is standard 10µm porosity. 1/8" OD. Fits Altex, ISCO, LDC, Varian, Waters, PerkinElmer, and other pumps.

Description	qty.	cat.#
Slip-on Inlet Filter	ea.	25008



### Low-Pressure CPI Inlet Filter for Mobile Phase Reservoir

A 316 stainless steel knurled cap and Tefzel® CPI ferrule seal to 1/8" OD Teflon® tubing when finger-tightened onto the precision-machined filter holder. The filter element is replaceable. Standard 10µm porosity protects delicate pump components from particles but introduces very little pressure drop. 1/8" OD. May be used as a helium sparging diffuser.

Description	qty.	cat.#
CPI Inlet Filter	ea.	25009
Replacement Elements: 10µm filter	2-pk.	25010

### also available

Trident™ Direct high-pressure filter—  
protection against particulate matter.  
See page 38 for details.

### Mobile Phase Sparge Filter; Inlet Filter

The 2 $\mu$ m helium sparge filter is an inexpensive way to prepare and maintain mobile phases free of dissolved gas. Both filters are made from 316 stainless steel and PEEK™ and are compatible with most solvents.

Description	qty.	cat. #
Mobile Phase Sparge Filter: 2 $\mu$ m	ea.	25311
Inlet Filter: 10 $\mu$ m	ea.	25312
Inlet Filter: 20 $\mu$ m	ea.	25313

### Last Drop Filter

The flat filter element sits parallel to the bottom of the mobile phase reservoir, allowing the filter to draw 98% of the mobile phase without drawing air into the system. Conventional cylindrical mobile phase filters begin to draw air into the system when approximately 10% of the solvent remains in the reservoir. The Last Drop Filter allows more analyses per batch of mobile phase and helps reduce hazardous waste. 22.1mm OD.

Description	qty.	cat. #
Last Drop Filter: 2 $\mu$ m	ea.	25314
Last Drop Filter: 10 $\mu$ m	ea.	25315

### Kontes Membrane Microfiltration Glassware

47mm filtration apparatus with fritted glass support is recommended for routine filtration of corrosive liquids and removal of particles from HPLC solvents. The ground joint connection eliminates phthalate contamination that can occur when using silicone or neoprene stoppers. The support base has a coarse porosity glass frit and an integral vacuum connection, located above the drip tip to prevent contamination of the vacuum line with filtrate droplets. Each apparatus includes a funnel, an anodized aluminum clamp, a 47mm fritted glass support base, and a filtration flask.

Kontes All-Glass Microfiltration Apparatus	qty.	cat. #
300mL Funnel, 1000mL Flask	ea.	KT953825-0000
500mL Funnel, 2000mL Flask	ea.	KT953835-0000
1000mL Funnel, 4000mL Flask	ea.	KT953845-0000
Replacement Parts for Kontes Microfiltration Apparatus	qty.	cat. #
40/35 PTFE Joint Sleeve	6-pk.	KT676001-4035
Flask Cap, 40/35 Outer Joint	ea.	KT953830-0000
Fritted Glass Support, 47mm, 40/35 Joint	ea.	KT953826-0000
Glass Funnel, 47mm, 100mL	ea.	KT953761-0000
Glass Funnel, 47mm, 300mL	ea.	KT953751-0000
Glass Funnel, 47mm, 500mL	ea.	KT953771-0000
Glass Funnel, 47mm, 1000mL	ea.	KT953781-0000
Flask, 1000mL, 40/35 Joint	ea.	KT953827-0000
Flask, 2000mL, 40/35 Joint	ea.	KT953828-0000
Flask, 4000mL, 40/35 Joint	ea.	KT953829-0000
Aluminum Clamp, 47mm	ea.	KT953753-0000
Membrane Filters	qty.	cat. #
Polypropylene Membrane Filters, 47mm, 0.45 $\mu$ m	100-pk.	26396
Polypropylene Membrane Filters, 47mm, 0.22 $\mu$ m	100-pk.	26397
Nylon Membrane Filters, 47mm, 0.45 $\mu$ m	100-pk.	26398
Nylon Membrane Filters, 47mm, 0.22 $\mu$ m	100-pk.	26399

### tech tip

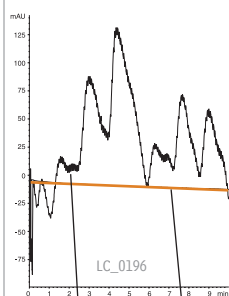
#### Mobile Phase Additives

Mobile phase additives such as triethylamine, trifluoroacetic acid, and ion-pairing reagents can compete with sample ions, decreasing sensitivity and, in some cases, reducing sample ion intake into the MS. To obtain symmetric peaks and/or sufficient retention, use base deactivated, state-of-the-art Type B silica packings that minimize the need for additives.



new!

### Degasys Ultimate Degasser provides highly stable baselines



Mobile Phase: water:methanol  
50:50  
Flow: 1.0 mL/min.  
Det.: UV @ 210nm

### Mobile Phase Degasser

Dissolved oxygen can cause flow rate instability and increased baseline noise. Also, it has a quenching effect on fluorescence detection and increases the background of UV detectors. Dissolved gases can out-gas in the HPLC system, forming bubbles in check valves, at connections, or in detector flow cells.

In-line vacuum degassing is more effective at removing dissolved gas from mobile phases than sonication or helium sparging. In-line degassers work by withdrawing gas across a gas-permeable membrane encased in a sealed chamber. Traditionally, the membrane has been made of PTFE tubing, but the Degasys Ultimate Degasser uses tubing composed of an amorphous fluoropolymer that is 200 to 300 times more gas permeable than PTFE. This translates into the ability to use shorter tubing for removing dissolved gas. This new material also has better tubular burst strength than PTFE. To prevent cross contamination, each channel on this Degasys unit is individually encased within its own vacuum chamber.



#### Specifications:

Residual Oxygen <sup>1</sup>	Pressure Loss <sup>1</sup>	Internal Volume	Wetted Parts	Max Flow Rate
0.9ppm	0.24psi (1.65kPa)	500μL	Teflon® AF, PTFE, ETFE, PPS	7mL/min./channel

<sup>1</sup> At a flow rate of 1mL/min.

Description	qty.	cat.#
110V Mobile Phase Degasser (4 Channel, 7mL/min./channel)	ea.	25189
220V Mobile Phase Degasser (4 Channel, 7mL/min./channel)	ea.	25194

Do not use the Degasys system with solutions containing TFA at concentrations greater than 5%.

### Solvent Debubbler

Bubbles in an HPLC system can cause check valve malfunctions and pump cavitation, seriously affecting pump performance. The debubbler removes bubbles from the fluid stream before it enters the pump.

Special geometry at the base of the housing allows bubbles entrained in the inlet fluid stream to rise and be trapped in the reservoir. The gas/liquid interface is easily visible through the translucent wall of the device. Loosening the airtight cap releases the trapped gas. The debubbler is fitted with a bracket and universal connecting tips.



Description	qty.	cat.#
Solvent Debubbler with Bracket	ea.	25014

### Sonic Debubbler

- Fast.
- Easy to use.
- Less solvent waste; less clean-up.

Just touch the Sonic Debubbler to the inlet line or check valve — sonic vibrations will quickly dislodge or redissolve trapped air bubbles. Reduces downtime or conversion time from one mobile phase to another.



Description	qty.	cat.#
Sonic Debubbler (110V)	ea.	20444
Sonic Debubbler (220V)	ea.	25098



CE



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Technical Service  
Representative  
8+ years of service!

**RESTEK**

**HRMalytic RESTECH '07**  
Australian Distributors  
ECH nology  
Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

**Opti-Cap™ Bottle Top**

The most economical way to helium-sparge and deliver HPLC mobile phases. The Opti-Cap™ top fits all standard GL45 bottles and has two 1/8-inch holes and one 1/16-inch hole for tubing.

Description	qty.	cat.#
Opti-Cap™ (Cap and PEEK™ Plug)	ea.	25300
Opti-Cap™ Kit (Opti-Cap™, 3 meters of tubing, sparging filters)	kit	25301
Opti-Cap™ Kit with 1L Bottle	kit	25302
Opti-Cap™ Kit with 2L Bottle	kit	25303
Related items and replacement parts	qty.	cat.#
SS Mobile Phase Mobile Phase Sparge Filter: 2µm	ea.	25311
Mobile Phase Inlet Filter: 10µm	ea.	25312
Teflon® Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307
Teflon® Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306
PEEK™ Plug, 1/4"-28 threads	3-pk.	25319
1L Graduated Safety-Coated Bottle – GL-45 threads	ea.	25304
2L Graduated Safety-Coated Bottle – GL-45 threads	ea.	25305



Opti-Cap™ Kit with bottle

**Eco-Cap Bottle Top, PTFE**

Fits all standard GL-45 bottles; has two 1/8-inch holes and one 1/16-inch hole for tubing.

Description	qty.	cat.#
Eco-Cap Bottle Top, includes 1 Male Luer Plug	ea.	25395

**Hub-Cap 4 Liter Bottle Tops**

Most bottles use a GL45 cap. New Hub-Cap bottle tops are a great way to neatly keep your mobile phase lines where they belong. Use instead of parafilm, aluminum foil, or tape on your mobile phase reservoirs.



new!



Hub-Cap (assembly of the bottle cap and plug)

Description	qty.	cat.#
Hub-Cap (assembly of the bottle cap and plug)	kit	26541
Hub-Cap Multi-pack	3-pk.	26542

**Hub-Cap Adapters**

Allow the use of the Opti-Cap™ with 4-liter solvent bottles.

Description	qty.	cat.#
Hub-Cap Adapter	ea.	26538
Hub-Cap Adapter Multi-pack	3-pk.	26539
Hub-Cap Adapter and Opti-Cap™	kit	26540

new!



Hub-Cap Adapter

Hub-Cap Adapter and Opti-Cap™

**Hub-Cap Filter Kit**

Kit includes: bottle adapter, bottle adapter nut, filter inlet cap, grid support, vacuum hose barb, tube compression fitting, 47mm grid, 47mm .22µm filter membrane, 47mm .45µm filter membrane, 1/4" OD x 1/8" ID ultra chemical resistant, Teflon® FEP lined Tygon® tubing (3'), 6" x 6" box with shrink wrap insert.

Description	qty.	cat.#
Hub-Cap Filter Kit	kit	26395

Replacement Membrane Filters	qty.	cat.#
Polypropylene Membrane Filters, 47mm, 0.45µm	100-pk.	26397
Polypropylene Membrane Filters, 47mm, 0.22µm	100-pk.	26397
Nylon Membrane Filters, 47mm, 0.45µm	100-pk.	26398
Nylon Membrane Filters, 47mm, 0.22µm	100-pk.	26399

new!

# Column Heater and Heater/Cooler, Gas Trapping System

new!

## Sidewinder™ Column Heater

- Easy to set up!
- Operation range: 5°C above ambient to 85°C,  $\pm 1^\circ\text{C}$ .
- Lightweight, compact design fits in small spaces.
- Column holder can be placed in any orientation.

This unique design completely encloses any HPLC analytical column up to 25cm in length. Two lengths of heater jackets are available: the short column holder accommodates columns up to 10cm in length, while the long column holder holds columns up to 25cm in length. The control module provides optimum heating performance, accuracy to within  $1^\circ\text{C}$ , and stability to within  $0.1^\circ\text{C}$ . The new Sidewinder™ controller has fast 10Hz sampling for improved responsiveness. Power requirements: 24V control unit for maximum stability; RS232 control allows external programming.

Description	qty.	cat.#
Temperature Control Module and Long Column Holder, 25cm Holder	ea.	26516
Temperature Control Module and Short Column Holder, 10cm Holder	ea.	26517

## Sidewinder™ Heater/Cooler Temperature Control Module

- Operation range: 5-55°C,  $\pm 0.2^\circ\text{C}$ .
- Ability to program multiple temperature points.
- Accommodates columns up to 30cm in length and 7.8mm ID.
- Compact design.

The Sidewinder™ heater/cooler unit has a doubly insulated cover to maintain the programmed temperature to within  $0.2^\circ\text{C}$ . The 24V control unit provides maximum stability and rapid equilibration times; RS232 control allows external programming.

Description	qty.	cat.#
Sidewinder™ Heater/Cooler Temperature Control Module	ea.	26518

All Sidewinder™ temperature control products carry the value recognized CE mark. Each unit meets the demanding electromagnetic emission standards of the new European Union Directives, United States standards, and Canadian standards.

## Mobile Phase Pre-heater

- Heats mobile phase before it enters a heated column.
- Minimizes temperature changes, to help keep analyte peaks sharp.

Description	qty.	cat.#
Mobile Phase Pre-heater	ea.	22484

## Super-Clean™ Gas Trapping System for LC/MS

- Changing filters is quick and easy.
- Up to 20L of hydrocarbon-free nitrogen per minute.

The Super-Clean™ Gas Trapping System is the latest technology in cartridge-style gas filtration for purifying nitrogen, and is ideal for use in LC/MS systems. The two-position baseplate (installed in the gas line) allows cartridges to be exchanged without introducing oxygen into the system. Spring-loaded check valves seal when a cartridge is removed and open only when a new cartridge has been locked in place. There is no need for loosening and tightening fittings every time you change cartridges, and your system cannot become contaminated during the changing process.

To meet the high flow needs of the LC/MS system, the charcoal-filled cartridges are positioned and connected in parallel. The incoming gas stream is split equally between the cartridges, and the two streams are rejoined after purification but before the gas exits the baseplate. This approach allows longer contact between the nitrogen and the adsorbent, ensuring higher gas purity and eliminating a potential source of contaminants to your analyses.

A handy date wheel, included with the system, indicates the cartridge installation date and the recommended replacement date.

Description	qty.	cat.#
Super-Clean™ Gas-Trapping System (2-position baseplate, 2 charcoal filters)	ea.	22062
2-Position Baseplate (1/4" Fittings)	ea.	22060
Replacement Hydrocarbon (Charcoal) Filters	2-pk.	22061

2-Position Base Plate



Sidewinder™ temperature control module



## it's a fact

A Super-Clean™ quick-change cartridge system efficiently removes hydrocarbons from nitrogen!



Charcoal Filters



### PEEK™ Survival Kit for HPLC

The PEEK™ Survival Kit is an invaluable parts kit that contains tubing, fittings, and tools essential for setting up and maintaining your HPLC system: PEEK™ tubing, connectors, and elbows, Teflon® tubing, a tubing cutter and extra blades, a ValvTool wrench, open-end wrenches, and more.

#### For start-up and maintenance in all HPLC systems.

Description	qty.	cat.#
PEEK™ Survival Kit for HPLC	kit	25322

Description	qty.	cat.#
PEEK™ Column Connector (beige, round body)	10-pk.	25015
PEEK™ Tubing, 1/16" OD x 0.005" ID x 3m (red stripe)	ea.	25065
PEEK™ Tubing, 1/16" OD x 0.007" ID x 3m (yellow stripe)	ea.	25066
PEEK™ Tubing, 1/16" OD x 0.010" ID x 3m (blue stripe)	ea.	25067
PEEK™ Tubing Elbow 90°	5-pk.	25308
PEEK™ Tubing Elbow 180°	5-pk.	25309
Teflon® Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306
Teflon® Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307
Tubing Clip	5-pk.	25310
ValvTool Wrench	ea.	25321
Open-End Wrenches (1/4" x 5/16")	2-pk.*	20110
Clean-Cut™ Tubing Cutter	ea.	25069
Replacement Blade for Clean-Cut™ Cutter	ea.	25070
PEEK™ Union Connector 1/16"	2-pk.	25323
Mobile Phase Sparge Filter: 2µm	ea.	25311
Inlet Filter: 10µm	ea.	25312

\*Kit contains 1 wrench, replacement (cat.# 20110) is 2-pk.



PEEK™ Survival Kit

### Stainless Steel Survival Kit for HPLC

The stainless steel survival kit contains a wide range of tubing, fittings, and tools necessary to set up and maintain your HPLC system: a selection of lengths and IDs of 1/16-inch tubing, plus nuts, ferrules, a ValvTool wrench, and a zero-dead-volume union.

Description	qty.	cat.#
Stainless Steel Survival Kit for HPLC	kit	25097

Description	color	qty.	cat.#
HPLC Capillary Tubing, SS 1/16" x 0.005" x 5cm	red	3-pk.	25240
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 10cm	red	3-pk.	25241
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 20cm	red	3-pk.	25242
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 30cm	red	3-pk.	25243
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 5cm	gray	3-pk.	25244
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 10cm	gray	3-pk.	25245
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 20cm	gray	3-pk.	25246
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 30cm	gray	3-pk.	25247
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 5cm	blue	3-pk.	25248
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 10cm	blue	3-pk.	25249
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 20cm	blue	3-pk.	25250
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 30cm	blue	3-pk.	25251
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 5cm	yellow	3-pk.	25252
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 10cm	yellow	3-pk.	25253
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 20cm	yellow	3-pk.	25254
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 30cm	yellow	3-pk.	25255
1/16" Rheodyne® Style Nut		10-pk.	25095
1/16" Rheodyne® Style Ferrule		10-pk.	25096
ValvTool Wrench		ea.	25321
1/16" Stainless Steel Ferrules		10-pk.	20286
1/16" Stainless Steel Nuts		10-pk.	20287
Zero-Dead-Volume Internal Union		ea.	20148



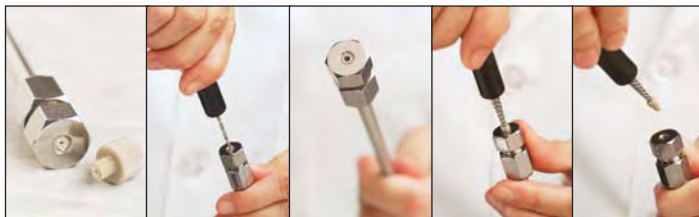
Stainless Steel Survival Kit

#### it's a **fact**

Survival Kits are convenient and economical, compared to ordering individual items!

**PEEK™ Fitting Extractor**

Drill into the broken fitting, then screw the extractor into the fitting and remove it easily. Eliminates the need for heat or other techniques that could damage your column.



Description	qty.	cat.#
PEEK™ Fitting Extractor	ea.	25325

**PEEK™ Union Connector**

Allows you to quickly and reliably connect two pieces of 1/16-inch tubing. 0.3mm union bore. End fittings included.

Description	qty.	cat.#
PEEK™ Union Connector 1/16"	2-pk.	25323

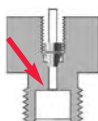
**Zero-Dead-Volume Internal Union**

Ends of tubing seat squarely at bottoms of fitting details. 300 series stainless steel. For 1/16-inch OD tubing. Stainless steel ferrules included.

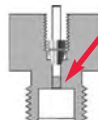
Description	Union Bore	Valco® #	qty.	cat.#
Internal Union	0.15mm	ZU1XC	ea.	20147
Internal Union	0.25mm	ZU1C	ea.	20148
Internal Union	0.75mm	ZU1	ea.	20149
Internal Union	1/16"	ZU1T	ea.	20150

**Figure 1**

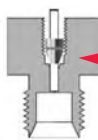
Incompatible fittings create problems.



Tubing and ferrule seated correctly



Tubing not seated, causing dead volume



Ferrule can't seal

**Improving Column Connections**

A good connection is necessary for trouble-free chromatography. Connecting incompatible fittings from different manufacturers can result in leaks, poor peak shape, and increased void volume (Figure 1). Each type of end-fitting has a unique seat depth or style. Generally, Restek, Valco®, Parker, and Upchurch® Scientific fittings are interchangeable; whereas Waters, SSI, Rheodyne®, and Gasukura fittings are not (Figure 2).

Our wrenchless universal 10-32 PEEK™ column connector (cat.# 25015, page 54) can be used with any style of end fitting, and all 1/16-inch tubing. It is reusable and will adjust to any seat, depth, or style.

**Figure 2** Fitting styles differ among various manufacturers.

Parker



Valco®



Waters



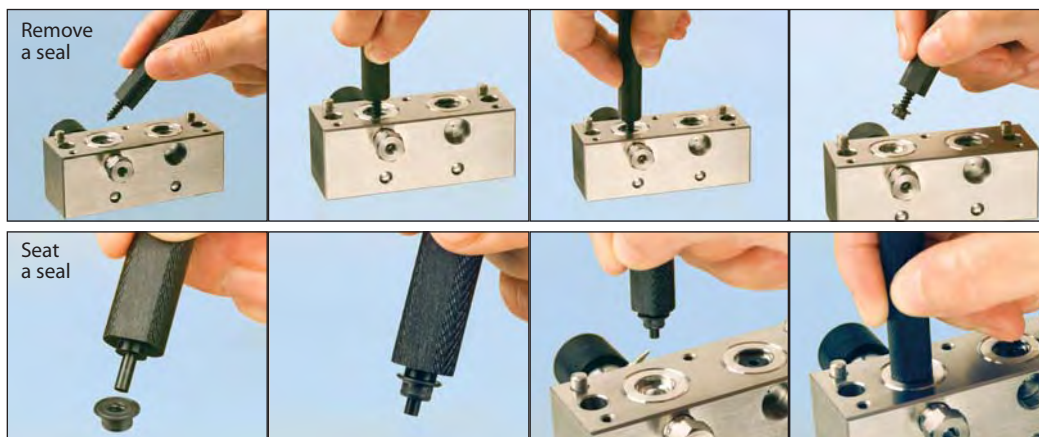
Rheodyne®



Swagelok® Parker A-Lok

**HPLC Piston Seal Insertion Tool**

Simplify pump maintenance: use one end to remove your old seal, then simply slip your new seal on the other end and push it flush into position. The tool cannot mar the surrounding metal surface of the pump housing.



Use the flat side of the Piston Seal Insertion Tool to seat a Waters face seal.

Description	qty.	cat.#
HPLC Piston Seal Insertion Tool	ea.	21356

**Secure-Fit Fittings**

A good connection between HPLC components is necessary for trouble-free chromatography. Secure-Fit connectors from Restek and Selerity Technologies ensure a consistent, leak-free seal—and they eliminate excess dead volume! An internal spring mechanism holds the capillary tubing at the proper depth in the female fitting. This seal is maintained while you finger-tighten the nut. These fittings are available in stainless steel or PEEK™, and in a variety of tubing lengths and internal diameters.

**Stainless Steel Secure-Fit Fittings—Single Connector**

Length	0.005" ID	0.007" ID	0.010" ID
6cm	25181	25185	25190
10cm	25182	25186	25191
20cm	25183	25187	25192
30cm	25184	25188	25193
50cm	26510	26511	26512

**Stainless Steel Secure-Fit Fittings—Two Connectors**

Length	0.005" ID	0.007" ID	0.010" ID
10cm	25208	25211	25214
20cm	25209	25212	25215
30cm	25210	25213	25216
50cm	26513	26514	26515

**PEEK™ Secure-Fit Fittings—Single Connector**

Length	0.005" ID	0.007" ID	0.010" ID
6cm	25230	25234	25217
10cm	25231	25235	25218
20cm	25232	25236	25219
30cm	25233	25237	25220

**PEEK™ Secure-Fit Fittings—Two Connectors**

Length	0.005" ID	0.007" ID	0.010" ID
10cm	25221	25224	25227
20cm	25222	25225	25228
30cm	25223	25226	25229



Stainless Steel Secure-Fit Fitting

## Connectors, Tubing Accessories



### PEEK™ Tubing Elbows

Tubing Elbows (90° and 180°) are ideal for routing 1/16-inch PEEK™ tubing through your system. Simply snap the tubing into the elbow. Prevent pinching of PEEK™ tubing which can cause high pressure.

Description	qty.	cat.#
PEEK™ Tubing Elbow 90°	5-pk.	25308
PEEK™ Tubing Elbow 180°	5-pk.	25309



### Tubing Dressing Tool

Opens stainless steel tubing bore and removes burrs. For 1/16-inch OD tubing or 1/8-inch OD tubing.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191



### Clean-Cut™ Tubing Cutter

- Burr-free, perpendicular cuts that will not distort the tubing OD or close the ID.
- Use on PEEK™, Teflon®, Tefzel®, other polymeric tubing.

Description	qty.	cat.#
Clean-Cut™ Tubing Cutter	ea.	25069
Replacement Blade for Clean-Cut™ Cutter	ea.	25070

For stainless steel tubing cutters, see our general catalog or website.



### Universal 10-32 PEEK™ Column Connectors and Plugs

Universal PEEK™ Connectors allow easy installation of all 1/16-inch tubing, including stainless steel. See "Improving Column Connections" data on page 52.

Description	qty.	cat.#
PEEK™ Column Connector (beige, round body)	10-pk.	25015
PEEK™ Column Plug (black)	10-pk.	25016
PEEK™ Fingertight Fittings (blue, flat-sided)	10-pk.	25324



### Rheodyne® Style Nut and Ferrule

Replacement long nut for connecting stainless steel tubing to a Rheodyne® 6-port valve or other Rheodyne® part.

Description	qty.	cat.#
1/16" Rheodyne® Style Nut	10-pk.	25095
1/16" Rheodyne® Style Ferrule	10-pk.	25096



### ValvTool Wrench

The ValvTool is a time-saving device that provides easy access to many hard-to-reach Rheodyne® or Valco® valves. For 1/4-inch nuts.

Description	qty.	cat.#
ValvTool Wrench	ea.	25321

## Inert PEEK™ Tubing

- Replaces stainless steel, titanium, Teflon® or Tefzel® tubing.
- Less oxygen permeable and more temperature resistant (to 250°C) than Teflon® or Tefzel® tubing.
- Use with PEEK™ fingertight or flangeless fittings.
- Use to 7,000psi (48,263kPa).

Description	Color Code	qty.	cat.#
PEEK™ Tubing, 1/16" OD x 0.0025" ID x 1m	pink dash stripe	3-pk.	25320
PEEK™ Tubing, 1/16" OD x 0.005" ID x 3m	red stripe	ea.	25065
PEEK™ Tubing, 1/16" OD x 0.007" ID x 3m	yellow stripe	ea.	25066
PEEK™ Tubing, 1/16" OD x 0.010" ID x 3m	blue stripe	ea.	25067
PEEK™ Tubing, 1/16" OD x 0.020" ID x 3m	orange stripe	ea.	25068



## HPLC Stainless Steel Capillary Tubing

- 316 grade stainless steel.
- Precise pre-cut lengths.
- Smooth surface finish.
- Ultra clean.

Whether you need to replace system tubing as part of your troubleshooting or are looking to reduce the dwell volume of your system as you move to narrower columns, Restek has the quality tubing in the lengths and IDs you need. Each ID is color-coded so it is easy to identify and replace correctly.

Length	qty.	0.005" ID (red) cat.#	0.007" ID (gray) cat.#	0.010" ID (blue) cat.#	0.020" ID (yellow) cat.#
1/16" OD					
5cm	3-pk.	25240	25244	25248	25252
10cm	3-pk.	25241	25245	25249	25253
20cm	3-pk.	25242	25246	25250	25254
30cm	3-pk.	25243	25247	25251	25255



## Teflon® Tubing

- Ideal for mobile phase inlet lines.
- Chemically inert.
- Use to 500psi (3,447kPa) and 80°C.

Description	qty.	cat.#
Teflon® Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306
Teflon® Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307



## Tubing Clip

Securely holds 1/16-inch or 1/8-inch tubing in beaker, flask, or bottle up to 4mm thick.

Description	qty.	cat.#
Tubing Clip	5-pk.	25310



## Flow Splitters, Static Mixers

### QuickSplit™ Post-Column Flow Splitters

Fluid resistor technology eliminates adjustments to capillary tubing for optimizing split ratio. Wide range of interchangeable resistors available.



### Fixed Flow Splitters for HPLC & LC/MS

- Split ratio not affected by changes in viscosity or pressure.
- High operating pressure limit: 10,000psi (68,948kPa).
- Low dead volume - negligible effect on analyte bandwidth.
- Total flow: 0.1–5.0mL/min.

### Adjustable Flow Splitter

- Adjustable metering valve gives convenient control of split ratio.
- Split ratio not affected by changes in viscosity or pressure.
- High operating pressure limit: 5,000psi (34,474kPa).
- Low dead volume - negligible effect on analyte bandwidth.
- Total flow: 0.1–5.0mL/min.



Description	Split Ratio	qty.	cat.#
Binary Fixed Flow Splitter	100:01:00	ea.	25326
	50:01:00	ea.	25327
	20:01	ea.	25328
	10:01	ea.	25329
	5:01	ea.	25330
Replacement Fixed Flow Splitter Resistor Set	100:01:00	ea.	25331
	50:01:00	ea.	25332
	20:01	ea.	25333
	10:01	ea.	25334
	5:01	ea.	25335
Adjustable Flow Splitter	5:1 to 100:1	ea.	25336
	1:1 to 20:1	ea.	25337
	new! 50:1 to 1000:1	ea.	26416
Replacement Adjustable Flow Splitter Resistor Set	5:1 to 100:1	ea.	25338
	1:1 to 20:1	ea.	25339

### did you know?

We are pleased to offer HPLC accessory items from Analytical Scientific Instruments (ASI). ASI specializes in HPLC system components and parts that often exceed the original equipment manufacturer's performance. See [page 45](#).

### HyperShear™ HPLC Mixers

- Reduced baseline noise.
- Increased sensitivity.
- Improved gradient accuracy, for more reproducible results.
- Increased reaction efficiency in post-column derivatization.



An efficient cross-flow shearing mechanism and interchangeable cartridges produce vortex shear mixing over a wide range of flows. Stainless steel or PEEK™.

### HyperShear™ Static In-Line Mixers

Description	qty.	Stainless Steel		PEEK™	
		cat.#		cat.#	
new! < 1µL In-Line Mixer	ea.	26409		ea.	26410
25µL In-Line Mixer	ea.	26411		ea.	26412
50µL In-Line Mixer	ea.	25341		ea.	26413
150µL In-Line Mixer	ea.	25342		ea.	26414
250µL In-Line Mixer	ea.	25343		ea.	26415

### Ternary Tee Mixer

Description	qty.	cat.#
25µL Ternary Tee Mixer	ea.	25138



**FlatLine™ Pulse Damper**

- Rupture-proof, no diaphragm—minimal risk of failure or leaks.
- Clean flush-out design—no sample carryover.
- Low internal volume—negligible effect on analyte bandwidth.

The ASI FlatLine™ Pulse Damper combines performance and reliability in a simple, easy-to-use housing. Standard 10-32 inlet and outlet ports allow quick connection into virtually any HPLC system. Solid core technology provides reliable long-term operation without the down time associated with ruptured or leaking membrane dampers. 600–700µL internal volume at ambient pressure.

Description	qty.	cat.#
FlatLine™ Pulse Damper	ea.	25340

**MicroPulse™ Pulse Dampers**

- Compact unit (2.5" x 1.5") can be placed almost anywhere.
- Small, 150µL dead volume at atmospheric pressure.
- PEEK™ unit can withstand pressures to 5,000psi (34,474kPa).
- 316 Stainless steel unit can withstand pressures to 6,000psi (41,369kPa).

Improves system baseline stability while increasing the total system volume by only 150µL. The MicroPulse™ pulse damper is ideal for applications where minimizing the total system volume is critical. Stainless steel and PEEK™ options for a wide range of applications.

Description	qty.	cat.#
MicroPulse™ Pulse Damper, Stainless Steel	ea.	25238
MicroPulse™ Pulse Damper, PEEK®	ea.	25239

**LO-Pulse® Pulse Damper**

The LO-Pulse® Pulse Damper is a patented, wide-dynamic-range 316 stainless steel device that smooths pulsations and maintains constant flow at system pressures up to 6,000psi (41,369kPa). The flow path volume is only 0.9mL and the path is efficiently swept, eliminating solvent memory effects when changing mobile phases.

The LO-Pulse® pulse damper also is available in a space-saving, economical kit that includes hardware for mounting the pulse damper on a bracket, or for installing feet on it for bench-top use.

Description	qty.	cat.#
Model LP-21 LO-Pulse® Pulse Damper	ea.	25012
Pulse Damper Kit	kit	25013



LO-Pulse®  
Pulse Damper Kit

**Backpressure Regulators**

Backpressure regulators can improve detector performance by preventing bubble formation in the detector flow cell. They also are useful in post-column reaction lines and between detectors and fraction collectors in preparatory work. Regulators are superior to more specific alternative solutions, like small-bore tubing, in which pressure varies with flow rate.

Our end-of-line and flow-through backpressure regulators are adjustable to assure constant backpressure over a wide range of mobile-phase viscosities and flow rates. The end-of-line model is available with 1/4-28 plastic flange-type fittings or high-pressure 1/16-inch compression fittings; this design adjusts from 15 to 60psi (103 to 414kPa). The flow-through design has 1/16-inch compression fittings and is adjustable from 7 to 75psi (48 to 517kPa).

Description	qty.	cat.#
A) Backpressure Regulator: end-of-line, 1/16-inch OD tubing, flanged	ea.	25017
B) Backpressure Regulator: end-of-line, high-pressure seat	ea.	25018
C) Backpressure Regulator: flow-through, 5µL internal volume	ea.	25020





### HPLC Column Tubing

Restek tubing is manufactured from fine, chromatographic-grade 316 stainless steel. It is corrosion resistant, ultrasonically cleaned and passivated. We polish the tubing and promise a burr-free cut. You can use this tubing immediately—there is no need for any additional treatment.

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>1/4" OD Tubing</b>			
30mm	25100	25106	25112
50mm	25101	25107	25113
100mm	25102	25108	25114
150mm	25103	25109	25115
200mm	25104	25110	25116
250mm	25105	25111	25117



### 1/4-Inch HPLC Frits

We manufacture our frits from fine, chromatographic-grade 316 stainless steel, and we offer sizes to fit most column and pore sizes. To choose the correct frit, check its pore size compatibility with the particle size of the packing in the column (see chart at left). If the packing has a smaller particle size than the pore size of the frit, the packing can clog the frit.

Packing particle size	Use this pore size:
3–4 $\mu$ m	0.5 $\mu$ m
5–20 $\mu$ m	2.0 $\mu$ m

ID	Pore Size	qty.	cat.#
4.6mm	2.0 $\mu$ m	10-pk.	25071
4.6mm	0.5 $\mu$ m	10-pk.	25072
3.2mm	2.0 $\mu$ m	10-pk.	25073
3.2mm	0.5 $\mu$ m	10-pk.	25074
2.1mm	2.0 $\mu$ m	10-pk.	25075
2.1mm	0.5 $\mu$ m	10-pk.	25076

### Column End-Fittings

1/4-inch end-fittings are compatible with Valco® and Parker fittings.



Description	qty.	cat.#
Column End-Fitting for 4.6mm Column	ea.	25077
Column End-Fitting Flat Bottom	ea.	25078

### Empty Chromatography Columns

- 316 stainless steel tubing complete with end-fittings, frits, nuts, and ferrules.
- Preassembled prior to shipment, unless otherwise requested.
- Internal 1/16-inch seats are compatible with Valco® and Parker fittings.



Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>1/4" OD Tubing</b>			
30mm	25118	25124	25130
50mm	25119	25125	25131
100mm	25120	25126	25132
150mm	25121	25127	25133
200mm	25122	25128	25134
250mm	25123	25129	25135

## Restek Pack in a Box Kit

Restek's new Pack in a Box Kit is a complete column-packing system. Everything you need to pack your own analytical HPLC columns is included: pump, reservoir, column hardware, packing material, and system control software (computer not included). Detailed packing instructions and a video also are included. The packing pump is electric, so no pressurized air is required.

Description	qty.	cat.#
Pack in a Box Kit	kit	26408

new!



## HPLC Organizers



LCLocker™ HPLC Organizer



Deluxe BenchBooster™ Organizer



Mini pHPerch™ Storage Unit



TopLoader™ BalanceBank™ Storage Unit



**Bill Grove**  
Instrument Innovations  
1+ year of service!



HPLC 30-Column Storage Cabinet



Book Holders



Open Supply Bins, 13-bin unit



Glove Box Dispensers

Description	dimensions	qty.	cat.#
LCLocker™	24 x 12 x 6"	ea.	25149
BenchBooster™	24 x 7 x 12"	ea.	25150
Mini pHPerch™	13 x 12 x 6"	ea.	25147
TopLoader™	12 x 12 x 7"	ea.	25148
30 Column Cabinet	17 <sup>3</sup> / <sub>8</sub> x 15 x 2 <sup>7</sup> / <sub>8</sub> "	ea.	25159
Book Holder, Small	0.75" ID	ea.	25151
Book Holder, Large	1.5" ID	ea.	25152
Open Supply Bin, 4-bin Unit	24 x 12 x 10"	ea.	25153
Open Supply Bin, 5-bin Unit	12 x 16 x 10.5"	ea.	25154
Open Supply Bin, 13-bin Unit	12 x 7.5 x 12"	ea.	25155
Glove Box Dispenser, Single	5 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25156
Glove Box Dispenser, Double	10 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25157
Glove Box Dispenser, Triple	15 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25158

\*Please note: Accessories and supplies in photographs are not included.

## HPLC Pump Pressure Conversion Table

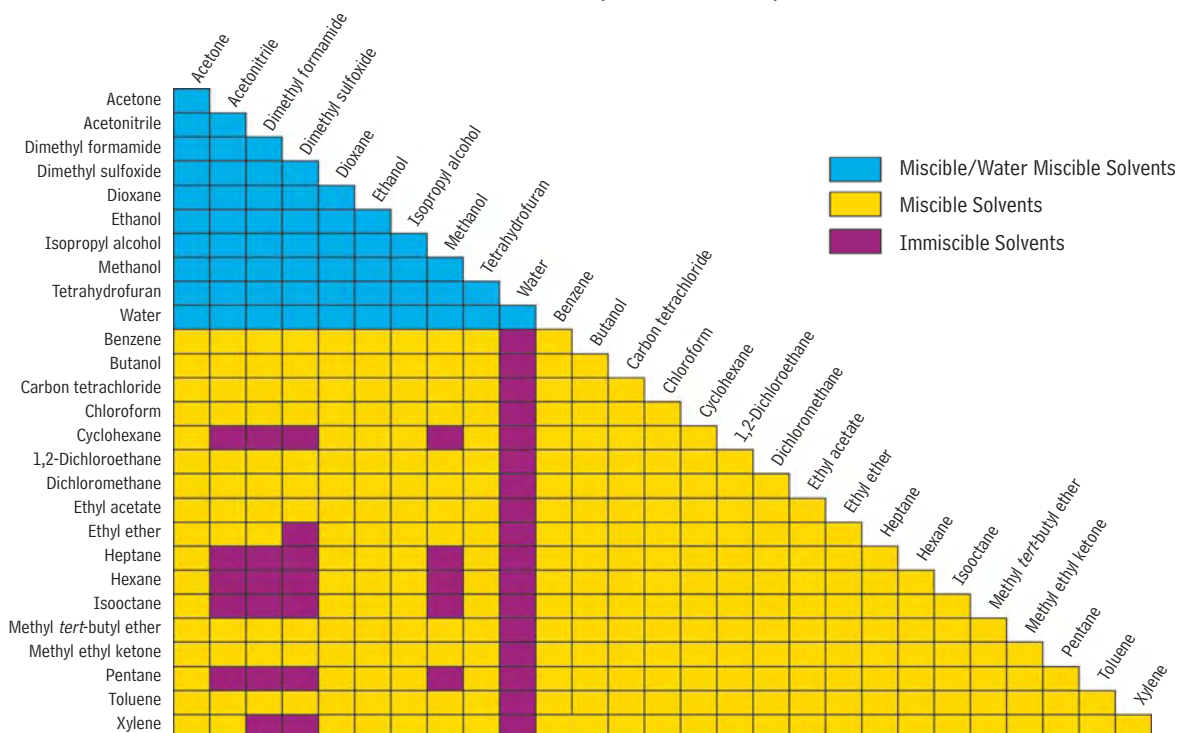
Pressure	psi	atm	kg/cm <sup>2</sup>	torr	kPa	bar	inches Hg
1 psi =	1	0.068	0.0703	51.713	6.8948	0.06895	2.0359
1 atm =	14.696	1	1.0332	760	101.32	1.0133	29.921
1 kg/cm <sup>2</sup> =	14.223	0.967	1	735.5	98.06	0.9806	28.958
1 torr =	0.0193	0.00132	0.00136	1	0.1330	0.00133	0.0394
1 kPa =	0.1450	0.00987	0.0102	7.52	1	0.0100	0.2962
1 bar =	14.5038	0.9869	1.0197	751.88	100	1	29.5300
1 in Hg =	0.49112	0.0334	0.0345	25.400	3.376	0.03376	1

Multiply units in the left-most column by the conversion factors listed in the columns to the right.

e.g., 10 psi x 0.068 = 0.68atm

10 bar x 29.5300 = 295.300 inches Hg

## Solvent Miscibility and Solubility



**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 62** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—



## Crimpers and Decappers

Safer than removing caps with pliers, knife or screwdriver blade!



Decapper



Crimper

### Aluminum Seal Crimpers and Decappers

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!

Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738



### Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.



CE

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.

### Decapping has never been easier!

one. . .

two. . .

three!



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

**Screw-Thread Step™ Vials, 4.0mL, WISP™ 48 Style, 13mm/425 Screw-Thread****WISP™ 48 Screw-Thread Step™ Vials (15 x 45mm, 13/425 Screw-Thread)**

Description	100-pk.	1000-pk.
4.0mL Clear Step™ Vial, White Grad. Marking Spot	24654	24655
4.0mL Amber Step™ Vial, White Grad. Marking Spot	24656	24657

**Caps and Septa**

Description	100-pk.	1000-pk.
Top Hat™, PTFE/Silicone Septa	21745	21746
Pre-Assembled, Red PTFE/Silicone, 0.065"	21743	21744
Caps, Black, Polypropylene, Open-Hole	21741	21742
Septa, Red PTFE/Silicone, 0.040"	21751	21752
Septa, Red PTFE/Silicone, 0.060"	21749	21750

**Limited Volume Inserts**

Description	100-pk.	1000-pk.
500µL, Glass, WISP™, Flat Bottom*	21787	21788

\*Also fit 4.0mL Snap Seal™ Vials (see our general catalog or website).



4.0mL Clear Step™ Vial

**Shell Vials, 1.0mL, WISP™ 96 Style, 8 x 40mm****WISP™ 96 Style, 8 x 40mm Shell Vials**

Description	200-pk.	1000-pk.
1.0mL Clear Vial	24662	24663
1.0mL Amber Vial	24664	24665
1.0mL Polypropylene Vial	24678	24679
700µL Limited Volume Polypropylene Vial	24680	24681

**8mm Starburst Plugs**

Description	200-pk.	1000-pk.
Snap Plug, Clear Polyethylene	21769	21770
Snap Plug, Conical, Clear Polyethylene	21771	21772
Snap Plug, Silicone Lined, Clear Polyethylene	21773	21774

**Limited Volume Inserts for Shell Vials**

Description	100-pk.	1000-pk.
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777



# LC Autosampler Syringes

## Syringes for Agilent 1090 & 1100 LC Autosamplers



25µL, 1/4-32 UNEF Thread

### SGE Syringes

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
25µL	25D-HP1090-GT	003670	ea.	22290
250µL	250D-HP1090-GT	006670	ea.	22291

## Syringe for Hitachi LC Autosamplers



500µL, M10 X1 Thread

### SGE Syringe

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
500µL	500C-HITACHI	007660	ea.	22292

## Syringes for PerkinElmer LC Autosamplers



250µL, 1/4-28 UNF Thread

### SGE Syringes

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
50µL	50D-CX-GT	004995	ea.	22295
100µL	100D-CX-GT	005990	ea.	22296
250µL	250D-CX-GT	006995	ea.	22297
500µL	500D-CX-GT	007995	ea.	22298
1mL	1MD-C-GT	008185	ea.	22299

## Syringes for Waters WISP™ LC Autosamplers



250µL, 1/4-28 UNF Thread

### SGE Syringes

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
25µL	25D-WISP	003990	ea.	22293
250µL	250D-WISP	006690	ea.	22294

## Syringes for Waters WISP™ LC Autosamplers

Teflon® PTFE-tipped plungers



### Hamilton Syringes

Volume	Hamilton		qty.	Restek
	Model	cat.#		cat.#
25µL	1702	80020	ea.	24528
250µL	1725	80024	ea.	24529

## Syringes for CTC/LEAP LC Autosamplers



new!

### Hamilton Syringes

Hamilton 10µL LC Autosampler Syringe

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	cat. #	qty.	Restek cat. #
10µL	N	22s	2"/51mm	3	701N	203073	ea.	22743
25µL	N	22s	2"/51mm	3	1702N	203075	ea.	22744
100µL	N	22s	2"/51mm	3	1710N Slim Line*	203077	ea.	22745
100µL	N	22	2"/51mm	3	1710N	203235	ea.	22746
250µL	N	22	2"/51mm	3	1725N	203079	ea.	22747
500µL	N	22	2"/51mm	3	1750N	203349	ea.	22748

\*Barrel O.D. = 6.7mm; all other 25µL and 100µL syringes have a 7.9mm barrel O.D.



new!

### SGE Syringes

SGE 10µL LC Autosampler Syringe

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	cat. #	qty.	Restek cat. #
10µL	F	22s	2"/51mm	LC	10F-CTC-LC	002710	ea.	22737
25µL	F	22s	2"/51mm	LC	25F-C/TLC	003984	ea.	22738
25µL*	R	22s	2"/51mm	LC	25R-C/T-GT-LC	003985	ea.	22739
50µL*	F	22s	2"/51mm	LC	50F-C/T-GT-LC	004810	ea.	22740
100µL*	R	22s	2"/51mm	LC	100R-C/T-GT-LC	005330	ea.	22741
500µL*	F	22s	2"/51mm	LC	500F-CTC-GT-LC(0.41)	007720	ea.	22742

\*Gas-Tight syringe.

## Analytical Reference Materials

### HPLC Normal Phase Test Mix #1

Routine analysis using this mix can assist in determining the need to perform column and/or system maintenance.

benzene	1.00mg/mL	benzyl alcohol	3.00
benzaldehyde	0.04	4-methoxybenzyl alcohol	2.00
In hexane, 1mL/ampul			
cat. # 35004 (ea.)			

No data pack available.

### HPLC Reversed Phase Test Mix #1

Routine analysis using this mix can assist in determining the need to perform column and/or system maintenance.

benzene	3.00mg/mL	naphthalene	0.50
uracil	0.02	biphenyl	0.06
In methanol:water (75:25), 1mL/ampul			
cat. # 35005 (ea.)			

No data pack available.

### HPLC Performance Test Mix

The National Institute of Standards and Technology (NIST) formulated a mixture that is highly effective for characterizing HPLC columns for efficiency, void volume, methylene selectivity, retentiveness, and activity toward chelators and organic bases. Results can be used for column classification, column selection, monitoring column performance over time, or for quality control. We test our material against the NIST 870 standard.

amitriptyline hydrochloride	2800µg/mL	quinizarin	94
ethylbenzene	1700	toluene	1400
In methanol, 1mL/ampul		uracil	28
cat. # 31699 (ea.)			

### HPLC OQ Linearity Test Mix Kit

Linear detector responses to concentration variations are an important part of operation qualification (OQ) for HPLC instruments. Our kit of five aqueous solutions of caffeine can be used to generate simple plots of UV response versus concentration. Certificate of Analysis includes caffeine concentration, calculated variance in preparing each mixture, a linearity plot, and coefficient of determination ( $r^2$ ) for the linear plot.

Caffeine at 5.0, 25.0, 125.0, 250.0, 500.0 µg/mL in water in a five ampul kit.

1mL each of these mixtures.

cat. # 31805 (kit)

No data pack available.

### Carbohydrate HPLC Performance Check Mix

Performance qualification (PQ) determines the precision of the HPLC system. Our performance check mix for HPLC / RI consists of five simple sugars in varied concentrations. We prepare the reference material in water, lyophilize it, and pack it dry for enhanced stability.

glucose	2.0mg	maltose	4.5
fructose	2.1	sucrose	4.0
lactose	4.4		

Dry components in 4mL screw-cap vial.

Reconstitute in 1mL acetonitrile:water (75:25) to 2.0, 2.1, 4.4, 4.5, 4.0 mg/mL, respectively.

cat. # 31809 (ea.)

No data pack available.

# Genuine Restek Replacement Parts & Accessories for HPLC Systems



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**Becky Witttrig**  
HPLC Products  
Marketing Manager  
7+ years of service!



Piston Seals



Outlet Ball Valve



Needle Seat Assembly



Lamp, VWD G1314A

## Restek Replacement Parts for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#
Preventive Maintenance Kit (Includes: rotor seal, needle seat, needle assembly, seat cap)	1050	01078-68721	kit	25259
Autosampler Preventive Maintenance Kit (Includes: rotor seal, needle assembly, needle seat)	1100	G1313-68709	kit	25271
Pump Maintenance Kit (Includes: PTFE frit, outlet cap, active inlet cartridge, gold disk seal, 2 piston seals, glass solvent filter)	1050, 1100	G1311-68710	kit	25270
Outlet Ball Valve, Binary Pump	1100, 1200	G1312-60012	ea.	25267
Outlet Ball Valve	1050, 1100, 1200	G1311-60012	ea.	25276
Sieves for Outlet Valve	1050, 1100, 1200	5063-6505	10-pk.	25266
Check Valve Cartridge Assembly	1090	79835-67101	ea.	25344
Piston Seals, Teflon w/Graphite	1050, 1100, 1200	5063-6589	2-pk.	22482
Piston Seals, Teflon w/Graphite	1050, 1100, 1200	5063-6589	10-pk.	22483
Piston Seals (Black)	1090	5062-2494	4-pk.	25347
Seal Wash Kit, Binary Pump (4 seals, 4 gaskets)	1100	—	kit	25268
Seal Wash Kit (2 seals, 2 gaskets)	1050, 1100	—	kit	25269
Wash Seal	1050, 1100, 1200	0905-1175	ea.	25277
Sapphire Piston	1050, 1100, 1200	5063-6586	ea.	25273
Sapphire Piston	1090	6980-0672	ea.	25345
Needle Seat	1050	79846-67101	ea.	25258
Needle Seat	1090	79846-67101	ea.	25348
Needle Seat Assembly	1100	G1313-87101	ea.	25265
Needle Assembly	1100	G1313-87201	ea.	25278
Rotor Seal (not for use with 7125 injection valve)	1050	0101-0626	ea.	25272
Rotor Seal	1100	0100-1853	ea.	25275
Rotor Seal (Rheodyne-style)	1090	0101-0623	ea.	25349
Frits, PTFE	1050, 1100, 1200	01018-22707	5-pk.	25466
Seal, Gold Disk (outlet)	1050, 1100, 1200	5001-3707	ea.	25467
Outlet Cap	1050, 1100	5062-2485	4-pk.	25139
Outlet Cap & Gold Seal Assembly	1050, 1100	—	2-pk.	25140
Connecting Tube	1050, 1100	G1311-67304	ea.	25058
Bottle Head Assembly	—	G1311-60003	ea.	25059
Detector Lamp, 1090 DA, 1050 VW/DA/MWD	1090, 1050	79883-60002	ea.	25260
Lamp, DAD G1315A, G1365A	1100, 1200	2140-0590	ea.	25261
Lamp, VWD G1314A	1100, 1200	G1314-60100	ea.	25262
8453 Deuterium Lamp	—	2140-0605	ea.	25263
G1321 Fluorescence Detector Flash Lamp	—	2140-0600	ea.	25264
Lamp, DAD Long Life Deuterium (2000 hours)	1100	5181-1530	ea.	25399
Helium Tubing, 5m, PTFE, 0.057" ID	1050, 1100	5062-2461	ea.	24990
Injector Lubricant, PTFE, 10g	1050, 1100	79841-65501	ea.	26520

## Capillary Stainless Steel Tubing Assemblies for Agilent HPLC Systems

- Precut, micropolished tubing and preassembled fittings for quick, easy maintenance.



Capillary SS Tubing with fittings



Mixing Capillary Assembly

Description	Model #	Similar to Agilent part #	qty.	cat.#
Capillary SS Tubing, 130mm x 0.17mm ID, with fittings	1090	01090-87305	ea.	26525
Capillary SS Tubing, 800mm x 0.17mm ID, with fittings	1050	01078-87305	ea.	26526
Capillary SS Tubing, 180mm x 0.17mm ID, with fittings	1100	G1313-87305	ea.	26527
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01018-67305	ea.	26528
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01078-87306	ea.	26529
Seat Capillary, SS Tubing, 0.17mm ID	1050	01078-87303	ea.	26530
Capillary SS Tubing, 105mm x 0.17mm ID	—	5021-1816	ea.	26531
Mixing Capillary Assembly	1100	G1312-67302	ea.	26532
Capillary SS Tubing, Valve to Metering Head	1100	G1313-87301	ea.	26533
Capillary SS Tubing, 150mm x 0.17mm ID	—	5021-1817	ea.	26534
Capillary SS Tubing, 280mm x 0.17mm ID	—	5021-1818	ea.	26535
Capillary SS Tubing, 400mm x 0.17mm ID	—	5021-1819	ea.	26536
1/16" SS Fitting, Front and Back Ferrules	—	5062-2418	10-pk.	26537

## Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

Easily install the gold seal into the outlet cap.



Put Outlet Cap on male part of Assembly Tool.



Push the Assembly Tool together.



Hold onto Outlet Cap and pull Assembly Tool apart.



Put Gold Seal over pin on male part of Assembly Tool.



Push the Assembly Tool together and press the Gold Seal in the Outlet Cap.



Pull the Assembly Tool apart and remove assembled Outlet Cap and Gold Seal.



Outlet Cap & Gold Seal Assembly

Description	qty.	cat.#
Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems	ea.	24989
Seal, Gold Disk (outlet)	ea.	25467
Outlet Cap	4-pk.	25139
Outlet Cap & Gold Seal Assembly	2-pk.	25140

## Restek Replacement Parts for Beckman HPLC Systems

Description	Model #	Similar to Beckman part #	qty.	cat.#
Inlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240720	ea.	25439
Outlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240721	ea.	25440
Inlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240620	ea.	25441
Outlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240621	ea.	25442
Guide Sleeve for Graphite Plunger Guide	110 Series Pumps	243713	ea.	25444
Outlet Check Filter Frit Assembly	110 Series Pumps	240619	ea.	25445
Piston Guide Assembly	110 Series and 112 Pumps	243045	ea.	25446
Plunger	110 Series and 112 Pumps	243053	ea.	25447
Plunger Seal	110 Series Pumps	887138	ea.	25448
Sapphire Plunger	114M, 116, 118, 125, 126, 127, 128 Pumps	240714	ea.	25450
Plunger Seal	114M, 116, 118, 126, 127, 128 Pumps	241037	ea.	25451
Pump Seal, Gold*	114, 116, 125, 126, 127, 128 Pumps	241037	ea.	25452
Plunger Wash Seal	125, 126, 127, 128 Pumps	728772	ea.	25453
Deuterium Lamp	DU60, 62, 64, 65	596791	ea.	25454

\*Ultra-high molecular weight polyethylene (UHMWPE)



Outlet Check Valve Assembly

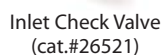


Sapphire Plunger

## Restek Replacement Parts for Hitachi HPLC Systems

Description	Model #	Similar to Hitachi part #	qty.	cat.#
SS Check Valve Cartridges (1/16" Ruby Ball)	655/6000/6200	AN0-085	2-pk.	25455
Inlet Check Valve Assembly	655/6000/6200	AN0-0833	ea.	25456
Outlet Check Valve Assembly	655/6000/6200	AN0-0834	ea.	25457
Plunger Assembly	655, 6000, 6200, 7100	810-1033	ea.	25458
Plunger Seal	L655A, 6000, 6200, 7100	655-1080	ea.	25459
Plunger Seal, Gold	655, 6000, 6200, 7100	655-1080	ea.	25460
Inlet Check Valve Assembly	L-7100	AN0-0836	ea.	25461
Outlet Check Valve Assembly	L-7100	AN0-0837	ea.	25462
Rotor Assembly for Dilutor Valve	AS-7200 Autosampler	810-3085	ea.	25463
Rotor Seal Kit	AS-7200, AS-7250 Injection Valve	AN0-0818	ea.	25464
Deuterium Lamp, Prealigned	L4000, L4200, L4250, L7400	AN0-0424	ea.	25465





## Restek Replacement Parts for Waters HPLC Systems

Description	Model #	Similar to Waters part #	qty.	cat.#
Preventative Maintenance Kit Includes: sparge diffuser, filter insert, compression screws, SS ferrule, battery for 2690/717, 250µL WISP syringe, seal wash plunger seal kits (2), wash tube seal kits (4), 2690 seal pack rebuild kit (steel bodies not included), 2690 head plunger seal kits (2), solvent reservoir 20µm filters (4), Alliance check valve cartridges (2), Alliance plunger assemblies (2), 2690 face seals (4)	Alliance 2690, 2695	WAT270944	kit	25143
Preventative Maintenance Kit Includes: PerformancePLUS cartridges (2), sparge diffusers (4), Super Seals (2), solvent reservoir 20µm filters (2), sapphire plungers (2), reference valve rebuild kit, inlet manifold kit	600 Pump	WAT052675	kit	25144
Preventative Maintenance Kit Includes: 717 seal pack with needle, filter insert, 250µL WISP syringe	717 Autosampler	WAT052669	kit	25145
Preventative Maintenance Kit Includes: 616/326/625 plunger assemblies (2), pump seal kit, sparge diffusers (4), solvent reservoir 20µm filters (4), 616 cartridge assemblies (4)	616 Pump	WAT052672	kit	25146
Preventative Maintenance Kit Includes: PerformancePLUS check valves (2), sparge diffuser, solvent 10µm filter, sapphire plungers (2), plunger seals (2)	515 Pump	WAT052587	kit	26519
Inlet Check Valve Assembly	M6KA, 501, 510, 515, 590, 600E	33679, 25214	ea.	25360
Inlet Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	25203	ea.	25361
Inlet Check Valve Rebuild Kit	M6KA, 501, 510, 515, 590, 600E	60495	2-pk.	25362
Outlet Check Valve Assembly (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25030	ea.	25363
Outlet Check Valve Housing (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25212	ea.	25364
Outlet Check Valve Rebuild Kit (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	26016	2-pk.	25365
Outlet Check Valve Assembly (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25216	ea.	25366
Outlet Check Valve Housing (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25207	ea.	25367
Outlet Check Valve Rebuild Kit (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	26014	2-pk.	25368
Inlet Check Valve Assembly, 225µL (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	60307	ea.	25369
PerformancePLUS Check Valve Cartridge	M6KA, 501, 510, 515, 590, 600E	700000254	2-pk.	25370
Check Valve Rebuild Kit (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	88223	2-pk.	25371
PerformancePLUS Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	—	ea.	25372
Check Valve Cartridges	Alliance	WAT270941	2-pk.	25373
Super Seal for Analytical Heads	M6KA, 501, 510, 515, 590, 600E	22946, 22934	ea.	25374
Plunger Seal, Gold for Analytical Heads*	M6KA, 501, 510, 515, 590, 600E	22934	ea.	25375
Plunger Seal, Black for graphite-filled Teflon	M6KA, 501, 510, 515, 590, 600E	26613	ea.	25378
Plunger Seal, Black for EF Heads	510, 590, 600E	26644	ea.	25379
Plunger Seal, Gold for EF Heads	510, 590, 600E	26644	ea.	25380
Seal Wash Plunger Seal	Alliance	WAT271018	2-pk.	25386
Head Plunger Seal Kit	Alliance	WAT270938	2-pk.	25387
Head Plunger Seal Kit (Black)	Alliance	WAT271066	2-pk.	25388
Insert Seal Parts Kit	M6KA, 501, 510, 515, 590, 600E	60012	kit	25389
Sapphire Plunger	M6KA, 510, 590, 600	25656	ea.	25381
Sapphire Plunger (Extended Flow)	510, 590, 600E	60304	ea.	25382
Sapphire Plunger	M45, M501	26524	ea.	25383
Sapphire Plunger Assembly Kit	M515	WAS207069	ea.	25384
Sapphire Plunger	616, 625, 626	31788	ea.	25420
Sapphire Plunger	Alliance	WAT270959	ea.	25385
Draw-Off Tube Assembly	510, 515, 600, 610	25470	ea.	25392
Inlet Manifold Kit	M45, 501, 510, 590, 600E	60448	kit	25412
Ferrule, Stainless Steel	515	22330	ea.	25417
Wash Face Seal	Alliance 2690	WAT271017	ea.	25428
Wash Tube Seal Kit	Alliance 2690	WAT270940	4-pk.	25429
Rebuild Kit, Reference Valve	600 Pump	25746	ea.	25492
Compression Screws, Stainless Steel	Alliance 2690	—	2-pk.	25493
Battery	Alliance 2690, 717, 486, 484	—	ea.	25494
Seal Pack Rebuild Kit, without Seal Wash Tube Assembly	Alliance 2690	WAT271019	ea.	25495
717 Seal Pack (Rebuilt) with Needle	717 Autosampler	4559	ea.	25496
Seal Kit, Pump	616 Pump, 626, 625	31790	ea.	25497
Cartridge Assembly, Stainless Steel	616 Pump	24960	ea.	25498

\*Ultra-high molecular weight polyethylene (UHMWPE).



Preventative Maintenance Kit for 717 Autosampler



Inlet Check Valve Assembly



717 Seal Pack (Rebuilt) with Needle



Piston



Syringe Assembly, 250µL



Lamp, UV



Inlet Check Valve Assembly



Hub-Cap (assembly of the bottle cap and plug)



Hub-Cap Adapter

Hub-Cap Adapter and Opti-Cap®



## Restek Replacement Parts for Thermo Separation HPLC Systems

Description	Model #	Similar to SP/TSP part #	qty.	cat.#
Inlet Check Valve Assembly	SP8800 & P-Series Pumps	A3495-010	ea.	25474
Outlet Check Valve Assembly	SP8800 Series Pumps	A3490-010	ea.	25475
Piston	SP8800 & P-Series Pumps	A3102-010	ea.	25476
Back-up Seal	SP8800 & P-Series Pumps	A2963-010	ea.	25477
Plunger Seal, Gold Superseal	SP8800 & P-Series Pumps	A2962-010	ea.	25478
Check Valve and Transducer Assembly	P-Series Pumps	A3990-010	ea.	25479
Kel-F Washer	P-Series Pumps	A2973-010	ea.	25480
Rotor Seal Assembly, Rheodyne 7010	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	7010-039	ea.	25481
Syringe Assembly, 250µL	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	A3588-020	ea.	25482
Syringe, 500µL	8800 Series	3301-0100	ea.	25483
Lamp, UV	Linear UV-200, 203, 204, 205, 206, and UV 100, 150, 1000, and 2000 Detectors	9551-0023	ea.	25484
Description	Model #	Similar to TSP part #	qty.	cat.#
Check Valve Cartridge	LDC Constametric Pumps	900946	ea.	25485
Sapphire Plunger	LDC Constametric Pumps	801306	ea.	25486
Plunger Seal Kit, Gold	LDC Constametric Pumps	31-36-00754	ea.	25487
Plunger Seal, Black	LDC Constametric Pumps	206129001	ea.	25488
Plunger Seal, Gold	LDC Constametric Pumps	206156001	ea.	25489
Lamp, Deuterium	LDC SM-I, II, III, 3000, 3100, 3100X, and 4000 Detectors	108035	ea.	25490

## Hub-Cap 4 Liter Bottle Tops

Most bottles use a GL45 cap. New Hub-Cap bottle tops are a great way to neatly keep your mobile phase lines where they belong. Use instead of parafilm, aluminum foil, or tape on your mobile phase reservoirs.



Description	qty.	cat.#
Hub-Cap (assembly of the bottle cap and plug)	kit	26541
Hub-Cap Multi-pack	3-pk.	26542

## Hub-Cap Adapters

Allow the use of the Opti-Cap® with 4-liter solvent bottles.

Description	qty.	cat.#
Hub-Cap Adapter	ea.	26538
Hub-Cap Adapter Multi-pack	3-pk.	26539
Hub-Cap Adapter and Opti-Cap	kit	26540

## Waste Overflow Indicator for HPLC Systems

- Avoid messy pooling around mobile phase waste containers.
- Audible alarm instantly alerts user, preventing overflow.
- Compact, battery operated unit.

The new Restek Waste Overflow Indicator will help to keep your mobile phase waste where it belongs—in the waste container! Compact, battery operated unit fits securely on 4-liter solvent bottles and accommodates two waste streams. An audible alarm is given as the solvent waste container approaches capacity, giving you time to empty or change the container. Another innovative design from Restek!

Description	qty.	cat.#
Waste Overflow Indicator for HPLC Systems	kit	26543
Replacement AA Battery for the Waste Overflow Indicator	ea.	26544
Replacement AA Batteries for the Waste Overflow Indicator	3-pk.	26545

## Hub-Cap Filter Kit

Kit includes: bottle adapter, bottle adapter nut, filter inlet cap, grid support, vacuum hose barb, tube compression fitting, 47mm grid, 1/4" OD x 1/8" ID ultra chemical resistant, Teflon® FEP lined Tygon® tubing (3')



Unscrew and lift off top.



Place membrane filter on top of grid.



Reattach top.



Connect vacuum line to side port.

**Transfer and filter mobile phase in a single step!**



Hub-Cap Filter Kit

Description	qty.	cat.#
Hub-Cap Filter Kit	kit	26395
Replacement Membrane Filters	qty.	cat.#
Polypropylene Membrane Filters, 47mm, 0.45µm	100-pk.	26396
Polypropylene Membrane Filters, 47mm, 0.22µm	100-pk.	26397
Nylon Membrane Filters, 47mm, 0.45µm	100-pk.	26398
Nylon Membrane Filters, 47mm, 0.22µm	100-pk.	26399



Polypropylene Membrane Filters

## PEEK™ Survival Kit for HPLC

The PEEK™ Survival Kit is an invaluable parts kit that contains tubing, fittings, and tools essential for setting up and maintaining your HPLC system: PEEK™ tubing, connectors, and elbows, Teflon® tubing, a tubing cutter and extra blades, a ValvTool wrench, open-end wrenches, and more.

Description	qty.	cat.#
PEEK Survival Kit for HPLC	kit	25322



## Stainless Steel Survival Kit for HPLC

The stainless steel survival kit contains a wide range of tubing, fittings, and tools necessary to set up and maintain your HPLC system: a selection of lengths and IDs of 1/16-inch tubing, plus nuts, ferrules, a ValvTool wrench, and a zero-dead-volume union.

Description	qty.	cat.#
Stainless Steel Survival Kit for HPLC	kit	25097



## Priming Syringes for Waters 6000, 6000A, 501, 510, 590, 610 and 610E HPLC Pumps

- Designed for maximum safety with metal flange and luer-lock (LL) hub.
- Teflon®-tipped plunger.

### Hamilton Syringe

Volume	Needle Term.	Hamilton Model	cat.#	Pressure Tested to	qty.	Restek cat.#
10mL	TLL	1010W	81610	700 psig	ea.	21265

### SGE Syringe

Volume	Needle Term.	SGE Model	cat.#	Pressure Tested to	qty.	Restek cat.#
10mL	LL	10MDR-LL-GT	008960	100 psig	ea.	24759

TLL=Teflon® Luer Lock LL=Luer Lock





## free literature

**HPLC Column Selection Guide**  
Quickly scan for important characteristics of Restek HPLC columns. Includes brief, practical guidelines for choosing stationary phase, particle size, pore diameter, and column dimensions.

lit. cat.# 59454D

## get more

For a complete listing of syringes, including the addition of NORM-JECT plastic disposable syringes visit [www.restek.com](http://www.restek.com).

Restek Trademarks:  
Restek logo

Other Trademarks: Agilent (Agilent Technologies, Inc.); Alliance, Waters (Waters Investments Ltd.); Kel-F (3M Co.); Opti-Cap (Millipore Corp); PEEK (Victrex plc); Rheodyne (Rheodyne LLC); Teflon, Tefzel, Tygon, Vespel, (E.I. du Pont de Nemours & Co. Inc.); Valco (Valco Instruments Co., Inc.).

## Syringes for CTC/LEAP LC Autosamplers

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	cat.#	qty.	Restek cat.#
10µL	N	22s	2"/51mm	3	701N	203073	ea.	22743
25µL	N	22s	2"/51mm	3	1702N	203075	ea.	22744
100µL	N	22s	2"/51mm	3	1710N Slim Line*	203077	ea.	22745
100µL	N	22	2"/51mm	3	1710N	203235	ea.	22746
250µL	N	22	2"/51mm	3	1725N	203079	ea.	22747
500µL	N	22	2"/51mm	3	1750N	203349	ea.	22748

\*Barrel OD = 6.7mm; all other 25µL and 100µL syringes have a 7.9mm barrel OD.



Hamilton 100µL LC Autosampler Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	cat.#	qty.	Restek cat.#
10µL	F	22s	2"/51mm	LC	10F-CTC-LC	002710	ea.	22737
25µL	F	22s	2"/51mm	LC	25F-C/T-LC	003984	ea.	22738
25µL*	R	22s	2"/51mm	LC	25R-C/T-GT-LC	003985	ea.	22739
50µL*	F	22s	2"/51mm	LC	50F-C/T-GT-LC	004810	ea.	22740
100µL*	R	22s	2"/51mm	LC	100R-C/T-GT-LC	005330	ea.	22741
500µL*	F	22s	2"/51mm	LC	500F-CTC-GT-LC(0.41)	007720	ea.	22742

\*Gas-tight syringe.



SGE 50µL LC Autosampler Syringe

### SGE Syringe for Hitachi LC Autosamplers

Volume	SGE Model	cat.#	qty.	Restek cat.#
500µL	500C-HITACHI	007660	ea.	22292



500µL, M10 X1 Thread

### SGE Syringes for PerkinElmer LC Autosamplers

Volume	SGE Model	cat.#	qty.	Restek cat.#
50µL	50D-CX-GT	004995	ea.	22295
100µL	100D-CX-GT	005990	ea.	22296
250µL	250D-CX-GT	006995	ea.	22297
500µL	500D-CX-GT	007995	ea.	22298
1mL	1MD-C-GT	008185	ea.	22299



250µL, 1/4-28 UNF Thread

### SGE Syringes for Waters WISP LC Autosamplers

Volume	SGE Model	cat.#	qty.	Restek cat.#
25µL	25D-WISP	003990	ea.	22293
250µL	250D-WISP	006690	ea.	22294



250µL, 1/4-28 UNF Thread



Lit. Cat.# GNFL1059-INT

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# SRI 8610C

# 2010 Gas Chromatographs

## PRODUCT INDEX

- GAS CHROMATOGRAPHS
- DETECTORS AND STAND-ALONE DETECTORS
- INJECTORS
- LABOR
- DATA SYSTEMS
- COLUMNS
- ACCESSORIES
- PARTS
- TRAINING



E COL: GREEN INDICATES NEW ITEM, ORANGE INDICATES PRICE CHANGE, RED INDICATES DISCONTINUED ITEM

ITEM

DESCRIPTION

AUD Mar 2010

Sorted By Category

\*\*\* PRICES SUBJECT TO CHANGE WITHOUT NOTICE \*\*\*

\*\*\*\* PLEASE CALL TO CONFIRM PRICING PRIOR TO ISSUING A QUOTATION OR PLACING ORDER \*\*\*\*

ALL PRICES ARE NEW IN 2010

## GAS CHROMATOGRAPH / STAND-ALONE DETECTOR

### ● CHASSIS ONLY

	0110-0003	110 CHASSIS, 110V	\$2,215
x	0110-0003-2	110 CHASSIS, 220V	\$2,215
	0310-1003	310 GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V	\$6,779
x	0310-1003-2	310 GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V	\$6,779
	0310-6003	310 GC MAINFRAME, 6 CHANNEL USB CHASSIS, 110V	\$8,384
x	0310-6003-2	310 GC MAINFRAME, 6 CHANNEL USB CHASSIS, 220V	\$8,384
	0410-1000	410 RACK GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V	\$10,481
x	0410-1000-2	410 RACK GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V	\$10,481
	0410-6000	410 RACK GC MAINFRAME, 6 CHANNEL USB CHASSIS, 110V	\$12,086
x	0410-6000-2	410 RACK GC MAINFRAME, 6 CHANNEL USB CHASSIS, 220V	\$12,086
	0410-0065	410 RACK MOUNT MUDLOGGING GC SYSTEM (FID-FID)	\$19,740
	0410-0065-2	410 RACK MOUNT MUDLOGGING GC SYSTEM (FID-FID)	\$19,740
	8610-1003	8610C GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V	\$6,779
x	8610-1003-2	8610C GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V	\$6,779
	8610-2003	8610V GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V (VERTICAL INJ.)	\$9,175
x	8610-2003-2	8610V GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V (VERTICAL INJ.)	\$9,175
	8610-6003	8610C GC MAINFRAME, 6 CHANNEL USB CHASSIS, 110V	\$8,384
x	8610-6003-2	8610C GC MAINFRAME, 6 CHANNEL USB CHASSIS, 220V	\$8,384
	8610-1004	8610D GC MAINFRAME w/ DUAL COLUMN OVENS, 1 CH USB 2.0, 110V	\$9,870
x	8610-1004-2	8610D GC MAINFRAME w/ DUAL COLUMN OVENS, 1 CH USB 2.0L, 220V	\$9,870
	8610-6004	8610D GC MAINFRAME w/ DUAL COLUMN OVENS, 6 CH USB, 110V	\$11,475
x	8610-6004-2	8610D GC MAINFRAME w/ DUAL COLUMN OVENS, 6 CH USB, 220V	\$11,475
	8610-7003	8610V GC MAINFRAME, 6 CHANNEL USB 2.0 CHASSIS, 110V (VERTICAL INJ.)	\$10,780
x	8610-7003-2	8610V GC MAINFRAME, 6 CHANNEL USB 2.0 CHASSIS, 220V (VERTICAL INJ.)	\$10,780
		● PRECONFIGURED GC SYSTEMS	\$0
	0110-0100	110 CHASSIS, VOC SCREENING DYNAMIC THERMAL STRIPPER, CCD, 110V	\$6,168
	0110-0100-2	110 CHASSIS, VOC SCREENING DYNAMIC THERMAL STRIPPER, CCD, 220V	\$6,168
	0310-0004	310 EDUCATIONAL FID GC, 110V USB 2.0 CHASSIS	\$7,402

x	0310-0045	310 SOIL GAS GC SYSTEM	\$19,740
	0310-1000	310 EDUCATIONAL TCD GC, 110V USB 2.0 CHASSIS	\$6,168
	0310-1006	310 GASLESS EDUCATIONAL CCD GC, USB 2.0 CHASSIS	
x	0310-1117	310 GASLESS EXPLOSIVES GC, TID	\$11,714
x	8610-0025	8610C METHOD 25 GC (METHANE/NON-METHANE HYDROCARB)	\$13,571
x	8610-0035	8610C DGA GC, HID	\$19,118
x	8610-0036	8610C DGA GC, TCD - HID	\$21,585
x	8610-0040	8610C GREENHOUSE GAS GC SYSTEM	\$24,053
x	8610-0050	8610C BTEX GAS CHROMATOGRAPH, METHOD 5030 COMPLIANT	\$24,053
x	8610-0051	8610C BTEX GAS CHROMATOGRAPH, METHOD 5030/5035 COMPLIANT	\$25,898
x	8610-0059	8610C ENVIRONMENTAL GC (PID-FID/DELCD-P&T)	\$27,755
x	8610-0061	8610C GEOPROBE GC (PID-FID/DELCD)	\$22,819
x	8610-0062	8610C GEOPROBE GC (FID/DELCD)	\$18,507
x	8610-0065	8610C MUDLOGGING GC (FID-FID)	\$17,273
x	8610-0066	8610C FAST MUDLOGGING GC, 110VAC	\$17,884
x	8610-0070	8610C MULTIPLE GAS GC I (TCD)	\$12,948
x	8610-0071	8610C MULTIPLE GAS GC I (TCD-FID-METH)	\$18,015
x	8610-0072	8610C MULTIPLE GAS GC I (TCD-HID)	\$18,507
x	8610-0073	8610C MULTIPLE GAS GC I + SULFUR ANALYZER	\$25,910
x	8610-0080	8610C PCB GC SYSTEM	\$19,118
x	8610-0114	8610C METHOD TO-14 AIR MONITORING GC	\$27,755
x	8610-0270	8610C MULTIPLE GAS GC II (TCD)	\$14,182
x	8610-0271	8610C MULTIPLE GAS GC II (TCD-FID-METH)	\$19,118
x	8610-0272	8610C MULTIPLE GAS GC II (TCD-HID)	\$19,740
x	8610-0273	8610C MULTIPLE GAS GC II + SULFUR ANALYZER	\$27,144
x	8610-0370	8610C MULTIPLE GAS GC III (TCD)	\$13,811
x	8610-0371	8610C MULTIPLE GAS GC III (TCD-FID-METH)	\$18,866
x	8610-0372	8610C MULTIPLE GAS GC III (TCD-HID)	\$19,369
x	8610-0373	8610C MULTIPLE GAS GC III + SULFUR ANALYZER	\$26,772
x	8610-1117	8610C EXPLOSIVES GC (TID)	\$11,714
x	8610-1500	8610C CFC GAS CHROMATOGRAPH WITH TCD	\$9,870
x	8610-1510	8610C CFC GAS CHROMATOGRAPH WITH FID	\$9,870
x	8610-3070	8610C BTU GAS ANALYZER GC, TCD	\$12,948
x	8610-5400	8610C CAPILLARY FID GC	\$10,481
x	8610-5405	8610C NARROW BORE CAPILLARY FID GC	\$12,325
x	8610-5500	8610D TUNEABLE COLUMN SELECTIVITY GC	\$14,182
x	8610-5675	8610C CRYOSULFUR GC SYSTEM	\$23,562
x	8610-5700	8610C SPME GC	\$11,103
x	8610-5800	8610C HRVOC GC SYSTEM, 110VAC	\$18,507
x	8610-5810	8610C HRVOC GC SYSTEM, 110VAC, ADD PID, 6 CH.	\$24,424
x	8610-6584	8610C BIODIESEL GC SYSTEM, ASTM D-6584, 110VAC	\$9,738
x	8610-6555	8610C SULFUR IN NATURAL GAS GC SYSTEM, 110VAC	\$21,585
			\$0
	<b>DETECTORS</b>		\$0
		● <b>CCD</b>	\$0
	0110-2007	CCD MOUNTED ON MODEL 110 CHASSIS	\$3,687
	8670-2007	REPLACEMENT CCD DETECTOR ELEMENT	\$126
	8690-2007	CCD DETECTOR	\$1,472
			\$0
		● <b>FID-DELCD</b>	\$0
	8670-0150	FID CERAMIC IGNITOR ELEMENT	\$93
	8670-0155	FID COLLECTOR ELECTRODE CABLE WITH BNC CONNECTOR	\$42
	8670-1024	FID DETECTOR BODY	\$370
	8670-1025	FID DETECTOR BODY FOR METHANIZER	\$494
	8670-1029	DELCD HEATER / COLLECTOR ASSEMBLY	\$502

0110-2026	FID-DELCD MOUNTED ON MODEL 110 CHASSIS	\$8,383
8690-2026	FID-DELCD DETECTOR ASSEMBLY (FID-DELCD)	\$6,168
		\$0
	● <b>DELCD</b>	\$0
0110-1026	DELCD MOUNTED ON MODEL 110 CHASSIS	\$7,149
8670-1029	DELCD HEATER / COLLECTOR ASSEMBLY	\$502
8690-1026	DELCD DETECTOR	\$4,934
		\$0
	● <b>RGD</b>	\$0
0110-0009	RGD MOUNTED ON MODEL 110 CHASSIS	\$9,617
8690-0009	RGD DETECTOR (WITH EMPTY REACTOR)	\$7,402
8670-0009	REPLACEMENT RGD REACTION TUBE, UNPACKED, WITH FRITS	\$126
8690-0011	BLANK REACTION TUBE W/FRITS	\$63
		\$0
	● <b>ECD</b>	\$0
0110-0020	ECD MOUNTED ON MODEL 110 CHASSIS	\$9,617
8690-0020	ECD DETECTOR	\$7,402
		\$0
	● <b>FID</b>	\$0
0110-0010	FID MOUNTED ON MODEL 110 CHASSIS	\$4,681
0110-1080	FID-FPD MOUNTED ON MODEL 110 CHASSIS	\$8,383
0110-4010	FID-PID MOUNTED ON MODEL 110 CHASSIS	\$8,993
0110-2026	FID-DELCD MOUNTED ON 110 CHASSIS	\$8,383
8670-0150	FID IGNITOR	\$93
8670-0154	FID COLLECTOR ELECTRODE (REPL. 8610C)	\$30
8670-0155	FID COLLECTOR ELECTRODE CABLE (REPL. 8610C)	\$36
8670-1023	FID DETECTOR INLET BULKHEAD FITTING	\$310
8670-1024	FID DETECTOR BODY	\$370
8670-1025	FID DETECTOR BODY FOR METHANIZER	\$494
8690-0010	FID DETECTOR	\$2,467
8690-0081	METHANIZER ACCESSORY MOUNTED TO EXISTING VALVE OVEN	\$1,844
8690-0082	METHANIZER ACCESSORY, IN JET	\$1,233
8670-1081	REPLACEMENT METHANIZER TUBE, 6" x 1/8" S.S.	\$126
8670-1082	REPLACEMENT METHANIZER JET	\$126
8690-1115	FID / NPD CONVERTIBLE DETECTOR	\$4,311
8690-2026	FID/DELCD DETECTOR	\$6,168
		\$0
	● <b>NPD</b>	\$0
8670-0120	NPD BEAD (REPLACEMENT ONLY)	
8670-1026	NPD DETECTOR BODY	\$370
0110-0015	NPD MOUNTED ON MODEL 110 CHASSIS	\$5,915
8690-0015	NPD DETECTOR	\$3,700
8690-1015	NPD CONVERSION KIT FOR FID	\$1,604
8690-1115	FID / NPD CONVERTIBLE DETECTOR	\$4,311
8690-2615	NPD-DELCD SERIES DETECTOR	\$7,402
		\$0
	● <b>PID</b>	\$0
8670-1240	PID CELL ASSEMBLY	\$617
8670-1242	PID LAMP 10.6eV w/ SEAL, 106-TYPE (SMALL, NEW STYLE)	\$617
8670-1243	PID LAMP 10.2eV w/ SEAL, 103C-TYPE (LARGE, OLD STYLE)	\$617
8670-1244	PID LAMP SEAL, TEFLON®, PACK OF 10	\$126
8670-1245	PID 45VDC BATTERY (REPLACEMENT)	\$33
8670-1246	PID HV POWER SUPPLY TRANSFORMER, 8610 A, B MODEL	\$126
8670-1247	PID HV POWER SUPPLY CIRCUIT BOARD, 8610C, 310 MODEL	\$155

	8670-1248	PID DETECTOR INLET BULKHEAD FITTING	\$310
	0110-0040	PID MOUNTED ON MODEL 110 CHASSIS	\$6,526
	0110-4010	PID-FID MOUNTED ON MODEL 110 CHASSIS	\$8,993
	0110-2426	PID-FID-DELCD MOUNTED ON MODEL 110 CHASSIS	\$12,682
	8690-0040	PID DETECTOR	\$4,311
			\$0
	● <b>FPD</b>		\$0
	0110-0080	FPD MOUNTED ON MODEL 110 CHASSIS	\$7,149
	0110-0085	DFPD MOUNTED ON MODEL 110 CHASSIS	\$12,085
	0110-1080	FPD-FID MOUNTED ON MODEL 110 CHASSIS	\$8,383
	8670-0080	PHOTOMULTIPLIER (PMT) TUBE	\$1,233
	8670-0081	FPD DETECTOR BODY	\$1,233
	8670-0082	SULFUR WAVELENGTH FILTER	\$370
	8670-0083	PHOSPHORUS WAVELENGTH FILTER	\$370
	8670-0084	FPD FILTER ASSEMBLY WITH BUILT-IN SULFUR FILTER	\$742
	8670-0085	FPD FILTER ASSEMBLY WITH BUILT-IN PHOSPHORUS FILTER	\$742
	8670-0086	FPD PMT SOCKET ASSEMBLY	\$454
	8670-2085	DFPD-FID DETECTOR BODY	\$1,233
	8690-0080	FPD DETECTOR	\$4,934
	8690-0085	SIMULTANEOUS S/P FPD DETECTOR (DFPD)	\$9,870
	8690-1080	FPD-FID DUAL DETECTOR (DUAL ELECTRONICS)	\$6,168
	8690-2085	DFPD-FID DETECTOR (3 AMPLIFIERS)	\$11,103
			\$0
	● <b>TCD</b>		\$0
	8670-0007	TCD CELL w/ FILAMENTS, HEATING ELEMENT, SRI MODEL	\$1,233
	8670-0011	TCD GAIN SWITCH	\$39
	8670-9007	UPGRADE TCD TO CURRENT HIGH TEMPERATURE MODEL (HARDWARE ONLY)	\$1,233
	8670-9100	TCD CELL STAINLESS STEEL, GOWMAC-TYPE	\$1,233
	8670-9110	O-RING FOR TCD FILAMENT, EACH (MIN. QTY 10)	\$3
	8670-9120	TCD FILAMENT, TUNGSTEN-RHENIUM (SPECIFY COPPER OR VITON SEAL)	\$93
	8670-9121	TCD FILAMENT, GOLD PLATED, SET OF FOUR (AuW 13-300)	\$742
	8670-9122	O-RING, FOR TCD FILAMENT, PACK OF 10	\$30
	8670-9123	NUT, TCD, FILAMENT RETAINING	\$15
	8670-9124	COPPER SEAL, FOR TCD FILAMENT, PACK OF 10	\$63
	8670-9125	TCD FILAMENT PROTECTION CIRCUIT (RETROFIT)	\$610
	0110-0007	TCD MOUNTED ON MODEL 110 CHASSIS	\$4,681
	8690-0007	TCD DETECTOR	\$2,467
			\$0
	● <b>HID</b>		\$0
	8670-0030	HID COLLECTOR ELECTRODE ASSEMBLY	\$370
	8670-0031	HID DETECTOR BODY	\$310
	8690-0030	HID DETECTOR, SRI DESIGN	\$4,311
	0110-0030	HID MOUNTED ON MODEL 110 CHASSIS	\$6,526
			\$0
	● <b>TID</b>		\$0
	8670-0017	TID DETECTOR BEAD	\$490
	8670-1017	TID DETECTOR BODY	\$370
	8690-0017	TID DETECTOR	\$3,700
	0110-0017	TID MOUNTED ON MODEL 110 CHASSIS	\$5,915
			\$0
	● <b>ASD</b>		\$0
	8690-0006	AROMATIC SELECTIVE DETECTOR	\$7,402
	0110-0006	ASD DETECTOR MOUNTED ON MODEL 110 CHASSIS	\$9,617
			\$0
	<b>INJECTORS</b>		\$0

	● <b>AUTOSAMPLERS</b>	\$0
8640-0050	AUTOCALIBRATION SYSTEM, GAS	\$3,700
8640-1006	SINGLE BAY AUTOINJECTOR	\$2,467
8670-0068	SYRINGE NEEDLE, REPLACEMENT, FOR LIQUID AUTOSAMPLER	\$93
8670-2368	INJECTION PORT COUPLER TO LIQUID AUTOSAMPLER CAROUSEL	\$190
8690-0068	LIQUID AUTOSAMPLER CAROUSEL, 42 VIAL TRAY	\$9,870
8690-0053	10 STATION PURGE-AND-TRAP SAMPLE SELECTOR	\$8,636
8690-0075	ON-LINE LIQUID SAMPLER, FOR P&T	\$4,311
8690-0087	DGA-TOGA PERMEATION LOOP ACCESSORY	\$4,311
8690-1068	ON-LINE SYRINGE SAMPLER (NO CAROUSEL)	\$7,402
8690-2253	10 STATION PURGE-AND-TRAP SAMPLE SELECTOR 220 V	\$8,636
		\$0
	● <b>DIRECT INJECTION</b>	\$0
8670-0024	HEATED INJECTOR BODY	\$610
8670-0025	HEATED INJECTOR HARDWARE, COMPLETE, WITHOUT EPC	\$1,233
8670-0026	HEATED INJECTION PORT CARRIER INLET	\$126
8670-0034	HEATED SPLIT INJECTOR BODY	\$861
8670-0072	NARROW BORE SPME INJECTOR SLEEVE (FOR HTD. INJ.)	\$190
8670-1034	SILCOSTEEL LINER FOR SPLIT/SPLITLESS INJECTOR	\$30
8670-1353	SILICONE SEPTA, MOLDED PLUG, FOR ON-COLUMN INJECTOR (PACK OF 25)	\$93
8670-1354	SILICONE SEPTA, STAMPED DISK, FOR HEATED INJECTOR (PACK OF 25)	\$93
8670-9090	SEPTUM NUT w/ GUIDE FOR 26GA. NEEDLE	\$42
8670-9092	CAPILLARY SPME ADAPTER	#VALUE!
8670-9093	0.53mm CAPILLARY COLUMN ADAPTER	\$30
8670-9094	INJECTOR BODY	\$310
8670-9095	SEPTUM NUT W/ GUIDE FOR 20GA. NEEDLE	\$42
8670-9096	SEPTUM NUT W/ GUIDE FOR 20GA. NEEDLE, FOR HEATED INJECTOR	\$42
8670-9304	HEATED TRANSFER LINE ADDITION, FOR NEW BUILD GC, RT. SIDE	\$861
8670-9305	HEATED TRANSFER LINE MOD. w/ PLUG	\$370
8670-9550	SYRINGE 10 uL	\$51
8690-0023	ADDITIONAL ON-COLUMN INJECTOR, EPC CIRCUIT	\$1,604
8690-0025	HEATED INJECTION PORT UPGRADE	\$981
8690-0034	SPLIT/SPLITLESS INJECTOR UPGRADE, AUTO. VENT	\$1,844
8690-0035	GAS PHASE SPLITTER	\$981
8690-0037	ON-COLUMN PTV INJECTOR UPGRADE	\$1,844
8690-0045	HEATED STATIC HEADSPACE INJECTOR	\$7,402
8690-0046	HEATED STATIC HEADSPACE INJECTOR UPGRADE, TO EXISTING VALVE, VALVE	\$4,934
8690-2022	ADDITIONAL EPC CONTROL ZONE (NO INJECTOR)	\$1,101
8690-2023	ADDITIONAL INJECTION PORT WITHOUT EPC CONTROL/CARRIER	\$610
8690-7034	HEATED SPLIT/SPLITLESS INJECTOR UPGRADE WITH PTV	\$2,467
8690-8034	HEATED SPLIT/SPLITLESS INJECTOR UPGRADE WITH PTV, VALVE	\$4,934
		\$0
	● <b>PURGE &amp; TRAP</b>	\$0
8670-1173	NEEDLE, 115 MM, FOR METHOD 5035 SPARGE HEAD	\$33
8670-1174	NEEDLE, 50 MM, FOR METHOD 5035 SPARGE HEAD	\$33
8670-1300	BLANK TRAP	\$30
8670-1305	TENAX GR TRAP	\$93
8670-1315	CARBOSIEVE II TRAP	\$93
8670-1320	CARBOPACK B TRAP	\$93
8670-1324	POLISHING FILTER, 3"	\$93
8670-1330	TEFLON TEST TUBE SEALS (1 PAIR), FOR P&T	\$21
8670-1335	SPARGE TEST TUBES (10 PACK)	\$15
8670-1350	PURGE & TRAP SPARGING HEAD w/ GAS INJ. PORT	\$430
8670-1351	SPARGE HEAD, 5030 INTERCHANGEABLE, REPLACEMENT	\$742
8670-1352	SPARGE HEAD, 5035 INTERCHANGEABLE, REPLACEMENT	\$1,472
8670-1450	TRAP HEATER ASSEMBLY WITH T-COUPLE	\$310
8670-5052	UPGRADE METHOD 5030 P&T TO 5035 COMPLIANT (NEW BUILD ONLY)	\$1,844

8670-5860	ONLINE SAMPLER / SPARGER FOR HRVOC GC	\$3,077
8670-9556	1/16" S.S. TUBE FOR P&T SPARGE GAS	\$30
8680-0052	METHOD 5035 COMPLIANT VOA VIAL SPARGE ACCESSORY	\$4,443
8690-0051	AUTOMATED PURGE AND TRAP CONCENTRATOR, METHOD 5030	\$8,013
8690-0052	AUTOMATED PURGE AND TRAP CONCENTRATOR, METHOD 5030/35	\$9,870
8690-0053	10 SAMPLE PURGE AND TRAP AUTOSAMPLER, w/4 RELAY BD	\$8,636
8690-0054	10 SAMPLE METHOD 5035 PURGE-AND-TRAP SAMPLER	\$8,636
8690-0064	4 PORT LIQUID SAMPLING VALVE, MANUAL ACTUATOR	\$1,472
8690-0075	ON-LINE LIQUID SAMPLER FOR PURGE-AND-TRAP	\$4,311
8690-0084	HEATED / FAST COOLING ADSORBENT TRAP FOR EXISTING GAS VALVE	\$1,844
8690-0086	PELTIER CRYOCOOLING w/ ELECTRONICS FOR TRAP	\$1,844
8690-0090	PELTIER CRYOCOOLING TRAP, FOR GAS SAMPLING VALVE	\$3,700
8690-0097	TRAP PACKING ACCESSORY	\$190
8690-1051	METHOD TO-14 AIR CONCENTRATOR, VAC PUMP, 1 TRAP	\$6,779
8690-1052	METHOD TO-14 AIR CONCENTRATOR, 2 TRAP, w/TUBE DESORBER	\$9,247
8690-1055	METHOD TO-14 AIR CONCENTRATOR, VAC PUMP, 2 TRAPS	\$7,402
8690-2084	DUAL HEATED TRAPS FOR EXISTING GAS VALVES	\$3,688
8690-2253	10 STATION PURGE-AND-TRAP AUTOSAMPLER 220V, 4 REL BD	\$8,636
8690-5052	UPGRADE 5030 P&T TO METHOD 5030/5035 COMPLIANT (NEW BUILD ONLY)	\$1,844
		\$0
	● <b>THERMAL DESORBERS</b>	\$0
8670-0062	VALCO T ROTOR HIGH TEMP.	\$150
8670-1501	DESORBER BULKHEAD	\$430
8670-1502	GAS DELIVERY LINE WITH CONNECTOR, THERMAL DESORBER	\$126
8670-1590	3/8" GRAPHITE FERRULE FOR TSD (EACH)	\$9
8690-1087	THERMAL DESORBER SAMPLE TUBE (PK. OF 10)	\$126
8690-1088	THERMAL SOIL DESORBER, MANUAL ACTUATOR	\$4,311
		\$0
	● <b>VALVES</b>	\$0
8670-0060	VALCO E ROTOR MID TEMP.	\$155
8670-0061	VALCO P ROTOR LOW TEMP.	\$155
8670-0062	VALCO T ROTOR HIGH TEMP.	\$155
8670-0063	10 PORT VALVE HEAD, GAS SAMPLING	\$1,077
8670-0064	ELECTRIC VALVE ACTUATOR, FOR 10 PORT GAS SAMPLING VALVE	\$1,233
8670-0066	CIRCUIT BOARD KIT, FOR ELECTRIC ACTUATOR, 110VAC	\$370
8670-8000	SAMPLE LOOP (SPECIFY VOLUME BETWEEN 0.5mL and 3.0mL)	\$63
8690-0060	10 PORT GAS SAMPLING VALVE, MULTIGAS 3 PLUMBING, WITH SOLENOID	\$3,077
8690-0061	10 PORT GAS SAMPLING VALVE, PNEUMATIC ACTUATOR	\$3,077
8690-0062	4 PORT LIQUID SAMPLING VALVE, ELECTRIC ACTUATOR	\$3,077
8690-0063	10 PORT GAS SAMPLING VALVE, MANUAL ACTUATOR	\$1,472
8690-0064	4 PORT LIQUID SAMPLING VALVE, MANUAL ACTUATOR	\$1,472
8690-0065	10 PORT GAS SAMPLING VALVE, ELECTRIC ACTUATOR	\$2,467
8690-0066	10 INPUT HEATED STREAM SELECTOR W/ TRANSFER LINE	\$5,545
8690-0067	BLOCK HEATER w/ CARTRIDGE FOR GAS VALVE	\$610
8690-0069	SOLENOID-CONTROLLED GAS VALVE	\$610
8690-0072	SPLIT VENT VALVE	\$1,101
8690-0073	VACUUM PUMP INTERFACE, DATA SYSTEM CONTROLLED	\$742
8690-0074	THERMOSTATTED VALVE OVEN, HIGH TEMP. (300°C MAX.)	\$1,472
8690-0077	22 PORT, 10 STREAM SELECTOR VALVE, AUTOMATED, STD. ALONE	\$5,545
8690-0078	22 PORT, 10 STREAM SELECTOR VALVE, ELECTRIC ACTUATOR, PLUMBED	\$4,311
8690-0079	22 PORT, 10 STREAM SELECTOR VALVE, ELECTRIC ACTUATOR, UNPLUMBED	\$3,700
8690-0083	CRYOTRAP LOOP, AUTOMATED CONTROL	\$1,844
8690-0084	HEATED / FAST COOLING TRAP AND PLUMBING	\$1,844
8690-0087	DGA-TOGA PERMEATION LOOP ACCESSORY	\$4,311
8690-0088	THERMOSTATTED VALVE OVEN	\$981
8690-0089	UNHEATED INSULATED VALVE OVEN	\$310

	8690-0091	THERMOSTATTED VALVE OVEN, NARROW, FOR 8610D GC	\$981
			\$0
		● <b>INJECTOR ACCESSORIES</b>	\$0
	8670-0025	HEATED INJECTOR HARDWARE, COMPLETE, WITHOUT EPC	\$1,233
	8690-0075	ON-LINE LIQUID SAMPLER	\$4,311
	8670-2368	INJECTION PORT COUPLER TO LIQUID AUTOSAMPLER CAROUSEL	\$190
	8670-8000	SAMPLE LOOP (0.5 to 3.0cc, SPECIFY)	\$63
			\$0
	<b>LABOR</b>		\$0
	8660-1000	LABOR	#VALUE!
	8660-1500	REFURBISH / TUNE-UP, BASE RATE (SEE PAGE 9 FOR RATE SCALE)	\$928
	8660-2000	TRAINING, DAY RATE IN-HOUSE	\$988
	8660-3000	RENTAL	#VALUE!
			\$0
	<b>MANUALS</b>		\$0
	8600-MANU	SRI GC MANUAL	\$190
	8600-SOFT	PEAKSIMPLE SOFTWARE MANUAL	\$126
			\$0
	<b>DATA SYSTEMS</b>		\$0
		● <b>DATA SYSTEM HOST PCs</b>	\$0
	8600-9000	DATA SYSTEM HOST NOTEBOOK PC w/ PTR.	\$3,700
	8600-9010	DATA SYSTEM HOST DESKTOP PC w/ PTR.	\$3,209
	8600-9050	MULTIMEDIA DATA SYSTEM HOST DESKTOP PC W/ PTR.	\$4,311
			\$0
		● <b>USB DATA SYSTEM</b>	\$0
	8600-1050	PEAKSIMPLE 1 CH. USB DATA SYSTEM KIT, 110VAC, MODEL 333	\$1,844
	8600-1051	4 RELAY KIT FOR MODEL 333	\$190
x	8600-1250	PEAKSIMPLE 1 CH. USB DATA SYSTEM KIT, 220VAC, MODEL 333	\$1,844
	8600-4060	4 RELAY BOARD FOR GC RETROFIT SERIAL INTERFACE, 8610C	\$286
	8600-4061	4 RELAY BOARD FOR GC RETROFIT, WITH EXTERNAL JACK (CURRENT 8610C)	\$310
	8600-5655	1 CH. DATA SYSTEM WITH H2 / HC SENSOR INSTALLED	\$2,095
	8600-6055	PEAKSIMPLE 6 CH. USB DATA SYSTEM KIT, 110V MODEL 302	\$3,449
	8600-6056	AC SWITCHED OUTLET FOR USB DATA SYSTEM	\$358
x	8600-6255	PEAKSIMPLE 6 CH. USB DATA SYSTEM KIT, 220V MODEL 302	\$3,449
	8660-4653	UPGRADE 4 CH. DATA SYSTEM TO 6 CH. USB VERSION (IN EXISTING GC/LC)	\$3,449
	8660-6053	UPGRADE 1 CH. DATA SYSTEM TO 6 CH. USB VERSION (IN EXISTING GC/LC)	\$3,449
	8660-6055	UPGRADE 1 CH. USB DATA SYSTEM TO 6 CH. USB VERSION (IN NEW GC/LC)	\$1,604
	8670-0232	SERIAL CABLE, RS-232 (DB-9 CONNECTORS), 6'	\$30
	8670-1052	64 BIT WINDOWS 7 COMPATIBLE PIC CHIP FOR EARLY MODEL 333	\$126
	8670-1058	POWER SUPPLY FOR MODEL 333, 110VAC TO 15VDC	\$33
	8670-1058-2	POWER SUPPLY FOR MODEL 333, 220VAC TO 15VDC	\$126
	8670-USB2	USB 2.0 A TO B CABLE, 6'	\$33
			\$0
	<b>ANALYTICAL COLUMNS</b>		\$0
		● <b>PACKED COLUMNS</b>	\$0
	8600-PK1A	3' x 1/8" S.S. SILICA GEL PACKED COLUMN	\$126
	8600-PK1B	6' x 1/8" S.S. SILICA GEL PACKED COLUMN	\$250
	8600-PK2A	3' x 1/8" S.S. MOLECULAR SIEVE 5A PACKED COLUMN	\$126
	8600-PK2B	6' x 1/8" S.S. MOLECULAR SIEVE 5A PACKED COLUMN	\$250
	8600-PK3A	3' x 1/8" S.S. MOLECULAR SIEVE 13X PACKED COLUMN	\$126
	8600-PK3B	6' x 1/8" S.S. MOLECULAR SIEVE 13X PACKED COLUMN	\$250
	8600-PKC3	CTR3 DOUBLE PACKED COLUMN, FOR ARGON	\$801
	8600-PKC4	CTR1 DOUBLE PACKED COLUMN	\$742
	8600-PKC5	24' x 1/8" S.S. AT-1000/CARBOPACK B CFC PACKED COLUMN	\$837
	8600-PKDA	3' x 1/8" S.S. HAYESEP D PACKED COLUMN	\$126
	8600-PKDB	6' x 1/8" S.S. HAYESEP D PACKED COLUMN	\$250
	8600-PKQA	3' x 1/8" S.S. PORAPAK Q PACKED COLUMN	\$126
	8600-PKQA-T	3' x 1/8" TEFLON® PORAPAK Q PACKED COLUMN	\$126

	8600-PKQB	6' x 1/8" S.S. PORAPAK Q PACKED COLUMN	\$250
	8600-PKQB-T	6' x 1/8" TEFLON® PORAPAK Q PACKED COLUMN	\$250
	8600-PKSC	6' x 1/8" S.S. SHINCARBON ST 80/100 PACKED COLUMN (2M)	\$514
	8600-PKTA	3' x 1/8" S.S. HAYESEP T PACKED COLUMN	\$126
	8600-PKTB	6' x 1/8" S.S. HAYESEP T PACKED COLUMN	\$250
	● <b>CAPILLARY COLUMNS</b>		\$0
	8600-WB1A	15M x 0.53MM I.D. 5.0U MXT-1 CAPILLARY COLUMN (DB-1 NON-POLAR)	\$466
	8600-WB1B	30M x 0.53MM I.D. 5.0U MXT-1 CAPILLARY COLUMN	\$777
	8600-WB1C	60M x 0.53MM I.D. 5.0U MXT-1 CAPILLARY COLUMN	\$1,233
	8600-WB5A	15M x 0.53MM I.D. 1.0U MXT-5 CAPILLARY COLUMN (DB-5 MED. POLARITY)	\$466
	8600-WB5B	30M x 0.53MM I.D. 1.0U MXT-5 CAPILLARY COLUMN	\$777
	8600-WB5C	60M x 0.53MM I.D. 1.0U MXT-5 CAPILLARY COLUMN	\$1,233
	8600-WBBD	15M x 0.53MM I.D. 0.15U MXT-500 CAPILLARY COLUMN (FOR GLYC. IN BIODIESEL)	\$526
	8600-WBBG	15M x 0.53MM I.D. 1.0U MXT-BIODIESEL CAPILLARY COLUMN	\$550
	8600-WBVA	15M x 0.53MM I.D. 5.0U MXT-VOL CAPILLARY COLUMN (FOR VOLATILES)	\$466
	8600-WBVB	30M x 0.53MM I.D. 5.0U MXT-VOL CAPILLARY COLUMN	\$777
	8600-WBVC	60M x 0.53MM I.D. 5.0U MXT-VOL CAPILLARY COLUMN	\$1,233
	8600-WBXA	15M x 0.53MM I.D. 1.0U MXT-WAX CAPILLARY COLUMN (POLAR)	\$466
	8600-WBXC	30M x 0.53MM I.D. 1.0U MXT-WAX CAPILLARY COLUMN	\$777
	8600-WBXC	60M x 0.53MM I.D. 1.0U MXT-WAX CAPILLARY COLUMN	\$1,233
	8600-WQPA	15M x 0.53MM I.D. 20.0U RT-QPLOT CAPILLARY COLUMN	\$801
	8600-WQPB	30M x 0.53MM I.D. 20.0U RT-QPLOT CAPILLARY COLUMN	\$1,149
			\$0
	<b>ACCESSORIES</b>		\$0
x	0510-0081	METHANIZER ACCESSORY, FOR NON-SRI GC / AFTERMARKET, 90-240 VAC	\$1,604
	8600-C346	GAS LINE INSTALLATION KIT CGA346	\$490
	8600-C350	GAS LINE INSTALLATION KIT CGA350	\$490
	8600-C380	GAS LINE INSTALLATION KIT CGA380	\$490
	8600-C580	GAS LINE INSTALLATION KIT CGA580	\$490
	8600-C590	GAS LINE INSTALLATION KIT CGA590	\$490
	8600-MAIN	GC MAINTENANCE KIT, SPECIFY 8610C OR 310, 110V OR 220V	\$610
	8660-0060	FAST MUDLOGGER MODIFICATION	\$610
	8660-0082	METHANIZER RETROFIT KIT, IN JET VERSION	\$1,233
	8670-1081	METHANIZER TUBE REPLACEMENT- 6" x 1/8"	\$126
	8670-1082	METHANIZER TUBE REPLACEMENT- 2" x 1/8" - FOR NEW 8610C GC	\$126
	8670-1083	METHANIZER TUBE, IN JET, UNPACKED	\$126
	8670-1122	VOLTAGE TRANSFORMER, STEP UP/STEP DOWN, 110VAC-220VAC	\$250
	8670-1340	OXYGEN TRAP FILTER	\$186
	8670-1341	HYDROCARBON TRAP FILTER	\$93
	8670-3500	AUTOSAMPLER MOUNTING SYSTEM, FOR HTA	\$2,467
	8670-5850	SAMPLE STREAM DRYER	\$610
	8670-9008	MAINTENANCE KIT, HYDROGEN GENERATOR (MINUS CELL)	\$526
	8670-9304	HEATED TRANSFER LINE ADDITION, FOR NEW BUILD GC, RT. SIDE	\$861
	8670-9305	HEATED TRANSFER LINE MOD. w/ PLUG	\$370
	8670-9554	SRI TUBING CUTTER FOR COPPER TUBING	\$15
	8680-0052	METHOD 5035 COMPLIANT VOA VIAL SPARGE ACCESSORY	\$4,443
	8680-0352	SPARE DESSICANT CANISTER	\$742
	8680-5050	HOT WAND ACCESSORY, ADJUSTABLE, 110V	\$952
	8690-0070	INTERNAL WHISPER-QUIET AIR COMPRESSOR, 110V	\$742
	8690-0071	PERISTALTIC PUMP, REPLACEMENT	\$490
	8690-0073	VACUUM PUMP INTERFACE, AUTOMATED	\$742
	8690-0081	METHANIZER ACCESSORY BUILT ONTO EXISTING VALVE OVEN	\$1,844
	8690-0082	METHANIZER ACCESSORY, IN JET	\$1,233
	8690-0086	PELTIER COOLING WITH ELECTRONICS, FOR EXISTING TRAP	\$1,844
	8690-0087	DGA-TOGA PERMEATION LOOP ACCESSORY	\$4,311
	8690-0090	PELTIER COOLED TRAP, FOR GAS SAMPLING VALVE	\$3,700
	8690-0092	ENRICHMENT COIL ACCESSORY	\$1,233

8690-0093	ONLINE MEMBRANE SAMPLER W/ SPARGER FOR COOLING TOWER WATER	\$4,311
8690-0094	OXIDIZER ACCESSORY	\$7,402
8690-0095	REUSEABLE SHIPPING CONTAINER	\$250
8690-2270	INTERNAL WHISPER-QUIET AIR COMPRESSOR, 220V	\$742
8690-5510	DIGITAL MULTIMETER, GENERAL PURPOSE	\$84
8690-5600	H2 / HC LEAK DETECTOR, AC POWERED, WITH DIGITAL VOLTMETER	\$490
8690-5655	H2 / HC LEAK DETECTOR, BUILT INTO 1 CH. DATA SYSTEM	\$1,963
8690-9305	HEATED TRANSFER LINE WITH THERMOCOUPLE, 110VAC	\$610
8690-LPGH	LPG HEATED EXPANSION CHAMBER / HOMOGENIZER	\$742
		\$0
<b>PARTS</b>		\$0
8660-6055	UPGRADE 1 CHANNEL DATA SYSTEM TO 6 CHANNEL VERSION (IN NEW GC)	\$1,604
8670-CB02	CIRCUIT BREAKER, 2 A (110VAC)	\$15
8670-CB05	CIRCUIT BREAKER, 5 A (220VAC)	\$15
8670-CB10	CIRCUIT BREAKER, 10A (110VAC)	\$15
8670-GRE1	GRAPHITE ELECTRODE ROPE, WITH CONNECTORS, FOR HYDROGEN GENERATOR	\$126
8670-KBF1	KYNAR BAR FITTING, WATER, FOR HYDROGEN GENERATOR (REPLACES NYLON)	\$30
8670-0007	TCD CELL w/ FILAMENTS, HEATING ELEMENT, SRI MODEL	\$1,233
8670-0011	TCD GAIN SWITCH	\$36
8670-0017	TID DETECTOR BEAD	\$473
8670-0025	HEATED INJECTOR HARDWARE, COMPLETE, WITHOUT EPC	\$1,233
8670-0026	HEATED INJECTION PORT CARRIER INLET	\$126
8670-0030	HID COLLECTOR ELECTRODE ASSEMBLY	\$359
8670-0031	HID DETECTOR BODY	\$299
8670-0034	HEATED SPLIT INJECTOR BODY	\$861
8670-0060	VALCO E ROTOR MID TEMP.	\$155
8670-0061	VALCO P ROTOR LOW TEMP.	\$155
8670-0062	VALCO T ROTOR HIGH TEMP.	\$155
8670-0063	10 PORT VALVE HEAD, GAS SAMPLING	\$1,077
8670-0064	ELECTRIC VALVE ACTUATOR, FOR 10 PORT GAS SAMPLING VALVE	\$1,233
8670-0066	CIRCUIT BOARD KIT, FOR ELECTRIC ACTUATOR, 110VAC	\$370
8670-0068	SYRINGE NEEDLE, REPLACEMENT, FOR LIQUID AUTOSAMPLER	\$93
8670-0070	AIR COMPRESSOR, REPLACEMENT, 110VAC	\$370
8670-0071	PERISTALTIC PUMP TUBING, REPLACEMENT	\$126
8670-0072	NARROW BORE SPME INJECTOR SLEEVE (FOR HTD. INJ.)	\$190
8670-0073	VACUUM PUMP INTERFACE, SELF INSTALL KIT	\$742
8670-0074	VACUUM PUMP, REPLACEMENT	\$126
8670-0080	PHOTOMULTIPLIER (PMT) TUBE	\$1,233
8670-0081	FPD DETECTOR BODY	\$1,233
8670-0082	SULPHUR WAVELENGTH FILTER	\$370
8670-0083	PHOSPHORUS WAVELENGTH FILTER	\$370
8670-0084	FPD FILTER ASSEMBLY WITH BUILT-IN SULFUR FILTER	\$742
8670-0085	FPD FILTER ASSEMBLY WITH BUILT-IN PHOSPHORUS FILTER	\$742
8670-0086	FPD PMT SOCKET ASSEMBLY	\$454
8670-0120	NPD BEAD (REPLACEMENT ONLY)	\$473
8670-0150	FID IGNITOR / ELCD HEATER	\$93
8670-0154	FID COLLECTOR ELECTRODE (REPL. 8610C)	\$30
8670-0155	FID COLLECTOR ELECTRODE CABLE (REPL. 8610C)	\$36
8670-0232	SERIAL CABLE, RS-232 (DB-9 CONNECTORS), 6'	\$30
8670-0353	CELL, HYDROGEN GENERATOR, REPLACEMENT (NEW)	\$1,472
8670-0354	CELL, HYDROGEN GENERATOR, REPLACEMENT (REBUILT)	\$861
8670-0355	H2-40 SAFETY UPGRADE KIT	#VALUE!
8670-0356	H2-50 SAFETY UPGRADE KIT	#VALUE!
8670-0357	GLASS CYLINDER REPLACEMENT KIT, FOR H2 GENERATOR	\$430
8670-0651	FAN MOTOR KIT, 8610C (SPECIFY 110VAC OR 220VAC)	\$250
8670-0655	FAN MOTOR AND BLADE, 310/410 (SPECIFY 110VAC OR 220VAC)	\$250
8670-1024	FID DETECTOR BODY	\$370

8670-1025	FID DETECTOR BODY FOR METHANIZER	\$494
8670-1026	NPD DETECTOR BODY	\$370
8670-1028	DELCD COOLING FAN, FOR RED LID	\$33
8670-1029	DELCD HEATER / COLLECTOR ASSEMBLY	\$502
8670-1034	SILCOSTEEL LINER FOR SPLIT/SPLITLESS INJECTOR	\$30
8670-1052	64 BIT WINDOWS 7 COMPATIBLE PIC CHIP FOR EARLY MODEL 333	\$126
8670-1081	METHANIZER TUBE REPLACEMENT- 6" x 1/8"	\$126
8670-1082	METHANIZER IN-JET TUBE REPLACEMENT- 2" x 1/8"	\$126
8670-1083	METHANIZER TUBE, IN JET, UNPACKED	\$126
8670-114A	DIFFERENTIAL AMPLIFIER IC, INA114AP	\$33
8670-117P	DIFFERENTIAL AMPLIFIER IC, INA117P	\$33
8670-1351	SPARGE HEAD, 5030 INTERCHANGEABLE, REPLACEMENT	\$742
8670-1352	SPARGE HEAD, 5035 INTERCHANGEABLE, REPLACEMENT	\$1,472
8670-1353	SILICONE SEPTA, MOLDED PLUG, FOR ON-COLUMN INJECTOR (PACK OF 25)	\$93
8670-1354	SILICONE SEPTA, STAMPED DISK, FOR HEATED INJECTOR (PACK OF 25)	\$93
8670-1357	PORTER PRESSURE REGULATOR w/ SENSOR	\$406
8670-1400	OVEN HEATER / SOCKET SET, 110 OR 220V	\$63
8670-1401	OVEN HEATER ELEMENT, 8610A/B/9300A, REPLACEMENT	\$250
8670-1402	OVEN HEATER SOCKET FOR 8610A, B, 9300A GC's	\$15
8670-1403	OVEN HEATER ELEMENT FOR 8610C GC, 110V	\$63
8670-1404	OVEN HEATER ELEMENT FOR 8610C GC, 220V	\$63
8670-1405	OVEN HEATER ELEMENT FOR 310 GC, 220V	\$63
8670-1406	OVEN HEATER ELEMENT FOR 310 GC, 110V	\$63
8670-1410	CARTRIDGE HEATER, 100W, 1/4"x1 5/16", FOR DET. BLOCK, METH. (110V OR 220V)	\$93
8670-1411	CARTRIDGE HEATER, 100W, 3/8"x2 3/4", FOR ECD HEATER BLOCK (110V OR 220V)	\$93
8670-1412	CARTRIDGE HEATER, 40W, 1/4"x1 1/4", FOR 5030 P&T SAMPLER (110V OR 220V)	\$93
8670-1413	CARTRIDGE HEATER, 40W, 1/4"x1 1/4", FOR HID HEATER BLOCK (24VDC)	\$93
8670-1414	CARTRIDGE HEATER, 50W, 1/4"x1 1/4", FOR 510 METHANIZER HEATER (12VDC)	\$93
8670-1415	CARTRIDGE HEATER, 150W, 3/8"x2", FOR THERMAL DESORBER (110V OR 220V)	\$93
8670-1416	CARTRIDGE HEATER, 200W, 1/4"x1 1/2", FOR PELTIER, BIOD. DET. BLK. (110V OR 220V)	\$93
8670-1450	TRAP HEATER ASSEMBLY WITH T-COUPLE	\$310
8670-1460	TYPE K THERMOCOUPLE, 36"	\$126
9670-1506	1/16" S.S. FERRULE SET, PACK OF 10	\$93
8670-1590	3/8" GRAPHITE FERRULE FOR TSD	\$9
8670-1800	1/8" BRASS NUT, PACK OF 10	\$30
8670-1801	1/8" BRASS FERRULE SET, PACK OF 10	\$33
8670-1805	1/8" S.S. NUT, PACK OF 10	\$63
8670-1806	1/8" S.S. FERRULE SET, PACK OF 10	\$60
8670-1814	1/4" TO 1/8" REDUCING FITTING, FOR CTR COLUMN, ETC.	\$33
8670-1815	1/4" TO 1/8" REDUCING FITTING, WITH 1/16" GAS LINE ENTRY	\$126
8670-1818	1/8" GRAPHITE STRAIGHT FERRULE, PACK OF 10	\$42
8670-1853	GRAPHITE REDUCING FERRULE, 1/8" - 0.8mm, PACK OF 10	\$42
8670-1855	1/4" GRAPHITE STRAIGHT FERRULE, PACK OF 10	\$42
8670-1828	GRAPHITE REDUCING FERRULE, 1/8" - 0.5MM, PACK OF 10	\$51
8670-2085	DFPD-FID DETECTOR BODY	\$1,233
8670-2270	AIR COMPRESSOR, REPLACEMENT, 220VAC	\$370
8670-2368	INJECTION PORT COUPLER TO LIQUID AUTOSAMPLER CAROUSEL	\$190
8670-5600	PROBE, REPLACEMENT, FOR HC/H2 LEAK DETECTOR	\$93
8670-6000	DIGITAL FLOW CONTROLLER	\$430
8670-6020	PRESSURE SENSOR WITH CONNECTOR FOR EPC	\$190
8670-6021	TANK PRES. REGULATOR w/ CGA FITTING	\$310
8670-6022	NORGREN GAS PRESSURE REGULATOR	\$93
8670-6023	NORGREN PRESSURE REGULATOR w/ SENSOR	\$190
8670-6024	WATTS GAS PRESSURE REGULATOR	\$126
8670-6025	WATTS PRESSURE REGULATOR w/ SENSOR	\$214
8670-6026	GAUGE FOR REGULATOR	\$51
8670-6500	OVEN CIRCULATING FAN w/ SQUIREL CAGE	\$126
8670-6550	GREY OVEN COOLING FAN, WITH COOLING FAN MUFFIN	\$310



0110-0085	SIMULTANEOUS S/P FPD MOUNTED ON MODEL 110 CHASSIS	\$12,085
0110-0100	110 CHASSIS, DYNAMIC THERMAL STRIPPER	\$6,168
0110-1026	DELCD MOUNTED ON MODEL 110 CHASSIS	\$7,149
0110-1080	FPD-FID MOUNTED ON MODEL 110 CHASSIS	\$8,383
0110-2007	CCD MOUNTED ON MODEL 110 CHASSIS	\$3,687
0110-2026	FID-DELCD MOUNTED ON MODEL 110 CHASSIS	\$8,383
0110-2426	PID-FID-DELCD MOUNTED ON MODEL 110 CHASSIS	\$12,682
0110-4010	PID-FID MOUNTED ON MODEL 110 CHASSIS	\$8,993
		\$0
0310-0004	310 EDUCATIONAL FID GC, USB 2.0 CHASSIS, 110V	\$7,402
0310-0045	310 SOIL GAS GC SYSTEM	\$19,740
0310-1000	310 EDUCATIONAL TCD GC, USB 2.0 CHASSIS, 110V	\$6,168
0310-1003	310 GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V	\$6,779
0310-1003-2	310 GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V	\$6,779
0310-1006	310 GASLESS EDUCATIONAL CCD GC, SERIAL CHASSIS, 110V	\$6,168
0310-1007	310 GASLESS INDOOR AIR QUALITY GC (CCD)	\$8,013
0310-1008	310 GASLESS INDOOR AIR QUALITY GC (CCD-PID)	\$12,337
0310-1117	310 GASLESS EXPLOSIVES GC, TID	\$11,714
0310-6003	310 GC MAINFRAME, 6 CHANNEL USB CHASSIS, 110V	\$8,384
0310-6003-2	310 GC MAINFRAME, 6 CHANNEL USB CHASSIS, 220V	\$8,384
		\$0
0410-0065	410 RACK MOUNT MUDLOGGING GC SYSTEM (FID-FID)	\$19,740
0410-0065-2	410 RACK MOUNT MUDLOGGING GC SYSTEM (FID-FID)	\$19,740
0410-1000	410 RACK GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V	\$10,481
0410-1000-2	410 RACK GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V	\$10,481
0410-6000	410 RACK GC MAINFRAME, 6 CHANNEL USB CHASSIS, 110V	\$12,086
0410-6000-2	410 RACK GC MAINFRAME, 6 CHANNEL USB CHASSIS, 220V	\$12,086
		\$0
0510-0081	METHANIZER ACCESSORY FOR NON-SRI GC / AFTERMARKET, 90-240 VAC	\$1,604
0510-1081	REPLACEMENT METHANIZER TUBE FOR MODEL 510	\$131
		\$0
8600-1050	PEAKSIMPLE 1 CH. USB DATA SYSTEM KIT, 110VAC, MODEL 333	\$1,844
8600-1051	4 RELAY KIT FOR MODEL 333	\$190
8600-1250	PEAKSIMPLE 1 CH. USB DATA SYSTEM KIT, 220VAC, MODEL 333	\$1,844
8600-2022	SINGLE-GAS EPC OPTION FOR MODEL 333 UNITS	\$610
8600-4060	4 RELAY BOARD FOR GC RETROFIT, 8610C/310	\$286
8600-4061	4 RELAY BOARD FOR GC RETROFIT, WITH EXTERNAL JACK (CURRENT 8610C)	\$310
8600-5655	1 CH. DATA SYSTEM WITH H2 / HC SENSOR INSTALLED	\$2,095
8660-6053	UPGRADE 1 CH. DATA SYSTEM TO 6 CH. USB VERSION (IN EXISTING GC/LC)	\$3,449
8600-6055	PEAKSIMPLE 6 CH. USB DATA SYSTEM KIT, 110V MODEL 302	\$3,449
8600-6056	SWITCHED AC OUTLET FOR USB DATA SYSTEM	\$358
8600-6255	PEAKSIMPLE 6 CH. USB DATA SYSTEM KIT, 220V MODEL 302	\$3,449
8600-9000	DATA SYSTEM HOST NOTEBOOK PC w/ PTR.	\$3,700
8600-9010	DATA SYSTEM HOST DESKTOP PC w/ PTR.	\$3,209
8600-9050	MULTIMEDIA DATA SYSTEM HOST DESKTOP PC W/ PTR.	\$4,311
8600-C346	GAS LINE INSTALLATION KIT CGA346	\$490
8600-C350	GAS LINE INSTALLATION KIT CGA350	\$490
8600-C380	GAS LINE INSTALLATION KIT CGA380	\$490
8600-C580	GAS LINE INSTALLATION KIT CGA580	\$490
8600-C590	GAS LINE INSTALLATION KIT CGA590	\$490
8600-PK1A	3' x 1/8" S.S. SILICA GEL PACKED COLUMN	\$126
8600-PK1B	6' x 1/8" S.S. SILICA GEL PACKED COLUMN	\$250
8600-PK2A	3' x 1/8" S.S. MOLECULAR SIEVE 5A PACKED COLUMN	\$126
8600-PK2B	6' x 1/8" S.S. MOLECULAR SIEVE 5A PACKED COLUMN	\$250
8600-PK3A	3' x 1/8" S.S. MOLECULAR SIEVE 13X PACKED COLUMN	\$126
8600-PK3B	6' x 1/8" S.S. MOLECULAR SIEVE 13X PACKED COLUMN	\$250
8600-PKC3	CTR3 DOUBLE PACKED COLUMN, FOR ARGON	\$801

8600-PKC4	CTR1 DOUBLE PACKED COLUMN	\$742
8600-PKC5	24' x 1/8" S.S. AT-1000/CARBOPACK B CFC PACKED COLUMN	\$837
8600-PKDA	3' x 1/8" S.S. HAYESEP D PACKED COLUMN	\$126
8600-PKDB	6' x 1/8" S.S. HAYESEP D PACKED COLUMN	\$250
8600-PKQA	3' x 1/8" S.S. PORAPAK Q PACKED COLUMN	\$126
8600-PKQA-T	3' x 1/8" TEFLON® PORAPAK Q PACKED COLUMN	\$126
8600-PKQB	6' x 1/8" S.S. PORAPAK Q PACKED COLUMN	\$250
8600-PKQB-T	6' x 1/8" TEFLON® PORAPAK Q PACKED COLUMN	\$250
8600-PKSC	6' x 1/8" S.S. SHINCARBON ST 80/100 PACKED COLUMN (2M)	\$514
8600-PKTA	3' x 1/8" S.S. HAYESEP T PACKED COLUMN	\$126
8600-PKTB	6' x 1/8" S.S. HAYESEP T PACKED COLUMN	\$250
8600-WB1A	15M x 0.53MM I.D. 5.0U MXT-1 CAPILLARY COLUMN (DB-1 NON-POLAR)	\$466
8600-WB1B	30M x 0.53MM I.D. 5.0U MXT-1 CAPILLARY COLUMN	\$777
8600-WB1C	60M x 0.53MM I.D. 5.0U MXT-1 CAPILLARY COLUMN	\$1,233
8600-WB5A	15M x 0.53MM I.D. 1.0U MXT-5 CAPILLARY COLUMN (DB-5 MED. POLARITY)	\$466
8600-WB5B	30M x 0.53MM I.D. 1.0U MXT-5 CAPILLARY COLUMN	\$777
8600-WB5C	60M x 0.53MM I.D. 1.0U MXT-5 CAPILLARY COLUMN	\$1,233
8600-WBBD	15M x 0.53MM I.D. 0.15U MXT-500 CAPILLARY COLUMN (FOR GLYC. IN BIODIESEL)	\$526
8600-WBBG	15M x 0.53MM I.D. MXT-BIODIESEL CAPILLARY COLUMN	\$550
8600-WBVA	15M x 0.53MM I.D. 5.0U MXT-VOL CAPILLARY COLUMN (FOR VOLATILES)	\$466
8600-WBVB	30M x 0.53MM I.D. 5.0U MXT-VOL CAPILLARY COLUMN	\$777
8600-WBVC	60M x 0.53MM I.D. 5.0U MXT-VOL CAPILLARY COLUMN	\$1,233
8600-WBXA	15M x 0.53MM I.D. 1.0U MXT-WAX CAPILLARY COLUMN (POLAR)	\$466
8600-WBXC	30M x 0.53MM I.D. 1.0U MXT-WAX CAPILLARY COLUMN	\$777
8600-WBXC	60M x 0.53MM I.D. 1.0U MXT-WAX CAPILLARY COLUMN	\$1,233
8600-WQPA	15M x 0.53MM I.D. 20.0U RT-QPLOT CAPILLARY COLUMN (19741)	\$801
8600-WQPB	30M x 0.53MM I.D. 20.0U RT-QPLOT CAPILLARY COLUMN (19742)	\$1,149
		\$0
8610-0025	8610C METHOD 25 GC (CH4/NON-CH4 HC)	\$13,571
8610-0035	8610C DGA GC SYSTEM, HID	\$19,118
8610-0036	8610C DGA GC SYSTEM, TCD - HID	\$21,585
8610-0040	8610C GREENHOUSE GAS GC SYSTEM	\$24,053
8610-0050	8610C BTEX GAS CHROMATOGRAPH, METHOD 5030 COMPLIANT	\$24,053
8610-0051	8610C BTEX GAS CHROMATOGRAPH, METHOD 5030/5035 COMPLIANT	\$25,898
8610-0059	8610C ENVIRONMENTAL GC (PID-FID/DELCD-P&T)	\$27,755
8610-0061	8610C GEOPROBE GC (PID-FID/DELCD)	\$22,819
8610-0062	8610C GEOPROBE GC (FID/DELCD)	\$18,507
8610-0065	8610C MUDLOGGING GC (FID-FID)	\$17,273
8610-0066	8610C FAST MUDLOGGING GC, 110VAC	\$17,884
8610-0070	8610C MULTIPLE GAS ANALYZER GC - TCD	\$12,948
8610-0071	8610C MULTIPLE GAS ANALYZER TCD FID METH	\$18,015
8610-0072	8610C MULTIPLE GAS ANALYZER TCD HID	\$18,507
8610-0073	8610C MULTIPLE GAS + SULFUR ANALYZER	\$25,910
8610-0080	8610C PCB GC SYSTEM	\$19,118
8610-0114	8610C METHOD TO-14 AIR MONITORING GC	\$27,755
8610-0270	8610C MULTIPLE GAS GC II (TCD)	\$14,182
8610-0271	8610C MULTIPLE GAS GC II (TCD-FID-METH)	\$19,118
8610-0272	8610C MULTIPLE GAS GC II (TCD-HID)	\$19,740
8610-0273	8610C MULTIPLE GAS GC II + SULFUR ANALYZER	\$27,144
8610-0370	8610C MULTIPLE GAS GC III (TCD)	\$13,811
8610-0371	8610C MULTIPLE GAS GC III (TCD-FID-METH)	\$18,866
8610-0372	8610C MULTIPLE GAS GC III (TCD-HID)	\$19,369
8610-0373	8610C MULTIPLE GAS GC III + SULFUR ANALYZER	\$26,772
8610-1003	8610C GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V	\$6,779
8610-1003-2	8610C GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V	\$6,779
8610-1117	8610C EXPLOSIVES GC (TID)	\$11,714
8610-1500	8610C CFC GAS CHROMATOGRAPH WITH TCD	\$9,870

8610-1510	8610C CFC GAS CHROMATOGRAPH WITH FID	\$9,870
8610-2003	8610V GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 110V (VERTICAL INJ.)	\$9,175
8610-2003-2	8610V GC MAINFRAME, 1 CHANNEL USB 2.0 CHASSIS, 220V (VERTICAL INJ.)	\$9,175
8610-3070	8610C BTU GAS ANALYZER GC, TCD	\$12,948
8610-5400	8610C CAPILLARY FID GC	\$10,481
8610-5405	8610C NARROW BORE CAPILLARY FID GC	\$12,325
8610-5500	8610D TUNEABLE COLUMN SELECTIVITY GC	\$14,182
8610-5675	8610C CRYOSULFUR GC SYSTEM	\$23,562
8610-5700	8610C SPME GC	\$11,103
8610-5800	8610C HRVOC GC SYSTEM, 110VAC	\$18,507
8610-5810	8610C HRVOC GC SYSTEM, 110VAC, ADD PID, 6 CH.	\$24,424
8610-6003	8610C GC MAINFRAME, 6 CHANNEL USB CHASSIS, 110V	\$8,384
8610-6003-2	8610C GC MAINFRAME, 6 CHANNEL USB CHASSIS, 220V	\$8,384
8610-6004	8610D GC MAINFRAME w/ DUAL COLUMN OVENS, 6 CH USB, 110V	\$11,475
8610-6004-2	8610D GC MAINFRAME w/ DUAL COLUMN OVENS, 6 CH USB, 220V	\$11,475
8610-6584	8610C BIODIESEL GC SYSTEM, ASTM D-6584, 110VAC	\$9,738
8610-6555	SULFUR IN NATURAL GAS GC SYSTEM, 110VAC	\$21,585
8610-7003	8610V GC MAINFRAME, 6 CHANNEL USB 2.0 CHASSIS, 110V (VERTICAL INJ.)	\$10,780
8610-7003-2	8610V GC MAINFRAME, 6 CHANNEL USB 2.0 CHASSIS, 220V (VERTICAL INJ.)	\$10,780
		\$0
8640-0050	AUTOCALIBRATION SYSTEM, GAS	\$3,700
8640-1006	SINGLE BAY AUTOINJECTOR	\$2,467
		\$0
8660-0060	FAST MUDLOGGER MODIFICATION	\$610
8660-0082	METHANIZER RETROFIT KIT, IN JET VERSION	\$1,233
8660-1000	LABOR	#VALUE!
8660-1500	REFURBISH / TUNE-UP, BASE RATE (SEE PAGE 9 FOR RATE SCALE)	\$928
8660-2000	TRAINING, DAY RATE IN-HOUSE	\$988
8660-3000	RENTAL	#VALUE!
8660-6053	UPGRADE 1 CH. DATA SYSTEM TO 6 CH. USB VERSION (IN EXISTING GC/LC)	\$3,449
8660-6055	UPGRADE 1 CH. USB DATA SYSTEM TO 6 CH. USB VERSION (IN NEW GC/LC)	\$1,604
		\$0
8670-CB02	CIRCUIT BREAKER, 2 A (110VAC)	\$15
8670-CB05	CIRCUIT BREAKER, 5 A (220VAC)	\$15
8670-CB10	CIRCUIT BREAKER, 10 A (110VAC)	\$15
8670-GRE1	GRAPHITE ELECTRODE ROPE, WITH CONNECTORS, FOR HYDROGEN GENERATOR	\$126
8670-KBF1	KYNAR BAR FITTING, WATER, FOR HYDROGEN GENERATOR (REPLACES NYLON)	\$30
8670-USB2	USB 2.0 A TO B CABLE, 6'	\$33
8670-0007	TCD CELL w/ FILAMENTS, HEATING ELEMENT, SRI MODEL	\$1,233
8670-0009	REPLACEMENT RGD REACTION TUBE, UNPACKED, WITH FRITS	\$126
8670-0011	TCD GAIN SWITCH	\$39
8670-0017	TID DETECTOR BEAD	\$490
8670-0024	HEATED INJECTOR BODY	\$610
8670-0025	HEATED INJECTOR HARDWARE, COMPLETE, WITHOUT EPC	\$1,233
8670-0026	HEATED INJECTION PORT CARRIER INLET	\$126
8670-0030	HID COLLECTOR ELECTRODE ASSEMBLY	\$370
8670-0031	HID DETECTOR BODY	\$310
8670-0034	HEATED SPLIT INJECTOR BODY	\$861
8670-0060	VALCO E ROTOR MID TEMP.	\$155
8670-0061	VALCO P ROTOR LOW TEMP.	\$155
8670-0062	VALCO T ROTOR HIGH TEMP.	\$155
8670-0063	10 PORT VALVE HEAD, GAS SAMPLING	\$1,077
8670-0064	ELECTRIC VALVE ACTUATOR, FOR 10 PORT GAS SAMPLING VALVE	\$1,233
8670-0066	CIRCUIT BOARD KIT, FOR ELECTRIC ACTUATOR, 110VAC	\$370
8670-0068	SYRINGE NEEDLE, REPLACEMENT, FOR LIQUID AUTOSAMPLER	\$93
8670-0070	AIR COMPRESSOR, REPLACEMENT, 110VAC	\$370
8670-0071	PERISTALTIC PUMP TUBING, REPLACEMENT	\$126
8670-0072	NARROW BORE SPME INJECTOR SLEEVE (FOR HTD. INJ.)	\$190
8670-0073	VACUUM PUMP INTERFACE, SELF INSTALL KIT	\$742

8670-0074	VACUUM PUMP, REPLACEMENT	\$126
8670-0080	PHOTOMULTIPLIER (PMT) TUBE	\$1,233
8670-0081	FPD DETECTOR BODY	\$1,233
8670-0082	SULPHUR WAVELENGTH FILTER	\$370
8670-0083	PHOSPHORUS WAVELENGTH FILTER	\$370
8670-0084	FPD FILTER ASSEMBLY WITH BUILT-IN SULFUR FILTER	\$742
8670-0085	FPD FILTER ASSEMBLY WITH BUILT-IN PHOSPHORUS FILTER	\$742
8670-0120	NPD BEAD (REPLACEMENT ONLY)	\$490
8670-0150	FID IGNITOR	\$93
8670-0154	FID COLLECTOR ELECTRODE (REPL. 8610C)	\$30
8670-0155	FID COLLECTOR ELECTRODE CABLE (REPL. 8610C)	\$42
8670-0232	SERIAL CABLE, RS-232 (DB-9 CONNECTORS), 6'	\$30
8670-0351	NAFION MEMBRANE REPLACEMENT FOR 50ML HYDROGEN GEN.	\$126
8670-0353	CELL, HYDROGEN GENERATOR, REPLACEMENT (NEW)	\$1,472
8670-0354	CELL, HYDROGEN GENERATOR, REPLACEMENT (REBUILT)	\$861
8670-0355	H2-40 SAFETY UPGRADE KIT	#VALUE!
8670-0356	H2-50 SAFETY UPGRADE KIT	#VALUE!
8670-0357	GLASS CYLINDER REPLACEMENT KIT, FOR H2 GENERATOR	\$430
8670-0651	FAN MOTOR KIT, 8610C (SPECIFY 110VAC OR 220VAC)	\$250
8670-0655	FAN MOTOR KIT, 310/410 (SPECIFY 110VAC OR 220VAC)	\$250
8670-6575	CHASSIS FAN, 24VDC, FOR 8610C/310	\$90
8670-1017	TID DETECTOR BODY	\$370
8670-1023	FID DETECTOR INLET BULKHEAD FITTING	\$310
8670-1024	FID DETECTOR BODY	\$370
8670-1025	FID DETECTOR BODY FOR METHANIZER	\$494
8670-1026	NPD DETECTOR BODY	\$370
8670-1028	DELCD COOLING FAN, FOR RED LID	\$33
8670-1029	DELCD HEATER / COLLECTOR ASSEMBLY	\$502
8670-1034	SILCOSTEEL LINER FOR SPLIT/SPLITLESS INJECTOR	\$30
8670-1052	64 BIT WINDOWS 7 COMPATIBLE PIC CHIP FOR EARLY MODEL 333	\$126
8670-1058	POWER SUPPLY FOR MODEL 333, 110VAC TO 15VDC	\$33
8670-1058-2	POWER SUPPLY FOR MODEL 333, 220VAC TO 15VDC	\$126
8670-1081	METHANIZER TUBE REPLACEMENT- 6" x 1/8"	\$126
8670-1082	METHANIZER IN-JET TUBE REPLACEMENT- 2" x 1/8"	\$126
8670-1083	METHANIZER TUBE, IN JET, UNPACKED	\$126
8670-1122	VOLTAGE TRANSFORMER, STEP UP/STEP DOWN, 110VAC-220VAC	\$250
8670-1173	NEEDLE, 115 MM, FOR METHOD 5035 SPARGE HEAD	\$33
8670-1174	NEEDLE, 50 MM, FOR METHOD 5035 SPARGE HEAD	\$33
8670-114A	DIFFERENTIAL AMPLIFIER IC, INA114AP	\$33
8670-117P	DIFFERENTIAL AMPLIFIER IC, INA117P	\$33
8670-1240	PID CELL ASSEMBLY	\$617
8670-1242	PID LAMP 10.6eV w/ SEAL, 106-TYPE (SMALL, NEW STYLE)	\$617
8670-1243	PID LAMP 10.2eV w/ SEAL, 103C-TYPE (LARGE, OLD STYLE)	\$617
8670-1244	PID LAMP SEAL, TEFLON®, PACK OF 10	\$126
8670-1245	PID 45VDC BATTERY (REPLACEMENT)	\$33
8670-1246	PID HV POWER SUPPLY TRANSFORMER, 8610 A, B MODEL	\$126
8670-1247	PID HV POWER SUPPLY CIRCUIT BOARD, 8610C, 310 MODEL	\$155
8670-1248	PID DETECTOR INLET BULKHEAD FITTING	\$310
8670-1300	BLANK TRAP	\$30
8670-1305	TENAX GR TRAP	\$93
8670-1315	CARBOSIEVE II TRAP	\$93
8670-1320	CARBOPACK B TRAP	\$93
8670-1324	POLISHING FILTER, 3"	\$93
8670-1330	TEFLON TEST TUBE SEALS (1 PAIR), FOR P&T	\$21
8670-1335	SPARGE TEST TUBES (10 PACK)	\$15
8670-1340	OXYGEN TRAP FILTER	\$186
8670-1341	HYDROCARBON TRAP FILTER	\$93
8670-1350	PURGE & TRAP SPARGING HEAD w/ GAS INJ. PORT	\$430
8670-1351	SPARGE HEAD, 5030 INTERCHANGEABLE, REPLACEMENT	\$742
8670-1352	SPARGE HEAD, 5035 INTERCHANGEABLE, REPLACEMENT	\$1,472

8670-1353	SILICONE SEPTA, MOLDED PLUG, FOR ON-COLUMN INJECTOR (PACK OF 25)	\$93
8670-1354	SILICONE SEPTA, STAMPED DISK, FOR HEATED INJECTOR (PACK OF 25)	\$93
8670-1356	PORTER GAS PRESSURE REGULATOR & FITTING	\$310
8670-1357	PORTER PRESSURE REGULATOR w/ SENSOR	\$406
8670-1400	OVEN HEATER / SOCKET SET, 110 or 220V	\$63
8670-1401	OVEN HEATER ELEMENT, 8610A/B/9300A, REPLACEMENT	\$250
8670-1402	OVEN HEATER SOCKET FOR 8610A, B, 9300A GC's	\$15
8670-1403	OVEN HEATER ELEMENT FOR 8610C GC, 110V	\$63
8670-1404	OVEN HEATER ELEMENT FOR 8610C GC, 220V	\$63
8670-1405	OVEN HEATER ELEMENT FOR 310 GC, 220V	\$63
8670-1406	OVEN HEATER ELEMENT FOR 310 GC, 110V	\$63
8670-1410	HEATER CARTRIDGE, 100W, 110V, 1/4"x1 5/16", FOR DET. BLOCK, METH. (110V OR 220V)	\$93
8670-1411	CARTRIDGE HEATER, 100W, 3/8"x2 3/4", FOR ECD HEATER BLOCK (110V OR 220V)	\$93
8670-1412	CARTRIDGE HEATER, 40W, 1/4"x1 1/4", FOR 5030 P&T SAMPLER (110V OR 220V)	\$93
8670-1413	CARTRIDGE HEATER, 40W, 1/4"x1 1/4", FOR HID HEATER BLOCK (24VDC)	\$93
8670-1414	CARTRIDGE HEATER, 50W, 1/4"x1 1/4", FOR 510 METHANIZER HEATER (12VDC)	\$93
8670-1415	CARTRIDGE HEATER, 150W, 3/8"x2", FOR THERMAL DESORBER (110V OR 220V)	\$93
8670-1416	CARTRIDGE HEATER, 200W, 1/4"x1 1/2", FOR PELTIER, BIOD. DET. BLK. (110V OR 220V)	\$93
8670-1450	TRAP HEATER ASSEMBLY WITH T-COUPLE	\$310
8670-1460	TYPE K THERMOCOUPLE, 36"	\$126
8670-1501	DESORBER BULKHEAD	\$430
8670-1502	GAS DELIVERY LINE WITH CONNECTOR, THERMAL DESORBER	\$126
8670-1506	1/16" S.S. FERRULE SET, PACK OF 10	\$93
8670-1590	3/8" GRAPHITE FERRULE FOR TSD (EACH)	\$9
8670-1800	1/8" BRASS NUT, PACK OF 10	\$30
8670-1801	1/8" BRASS FERRULE SET, PACK OF 10	\$33
8670-1805	1/8" S.S. NUT, PACK OF 10	\$63
8670-1806	1/8" S.S. FERRULE SET, PACK OF 10	\$63
8670-1814	1/4" TO 1/8" REDUCING FITTING, FOR CTR COLUMN, ETC.	\$33
8670-1815	1/4" TO 1/8" REDUCING FITTING, WITH 1/16" GAS LINE ENTRY	\$126
8670-1818	1/8" GRAPHITE STRAIGHT FERRULES, PACK OF 10	\$42
8670-1828	GRAPHITE REDUCING FERRULE, 1/8" - 0.5MM, PACK OF 10	\$51
8670-1853	GRAPHITE REDUCING FERRULE, 1/8" - 0.8MM, PACK OF 10	\$42
8670-1855	1/4" GRAPHITE STRAIGHT FERRULE, PACK OF 10	\$42
8670-2007	REPLACEMENT CCD DETECTOR ELEMENT	\$126
8670-2085	DFPD-FID DETECTOR BODY	\$1,233
8670-2270	AIR COMPRESSOR, REPLACEMENT, 220VAC	\$370
8670-2368	INJECTION PORT COUPLER TO LIQUID AUTOSAMPLER CAROUSEL	\$190
8670-3500	AUTOSAMPLER MOUNTING SYSTEM, FOR HTA	\$2,467
8670-5052	UPGRADE 5030 P&T TO METHOD 5030/5035 COMPLIANT (NEW BUILD ONLY)	\$1,844
8670-5600	PROBE, REPLACEMENT, FOR HC/H2 LEAK DETECTOR	\$93
8670-5850	SAMPLE STREAM DRYER	\$610
8670-5860	ON-LINE SAMPLER / SPARGER FOR HRVOC	\$3,077
8670-6000	DIGITAL FLOW CONTROLLER	\$430
8670-6015	FLUISTOR (EPC MODULE) WITH CONNECTOR, CURRENT 8610C	\$430
8670-6016	EPC CIRCUIT BOARD	\$430
8670-6020	PRESSURE SENSOR WITH CONNECTOR, FOR EPC	\$190
8670-6021	TANK PRES. REGULATOR w/ CGA FITTING	\$310
8670-6022	NORGREN GAS PRESSURE REGULATOR	\$93
8670-6023	NORGREN PRESSURE REGULATOR w/ SENSOR	\$190
8670-6024	WATTS GAS PRESSURE REGULATOR	\$126
8670-6025	WATTS PRESSURE REGULATOR w/ SENSOR	\$214
8670-6026	GAUGE FOR REGULATOR	\$51
8670-6500	OVEN CIRCULATING FAN	\$126
8670-6550	GREY OVEN COOLING FAN, WITH COOLING MUFFIN FAN	\$310
8670-6554	HEATSINK FAN	\$93
8670-6575	CHASSIS FAN, 24VDC, FOR 8610C/310	\$93
8670-6576	CHASSIS FAN, 110VAC, FOR 8610C/310	\$126
8670-6600	COLUMN OVEN LID, 8610B	\$126

8670-8000	SAMPLE LOOP (SPECIFY VOLUME BETWEEN 0.5mL and 3.0mL)	\$63
8670-9001	GC MAINTENANCE KIT, 8610C 110V	\$610
8670-9002	GC MAINTENANCE KIT, 8610C 220 VAC	\$610
8670-9003	GC MAINTENANCE KIT, 8610B 110V	\$490
8670-9004	GC MAINTENANCE KIT, 8610B 220V	\$490
8670-9005	GC MAINTENANCE KIT, 310 110V	\$610
8670-9006	GC MAINTENANCE KIT, 310 220V	\$610
8670-9007	UPGRADE TCD TO CURRENT HIGH TEMPERATURE MODEL (HARDWARE ONLY)	\$1,233
8670-9008	MAINTENANCE KIT, HYDROGEN GENERATOR (MINUS CELL)	\$526
8670-9010	FID MAINTENANCE KIT	\$155
8670-9090	SEPTUM NUT w/ GUIDE FOR 26GA. NEEDLE	\$42
8670-9093	0.53mm CAPILLARY COLUMN ADAPTER	\$30
8670-9094	INJECTOR BODY	\$310
8670-9095	SEPTUM NUT W/ GUIDE FOR 20GA. NEEDLE	\$42
8670-9096	SEPTUM NUT W/ GUIDE FOR 20GA. NEEDLE, FOR HEATED INJECTOR	\$42
8670-9100	TCD CELL STAINLESS STEEL, GOWMAC-TYPE	\$1,233
8670-9110	O-RING FOR TCD FILAMENT, EACH (MIN. QTY 10)	\$3
8670-9120	TCD FILAMENT, TUNGSTEN-RHENIUM (SPECIFY COPPER OR VITON SEAL)	\$93
8670-9121	TCD FILAMENT, GOLD PLATED, SET OF FOUR (AuW 13-300)	\$742
8670-9122	O-RING, FOR TCD FILAMENT, PACK OF 10	\$30
8670-9123	NUT, TCD, FILAMENT RETAINING	\$15
8670-9124	COPPER SEAL, FOR TCD FILAMENT, PACK OF 10	\$63
8670-9125	TCD FILAMENT PROTECTION CIRCUIT (RETROFIT)	\$610
8670-9127	TCD CELL w/ FILAMENTS, SRI MODEL (EXCHANGE)	\$742
8670-9304	HEATED TRANSFER LINE ADDITION, FOR NEW BUILD GC, RT. SIDE	\$861
8670-9305	HEATED TRANSFER LINE MOD. w/ PLUG	\$370
8670-9306	HEATED TRANSFER LINE, CAPILLARY TUBING	\$63
8670-9550	SYRINGE 10 UL	\$51
8670-9554	SRI TUBING CUTTER FOR COPPER TUBING	\$15
8670-9555	TUBING COPPER 1/8", 50' ROLL	\$63
8670-9556	1/16" S.S. TUBE FOR P&T SPARGE GAS	\$30
		\$0
8680-0052	METHOD 5035 COMPLIANT VOA VIAL SPARGE ACCESSORY	\$4,443
8680-0352	SPARE DESSICANT CANISTER	\$742
		\$0
8690-0006	AROMATIC SELECTIVE DETECTOR (ASD)	\$7,402
8690-0007	TCD DETECTOR	\$2,467
8690-0009	RGD DETECTOR (WITH EMPTY REACTOR)	\$7,402
8690-0010	FID DETECTOR	\$2,467
8690-0011	BLANK REACTION TUBE W/FRITS	\$63
8690-0015	NPD DETECTOR	\$3,700
8690-0017	TID DETECTOR	\$3,700
8690-0020	ECD DETECTOR	\$7,402
8690-0023	ADDITIONAL ON-COLUMN INJECTOR WITH EPC CIRCUIT	\$1,604
8690-0025	HEATED INJECTION PORT UPGRADE	\$981
8690-0030	HID DETECTOR, SRI DESIGN	\$4,311
8690-0034	SPLIT / SPLITLESS INJECTOR, AUTOMATED VENT	\$1,844
8690-0035	GAS PHASE SPLITTER	\$981
8690-0037	ON-COLUMN PTV INJECTOR UPGRADE	\$1,844
8690-0040	PID DETECTOR	\$4,311
8690-0045	HEATED STATIC HEADSPACE INJECTOR	\$7,402
8690-0046	HEATED STATIC HEADSPACE INJECTOR UPGRADE, TO EXISTING VALVE, VALVE	\$4,934
8690-0051	AUTOMATED PURGE AND TRAP CONCENTRATOR, METHOD 5030	\$8,013
8690-0052	AUTOMATED PURGE AND TRAP CONCENTRATOR, METHOD 5030/35	\$9,870
8690-0053	10 SAMPLE PURGE AND TRAP AUTOSAMPLER, w/4 RELAY BD	\$8,636
8690-0054	10 SAMPLE METHOD 5035 PURGE-AND-TRAP AUTOSAMPLER	\$8,636
8690-0060	10 PORT GAS SAMPLING VALVE, MULTIGAS 3 PLUMBING, WITH SOLENOID	\$3,077
8690-0061	10 PORT GAS SAMPLING VALVE, PNEUMATIC ACTUATOR	\$3,077
8690-0062	4 PORT LIQUID SAMPLING VALVE, ELECTRIC ACTUATOR	\$3,077
8690-0063	10 PORT GAS SAMPLING VALVE, MANUAL ACTUATOR	\$1,472

8690-0064	4 PORT LIQUID SAMPLING VALVE, MANUAL ACTUATOR	\$1,472
8690-0065	AUTOMATED GAS SAMPLE VALVE, 10 PORT	\$2,467
8690-0066	10 INPUT HEATED STREAM SELECTOR W/ TRANSFER LINE	\$5,545
8690-0067	BLOCK HEATER w/ CARTRIDGE FOR GAS VALVE	\$610
8690-0068	LIQUID AUTOSAMPLER CAROUSEL, 42 VIAL TRAY	\$9,870
8690-0069	SOLENOID-CONTROLLED GAS VALVE	\$610
8690-0070	INTERNAL WHISPER-QUIET AIR COMPRESSOR, 110V	\$742
8690-0071	PERISTALTIC PUMP, REPLACEMENT	\$490
8690-0072	SPLIT VENT VALVE	\$1,101
8690-0073	VACUUM PUMP INTERFACE, DATA SYSTEM CONTROLLED	\$742
8690-0074	THERMOSTATTED VALVE OVEN, HIGH TEMP. (300°C MAX.)	\$1,472
8690-0075	ON-LINE LIQUID SAMPLER FOR PURGE-AND-TRAP	\$4,311
8690-0077	22 PORT, 10 STREAM SELECTOR VALVE, AUTOMATED, STD. ALONE	\$5,545
8690-0078	22 PORT, 10 STREAM SELECTOR VALVE, ELECTRIC ACTUATOR, PLUMBED	\$4,311
8690-0079	22 PORT, 10 STREAM SELECTOR VALVE, ELECTRIC ACTUATOR, UNPLUMBED	\$3,700
8690-0080	FPD DETECTOR	\$4,934
8690-0081	METHANIZER ACCESSORY BUILT ONTO EXISTING VALVE OVEN	\$1,844
8690-0082	METHANIZER ACCESSORY, IN JET	\$1,233
8690-0083	TO-14 CRYOTRAP LOOP, AUTOMATED CONTROL	\$1,844
8690-0084	HEATED / FAST COOLING ADSORBENT TRAP FOR EXISTING GAS VALVE	\$1,844
8690-0085	SIMULTANEOUS S/P FPD DETECTOR (DFPD)	\$9,870
8690-0086	PELTIER COOLING w/ ELECTRONICS, FOR EXISTING TRAP	\$1,844
8690-0087	DGA-TOGA PERMEATION LOOP ACCESSORY	\$4,311
8690-0088	THERMOSTATTED VALVE OVEN	\$981
8690-0089	UNHEATED INSULATED VALVE OVEN	\$310
8690-0090	PELTIER COOLED TRAP, FOR GAS SAMPLING VALVE	\$3,700
8690-0091	THERMOSTATTED VALVE OVEN, NARROW, FOR 8610D GC	\$981
8690-0092	ENRICHMENT COIL ACCESSORY	\$1,233
8690-0093	ONLINE MEMBRANE SAMPLER W/ SPARGER FOR COOLING TOWER WATER	\$4,311
8690-0094	OXIDIZER ACCESSORY	\$7,402
8690-0095	REUSEABLE SHIPPING CONTAINER	\$250
8690-0096	DGA-TOGA EXTRACTOR ASSEMBLY	\$861
8690-0097	TRAP PACKING ACCESSORY	\$190
8690-0151	NAFION MEMBRANE REPLACEMENT FOR HYDROGEN GEN.	\$126
8690-0152	NAFION TUBING, DRYER, FOR HYDROGEN GENERATOR	\$250
8690-0153	WATER FILTER, FOR HYDROGEN GENERATOR	\$33
8690-0160	TURBO-COOL FAST OVEN COOLING	\$981
8690-0230	220VAC 50Hz CONVERSION KIT	\$310
8690-1015	NPD CONVERSION KIT FOR FID	\$1,604
8690-1026	DELCD DETECTOR	\$4,934
8690-1051	METHOD TO-14 AIR CONCENTRATOR, VAC PUMP, 1 TRAP	\$6,779
8690-1052	METHOD TO-14 AIR CONCENTRATOR, 2 TRAP, w/TUBE DESORBER	\$9,247
8690-1055	METHOD TO-14 AIR CONCENTRATOR, VAC PUMP, 2 TRAPS	\$7,402
8690-1068	ON-LINE SYRINGE SAMPLER (NO CAROUSEL)	\$7,402
8690-1070	REPLACEMENT AIR FILTER	\$126
8690-1080	FPD/FID DETECTOR WITH DUAL AMPLIFIERS	\$6,168
8690-1081	REPLACEMENT METHANIZER TUBE	\$126
8690-1087	THERMAL DESORBER SAMPLE TUBE (PK. OF 10)	\$126
8690-1088	THERMAL SOIL DESORBER, MANUAL ACTUATOR	\$4,311
8690-1115	FID / NPD CONVERTIBLE DETECTOR	\$4,311
8690-2007	CCD DETECTOR	\$1,472
8690-2022	ADDITIONAL EPC CONTROL ZONE (NO INJECTOR)	\$1,101
8690-2023	ADDITIONAL INJECTION PORT WITHOUT EPC CONTROL/CARRIER	\$610
8690-2026	FID-DELCD DETECTOR (FID-DELCD)	\$6,168
8690-2084	DUAL HEATED TRAPS FOR EXISTING VALVES	\$3,688
8690-2085	DFPD-FID DETECTOR (3 AMPLIFIERS)	\$11,103
8690-2253	10 STATION PURGE-AND-TRAP AUTOSAMPLER 220V, 4 REL BD	\$8,636
8690-2270	INTERNAL WHISPER-QUIET AIR COMPRESSOR, 220V	\$742
8690-2615	NPD-DELCD SERIES DETECTOR	\$7,402
8690-5052	UPGRADE PURGE & TRAP TO 5030/5035 COMPLIANT	\$1,844



# Genuine Restek Replacement Parts for **Shimadzu GCs**



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# From Injector to Detector

Restek is your #1 source for consumables and supplies for Shimadzu GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

### Feature

### Benefit

Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—easy to hold and operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe assembly

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks with the adaptor fitting.



Leak Detector is easily accessed when stored in the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

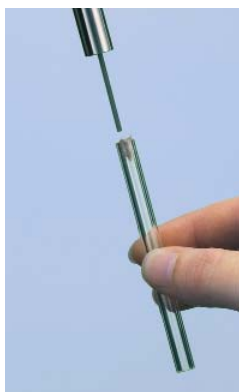
Insert and remove wool plugs easily. Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.



Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

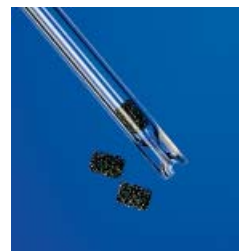
**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller- inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!















Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for Shimadzu 9A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Split</b>	universal, for most common analyses	3.5 ID 5.0 OD x 128	221-25822-01	20751	20752	20753
		dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 128	—	20754	20755	—
	<b>Cycloplitter®</b>	high & low MW compounds	3.5 ID 5.0 OD x 128	—	20757	20758	—
Splitless Liners for Shimadzu 9A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>3.5mm Splitless</b>	trace samples	3.5 ID 5.0 OD x 128	221-25440-03	20748	20749	20750
DI Liners for Shimadzu 9A GCs (0.32/0.53mm ID)		Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Uniliner®</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 128	—	20872	20873	—
Split Liners for Shimadzu 14A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Split</b>	universal, for most common analyses	3.5 ID 5.0 OD x 99	221-32544-01	20860	20861	20862
	<b>Cycloplitter®</b>	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 99	—	20870	20871	—
	<b>Laminar Cup Splitter</b>	high MW compounds	3.5 ID 5.0 OD x 99	—	20868	20869	—
Splitless Liners for Shimadzu 14A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>3.5mm Splitless</b>	trace samples	3.5 ID 5.0 OD x 99	221-32544-00	20863	20864	20865
DI Liners for Shimadzu 14A GCs (0.32/0.53mm ID)		Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>Uniliner®</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	—	20876	20877	—
	<b>Cyclo-Uniliner®</b>	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	—	20893	20894	—
Split Liners for Shimadzu 17A, 2010, and 2014 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	<b>1mm Split</b>	purge & trap, fast GC	1.0 ID 5.0 OD x 95	—	20976	20977	20978
	<b>3.5mm Split</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-01	22283	22284	22285
	<b>Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	3.5 ID 5.0 OD x 95	—	21020	21021	—
	<b>Cycloplitter®</b>	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 95	<b>new!</b>	22072	22073	—












\*Nominal ID at syringe needle expulsion point.

### ordering note

For descriptions of liner deactivations, packings, and tools, see [pages 3-5](#).

All liners are  
**100% deactivated**



All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>3.5mm Splitless</b>	universal, trace samples	3.5 ID 5.0 OD x 95	221-48335-01	22286	22287	—
 <b>Double Gooseneck</b>	reduces backflash and catalytic decomposition	3.5 ID 5.0 OD x 95	—	20958	20959	20960
 <b>Single Gooseneck</b>	reduces backflash, also operates in DI mode	3.5 ID 5.0 OD x 95	221-41599-00	20961	20962	20963
Split/Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Split/Splitless w/ Wool</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-00	20955	20956	20957
 <b>Siltek® Split/Splitless w/ Wool</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	—	20955-213.1	20956-213.5	20957-213.25
SPME Liner for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>SPME Liner</b>	ideal for low volume SPME applications	.75 ID 5.0 OD x 95	<b>new!</b>	22278	22279	—
DI Liners for Shimadzu 17A, 2010, and 2014 GCs (0.32/0.53mm ID)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Uniliner® w/ Wool</b>	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21713	21719	—
 <b>Open-top Drilled Uniliner® (hole on top)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21285	21286	—
 <b>Open-top Drilled Uniliner® (hole on bottom)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21287	21288	—
 <b>Gooseneck Drilled Uniliner® (hole on top)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21289	21290	—
 <b>Gooseneck Drilled Uniliner® (hole on bottom)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21291	21292	—

## tech tip

### DI Liners for Shimadzu GCs

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

Liner for Shimadzu 17A PTV GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>17A PTV Liner w/ Wool</b>	trace, dirty, high & low MW active samples	1.6 ID 4.0 OD x 95	225-09212-01	21705	21706	21707
Make-up Liner for Shimadzu GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Detector Make-up Liner</b>	FIDs, ECDs & misc. detectors	1.0 ID 5.0 OD x 75	—	20760	20761	—

\*Nominal ID at syringe needle expulsion point.

## Siltek® Treated Metal Inlet Liners for Shimadzu GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

**SILTEK®**  
deactivation



Liner Type (3.5mm ID x 5.0mm OD x 95mm)	qty.	cat.#
95mm Split/Splitless Siltek® Treated Metal Inlet Liners w/Wool	5-pk.	21003

**Viton® O-Rings for Shimadzu 17A, 2010, and 2014 GCs**

Description	Max. temp.	Similar to Shimadzu part #	qty.	cat.#
Viton® O-Rings for Shimadzu 17A, 2010, and 2014 GCs	250°C	036-11203-84	10-pk.	21477

**Graphite O-Rings for Shimadzu 17A, 2010, and 2014 GCs**

Description	Max. temp.	Similar to Shimadzu part #	qty.	cat.#
Graphite O-Rings for Split Liners	450°C	221-48393-91	5-pk.	20243
Graphite O-Rings for Splitless Liners	450°C	221-47222-91	5-pk.	20244

**Plug Septa for Shimadzu GCs**

Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27153	50-pk.	27170	50-pk.	27118
50-pk.	27154	100-pk.	27171	100-pk.	27119
100-pk.	27155				

**Septum Nut for Shimadzu 17A, 2010, and 2014 GCs**

- One piece design for ease of installation and removal.
- Made of clear anodized aluminum and high-quality stainless steel.

Description	Similar to Shimadzu part #	qty.	cat.#
	221-41286-00		
Septum Nut for Shimadzu 17A, 2010, and 2014 GCs	221-44584-00	ea.	22079

**Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs**

- Includes 17A injector nut, 0.4mm graphite ferrule, and 1/16-inch stainless steel capillary nut.

Description	qty.	cat.#
Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs	kit	21895
Siltek® Treated Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs	kit	22331

**Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs**

- Meets OEM performance.

Description	Similar to Shimadzu part #	qty.	cat.#
Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41533-00	2-pk.	22688

**Restek Enhanced Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs**

- Restek's design eliminates the slot, increasing lifetime and durability.
- Meets or exceeds OEM performance.

Description	Similar to Shimadzu part #	qty.	cat.#
Restek Enhanced Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41533-00	2-pk.	20375

**5mm Ferrules for Shimadzu 17A GCs**

- For use with packed columns.
- Graphite composition.

Description	qty.	cat.#
5mm Ferrules for Shimadzu 17A GCs	10-pk.	21121

**5mm Stainless Steel Uniliner® Liner Adaptor Fitting for Shimadzu Packed Column GCs**

Shimadzu GCs do not require a standard 1/4" Uniliner® liner adaptor because the injection port cavity will accept 5mm Uniliner® liners. This specially-designed fitting allows a Shimadzu packed column injection port to accept 0.53mm ID columns. Use a Shimadzu 5mm nut and ferrule to install the adaptor fitting into the injection port. Includes a 1/16-inch nut and 0.8mm ID graphite ferrule.

Description	qty.	cat.#
5mm Stainless Steel Uniliner® Liner Adaptor for Shimadzu Packed Column GCs (required for installing Uniliner® liners in 1/4" injection ports)	ea.	20312

**Injector Wrench for Shimadzu 17A, 2010, and 2014 GCs**

- Designed specifically for removing Shimadzu injection ports.
- High-quality stainless steel construction.



Description	Similar to Shimadzu part #	qty.	cat. #
Injector Wrench for Shimadzu 17A, 2010, and 2014 GCs	221-46977-00	ea.	21159

**Capillary Installation Gauge for Shimadzu 17A, 2010, & 2014 GCs**

- Seats ferrule onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Description	qty.	cat. #
Capillary Installation Gauge for Shimadzu 17A, 2010, and 2014 GCs	ea.	22333

**Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge**

Description	qty.	cat. #
1/4" x 5/16" and 10mm x 11mm Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge	ea.	22334

**MLE Capillary Tool Kit for Shimadzu GCs**

Includes:

- capillary installation gauge for Shimadzu GCs
- injector wrench for Shimadzu GCs
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insert tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat. #
MLE Capillary Tool Kit for Shimadzu GCs	kit	22182

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### qty.

kit

### cat.#

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat.#
Septum Puller	ea.	20117

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge**

Description	qty.	cat.#
$\frac{1}{4}$ " x $\frac{5}{16}$ " and 10mm x 11mm Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge	ea.	22334

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124





Vespel® ferrules

## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/16"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## 5mm Ferrules for Shimadzu 17A GCs

- For use with packed columns.
- Graphite composition.

Description	qty.	cat.#
5mm Ferrules for Shimadzu 17A GCs	10-pk.	21121



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespel®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.



## Vu2 Union™ Column Connectors



Patent pending.

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

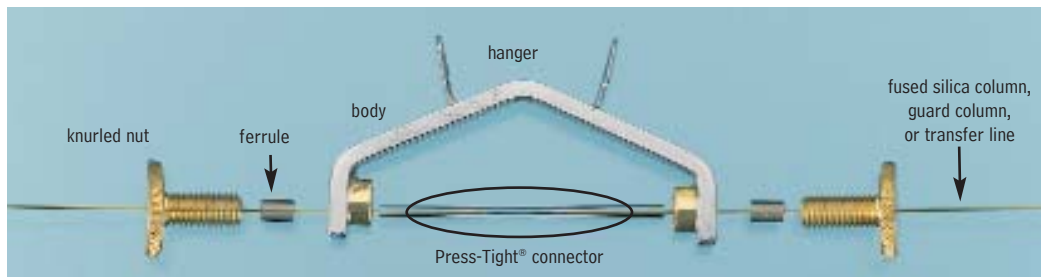
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors

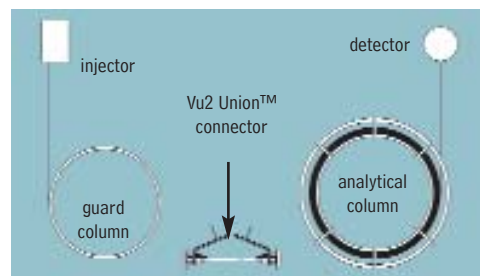
Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

A guard column connected to an analytical column by a Vu2 Union™ connector.



Secure, reliable  
column-to-column  
connections!

NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).



restek  
innovation!

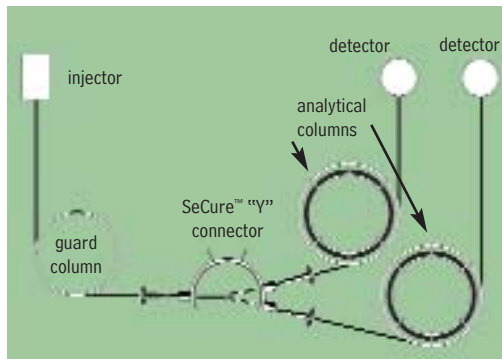
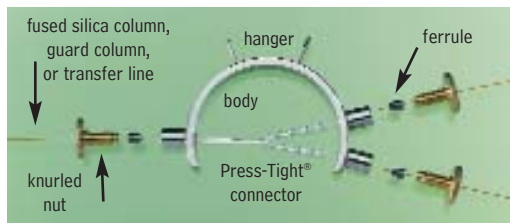
### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.

Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



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## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481



## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



## Universal Angled "Y" Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled "Y" Press-Tight® Connector	20403	20404
Deactivated Universal Angled "Y" Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487	20469



## Universal "X" Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "X" Press-Tight® Connector	20407	20408
Deactivated Universal "X" Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal "X" Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat. #
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat. #
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat. #
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat. #
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat. #
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat. #
Ferrule Removal Kit	FRK1	kit	20146



## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.



## did you know?

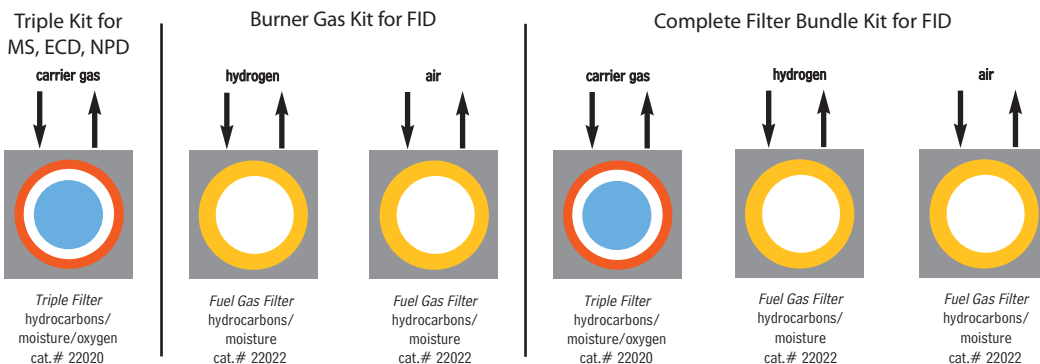
All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	>99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

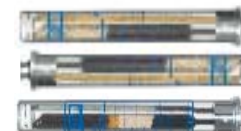
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833



## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.



Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

## please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel		
Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 19) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa) inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

### it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific Purifier Module

	qty.	1/4-inch Compression Tube Fittings		1/8-inch
		cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat.#
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat.#
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

Specifications	
Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat.#
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913
<b>Replacement Components for FID Gas Stations</b>		
Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat.# suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat.# 580051

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.



Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648



## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

### cleaned

All tubing is cleaned and ready to use.

### ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

Tubing Dimensions		25 Feet	Length (per-foot pricing on 26 feet or more)	
ID (in.)	OD (in.)	cat.#	26–100 Feet	> 100 Feet*
0.01" ID	1/32" OD	21500	21501	21502
0.02" ID	1/32" OD	21503	21504	21505
0.03" ID	1/32" OD	21506	21507	21508
0.04" ID	1/32" OD	21509	21510	21511
0.085" ID	1/8" OD	21512	21513	21514
0.21" ID	1/4" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

## GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.

Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185



## Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.

Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012



## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134



## Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

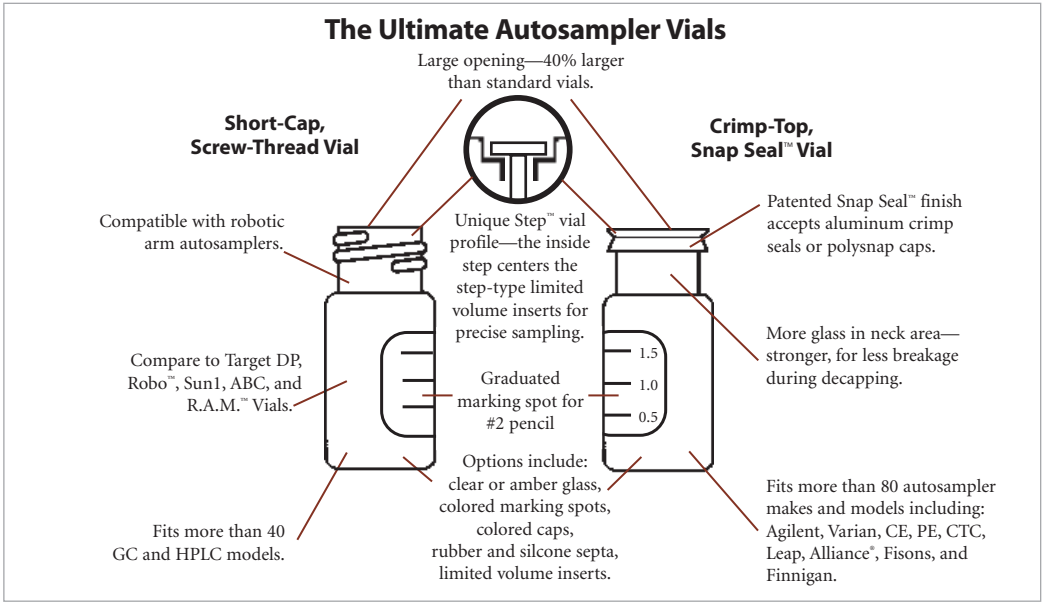


## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.

Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193





**For a highly inert surface, we recommend Siltek® deactivation for your vials:**

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

instrument **reference**

Shimadzu Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	Headspace	8mm Screw-Thread	10mm Screw-Thread	WISP™ 48 Style
SIL-10A, 10Ai, 10AxiL	X	X		X	X	
AOC-8B/9, SIL-6A, SIL-6B, -9A, -8A				X		
AOC-14/1400, AOC-17				X		X
SIL-2AS						X
HSS-2B			X			

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for new electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**instrument **reference******For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10AxL

## 8mm Screw-Thread Vials



8mm (2.0mL)  
Screw-Thread Vial

### Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread

#### Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

#### Screw-Thread Vials—12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

#### 8mm Pre-Assembled Caps and Septa

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

#### Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"*	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"*	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24636	24637

\*Best fit for Shimadzu.

#### Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately

##### (Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195



#### 8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177

#### Septa for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
8mm x 0.045" Red PTFE/Silicone	21178	21179
8mm x 0.065" Red PTFE/White Silicone	21795	21147

#### Limited Volume Inserts for 8mm/425 Screw-Thread Vials

Description	100-pk.	1000-pk.
100µL Glass w/ Polypropylene Bottom Spring	24508	21775
250µL Glass, Flat Bottom	—	24510
250µL Glass, Flat Bottom w/ ID Ring	—	24691
100µL Polypropylene, No Spring	24511	—
100µL Polypropylene, Bottom Spring	24512	—

#### Limited Volume Vials, 12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
100µL Polypropylene	24623	24624
100µL Glass Insert/Clear Plastic Vial*	24625	—

\*Amber glass/clear plastic available on request (1000 packs only).



Flat Bottom Limited  
Volume Insert w/ ID Ring

## instrument reference

### For 8mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	AOC-8B/9, SIL-6A, AOC14/1400, AOC-17, SIL-6B, -9A, -8A, SIL-10A, 10Ai, 10AxL

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

#### Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

### 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10Axi

### Screw-Thread Vials, 12 x 32mm, 10mm/425 Thread, Big Mouth Step™ Design

- 40% larger opening than other vials.
- Step™ profile automatically centers glass flange limited volume inserts.
- Pre-assembled caps with septa, with or without vials.
- Designed for Waters Alliance® autosamplers.

The Big Mouth Step™ Vial System has a larger ID than conventional vials and incorporates a neck finish that is uniquely designed to allow the insert to be precisely aligned in the center of the vial. This precise alignment provides maximum sample withdrawal and eliminates any chance of missed injections. All vials with the large opening are designed with the Step™ Vial System.

### Big Mouth Step™ Screw-Thread Vials (12 x 32mm, 10mm/425 Thread)

Description	100-pk.	1000-pk.
2.0mL Clear Step™ Vial, White Graduated Marking Spot	24626	24627
2.0mL Amber Step™ Vial, White Graduated Marking Spot	24628	24629



### 10mm Pre-Assembled Big Mouth Step™ Vial Kits (w/Black Cap)

Caps attached to vials.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, PTFE/Silicone/Red PTFE Septa, 0.040"	24675	24676
2.0mL Clear Vial, Red PTFE/Silicone Septa, 0.065"	24642	24643
2.0mL Amber Vial, Red PTFE/Silicone Septa, 0.065"	24644	24645

## instrument reference

### For 10mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10Axi



4.0mL Clear Step™ Vial

**Screw-Thread Step™ Vials, 4.0mL, WISP™ 48 Style, 13mm/425 Screw-Thread****WISP™ 48 Screw-Thread Step™ Vials (15 x 45mm, 13/425 Screw-Thread)**

Description	100-pk.	1000-pk.
4.0mL Clear Step™ Vial, White Grad. Marking Spot	24654	24655
4.0mL Amber Step™ Vial, White Grad. Marking Spot	24656	24657

**Caps and Septa**

Description	100-pk.	1000-pk.
Top Hat™, PTFE/Silicone Septa	21745	21746
Pre-Assembled, Red PTFE/Silicone, 0.065"	21743	21744
Caps, Black, Polypropylene, Open-Hole	21741	21742
Septa, Red PTFE/Silicone, 0.040"	21751	21752
Septa, Red PTFE/Silicone, 0.060"	21749	21750

**Limited Volume Inserts**

Description	100-pk.	1000-pk.
500µL, Glass, WISP™, Flat Bottom*	21787	21788

\*Also fit 4.0mL Snap Seal™ Vials (see our general catalog or website).

**instrument reference****For WISP™ 48 Style Vials**

Shimadzu AOC-14/1400, AOC-17, SIL-2AS

Manufacturer	Instrument/Model #
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**Headspace Vials****Headspace Autosampler Vials**

Description	100-pk.	1000-pk.
2mL Clear Vial	21160	21161

**For Headspace Vials**

Manufacturer	Instrument/Model #
--------------	--------------------

Shimadzu HSS-2B

**20mm Aluminum Seals w/Septa, Assembled**

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.



**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one. . .



two. . .



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK



### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for Shimadzu GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 10µL Autosampler Syringe

**Hamilton Syringes for Shimadzu AOC 9 GCs**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		Restek
					Model	cat.#	cat.#
5µL	RN	26s	2"/51mm	2	75RN	87930	24617
5µL	N	26s	2"/51mm	2	75N	87900	24938
10µL	RN	26s	2"/51mm	2	701RN	80330	24530



SGE 5µL Autosampler Syringe

**SGE Syringes for Shimadzu AOC 14, 17, 20, and 20i GCs**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		Restek
					Model	cat.#	cat.#
0.5µL	R	23	42mm	Cone	0.5BR-S-0.63	000445	24841
0.5µL	R	26	42mm	Cone	0.5BR-S-0.47	000440	24840
5µL	F	23	42mm	Cone	5F-S-0.63	001988	24843
5µL	F	26	42mm	Cone	5F-S-0.47	001987	24842
10µL	R	23	42mm	Cone	10R-S-0.63	002898	24845
10µL*	R	23	42mm	Cone	10R-S-GT-0.63	002902	24846
10µL	R	26	42mm	Cone	10R-S-0.47	002897	24844
250µL*	F	23	42mm	Cone	250F-S-GT-0.63	006682	24847

\*Gas-Tight

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

**Replacement Needles for Shimadzu Autosampler Syringes****Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	42mm	Cone	033745	ea.	24747
0.5µL	26	42mm	Cone	033738	ea.	24746
10µL	23	42mm	Cone	037747	2-pk.	24749
10µL	26	42mm	Cone	037745	2-pk.	24748

## Standard Microliter Volume Syringes

### Standard Microliter Volume Syringes

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton			Restek
					Model	cat.#	qty.	cat.#
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE			Restek
					Model	cat.#	qty.	cat.#
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 36.

\*\*With plunger protection.



**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler  
 Cemented Needle  
 (ASRN) Autosampler  
 Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented  
 Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 36.

## Gas-Tight Syringe Replacement Needles

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

### Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

#### Needles for Hamilton Syringes

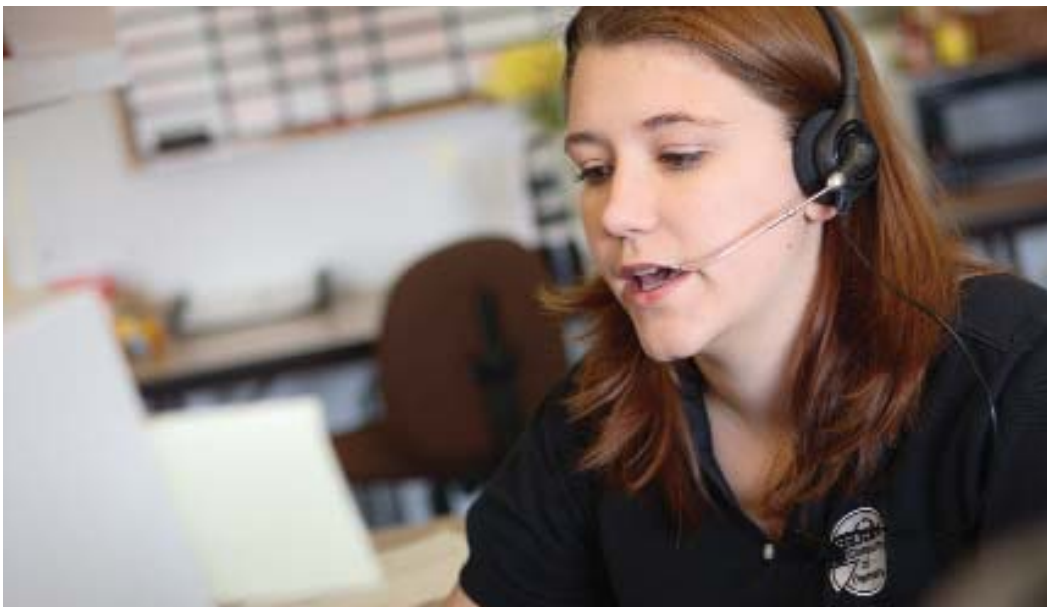
Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

#### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.



## In the U.S.

**Call:** 800-356-1688 (ext. 3) or 814-353-1300 (ext. 3)  
Monday–Friday 8:00 a.m.–6:00 p.m.  
Eastern Standard Time

**Fax:** 814-353-1309—24-hours a day

**Online:** [www.restek.com](http://www.restek.com)—24-hours a day

## Outside the U.S.

**Contact your Restek representative:**

Refer to our website at [www.restek.com](http://www.restek.com)



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e-mail: [sales@thamesrestek.co.uk](mailto:sales@thamesrestek.co.uk)

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because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
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# AVOID **SEPTUM** PROBLEMS

## Septum Handling

All septa, regardless of their composition, puncturability, or resistance to thermal degradation, will be a source of problems if they are mishandled. Always use clean forceps or wear clean cotton gloves when handling septa; do not handle them with bare fingers, nor with powdered latex gloves—contaminants such as finger oils, perfumes, make-up, fingernail polish, skin creams, hand soaps, and talcum can be absorbed into the septum and will bleed from the septum during your analyses.

Also, follow septum and instrument manufacturers' recommendations when installing a septum. Overtightening a septum nut invariably will reduce septum lifetime by increasing septum coring and splitting problems.

## Septum Bleed

All septa contain various amounts of volatile materials (e.g., silicone oils, phthalates) that can be released when the septum is heated to analysis temperatures. Septum bleed occurs when these volatiles from the septum collect on the column, then elute from the column and create baseline disturbances or extraneous (ghost) peaks in the chromatogram. This problem is prevalent in temperature-programmed analyses, because the septum volatiles collect on the column during the oven cool-down and initial hold periods. Capillary columns require much lower gas flow rates than packed columns, therefore septum volatiles are more concentrated, and bleed problems are more pronounced in capillary GC systems.

Because most GCs are equipped with a septum purge, septum bleed generally will disappear within 30 minutes after installing a new septum and exposing it to normal injector temperatures. All Restek septa eliminate this conditioning period because they are pre-conditioned and can be used without delay.

## Why are Low-Bleed Septa Important?

Either baseline rise or extraneous peaks caused by septum bleed can interfere with identification and quantification of target analytes. And, because septum bleed is inconsistent, method reproducibility can be a problem. Using low-bleed septa can minimize these effects and help produce more reliable results.

## SEPTUM HANDLING TIPS

- Handle septa carefully, to prevent contamination.
- Minimize bleed—use preconditioned, low-bleed septa.
- Follow septum and instrument manufacturers' recommendations.

## Why Does Septum Puncturability Matter?

A septum that can be penetrated cleanly and easily by a syringe needle has a longer life, and consistent injections made through such a septum help ensure accurate results. The soft silicone rubber from which all Restek septa are manufactured is specially formulated for chromatographic performance, which ensures our septa are easy to puncture.



## HANDY septum size chart

Instrument	Septum Diameter (mm)
<b>Agilent (HP)</b>	
5880A, 5890, 6890,	
6850, PTV	11
5700, 5880	9.5/10
On-Column Injection	5
<b>CE Instruments (TMQ)</b>	
TRACE™ GC	17
<b>Finnigan (TMQ)</b>	
GC 9001	9.5
GCQ	9.5
GCQ w/TRACE™, PTV	17
QCQ™	9.5
TRACE™ 2000	9.5
<b>Fisons/Carlo Erba (TMQ)</b>	
8000 series	17
<b>Gow-Mac</b>	
6890 series	11
All other models	9.5
<b>PerkinElmer</b>	
Sigma series	11
900,990	11
8000 series	11
Auto SYS™	11
Auto SYS™ XL	11
<b>Pye/Unicam</b>	
All models	7
<b>Shimadzu</b>	
All models	Plug
<b>SRI</b>	
All models	Plug
<b>Tracor</b>	
540	11.5
550,560	9.5
220,222	12.5
<b>Varian</b>	
Injector type:	
Packed column	9.5/10
Split/splitless	
1078/1079	10/11
1177	9
1075/1077	11

### What Septum Configurations are Available, and for Which GCs?

Restek has fashioned septa for all major brands of gas chromatographs and injectors. Use the septum size chart to determine the septum diameter for your instrument, or measure an old septum if your model is not listed.

### Which Septa Should I Use?

Thermolite® septa are a proven low-bleed champion. With a maximum temperature of 340°C, there are very few applications for which Thermolite® septa are not suitable.

IceBlue™ septa are ideal for analysts using inlet temperatures of 250°C or below, or using solid phase microextraction (SPME) sampling techniques. IceBlue™ septa will accommodate puncturing from the large needles used in SPME, and still assure consistent injections and long lifetime.

BTO® septa are bleed and temperature optimized with a maximum temperature of 400°C, for the most demanding GC and GC/MS applications. They retain remarkable softness and puncturability at high temperatures. The CenterGuide™ can help reduce coring when used with tapered (rounded-tip) needles.



**Thermolite® Septa**  
Usable to 340°C



**IceBlue™ Septa**  
Usable to 250°C



**BTO® Septa**  
Usable to 400°C

## Thermolite® Septa

- Precision molding assures consistent, accurate fit.
- Usable to 340°C inlet temperature.
- Excellent puncturability.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.



Septum Diameter	25-pk.	50-pk.	100-pk.
5mm (5/16")	27120	27121	27122
6mm (1/4")	27123	27124	27125
7mm	27126	27127	27128
8mm	27129	27130	27131
9mm	27132	27133	27134
9.5mm (5/8")	27135	27136	27137
10mm	27138	27139	27140
11mm (7/16")	27141	27142	27143
11.5mm	27144	27145	27146
12.5mm (1/2")	27147	27148	27149
17mm	27150	27151	27152
Shimadzu Plug	27153	27154	27155

## IceBlue™ Septa

- Precision molding assures consistent, accurate fit.
- Usable to 250°C inlet temperature.
- General-purpose septa.
- Excellent puncturability.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.
- Ideal for SPME.



Septum Diameter	50-pk.	100-pk.
9mm	27156	27157
9.5mm (5/8")	27158	27159
10mm	27160	27161
11mm (7/16")	27162	27163
11.5mm	27164	27165
12.5mm (1/2")	27166	27167
17mm	27168	27169
Shimadzu Plug	27170	27171



### DID YOU KNOW?

Restek offers an extensive selection of inlet liners for all major gas chromatographs and injectors, including innovative Siltek® deactivated liners. For details, request the *Inlet Supplies Guide* (lit. cat. #59893C) or visit us online at [www.restek.com](http://www.restek.com)

### Inlet Liner Removal Tool

Easily remove liner from injector—no more burned fingers.



qty.	cat.#
3-pk.	20181



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## BTO® Septa

- Precision molding assures consistent, accurate fit.
- CenterGuide™ design requires less force for initial penetration.
- Usable to 400°C inlet temperature.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.
- Each batch GC-FID tested.
- Bleed and temperature optimized; ideal for demanding GC and GC/MS applications.



Septum Diameter	50-pk.	100-pk.
5mm CenterGuide™	27100	27101
6mm (1/4")	27102	27103
9mm CenterGuide™	27104	27105
9.5mm (3/8")	27106	27107
10mm	27108	27109
11mm (7/16") CenterGuide™	27110	27111
11.5mm CenterGuide™	27112	27113
12.5mm (1/2") CenterGuide™	27114	27115
17mm CenterGuide™	27116	27117
Shimadzu Plug	27118	27119

## Merlin Microseal™ Septa for Agilent GCs

- Allow operation from 2 to 100psi (400 Series) or 2 to 30psi (300 Series).
- Top wiper rib improves resistance to particulate contamination; can be taken apart for cleaning.
- High resistance to wear—greatly reduces shedding of septum particles into the injection port liner, eliminating a major source of septum bleed and ghost peaks.
- Longer life—reduces the risk of septum leaks during extended automated runs.
- Maximum temperature—Agilent 6890, 5890 Series II: 325°C; Agilent 5890A: 300°C.

## Microseal™ High-Pressure Septa, 400 Series

Microseal™ High-Pressure Septa, 400 Series (100psi)	Merlin#	Similar to Agilent#	cat.#
Standard kit (nut, 2 septa)	404	Not offered	22810
Starter kit (nut, 1 septum)	405	5182-3442	22811
Nut kit (1 nut, fits 300 & 400 series septa)	403	5182-3445	22809
High-pressure replacement septum (1 septum)	410	5182-3444	22812



## Microseal™ Septa, 300 Series

Microseal™ Septa, 300 Series (30psi)	Merlin#	Similar to Agilent#	cat.#
Standard kit (nut, 2 septa)	304	5181-8833	22813
Starter kit (nut, 1 septum)	305	5181-8816	22814
Microseal replacement septum (1 septum)	310	5181-8815	22815
Replacement PTFE washers (2-pk.)	311	5182-0853	22808



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## Septum Puller

- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.
- Keep several on hand in your laboratory—can be used in many different ways.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.

Description	qty.	cat.#
Septum Puller	ea.	20117

Restek Trademarks: IceBlue, Thermolite, Siltek, Restek logo. Other Trademarks: Auto SYS (PerkinElmer); QCQ (Finnigan Corp.); TRACE (ThermoQuest Corp.); BTO, CenterGuide (Chromatography Research Supplies, Inc.); Microseal (Merlin Instrument Co.).

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**RESTEK**

# Genuine Restek Replacement Parts & Accessories for HPLC Systems



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Piston Seals



Outlet Ball Valve



Needle Seat Assembly



Lamp, VWD G1314A

## Restek Replacement Parts for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#
Preventive Maintenance Kit (Includes: rotor seal, needle seat, needle assembly, seat cap)	1050	01078-68721	kit	25259
Autosampler Preventive Maintenance Kit (Includes: rotor seal, needle assembly, needle seat)	1100	G1313-68709	kit	25271
Pump Maintenance Kit (Includes: PTFE frit, outlet cap, active inlet cartridge, gold disk seal, 2 piston seals, glass solvent filter)	1050, 1100	G1311-68710	kit	25270
Outlet Ball Valve, Binary Pump	1100, 1200	G1312-60012	ea.	25267
Outlet Ball Valve	1050, 1100, 1200	G1311-60012	ea.	25276
Sieves for Outlet Valve	1050, 1100, 1200	5063-6505	10-pk.	25266
Check Valve Cartridge Assembly	1090	79835-67101	ea.	25344
Piston Seals, Teflon w/Graphite	1050, 1100, 1200	5063-6589	2-pk.	22482
Piston Seals, Teflon w/Graphite	1050, 1100, 1200	5063-6589	10-pk.	22483
Piston Seals (Black)	1090	5062-2494	4-pk.	25347
Seal Wash Kit, Binary Pump (4 seals, 4 gaskets)	1100	—	kit	25268
Seal Wash Kit (2 seals, 2 gaskets)	1050, 1100	—	kit	25269
Wash Seal	1050, 1100, 1200	0905-1175	ea.	25277
Sapphire Piston	1050, 1100, 1200	5063-6586	ea.	25273
Sapphire Piston	1090	6980-0672	ea.	25345
Needle Seat	1050	79846-67101	ea.	25258
Needle Seat	1090	79846-67101	ea.	25348
Needle Seat Assembly	1100	G1313-87101	ea.	25265
Needle Assembly	1100	G1313-87201	ea.	25278
Rotor Seal (not for use with 7125 injection valve)	1050	0101-0626	ea.	25272
Rotor Seal	1100	0100-1853	ea.	25275
Rotor Seal (Rheodyne-style)	1090	0101-0623	ea.	25349
Frits, PTFE	1050, 1100, 1200	01018-22707	5-pk.	25466
Seal, Gold Disk (outlet)	1050, 1100, 1200	5001-3707	ea.	25467
Outlet Cap	1050, 1100	5062-2485	4-pk.	25139
Outlet Cap & Gold Seal Assembly	1050, 1100	—	2-pk.	25140
Connecting Tube	1050, 1100	G1311-67304	ea.	25058
Bottle Head Assembly	—	G1311-60003	ea.	25059
Detector Lamp, 1090 DA, 1050 VW/DA/MWD	1090, 1050	79883-60002	ea.	25260
Lamp, DAD G1315A, G1365A	1100, 1200	2140-0590	ea.	25261
Lamp, VWD G1314A	1100, 1200	G1314-60100	ea.	25262
8453 Deuterium Lamp	—	2140-0605	ea.	25263
G1321 Fluorescence Detector Flash Lamp	—	2140-0600	ea.	25264
Lamp, DAD Long Life Deuterium (2000 hours)	1100	5181-1530	ea.	25399
Helium Tubing, 5m, PTFE, 0.057" ID	1050, 1100	5062-2461	ea.	24990
Injector Lubricant, PTFE, 10g	1050, 1100	79841-65501	ea.	26520

## Capillary Stainless Steel Tubing Assemblies for Agilent HPLC Systems

- Precut, micropolished tubing and preassembled fittings for quick, easy maintenance.



Capillary SS Tubing with fittings



Mixing Capillary Assembly

Description	Model #	Similar to Agilent part #	qty.	cat.#
Capillary SS Tubing, 130mm x 0.17mm ID, with fittings	1090	01090-87305	ea.	26525
Capillary SS Tubing, 800mm x 0.17mm ID, with fittings	1050	01078-87305	ea.	26526
Capillary SS Tubing, 180mm x 0.17mm ID, with fittings	1100	G1313-87305	ea.	26527
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01018-67305	ea.	26528
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01078-87306	ea.	26529
Seat Capillary, SS Tubing, 0.17mm ID	1050	01078-87303	ea.	26530
Capillary SS Tubing, 105mm x 0.17mm ID	—	5021-1816	ea.	26531
Mixing Capillary Assembly	1100	G1312-67302	ea.	26532
Capillary SS Tubing, Valve to Metering Head	1100	G1313-87301	ea.	26533
Capillary SS Tubing, 150mm x 0.17mm ID	—	5021-1817	ea.	26534
Capillary SS Tubing, 280mm x 0.17mm ID	—	5021-1818	ea.	26535
Capillary SS Tubing, 400mm x 0.17mm ID	—	5021-1819	ea.	26536
1/16" SS Fitting, Front and Back Ferrules	—	5062-2418	10-pk.	26537

## Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

Easily install the gold seal into the outlet cap.



Put Outlet Cap on male part of Assembly Tool.



Push the Assembly Tool together.



Hold onto Outlet Cap and pull Assembly Tool apart.



Put Gold Seal over pin on male part of Assembly Tool.



Push the Assembly Tool together and press the Gold Seal in the Outlet Cap.



Pull the Assembly Tool apart and remove assembled Outlet Cap and Gold Seal.



Outlet Cap & Gold Seal Assembly

Description	qty.	cat.#
Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems	ea.	24989
Seal, Gold Disk (outlet)	ea.	25467
Outlet Cap	4-pk.	25139
Outlet Cap & Gold Seal Assembly	2-pk.	25140

## Restek Replacement Parts for Beckman HPLC Systems

Description	Model #	Similar to Beckman part #	qty.	cat.#
Inlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240720	ea.	25439
Outlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240721	ea.	25440
Inlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240620	ea.	25441
Outlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240621	ea.	25442
Guide Sleeve for Graphite Plunger Guide	110 Series Pumps	243713	ea.	25444
Outlet Check Filter Frit Assembly	110 Series Pumps	240619	ea.	25445
Piston Guide Assembly	110 Series and 112 Pumps	243045	ea.	25446
Plunger	110 Series and 112 Pumps	243053	ea.	25447
Plunger Seal	110 Series Pumps	887138	ea.	25448
Sapphire Plunger	114M, 116, 118, 125, 126, 127, 128 Pumps	240714	ea.	25450
Plunger Seal	114M, 116, 118, 126, 127, 128 Pumps	241037	ea.	25451
Pump Seal, Gold*	114, 116, 125, 126, 127, 128 Pumps	241037	ea.	25452
Plunger Wash Seal	125, 126, 127, 128 Pumps	728772	ea.	25453
Deuterium Lamp	DU60, 62, 64, 65	596791	ea.	25454

\*Ultra-high molecular weight polyethylene (UHMWPE)



Outlet Check Valve Assembly



Sapphire Plunger

## Restek Replacement Parts for Hitachi HPLC Systems

Description	Model #	Similar to Hitachi part #	qty.	cat.#
SS Check Valve Cartridges (1/16" Ruby Ball)	655/6000/6200	AN0-085	2-pk.	25455
Inlet Check Valve Assembly	655/6000/6200	AN0-0833	ea.	25456
Outlet Check Valve Assembly	655/6000/6200	AN0-0834	ea.	25457
Plunger Assembly	655, 6000, 6200, 7100	810-1033	ea.	25458
Plunger Seal	L655A, 6000, 6200, 7100	655-1080	ea.	25459
Plunger Seal, Gold	655, 6000, 6200, 7100	655-1080	ea.	25460
Inlet Check Valve Assembly	L-7100	AN0-0836	ea.	25461
Outlet Check Valve Assembly	L-7100	AN0-0837	ea.	25462
Rotor Assembly for Dilutor Valve	AS-7200 Autosampler	810-3085	ea.	25463
Rotor Seal Kit	AS-7200, AS-7250 Injection Valve	AN0-0818	ea.	25464
Deuterium Lamp, Prealigned	L4000, L4200, L4250, L7400	AN0-0424	ea.	25465





## Restek Replacement Parts for PerkinElmer HPLC Systems

Description	Model #	Similar to PerkinElmer part #	qty.	cat.#
Inlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540177	ea.	25438
Outlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540197	ea.	25437
High Pressure Seal Kit	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	2540275	ea.	25433
Standard High Pressure Seal	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	9907324	ea.	25434
Low Pressure Seal	PE Series 200 Pumps	9907339	ea.	25435
Needle	PE Series 200 Pumps	N2930023	ea.	25432
Deuterium Lamp	PE Lambda--2, 5, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 40, 800, 900	B0160917	ea.	25436
Deuterium Lamp	PE 200/785A	N2920149	ea.	25431



## Restek Replacement Parts for Shimadzu HPLC Systems

Description	Model #	Similar to Shimadzu part #	qty.	cat.#
Inlet Check Valve	LC-6A, LC-10AS	228-12353-91	ea.	25287
Inlet Check Valve	LC-600, LC-9A, LC-10AD	228-18522-91	ea.	25295
Inlet Check Valve	LC-10ADvp	228-39093-92	ea.	24984
Inlet Check Valve	LC-10AT, LC-10ATvp	228-32166-91	ea.	26521
Outlet Check Valve	LC-6A, LC-10AS	228-09054-93	ea.	25288
Outlet Check Valve Rebuild Kit	LC-6A, LC-10AS	228-11200-91	2-pk.	25289
Outlet Check Valve	LC-600, LC-9A, LC-10AD, LC-10AT	228-18522-92	ea.	25282
Outlet Check Valve	LC-10ADvp, LC-10ATvp	228-34976-91	ea.	24983
Plunger Seal	LC-6A	228-11999-00	ea.	25285
Plunger Seal, Polyethylene	LC-10AS, LC-10AT, LC-10ATvp	228-21975-00	ea.	25290
Plunger Seal	LC-600, LC-9A, LC-10AD	228-18745-00	ea.	25293
Plunger Seal	LC-10ADvp, LC 20AD	228-35146-00	ea.	24980
Plunger Seal, Gold	LC-10ADvp	228-32628-00	ea.	24981
Plunger Seal	SIL-10ADvp, LC-10ATvp	228-35145-00	ea.	24985
Plunger Rinse Seal	LC-10AS	228-28499-00	ea.	25292
Sapphire Plunger	LC-6A	228-12904-93	ea.	25286
Sapphire Plunger	LC-10AS	228-17019-93	ea.	25291
Sapphire Plunger	LC-600, LC-9A, LC-10AD	228-18523-91	ea.	25294
Needle Seal	SIL-10A, 10XL, 10ADvp	228-33355-04	ea.	25468
Rotor Seal	SIL-10ADvp	228-21217-97	ea.	24986
Rotor Seal Assembly	SIL-10A, 10AXL	228-21217-91	ea.	25469
Stator Assembly	SIL-10A, 10AXL	228-21220-91	ea.	25470
Syringe, 500µL	SIL-10A, 10AXL	228-25237-04	ea.	25471
Plunger Assembly, Ceramic	LC-10ADvp	228-35601-91	ea.	25472
Plunger Assembly, Ceramic	LC-10ATvp	228-35009-92	ea.	25473
Plunger Assembly, Sapphire	LC-10ADvp	228-35601-92	ea.	24982
Deuterium Lamp	SPD-6A	062-65056-02	ea.	25283
Deuterium Lamp	SPD-10A, 10AV, M20A	228-34016-02	ea.	25284

Inlet Check Valve  
(cat.#26521)

## Restek Replacement Parts for Waters Detectors

Description	Model #	Similar to Waters part #	qty.	cat.#
Window Gasket	484, 486, 490	80335	ea.	25423
Lamp Side Gasket	484, 486, 490	80336	ea.	25424
Quartz Lens	486	80687	ea.	25427
Xenon Lamp (w/o holder or mirror)	470	—	ea.	25404
Xenon Lamp	474	—	ea.	25405
Deuterium Lamp (UV/Vis)	480, 481	99499	ea.	25403
Deuterium Lamp (UV/Vis)	484	80357	ea.	25406
Deuterium Lamp (UV/Vis)	486	80678	ea.	25407
Deuterium Lamp	996, 2996	WAT052586	ea.	25408
Deuterium Lamp	2487	WAS081142	ea.	25409
Deuterium Lamp, long life (2000 hours)*	486	80678	ea.	25410

\*Standard lamps have nominal 1000-hr. life.

## Restek Rheodyne® Style Replacement Parts for Waters HPLC Systems

Description	Similar to Rheodyne part #	qty.	cat.#
7010 Vespel Rotor Seal	7010-039	ea.	25279
7125 Vespel Rotor Seal	7125-047	ea.	25280
Isolation Seal, 7010	7010-015	ea.	25281

7125 Vespel® Rotor Seal  
(both sides shown)

## Restek Replacement Parts for Waters HPLC Systems

Description	Model #	Similar to Waters part #	qty.	cat.#
Preventative Maintenance Kit Includes: sparge diffuser, filter insert, compression screws, SS ferrule, battery for 2690/717, 250µL WISP syringe, seal wash plunger seal kits (2), wash tube seal kits (4), 2690 seal pack rebuild kit (steel bodies not included), 2690 head plunger seal kits (2), solvent reservoir 20µm filters (4), Alliance check valve cartridges (2), Alliance plunger assemblies (2), 2690 face seals (4)	Alliance 2690, 2695	WAT270944	kit	25143
Preventative Maintenance Kit Includes: PerformancePLUS cartridges (2), sparge diffusers (4), Super Seals (2), solvent reservoir 20µm filters (2), sapphire plungers (2), reference valve rebuild kit, inlet manifold kit	600 Pump	WAT052675	kit	25144
Preventative Maintenance Kit Includes: 717 seal pack with needle, filter insert, 250µL WISP syringe	717 Autosampler	WAT052669	kit	25145
Preventative Maintenance Kit Includes: 616/326/625 plunger assemblies (2), pump seal kit, sparge diffusers (4), solvent reservoir 20µm filters (4), 616 cartridge assemblies (4)	616 Pump	WAT052672	kit	25146
Preventative Maintenance Kit Includes: PerformancePLUS check valves (2), sparge diffuser, solvent 10µm filter, sapphire plungers (2), plunger seals (2)	515 Pump	WAT052587	kit	26519
Inlet Check Valve Assembly	M6KA, 501, 510, 515, 590, 600E	33679, 25214	ea.	25360
Inlet Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	25203	ea.	25361
Inlet Check Valve Rebuild Kit	M6KA, 501, 510, 515, 590, 600E	60495	2-pk.	25362
Outlet Check Valve Assembly (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25030	ea.	25363
Outlet Check Valve Housing (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25212	ea.	25364
Outlet Check Valve Rebuild Kit (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	26016	2-pk.	25365
Outlet Check Valve Assembly (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25216	ea.	25366
Outlet Check Valve Housing (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25207	ea.	25367
Outlet Check Valve Rebuild Kit (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	26014	2-pk.	25368
Inlet Check Valve Assembly, 225µL (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	60307	ea.	25369
PerformancePLUS Check Valve Cartridge	M6KA, 501, 510, 515, 590, 600E	700000254	2-pk.	25370
Check Valve Rebuild Kit (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	88223	2-pk.	25371
PerformancePLUS Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	—	ea.	25372
Check Valve Cartridges	Alliance	WAT270941	2-pk.	25373
Super Seal for Analytical Heads	M6KA, 501, 510, 515, 590, 600E	22946, 22934	ea.	25374
Plunger Seal, Gold for Analytical Heads*	M6KA, 501, 510, 515, 590, 600E	22934	ea.	25375
Plunger Seal, Black for graphite-filled Teflon	M6KA, 501, 510, 515, 590, 600E	26613	ea.	25378
Plunger Seal, Black for EF Heads	510, 590, 600E	26644	ea.	25379
Plunger Seal, Gold for EF Heads	510, 590, 600E	26644	ea.	25380
Seal Wash Plunger Seal	Alliance	WAT271018	2-pk.	25386
Head Plunger Seal Kit	Alliance	WAT270938	2-pk.	25387
Head Plunger Seal Kit (Black)	Alliance	WAT271066	2-pk.	25388
Insert Seal Parts Kit	M6KA, 501, 510, 515, 590, 600E	60012	kit	25389
Sapphire Plunger	M6KA, 510, 590, 600	25656	ea.	25381
Sapphire Plunger (Extended Flow)	510, 590, 600E	60304	ea.	25382
Sapphire Plunger	M45, M501	26524	ea.	25383
Sapphire Plunger Assembly Kit	M515	WAS207069	ea.	25384
Sapphire Plunger	616, 625, 626	31788	ea.	25420
Sapphire Plunger	Alliance	WAT270959	ea.	25385
Draw-Off Tube Assembly	510, 515, 600, 610	25470	ea.	25392
Inlet Manifold Kit	M45, 501, 510, 590, 600E	60448	kit	25412
Ferrule, Stainless Steel	515	22330	ea.	25417
Wash Face Seal	Alliance 2690	WAT271017	ea.	25428
Wash Tube Seal Kit	Alliance 2690	WAT270940	4-pk.	25429
Rebuild Kit, Reference Valve	600 Pump	25746	ea.	25492
Compression Screws, Stainless Steel	Alliance 2690	—	2-pk.	25493
Battery	Alliance 2690, 717, 486, 484	—	ea.	25494
Seal Pack Rebuild Kit, without Seal Wash Tube Assembly	Alliance 2690	WAT271019	ea.	25495
717 Seal Pack (Rebuilt) with Needle	717 Autosampler	4559	ea.	25496
Seal Kit, Pump	616 Pump, 626, 625	31790	ea.	25497
Cartridge Assembly, Stainless Steel	616 Pump	24960	ea.	25498

\*Ultra-high molecular weight polyethylene (UHMWPE).



Preventative Maintenance Kit for 717 Autosampler



Inlet Check Valve Assembly



717 Seal Pack (Rebuilt) with Needle



Piston



Syringe Assembly, 250µL



Lamp, UV



Inlet Check Valve Assembly



Hub-Cap (assembly of the bottle cap and plug)



Hub-Cap Adapter

Hub-Cap Adapter and Opti-Cap®



## Restek Replacement Parts for Thermo Separation HPLC Systems

Description	Model #	Similar to SP/TSP part #	qty.	cat.#
Inlet Check Valve Assembly	SP8800 & P-Series Pumps	A3495-010	ea.	25474
Outlet Check Valve Assembly	SP8800 Series Pumps	A3490-010	ea.	25475
Piston	SP8800 & P-Series Pumps	A3102-010	ea.	25476
Back-up Seal	SP8800 & P-Series Pumps	A2963-010	ea.	25477
Plunger Seal, Gold Superseal	SP8800 & P-Series Pumps	A2962-010	ea.	25478
Check Valve and Transducer Assembly	P-Series Pumps	A3990-010	ea.	25479
Kel-F Washer	P-Series Pumps	A2973-010	ea.	25480
Rotor Seal Assembly, Rheodyne 7010	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	7010-039	ea.	25481
Syringe Assembly, 250µL	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	A3588-020	ea.	25482
Syringe, 500µL	8800 Series	3301-0100	ea.	25483
Lamp, UV	Linear UV-200, 203, 204, 205, 206, and UV 100, 150, 1000, and 2000 Detectors	9551-0023	ea.	25484
Description	Model #	Similar to TSP part #	qty.	cat.#
Check Valve Cartridge	LDC Constametric Pumps	900946	ea.	25485
Sapphire Plunger	LDC Constametric Pumps	801306	ea.	25486
Plunger Seal Kit, Gold	LDC Constametric Pumps	31-36-00754	ea.	25487
Plunger Seal, Black	LDC Constametric Pumps	206129001	ea.	25488
Plunger Seal, Gold	LDC Constametric Pumps	206156001	ea.	25489
Lamp, Deuterium	LDC SM-I, II, III, 3000, 3100, 3100X, and 4000 Detectors	108035	ea.	25490

## Hub-Cap 4 Liter Bottle Tops

Most bottles use a GL45 cap. New Hub-Cap bottle tops are a great way to neatly keep your mobile phase lines where they belong. Use instead of parafilm, aluminum foil, or tape on your mobile phase reservoirs.



Description	qty.	cat.#
Hub-Cap (assembly of the bottle cap and plug)	kit	26541
Hub-Cap Multi-pack	3-pk.	26542

## Hub-Cap Adapters

Allow the use of the Opti-Cap® with 4-liter solvent bottles.

Description	qty.	cat.#
Hub-Cap Adapter	ea.	26538
Hub-Cap Adapter Multi-pack	3-pk.	26539
Hub-Cap Adapter and Opti-Cap	kit	26540

## Waste Overflow Indicator for HPLC Systems

- Avoid messy pooling around mobile phase waste containers.
- Audible alarm instantly alerts user, preventing overflow.
- Compact, battery operated unit.

The new Restek Waste Overflow Indicator will help to keep your mobile phase waste where it belongs—in the waste container! Compact, battery operated unit fits securely on 4-liter solvent bottles and accommodates two waste streams. An audible alarm is given as the solvent waste container approaches capacity, giving you time to empty or change the container. Another innovative design from Restek!

Description	qty.	cat.#
Waste Overflow Indicator for HPLC Systems	kit	26543
Replacement AA Battery for the Waste Overflow Indicator	ea.	26544
Replacement AA Batteries for the Waste Overflow Indicator	3-pk.	26545

## Hub-Cap Filter Kit

Kit includes: bottle adapter, bottle adapter nut, filter inlet cap, grid support, vacuum hose barb, tube compression fitting, 47mm grid, 1/4" OD x 1/8" ID ultra chemical resistant, Teflon® FEP lined Tygon® tubing (3')



Unscrew and lift off top.



Place membrane filter on top of grid.



Reattach top.



Connect vacuum line to side port.

**Transfer and filter mobile phase in a single step!**



Hub-Cap Filter Kit

Description	qty.	cat.#
Hub-Cap Filter Kit	kit	26395
Replacement Membrane Filters	qty.	cat.#
Polypropylene Membrane Filters, 47mm, 0.45µm	100-pk.	26396
Polypropylene Membrane Filters, 47mm, 0.22µm	100-pk.	26397
Nylon Membrane Filters, 47mm, 0.45µm	100-pk.	26398
Nylon Membrane Filters, 47mm, 0.22µm	100-pk.	26399



Polypropylene Membrane Filters

## PEEK™ Survival Kit for HPLC

The PEEK™ Survival Kit is an invaluable parts kit that contains tubing, fittings, and tools essential for setting up and maintaining your HPLC system: PEEK™ tubing, connectors, and elbows, Teflon® tubing, a tubing cutter and extra blades, a ValvTool wrench, open-end wrenches, and more.

Description	qty.	cat.#
PEEK Survival Kit for HPLC	kit	25322



## Stainless Steel Survival Kit for HPLC

The stainless steel survival kit contains a wide range of tubing, fittings, and tools necessary to set up and maintain your HPLC system: a selection of lengths and IDs of 1/16-inch tubing, plus nuts, ferrules, a ValvTool wrench, and a zero-dead-volume union.

Description	qty.	cat.#
Stainless Steel Survival Kit for HPLC	kit	25097



## Priming Syringes for Waters 6000, 6000A, 501, 510, 590, 610 and 610E HPLC Pumps

- Designed for maximum safety with metal flange and luer-lock (LL) hub.
- Teflon®-tipped plunger.

### Hamilton Syringe

Volume	Needle Term.	Hamilton Model	cat.#	Pressure Tested to	qty.	Restek cat.#
10mL	TLL	1010W	81610	700 psig	ea.	21265

### SGE Syringe

Volume	Needle Term.	SGE Model	cat.#	Pressure Tested to	qty.	Restek cat.#
10mL	LL	10MDR-LL-GT	008960	100 psig	ea.	24759

TLL=Teflon® Luer Lock LL=Luer Lock





## free literature

**HPLC Column Selection Guide**  
Quickly scan for important characteristics of Restek HPLC columns. Includes brief, practical guidelines for choosing stationary phase, particle size, pore diameter, and column dimensions.

lit. cat.# 59454D

## get more

For a complete listing of syringes, including the addition of NORM-JECT plastic disposable syringes visit [www.restek.com](http://www.restek.com).

Restek Trademarks:  
Restek logo

Other Trademarks: Agilent (Agilent Technologies, Inc.); Alliance, Waters (Waters Investments Ltd.); Kel-F (3M Co.); Opti-Cap (Millipore Corp); PEEK (Victrex plc); Rheodyne (Rheodyne LLC); Teflon, Tefzel, Tygon, Vespel, (E.I. du Pont de Nemours & Co. Inc.); Valco (Valco Instruments Co., Inc.).

## Syringes for CTC/LEAP LC Autosamplers

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	cat.#	qty.	Restek cat.#
10µL	N	22s	2"/51mm	3	701N	203073	ea.	22743
25µL	N	22s	2"/51mm	3	1702N	203075	ea.	22744
100µL	N	22s	2"/51mm	3	1710N Slim Line*	203077	ea.	22745
100µL	N	22	2"/51mm	3	1710N	203235	ea.	22746
250µL	N	22	2"/51mm	3	1725N	203079	ea.	22747
500µL	N	22	2"/51mm	3	1750N	203349	ea.	22748

\*Barrel OD = 6.7mm; all other 25µL and 100µL syringes have a 7.9mm barrel OD.



Hamilton 100µL LC Autosampler Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	cat.#	qty.	Restek cat.#
10µL	F	22s	2"/51mm	LC	10F-CTC-LC	002710	ea.	22737
25µL	F	22s	2"/51mm	LC	25F-C/T-LC	003984	ea.	22738
25µL*	R	22s	2"/51mm	LC	25R-C/T-GT-LC	003985	ea.	22739
50µL*	F	22s	2"/51mm	LC	50F-C/T-GT-LC	004810	ea.	22740
100µL*	R	22s	2"/51mm	LC	100R-C/T-GT-LC	005330	ea.	22741
500µL*	F	22s	2"/51mm	LC	500F-CTC-GT-LC(0.41)	007720	ea.	22742

\*Gas-tight syringe.



SGE 50µL LC Autosampler Syringe

### SGE Syringe for Hitachi LC Autosamplers

Volume	SGE Model	cat.#	qty.	Restek cat.#
500µL	500C-HITACHI	007660	ea.	22292



500µL, M10 X1 Thread

### SGE Syringes for PerkinElmer LC Autosamplers

Volume	SGE Model	cat.#	qty.	Restek cat.#
50µL	50D-CX-GT	004995	ea.	22295
100µL	100D-CX-GT	005990	ea.	22296
250µL	250D-CX-GT	006995	ea.	22297
500µL	500D-CX-GT	007995	ea.	22298
1mL	1MD-C-GT	008185	ea.	22299



250µL, 1/4-28 UNF Thread

### SGE Syringes for Waters WISP LC Autosamplers

Volume	SGE Model	cat.#	qty.	Restek cat.#
25µL	25D-WISP	003990	ea.	22293
250µL	250D-WISP	006690	ea.	22294



250µL, 1/4-28 UNF Thread



Lit. Cat.# GNFL1059-INT

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[illegible]

**HRoMalytic TESTEK '07**  
**Australian Distributors ECHnology**  
 Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)



## Chromatography Products

# From Injector to Detector

Restek is your #1 source for consumables and supplies for Agilent GC and GC/MS systems!

Restek designs, develops, and markets OEM-equivalent parts and supplies for Agilent systems—even difficult-to-find parts for older models. A team of Restek chemists and engineers is dedicated to creating innovative tools to make your work easier, your system work faster, your analyses more reproducible, and your data more accurate. And, as always, we back our products with friendly, knowledgeable technical service and customer service.

We also offer an extensive selection of capillary, packed, micropacked, and PLOT columns to use in your Agilent system, plus analytical reference materials, vials, syringes, and much more. We also manufacture HPLC columns and accessories. If you don't have a copy of our current catalog, simply call us and ask for one—or request one from our website. Whether you want to order a product, discuss an application or chromatography in general, we look forward to talking with you.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active (e.g., sulfur) compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinit®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinit® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.

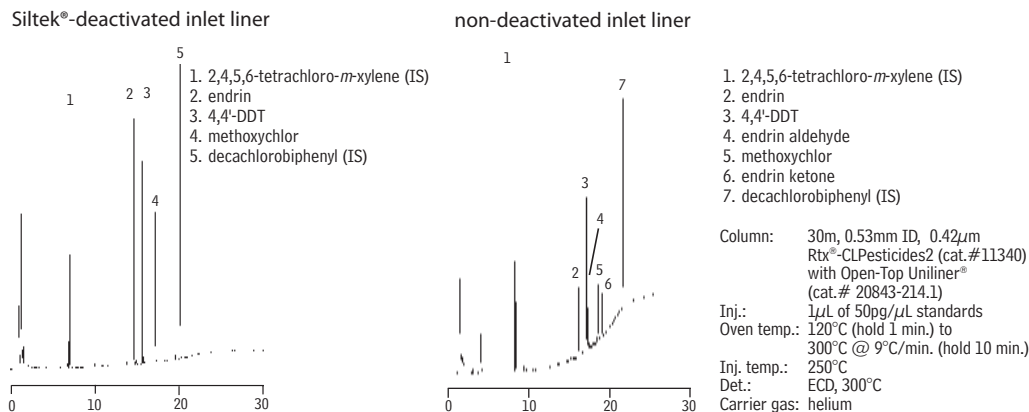
## Siltek® Surface Deactivation

- Eliminate activity by using the most advanced surface treatment available.
- Increase component lifetime—the non-stick surface cleans easily with solvent sonication.
- Ideal for acidic conditions. Siltek® treatment will improve reproducibility and protect hardware.
- Stable to 600°C. A no-bleed deactivation treatment, ideal for all analytical methods.
- Custom service available.

Endrin is more prone to break down on glass surfaces than metal, and DDT is more prone to break down on metal surfaces. Siltek® deactivation of sample-contacting surfaces minimizes endrin and DDT breakdown, to less than 1%!

In addition to our many stock Siltek®-treated products, custom coating service is available. Contact our Technical Service Team at 800-356-1688 or 814-353-1300, ext. 4, or contact your Restek representative.

### A Siltek®-deactivated Uniliner® inlet liner reduces endrin breakdown to less than 1%; DDT and methoxychlor breakdown are undetectable.



### Industries currently benefiting from the reliability of Restek's performance coatings include:

- petroleum, petrochemical, and refineries
- analytical instrument manufacturers
- analytical labs



Silcosteel® is a general purpose passivation for metals.



Silcosteel®-CR treatment improves the corrosion resistance of stainless steel 10X or more.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.



A Sulfinit® layer on metal components is required when analyzing for parts-per-billion levels of organosulfur compounds.



Small, compact unit—  
easy to hold and operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly



**Mike Goss**

Instrument Innovations  
Specialist  
7+ years of service!

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner with Wool		Siltek® Liner with CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner with Base-Deactivated Wool		Base Deactivated Liner with CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for amines and basic compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Liner Packing Materials & Accessories



**Matt Lininger**  
Instrument Innovations  
Engineer  
2+ years of service!

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.



### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324

### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999



### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

Not recommended for use with double gooseneck liners.



### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™ packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*  
**Dr. Konrad Grob**, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.


























No more burned fingers!

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.








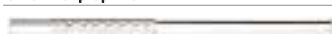

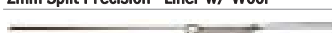








Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 <b>2mm Splitless</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	5181-8818 (ea.) 5183-4703 (5-pk.) 5183-4704 (25-pk.)	20712	20713	20714
 <b>4mm Splitless</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	210-3003 (ea.) 210-3003-5 (5-pk.)	20772	20773	20774
 <b>Siltek® 4mm Splitless</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20772-214.1	20773-214.5	20774-214.25
 <b>4mm Splitless w/ Wool</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	19251-60540 (ea.) 5183-4691 (5-pk.) 5183-4692 (25-pk.)	22400	22401	22402
 <b>2mm Splitless (quartz)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	18740-80220 (ea.) 5183-4707 (5-pk.)	20914	20915	—
 <b>4mm Splitless (quartz)</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20912	20913	—
 <b>4mm Splitless (quartz) w/ Wool</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22403	22404	—
 <b>Gooseneck Splitless (2mm)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795	20796	20797
 <b>Siltek® Gooseneck Splitless (2mm)</b>	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795-214.1	20796-214.5	20797-214.25
 <b>Gooseneck Splitless (4mm)†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	5181-3316 (ea.) 5183-4695 (5-pk.) 5183-4696 (25-pk.)	20798	20799	20800
 <b>Siltek® Gooseneck Splitless (4mm)†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20798-214.1	20799-214.5	20800-214.25
 <b>Gooseneck Splitless (4mm) w/ Wool†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	5062-3587 (ea.) 5183-4693 (5-pk.) 5183-4694 (25-pk.)	22405	22406	22407
 <b>Siltek® Gooseneck Splitless (4mm) w/ Wool†</b>	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22405-213.1	22406-213.5	22407-213.25
 <b>Double Gooseneck Splitless (4mm)</b>	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	5181-3315 (ea.) 5183-4705 (5-pk.) 5183-4706 (25-pk.)	20784	20785	20786
 <b>Siltek® Double Gooseneck Splitless (4mm)</b>	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	20784-214.1	20785-214.5	20786-214.25
 <b>Cyclo Double Gooseneck (2mm)</b>	trace, active, dirty samples <2µL	2.0 ID 6.5 OD x 78.5	—	20907	20908	—
 <b>Cyclo Double Gooseneck (4mm)</b>	trace, active, dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20895	20896	20997
 <b>Siltek® Cyclo Double Gooseneck (4mm)</b>	trace, active, dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20895-214.1	20896-214.5	20997-214.25
 <b>Recessed Gooseneck (2mm)**</b>	base easily packs with wool for dirty samples <2µL	2.0 ID 6.5 OD x 78.5	—	20980	20981	20982
 <b>Recessed Gooseneck (4mm)**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20983	20984	20985
 <b>Siltek® Recessed Gooseneck (4mm)**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	20983-214.1	20984-214.5	20985-214.25
 <b>Recessed Gooseneck (4mm) w/ Wool**</b>	base easily packs with wool for dirty samples >2µL	4.0 ID 6.5 OD x 78.5	—	22408	22409	22410
 <b>Recessed Double Gooseneck (4mm)**</b>	base easily packs with wool for dirty, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	20986	20987	20988

\*Nominal ID at syringe needle expulsion point.

\*\*Use with two-hole ferrule for dual-column analysis.

†Use this liner for increased sensitivity.

All liners are  
**100%**  
deactivatedAll liners are shipped intermediate  
polarity (IP) deactivated unless  
otherwise requested.

Split Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#	ea.	cat.# 5-pk.	25-pk.
 <b>1mm Split**</b>	for purge & trap inlet splitting or sample <1µL	1.0 ID 6.3 OD x 78.5	18740-80200 (ea.) 5183-4709 (5-pk.)	20972	20973	—
 <b>4mm Split w/ Wool</b>	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	19251-60540 (ea.) 5183-4691 (5-pk.) 5183-4692 (25-pk.)	20781	20782	20783
 <b>Siltek® 4mm Split w/ Wool</b>	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	—	20781-213.1	20782-213.5	20783-213.25
 <b>Laminar Cup Splitter</b>	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20801	20802	—
 <b>mini-Lam™ Split</b>	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20990	20991	—
 <b>Cup Splitter</b>	high & low MW compounds	4.0 ID 6.3 OD x 78.5	18740-80190 (ea.) 5183-4699 (5-pk.)	20709	20710	—
 <b>Siltek® Cup Splitter</b>	high & low MW compounds	4.0 ID 6.3 OD x 78.5	—	20709-214.1	20710-214.5	—
 <b>Cyclosplitter®</b>	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 78.5	—	20706	20707	20708
 <b>2mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	2.0 ID 6.3 OD x 78.5	—	20823	20824	—
 <b>4mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	210-4004-5 (5-pk.)	21022	21023	20979
 <b>Siltek® 4mm Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	21022-213.1	21023-213.5	20979-213.25
Split/Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 <b>Low Pressure Drop Liner w/ Wool</b>	universal, use with Agilent 6890 GCs	4.0 ID 6.3 OD x 78.5	5183-4647 (ea.) 5183-4701 (5-pk.)	21032	21033	—
 <b>Low Pressure Drop Liner w/ Wool</b>	universal, use with Agilent 6850 GCs	4.0 ID 6.3 OD x 78.5	5183-4711 (ea.) 5183-4712 (5-pk.) 5183-4713 (25-pk.)	20994	20995	20996
CIS4 and PTV Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#		cat.# 10-pk.	
 <b>Straight Glass</b>	general use	2.0 ID 3.0 OD x 71	5183-2036		21157	
 <b>Baffled Glass</b>	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	5183-2037		21704	
 <b>Siltek® Baffled Glass</b>	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	—		21704-214.10	
 <b>Glass w/ Wool</b>	large volume injections	2.0 ID 3.0 OD x 71	5183-2038		21156	
SPME Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
 <b>SPME Liner</b>	ideal for low-volume SPME applications	0.75 ID 6.35 OD x 78.5		21110	21111	

\*Nominal ID at syringe needle expulsion point.

\*\*Use this liner for increased sensitivity.















## tech tip

### Injector Maintenance

Approximately ninety percent of “bad” chromatography is traceable to problems in the injection port. These problems include contaminated carrier gas, incorrect injector flows, active or dirty sites on inlet seals and liners, improper use of wool, leaks, backflash, discrimination, incorrect injector temperature, poor column installation, and use of the wrong injection technique. To minimize injection port problems, set up a routine maintenance schedule and be sure to investigate the injector first when troubleshooting.

## ordering note

For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.

DI Liners for Agilent GCs (For 0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)		cat.# ea.	cat.# 5-pk.	
 1mm Uniliner***†	trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052	21053	
 Siltek® 1mm Uniliner***†	trace, active samples, samples <1µL	1.0 ID 6.3 OD x 78.5		21052-214.1	21053-214.5	
 Uniliner***	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20335	20336	
 Siltek® Uniliner***	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	<div>All liners are</div> <div>100% deactivated</div> <div>All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.</div>	20335-214.1	20336-214.5	
 Cyclo-Uniliner***	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337	20338	
 Siltek® Cyclo-Uniliner***	trace, dirty, high MW active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20337-214.1	20338-214.5	
 Open-top Uniliner® w/ Wool**	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5			20843	20844
 Siltek® Open-top Uniliner® w/ Wool**	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5		20843-213.1	20844-213.5	
DI Liners for Agilent 5890 & 6890 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses***	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054	21055	20998
 Siltek® Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054-214.1	21055-214.5	20998-214.25
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	G1544-80730	20756	20771	—
 Double Gooseneck Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	20508	20509	—
 Double Gooseneck Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	G1544-80700	20954	20989	—
 Siltek® 1mm Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	1.0 ID 6.3 OD x 78.5	—	21390-214.1	21391-214.5	—
†Hole in Drilled Uniliner makes direct injection possible with EPC-equipped 6890 GCs!						
				*Nominal ID at syringe needle expulsion point		

\*Hole in Drilled Uniliner® makes direct injection possible with EPC-equipped 6890 GCs!

\*Nominal ID at syringe needle expulsion point.

\*\*These Uniliner® liners are for split/splitless injection ports.

†This liner for use with 0.25, 0.32, or 0.53mm ID columns.

## tech tip

### Drilled Uniliner®

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.



### Siltek® Metal Inlet Liners for Agilent GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (5.2mm ID x 6.3mm OD x 78.5mm)	5-pk.	25-pk.
Cyclo/Single Gooseneck	20974	20975
Single Gooseneck	21702	21703
Cycloplitter®	20726	20729
Split/Splitless w/Wool	21700	21701

**Viton® O-Rings for Agilent GCs**

- Fit split (6.3mm OD) or splitless (6.5mm OD) liners.

Description	Max. temp.	Similar to Agilent part #	qty.	cat.#
Viton® O-Rings for Agilent GCs	250°C	5180-4182	25-pk.	20377

**Graphite O-Rings for Agilent and Varian 1177 GCs**

- Excellent thermal stability at injection port temperatures up to 450°C!

Description	Max. temp.	Similar to Agilent part #	Restek cat.# 10-pk.	50-pk.
6.35mm ID Graphite O-rings for split liners	450°C	5180-4168	20296	20297
6.5mm ID Graphite O-rings for splitless liners	450°C	5180-4173	20298	20299

**Liner Seals for CIS4 and PTV**

Description	Max. temp.	Similar to Agilent part #	Similar to Gerstel part #	qty.	cat.#
Liner Seals for CIS4 and PTV	450°C	5182-9749	007541-005-00	5-pk.	22684

### HANDY septum size chart

Agilent Instrument	Septum Diameter (mm)
5880A, 5890, 6890, 6850, PTV	11
5700, 5880	9.5/10
On-Column Injection	5

**Thermolite® Septa for Agilent GCs**

- Usable to 340°C inlet temperature; precision molded for consistent fit.

Septum Diameter	25-pk.	50-pk.	100-pk.
5mm ( $\frac{1}{16}$ " )	27120	27121	27122
9.5mm ( $\frac{3}{8}$ " )	27135	27136	27137
10mm	27138	27139	27140
11mm ( $\frac{7}{16}$ " )	27141	27142	27143

**IceBlue™ Septa for Agilent GCs**

- Usable to 250°C inlet temperature; precision molded for consistent fit.

Septum Diameter	50-pk.	100-pk.
9.5mm ( $\frac{3}{8}$ " )	27158	27159
10mm	27160	27161
11mm ( $\frac{7}{16}$ " )	27162	27163

**BTO® Septa for Agilent GCs**

- Usable to 400°C inlet temperature; precision molded for consistent fit.

Septum Diameter	50-pk.	100-pk.
5mm CenterGuide™	27100	27101
9.5mm ( $\frac{3}{8}$ " )	27106	27107
10mm	27108	27109
11mm ( $\frac{7}{16}$ " ) CenterGuide™	27110	27111

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



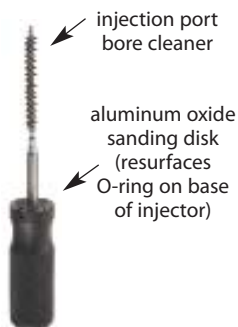
Description	qty.	cat.#
Septum Puller	ea.	20117





## tech tip

Always use the Manual Injection Septum Nut (for 26-gauge needles) for on-column injections.



Make your injection port threads like new!

## Knurled Septum Nuts for Agilent 5890/6890/6850 GC Split/Splitless Injectors

- Tighten easily without the use of a wrench.
- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Thread design and needle guide allow easy penetration and prevent premature septum coring.
- High-quality stainless steel construction.

Description	qty.	cat.#
Knurled Septum Nut, Autosampler (for 23-gauge needles)	ea.	21479
Knurled Septum Nut, Manual Injection (for 26-gauge needles)	ea.	21478

## Septum Nuts for use with Agilent 5890/6890/6850 Split/Splitless Injectors

- Ensure a leak-tight injection port, increase septum lifetime, and decrease maintenance requirements.
- Thread design and needle guide allow easy penetration and prevent premature septum coring.
- Manual injection septum nut allows use of 26-gauge needles for on-column injections.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat.#
Autosampler & PTV Septum Nut (for 23-gauge needles)	18740-60835	ea.	20631
Manual Injection Septum Nut (for 26-gauge needles)	18740-60835	ea.	21309

## Septum Nut Removal Tool for Agilent 5890/6890/6850 GCs

- Easily remove the septum nut without touching the heated nut—no more burned fingers!
- Unique, ergonomic handle—easy to grip.

Description	qty.	cat.#
Septum Nut Removal Tool for Agilent 5890/6890/6850 GCs	ea.	24918

## Injector Wrench for Agilent 5890/6890/6850 GCs

- Use to remove the septum nut and weldments during GC maintenance.
- High-quality stainless steel construction.
- Meets original equipment performance.



Use the smaller end to remove the septum nut.



Use the larger end to tighten the split/splitless weldment nut.

Description	Similar to Agilent part #	qty.	cat.#
Injector Wrench for Agilent 5890/6890/6850 GCs	19251-00100	ea.	22065

## Injection Port Repair Tool for Agilent Split/Splitless Injection Ports

- Remove contaminants, achieve a better seal.
- Resurface critical inlet seal areas.



Description	qty.	cat.#
Injection Port Repair Tool for Agilent Split/Splitless Injection Ports	ea.	21393
Replacement Sanding Disks (5 fine & 5 medium)	10-pk.	22689
Replacement Bore Brushes (one 6.5mm & one 7mm)	2-pk.	21353

## Rethreading Tool

- Repair worn or damaged threads in injection ports, fittings, etc.
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction. Unscrew the tool and inspect the threads, repeat as necessary. When done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Rethreading Tool for 1/4" compression fittings (Agilent split/splitless injection ports)	ea.	23018

## Capillary Column Nuts for Agilent 5890/6890 GCs

Available in brass or stainless steel.



for use with "compact"  
Agilent-style ferrules



for use with standard ferrules

Description	Similar to Agilent part #	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.</b>			
Stainless Steel Capillary Column Nut	5181-8830	2-pk.	21884
Brass Capillary Column Nut	5181-8830	2-pk.	21878
<b>For use with standard 1/16"-type ferrules.*</b>			
Stainless Steel Capillary Column Nut	05921-21170	2-pk.	20883
Brass Capillary Column Nut	05921-21170	2-pk.	21879

\*Designed to fit a wider variety of 1/16" ferrules

## Capillary Column Nuts for Agilent 6850 GCs

- Meet or exceed original equipment performance.
- High-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat.#
Capillary Column Nuts for Agilent 6850 GCs	5183-4732	2-pk.	21882



## Finger-Tight Capillary Column Nut

- Rapidly tighten without wrenches; avoid stripped threads.
- Either version can be used with 0.25, 0.32, or 0.53mm ID columns.

Description	Similar to Agilent part #	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.*</b>			
Finger-Tight Capillary Column Nut	5020-8293	ea.	21311
	5020-8292	ea.	21311
<b>For use with standard ferrules.</b>			
Finger-Tight Capillary Column Nut	5020-8293	ea.	21312

\*Similar to Agilent part # 5020-8293 and 5020-8292, except that the Restek nut can be used with Vespe® ferrules.



also **available**

### Ferrules

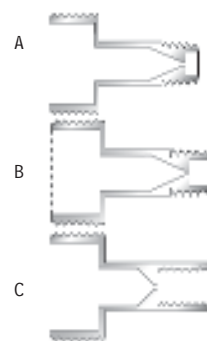
See **pages 31-32** for our listing of ferrules.

## Finger-Tight Capillary Column Nuts

- Allow wrench-free column installations.
- Work with standard or compact (Agilent-style) ferrules.
- Made from high-quality stainless steel.



Description	qty.	cat.#
<b>For use with "compact" Agilent-style ferrules.</b>		
A) Finger-Tight Capillary Column Nuts	2-pk.	21040
<b>For use with standard 1/16"-type ferrules.</b>		
B) Finger-Tight Capillary Column Nuts	2-pk.	21041
<b>For use with standard 1/16" compression fittings</b>		
C) Finger-Tight Capillary Column Nuts	2-pk.	21042



## Capillary Installation Gauge

- Seats graphite\* ferrules onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



A

B



Thread . . .



. . . tighten. . .



. . . done.

Easily seat ferrules for  
consistent  
installations!

Description	qty.	cat.#
A) Capillary Installation Gauge for Agilent-style fittings (compact ferrules)	ea.	21034
B) Capillary Installation Gauge for 1/16" fittings (1/16" ferrules)	ea.	21399

\*Recommended for use with graphite ferrules.



A Dual Vespel® Ring Inlet Seal eliminates the need for a washer!



## Dual Vespel® Ring Inlet Seals

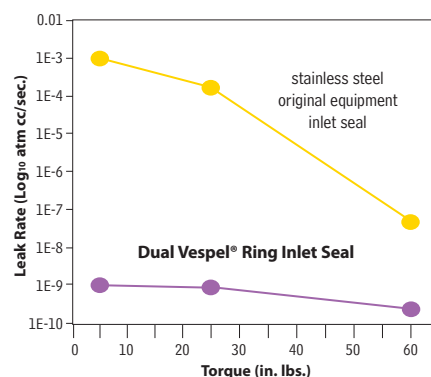
- Vespel® ring embedded in bottom surface eliminates need for washer.
- Vespel® ring embedded in top surface reduces operator variability by requiring minimal torque to seal.
- Prevents oxygen from permeating into the carrier gas, increasing column lifetime.

In Agilent split/splitless injection ports, it can be difficult to make and maintain a good seal with a conventional metal inlet disk. The metal-to-metal seal dictates that you apply considerable torque to the reducing nut, and, based on our testing, this does not ensure a leak-tight seal. Over the course of oven temperature cycling, metal seals are prone to leaks, which ultimately can degrade the capillary column and cause other analytical difficulties.

Our Dual Vespel® Ring Inlet Seal greatly improves injection port performance—it stays sealed, even after repeated temperature cycles, without retightening the reducing nut! This seal features two soft Vespel® rings, one embedded in its top surface and the other embedded in its bottom surface. These rings eliminate the need for a washer, and ensure very little torque is needed to make a leak-tight seal. The rings will not harm the critical seal in the injector body, or any other surface, and are outside the sample flow path. Tests using a high sensitivity helium leak detector show Dual Vespel® Ring Inlet Seals will seal equally effectively at torques from 5 in. lb. to 60 in. lb. (Figure 1).

Why trust a metal-to-metal seal when you can make leak-tight seals quickly and easily—and more reliably—without a washer, with a Restek Dual Vespel® Ring Inlet Seal. Use a stainless steel seal for analyses of unreactive compounds. To reduce breakdown and adsorption of active compounds, use a gold-plated or Siltek®-treated seal. The gold surface offers better inertness than untreated stainless steel; Siltek® treatment provides inertness similar to that of a fused silica capillary column.

**Figure 1** The Dual Vespel® Ring Inlet Seal achieves leak-tight seals even at low torque, reducing the chance of leak-related problems.



Dual Vespel® Ring Inlet Seals are available in gold plating, stainless steel, and Siltek® treated.



Patent pending.

0.8mm ID Dual Vespel® Ring Inlet Seal	2-pk.	10-pk.
Gold-Plated	21240	21241
Siltek® Treated	21242	21243
Stainless Steel	21238	21239
1.2mm ID Dual Vespel® Ring Inlet Seal	2-pk.	10-pk.
Gold-Plated	21246	21247
Siltek® Treated	21248	21249
Stainless Steel	21244	21245

**Replacement Inlet Seals with Washers**

- Special grade of stainless steel that is softer and deforms more easily, creating a better seal.
- Increases column lifetime because oxygen cannot permeate into the carrier gas.
- Reduced noise benefits high-sensitivity detectors (e.g., ECDs, MSDs).
- Siltek® treatment provides inertness similar to fused silica.
- All seals include washers.

**Replacement Inlet Seals for Agilent 5890/6890/6850 Split/Splitless Injection Ports**

The inlet seal at the base of the Agilent 5890/6890 GC injection port contacts the sample and must be changed frequently to prevent adsorption of active compounds. In addition, septum fragments and sample residue accumulate on the disk surface, requiring disk replacement.

The Restek inlet seal design increases column lifetime because oxygen cannot permeate into the carrier gas. Detector noise also is reduced with high-sensitivity detectors (e.g., ECDs or MSDs). To reduce breakdown and adsorption of active compounds, use Siltek® or gold-plated seals.



Note: The 1.2mm inlet seal is recommended for use with Vespel®/graphite ferrules or when installing two columns using a two-hole ferrule.

Single-Column Installation, 0.8mm Opening*		0.25/0.32mm ID Dual-Column Installation, 1.2mm Opening		0.53mm ID Dual-Column Installation ( $\frac{1}{16}$ -inch opening)	
2-pk.	10-pk.	2-pk.	10-pk.	2-pk.	10-pk.
<b>Stainless Steel Inlet Seal</b>					
21315	21316	20390	20391	20392	20393
<b>Gold-Plated Inlet Seal</b>					
21317	21318	21305	21306	—	—
<b>Siltek® Treated Inlet Seal</b>					
21319	21320	21307	21308	—	—

\*0.8mm ID stainless steel inlet seal is similar to Agilent part #18740-20880,  
0.8mm ID gold-plated inlet seal is similar to Agilent part #18740-20885.

All seals include washers.

**Replacement Inlet Seal Washers**

Description	Similar to Agilent part #	qty.	cat.#
Replacement Inlet Seal Washers	5061-5869	15-pk.	21710

**Replacement Inlet Cross-Disk Seal for Agilent GCs**

- Ideal for high-flow split applications on Agilent 5890 GCs.
- All seals include washers.

0.8mm ID Cross-Disk Inlet Seal for Agilent GCs	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	5182-9652	20477	20476
Siltek® Treated	—	20475	20474
1.2mm ID Cross-Disk Inlet Seal for Agilent GCs	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	—	21009	21010
Siltek® Treated	—	21011	21012

**Silver PTV Seals for Agilent 6890 GCs**

Description	Similar to Agilent part #	qty.	cat.#
Silver PTV Seals for Agilent 6890 GCs	5182-9763	5-pk.	21409



**Direct Replacement and Siltek® Treated Split/Splitless Injection Ports for Agilent GCs**

Would you like better performance from your injector? Our Siltek® treated split/splitless injector is a direct replacement for Agilent 5890 and 6890/6850 GCs, but Siltek® treatment passivates the metal surface to ensure an inert pathway for the sample, delivering increased performance. The injector is manufactured from high-quality stainless steel and meets or exceeds Agilent original equipment performance.

**Direct Replacement and Siltek® Treated Split/Splitless Injection Port for Agilent 5890 GCs**

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Weldment*	19251-60575	ea.	20265
-Siltek® Weldment**	19251-60575	ea.	20267
-B) Replacement Shell Weldment	19251-80570	ea.	20266
-Siltek® Shell Weldment**	19251-80570	ea.	20268
-O-rings for Agilent Trap Fittings	5180-4181	25-pk.	22064

**Direct Replacement and Siltek® Treated Split/Splitless Injection Port for Agilent 6890/6850 GCs**

Description	Similar to Agilent part #	qty.	cat.#
C) Replacement Weldment with EPC	G1544-60575	ea.	22674
Siltek® Weldment with EPC**	G1544-60575	ea.	22672
D) Replacement Weldment*	19251-60575	ea.	20265
Siltek® Weldment**	19251-60575	ea.	20267
E) Replacement Shell Weldment	G1544-80570	ea.	22673
Siltek® Shell Weldment**	G1544-80570	ea.	22671
F) Optional Split/Splitless Weldment (for use with large canister type filter)	G1544-60585	ea.	22686
Siltek® Optional Split/Splitless Weldment** (for use with large canister type filter)	G1544-60585	ea.	22670

\*For use with manual flow or EPC on Agilent 5890 GCs. For use with manual flow only on Agilent 6890/6850 GCs.

\*\*Treated with Restek's exclusive Siltek® treatment for increased inertness.

**Replacement Chemical Traps for Agilent GCs**

- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moisture and hydrocarbons.

Description	Similar to Agilent part #	qty.	cat.#
G) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
H) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032

**Injection Port Weldments for Agilent GCs for use with Purge and Trap Systems**

Easily attach your purge and trap with pre-installed low dead volume fittings.

**For Agilent GCs with Tekmar Purge and Trap Systems**

Description	qty.	cat.#
I) Weldment for Agilent 6890 GCs	ea.	22664
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22668
Weldment for Agilent 5890 GCs	ea.	22666

**For Agilent GCs with OI Purge and Trap Systems**

Description	qty.	cat.#
J) Weldment for Agilent 6890 GCs	ea.	22665
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22669
Weldment for Agilent 5890 GCs	ea.	22667

**tech tip****Installing a New Weldment**

To eliminate possible leaks and damage to the weldment, always replace the split vent line, nut, and ferrule when installing a new shell weldment.

**EPC Test Kit for Agilent 6890 GCs**

- Kit includes 3 O-rings, 2 plugs, 1 mounting screw and 1 test block.

Description	Similar to Agilent part #	qty.	cat.#
EPC Test Kit for Agilent 6890 GCs	G1530-60960*	kit	24323

\*Similar to, but not exact equivalent. Kits differ in parts.

**Heater Cartridge & PRT Sensor for Agilent 5890 GCs**

- Use with 5890 FID and split/splitless weldments.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
A + B) Injector/FID Heater + Injector/FID PRT Sensor	05890-61140	ea.	22068
A) Injector/FID Heater	19231-60620	ea.	22069
B) Injector/FID PRT Sensor	19231-60660	ea.	23035

**Heat Sink for Agilent 5890 GC Split/Splitless Injector**

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Heat Sink for Agilent 5890 GCs	18740-20940	ea.	20409

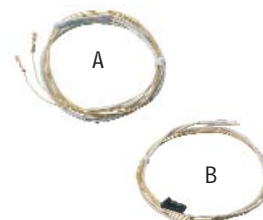
**Heater Block Retaining Nuts for Agilent GC Split/Splitless Injectors**

- Aluminum construction.
- Meet or exceed OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Heater Block Retaining Nut for Agilent 5890 GCs	19251-20620	ea.	22080
Heater Block Retaining Nut for Agilent 6890/6850 GCs	G1544-20590	ea.	23042

**Oven Temp Sensor Assembly**

Description	Similar to Agilent part #	qty.	cat.#
A) Oven Temp Sensor for Agilent 5890 GC	05890-61030	ea.	23040
B) Oven Temp Sensor for Agilent 6890 GC	G1530-61030	ea.	23039

**60psig Backpressure Regulator Kit**

Increase the versatility of your Agilent 5890/6890 GC by replacing the existing 30psig backpressure regulator and gauge with our 60psig regulator. Enables you to use longer 60m and 105m columns as well as shorter 10-meter columns. Includes complete instructions.

Description	Similar to Agilent part #	qty.	cat.#
Backpressure Regulator Kit	19246-60630	kit	20634

**Replacement Chemical Traps for Agilent GCs**

- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moisture and hydrocarbons.

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Chemical Trap for Agilent 6890/6850 GCs	G1544-80550	ea.	22820
B) Replacement Chemical Trap for Agilent 5890 GCs	05890-61260	ea.	21610
C) Replacement Chemical Trap for Agilent 5880 GCs	19362-60500	ea.	21158
D) Split Vent Line for Agilent GCs (32-inch) (Includes all installation hardware.)	19251-80525 G1544-20620	2-pk.	22800
E) O-rings for Agilent Trap Fittings	5180-4181	25-pk.	22064
F) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
G) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032





### Dual-Column *mini-Lam*™ Direct Injection Tee

(for 1/4-inch packed column inlets)

The inverted cup design offers complete sample vaporization and permits larger sample volumes. It incorporates a Press-Tight® taper in each outlet leg, to make a perfect, dead-volume-free connection to each analytical column (ODs ranging from 0.4 to 0.8mm). Allows visual confirmation of the column connection. The open-top design makes it easy to pack with glass wool, keeping sample residue from contaminating the cup.

Description	qty.	cat.#
<i>mini-Lam</i> ™ DI Tee Kit (Includes all fittings and ferrules)	kit	20436
Replacement 4mm <i>mini-Lam</i> ™ DI Tee	ea.	20435

### Low-Volume Injector for Agilent Split/Splitless Injectors

- Attaches to the GC inlet without cutting existing injection port lines.
- Allows injections from a syringe onto the column for purge & trap troubleshooting or calibration.
- Siltek® treatment eliminates adsorption of active compounds.

Our low-volume injector can be installed in a matter of minutes. Remove the septum nut or splitless weldment and insert the Restek low-volume injector through the split injector. Tighten the base nut and you're ready! Includes a 1/16-inch nut, a 1/16-inch ferrule, a base nut and 1/4-inch Vespel®/graphite ferrule, a 1/16-inch capillary nut, a 5-pack of low-bleed plug septa, and a low-mass septum nut. Order appropriate capillary ferrules separately.



Description	qty.	cat.#
Low-Volume Injector for Agilent Split/Splitless Injectors	kit	21692



### Siltek® Septum Packed Purge Port Weldment for Agilent 5890 GCs

Siltek® treatment eliminates adsorption of sensitive compounds (e.g., DDT and endrin). Order Viton® O-rings (below) and appropriate septa (page 9) separately.

Description	Similar to Agilent part #	qty.	cat.#
Siltek® Septum Packed Purge Port Weldment for Agilent 5890 GCs	19243-80570	ea.	21691
Viton® Replacement O-rings	5080-8898	10-pk.	21685

## tech tip

### Minimizing Injector Discrimination

When an injected sample is not completely vaporized, lower percentages of compounds that are less volatile (i.e., compounds with high boiling points or high molecular weights) are transferred into the analytical column. As a result, these later-eluting compounds will have progressively decreased peak areas. You can minimize injector discrimination by reducing injector flows, increasing the injector temperature, using pressure pulse injection or a fast autosampler, or using an injector liner that aids in vaporization (e.g., a laminar cup splitter or a liner packed with wool).

## Direct Injection (DI) Inserts and Liner Adaptor for 1/4-Inch Packed Column Injection Ports (for 0.25, 0.32, & 0.53mm ID columns)

### DI Glass Inserts for Agilent 5890 Packed Column GC

- Tolerances closely controlled.
- Can be removed from the septum nut weldment.



Description	Similar to Agilent part #	qty.	cat.#
DI Glass Inserts for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	5-pk.	20967

**SILTEK®**  
version available.

### DI Uniliner® Liners for Agilent 5890 Packed Column GC

- Press-Tight® taper forms dead-volume-free connection to column.
- Minimizes solvent and peak tailing.
- Use with 0.25, 0.32, and 0.53mm ID capillary columns.
- Can be removed from the septum nut weldment.



Description	Fits same liner adaptor as Agilent part #	qty.	cat.#
DI Uniliner® Liner for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	ea.	20964
DI Uniliner® Liners for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	5-pk.	20965
DI Uniliner® Liners for Agilent 5890 Packed Column GC (1.7mm ID x 3.0mm OD x 93mm)	5181-3382 5080-8732	25-pk.	20966

### DI Liner Adaptor for Agilent 5890 Packed Column GC

- Uses standard 1/16-inch capillary nut and ferrules.
- Convenient wrench pad at base.
- Includes 1/4-inch graphite ferrule and stainless steel nut.
- Use with Agilent or Restek DI glass inserts or Restek DI Uniliner® liners for an Agilent 5890 packed column GC.

Description	Similar to Agilent part #	qty.	cat.#
DI Liner Adaptor for Agilent 5890 Packed Column GC	19244-80540	ea.	21303





For use with 0.25/0.32mm ID columns.

### 1/16-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.25 or 0.32mm ID capillary columns)

We have specially engineered a high-precision, 1/16-inch split/splitless fitting that accepts standard, two-hole capillary ferrules. Our design makes it easier to install capillary columns because the nut protrudes farther from the insulated injection port chamber. The column insertion depth is the same as the original equipment.

Kit includes adaptor fitting, capillary nut, stainless steel inlet seal, washer, and one 0.4mm ID ferrule.

Description	qty.	cat.#
1/16-Inch Capillary Inlet Adaptor Fitting Kit	kit	20633
Replacement Inlet Seal (1.2mm hole)	2-pk.	20390
Replacement Inlet Seal (1.2mm hole)	10-pk.	20391



For use with 0.53mm ID columns.

### 1/8-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.53mm ID capillary columns)

Our specially engineered high-precision, 1/8-inch split/splitless fitting accepts standard two-hole capillary ferrules and a standard 1/8-inch nut. This design makes column installation easy because the nut protrudes farther from the insulated injection port chamber. The column insertion depth is the same as the original equipment.

Kit includes adaptor fitting, capillary nut, stainless steel inlet seal, washer, and one 0.8mm ID two-hole ferrule.

Description	qty.	cat.#
1/8-Inch Capillary Inlet Adaptor Fitting Kit	kit	20645
0.53mm ID Dual-Column Installation (1/16-inch opening)	2-pk.	20392
0.53mm ID Dual-Column Installation (1/16-inch opening)	10-pk.	20393



### Direct Replacement Reducing Nut

- Made from high-quality stainless steel.
- Meets original equipment performance.

Description	Similar to Agilent part #	qty.	cat.#
Reducing Nut	18740-20800	ea.	22078



### Replacement Ferrules for Dual-Column Confirmational Analysis

Use 1/16-inch, two-hole ferrules with the 1/16-Inch Capillary Inlet Adaptor Fitting Kit (cat.# 20633); and 1/8-inch, two-hole ferrules with the 1/8-Inch Capillary Inlet Adaptor Fitting Kit (cat.# 20645).

Two-Hole Ferrule Size	Fits Nut	Fits Column ID	qty.	Vespe <sup>®</sup> / Graphite cat.#
0.4mm (1/16")	1/16"	0.25/0.28mm	5-pk.	20241
0.5mm (1/16")	1/16"	0.32mm	5-pk.	20242
0.8mm (1/8")	1/8"	0.45/0.53mm	5-pk.	20246



### Dual-Column Direct Injection Tee

(for 1/4-inch packed column inlets)

The tee is designed with a glass spiral to promote sample vaporization and to provide even sample distribution to the two columns. The glass spiral also traps sample residue and minimizes the need for guard columns. A Press-Tight<sup>®</sup> taper in each outlet leg facilitates a perfect dead-volume-free connection to each analytical column (OD 0.4 to 0.8mm) and allows visual confirmation of the column connection.

Description	qty.	cat.#
DI Tee Kit (includes all fittings/ferrules)	kit	20412
Replacement Tee	ea.	20411

**Air Diverters for Agilent GCs**

- Divert GC exhaust heat away from the lab bench.
- Meet OEM performance.
- Easy to install—no tools required.

Description	Similar to Agilent part #	qty.	cat.#
Air Diverter for Agilent 5890/6890 GCs	19247-60510	ea.	22076
Air Diverter for Agilent 6850 GCs	G2630-60710	ea.	20926

**MLE Capillary Tool Kit for Agilent GCs**

Includes:

- capillary installation gauge for Agilent GCs
- injector wrench for Agilent GCs
- septum nut removal tool
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 3/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insertor tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



new!

Description	qty.	cat.#
MLE Capillary Tool Kit for Agilent GCs	kit	22186



### Injector Wrench for Agilent 5890/6890/6850 GCs

- Use to remove the septum nut and weldments during GC maintenance.
- High-quality stainless steel construction.
- Meets original equipment performance.



Use the smaller end to remove the septum nut.



Use the larger end to tighten the split/splitless weldment nut.

Description	Similar to Agilent part #	qty.	cat.#
Injector Wrench for Agilent 5890/6890/6850 GCs	19251-00100	ea.	22065



Make your injection port threads like new!

### Rethreading Tool

- Repair worn or damaged threads in injection ports, fittings, etc.
- Built-in guide to prevent cross-threading.



- 1) Worn & damaged threads can allow oxygen into the system—compromising analytical results and destroying columns.
- 2) Screw the tool completely onto the injection port in a clockwise direction. Unscrew the tool and inspect the threads, repeat as necessary. When done, wipe threads with methanol to remove any debris.

Description	qty.	cat.#
Rethreading Tool for 1/4" compression fittings (Agilent split/splitless injection ports)	ea.	23018

### FID/Injector Cleaning Kit

The FID/Injector Cleaning Kit includes:

- Nylon tube brushes (1/8", 3/16", 1/4").
- Pipe cleaner.
- Stainless steel tube brushes (3/8", 3/16", 1/4").
- Stainless steel surface brush.
- Stainless steel jet reamers.
- Emery cloth.



Use Restek's Cleaning Kit with ANY injection port!

Description	qty.	cat.#
FID/Injector Cleaning Kit	kit	20120

### Inlet Liner Removal Tool

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!



Description	qty.	cat.#
Inlet Liner Removal Tool	3-pk.	20181

new!

### Flashlight with Swivel Head

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).



Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187



### Injection Port Split/Splitless Weldment Retaining Ring Pliers

- Easily removes snap ring on split/splitless weldment assemblies.
- Use with Agilent 5890/6890/6850 GCs.

Description	qty.	cat.#
Injection Port Split/Splitless Weldment Retaining Ring Pliers	ea.	26186

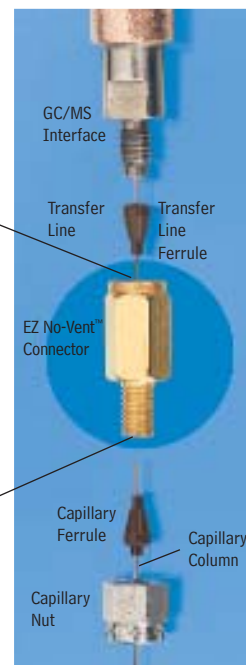
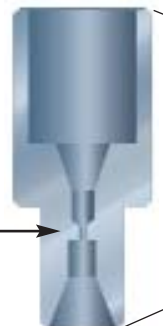
**EZ No-Vent™ GC Column-Mass Spectrometer Connector**

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- Available for Agilent GCs with 5971/5972 or 5973 GC/MS.

We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing. Figure 1 shows the internal structure of the connector.

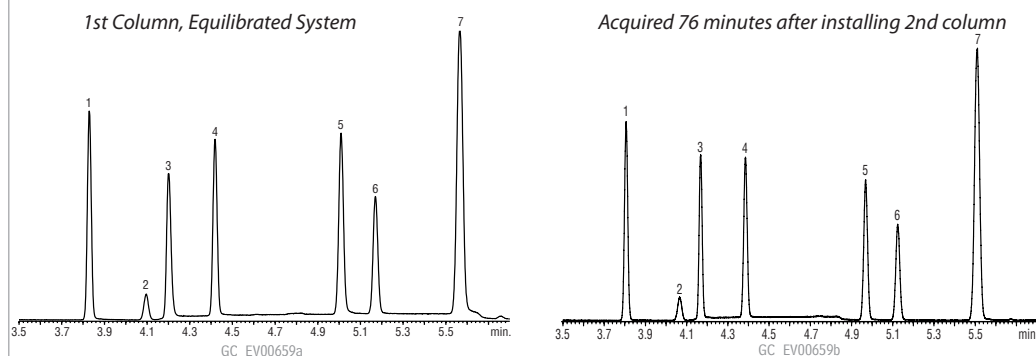
**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

**Laser drilled to 100µm ID**



Change columns in minutes—without venting!

**Figure 2** Sharp, symmetric peaks for gases show the EZ No-Vent™ connector does not add dead volume and allows rapid column changes.



Rtx®-624 60m, 0.25mm ID, 1.4µm (cat# 10969), column direct to source.

Rtx®-624 60m, 0.25mm ID, 1.4µm (cat# 10969) using EZ No-Vent™.

1. dichlorodifluoromethane
2. 1,2-dichlorotetrafluoroethene (Freon® 114)
3. chloromethane
4. vinyl chloride
5. bromomethane
6. chloroethane
7. trichlorofluoromethane

Sample: Volatile Gas Mix 502.2  
Calibration Mix#1 (gases)  
cat# 30042  
Inj.: Purge & Trap  
GC: Agilent 6890  
Inj. temp.: 300°C  
Carrier gas: helium, constant flow  
Flow rate: 1.0mL/min.

Oven temp.: 60°C isothermal  
Det: Agilent 5973 GC/MS  
Transfer line temp.: 280°C  
Scan range: 35-550 amu  
Tune: BFB  
Ionization: EI

Kit installs easily, without special tools or plumbing.

**Description**

EZ No-Vent™ Connector Kit for Agilent 5971/5972 and 5973 GC/MS

Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.

Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:

0.4mm ID (Polyimide)

0.5mm ID (Polyimide)

Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID

Replacement 100µm deactivated transfer line

Replacement EZ No-Vent™ Column Nut

Replacement EZ No-Vent™ Plug

Open-End Wrenches (7/16" x 5/16")

qty.

cat.#

kit 21323

2-pk. 21015

2-pk. 21016

2-pk. 21043

3 ft. 21018

5-pk. 21900

2-pk. 21915

2-pk. 20110

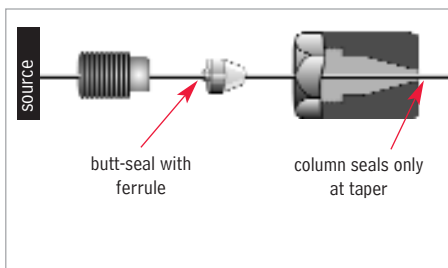


Agilent's MSD interface uses a butt-seal to simultaneously seal the MSD source to the capillary column. This system is prone to leakage. Restek's MSD conversion fitting is designed with two separate seals to reduce the chance of leaks: a crunch washer seals the MSD conversion fitting to the source; a ferrule seals the capillary tubing to the conversion fitting.

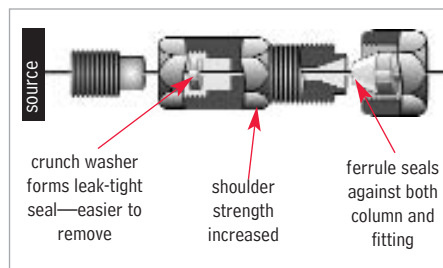
### MSD Conversion Fitting

- A flat, soft aluminum sealing ring deforms and butt-seals against the MSD interface.
- A standard Vespel® ferrule seals the column and 1/16-inch stainless steel nut.
- Fitting is constructed of nickel-plated brass for longevity and softness.
- Use any standard Vespel® or Vespel®/graphite 1/16-inch ferrule.
- Includes a 1/16-inch stainless steel nut and two replacement sealing rings. Order ferrules separately.

**Agilent Design**



**Improved Restek Design**



Description	qty.	cat.#
MSD Conversion Fitting	ea.	21314
Replacement Ring Seal for MSD Conversion Fitting	2-pk.	21313

Improved design!



### MSD Source Nut

- 1.2mm nut bore permits easy removal of ferrules with a standard tapered-needle file (cat.# 20106).
- Made of brass to prevent thread-stripping on the transfer line.
- Improved design enhances ease of threading onto the transfer line and improves overall lifetime.

Description	Similar to Agilent part #	qty.	cat.#
(Detector) MSD Source Nut	05988-20066	2-pk.	20643

### Capillary Installation Gauge for Agilent 5973/5975 MS

- Seats ferrules onto column for consistent installations.
- Made from high-quality stainless steel.



Install the nut and ferrule onto the column, then insert the column through the installation tool, exposing several centimeters at the exit end. Tighten the nut.



Score and remove the exposed end of the column, then loosen the nut.



The ferrule will be properly seated and should remain in place when light force is applied. Install the column into the GC/MS interface.

Description	Similar to Agilent part #	qty.	cat.#
Capillary Installation Gauge for Agilent 5973/5975 MS	G1099-20030	ea.	21894



### Gold Tip Transfer Line

- For use with Agilent 5971/5972 MS Systems.
- Gold-plated for inertness.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
Gold Tip Transfer Line	05971-20305	ea.	24699

**Replacement Interface with Bellows for Agilent 5971/5972 MS**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Interface with Bellows for Agilent 5971/5972 MS	05971-60302	ea.	22659

**Replacement Interface Guide Tube for Agilent 5971/5972 MS**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Interface Guide Tube for Agilent 5971/5972 MS	05971-20307	ea.	22660

**Replacement Cold Sensor for Agilent 5971/5972 MS Diffusion Pump**

- Meets or exceeds OEM performance.
- Made of high-quality stainless steel.

Description	Similar to Agilent part #	qty.	cat. #
Replacement Cold Sensor for Agilent 5971/5972 MS Diffusion Pump	3103-0145	ea.	22661

**Replacement Diffusion Pump Fan Assemblies for Agilent 5971/5972 MS**

- 110/120 VAC

Description	Similar to Agilent part #	qty.	cat. #
Replacement Diffusion Pump Fan Assembly for Agilent 5971 MS	05971-60540	ea.	22662
Replacement Diffusion Pump Fan Assembly for Agilent 5972 MS	05972-60540	ea.	22663

**Rough Pump Oil #19 for MSD Pumps, Oil Vacuum Pump**

- Formulated from crude oil stocks known for their durability and line lubricating qualities.
- Use in Agilent 5973/5972/5971 and GCD mass spec systems, or in other manufacturers' MSD systems that require rough pump oil.
- Under average use, the oil in the foreline rough pump should be replaced every six months.

Description	Similar to Agilent part #	qty.	cat. #
Rough Pump Oil for MSD Pumps	6040-0834	1 liter	22687

**Ion Source Cleaning Powder**

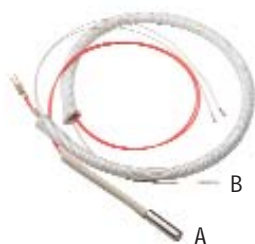
- Use this aluminium oxide powder to clean surfaces that contact the sample or ion beam when you encounter poor sensitivity and inadequate abundances at high masses.

Description	Similar to Agilent part #	qty.	cat. #
Ion Source Cleaning Powder	8660-0791	1 kg.	22685



## Heater Cartridge & PRT Sensor for Agilent 5890 GCs

- Use with 5890 FID and split/splitless weldments.
- Meets or exceeds OEM performance.



Description	Similar to Agilent part #	qty.	cat.#
A + B) Injector/FID Heater + Injector/FID PRT Sensor	05890-61140	ea.	22068
A) Injector/FID Heater	19231-60620	ea.	22069
B) Injector/FID PRT Sensor	19231-60660	ea.	23035

## FID Collector Housing Kits for Agilent GCs

- Meets or exceeds OEM performance.



Description	Similar to Agilent part #	qty.	cat.#
FID Collector Housing Kit for Agilent 5890 GCs (includes collector body, spanner nut, and silicone washer—order mount separately)	19231-20920	kit	23037
FID Collector Housing Kit for Agilent 6890 GCs (includes collector body, silicone washer, nut, and mount)	G1531-20550	kit	23045
FID Collector Housing for Agilent 6890 GCs	G1531-20740	ea.	23044
Replacement Silicone Washers for FID Collector Housing for Agilent 5890/6890 GCs	5180-4165	12-pk.	23064

new!



## FID Collector Mount for Agilent GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat.#
A) FID Collector Mount for Agilent 5890 GCs	19231-20930	ea.	23036
B) FID Collector Mount for Agilent 6890 GCs	G1531-20550	ea.	23043

## FID Base Weldment for Agilent GCs

- Meets or exceeds OEM performance.
- Includes brass nut.



Description	Similar to Agilent part #	qty.	cat.#
A) FID Base Weldment for Agilent 5890 GCs	19231-80580	ea.	23041
B) FID Base Weldment, Pack Column FID, for Agilent 6850/6890 GCs	G1531-80580	ea.	23052
C) FID Base Weldment, Capillary Column FID, for Agilent 6850/6890 GCs	G1531-80630	ea.	23053

## Spanner Wrench for Agilent 5890/6890/6850 FID Collector Assemblies

- Easily remove the nut from the FID collector without damaging the nut.
- Unique, ergonomic handle—easy to grip.



Remove FID ignitor castle.



Easily loosen the nut by aligning the two pins on the bottom of the wrench with the two open slots on the nut...



...then turn counterclockwise...



...and remove.

Description	Similar to Agilent part #	qty.	cat.#
Spanner Wrench for Agilent 5890/6890/6850 FID Collector Assembly	19231-00130	ea.	22329

### Direct Replacement FID Collector Assembly for Agilent 5890 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Collector Assembly (includes insulators)	19231-60690	kit	23010
FID Collector Assembly w/Siltek® Ignitor Castle	—	kit	21131

### Replacement FID Parts for Agilent 5890 GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
	19231-20970		
	19231-20960		
A) FID Collector (includes insulators)	19231-20950	ea.	21138
	19231-20940		
B) FID Collector Nut and Washer	5181-3311	set	21136
C) FID Ignitor*	19231-60680	ea.	21001
D) FID Ignitor Castle	19231-20910	ea.	21137
Siltek® FID Ignitor Castle	—	ea.	21135

\*Also fits OI Analytical 4410 detector (similar to OI part # 191833).



**SILTEK®**  
versions available.

### Direct Replacement FID Collector Assembly for Agilent 6890/6850 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Collector Assembly (includes insulator)	G1531-60690	kit	21699
FID Collector Assembly w/Siltek® Ignitor Castle	—	kit	21132

### Replacement FID Parts for Agilent 6890/6850 GCs

- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
	G1531-20690		
A) FID Collector (includes insulators)	G1531-20700	ea.	21139
	19231-20940		
B) FID Collector Nut and Washer	5181-3311	set	21136
C) FID Ignitor*	19231-60680	ea.	21001
D) FID Ignitor Castle	19231-20910	ea.	21137
Siltek® FID Ignitor Castle	—	ea.	21135

\*Also fits OI Analytical 4410 detector (similar to OI part # 191833).



### Direct Replacement FID Flow Measuring Adaptor for Agilent 5890/6890/6850 GCs

- Makes setting flows easy.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID Flow Measuring Adaptor	19301-60660	ea.	21000



## Replacement Jets

### Standard Version

- Engineered with a fluted tip to guide the capillary column into the jet.
- Threads specially coated for easy installation and removal.
- Special processing ensures the highest degree of cleanliness.

### High-Performance Version

- Similar to the standard version, but Siltek® treated.
- Extremely inert, use with active compounds.

### Capillary Adaptable FID Replacement Jet for Agilent 5890/6890/6850 GCs (0.011-inch ID tip)

Description	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	19244-80560	ea.	20670	3-pk.	20671
High-Performance Siltek® Treated	19244-80560	ea.	20672	3-pk.	20673

### Capillary Dedicated FID Replacement Jet for Agilent 6890/6850 GCs

0.011-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	G1531-80560	ea.	21621	3-pk.	21682
High-Performance Siltek® Treated	G1531-80560	ea.	21620	3-pk.	21683

### Packed Column Replacement Jets for Agilent 5890/6890/6850 GCs

0.018-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	18710-20119	ea.	21694	3-pk.	21695
High-Performance Siltek® Treated	18710-20119	ea.	21696	3-pk.	21697

0.030-Inch ID	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard	18789-80070	ea.	21688	3-pk.	21689
High-Performance Siltek® Treated	18789-80070	ea.	21686	3-pk.	21687

## tech tip

### Which FID Jet Should I Use?

There are two FID jet configurations for Agilent GCs. The longer "adaptable" jet fits both 5890 and 6890 GCs, and can be used with capillary or packed columns. The shorter "dedicated" jet is for the FID in the 6890 GC that is designed only for use with capillary columns.

restek  
innovation!

### FID Jet Removal Tool for Agilent 5890/6890/6850 FIDs

- Securely grips jet in socket for easy removal or installation.
- Unique, ergonomic handle—easy to hold.



Slip tool  
over FID  
jet...



...loosen  
jet...



...and  
remove.

Description	qty.	cat.#
FID Jet Removal Tool for Agilent 5890/6890/6850 FIDs	ea.	22328

### Torx® Screwdriver Set

- Set includes TR-10, TR-15, and TR-20.
- Ideal for performing routine maintenance on Agilent 6890 GCs.

Description	qty.	cat.#
Torx® Screwdriver Set	set	23034

### Detector Plug Nut

Use Restek's detector plug nut to cap off a detector for thermal cleaning, to check detector or make-up gas flow rates, or to prevent hydrogen from accidentally diffusing into the oven from an unused detector base.

Description	Similar to Agilent part #	qty.	cat. #
Detector Plug Nut	5020-8294	2-pk.	21883



### FID/NPD Adaptor Fitting

- Easy to use, sturdy, compact stainless steel fitting.
- 1/16-inch nut uses standard graphite or Vespel®/graphite ferrules.
- Wrench pad won't turn when installing a capillary column.
- Includes 1/4- and 1/16-inch stainless steel nuts, and 1/4-inch Vespel® and 0.4mm ID graphite ferrules.

Description	qty.	cat. #
FID/NPD Adaptor Fitting	kit	20884



### FID/NPD Capillary Adaptor Fitting for Agilent 5890/6890/6850 GCs

- High-quality stainless steel construction.
- Meets or exceeds OEM performance.

Description	Similar to Agilent part #	qty.	cat. #
FID/NPD Capillary Adaptor Fitting	19244-80610	ea.	22077



### TCD Adaptor Fitting

Description	Similar to Agilent part #	qty.	cat. #
TCD Adaptor Fitting	19302-80020 G1532-80540	ea.	20269



### ECD/FID Dual-Purpose Make-Up Gas Kit

Incorporates a better make-up gas flow profile and a straight section of inert Siltek® tubing as the capillary guide. To add make-up gas to an FID, remove the tubing guide and insert an FID jet tail. A direct replacement fitting with a special end connector is available for GCs factory-equipped with make-up gas. A complete kit is available for plumbing GCs that are not factory-equipped with make-up gas. Complete kit includes make-up gas fitting, Siltek® treated guide, 1/4" nut and ferrules, 1/16" nut, 0.4mm ID graphite ferrule, and fine metering valve.

Description	qty.	cat. #
ECD/FID Dual-Purpose Make-Up Gas Kit	kit	21300
ECD/FID Replacement Fitting for Restek Make-up Gas Kit	ea.	21324
Replacement ECD/FID Siltek® Guide	2-pk.	21302
ECD/FID Direct Replacement Fitting (includes 1/4" nut, Vespel®/graphite ferrule, 1/16" nut, 0.4mm ID graphite ferrule)	ea.	21301



Rugged design!

### FID Gauge Pack for Agilent 5890 GCs

Pressure regulators and gauges for air & hydrogen. The 1/8-inch bulkhead allows easy hookup to instrument. Rated for inlet pressures to 250psi, outlet pressures of 0 to 60psi.

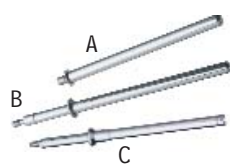
Description	qty.	cat. #
FID Gauge Pack for Agilent 5890 GCs	ea.	22071



## Autosampler Parts

### Replacement Parts for Agilent Autosamplers

- All parts meet or exceed OEM performance.



### Injector Mounting Posts for Agilent Autosamplers

Description	Similar to Agilent part #	qty.	cat.#
A) Injector Mounting Post for Agilent 7673 Series Autosamplers for use with 5890 GCs	18597-60805	ea.	21236
B) Injector Mounting Post for Agilent 7673 Series Autosamplers for use with 6890 GCs	07673-21140	ea.	21237
C) Injector Mounting Post for Agilent 7683 Series Autosamplers	G2613-20500	ea.	21172



### Turret Tray Assembly for Agilent 5890/6890 GC

- Holds sample, waste and solvent vials.

Description	qty.	cat.#
Turret Tray Assembly for Agilent 5890/6890 GC	ea.	22855



### Autosampler Plunger Carrier Belt

Description	Similar to Agilent part #	qty.	cat.#
Autosampler Plunger Carrier Belt for Agilent 7673A and 7673B	07673-61275	ea.	22695



### Carriage Motor Belt

Description	Similar to Agilent part #	qty.	cat.#
Carriage Motor Belt for Agilent 7673A and 7673B	1500-0676	ea.	22692

new!



### Z-Belt for Agilent 7673B Autosampler

Description	Similar to Agilent part #	qty.	cat.#
Z-Belt for Agilent 7673B Autosampler	1500-0803	ea.	22332



### Carriage Motor

Description	Similar to Agilent part #	qty.	cat.#
Carriage Motor for Agilent 7673A and 7673B	07673-60890	ea.	22693



new!

### Injector Turret Motor for Agilent 7673A & 7673B Injectors

Description	Similar to Agilent part #	qty.	cat.#
Injector Turret Motor for Agilent 7673A & 7673B Injectors	07673-60810	ea.	22337

## Replacement Cables

### (for Agilent GCs, Integrators, & Autosamplers)

- Priced less than original equipment.
- Instructions and wiring diagrams included.
- Manufactured with only the highest-quality components.

Connect an Agilent 5890 GC to an Agilent integrator (for second Inet integrator).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60610	6 ft.	ea.	20650
Replacement Cables	35900-60610	6 ft.	2-pk.	20651

## did you know?

Restek provides  
pin schematics.



Connect an Agilent 5890 GC to an Agilent 3396 integrator to enable remote starts (non-Inet connection from GC to integrator).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	03394-60560	6 ft.	ea.	20654



Connect an Agilent 3396 integrator to remote-start another piece of equipment or to start the Agilent 3396 integrator from that other piece of equipment.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	03394-60540	6 ft.	ea.	20655
Replacement Cables	03394-60540	6 ft.	2-pk.	20656



Connect an Agilent 5890 GC to a non-Agilent integrator or standard strip chart recorder.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	05890-60800	6 ft.	ea.	20652
Replacement Cables	05890-60800	6 ft.	2-pk.	20653



Connect an Agilent 5890 GC to remote-start another piece of equipment or to start the Agilent 5890 GC from that piece of equipment.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	05890-61080	6 ft.	ea.	20657



Connect an Agilent 3396 integrator to a non-Agilent GC.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60630	6 ft.	ea.	20658
Replacement Cables	35900-60630	6 ft.	2-pk.	20659



Connect an Agilent 5890 GC to an Agilent 35900C Interface or to an Agilent 7673A Autosampler to enable remote starts.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	35900-60700	6 ft.	ea.	20660
Replacement Cables	35900-60700	6 ft.	2-pk.	20661



Automatic liquid sampler stop/start cable for Agilent GCs.

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	G1530-60930	7 ft.	ea.	20929



Connect an Agilent 6890 GC to a PC 9F/9F (RS232).

Description	Similar to Agilent part #	length	qty.	cat.#
Replacement Cable	G1530-60600	6 ft.	ea.	22694





### GC Racer by Zip Scientific

- Saves time and money by increasing throughput.
- Makes fast GC possible with any capillary GC column.
- Easy to operate and install—truly a “plug and use” accessory.

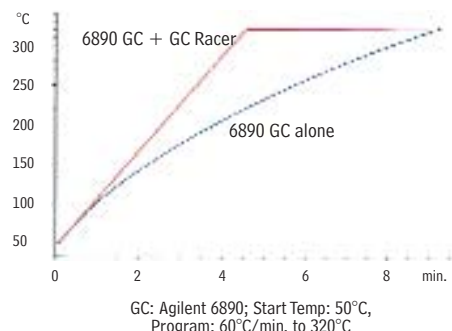
Fast gas chromatographic temperature programs can speed up elution of high boiling point compounds and late eluters, but often are not used to maximum advantage. The Agilent 5890 has a maximum temperature program rate of 70°C/min., but the factory heating elements in the 5890 only allow this maximum rate to be maintained up to a temperature of 100°C. The Agilent 6890 allows a maximum ramp rate of 75°C/min. at starting temperatures of 50–70°C and 20°C/min. at starting temperatures of 300–450°C.\* For analysts trying to push temperature ramps as fast as possible, these restricted program rates can lead to longer analysis time and broader peaks.

The GC Racer system will maintain a temperature program rate of 70°C/min. up to 350°C or 60°C/min. to temperatures as high as 450°C in an Agilent 5890 or a rate of 70°C/min. up to 400°C in an Agilent 6890.

Restek and Zip Scientific have teamed up to bring you the GC Racer temperature programmer, a system that enhances conventional ovens with an auxiliary heater that is controlled by the GC. The GC Racer consists of a control unit and a resistive heating element that is placed on the floor of the GC oven. The heating element is connected to the controller, which is plugged into the main PC board of the GC and into a 120V standard grounded wall outlet. When the GC Racer controller detects that the factory heating elements are not keeping up with the programmed heating rate, the GC Racer heater is brought into the circuit to augment the heat being supplied to the oven.

The auxiliary heater design is similar to that of the original GC heater. At no time during the installation of the GC Racer system is the column removed from the oven, or disconnected from the detector or injection port.

**Figure 1** Faster temperature programs increase sample throughput.



### a plus 1 story

“We tried a GC Racer Temperature Programmer from Restek and now we want more! With the GC Racer, we can perform high

speed temperature programming to get the results we need, and we can use conventional columns and fittings. This is a great time and cost savings for us. Not only that, but, with this system, we don’t experience any leaks at the fittings, so we can use it with our mass spectrometer. All this for an economical price.”

**Josh Hildabrand**, Chemist, and **William Mock**, Lab Manager, Environmental Science Corporation

The simplicity of its components and installation make the Zip Scientific GC Racer system a valuable tool in the quest for high-speed GC, and a must-have add-on accessory for every 5890 or 6890 GC. The speed of analysis that can be achieved and the ease of installation will lead to direct savings of time and money by decreasing run time and increasing sample throughput.

### for more info

GC Racer brochure  
(lit. cat.# 59297) and  
Applications Note  
(lit. cat.# 59457)

Download your free printable  
pdfs from our website.



Description	voltage	qty.	cat.#
GC Racer for Agilent 5890 Series II (only) GC	120 volt	ea.	23024
GC Racer for Agilent 5890A (only) GC	120 volt	ea.	23025
GC Racer for Agilent 6890 (only) GC	120 volt	ea.	23028

\*Use of high voltage and amperage or a special insert purchased with the GC will allow slightly higher ramp rates.

**Vespel® Ferrules**

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

**Graphite Ferrules**

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

**Vespel®/Graphite Ferrules**

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.



Vespel® ferrules

**Capillary Ferrules—For 1/16-Inch Compression-Type Fittings**

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

**Encapsulated Ferrules—For 1/16-Inch Compression Fittings**

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038



Reusable!

**Compact Ferrules—For Agilent 5890/6890/6850 GCs**

Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
0.4mm	0.25/0.28mm	10-pk.	20250	20238
0.4mm	0.25/0.28mm	50-pk.	20251	20239
0.5mm	0.32mm	10-pk.	21007	20248
0.5mm	0.32mm	50-pk.	21008	20249
0.8mm	0.45/0.53mm	10-pk.	20252	20263
0.8mm	0.45/0.53mm	50-pk.	20253	20264
1.0mm	0.75mm*	10-pk.	21059	21056
1.6mm	1.00mm*	10-pk.	21061	21057



\*For micropacked columns.

\*\*For 0.28mm MXT® columns.

## Standard Ferrules—For 1/16", 1/8", and 1/4-Inch Fittings



Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223

## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings



Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246

## Reducing Ferrules



Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings



Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.



Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## tech tip

### Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference. Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas. Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespel®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles. Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

**Universal Press-Tight® Connectors**

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

**Universal Angled Press-Tight® Connectors**

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484

**Universal “Y” Press-Tight® Connectors**

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

**Universal Angled “Y” Press-Tight® Connectors**

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469

**Universal “X” Press-Tight® Connectors**

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266

**Polyimide Resin**

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat.#
Polyimide Resin	350°C	5 grams	20445





Patent pending.

Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

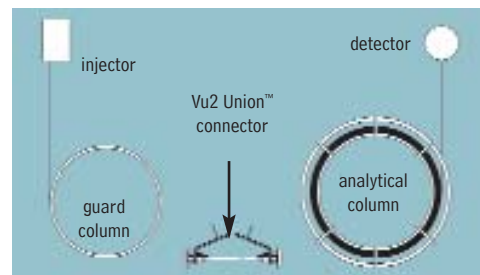
- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

#### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

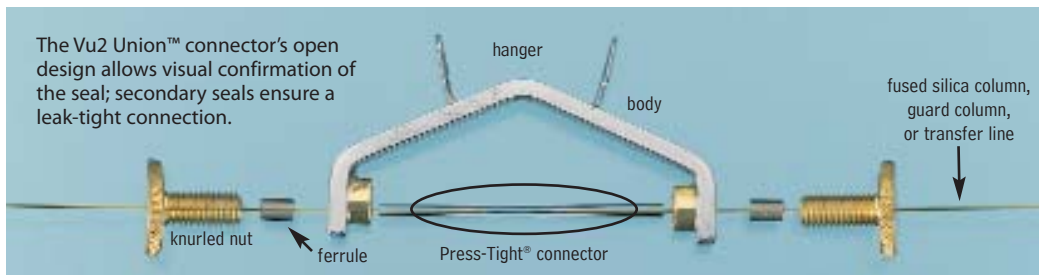
A guard column connected to an analytical column by a Vu2 Union™ connector.



#### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or our website).



Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors



Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.



Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

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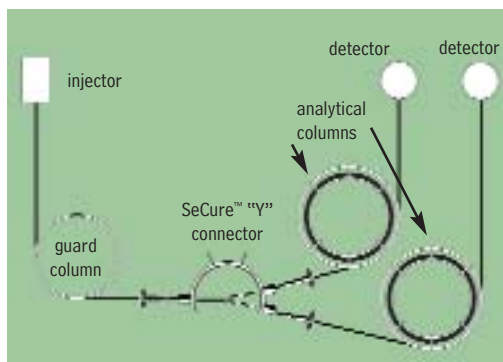
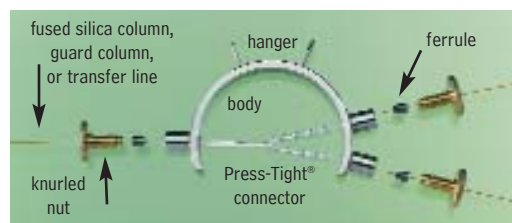
**SeCure™ “Y” Connector Kits**

- Connect two analytical columns to a transfer line or guard column.
- Use standard “Y” Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

Combine the simplicity of a “Y” Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ “Y” Connector’s open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.

Dual-column confirmational analysis with a single injection—one of the SeCure™ “Y” connector’s many uses.



Patent pending.

Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ “Y” connector body, 3 knurled nuts, “Y” Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ “Y” Connector Kit	0.25/0.28mm	kit	20276
SeCure™ “Y” Connector Kit	0.32mm	kit	20277
SeCure™ “Y” Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

**Universal “Y” Press-Tight® Connectors**

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486

**Graphite Ferrules for SeCure™ “Y” Connectors**

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



## please note

Use for fused silica-to-fused silica or fused silica-to-metal connections.

**MXT™ Low-Dead-Volume Connector Kits for Metal Columns are also available.** See our general catalog or our website.

### MXT™-Union Connector Kits for Fused Silica Columns

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.



### MXT™-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384



### MXT™ “Y”-Union Connector Kits for Fused Silica Columns

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

### 1/32-Inch Replacement Nut

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

### Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.



### 1/32-Inch Adaptor Ferrule (Valcon Polyimide)

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389



### 1/4-Inch–3/16-Inch Open-End Wrenches

High-quality miniature wrenches to use with MXT™ low-dead-volume connectors.

Description	qty.	cat.#
1/4"-3/16" Open-End Wrenches	2-piece set	20388

## tech tip

### Coupling GC Columns

An MXT™ connector is a good alternative to a glass connector when coupling GC columns. This connector is constructed from stainless steel and will not break; it uses ferrules for sealing. The design ensures low dead volume, and Siltek® treatment ensures the MXT™ connector is inert—both features help minimize peak tailing. MXT™ connectors can be used to connect metal to metal, metal to fused silica, or fused silica to fused silica tubing. When connecting metal tubing, use 1/32-inch stainless steel ferrules (see our general catalog or visit [www.restek.com](http://www.restek.com)); for fused silica tubing, use Valcon polyimide adaptor ferrules (see above).

**Thermal Gas Purifier\***

- Removes oxygen, water, carbon monoxide, carbon dioxide, hydrocarbons (except methane) to ppb levels—pure enough for MS.
- Packed with reactor-grade, pure getter material for maximum efficiency and no contamination.
- Welded end-fittings on getter tubes eliminate leaks.
- Each tube has 12L oxygen and 35L water vapor capacity.
- Maximum flow: 1 liter/minute.

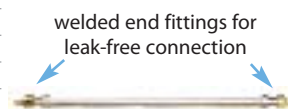
The getter material in Restek's re-engineered line of thermal gas purifiers reacts chemically with impurities in the carrier gas stream. Because the reaction is non-reversible, there is no possibility of contaminants breaking through the thermal gas purifier.

Gas purification is very economical when you use a thermal gas purifier. Getter tubes normally require changing only once per year; heavy use or very impure feed gas may require more frequent getter tube replacement.

<b>Restek Single-Tube Thermal Gas Purifier, 110 Volt (1 tube included)**</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings	ea.	21496
1/4" Fittings	ea.	21497
<b>Restek Dual-Tube Thermal Gas Purifier, 110 Volt (2 tubes included)**</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings	ea.	21498
1/4" Fittings	ea.	21499
<b>Replacement Getter Tube</b>	<b>qty.</b>	<b>cat.#</b>
1/8" Fittings (Similar to Supelco part# 2-2396)	ea.	21661
1/4" Fittings (Similar to Supelco part# 2-2398)	ea.	21660

\*Use with helium or nitrogen carrier gas only. Do not use with hydrogen, oxygen, or air—a violent reaction and/or fire will occur.

\*\*Single-tube model dimensions: 15" x 7" x 6" (38 x 17.8 x 15.2 cm). Dual-tube model dimensions: 15" x 10" x 6" (38 x 25.4 x 15.2 cm).

**Single-Tube Model****Dual-Tube Model**

Dimensions: 13" x 1/2"  
(33 x 1.3 cm)

**Pressure Gauge Kit**

- Use an in-line pressure gauge to indicate when the Thermal Gas Purifier getter tube should be replaced.
- Includes 1/8" tee and 0–100 psi gauge.

<b>Description</b>	<b>qty.</b>	<b>cat.#</b>
In-line Pressure Gauge Kit for Thermal Gas Purifiers	kit	21657



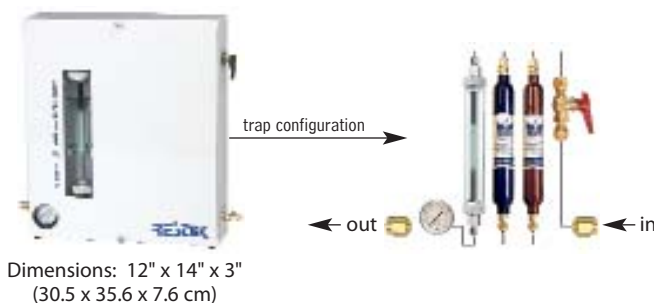
Always know the status of the Thermal Gas Purifier getter tube: change tube when pressure drops below 10psi.

**Restek Gas Management System**

- Removes moisture, hydrocarbons, and oxygen from carrier gas, extending column lifetime.
- Produces high-purity carrier gas for most applications.
- Includes one each: moisture, hydrocarbon, and indicating oxygen trap.
- Replacing traps is safe and easy.
- Maximum flow: 1 liter/minute.

**did you know?**

The Restek Gas Management System removes water vapor (to 10ppb), hydrocarbons (to 0.1ppm), and oxygen (to less than 0.1ppm) with three traps housed in one unit.



<b>Description</b>	<b>qty.</b>	<b>cat.#</b>
Restek Gas Management System (includes fittings for 1/8" and 1/4" gas line)	ea.	21999
<b>Replacement Traps</b>	<b>qty.</b>	<b>cat.#</b>
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010



## did you know?

All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

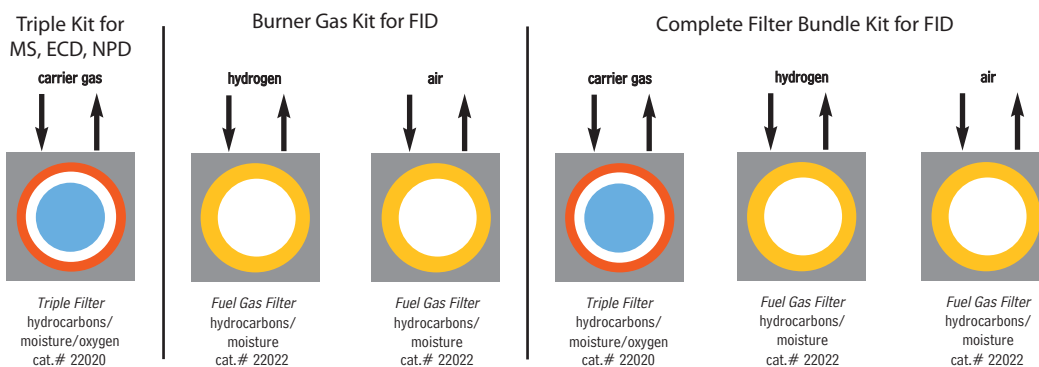
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure or Maximum Flow Rates	Use for:	Indicator Color Change	H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Capacity Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.# 22028	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>3</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>3</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>3</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	> 99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>3</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

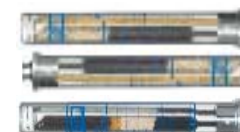
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

- Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

- Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

- Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

- Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

- To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833





**Kelli Steindl**  
GC Accessories Associate  
Product Marketing  
Manager  
2+ years of service!

### Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters (page 39), Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.



Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

NOTE: Super-Clean™ Gas Filters are recommended for purifying non corrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

### Click-On Inline Super-Clean™ Traps and Connector Kits



Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463

**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat.#
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat.#
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat.#
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat.#
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat.#
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



**Dual-Stage Ultra-High-Purity Brass Regulators**

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve,  
 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

**Single-Stage Ultra-High-Purity Brass Regulators**

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve,  
 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)



Produce zero air and pure hydrogen from one unit!

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**ordering note**

For **international orders**, please add the appropriate power cord suffix from the table below.

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)!

lit. cat.# 580051

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913
<b>Replacement Components for FID Gas Stations</b>		
Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge FID Gas Station Maintenance Kit	ea.	21671
Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge. *Zero air inlet requires minimum of 10psig compressed air pressure.	ea.	24915

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat.# suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555

[www.restek.com](http://www.restek.com)

### Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/16" OD	21500	21501	21502
0.02" ID	1/8" OD	21503	21504	21505
0.03" ID	1/8" OD	21506	21507	21508
0.04" ID	1/8" OD	21509	21510	21511
0.085" ID	1/4" OD	21512	21513	21514
0.21" ID	1/2" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.



### ordering note

Required length in meters  
x 3.2808 = length in feet.

### ordering note

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item

### Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Chromatographically free of background contamination.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### cleaned

All tubing is cleaned and ready to use.

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.

Description	qty.	cat.#
GC Installation Kit	kit	21325



### tech tip

#### Plumbing a GC

It is essential to use clean chromatographic-grade tubing to plumb a GC. Standard-grade tubing contains residual hydrocarbon contaminants from the drawing process. These contaminants migrate into the gas stream, elevating background noise and causing down time.

For the *ultimate*  
in inertness, use

**SILTEK®**  
tubing.

See our catalog or  
website.



## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.

Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185



## Ridgid™ Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.

Description	qty.	cat.#
Ridgid™ Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012



## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134



CE

8" x 6 1/4" x 4 1/4"  
(20.3 x 15.9 x 10.8 cm)  
Weight: 11 lbs. (5.0 kg)

## SSI TC-20 Tube Cutting Machine

- Cuts 1/16", 1/8", or 1/4" tubing with inside diameter as small as 0.008".
- Electrically operated bench-top model.
- Handy dressing tool on the swing arm removes burrs and reams tubing.
- Voltage selectable 110–120/220–240 volts, 50–60Hz.\*

Description	qty.	cat.#
SSI Tubing Cutter Machine	ea.	23029
SSI Replacement Cutting Wheels	3-pk.	23030

\*Unit shipped set for 110–120 operating voltage. Switch to 220–240 volts by using alternate fuse and power cord (included).

## Tubing Dressing Tool

- Same tool as included with the SSI tube cutting machine.



Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

## Tubing Bender

- Bends 1/8-inch, 3/16-inch, or 1/4-inch tubing.
- Accurate left-hand, right-hand, or offset bends.



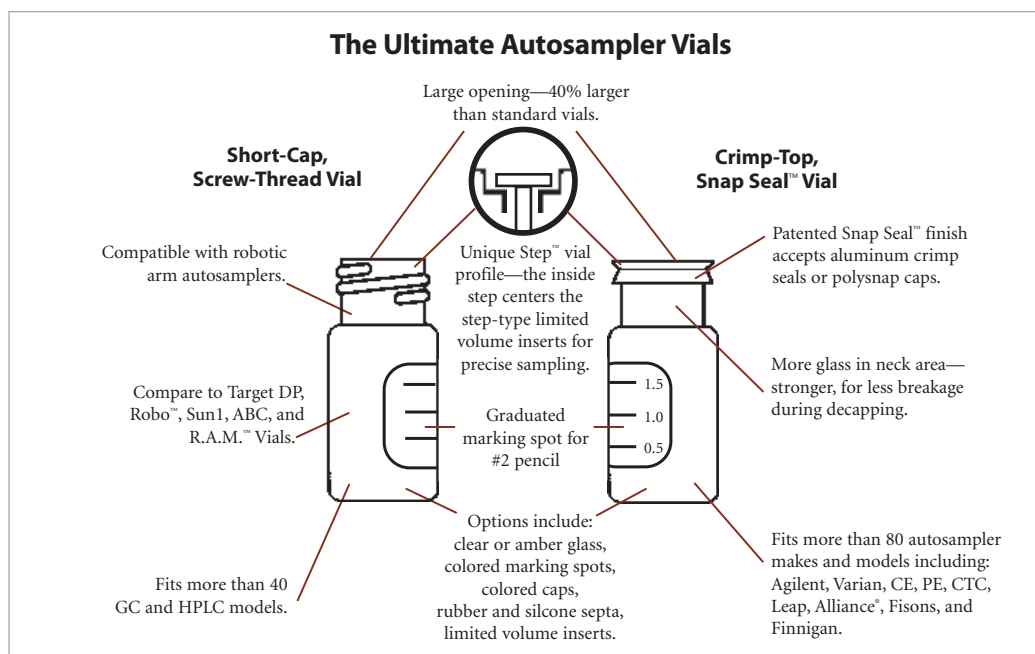
Description	qty.	cat.#
Tubing Bender	ea.	23009



## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.

Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



### Snap Seal™ Vials: The Versatile Crimp Top Vial

- Purchase only one vial type, but use any crimp capping system.
- Seal securely with a standard aluminum crimp seal, a Poly Crimp™ Seal, or a variety of Snap-Top Cap™ designs.
- Crimp tightly—the neck finish provides a tighter seal when using the new Poly Crimp™ Seal, Snap-Top Cap™ or aluminum crimp seal.
- Seal tightly—the unique design seals securely using septum of proper thickness.
- 40% larger opening than standard crimp-top vials.
- Autosampler compatible—the unique Step™ vial design precisely centers a limited-volume insert in the vial neck. This ensures dependable, reliable use with autosamplers—even autosamplers with robotic arms.
- Less breakage—more glass in the neck area minimizes breakage during decapping.
- Bags of mixed color caps aid in coding special samples, controls, or standards.



### Catalog Number Cross-Reference: Vials for Agilent Autosamplers

Similar to Agilent Part #	Restek Cat. #	Description	Page
5181-1210	21174	Aluminum Crimp Seals, PTFE/Rubber, 100-pk.	46
5181-1270	24513	50µL Polypropylene Spring Inserts, 100-pk.	46
5181-3376	24385	2mL Amber Crimp-Top Vials, 100-pk.	46
5181-3377	24517	350µL Glass Flat Bottom Inserts, 1000-pk.	46
5182-0543	24383	2mL Clear Crimp-Top Vials, 100-pk.	46
5182-0549	24518	250µL Polypropylene Bottom Spring Inserts, 100-pk.	46
5182-0552	24359	Aluminum Crimp Seals, PTFE/Silicone, 100-pk.	46
5182-0714	21154	2mL Clear Screw-Top Vials - No Marking Spot, 100-Pk.	47
5182-0715	21140	2mL Clear Screw-Top Vials, 100-pk.	47
5182-0716	21142	2mL Amber Screw-Top Vials, 100-pk.	47
5182-0717	24473	9mm Screw-Top Closures, PTFE/Rubber, 100-pk.	47
5182-0720	24485	9mm Screw-Top Closures, PTFE/Silicone, 100-pk.	47
5182-0723	24497	9mm Screw-Top Closures, PTFE/Silicone/PTFE, 100-pk.	47
5183-2068	21141	2mL Clear Screw-Top Vials, 1000-pk.	47
5183-2069	21143	2mL Amber Screw-Top Vials, 1000-pk.	47
5183-4492	24384	2mL Clear Crimp-Top Vials, 1000-pk.	46
5183-4493	24386	2mL Amber Crimp-Top Vials, 1000-pk.	46
5183-4498	21175	Aluminum Crimp Seals, PTFE/Rubber, 1000-pk.	46
5183-4500	24360	Aluminum Crimp Seals, PTFE/Silicone, 1000-pk.	46
9301-0978	24651	100µL Polypropylene Limited Volume Vials, 100-pk.	46
9301-0977	24653	100µL Glass/Plastic Limited Volume Vials, 100-pk.	46

← cross-reference

## 11mm Vials



### Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish

#### Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153



for **more** info

see **page 48** for crimpers and decappers.

#### 11mm Aluminum Crimp Seals with Septa

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370



#### Convenience Kits: Vials, Caps, & Septa

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649



#### Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.



#### Limited Volume Vials, 11mm Crimp-Top

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

Agilent Compatible!

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

Ideal for Agilent 7673 & other autosamplers that process 12 x 32mm crimp-top vials.

**Headspace Vials****Headspace Autosampler Vials**

Description	100-pk.	1000-pk.
6mL Clear Vial	21166	21167
10mL Clear Vial, Flat Bottom	24683	24684
10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Flat Bottom	24685	24686
20mL Clear Vial, Rounded Bottom	21162	21163
27mL Clear Vial	21160	21161

**20mm Aluminum Seals w/Septa, Assembled**

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838



new!

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.

Safer than removing caps with pliers, knife or screwdriver blades!



### Aluminum Seal Crimpers and Decappers

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!



Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738

### Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

### Decapping has never been easier!

one...



two...



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

**Standard MICROLITER™ Syringes for Agilent 7673, 7683, and 6850 Autosamplers**

- Hamilton and SGE syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are designed to withstand multiple, rapid injections through a septum.

for **more** info

See **page 52** for Needle Gauge Chart and Needle Point Style drawings.



Hamilton 10µL, Autosampler Cemented Needle for Agilent 7673, 7683, 6850 Autosamplers

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton			Restek
					Model	cat.#	qty.	cat.#
0.5µL	ASRN	23s	1.71"	Agilent	7000.5	86276	ea.	24895
0.5µL	ASRN	26s	1.71"	Agilent	7000.5	86274	ea.	21221
5µL	ASRN	23s	1.71"	Agilent	75	87957	ea.	20172
5µL	ASN	23s	1.71"	Agilent	75	87987	ea.	20168
5µL	ASN	23s	1.71"	Agilent	75	87990	6-pk.	20170
5µL	ASN	26s	1.71"	Agilent	75	87988	ea.	24592
5µL	ASN	26s	1.71"	Agilent	75	87989	6-pk.	21230
5µL	ASRN	23s-26s	1.71"	Agilent	75	87959	ea.	21223
5µL	ASN	23s-26s	1.71"	Agilent	75	87993	ea.	24593
5µL	ASN	23s-26s	1.71"	Agilent	75	87994	6-pk.	24594
10µL	ASRN	23s	1.71"	Agilent	701	80357	ea.	20171
10µL	ASN	23s	1.71"	Agilent	701	80387	ea.	20167
10µL	ASN	23s	1.71"	Agilent	701	80390	6-pk.	20169
10µL	ASRN	26s	1.71"	Agilent	701	80358	ea.	24597
10µL	ASN	26s	1.71"	Agilent	701	80388	ea.	24595
10µL	ASN	26s	1.71"	Agilent	701	80389	6-pk.	24599
10µL	ASRN	23s-26s	1.71"	Agilent	701	80359	ea.	24598
10µL	ASN	23s-26s	1.71"	Agilent	701	80393	ea.	24596
10µL	ASN	23s-26s	1.71"	Agilent	701	80391	6-pk.	24600



SGE Removable Needle for Agilent 7673, 7683, 6850 Autosamplers

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE			Restek
					Model	cat.#	qty.	cat.#
0.5µL	R	23	42mm	Cone	0.5BR-HP-0.63	000410	ea.	24791
0.5µL	R	26	42mm	Cone	0.5BR-HP-0.47	000400	ea.	24790
5µL	R	23	42mm	Cone	5R-HP-0.63	001815	ea.	24793
5µL	F	23	42mm	Cone	5F-HP-0.63	001810	ea.	24781
5µL	F	23	42mm	Cone	SK-5F-HP-0.63	001814	6-pk.	24783
5µL	R	26	42mm	Cone	5R-HP-0.47	001805	ea.	24792
5µL	F	26	42mm	Cone	5F-HP-0.47	001800	ea.	24780
5µL	F	26	42mm	Cone	SK-5F-HP-0.47	001804	6-pk.	24782
5µL	R	23-26s	42mm	Cone	5R-HP-0.63/0.47	001825	ea.	21211
5µL	F	23-26s	42mm	Cone	5F-HP-0.63/0.47	001821	ea.	21210
5µL	F	23-26s	42mm	Cone	SK-5F-HP-0.63/0.47	001822	6-pk.	21214
10µL	R	23	42mm	Cone	10R-HP-0.63	002815	ea.	24795
10µL	F	23	42mm	Cone	10F-HP-0.63	002810	ea.	24785
10µL	F	23	42mm	Cone	SK-10F-HP-0.63	002814	6-pk.	24787
10µL	R	26	42mm	Cone	10R-HP-0.47	002805	ea.	24794
10µL	F	26	42mm	Cone	10F-HP-0.47	002800	ea.	24784
10µL	F	26	42mm	Cone	SK-10F-HP-0.47	002804	6-pk.	24786
10µL	R	23-26s	42mm	Cone	10R-HP-0.63/0.47	002825	ea.	21213
10µL	F	23-26s	42mm	Cone	10F-HP-0.63/0.47	002821	ea.	21212
10µL	F	23-26s	42mm	Cone	SK-10F-HP-0.63/0.47	002822	6-pk.	21215

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

## GASTIGHT® Teflon®-Tipped Syringes for Agilent 7673, 7683, and 6850 Autosamplers



Hamilton 10µL Gas-Tight Syringe

## Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
5µL	ASN	23s	1.71"	Agilent	175	80074	ea.	24893
10µL	ASN	23s	1.71"	Agilent	1701	80080	ea.	24894
10µL	ASRN	23s	1.71"	Agilent	1701	80087	ea.	21224
10µL	ASRN	26s	1.71"	Agilent	1701	80088	ea.	21228
10µL	ASRN	23s–26s	1.71"	Agilent	1701	80089	ea.	21229

## SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	23	42mm	Cone	10F-HP-GT-0.63	002812	ea.	24789
10µL	R	23	42mm	Cone	10R-HP-GT-0.63	002818	ea.	24797
10µL	R	23–26	42mm	Cone	10R-HP-GT-0.63/0.47	002829	ea.	21220

## Guide to Needle Termination Codes

## Hamilton:

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

## SGE:

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

## Large Volume Syringes for Agilent 7673, 7683, and 6850 Autosamplers

## SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
25µL	R	23	42mm	Cone	25R-HP-0.63	003665	ea.	24798
50µL	R	23	42mm	Cone	50R-HP-0.63	004665	ea.	24799
100µL	R	23	42mm	Cone	100R-HP-0.63	005665	ea.	24800
250µL	R	23	42mm	Cone	250R-HP-0.63	006665	ea.	24801

## Replacement Needles for Agilent 7673, 7683, and 6850 Autosampler Syringes



## Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–10µL	23s	1.71"	Agilent	7786-01	6-pk.	20164
5–10µL	26s	1.71"	Agilent	7786-02	6-pk.	20165
5–10µL	23s–26s	1.71"	Agilent	7785-01	6-pk.	20166

## Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	42mm	Cone	033715	ea.	24821
5µL	23	42mm	Cone	036720	2-pk.	24823
5µL	26	42mm	Cone	036710	2-pk.	24822
10µL	23	42mm	Cone	037717	2-pk.	24825
10µL	26	42mm	Cone	037715	2-pk.	24824
25–250µL	23	42mm	Cone	038717	2-pk.	24826

**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.

for **more** info

See **page 52** for Needle Gauge Chart and Needle Point Style drawings.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek cat.#
					Model	cat.#		
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek cat.#
					Model	cat.#		
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 52.

## Gas-Tight Syringes

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub



#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944



#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

## did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

#### Needle Point Style



**Point Style 2, BV:** Beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

## Part Number Cross Reference

Similar to Agilent Part #	Restek Part #	Page	Product Name	Similar to Agilent Part #	Restek Part #	Page	Product Name
G1099-20030	21894	22	Capillary Installation Gauge	500-2114	20250	31	Compact Ferrules
G1530-60600	22694	29	Replacement Cable	5020-8292	21311, 21312	11	Finger-Tight Capillary Column Nuts
G1530-60930	20929	29	Replacement Cable	5020-8293	21311, 21312	11	Finger-Tight Capillary Column Nuts
G1530-60960	24323	15	EPC Test Kit	5020-8294	21883	27	Detector Plug Nut
G1530-61030	23039	15	Oven Temp Sensor	5061-5869	21710	13	Replacement Inlet Seal Washers (15-pk.)
G1530-80650	22076	19	Air Diverter	5062-3506	20212	31	Capillary Ferrules
G1531-20550	23043	24	FID Collector Mount	5062-3508	20211	31	Capillary Ferrules
G1531-20550	23045	24	FID Collector Housing Kit	5062-3538	20213	31	Capillary Ferrules
G1531-20690	21139	25	FID Collector	5062-3580	20241	18, 32	Replacement Ferrules
G1531-20700	21139	25	FID Collector	5062-3581	20242	18, 32	Replacement Ferrules
G1531-20740	23044	24	FID Collector Housing	5062-3587	22405	6	Gooseneck Splitless Liner (4mm) w/ Wool
G1531-60690	21699	25	FID Collector Assembly	5080-8732	20964, 20965	17	DI Uniliner Liners for Packed Column GC
G1531-80560	21620, 21621, 21682, 21683	26	FID Jets (.011")		20966, 20967		
G1531-80580	23052	24	FID Base Weldment, Pack Column FID	5080-8773	20252	31	Compact Ferrules
G1531-80630	23053	24	FID Base Weldment, Capillary Column FID	5080-8898	21685	16	Viton Replacement O-rings (10-pk.)
G1532-80540	20269	27	TCD Adaptor Fitting	5180-4165	23064	24	Replacement Silicone Washers for FID Collector Housing
G1544-20590	23042	15	Heater Block Retaining Nut	5180-4168	20296, 20297	9	Graphite O-rings for split liners
G1544-20620	22800	15	Split Vent Line for Agilent GCs (32-inch)	5180-4173	20298, 20299	9	Graphite O-rings for splitless liners
G1544-60575	22672, 22674	14	Weldment with EPC	5180-4181	22064	14, 15	O-rings for Agilent Trap Fittings (25-pk.)
G1544-60585	22670, 22686	14	Optional Split/Splitless Weldment	5180-4182	20377	9	Viton O-Rings for Agilent GCs (25-pk.)
G1544-60610	23031	14, 15	Optional Split Vent Trap Assembly	5181-1210	21174	46	Aluminum Seals, Silver Seal, PTFE/Natural Rubber Septa
G1544-80530	23032	14, 15	Replacement Traps and O-rings	5181-1267	21212, 24596	49	10µL Standard Microliter Syringes
G1544-80550	22820	15	Replacement Chemical Trap	5181-1270	24513	46	50µL Glass, Big Mouth, Bottom Spring Vial Inserts
G1544-80570	22671, 22673	14	Shell Weldment	5181-1273	21210, 24593	49	5µL Standard Microliter Syringes
G1544-80700	20954, 20989	8	Double Gooseneck Drilled Unliners	5181-3311	21136	25	FID Collector Nut and Washer
G1544-80730	20756, 20771	8	Drilled Unliners	5181-3315	20784	6	Double Gooseneck Splitless Liner (4mm)
G2613-20500	21172	28	Injector Mounting Post	5181-3316	20798	6	Gooseneck Splitless Liner (4mm)
G2630-60710	20926	19	Air Diverter	5181-3319	20166	50	Needles for 5-10µL Syringes (6-pk.)
03394-60540	20655, 20656	29	Replacement Cable	5181-3321	21213, 24598	49	10µL Standard Microliter Syringes
03394-60560	20654	29	Replacement Cable	5181-3360	21215, 24600	49	10µL Standard Microliter Syringes (6-pk.)
05890-60800	20652, 20653	29	Replacement Cable	5181-3376	24385	46	2.0mL Amber Glass Vial
05890-61030	23040	15	Oven Temp Sensor	5181-3377	24517	46	350µL Glass, Flat Bottom Vial Insert
05890-61080	20657	29	Replacement Cable	5181-3382	20964, 20965	17	DI Uniliner Liners for Packed Column GC
05890-61140	22068	15, 24	Injector/FID Heater + Injector/FID PRT Sensor		20966, 20967		
05890-61260	21610	15	Replacement Chemical Trap	5181-3395	20400	33	Press-Tight Connector
05921-21170	20883, 21879	11	Capillary Column Nuts (2-pk.)	5181-3396	20429	33	Deactivated Press-Tight Connector
05971-20305	24699	22	Gold Tip Transfer Line	5181-3397	20405	33	"Y" Press-Tight Connector
05971-20307	22660	23	Replacement Interface Guide Tube	5181-3398	20405-261	33	Deactivated "Y" Press-Tight Connector
05971-60302	22659	23	Replacement Interface with Bellows	5181-8809	24789, 24894	50	10µL Gas-Tight Syringes
05971-60540	22662	23	Replacement Diffusion Pump Fan Assembly	5181-8811	20164	50	Needles for 5-10µL Syringes
05972-60540	22663	23	Replacement Diffusion Pump Fan Assembly		24825		
05988-20066	20643	22	(Detector) MSD Source Nut (2-pk.)	5181-8813	21224, 24797	50	10µL Gas-Tight Syringes
07673-21140	21237	28	Injector Mounting Post	5181-8818	20712	6	2mm Splitless Liner
07673-60810	22337	28	Injector Turret Motor	5181-8830	21878, 21884	11	Capillary Column Nuts (2-pk.)
07673-60890	22693	28	Carriage Motor	5182-0543	24383	46	2.0mL Clear Glass Vials
07673-61275	22695	28	Autosampler Plunger Carrier Belt	5182-0549	24518	46	250µL Polypropylene Vial Inserts
1500-0676	22692	28	Carriage Motor Belt	5182-0552	24359	46	Silver Seal, PTFE/Silicone Septa Vials
1500-0803	22332	28	Z-Belt	5182-0714	21154	47	2.0mL Clear Vial
18597-60805	21236	28	Injector Mounting Post	5182-0715	21140	47	2.0mL Clear Vial
18710-20119	21694, 21695, 21696, 21697	26	FID Jets (.018")	5182-0716	21142	47	2.0mL Amber Vial
				5182-0717	24473	47	9mm Screw-Top Caps, Blue Cap, PTFE/Natural Rubber Liner
				5182-0720	24485	47	9mm Screw-Top Caps, Blue Cap, PTFE/Silicone Liner
18740-20800	22078	18	Reducing Nut	5182-0723	24497	47	9mm Screw-Top Caps, Blue Cap, PTFE/Silicone/PTFE Liner
18740-20880	21315, 21316	13	Replacement Inlet Seal (0.8mm hole)	5182-0830	24821	50	Needles for 0.5µL Syringes
18740-20885	21317, 21318	13	Replacement Inlet Seal (0.8mm hole)	5182-0834	20172, 24793	49	5µL Microliter Syringes
18740-20940	20409	15	Heat Sink	5182-0835	21211, 21223	49	5µL Microliter Syringes
18740-60835	20631, 21309	10	Septum Nuts	5182-0875	20170, 24783	49	5µL Microliter Syringes (6-pk.)
18740-80190	20709	7	Cup Splitter Liner	5182-9652	20476, 20477	13	Replacement Inlet Seals (0.8mm ID)
18740-80200	20972	7	1mm Split Liner	5182-9749	22684	9	Liner Seals for C15 and PTV (5-pk.)
18740-80220	20914	6	2mm Splitless Liner (quartz)	5182-9763	21409	13	Silver PTV Seals (5-pk.)
18789-80070	21686, 21687, 21688, 21689	26	FID Jets (.030")	5183-2036	21157	7	Straight Glass Liner (10-pk.)
				5183-2037	21704	7	Baffled Glass Liner (10-pk.)
19231-00130	22329	24	Spanner Wrench for FID Collector Assembly	5183-2038	21156	7	Glass Liner w/ Wool (10-pk.)
19231-20910	21137	25	FID Ignitor Castle	5183-2068	21141	47	2.0mL Clear Vial
19231-20920	23037	24	FID Collector Housing Kit	5183-2069	21143	47	2.0mL Amber Vial
19231-20930	23036	24	FID Collector Mount	5183-4492	24384	46	2.0mL Clear Glass Vial
19231-20940	21136	25	FID Collector Nut and Washer	5183-4493	24386	46	2.0mL Amber Glass Vial
19231-20950	21138	25	FID Collector	5183-4498	21175	46	11mm Aluminum Seals, Silver Seal, PTFE/Natural Rubber Septa
19231-20960	21138	25	FID Collector				
19231-20970	21138	25	FID Collector	5183-4500	24360	46	11mm Crimp Seals, Silver Seal, PTFE/Silicone Septa
19231-60620	22069	15, 24	Injector/FID Heater	5183-4647	21032	7	Low Pressure Drop Liner w/ Wool
19231-60660	23035	15, 24	Injector/FID PRT Sensor	5183-4691	22401, 20782	6, 7	4mm Split and Splitless Liners w/ Wool (5-pk.)
19231-60680	21001	25	FID Ignitor	5183-4692	22402, 20783	6, 7	4mm Split and Splitless Liners w/ Wool (25-pk.)
19231-60690	23010	25	FID Collector Assembly	5183-4693	22406	6	Gooseneck Splitless Liner (4mm) w/ Wool (5-pk.)
19231-80580	23041	24	FID Base Weldment	5183-4694	22407	6	Gooseneck Splitless Liner (4mm) w/ Wool (25-pk.)
19243-80570	21691	16	Septum Packed Purge Port Weldment	5183-4695	20799	6	Gooseneck Splitless Liner (4mm) (5-pk.)
19244-80540	21303	17	DI Liner Adaptor for Packed Column GC	5183-4696	20800	6	Gooseneck Splitless Liner (4mm) (25-pk.)
19244-80560	20670, 20671, 20672, 20673	26	FID Jets	5183-4699	20710	7	Cup Splitter Liner (5-pk.)
				5183-4701	21033	7	Low Pressure Drop Liner w/ Wool (5-pk.)
19244-80610	22077	27	FID/NPD Capillary Adaptor Fitting	5183-4703	20713	6	2mm Splitless Liner (5-pk.)
19246-60630	20634	15	Backpressure Regulator Kit	5183-4704	20714	6	2mm Splitless Liner (25-pk.)
19247-60510	22076	19	Air Diverter	5183-4705	20785	6	Double Gooseneck Splitless Liner (4mm) (5-pk.)
19251-00100	22065	10, 20	Injector Wrench	5183-4706	20786	6	Double Gooseneck Splitless Liner (4mm) (25-pk.)
19251-20620	22080	15	Heater Block Retaining Nut	5183-4707	20915	6	2mm Splitless Liner (quartz) (5-pk.)
19251-60540	22400, 20781	6, 7	4mm Split and Splitless Liners w/ Wool	5183-4709	20973	7	1mm Split Liner (5-pk.)
19251-60575	20265, 20267	14	Weldment	5183-4711	20994	7	Low Pressure Drop Liner w/ Wool
19251-80525	22800	15	Split Vent Line for Agilent GCs (32-inch)	5183-4712	20995	7	Low Pressure Drop Liner w/ Wool (5-pk.)
19251-80570	20266, 20268	14	Shell Weldment	5183-4713	20996	7	Low Pressure Drop Liner w/ Wool (25-pk.)
19301-60660	21000	25	FID Flow Measuring Adaptor	5183-4732	21882	11	Capillary Column Nut (2-pk.)
19302-80020	20269	27	TCD Adaptor Fitting	6040-0834	22687	23	Rough Pump Oil for MSD Pumps
19362-60500	21158	15	Replacement Chemical Trap	8660-0791	22685	23	Ion Source Cleaning Powder
210-3003	20772	6	4mm Splitless Liner	9301-0713	20167, 24785	49	10µL Standard Microliter Syringes
210-3003-5	20773	6	4mm Splitless Liner (5-pk.)	9301-0714	24595, 24784	49	10µL Standard Microliter Syringes
210-4004-5	21023	7	4mm Split Precision Liner w/ Wool (5-pk.)	9301-0725	20169, 24787	49	10µL Standard Microliter Syringes (6-pk.)
3103-0145	22661	23	Replacement Cold Sensor for MS Diffusion Pump	9301-0891	24592, 24780	49	5µL Standard Microliter Syringes
35900-60610	20650, 20651	29	Replacement Cables	9301-0892	20168, 24781	49	5µL Standard Microliter Syringes
35900-60630	20658, 20659	29	Replacement Cables	9301-0977	24653	46	100µL Glass Insert/Clear Plastic Vial
35900-60700	20660, 20661	29	Replacement Cables	9301-0978	24651	46	100µL Polypropylene Vial
500-1210	20445	33	Polyimide Resin				

# Restek is here for **you**



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

## Experience Restek

We're the most dedicated chromatography company you'll ever do business with.

### Restek Trademarks:

Silcosteel, Siltek, Sulfinert, Rtx, Stx, Stabilwax, MXT, CarboFrit, *mini*-Lam, Cycloplitter, Precision, Uniliner, EZ No-Vent, Alumaseal, Press-Tight, Vu2 Union, SeCure, Vu-Union, Thermolite, IceBlue, Silcote, Restek logo.

### Other Trademarks:

Teflon, Vespel, Viton (E. I. du Pont de Nemours & Co., Inc.), BTO, CenterGuide (Chromatography Research Supplies, Inc.), Torx (Textron, Inc.), Valco (Valco Instruments Co, Inc.), Super-Clean (SGT Middleburg BV), Ridgid (Rigid, Inc.), Robo (XX sys Technologies, Inc.), Poly Crimp, R.A.M., Step, Snap Seal, Snap-Top Cap (J.G. Finneran Associates, Inc.), Versapak (The Black & Decker Corporation), MICROLITER, GASTIGHT (Hamilton Co.), Alliance (Waters Associates, Inc.)



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# Genuine Restek Replacement Parts for **Shimadzu GCs**



**HROMalytic** **RESTEK** **'07**  
Australian Distributors **ECH**nology  
Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

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**Chromatography Products**

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# From Injector to Detector

Restek is your #1 source for consumables and supplies for Shimadzu GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



## it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

### Feature

### Benefit

Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—easy to hold and operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe assembly

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks with the adaptor fitting.



Leak Detector is easily accessed when stored in the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)

## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

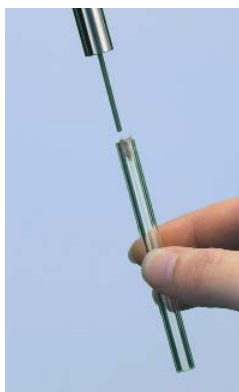
Insert and remove wool plugs easily. Order a spare pack so you'll always have one available.



Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.



Eliminates user variation!



Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

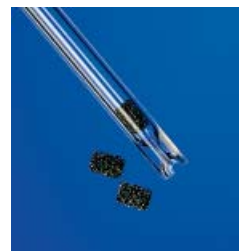
**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller- inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!












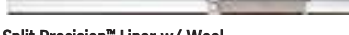

Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for Shimadzu 9A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	Split	universal, for most common analyses	3.5 ID 5.0 OD x 128	221-25822-01	20751	20752	20753
		dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 128	—	20754	20755	—
	Cycloplitter®	high & low MW compounds	3.5 ID 5.0 OD x 128	—	20757	20758	—
Cup Splitter							
Splitless Liners for Shimadzu 9A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	3.5mm Splitless	trace samples	3.5 ID 5.0 OD x 128	221-25440-03	20748	20749	20750
DI Liners for Shimadzu 9A GCs (0.32/0.53mm ID)		Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	Uniliner®	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 128	—	20872	20873	—
Split Liners for Shimadzu 14A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	Split	universal, for most common analyses	3.5 ID 5.0 OD x 99	221-32544-01	20860	20861	20862
		dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 99	—	20870	20871	—
	Cycloplitter®	high MW compounds	3.5 ID 5.0 OD x 99	—	20868	20869	—
Laminar Cup Splitter							
Splitless Liners for Shimadzu 14A GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	3.5mm Splitless	trace samples	3.5 ID 5.0 OD x 99	221-32544-00	20863	20864	20865
DI Liners for Shimadzu 14A GCs (0.32/0.53mm ID)		Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	Uniliner®	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	—	20876	20877	—
	Cyclo-Uniliner®	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 99	—	20893	20894	—
Split Liners for Shimadzu 17A, 2010, and 2014 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap, fast GC	1.0 ID 5.0 OD x 95	—	20976	20977	20978
	3.5mm Split	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-01	22283	22284	22285
	Split Precision™ Liner w/ Wool	dirty samples, trace samples	3.5 ID 5.0 OD x 95	—	21020	21021	—
	Cycloplitter®	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 95	<b>new!</b>	22072	22073	—












\*Nominal ID at syringe needle expulsion point.

### ordering note

For descriptions of liner deactivations, packings, and tools, see [pages 3-5](#).

All liners are  
**100% deactivated**



All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>3.5mm Splitless</b>	universal, trace samples	3.5 ID 5.0 OD x 95	221-48335-01	22286	22287	—
 <b>Double Gooseneck</b>	reduces backflash and catalytic decomposition	3.5 ID 5.0 OD x 95	—	20958	20959	20960
 <b>Single Gooseneck</b>	reduces backflash, also operates in DI mode	3.5 ID 5.0 OD x 95	221-41599-00	20961	20962	20963
Split/Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Split/Splitless w/ Wool</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-00	20955	20956	20957
 <b>Siltek® Split/Splitless w/ Wool</b>	universal, for most common analyses	3.5 ID 5.0 OD x 95	—	20955-213.1	20956-213.5	20957-213.25
SPME Liner for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>SPME Liner</b>	ideal for low volume SPME applications	.75 ID 5.0 OD x 95	<b>new!</b>	22278	22279	—
DI Liners for Shimadzu 17A, 2010, and 2014 GCs (0.32/0.53mm ID)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Uniliner® w/ Wool</b>	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21713	21719	—
 <b>Open-top Drilled Uniliner® (hole on top)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21285	21286	—
 <b>Open-top Drilled Uniliner® (hole on bottom)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21287	21288	—
 <b>Gooseneck Drilled Uniliner® (hole on top)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21289	21290	—
 <b>Gooseneck Drilled Uniliner® (hole on bottom)</b>	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21291	21292	—

## tech tip

### DI Liners for Shimadzu GCs

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

Liner for Shimadzu 17A PTV GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>17A PTV Liner w/ Wool</b>	trace, dirty, high & low MW active samples	1.6 ID 4.0 OD x 95	225-09212-01	21705	21706	21707
Make-up Liner for Shimadzu GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	ea.	cat.# 5-pk.	25-pk.
 <b>Detector Make-up Liner</b>	FIDs, ECDs & misc. detectors	1.0 ID 5.0 OD x 75	—	20760	20761	—

\*Nominal ID at syringe needle expulsion point.

## Siltek® Treated Metal Inlet Liners for Shimadzu GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

**SILTEK®**  
deactivation



Liner Type (3.5mm ID x 5.0mm OD x 95mm)	qty.	cat.#
95mm Split/Splitless Siltek® Treated Metal Inlet Liners w/Wool	5-pk.	21003

**Viton® O-Rings for Shimadzu 17A, 2010, and 2014 GCs**

Description	Max. temp.	Similar to Shimadzu part #	qty.	cat.#
Viton® O-Rings for Shimadzu 17A, 2010, and 2014 GCs	250°C	036-11203-84	10-pk.	21477

**Graphite O-Rings for Shimadzu 17A, 2010, and 2014 GCs**

Description	Max. temp.	Similar to Shimadzu part #	qty.	cat.#
Graphite O-Rings for Split Liners	450°C	221-48393-91	5-pk.	20243
Graphite O-Rings for Splitless Liners	450°C	221-47222-91	5-pk.	20244

**Plug Septa for Shimadzu GCs**

Thermolite® Septa (useable to 340°C inlet temp.)		IceBlue™ Septa (useable to 250°C inlet temp.)		BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#	qty.	cat.#	qty.	cat.#
25-pk.	27153	50-pk.	27170	50-pk.	27118
50-pk.	27154	100-pk.	27171	100-pk.	27119
100-pk.	27155				

**Septum Nut for Shimadzu 17A, 2010, and 2014 GCs**

- One piece design for ease of installation and removal.
- Made of clear anodized aluminum and high-quality stainless steel.

Description	Similar to Shimadzu part #	qty.	cat.#
	221-41286-00		
Septum Nut for Shimadzu 17A, 2010, and 2014 GCs	221-44584-00	ea.	22079

**Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs**

- Includes 17A injector nut, 0.4mm graphite ferrule, and 1/16-inch stainless steel capillary nut.

Description	qty.	cat.#
Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs	kit	21895
Siitek® Treated Injector Nut Kit for Shimadzu 17A, 2010, and 2014 GCs	kit	22331

**Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs**

- Meets OEM performance.

Description	Similar to Shimadzu part #	qty.	cat.#
Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41533-00	2-pk.	22688

**Restek Enhanced Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs**

- Restek's design eliminates the slot, increasing lifetime and durability.
- Meets or exceeds OEM performance.

Description	Similar to Shimadzu part #	qty.	cat.#
Restek Enhanced Capillary Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41533-00	2-pk.	20375

**5mm Ferrules for Shimadzu 17A GCs**

- For use with packed columns.
- Graphite composition.

Description	qty.	cat.#
5mm Ferrules for Shimadzu 17A GCs	10-pk.	21121

**5mm Stainless Steel Uniliner® Liner Adaptor Fitting for Shimadzu Packed Column GCs**

Shimadzu GCs do not require a standard 1/4" Uniliner® liner adaptor because the injection port cavity will accept 5mm Uniliner® liners. This specially-designed fitting allows a Shimadzu packed column injection port to accept 0.53mm ID columns. Use a Shimadzu 5mm nut and ferrule to install the adaptor fitting into the injection port. Includes a 1/16-inch nut and 0.8mm ID graphite ferrule.

Description	qty.	cat.#
5mm Stainless Steel Uniliner® Liner Adaptor for Shimadzu Packed Column GCs (required for installing Uniliner® liners in 1/4" injection ports)	ea.	20312

**Injector Wrench for Shimadzu 17A, 2010, and 2014 GCs**

- Designed specifically for removing Shimadzu injection ports.
- High-quality stainless steel construction.



Description	Similar to Shimadzu part #	qty.	cat.#
Injector Wrench for Shimadzu 17A, 2010, and 2014 GCs	221-46977-00	ea.	21159

**Capillary Installation Gauge for Shimadzu 17A, 2010, & 2014 GCs**

- Seats ferrule onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Description	qty.	cat.#
Capillary Installation Gauge for Shimadzu 17A, 2010, and 2014 GCs	ea.	22333

**Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge**

Description	qty.	cat.#
3/4" x 5/16" and 10mm x 11mm Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge	ea.	22334

**MLE Capillary Tool Kit for Shimadzu GCs**

Includes:

- capillary installation gauge for Shimadzu GCs
- injector wrench for Shimadzu GCs
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insert tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat.#
MLE Capillary Tool Kit for Shimadzu GCs	kit	22182

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### kit

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat.#
Septum Puller	ea.	20117

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge**

Description	qty.	cat.#
$\frac{1}{4}$ " x $\frac{5}{16}$ " and 10mm x 11mm Open-End Wrench Set for use with Shimadzu 17A, 2010, and 2014 Capillary Installation Gauge	ea.	22334

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124





VespeL® ferrules

## VespeL® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## VespeL®/Graphite Ferrules

- 60%/40% VespeL®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	VespeL®	Graphite	VespeL®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	VespeL®	Graphite	VespeL®/Graphite
1/16"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	VespeL®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespel®/Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217

## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespel® or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## 5mm Ferrules for Shimadzu 17A GCs

- For use with packed columns.
- Graphite composition.

Description	qty.	cat.#
5mm Ferrules for Shimadzu 17A GCs	10-pk.	21121



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespel®/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespel®/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespel®/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.



## Vu2 Union™ Column Connectors



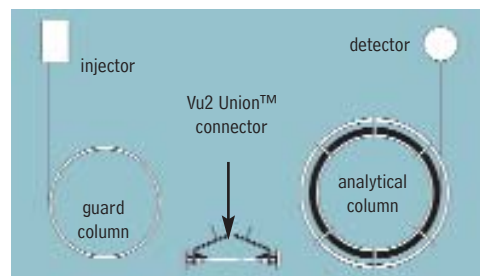
Patent pending.

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

A guard column connected to an analytical column by a Vu2 Union™ connector.



Secure, reliable  
column-to-column  
connections!

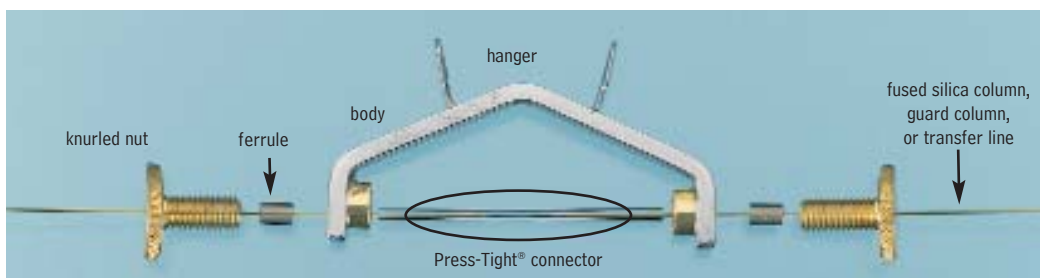
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

restek  
innovation!

### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

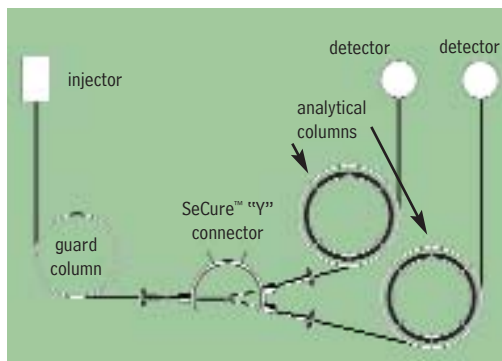
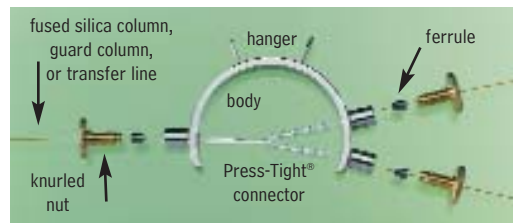
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



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## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481



## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



## Universal Angled "Y" Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled "Y" Press-Tight® Connector	20403	20404
Deactivated Universal Angled "Y" Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487	20469



## Universal "X" Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "X" Press-Tight® Connector	20407	20408
Deactivated Universal "X" Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal "X" Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat. #
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146



## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.



## did you know?

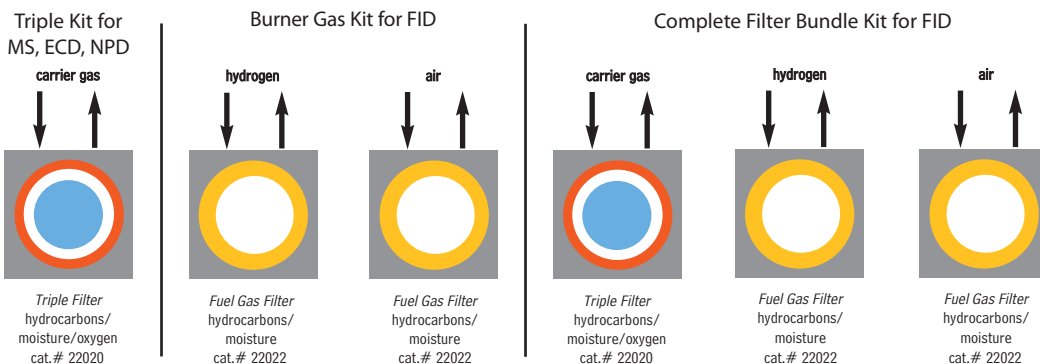
All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	>99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

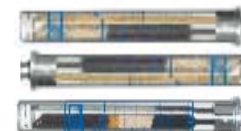
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833



## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.



Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

## please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel		
Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b>		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/8" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 19) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa) inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

## it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific Purifier Module

	qty.	1/4-inch Compression Tube Fittings		1/8-inch
		cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat.#
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat.#
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

Specifications	
Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat.#
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913
<b>Replacement Components for FID Gas Stations</b>		
Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat.# suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat.# 580051



## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648



## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

## cleaned

All tubing is cleaned and ready to use.

## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/32" OD	21500	21501	21502
0.02" ID	1/32" OD	21503	21504	21505
0.03" ID	1/32" OD	21506	21507	21508
0.04" ID	1/32" OD	21509	21510	21511
0.085" ID	1/8" OD	21512	21513	21514
0.21" ID	1/4" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

## GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

## Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

## Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

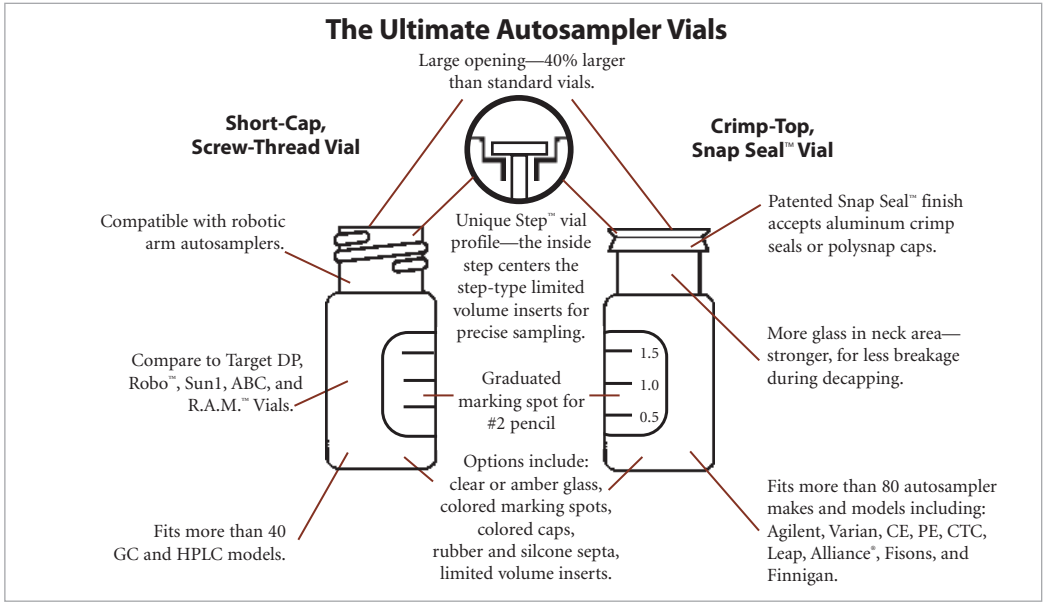


## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



**For a highly inert surface, we recommend Siltek® deactivation for your vials:**

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

instrument **reference**

Shimadzu Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	Headspace	8mm Screw-Thread	10mm Screw-Thread	WISP™ 48 Style
SIL-10A, 10Ai, 10AxiL	X	X		X	X	
AOC-8B/9, SIL-6A, SIL-6B, -9A, -8A				X		
AOC-14/1400, AOC-17				X		X
SIL-2AS						X
HSS-2B			X			



**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for new electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**instrument **reference******For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10AxL

## 8mm Screw-Thread Vials



8mm (2.0mL)  
Screw-Thread Vial

### Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread

#### Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

#### Screw-Thread Vials—12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

#### 8mm Pre-Assembled Caps and Septa

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

#### Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"*	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"*	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24636	24637

\*Best fit for Shimadzu.

#### Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately

##### (Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195



#### 8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177

#### Septa for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
8mm x 0.045" Red PTFE/Silicone	21178	21179
8mm x 0.065" Red PTFE/White Silicone	21795	21147

#### Limited Volume Inserts for 8mm/425 Screw-Thread Vials

Description	100-pk.	1000-pk.
100µL Glass w/ Polypropylene Bottom Spring	24508	21775
250µL Glass, Flat Bottom	—	24510
250µL Glass, Flat Bottom w/ ID Ring	—	24691
100µL Polypropylene, No Spring	24511	—
100µL Polypropylene, Bottom Spring	24512	—

#### Limited Volume Vials, 12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
100µL Polypropylene	24623	24624
100µL Glass Insert/Clear Plastic Vial*	24625	—

\*Amber glass/clear plastic available on request (1000 packs only).



Flat Bottom Limited  
Volume Insert w/ ID Ring

## instrument reference

### For 8mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	AOC-8B/9, SIL-6A, AOC14/1400, AOC-17, SIL-6B, -9A, -8A, SIL-10A, 10Ai, 10AxL

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

#### Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

### 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10Axi

### Screw-Thread Vials, 12 x 32mm, 10mm/425 Thread, Big Mouth Step™ Design

- 40% larger opening than other vials.
- Step™ profile automatically centers glass flange limited volume inserts.
- Pre-assembled caps with septa, with or without vials.
- Designed for Waters Alliance® autosamplers.

The Big Mouth Step™ Vial System has a larger ID than conventional vials and incorporates a neck finish that is uniquely designed to allow the insert to be precisely aligned in the center of the vial. This precise alignment provides maximum sample withdrawal and eliminates any chance of missed injections. All vials with the large opening are designed with the Step™ Vial System.

### Big Mouth Step™ Screw-Thread Vials (12 x 32mm, 10mm/425 Thread)

Description	100-pk.	1000-pk.
2.0mL Clear Step™ Vial, White Graduated Marking Spot	24626	24627
2.0mL Amber Step™ Vial, White Graduated Marking Spot	24628	24629



### 10mm Pre-Assembled Big Mouth Step™ Vial Kits (w/Black Cap)

Caps attached to vials.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, PTFE/Silicone/Red PTFE Septa, 0.040"	24675	24676
2.0mL Clear Vial, Red PTFE/Silicone Septa, 0.065"	24642	24643
2.0mL Amber Vial, Red PTFE/Silicone Septa, 0.065"	24644	24645

## instrument reference

### For 10mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Shimadzu	SIL-10A, 10Ai, 10Axi



4.0mL Clear Step™ Vial

**Screw-Thread Step™ Vials, 4.0mL, WISP™ 48 Style, 13mm/425 Screw-Thread****WISP™ 48 Screw-Thread Step™ Vials (15 x 45mm, 13/425 Screw-Thread)**

Description	100-pk.	1000-pk.
4.0mL Clear Step™ Vial, White Grad. Marking Spot	24654	24655
4.0mL Amber Step™ Vial, White Grad. Marking Spot	24656	24657

**Caps and Septa**

Description	100-pk.	1000-pk.
Top Hat™, PTFE/Silicone Septa	21745	21746
Pre-Assembled, Red PTFE/Silicone, 0.065"	21743	21744
Caps, Black, Polypropylene, Open-Hole	21741	21742
Septa, Red PTFE/Silicone, 0.040"	21751	21752
Septa, Red PTFE/Silicone, 0.060"	21749	21750

**Limited Volume Inserts**

Description	100-pk.	1000-pk.
500µL, Glass, WISP™, Flat Bottom*	21787	21788

\*Also fit 4.0mL Snap Seal™ Vials (see our general catalog or website).

**instrument reference****For WISP™ 48 Style Vials**

Shimadzu AOC-14/1400, AOC-17, SIL-2AS

Manufacturer	Instrument/Model #
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**Headspace Vials****Headspace Autosampler Vials**

Description	100-pk.	1000-pk.
2mL Clear Vial	21160	21161

**For Headspace Vials**

Manufacturer	Instrument/Model #
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Shimadzu HSS-2B

**20mm Aluminum Seals w/Septa, Assembled**

Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.



**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one. . .



two. . .



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK



## Syringe Overview

### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for Shimadzu GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 10µL Autosampler Syringe

**Hamilton Syringes for Shimadzu AOC 9 GCs**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		Restek
					Model	cat.#	cat.#
5µL	RN	26s	2"/51mm	2	75RN	87930	24617
5µL	N	26s	2"/51mm	2	75N	87900	24938
10µL	RN	26s	2"/51mm	2	701RN	80330	24530



SGE 5µL Autosampler Syringe

**SGE Syringes for Shimadzu AOC 14, 17, 20, and 20i GCs**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		Restek
					Model	cat.#	cat.#
0.5µL	R	23	42mm	Cone	0.5BR-S-0.63	000445	24841
0.5µL	R	26	42mm	Cone	0.5BR-S-0.47	000440	24840
5µL	F	23	42mm	Cone	5F-S-0.63	001988	24843
5µL	F	26	42mm	Cone	5F-S-0.47	001987	24842
10µL	R	23	42mm	Cone	10R-S-0.63	002898	24845
10µL*	R	23	42mm	Cone	10R-S-GT-0.63	002902	24846
10µL	R	26	42mm	Cone	10R-S-0.47	002897	24844
250µL*	F	23	42mm	Cone	250F-S-GT-0.63	006682	24847

\*Gas-Tight

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

**Replacement Needles for Shimadzu Autosampler Syringes****Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	42mm	Cone	033745	ea.	24747
0.5µL	26	42mm	Cone	033738	ea.	24746
10µL	23	42mm	Cone	037747	2-pk.	24749
10µL	26	42mm	Cone	037745	2-pk.	24748

## Standard Microliter Volume Syringes

### Standard Microliter Volume Syringes

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek
					Model	cat.#		cat.#
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek
					Model	cat.#		cat.#
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 36.

\*\*With plunger protection.



**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler  
 Cemented Needle  
 (ASRN) Autosampler  
 Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented  
 Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 36.

## Gas-Tight Syringe Replacement Needles

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

### Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

#### Needles for Hamilton Syringes

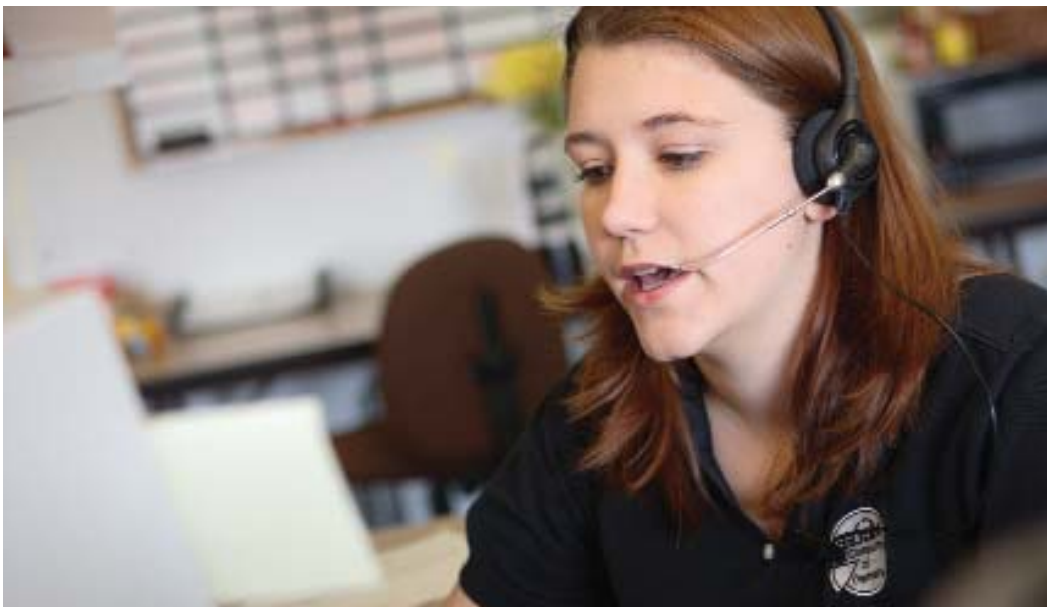
Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

#### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.



## In the U.S.

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Monday–Friday 8:00 a.m.–6:00 p.m.  
Eastern Standard Time

**Fax:** 814-353-1309—24-hours a day

**Online:** [www.restek.com](http://www.restek.com)—24-hours a day

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Refer to our website at [www.restek.com](http://www.restek.com)



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Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

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We're the most dedicated chromatography company you'll ever do business with.

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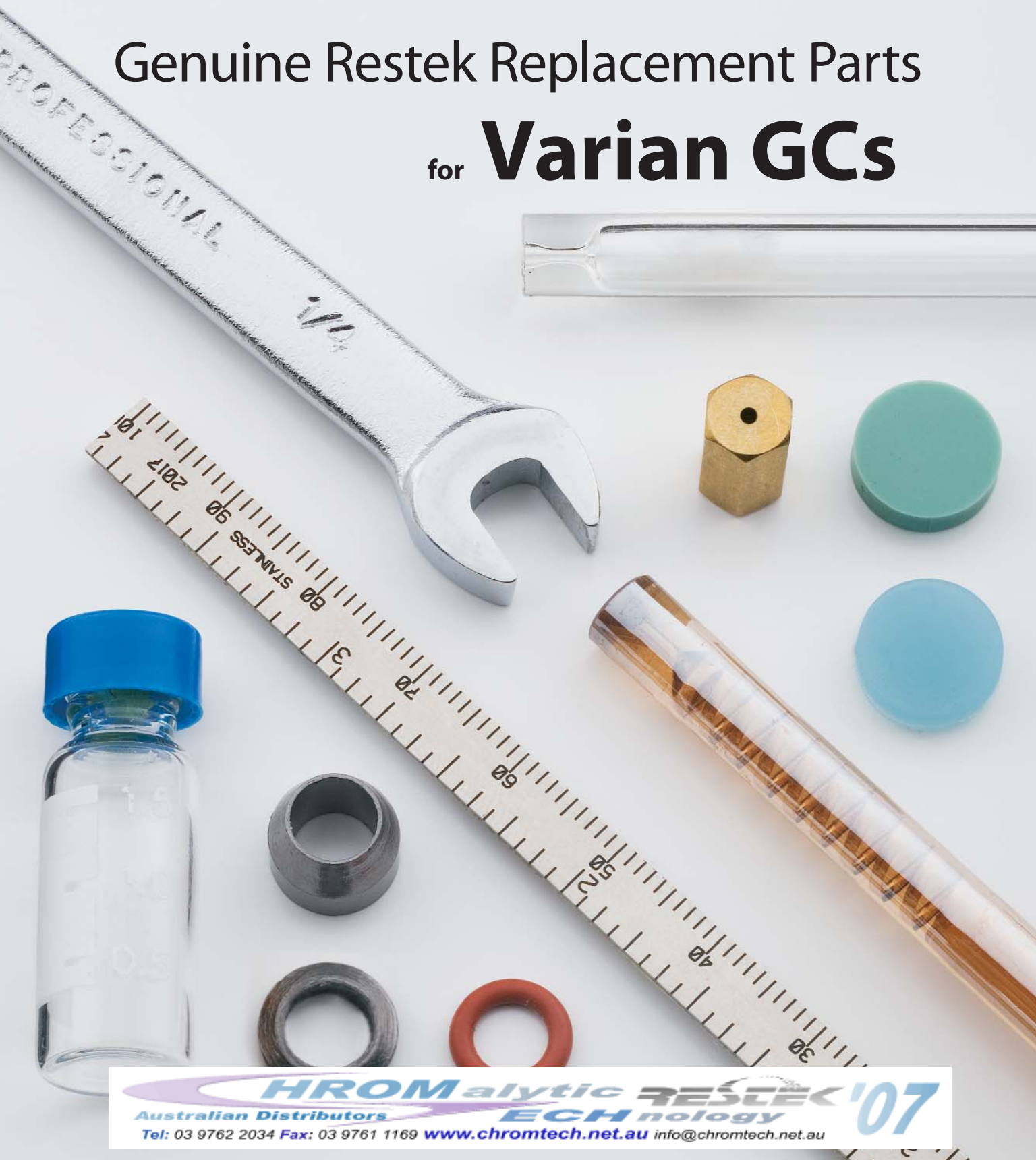


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# From Injector to Detector

Restek is your #1 source for consumables and supplies for Varian GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.

Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.



### it's a fact

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.



Small, compact unit—  
easy to hold and  
operate.

## Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

## How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

## tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

## Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

## Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

## tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner with Wool		Siltek® Liner with CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/ Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)



## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.

Description	qty.	cat.#
Deactivated Wool	10 grams	24324



### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat.#
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

Insert and remove wool plugs easily.  
Order a spare pack so you'll always have one available.

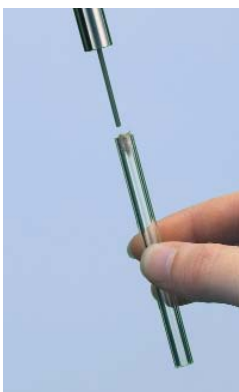


Description	qty.	cat.#
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.

Description	qty.	cat.#
Inlet Liner Packing Tool	ea.	20339



Eliminates user variation!



### Prepacked Inlet Liners

Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-inserter tool listed below.\*

Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

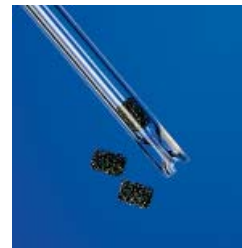
**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™) packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!











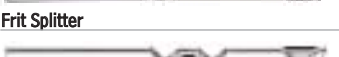
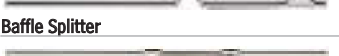








Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181

**tech tip****Use of Packings with Splitless Liners**

We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners
















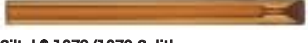



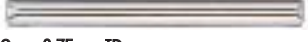

COLUMN INSTALLS THIS END

Splitless Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	2mm Splitless	trace samples <2µL	2.0 ID 6.3 OD x 74	01-900109-05	20721	20722	20723
	4mm Splitless	trace samples >2µL	4.0 ID 6.3 OD x 74	01-900109-05	20904	20905	20906
	Double Gooseneck	trace, active samples up to 4µL	4.0 ID 6.3 OD x 74	—	20847	20848	20849
	Cyclo Double Gooseneck	trace, dirty, active samples up to 4µL	4.0 ID 6.3 OD x 74	—	20897	20898	—
Split Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	1mm Split	purge & trap inlet splitting or samples <1µL	1.0 ID 6.3 OD x 72	—	20970	20971	—
	Splitter w/ Wool	universal, use with rapid autosamplers	4.0 ID 6.3 OD x 72	01-900109-01	20792	20793	20794
	Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 72	01-900109-02	20803	20804	—
	Cup Splitter	high & low MW compounds	4.0 ID 6.3 OD x 72	—	20724	20725	—
	Cycloplitter*	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 72	—	20727	20728	—
	Frit Splitter	dirty samples, non-active compounds	4.0 ID 6.3 OD x 72	01-900109-03	20715	20716	20717
	Baffle Splitter	compounds with close boiling points	4.0 ID 6.3 OD x 72	01-900109-04	20718	20719	20720
	Split Precision* Liner w/ Wool	dirty samples, active samples	4.0 ID 6.3 OD x 72	—	21030	21031	—
DI Liners for Varian 1075/1077 GCs (0.32/0.53mm ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	Uniliner*	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	—	20345	20346	—
	Cyclo-Uniliner*	trace, dirty, high MW, active samples, linearity	4.0 ID 6.3 OD x 72	—	20347	20348	—
	Open-top Uniliner* w/ Wool	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.3 OD x 72	—	20845	20846	—
SPME Liners for Varian 1075/1077 GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	SPME Liner	ideal for low-volume SPME applications	0.75 ID 6.30 OD x 74	—	21112	21113	—
SPI Liners for Varian GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
	0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	01-900109-06	20775	20776	20777
	Siltek* 0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	—	20775-214.1	20776-214.5	20777-214.25
	0.8mm SPI	high linearity for 0.53mm ID columns	0.80 ID 4.6 OD x 54	01-900109-07	20778	20779	20780
	SPI with Buffer	dirty samples >1µL, fits 0.25, 0.32 & 0.53mm ID columns	2.4 ID 4.6 OD x 54	01-900109-08	20850	20851	20852

\*Nominal ID at syringe needle expulsion point.


All liners are  
**100%**  
deactivated

All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

Liners for Varian 1177 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
 4mm Split w/Glass Frit	universal	4.0 ID 6.3 OD x 78.5	39-26119-36	21045	21046	—
 4mm Split w/ Wool	universal	4.0 ID 6.3 OD x 78.5	39-26119-34	—	21079	—
 4mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	20759	20762	—
 Low Pressure Drop Precision™ Liner w/ Wool	trace samples <2μL, dirty samples	2.0 ID 6.3 OD x 78.5	—	22421	22422	—
 Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 78.5	—	20765	20768	—
 2mm Splitless w/ Wool	trace samples <2μL	2.0 ID 6.5 OD x 78.5	39-26119-38	—	21077	—
 Gooseneck Splitless (4mm)	trace samples <2μL	4.0 ID 6.5 OD x 78.5	39-26119-27	21896	21897	—
 Siltek® Gooseneck Splitless (4mm)	trace samples <2μL	4.0 ID 6.5 OD x 78.5	—	21896-214.1	21897-214.5	—
 Gooseneck Splitless (4mm) w/ Wool	trace samples <2μL	4.0 ID 6.5 OD x 78.5	39-26119-36	21896-200.1	21897-200.5	—
 Siltek® Gooseneck Splitless (4mm) w/ Wool	trace samples <2μL	4.0 ID 6.5 OD x 78.5	—	21896-213.1	21897-213.5	—
 Double Gooseneck Splitless (4mm)	trace, active samples <2μL	4.0 ID 6.5 OD x 78.5	—	21891	21892	—
DI Liners for Varian 1177 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.	
 Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21470	21471	
 Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21468	21469	
Liners for Varian 1078/1079 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	ea.	cat.# 5-pk.	25-pk.
 1078/1079 Split w/ Frit	dirty samples, non-active compounds	3.4 ID 5.0 OD x 54	03-918464-00	21708	21709	—
 1078/1079 Splitless	trace samples <2μL	2.0 ID 5.0 OD x 54	03-918466-00	21711	21712	—
 Siltek® 1078/1079 Splitless	trace samples <2μL	2.0 ID 5.0 OD x 54	—	21711-214.1	21712-214.5	—
 Open 0.5mm ID	trace samples <1μL	0.5 ID 5.0 OD x 54	03-925331-00	20992	20993	—
 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	392611945	20859	20901	20909
 Siltek® 1078/1079 Split-No Frit	active samples	3.4 ID 5.0 OD x 54	—	20859-214.1	20901-214.5	20909-214.25
 Open 0.75mm ID	trace, low volume samples	0.75 ID 5.0 OD x 54	03-925330-00	21714	21715	21716
 1078/1079 Split Precision™ Liner w/ Wool	dirty samples, trace samples	3.4 ID 5.0 OD x 54	—	21024	21025	—

\*Nominal ID at syringe needle expulsion point.

ordering **note**For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.All liners are  
**100%**  
deactivatedAll liners are shipped intermediate polarity (IP)  
deactivated unless otherwise requested.

DI Liners for Varian 1078/1079 GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.
	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 54	—	22280	22281

Drilled Uniliner® (hole on bottom)

\*Nominal ID at syringe needle expulsion point.

## tech tip

### DI Liners for Varian 1078/1079 GCs (for 0.25/0.32/0.53mm ID Columns)

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

### Siltek® Treated Metal Inlet Liners for Varian GCs

- Won't crack, chip or break like glass liners.
- Inertness equivalent to glass liners.
- Excellent response for pesticides, phenols, and other active compounds.

Liner Type (3.8mm ID x 5.0mm OD x 54mm)	qty.	cat.#
Split/Splitless	5-pk.	20711
Splitless Gooseneck	5-pk.	21002

### Inlet Liner Seals for Varian 1177 Injectors

- Meets or exceeds OEM performance.

Description	Max. temp.	Similar to Varian part #	Restek cat.# 10-pk.	Restek cat.# 50-pk.
6.35mm ID Graphite O-rings for split liners	450°C	—	20296	20297
6.5mm ID Graphite O-rings for splitless liners	450°C	39-26119-40	20298	20299

### Liner Seals for Varian 1078/1079

Description	Max. temp.	Similar to Varian part #	qty.	cat.#
5mm Graphite Liner Seals for Varian 1078/1079 GCs	450°C	392611919 392534201	10-pk.	22683

### Septa for Varian GCs

- Precision molding assures consistent, accurate fit.
- Preconditioned and ready to use.
- Do not adhere to hot metal surfaces.
- Packaged in non-contaminating glass jars.

Septum Diameter	25-pk.	50-pk.	100-pk.
<b>Thermolite® Septa (useable to 340°C inlet temp.)</b>			
9mm	27132	27133	27134
9.5mm (7/8")	27135	27136	27137
10mm	27138	27139	27140
11mm (7/16")	27141	27142	27143

<b>IceBlue™ Septa (useable to 250°C inlet temp.)</b>			
9mm	—	27156	27157
9.5mm (7/8")	—	27158	27159
10mm	—	27160	27161
11mm (7/16")	—	27162	27163

<b>BTO® Septa (useable to 400°C inlet temp.)</b>			
9mm CenterGuide™	—	27104	27105
9.5mm (7/8")	—	27106	27107
10mm	—	27108	27109
11mm (7/16") CenterGuide™	—	27110	27111

**HANDY**  
septum size chart

Injector Type	Septum Diameter (mm)
Packed Column	9.5/10
Split/Splitless 1078/1079	10/11
1177	9
1075/1077	11

### Stainless Steel Septum Nuts for Varian GCs

- Maintain a sharper knife edge longer than the original equipment aluminum design.
- Greatly minimize septum fragmentation and increase septum lifetime.

Description	Similar to Varian part #*	qty.	cat.#
26 Gauge Needle Guide Septum Nut	03-949666-01	ea.	21310
Standard Stainless Steel Septum Nut	03-949666-01	ea.	21304

\*Similar to Varian part # 03-949666-01, except Restek nuts are not equipped with remote-start capabilities.



### Capillary Nuts for Varian GCs

- Choose brass (<200°C) or stainless steel (>200°C) replacement nuts.

Description	Similar to Varian part #	qty.	cat.#
Brass Capillary Nuts	03-949551-00	2-pk.	20881
Stainless Steel Capillary Nuts	03-949551-00	2-pk.	20882



### Siltek® Treated Inlet Support Springs for Varian 1075/1077 Split Injectors

- Siltek® treated to eliminate sample adsorption.

Description	Similar to Varian part #	qty.	cat.#
Siltek® Treated Inlet Support Springs for Varian	03-949786-00	3-pk.	21690



### Capillary Installation Gauge for Varian GCs for use with 1/16" ferrules

- Seats ferrule\* onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.



Description	qty.	cat.#
Capillary Installation Gauge for Varian GCs for use with 1/16" ferrules	ea.	22335

\*Recommended for use with graphite ferrules.

### MLE Capillary Tool Kit for Varian GCs

Includes:

- capillary installation gauge for Varian GCs
- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insert tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat.#
MLE Capillary Tool Kit for Varian GCs	kit	22184

restek  
innovation!

Change columns in  
minutes—without  
venting!

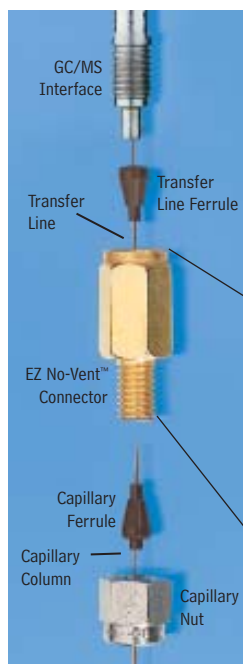
### EZ No-Vent™ GC Column-Mass Spectrometer Connector

- Change GC/MS columns in minutes without venting—100µm transfer line throttles vacuum and prevents venting.
- Easy to install and maintain—no special tools or plumbing required.
- Gold-plated body for inertness.
- Deactivated transfer line keeps analytes focused; high-temperature polyimide ferrules eliminate leaks at the problematic transfer line fitting.
- Lower cost than other “no-vent” fittings.
- For Varian Saturn 2000 Series Mass Spectrometers.

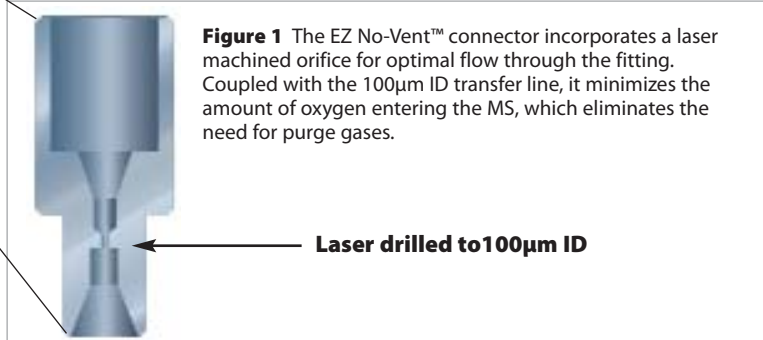
We designed the EZ No-Vent™ GC column-mass spectrometer connector to be simple and easy to use. A critical orifice in the EZ No-Vent™ connector minimizes the amount of oxygen allowed into the MS source, eliminating the need for purge gas and enabling you to skip the lengthy vent and pump-down cycle otherwise required when you make a column change. This can save nearly a day of downtime with each column change. The EZ No-Vent™ connector easily attaches to the MS source without special tools or extra plumbing.



**Kelli Steindl**  
GC Accessories Associate  
Product Marketing  
Manager  
2+ years of service!



Kit installs easily,  
without special tools  
or plumbing.



**Figure 1** The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Description	qty.	cat.#
EZ No-Vent™ Connector Kit for Varian Saturn 2000 Series MSs Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.	kit	22423
Replacement ferrules for connecting capillary column to EZ No-Vent™ Connector:		
0.4mm ID (Polyimide)	2-pk.	21015
0.5mm ID (Polyimide)	2-pk.	21016
Replacement ferrules for connecting transfer line to EZ No-Vent™ Connector: 0.4mm ID	2-pk.	21043
Replacement 100µm deactivated transfer line	3 ft.	21018
Replacement EZ No-Vent™ Column Nut	5-pk.	21900
Replacement EZ No-Vent™ Plug	2-pk.	21915
Open-End Wrenches (1/4" x 5/16")	2-pk.	20110

**Capillary Inlet Guide Kit for Varian GCs**

- Use as a replacement for Varian 1075 and 1077 split/splitless injectors.
- Use inexpensive 1/16-inch fittings instead of a non-standard nut.
- Quick and simple installation.
- Ideal for two-hole ferrule installation.

Two 0.25 or 0.32mm ID capillary columns can be inserted into a standard 1/16-inch type capillary fitting. The two-hole ferrule positions the column squarely inside 2 or 4mm ID splitless liners. (Use recessed-taper double-gooseneck liners for dual column analysis.) Complete kit includes splitter guide, 1/4-inch nut, 1/4-inch Vespel®/graphite ferrule, and a 1/16-inch nut and ferrule.

Description	Similar to Varian part #	qty.	cat.#
Inlet Guide Kit	03-908358-00	kit	20502



Save time and money with Restek's inlet splitter guide for Varian GCs!

**Low-Volume Injector for Varian Split/Splitless Inlets**

- Attaches to the GC inlet without cutting existing injection port lines.
- Allows injections from a syringe onto the column for purge & trap troubleshooting or calibration.
- Siltek® treatment eliminates adsorption of active compounds.
- Order capillary ferrules separately.

Description	qty.	cat.#
Low-Volume Injector for Varian Split/Splitless GC Inlets	kit	21693

**Rethreading Tool**

- Repair worn or damaged threads.
- Multiple uses (injection ports, fittings, etc.).
- Built-in guide to prevent cross-threading.



Description	qty.	cat.#
Rethreading Tool for 7/16" compression fitting (Varian injection ports)	ea.	23019
Rethreading Tool for 1/4" Varian-style capillary column fittings	ea.	21893



Make your injection port threads like new!

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.

Maintenance Kit for  
Shortix® Capillary GC  
Column Cutter



### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

### qty.

kit

### cat.#

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

**Flashlight with Swivel Head**

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).

Description	qty.	cat.#
Flashlight with Swivel Head	ea.	22187

**High-Temperature String**

- Withstands temperatures to 400°C.
- Use to restraining capillary columns, attach column connectors to column cages, or hold a column in the GC oven.

Description	qty.	cat.#
High-Temperature String	10m	20109
High-Temperature String	450m	20618

**Stainless Steel Jet Reamers**

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat.#
Stainless Steel Jet Reamers	6-piece set	20113

**Open-End Wrench Set**

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat.#
Open-End Wrench Set	set	20387

**Open-End Wrenches**

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat.#
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455

**Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.

Description	qty.	cat.#
Septum Puller	ea.	20117

**Pocket Magnifier**

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat.#
Pocket Magnifier	ea.	20124



## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.



Vespel® ferrules

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/16"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223



## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespe <sup>®</sup> /Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217



## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespe <sup>®</sup> /Graphite
1/16"	no hole	10-pk.	20240

Teflon<sup>®</sup> Ferrules

- Upper temperature limit 250°C.
- 100% Teflon<sup>®</sup>; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/4"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128

Alumaseal<sup>™</sup> Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespe<sup>®</sup> or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespe<sup>®</sup>/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespe<sup>®</sup>/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespe<sup>®</sup>/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal<sup>™</sup> ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

## Vu2 Union™ Column Connectors



Patent pending.

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

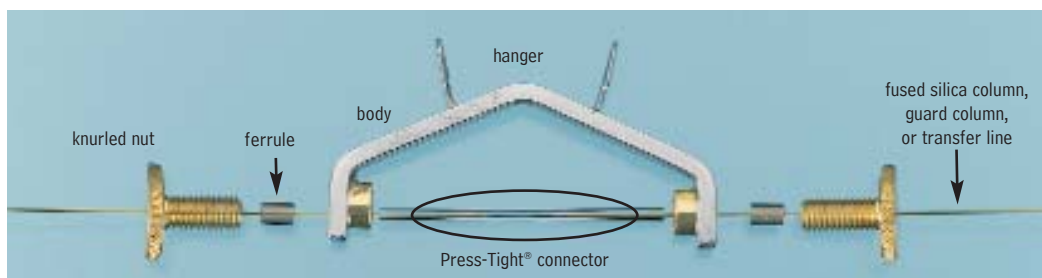
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108

### Universal Press-Tight® Connectors

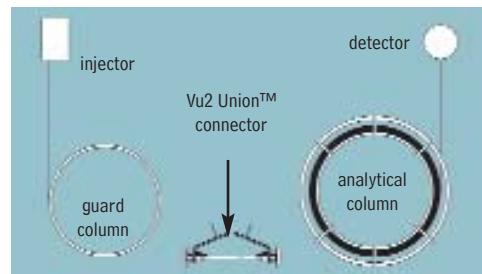
Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

A guard column connected to an analytical column by a Vu2 Union™ connector.



Secure, reliable  
column-to-column  
connections!



restek  
innovation!

### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

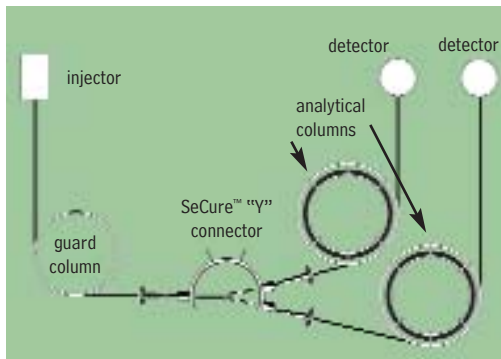
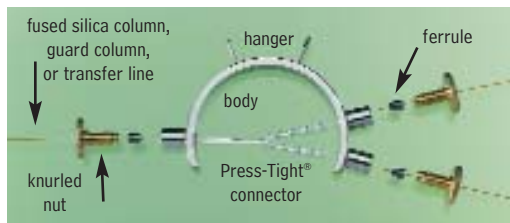
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486

### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



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## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481



## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal "Y" Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



## Universal Angled "Y" Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled "Y" Press-Tight® Connector	20403	20404
Deactivated Universal Angled "Y" Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled "Y" Press-Tight® Connector	20487	20469



## Universal "X" Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "X" Press-Tight® Connector	20407	20408
Deactivated Universal "X" Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal "X" Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat.#
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146



# Super-Clean™ Gas Filter System



## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

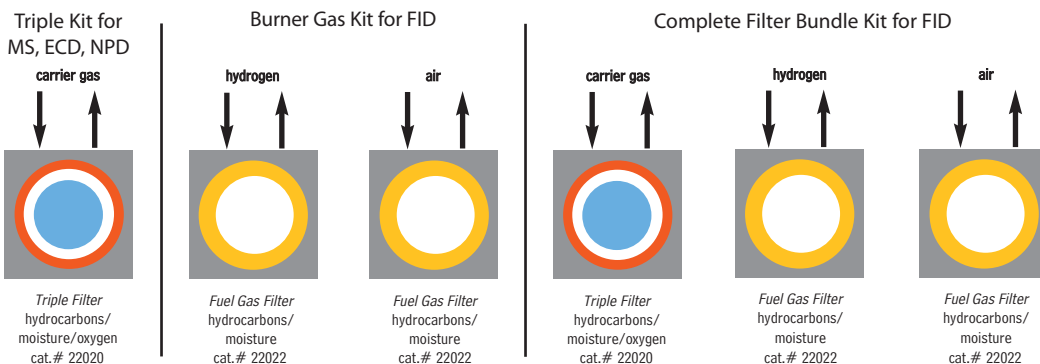
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## tech tip

### Oxygen and Moisture Traps

We highly recommend oxygen and moisture traps for make-up gas when operating sensitive detectors such as electron capture detectors (ECD). The hydrogen reaction gas for sensitive electrolytic conductivity detectors (ELCD) also requires a hydrocarbon trap, to remove trace impurities.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure:  
10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>" (27 x 4.4 cm)  
Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

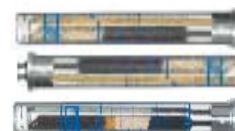
**Replacement Filters**

Description	qty.	cat.#
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat.#
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat.#
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat.#
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat.#
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat.#
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat.#
1/8" to 1/4" Tube-End Unions	5-pk.	21833





## Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

## please note

NOTE: Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

## Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel		
Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass		
Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel		
Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass		
Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel		
Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass		
Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel		
Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass		
Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b> Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481





Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 22) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

## VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa)	
inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

## it's a fact

The nitrogen module is excellent for LC/MS systems.

### Gas-Specific Purifier Module

	qty.	1/4-inch		Compression Tube Fittings	
		cat.#		qty.	1/8-inch cat.#
Helium Purifier Module	ea.	22600		ea.	22601
Hydrogen Purifier Module	ea.	22602		ea.	22603
Nitrogen Purifier Module*	ea.	22604		ea.	22605
Air Purifier Module	ea.	22606		ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

## Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011

## High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600

## High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.



Dimensions: 13" x 2"  
(33 x 5.1 cm)

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our *FID Gas Stations Fast Facts* from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

## Ultra-High-Purity Chrome-Plated Brass Line Regulator

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20psi or more.
- Same purity protection as high-pressure cylinder regulators.

Inlet connections: 1/4" FPT  
 Outlet assembly: 1/4" FPT port

Fitting	Outlet Gauge	Outlet Pressure	qty.	cat.#
1/4" female NPT ports*	30" - 0 to 100psig	0-50psig	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig	0-100psig	ea.	22452

\*Order appropriate male connector, pipe-to-tube fittings.

## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
ID (in.)	OD (in.)	25 Feet	26–100 Feet	> 100 Feet*
0.01" ID	1/16" OD	cat.# 21500	cat.# 21501	cat.# 21502
0.02" ID	1/16" OD	cat.# 21503	cat.# 21504	cat.# 21505
0.03" ID	1/16" OD	cat.# 21506	cat.# 21507	cat.# 21508
0.04" ID	1/16" OD	cat.# 21509	cat.# 21510	cat.# 21511
0.085" ID	1/8" OD	cat.# 21512	cat.# 21513	cat.# 21514
0.21" ID	1/4" OD	cat.# 21515	cat.# 21516	cat.# 21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592



## ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

## GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.

Description	qty.	cat.#
GC Installation Kit	kit	21325



## 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.

Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185



## Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.

Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012



## Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134



## Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

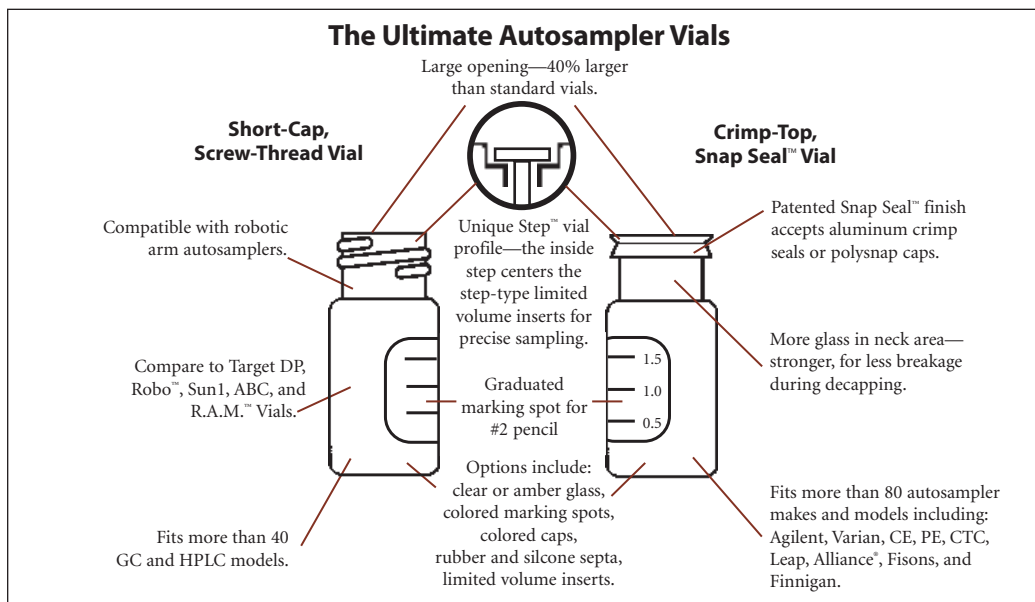


## 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.

Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193





#### For a highly inert surface, we recommend Siltek® deactivation for your vials:

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

#### instrument reference

Varian/Rainin / Varian Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	Headspace	8mm Screw-Thread	10mm Screw-Thread
Dynamax AI-1A, AI-200, Dynamax AI-3	X				
DynamaxAI-3AI-1A, AI-2W				X	
8100/8200	X	X		X	X
Marathon	X	X		X	
9100/9090/9095	X			X	
8035, 8000 series, 8055, 8085, 3800 GC					X
Genesis			X		

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 32** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

instrument **reference****For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
Varian/Rainin	Dynamax AI-IA, AI-200, Dynamax AI-3
Varian	8100/8200, 9100/9090/9095, Marathon

## 8mm Screw-Thread Vials



8mm (2.0mL) Screw-Thread Vial

### Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread

#### Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

#### Screw-Thread Vials—12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

#### 8mm Pre-Assembled Caps and Septa

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

#### Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"*	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"*	24636	24637

\*Best fit for Varian.

#### Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately

##### (Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195

#### 8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177

#### Septa for 8mm Screw-Thread Vials

Description	100-pk.	1000-pk.
8mm x 0.045" Red PTFE/Silicone	21178	21179
8mm x 0.065" Red PTFE/White Silicone	21795	21147

#### Limited Volume Inserts for 8mm/425 Screw-Thread Vials

Description	100-pk.	1000-pk.
100μL Glass w/ Polypropylene Bottom Spring	24508	21775
250μL Glass, Flat Bottom	—	24510
250μL Glass, Flat Bottom w/ ID Ring	—	24691
100μL Polypropylene, No Spring	24511	—
100μL Polypropylene, Bottom Spring	24512	—



Limited Volume Insert

#### Limited Volume Vials, 12 x 32mm, 8mm/425 Thread

Description	100-pk.	1000-pk.
100μL Polypropylene	24623	24624
100μL Glass Insert/Clear Plastic Vial*	24625	—

\*Amber glass/clear plastic available on request (1000 packs only).



Limited Volume Vial

## instrument reference

### For 8mm Screw-Thread Vials

Manufacturer	Instrument/Model #
Varian/Rainin	Dynamax AI-3AI-IA, AI-2W
Varian	8100/8200, 8035, 8000 Series, Marathon, 8055, 8085, 9100/9090/9095, 3800 GC

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

instrument **reference****For 9mm Short-Cap, Screw-Thread Vials**

Manufacturer	Instrument/Model #
Varian	8100/8200, Marathon

**Screw-Thread Vials, 12 x 32mm, 10mm/425 Thread, Big Mouth Step™ Design**

- 40% larger opening than other vials.
- Step™ profile automatically centers glass flange limited volume inserts.
- Pre-assembled caps with septa, with or without vials.
- Designed for Waters Alliance® autosamplers.

The Big Mouth Step™ Vial System has a larger ID than conventional vials and incorporates a neck finish that is uniquely designed to allow the insert to be precisely aligned in the center of the vial. This precise alignment provides maximum sample withdrawal and eliminates any chance of missed injections. All vials with the large opening are designed with the Step™ Vial System.

**Big Mouth Step™ Screw-Thread Vials (12 x 32mm, 10mm/425 Thread)**

Description	100-pk.	1000-pk.
2.0mL Clear Step™ Vial, White Graduated Marking Spot	24626	24627
2.0mL Amber Step™ Vial, White Graduated Marking Spot	24628	24629

**10mm Pre-Assembled Big Mouth Step™ Vial Kits (w/Black Cap)**

Caps attached to vials.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, PTFE/Silicone/Red PTFE Septa, 0.040"	24675	24676
2.0mL Clear Vial, Red PTFE/Silicone Septa, 0.065"	24642	24643
2.0mL Amber Vial, Red PTFE/Silicone Septa, 0.065"	24644	24645

instrument **reference****For 10mm Screw-Thread Vials**

Manufacturer	Instrument/Model #
Varian	8100/8200



Ideal for autosamplers that process 12 x 32mm crimp-top vials.





## Headspace Vials

### Headspace Autosampler Vials

Description	100-pk.	1000-pk.
10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Rounded Bottom	21162	21163

## instrument **reference**

### For Headspace Vials

Manufacturer	Instrument/Model #
Varian	Genesis

### 20mm Aluminum Seals w/Septa, Assembled



Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.

### Hand-held Rechargeable Crimpers and Rechargeable Decappers



- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.

### Decapping has never been easier!

one...



two...



three!



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

## Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

## did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

## Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

## Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

## Autosampler Syringes for Varian 8000 Series GCs

### Guide to Needle Termination Codes

#### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

#### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip



Hamilton 10µL Autosampler Syringe

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
<b>Varian 8100/8200 Syringes</b>								
10µL	RN	26s	1.99"	5	701 Varian	202880	ea.	24956



SGE 10µL Autosampler Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
<b>Varian 8000 Syringes</b>								
10µL	R	25	50mm	Dome	10R-VA80-II	002926	ea.	24850

### Varian 8035, 8100, & 8200 Syringes

10µL	F	25	53mm	S/Hole	10F-VA8X-11	002923	ea.	24851
10µL	R	25	53mm	S/Hole	10R-VA8X-II	002924	ea.	24852
100µL	R	25	53mm	S/Hole	100R-VA8X	005921	ea.	24853

### Varian CP 8400, CP8410 Syringes

10µL	F	26	50mm	Cone	10F-C/F-5/0.47C	002980	ea.	24922
10µL	F	26	50mm	Bevel	10F-VA8400-5/0.47	002950	ea.	21202

## Replacement Needles for Varian 8000 Series Autosampler Syringes



### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
10µL	23	53mm	S/Hole	037779	2-pk.	24857
10µL	25	53mm	S/Hole*	037780	ea.	24858
10µL	25	53mm	S/Hole**	037777	ea.	24854
10µL	25	53mm	2	037776	2-pk.	24855

\*straight needle shaft, 0.20mm ID needle, for use with viscous samples

\*\*tapered needle shaft, 0.12mm ID needle

**Standard Microliter Volume Syringes**

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton		qty.	Restek cat. #
					Model	cat. #		
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE		qty.	Restek cat. #
					Model	cat. #		
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713



\*For replacement RN/R needles, see page 37.

\*\*With plunger protection.

## Teflon® Tip, Gas-Tight Syringes

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

### Guide to Needle Termination Codes

#### Hamilton:

(N) Cemented Needle  
(RN) Removable Needle  
(ASN) Autosampler  
Cemented Needle  
(ASRN) Autosampler  
Removable Needle  
(TLL) Teflon® Luer Lock  
(KH) Knurled Hub  
(LT) Luer Tip  
(LTN) Luer Tip Cemented  
Needle

#### SGE:

(F) Fixed Needle  
(R) Removable Needle  
(LL) Luer Lock  
(LT) Luer Tip

### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat. #	qty.	Restek cat. #
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717



SGE Gas-Tight Syringe

### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat. #	qty.	Restek cat. #
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 37.

**Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes**

Materials: stainless steel needle, nickel plated brass hub

**Needles for Hamilton Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

**Needles for SGE Syringes**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

**Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes****Needles for Hamilton Syringes**

Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

**Needles for SGE Syringes**

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*For Waters U6K injection valve.

\*\*For Rheodyne®/Valco® valves.

# Restek is here for you



Our customers love us because we're dedicated to making their lives easier by providing:

- Innovative **products**  
because we're focused on columns and supplies, not instruments
- Meaningful **solutions**  
for analytical chemists from our world class chromatographers
- Unsurpassed **service**  
from a small company that takes every customer and every order seriously

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We're the most dedicated chromatography company you'll ever do business with.

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**for PerkinElmer GCs**

This image displays a variety of components used in gas chromatography systems, specifically for PerkinElmer models. The parts include:

- A long, clear glass or quartz tube.
- A copper-colored Y-shaped fitting.
- A green circular seal or cap.
- A black conical component.
- A black O-ring.
- An orange O-ring.
- A red O-ring.
- A blue circular seal or cap.
- A grey metal ring.
- A stainless steel needle or probe with a threaded base.
- A white plastic sleeve or connector.
- A small grey metal flange.
- A small grey metal flange.
- A thin metal rod or wire.



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Restek is your #1 source for consumables and supplies for PerkinElmer GCs!

## Genuine Restek Replacement Parts

We take a position of advocacy through quality in the innovative manufactured products and the selected resale products we offer. Our reputation has been built on supplying superior-quality manufactured parts, accessories, and operating supplies for gas chromatography. We do whatever it takes to provide you with the best—from our own innovative designs to original equipment manufacturers' replacement parts. Our consumables and parts will help you maintain optimum system performance, and give you the convenience and economy of one-stop shopping for all your GC needs.



**Donna Lidgett**

Product Marketing Manager, GC Accessories  
20+ Years of Service

*Donna Lidgett*

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## Restek Performance Coatings

As needs for improved performance of system components increase, coatings often are an effective solution. Restek's Performance Coatings Division specializes in innovative surface treatments for steel, stainless steel, alloys, glass, and other materials. Our surface treatments increase resistance to corrosion, reduce interactions between steel surfaces and active compounds, inhibit coking on process system surfaces, and offer many other advantages.



Restek's involvement in coatings began in 1987. The focus of our initial work was to produce a coating on stainless steel that would be inert to low levels of reactive organic compounds, such as explosives and volatile organic compounds (VOCs). The end product from this work was the Silcosteel® surface treatment for stainless steel tubing. Silcosteel® treated tubing currently is used for constructing analytical testing equipment by all major manufacturers of gas chromatography sampling and testing instruments.

Since this initial project, our coatings experts have developed a family of surface treatments to address other specific needs, and thereby enhance the performance of system components. Products of our processes are more correctly described as surface treatments, rather than as coatings, because, unlike coatings, the introduced layer permeates and chemically bonds to the treated surface. And unlike coatings, this layer cannot chip, flake, or blister. In brief, these treatments are:

- **Silcosteel®**—A general purpose passivation layer for steel and stainless steel. US Patent 6,511,760.
- **Siltek®**—The ultimate passivation of treated surfaces, from glass to high nickel alloys of steel. US Patent 6,444,326.
- **Silcosteel®-AC**—Dramatically reduces carbon buildup on stainless steel components. US Patent 6,444,326.
- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater. US Patent 7,070,833.
- **Silcosteel®-UHV**—Greatly reduces outgassing from components of ultra-high vacuum systems. US Patent 7,070,833.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. US Patent 6,444,326.

Restek surface treatments are now used in many applications, spanning multiple industries and market areas. Restek coated components increase the lifetime of stack monitoring equipment. Treated injector nozzles have longer service life because coking is inhibited. Sulfinert® treated sampling equipment increases the reliability of process measurements in refineries and petrochemical plants. A mass spectrometer manufacturer demands Silcosteel® treated parts to increase instrument sensitivity for analyzing pesticides. Restek coated air sampling equipment is used in applications as diverse as sampling city air and monitoring submarine cabins.

### it's a **fact**

All treatments are **total and uniform**: all pockets, holes, corners, and channels are coated evenly.

## Siltek®/Sulfinert® Treatment

Feature	Benefit
Inert.	Sample, transfer, and analyze sulfur compounds and other active compounds at parts-per-billion levels.
Durable and flexible layer, incorporated into the surface.	Items can be worked after treatment—no flaking, chipping, or cracking.
Stable in acidic or weakly basic (pH 8-9) environments.	Sample sulfur compounds without compromising compound stability.
Tested thermal stability to 450°C in an inert atmosphere.	Effectively bake-out contaminants.
Non-polymeric.	No memory effects, as seen with Teflon®-coated parts.
Treated tubing and fittings in stock for immediate delivery.	Parts are available when you need them.



Siltek® treatment provides the ultimate passivation for many surfaces, from glass to high nickel alloys of steel.

## Restek Electronic Leak Detector



Small, compact unit—  
easy to hold and  
operate.

### Restek Electronic Leak Detector

- Reliable thermal conductivity leak detector.
- Responds to leaks in less than 2 seconds.
- Audible alarm plus LED readout.
- Auto zeros with the touch of a button.
- Built-in rechargeable 9 volt battery.

### Improve GC Performance; Save Your Column!

Avoid poor chromatography caused by leaks—leak check your GC system with the Restek Electronic Leak Detector, the affordable, reliable tool for detecting leaks. Features include internal battery charge capability, a low-battery indicator, a battery charge indicator light, yellow lights to signal a nitrogen leak, a repositioned on/off switch to eliminate accidentally powering on the unit, and a probe tip design that prevents debris from entering the unit. The leak detector's microchip technology enables high sensitivity in a compact unit, the autozero feature allows instantaneous zeroing with the touch of a button, and the ergonomic design puts all controls at your fingertips, for maximum ease of use.

Leaks can cause detector noise and baseline instability, waste carrier gas, and shorten column lifetimes, so leak checks should be a regular part of a GC maintenance program. The Restek Electronic Leak Detector responds in less than 2 seconds to leaks of gases with thermal conductivities different from air, indicating leaks with both an audible alarm and an LED readout. The leak detector detects minute gas leaks that can go undetected by liquid leak detectors. Never use liquid leak detectors on a capillary GC system; liquids drawn into the system through the leaks will contaminate the system.

### How does the Restek Electronic Leak Detector work?

The Restek Electronic Leak Detector detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet draws in ambient air for comparison to air drawn into the sample probe. A thermal conductivity difference between the two indicates a leak, and the leak is revealed to the user by both an LED bar graph and an audible tone. The leak detector operates on one rechargeable 9-volt Ni-MH battery (included).

### tech tip

Avoid poor chromatography caused by leaks—leak check with the Restek Electronic Leak Detector.

### Leak Detector Facts

Detectable gases:	helium, nitrogen, argon, carbon dioxide
Battery:	Rechargeable Ni-MH, 9 volt
Operating	
Temperature Range:	32°-120°F (0°-48°C)
Humidity Range:	0-97%
CE Approved:	Yes



Easy-to-clean probe  
assembly

Description	qty.	cat.#
Leak Detector with 110Volt Battery Charger	ea.	22451
Leak Detector with 220Volt European Battery Charger	ea.	22451-EUR
Leak Detector with 220Volt UK Battery Charger	ea.	22451-UK

Caution: The Restek Electronic Leak Detector is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks under any condition. The Restek Electronic Leak Detector may be used for determining trace amounts of hydrogen in a GC environment only.

### Leak Detector Accessory Kit

The kit includes an adaptor fitting to detect leaks in hard-to-reach locations, and a mounting bracket that can be affixed to the wall or GC.



Verify hard-to-reach leaks  
with the adaptor fitting.



Leak Detector is easily  
accessed when stored in  
the mounting bracket.

Description	qty.	cat.#
Leak Detector Accessory Kit (adaptor fitting for probe, mounting bracket)	kit	22453

### tech tip

Avoid using liquid leak detectors on a capillary system! Liquids can be drawn into the system.

## Liner Deactivations

### Intermediate Polarity (IP) Deactivation

- Phenylmethyl-deactivated surface for better recovery of polar and nonpolar compounds.
- Compatible with most common solvents.
- Our standard deactivation—every Restek liner is IP deactivated unless otherwise requested.

### Siltek® Deactivation

- Revolutionary deactivation for difficult matrices and reactive compounds.
- Inertness retained over a wide sample pH range.
- Minimal bleed.
- Ideal for chlorinated pesticide analysis; lowers endrin breakdown to less than 1%.
- Recommended for use with Rtx®-CLPesticides, Stx™-CLPesticides, Stx™-1HT, and Rtx®-TNT columns.

### Base Deactivation

- Excellent inertness for basic compounds.
- Recommended for use with Rtx®-5 Amine, Rtx®-35 Amine, and Stabilwax®-DB columns.

All liners are  
**100%**  
deactivated

All liners are shipped  
intermediate polarity (IP)  
deactivated unless otherwise  
requested.

### Siltek® Deactivation—The Next Generation

- Maximizes the inertness of the sample pathway.
- Minimizes breakdown.
- Low bleed.
- Thermally stable.
- “Clean and green”—manufactured without the use of harmful organic solvents.



Our Siltek® deactivation process (US Patent 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® liners, guard columns, and connectors for better recovery of sample analytes.

**For Siltek® deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Siltek® Liner		Siltek® Liner w/Wool		Siltek® Liner w/CarboFrit™	
each	-214.1	addl. cost	-213.1	addl. cost	-216.1	addl. cost
5-pk.	-214.5	addl. cost	-213.5	addl. cost	-216.5	addl. cost
25-pk.	-214.25	addl. cost	-213.25	addl. cost	-216.25	addl. cost

### Base-Deactivated Inlet Liners

**For base-deactivated inlet liners, add the corresponding suffix number to the liner catalog number.**

qty.	Base-Deactivated Liner		Base-Deactivated Liner w/Base-Deactivated Wool		Base Deactivated Liner w/CarboFrit™	
each	-210.1	addl. cost	-211.1	addl. cost	-229.1	addl. cost
5-pk.	-210.5	addl. cost	-211.5	addl. cost	-229.5	addl. cost
25-pk.	-210.25	addl. cost	-211.25	addl. cost	-229.25	addl. cost

← Ideal for  
amines and basic  
compounds!

## a plus 1 story

“I installed Siltek® liners on one of our GCs to replace standard quartz liners that required deactivating daily. I found the results to be excellent, saving many hours of instrument time with no detrimental effects on the analysis.”

**Matthew Turner**, Laboratory Manager—food contaminants, Global Analysis (UK)



## Inlet Liner Packing Materials & Accessories

### Why Use Deactivated Wool for a Liner Packing?

- Ensure uniform vaporization in split or splitless liners.
- Prolong column life by trapping septum particles.
- Recommended for autosamplers with fast injection rates.
- Inertness tested for endrin breakdown.

### Deactivated Wool

Further improving our proprietary deactivation process, we make this deactivated wool more inert than our traditional fused silica wool, yet it is as flexible as our traditional borosilicate glass wool.



Description	qty.	cat. #
Deactivated Wool	10 grams	24324

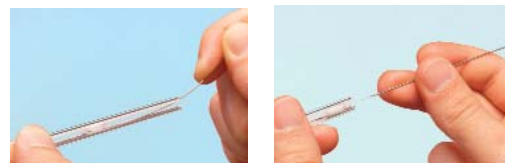
### Base-Deactivated Wool

Ideal for amines and other basic compounds.

Description	qty.	cat. #
Base-Deactivated Wool	10 grams	20999

### Mini Wool Puller/Inserter

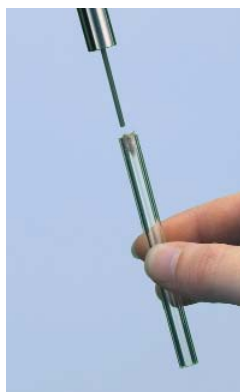
Insert and remove wool plugs easily. Order a spare pack so you'll always have one available.



Description	qty.	cat. #
Mini Wool Puller/Inserter	2-pk.	20114

### Inlet Liner Packing Tool

- Easy to use—position wool reproducibly every time.
- Accurate to a specific, measured depth.



Eliminates user variation!



Description	qty.	cat. #
Inlet Liner Packing Tool	ea.	20339

### Prepacked Inlet Liners

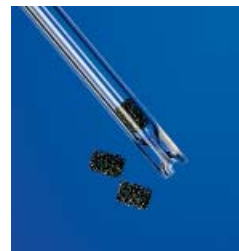
Let Restek do the work! Just add the appropriate suffix to the liner catalog number.

qty.	Wool	FS Beads	CarboFrit™†
ea.	-200.1	-201.1	-209.1
5-pk.	-200.5	-201.5	-209.5
25-pk.	-200.25	-201.25	-209.25

†CarboFrit™ inserts require a neck greater than 2mm.

**CarboFrit™ Inlet Liner Packing Material**

- Highly inert.
- Extends analytical column lifetime.
- Enhances reproducibility of split and splitless injection.
- Uniform pore size and consistent packing density guarantee consistent flow through the liner.
- Easy to install in any liner with an ID >3.5mm when using puller-inserter tool listed below.\*



Add the corresponding suffix number to the liner catalog number.

Description	suffix	
each	-209.1	addl. cost
5-pk.	-209.5	addl. cost
25-pk.	-209.25	addl. cost

\*Liners with IDs less than 3.5mm are difficult to pack. We will pack them on a custom basis (minimum neck ID of 2mm required).

**Replacement CarboFrit™ Inserts**

Description	qty.	cat. #
Frits for liner ID ≤4mm	10-pk.	20295
Frits for liner ID >4mm	10-pk.	20294

**CarboFrit™ Puller/Inserter Tool**

- Hook end for removing CarboFrit™ inserts.
- Bent end (90°) for inserting CarboFrit™ inserts.

Description	qty.	cat. #
CarboFrit™ Puller/Inserter Tool	ea.	21642

**a plus 1 story**

"Restek sent us some carbon material (CarboFrit™ packing) with the suggestion to test it as liner packing. Initially, I didn't even want to try it because carbon is usually highly retentive and catalytically active. As we nevertheless gave it a chance, we were highly surprised...it exhibited low retentive power and good inertness."

excerpt from: *Sample Evaporation in Hot GC Injectors*,  
Dr. Konrad Grob, *The Restek Advantage*, Winter 1996.

**Deactivated Fused Silica Beads**

- Increase sample vaporization surface and minimize splitter discrimination to improve quantitation of compounds having dissimilar boiling points.
- Trap non-volatile or inorganic residue to prevent column inlet contamination.
- Deactivated, heat-treated, and tested to ensure complete inertness.

Description	Mesh	qty.	cat. #
Deactivated Fused Silica Beads	60-80	25 grams	20791

**Inlet Liner Removal Tool**

- Easily remove liner from injector—no more burned fingers.
- Made from high-temperature silicone.
- Won't chip or crack the liner.



No more burned fingers!










Description	qty.	cat. #
Inlet Liner Removal Tool	3-pk.	20181







**tech tip****Use of Packings with Splitless Liners**



We recommend using an injection port liner with wool or CarboFrit™ packing when making splitless injections with an autosampler. If there is no packing material in the liner, the solvent droplets act like water on a hot iron: they bounce around until vaporized (Leidenfrost phenomenon). Because autosamplers make rapid injections, samples can be incompletely vaporized, leading to non-reproducible peak response and tailing. You can prevent this by using wool or CarboFrit™ packing material in the splitless liner, to provide a surface for the solvent droplets to "sit" on until the heat from the injector vaporizes them.

## Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 <b>Baffle Splitter</b>	universal, for most common analyses	3.5 ID 5.0 OD x 100	N6502008	20736	20737	—
 <b>Cup Splitter</b>	high & low MW compounds	3.5 ID 5.0 OD x 100	—	20739	20740	—
 <b>Cycloplitter®</b>	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 100	—	20745	20746	—
 <b>Auto SYS™ Splitter w/ Wool</b>	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6502009	20832	20833	20834
 <b>Siltek® Auto SYS™ Splitter w/ Wool</b>	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6502010	20832-213.1	20833-213.5	20834-213.25
 <b>Auto SYS™ Cup Splitter</b>	high & low MW compounds	4.0 ID 6.2 OD x 92.1	N6502011	20835	20836	—
 <b>Auto SYS™ Cycloplitter®</b>	dirty samples, many injections before cleaning required	4.0 ID 6.2 OD x 92.1	N6502012	20910	20911	—
 <b>Auto SYS™ Laminar Cup Splitter</b>	high MW compounds	4.0 ID 6.2 OD x 92.1	—	20827	20828	—
 <b>Auto SYS™ Split Precision™ Liner w/ Wool</b>	dirty samples, trace samples	4.0 ID 6.2 OD x 92.1	N6121020	21026	21027	—

Splitless Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 <b>Splitless (2mm ID)</b>	trace samples	2.0 ID 5.0 OD x 100	N6502007	20730	20731	20732
 <b>Auto SYS™ Splitless</b>	headspace & purge & trap	1.0 ID 6.2 OD x 92.1	N6502006	21272	21273	21274
 <b>Auto SYS™ Splitless w/ Wool (2mm ID)</b>	trace samples	2.0 ID 6.2 OD x 92.1	N6121021	20829	20830	20831
 <b>Siltek® Auto SYS™ Splitless w/ Wool (2mm ID)</b>	trace samples	2.0 ID 6.2 OD x 92.1	N6502004	20829-213.1	20830-213.5	20831-213.25
 <b>Auto SYS™ Double Gooseneck</b>	trace, active samples up to 4µL	4.0 ID 6.2 OD x 92.1	N6502003	20853	20854	—
 <b>Auto SYS™ Cyclo Double Gooseneck</b>	trace, dirty, active samples, up to 4µL	4.0 ID 6.2 OD x 92.1	N6502005	20899	20900	—

PSS Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 <b>PSS Split/Splitless (1mm ID)</b>	trace samples	1.0 ID 4.0 OD x 86.2	N6121006	20738	20741	—
 <b>Auto SYS™ XL PSS Split/Splitless w/ Wool</b>	most common analyses	2.0 ID 4.0 OD x 86.2	N6121004	21717	21718	—













\*Nominal ID at syringe needle expulsion point.

### ordering note

For descriptions of liner deactivations, packings, and tools, see **pages 3-5**.

All liners are  
**100%**  
deactivated

All liners are shipped intermediate  
polarity (IP) deactivated unless  
otherwise requested.

Zero Dilution Liners for PerkinElmer Auto SYS™ and Clarus GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
		headspace analysis	1.0 ID 2.0 OD x 73	N1011446	22990	22991	<b>new!</b>
<b>Zero Dilution Inner Liner</b>							
		headspace analysis	2.5 ID 6.2 OD x 90	N1011445	22992	22993	<b>new!</b>
<b>Zero Dilution Outer Liner</b>							
PTV Liners for PerkinElmer GCs		Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
		high linearity for 0.25, 0.32, & 0.53mm ID columns	1.0 ID 2.0 OD x 88	—	20733	20734	20735
<b>PTV Press-Tight®</b>							
		high linearity	1.0 ID 2.0 OD x 88	—	20742	20743	20744
<b>PTV Injector</b>							
DI Liners for PerkinElmer GCs (0.32/0.53mm ID)		Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
		trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 100	N6502018	20855	20856	—
<b>Uniliner®</b>							
		trace, dirty, active samples, high linearity	3.5 ID 5.0 OD x 100	N6502019	20857	20858	—
<b>Cyclo-Uniliner®</b>							
		trace, dirty, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502016	20837	20838	—
<b>Auto SYS™ Open-top Uniliner® w/ Wool</b>							
		trace, dirty, high MW active samples, high linearity	4.0 ID 6.2 OD x 92.1	N6502017	20839	20840	—
<b>Auto SYS™ Cyclo-Uniliner®</b>							
DI Liners for PerkinElmer GCs (For 0.32/0.53mm ID Columns)		Benefits/Uses	ID*/OD & Length (mm)	Similar to PE part #	cat.# ea.	cat.# 5-pk.	
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6121022	20819	20822	
<b>Auto SYS™ Drilled Uniliner® (hole on top)</b>							
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502013	21293	21294	
<b>Auto SYS™ Drilled Uniliner® (hole on bottom)</b>							
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502014	21295	21296	
<b>Auto SYS™ Gooseneck Drilled Uniliner® (hole on top)</b>							
		trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502015	21297	21298	
<b>Auto SYS™ Gooseneck Drilled Uniliner® (hole on bottom)</b>							

\*Nominal ID at syringe needle expulsion point.

**tech tip****DI Liners for PerkinElmer GCs**

Use the Drilled Uniliner® with the hole near the bottom for analysis in which compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® with the hole near the top for aqueous injections, as well as for analysis in which the compounds of interest elute away from the solvent peak.

**Graphite O-Rings for PerkinElmer Auto SYS™ XL PSS**

Description	Max. temp.	Similar to PE part #	qty.	cat.#
Graphite O-Rings for PerkinElmer Auto SYS™ XL PSS	450°C	N610-1751	10-pk.	21475
Graphite O-Rings for PerkinElmer Auto SYS™ XL PSS	450°C	N610-1751	25-pk.	21476

**Viton® O-Rings for PerkinElmer PSS**

Description	Max. temp.	Similar to PE part #	qty.	cat.#
Viton® O-Rings for PerkinElmer PSS	250°C	N6101747	10-pk.	20366

**Silicone O-Rings for PerkinElmer Auto SYS™ GCs**

Description	Max. temp.	Similar to PE part #	qty.	cat.#
Silicone O-Rings for PerkinElmer Auto SYS™ GCs	250°C	N6101374	10-pk.	20262





### 11mm Septa for PerkinElmer GCs

- Precision molded, for consistent, accurate fit.

Thermolite® Septa (useable to 340°C inlet temp.)	
qty.	cat.#
25-pk.	27141
50-pk.	27142
100-pk.	27143

IceBlue™ Septa (useable to 250°C inlet temp.)	
qty.	cat.#
50-pk.	27162
100-pk.	27163

BTO® Septa (useable to 400°C inlet temp.)	
qty.	cat.#
50-pk.	27110
100-pk.	27111

### HANDY septum size chart

PE Instrument	Septum Diameter (mm)
Sigma series	11
900,990	11
8000 series	11
Auto SYS™	11
Auto SYS™ XL	11



### Septum Cap for PerkinElmer Auto SYS™ XL

- Made of clear anodized aluminum and high-quality stainless steel.
- Meets or exceeds OEM performance.

Description	Similar to PE part #	qty.	cat.#
Septum Cap for PerkinElmer Auto SYS™ XL	N6100153	ea.	22322

### Injector Adaptor for PerkinElmer Auto SYS™ XL

- Made of high-quality stainless steel.
- Meets or exceeds OEM performance.
- Siltek® treated version available for increased inertness.



Description	Similar to PE part #	qty.	cat.#
<b>A) For use with PE style capillary nuts</b>			
Injector Adaptor for PerkinElmer Auto SYS™ XL	N6100157	ea.	22318
Siltek® Treated Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22320
<b>B) For use with 1/8" compression style nuts</b>			
Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22319
Siltek® Treated Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22321

### FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL

- Made of high-quality stainless steel.
- Meets or exceeds OEM performance.



Description	Similar to PE part #	qty.	cat.#
<b>A) For use with PE style capillary nuts</b>			
FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL	N6120020	ea.	22608
<b>B) For use with 1/8" compression style nuts</b>			
FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22609

**FID Replacement Parts for PerkinElmer Auto SYS™ XL and Clarus 500**

- Made of high-quality stainless steel.
- Meet or exceed OEM performance.



Description	Similar to PE part #	qty.	cat.#
FID Jet for PerkinElmer Auto SYS™ XL and Clarus 500	N6100361	ea.	23038
	N6103167		
Auto-Ignite FID Replacement Part Kit for PerkinElmer Auto SYS™ XL and Clarus 500	N6103175	kit	23061
	N6101085		
	N6001204		
	09912223		
Nozzle Insulator for PerkinElmer Auto SYS™ XL and Clarus 500	N6101085	ea.	23062
FID Body for PerkinElmer Auto SYS™ XL and Clarus 500	N6100364	ea.	23063

**MLE Capillary Tool Kit for PerkinElmer GCs**

Includes:

- 1/8", 3/16", and 1/4" nylon brushes
- 1/4", 3/8", and 3/16" stainless steel wire tube brushes
- stainless steel surface brush
- 6 stainless steel jet reamers (0.25–0.65mm OD)
- 1/4" x 5/16" open end wrench
- 3/8" x 7/16" open end wrench
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench
- rubber-tipped slide-lock tweezers
- scoring wafers with handles
- inlet liner removal tool
- septum puller
- mini wool puller/insertor tool
- 4-inch tapered needle file
- swivel head flashlight
- mini hand drill set
- 15cm compact steel ruler
- pocket magnifier
- high temperature string (1 meter)
- pipe cleaner (12-inch)
- cotton tip swabs (pk. of 25)



Description	qty.	cat.#
MLE Capillary Tool Kit for PerkinElmer GCs	kit	22185

restek  
innovation!



Make clean,  
square cuts!

## Scoring Wafer with Handle

- Ceramic wafer is serrated on one side and straight-edged on the other to cut both fused silica and metal tubing cleanly.
- Unique, ergonomic handle is made of soft, comfortable rubber.



Hold tubing firmly in one hand, allowing about two inches to extend freely. Hold the scoring wafer at a 45° angle to the tubing. Exert just enough pressure to put a slight arc in the tubing. Pull perpendicularly across the tubing.



The tubing should fall off on its own, or it should easily break at the score with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Scoring Wafer with Handle

### qty.

2-pk.

### cat.#

23015



## Ceramic Scoring Wafers

- Four straight scoring edges for cutting fused silica tubing and four serrated edges for cutting MXT® metal capillary columns.
- Sure-grip handle included.



Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.



Check the cut against the white of the scoring wafer. Look for a clean, square cut.

### Description

Ceramic Scoring Wafers

### qty.

5-pk.

### cat.#

20116



## Sapphire Scribe

- Cuts fused silica tubing.
- Produces a clean, square cut.



One quick stroke...



...and tap leaves a clean, square end.

### Description

Sapphire Scribe

### qty.

ea.

### cat.#

20182



## Shortix® Capillary GC Column Cutter

- Consistently make precise, clean, square cuts with a diamond blade.
- Built-in magnifier to verify square cut.
- Use with 0.25mm ID to 0.53mm ID tubing (0.78mm OD maximum).
- Maintenance kit includes diamond cutting wheel, O-rings, and a tool to open the column cutter.



Maintenance Kit for Shortix®  
Capillary GC Column Cutter

### Description

Shortix® Capillary GC Column Cutter

### qty.

ea.

### cat.#

23026

Maintenance Kit for Shortix® Capillary GC Column Cutter

kit

23027

## Capillary Column Caps

- Attach to the column in seconds to form an airtight seal.
- Increase column lifetime—prevent moisture and air from entering the column during storage.
- Color-coded for identifying detector and injector ends.
- Not recommended for reuse.



### Description

Capillary Column Caps

### qty.

10-pk.

### cat.#

21044

## Flashlight with Swivel Head

- Ideal for tight spaces—like inside a GC oven.
- Uses two AA batteries (included).



### Description

Flashlight with Swivel Head

### qty.

ea.

### cat.#

22187

### Septum Puller

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.



Remove septum without damaging an expensive weldment.



Dislodge a stuck ferrule quickly and easily—without scoring the fitting.



Description	qty.	cat. #
Septum Puller	ea.	20117

### Slide-Lock Tweezers and 15cm Compact Steel Ruler

- “Lock” capillary columns to the correct insertion distance recommended by the instrument manufacturer during installation.
- Useful for many laboratory tasks.



Description	qty.	cat. #
Slide-Lock Tweezers and 15cm Compact Steel Ruler	set	20101

### High-Temperature String

- Withstands temperatures to 400°C.
- Use to restring capillary columns, attach column connectors to column cages, or hold a column in the GC oven.

Description	qty.	cat. #
High-Temperature String	10m	20109
High-Temperature String	450m	20618



### Stainless Steel Jet Reamers

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants.

Description	qty.	cat. #
Stainless Steel Jet Reamers	6-piece set	20113



### Stainless Steel Tube Brushes/Surface Brush

Unlike brass brushes that can leave a metal residue, these stainless steel tube brushes ( $\frac{3}{8}$ -,  $\frac{3}{16}$ -, and  $\frac{1}{4}$ -inch) work well for cleaning dirty collectors, injector ports, and detector ports. The surface brush can be used to remove residue that builds up on metal detector jets and electronic contacts.

Description	qty.	cat. #
Stainless Steel Tube Brushes/Surface Brush	4-piece set	20112



### Open-End Wrench Set

High-quality  $\frac{1}{4}$ " x  $\frac{5}{16}$ ",  $\frac{3}{8}$ " x  $\frac{7}{16}$ ",  $\frac{7}{16}$ " x  $\frac{1}{2}$ ", and  $\frac{1}{2}$ " x  $\frac{9}{16}$ " wrenches for tightening a wide variety of chromatograph and other fittings.

Description	qty.	cat. #
Open-End Wrench Set	set	20387



### Open-End Wrenches

High-quality wrenches for tightening capillary fittings.

Description	qty.	cat. #
Open-End Wrenches ( $\frac{1}{4}$ " x $\frac{5}{16}$ ")	2-pk.	20110
Open-End Wrenches ( $\frac{3}{8}$ " x $\frac{7}{16}$ ")	2-pk.	22455



### Pocket Magnifier

- Small and easy to handle.
- 10X magnification makes it easy to see the column end to verify a square cut.

Description	qty.	cat. #
Pocket Magnifier	ea.	20124



## Vespel® Ferrules

- 100% high-temperature polyimide.
- Stable to 350°C.
- Durable, leak-tight.



Vespel® ferrules

## Graphite Ferrules

- Pre-conditioned to eliminate out-gassing.
- High-purity, high-density graphite.
- Smoother surface and cleaner edges than conventional graphite ferrules.
- Contain no binders that can off-gas or adsorb analytes.
- Stable to 450°C.

## Vespel®/Graphite Ferrules

- 60%/40% Vespel®/graphite blend, offering the best combination of sealing and ease of workability.
- Seal with minimal torque, reusable, and preferred for vacuum and high-pressure uses.
- Stable to 400°C.
- Recommended for mass spec transfer lines.

## Capillary Ferrules—For 1/16-Inch Compression-Type Fittings

Ferrule ID	Fits Column ID	qty.	Vespel®	Graphite	Vespel®/Graphite
0.3mm	< 0.18mm	10-pk.	22213	20233	20275
0.4mm	0.18/0.25/0.28mm	10-pk.	22214	20200	20211
0.4mm	0.18/0.25/0.28mm	50-pk.	—	20227	20229
0.5mm	0.32mm	10-pk.	22215	20201	20212
0.5mm	0.32mm	50-pk.	—	20228	20231
0.6mm	0.28mm**	10-pk.	—	—	20232
0.8mm	0.45/0.53mm	10-pk.	22216	20202	20213
0.8mm	0.45/0.53mm	50-pk.	—	20224	20230
1.0mm	0.75mm*	10-pk.	22217	21058	24912
1.2mm	0.75mm	10-pk.	22218	—	—
1.6mm	1.00mm*	10-pk.	—	21060	—

\*For micropacked columns.

\*\*For 0.28mm MXT® columns.



## Encapsulated Ferrules—For 1/16-Inch Compression Fittings

- Reusable—will not deform and stick in fittings.
- Less torque needed to seal ferrule.
- Restek's unique blend of graphite minimizes fragmentation and outgassing.



Reusable!

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21036
0.5mm	0.32mm	10-pk.	21037
0.8mm	0.53mm	10-pk.	21038

## Standard Ferrules—For 1/16-, 1/8-, and 1/4-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespel®	Graphite	Vespel®/Graphite
1/4"	3/16"	5-pk.	—	—	20258
1/16"	1/16"	10-pk.	22210	20207	20218
1/8"	1/8"	10-pk.	22211	20208	20219
1/8"	reduce to 1/16"	10-pk.	—	20209	20220
1/4"	1/4"	10-pk.	22212	20210	20221
1/4"	reduce to 1/8"	10-pk.	22219	20225	20222
1/4"	reduce to 1/16"	10-pk.	—	20226	20223

## Two-Hole Ferrules—For 1/8-Inch and 1/16-Inch Compression-Type Fittings

Fitting Size	Ferrule ID	Fits Column ID	qty.	Vespel®/Graphite
1/16"	0.4mm	0.25/0.28mm	5-pk.	20241
1/16"	0.5mm	0.32mm	5-pk.	20242
1/8"	0.8mm	0.45/0.53mm	5-pk.	20246



## Reducing Ferrules

Fitting Size	Ferrule ID	Fits Column ID	qty.	Graphite	Vespe <sup>®</sup> /Graphite
1/8"	0.4mm	0.25mm	5-pk.	20205	20254
1/8"	0.5mm	0.32mm	5-pk.	20205	20255
1/8"	0.8mm	0.53mm	5-pk.	20206	20215
1/4"	0.4mm	0.25mm	5-pk.	20203	—
1/4"	0.5mm	0.32mm	5-pk.	20203	20257
1/4"	0.8mm	0.45/0.53mm	5-pk.	20204	20217



## Blank Ferrules—For 1/16-Inch Fittings

Fitting Size	Ferrule ID	qty.	Vespe <sup>®</sup> /Graphite
1/16"	no hole	10-pk.	20240



## Alumaseal™ Ferrules\*

- No more ferrule fragments in the transfer line; aluminum construction—will not crack or fragment.
- No retightening required after temperature cycles—excellent for GC/MS.
- Eliminate out-gassing, make leak-tight seals, for less detector noise.
- Unique two-piece design permanently locks on fused silica tubing without causing breakage.
- Will not stick in fittings, unlike Vespe<sup>®</sup> or graphite.
- Stable to 550°C.
- Use with any 1/16" compression-type fitting.

Ferrule ID	Fits Column ID	qty.	cat.#
0.4mm	0.25mm	10-pk.	21472
0.5mm	0.32mm	10-pk.	21473
0.8mm	0.53mm	10-pk.	21474

\*Patent pending.



## Teflon® Ferrules

- Upper temperature limit 250°C.
- 100% Teflon®; completely inert.
- One-piece design requires no back ferrule.

Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128



## tech tip

## Choosing the Right Ferrule

Although graphite and Vespe<sup>®</sup>/graphite ferrules each have advantages and disadvantages, the choice of ferrule composition is largely a personal preference.

Graphite ferrules are soft, easy to seal, stable to 450°C, and contain no binders that might off-gas.

Vespe<sup>®</sup>/graphite ferrules work better for vacuum and high-pressure applications (e.g., GC/MS) because they will not fragment or allow oxygen to permeate into the system, whereas graphite ferrules will. Because Vespe<sup>®</sup>/graphite ferrules are made from a harder material, they might require retightening after several temperature cycles.

Alumaseal™ ferrules are ideal for GC/MS. They will not crack or fragment and require no retightening after temperature cycles.

## Vu2 Union™ Column Connectors



Patent pending.

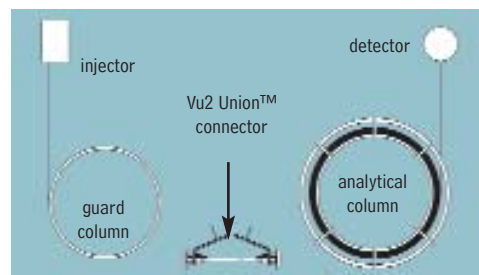
Secure, reliable  
column-to-column  
connections!

### Vu2 Union™ Connectors

- Connect a guard column to an analytical column.
- Connect a column to a transfer line.
- Connect two columns in series.
- Repair a broken column.

Restek's Vu2 Union™ connector combines the simplicity of a Press-Tight® union with the strength of a metal union. The Vu2 Union™ connector reliably couples one analytical column to another, or to a transfer line or guard column. The columns cannot unexpectedly disconnect, even at temperatures as high as 400°C.

A guard column connected to an analytical column by a Vu2 Union™ connector.



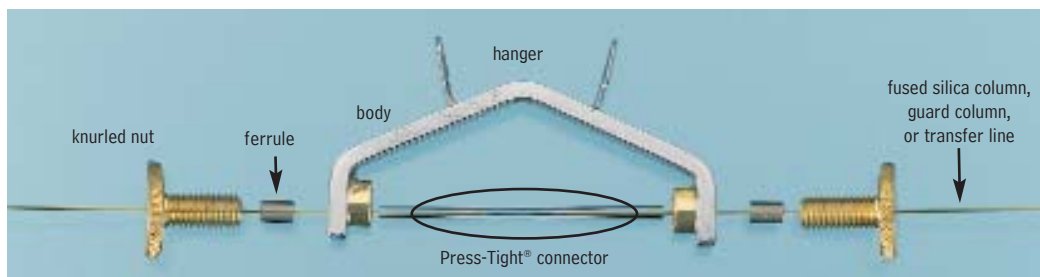
### How does a Vu2 Union™ connector work?

A Press-Tight® union in the Vu2 Union™ connector joins the fused silica ends together; the ferrule and knurled nut at each end of the connector hold the tubing in place via a secondary seal between the ferrule and the Press-Tight® union. Each knurled nut applies independent pressure to each ferrule, to make a leak-tight seal with the column end. These ultra-strong connections will not unexpectedly disconnect under temperature changes, vibrations, or other stresses normally encountered in GC analyses. The open design allows visual confirmation of the seal between the column and the Press-Tight® union, to ensure confidence in the connection. Hang the connector from the column cage, to minimize stress on the connections.

### Who will benefit from using Vu2 Union™ connectors?

Any analyst using guard columns, transfer lines, or restrictor tubing, performing a dual-column analysis with columns connected in series, or seeking to repair a broken column will find Vu2 Union™ connectors the simple, reliable, easy-to-use solution to their connection needs.

The Vu2 Union™ connector's open design allows visual confirmation of the seal; secondary seals ensure a leak-tight connection.



NOTE: Not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (see our general catalog or website).

Kits include: Vu2 Union™ body, 2 knurled nuts, 2 Press-Tight® unions, and 4 ferrules

Description	Ferrules Fit Column ID	qty.	cat.#
Vu2 Union™ Connector Kit	0.10/0.15mm	kit	22220
Vu2 Union™ Connector Kit	0.18/0.28mm	kit	21105
Vu2 Union™ Connector Kit	0.32mm	kit	21106
Vu2 Union™ Connector Kit	0.45/0.53mm	kit	21107
Knurled nut		2-pk.	21108



### Universal Press-Tight® Connectors

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

### Graphite Ferrules for Vu2 Union™ Connectors

- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.



Ferrule ID	Fits Column ID	Graphite 2-pk.	Graphite 10-pk.
0.3mm	0.10/0.15mm	22221	22222
0.4mm	0.18/0.28mm	20280	20281
0.5mm	0.32mm	20282	20283
0.8mm	0.45/0.53mm	20284	20285

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### SeCure™ "Y" Connector Kits

- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added confidence in the connection.

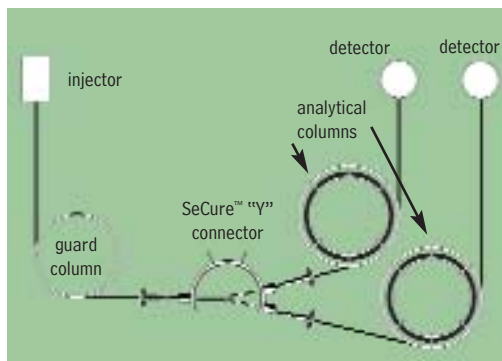
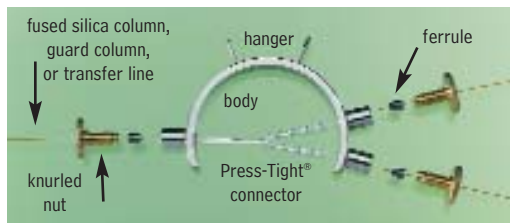
Combine the simplicity of a "Y" Press-Tight® connector with the strength of a metal union. The ferrules and knurled nuts hold the fused silica tubing in place, which prevents the tubing from unexpectedly disconnecting, even at temperatures as high as 400°C.

The SeCure™ "Y" Connector's open design allows visual confirmation of the seal.

Dual-column confirmational analysis with a single injection—one of the SeCure™ "Y" connector's many uses.



Patent pending.



Secure, reliable  
column-to-column  
connections!

Kits include: SeCure™ "Y" connector body, 3 knurled nuts, "Y" Universal Press-Tight® union, 3 ferrules.

Description	Ferrules Fit Column ID	qty.	cat.#
SeCure™ "Y" Connector Kit	0.18/0.25/0.28mm	kit	20276
SeCure™ "Y" Connector Kit	0.32mm	kit	20277
SeCure™ "Y" Connector Kit	0.45/0.53mm	kit	20278
Knurled nut		3-pk.	20279

### a plus 1 story

"Restek is a great corp. that keeps us operating on a daily basis with your GC supplies. We really love the new SeCure™ "Y" Connector. It has worked wonders for us."

**Eric A. Lorge**, Project Manager,  
Major Equipment Manufacturer,  
Environmental Lab

### Universal "Y" Press-Tight® Connectors

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



### Graphite Ferrules for SeCure™ "Y" Connectors

- Preconditioned to minimize out-gassing.
- High-purity, high-density graphite.
- Stable to 450°C.
- No binders that can off-gas or adsorb analytes.
- Smooth surface and clean edges.

Ferrule ID	Fits Column ID	Graphite 10-pk.	Graphite 50-pk.
0.4mm	0.18/0.25/0.28mm	20200	20227
0.5mm	0.32mm	20201	20228
0.8mm	0.45/0.53mm	20202	20224



**HRMalytic RESTEK '07**  
Australian Distributors **ECH nology**  
Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)



## Universal Press-Tight® Connectors

- Connect a guard column to an analytical column.
- Repair a broken column.
- Connect a column outlet to a transfer line.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Press-Tight® Connectors	20400	20401	20402
Deactivated, Universal Press-Tight® Connectors	20429	20430	20431
Siltek® Treated Universal Press-Tight® Connectors	20480	20449	20481

## Universal Angled Press-Tight® Connectors

- Ideal for connecting a guard column to an analytical column.
- Made from inert fused silica.
- Angle approximates the curvature of a capillary column, reduces strain on column-end connections.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	5-pk.	25-pk.	100-pk.
Universal Angled Press-Tight® Connectors	20446	20447	20448
Deactivated Universal Angled Press-Tight® Connectors	20446-261	20447-261	20448-261
Siltek® Treated Universal Angled Press-Tight® Connectors	20482	20483	20484



## Universal “Y” Press-Tight® Connectors

An alternative method of performing dual-column confirmational analyses!

- Split sample flow onto two columns.
- Split a single column flow to two detectors—perform confirmation analysis with a single injection.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “Y” Press-Tight® Connector	20405	20406
Deactivated Universal “Y” Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal “Y” Press-Tight® Connector	20485	20486



## Universal Angled “Y” Press-Tight® Connectors

- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Siltek® treated connectors are ideal for organochlorine pesticides analysis.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal Angled “Y” Press-Tight® Connector	20403	20404
Deactivated Universal Angled “Y” Press-Tight® Connector	20403-261	20404-261
Siltek® Treated Universal Angled “Y” Press-Tight® Connector	20487	20469



## Universal “X” Press-Tight® Connectors

- Connect a column to three detectors.
- Connect a column to two detectors and a sniffer port.
- Split sample flow onto three columns.
- Deactivated Press-Tight® connectors assure better recovery of polar and non-polar compounds.
- Fit column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

Description	ea.	3-pk.
Universal “X” Press-Tight® Connector	20407	20408
Deactivated Universal “X” Press-Tight® Connector	20407-261	20408-261
Siltek® Treated Universal “X” Press-Tight® Connector	20407-266	20408-266



## Polyimide Resin

- Permanently connects a Press-Tight® connector to a fused silica column.

Description	Max. Temp.	qty.	cat. #
Polyimide Resin	350°C	5 grams	20445

**MXT™-Union Connector Kits for Fused Silica Columns**

- Low-dead-volume, leak-tight connection.
- Reusable.
- Siltek® treatment ensures maximum inertness.
- Ideal for connecting a guard column or transfer line to an analytical column.
- Use to oven temperatures of 350°C.
- Available in union and “Y” configurations.

These MXT™ connectors can be used with fused silica tubing, because of a Valcon polyimide 1/32-inch one-piece fused silica adaptor. This unique graphite-reinforced composite allows a capillary column to slide into the adaptor and be locked in place simply by loosening and tightening the fitting.

**MXT™-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, two 1/32-inch nuts and two one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21386
For 0.32mm ID Fused Silica Columns	kit	21385
For 0.53mm ID Fused Silica Columns	kit	21384

**MXT™ “Y”-Union Connector Kits for Fused Silica Columns**

Each kit contains the MXT™ union, three 1/32-inch nuts and three one-piece fused silica adaptors.

Description	qty.	cat.#
For 0.25mm ID Fused Silica Columns	kit	21389
For 0.32mm ID Fused Silica Columns	kit	21388
For 0.53mm ID Fused Silica Columns	kit	21387

**1/32-Inch Replacement Nut**

Description	qty.	cat.#
1/32" Replacement Nut	5-pk.	20389

**Valco® Connectors—One-Piece Valcon Polyimide Adaptor Ferrule for Fused Silica**

We recommend a one-piece adaptor ferrule for use in fittings in which the ferrule will not be removed. Connections are made or broken by tightening or loosening the fitting nut and sliding the tubing in or out. Fused silica adaptor ferrules are Valcon polyimide, a unique graphite-reinforced composite, specially prepared to maximize mechanical stability at temperatures to 350°C. The determining factor for selecting adaptor ferrule size is the fused silica tubing OD.

**1/32-Inch Adaptor Ferrule (Valcon Polyimide)**

Tubing OD	Tubing ID	Valco® #	qty.	cat.#
0.25 ≤ 0.40mm	0.25mm	FS.4-5	5-pk.	20137
0.40 ≤ 0.50mm	0.32mm	FS.5-5	5-pk.	20140
0.50 ≤ 0.80mm	0.53mm	ZF.5V-5	5-pk.	20141
1/32" Replacement Nut			5-pk.	20389

**Ferrule Removal Kit**

The tapered tools in this kit have teeth designed to grip and remove fused silica adaptor ferrules that have become stuck in the fitting detail. Each kit has two tools: one for removing 1/32-inch adaptor ferrules and one for removing 1/16-inch adaptor ferrules.

Description	Valco® #	qty.	cat.#
Ferrule Removal Kit	FRK1	kit	20146





## did you know?

All Super-Clean™ filter cartridges (except hydrocarbon filter cat.# 22030) feature easy-to-read indicators. The indicator code is shown on every trap so there is no confusion about when to replace it.

## Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas.
- “Quick connect” fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; plastic outside for safety.

## Designed for fast, simple cartridge changing

Cartridge systems make changing gas filters quick and easy, and Super-Clean™ gas filters are the latest in cartridge-style gas filtration. A baseplate allows cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no longer a need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

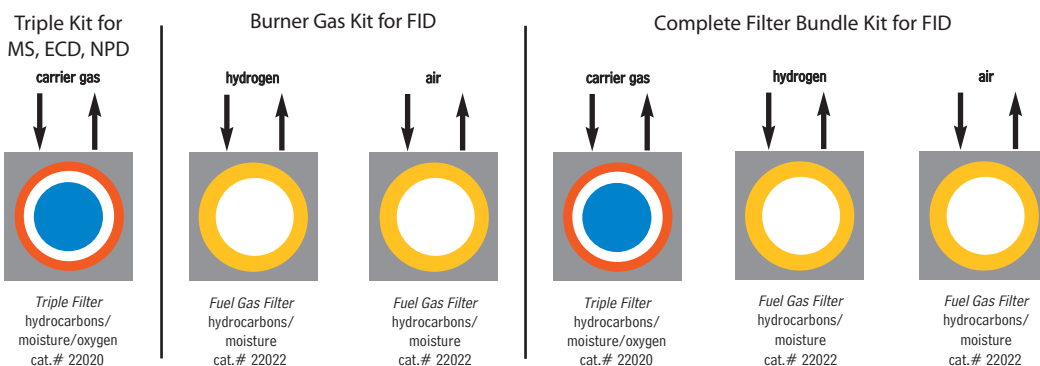
With available 2- or 3-position baseplates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these baseplates. Any combination is possible because any Restek Super-Clean™ filter cartridge can be used with any Restek baseplate.

## High-purity output for improved sensitivity (Table I)

The Triple Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge. The purity of your carrier gas after flowing through the Triple Filter is better than six-9s (99.9999% pure), which is ideal for sensitive mass spectrometry (MS) or ECD analyses, and for protecting your analytical columns against damage from contaminated carrier gas.

The Fuel Gas Filter cartridge (cat.# 22022) is perfect for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons. Using the Fuel Gas Filter for FID hydrogen and air will produce a stable baseline, improving overall reproducibility and sensitivity.

**Figure 1** Filter cartridges can be configured for different applications.



**Table I** Each Super-Clean™ filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity			Estimated Lifetime (years)
					H <sub>2</sub> O (g)	O <sub>2</sub> (mL)	Hydrocarbons (g)	
Moisture cat.# 22028	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	7.2	—	—	>2
Oxygen cat.# 22029	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Green to grey	NA	1000	—	>2
Hydrocarbons cat.# 22030	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	No indicator	NA	—	12 <sup>1</sup>	>2
Fuel Gas <sup>1</sup> cat.# 22022	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow to clear	3.5	—	24 <sup>1</sup>	>1.5
Triple <sup>2</sup> cat.# 22020	> 99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas	Yellow to clear Green to grey	1.8	500	4 <sup>1</sup>	>1
Helium Specific <sup>2</sup> cat.# 21982	> 99.9999	11 bar 159psi/ 7 L/min.	Helium	Yellow to clear Green to grey	1.8	500	—	>1

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

**Super-Clean™ Filter and Baseplate Kits**

Description	qty.	cat. #
Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021



All traps measure: 10<sup>5</sup>/<sub>8</sub>" x 1<sup>3</sup>/<sub>4</sub>"  
(27 x 4.4 cm)

Each baseplate unit measures:  
4" x 4" x 1<sup>7</sup>/<sub>8</sub>"  
(10.2 x 10.2 x 4.8 cm)

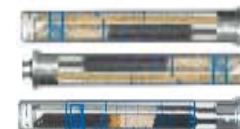
**Replacement Filters**

Description	qty.	cat. #
Replacement Triple Filter (removes oxygen, moisture and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022

**Filter Bundle Kit**

Kit includes two Fuel Gas Filters for FID fuel gases and one Triple Filter for carrier gas.

Description	qty.	cat. #
Filter Bundle Kit	kit	22031

**Super-Clean™ Ultra-High Capacity Filters**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029

**Helium-Specific Super-Clean™ Filter and Kit**

- Specifically designed for purification of helium in GC/MS systems.
- Traps are packed and conditioned using helium.
- Uses standard single-position baseplate.

Description	qty.	cat. #
Helium-Specific Carrier Gas Cleaning Kit (includes mounting baseplate, 1/8" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

**Baseplates**

Standard baseplate fittings are 1/8". To adapt to 1/4", order 1/8" to 1/4" tube-end unions (cat. # 21833, below).

Description	qty.	cat. #
Single-Position Baseplate	ea.	22025
2-Position Baseplate	ea.	22026
3-Position Baseplate	ea.	22027

**Wall Mounting Bracket**

Baseplates can be mounted by using screws and the mounting holes on the baseplate, or by using this optional wall mounting bracket.

Description	qty.	cat. #
Wall Mounting Bracket for Super-Clean™ Baseplates	ea.	21984

**Replacement O-Rings for Cartridge Baseplates**

Pack includes 10 large O-rings and 10 small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Cartridge Baseplates	20-pk.	22023

**1/8-Inch to 1/4-Inch Tube-End Unions**

To adapt 1/8" Super-Clean™ baseplate fittings to 1/4", use 1/8" to 1/4" tube-end unions.

Description	qty.	cat. #
1/8" to 1/4" Tube-End Unions	5-pk.	21833



## Super-Clean™ Gas Filter Systems



### Click-On Inline Super-Clean™ Traps

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Helium-Specific Triple Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters, SGT designed an inline trap. Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen. Spring-loaded check valves seal when a filter is removed and open only when a new filter has been locked in place. There is no need for loosening and tightening fittings every time a trap is changed, and your system will not become contaminated during the process.

The Triple Trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

The Fuel Gas Trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.

The Helium-Specific Triple Trap is ideal for purifying helium in GC/MS systems. This trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Trap replacement depends on the quality of the incoming gas. Use the double connector and install an indicating cartridge after a trap to indicate when the trap should be replaced.

### please note

Super-Clean™ Gas Filters are recommended for purifying noncorrosive gases with low concentrations of contaminants. The maximum concentration of oxygen in the incoming gas stream for oxygen purifiers is 0.5%.

Filter Type	Gas Quality at Outlet	Maximum Pressure	Maximum Flow (L/min.)	Use For	H <sub>2</sub> O (g)	Capacity O <sub>2</sub> (mL)	Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	21	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	3000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	NA	NA	36 <sup>3</sup>	>3
Fuel Gas <sup>1</sup> cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H <sub>2</sub>	10	NA	18 <sup>3</sup>	>2
Triple <sup>2</sup> cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	6	1000	12 <sup>3</sup>	>2

<sup>1</sup>Removes hydrocarbons, moisture.

<sup>2</sup>Removes hydrocarbons, moisture, oxygen.

<sup>3</sup>As *n*-butane.

### Click-On Inline Super-Clean™ Traps and Connector Kits

Description	qty.	cat.#
Carrier Gas Purification Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22456
Carrier Gas Purification Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22457
Carrier Gas Purification Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22458
Carrier Gas Purification Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon triple trap	kit	22459
Fuel Gas Purification Kit, 1/8" Stainless Steel Includes (4) 1/8" SS connectors and (2) hydrocarbon/moisture traps	kit	22460
Fuel Gas Purification Kit, 1/8" Brass Includes (4) 1/8" brass connectors and (2) hydrocarbon/moisture traps	kit	22461
Fuel Gas Purification Kit, 1/4" Stainless Steel Includes (4) 1/4" SS connectors and (2) hydrocarbon/moisture traps	kit	22462
Fuel Gas Purification Kit, 1/4" Brass Includes (4) 1/4" brass connectors and (2) hydrocarbon/moisture traps	kit	22463



**Click-On Inline Super-Clean™ Replacement Traps**

Description	qty.	cat. #
Click-On Super-Clean™ Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22464
Click-On Super-Clean™ Replacement Fuel Gas Trap (removes moisture and hydrocarbons)	ea.	22465

**Click-On Inline Super-Clean™ Ultra-High Capacity Traps**

Description	qty.	cat. #
Ultra-High Capacity Hydrocarbon Trap	ea.	22466
Ultra-High Capacity Moisture Trap	ea.	22467
Ultra-High Capacity Oxygen Trap	ea.	22468

**Helium-Specific Click-On Inline Super-Clean™ Trap and Connector Kits**

Description	qty.	cat. #
<b>Kits</b>		
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Stainless Steel Includes (2) 1/8" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22469
Helium-Specific Carrier Gas Cleaning Kit, 1/8" Brass Includes (2) 1/8" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22470
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Stainless Steel Includes (2) 1/4" SS connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22471
Helium-Specific Carrier Gas Cleaning Kit, 1/4" Brass Includes (2) 1/4" brass connectors and (1) oxygen/moisture/hydrocarbon helium-specific triple trap	kit	22472
<b>Replacement Trap</b> Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

**did you know?**

Helium-Specific Click-On Inline Super-Clean™ Trap and Kits are designed specifically for purification of helium in GC/MS systems!

**tech tip**

Install an indicator after the Click-On inline filter so there is no confusion about when to replace the traps.

**Click-On Inline Super-Clean™ Indicator**

- Oxygen: Green to Grey
- Moisture: Beige to Clear

Description	qty.	cat. #
Click-On Inline Super-Clean™ Indicator (oxygen, moisture)	ea.	22474

**Click-On Inline Super-Clean™ Connectors**

- Click-On connectors allow you to change traps quickly, without introducing oxygen into your system.

Description	qty.	cat. #
1/8" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22475
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22476
1/4" Brass Click-On Inline Super-Clean™ Connectors	2-pk.	22477
1/4" Stainless Steel Click-On Inline Super-Clean™ Connectors	2-pk.	22478

**Click-On Inline Super-Clean™ Double Connector**

- Connects any Click-On trap to a Click-On indicator.

Description	qty.	cat. #
Click-On Inline Super-Clean™ Double Connector, stainless steel	ea.	22479

**Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps**

Description	qty.	cat. #
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Traps	4-pk.	22480

**Replacement O-Rings for Click-On Inline Super-Clean™ Connectors**

- Pack includes 10 large O-rings and 10 Small O-rings.

Description	qty.	cat. #
Replacement O-Rings for Click-On Inline Super-Clean™ Connectors	20-pk.	22481



## Gas Purifiers / Traps



Dimensions: 21" x 1 1/2"  
(53.3 x 3.8 cm)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 19) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

### VICI® Mat/Sen® Gas-Specific Purifier Modules

- Replace separate oxygen, moisture, and hydrocarbon traps with one multiple-bed purifier, specific for purifying helium, hydrogen, nitrogen, or air.
- Reduce gas impurities from ppm to low ppb levels.
- Decrease baseline noise and increase GC/MS sensitivity.
- Pre-purged with the specified gas, to shorten downtime.

These gas-specific purifier modules offer dramatic reductions in contaminant levels—from ppm to levels that are below the limit of standard analytical detection. Performance is optimized by incorporating a multiple-bed format that progressively lowers concentrations of contaminants at each successive bed. VICI® Mat/Sen® purifiers are guaranteed to produce gases that are purer than 99.9999%, when supplied with gas of 99.995% purity, and are pre-purged with the specified gas to speed conditioning. Purifier capacity is approximately four tanks of gas at 99.995% (50ppm) purity, and correspondingly longer for purer gases.

#### Specifications:

Length:	21" (52.3cm)
Diameter:	1.5" (3.8cm)
Maximum Inlet Pressure:	1000psi (6895 kPa)
Maximum Recommended Flow:	500mL/min.

Pressure Drop from 120psi (827 kPa) inlet at a flow of 0-500mL/min.:	<0.20psi (2.1kPa)
Compression End Fittings:	1/8" or 1/4", stainless steel
Shipping Weight:	3.04 lb. (1300 g)

### it's a fact

The nitrogen module is excellent for LC/MS systems.

#### Gas-Specific

##### Purifier Module

	Compression Tube Fittings			
	1/4-inch		1/8-inch	
	qty.	cat.#	qty.	cat.#
Helium Purifier Module	ea.	22600	ea.	22601
Hydrogen Purifier Module	ea.	22602	ea.	22603
Nitrogen Purifier Module*	ea.	22604	ea.	22605
Air Purifier Module	ea.	22606	ea.	22607

\*Warning: Do not use with nitrogen containing more than 500ppm of oxygen. If the oxygen level in the stream exceeds 500ppm, use an air purifier.

### Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Pre-purged for fast stabilization.
- 100psig maximum operating pressure.
- Reduces oxygen to 0.1ppm.

Description	qty.	cat.#
Indicating Oxygen Trap, 1/8" Fittings	ea.	22010
Indicating Oxygen Trap, 1/4" Fittings	ea.	22011



Dimensions: 10" x 1 1/4"  
(25.4 x 3.2 cm)

### High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft<sup>3</sup> cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi.
- Flow: 3L/min. @ 32psi.

Description	qty.	cat.#
High-Capacity Oxygen Trap, 1/8" Fittings	ea.	20601
High-Capacity Oxygen Trap, 1/4" Fittings	ea.	20600



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

GC/MS Compatible

### High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi.
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
High-Capacity Moisture Trap, 1/8" Fittings	ea.	21997
High-Capacity Moisture Trap, 1/4" Fittings	ea.	20638



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

**Indicating Moisture Trap**

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Pre-purged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen & water infusion.
- 40µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100psig.

Description	qty.	cat. #
Indicating Moisture Trap, 1/8" Fittings	ea.	22014
Indicating Moisture Trap, 1/4" Fittings	ea.	22015



Dimensions: 13" x 2"  
(33 x 5.1 cm)

**Capillary-Grade Hydrocarbon Trap**

- Packed with an extremely high surface area, baked coconut shell-based activated carbon.
- Purged with ultra-high-purity helium.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Maximum operating pressure: 250psi.

Description	qty.	cat. #
Capillary-Grade Hydrocarbon Trap, 1/8" Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, 1/4" Fittings	ea.	21992



Dimensions: 11" x 1 1/2"  
(27.9 x 3.8 cm)

**Model FID-1000 and FID-2500 Gas Stations**

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5 - 6 FIDs.
- Eliminates inconvenient and dangerous cylinders.
- Silent operation, minimal operator attention required.

Parker Balston's Gas Stations provide both UHP grade hydrogen fuel gas and zero grade air for flame ionization detectors on gas chromatographs. The system is specifically designed to supply fuel gas to FIDs and to support flame thermionic and flame photometric detectors. The units produce zero air by purifying compressed air to a total hydrocarbon concentration of 0.1ppm or less (measured as methane).

The hydrogen generators produce hydrogen gas from deionized water, using the principle of electrolytic dissociation of water and hydrogen proton conduction through a proton exchange membrane cell.

**Specifications**

Hydrogen Purity:	99.9995%
Zero Air Purity:	FID-1000: < 0.1ppm total hydrocarbons as methane
	FID-2500: < 0.05ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate:	FID-1000: 90cc/min. FID-2500: 250cc/min.
Max. Zero Air Flow Rate:	FID-1000: 1000cc/min. FID-2500: 2500cc/min.
Power:	120VAC/amp, 60Hz, 400 watts
Hydrogen Outlet Pressure:	60 psig
Zero Air Outlet Pressure:	40-125 psig*
Inlet Connection:	1/4" NPT (female)
Outlet:	1/8" compression
Dimensions:	16.5"h x 10.5"w x 17"d (42cm x 27cm x 43cm)
Weight:	53 lbs. (24kg)

Description	qty.	cat. #
Model FID-1000 Gas Station (ideal for 1 - 2 FIDs)	ea.	20177
Model FID-2500 Gas Station (ideal for 5 - 6 FIDs)	ea.	24913

**Replacement Components for FID Gas Stations**

Resin Bed Cartridge for Hydrogen Generators in FID-1000 and FID-2500 Gas Stations	ea.	24914
Replacement Desiccant Cartridge	ea.	21671
FID Gas Station Maintenance Kit (Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

\*Zero air inlet requires minimum of 40psig compressed air pressure.



CE

Produce zero air and pure hydrogen from one unit!

**free literature**

For more information, download a free copy of our FID Gas Stations Fact Facts from [www.restek.com](http://www.restek.com)

lit. cat. # 580051

**International Power Cord Sets**

Just add the proper suffix to the catalog number for the gas generator you are ordering.

Location	qty.	cat. # suffix
United Kingdom (230VAC, 50/50Hz)	ea.	-550
European (230VAC, 50/60Hz)	ea.	-551
IEC Connector Only (230VAC, 50/60Hz)	ea.	-552
Japanese (200VAC, 50/60Hz)	ea.	-556
Japanese for Zero Air (100VAC, 50/60Hz)	ea.	-553
Japanese for Hydrogen (100VAC, 50/60Hz)	ea.	-554
Japanese for Nitrogen (100VAC, 50/60Hz)	ea.	-555

## Dual-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting



Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	21667
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	21668
CGA 590 (Air)	ea.	21669

## Single-Stage Ultra-High-Purity Chrome-Plated Brass Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with our dual-stage regulators.

Outlet pressure: 0 to 100psig  
 Outlet gauge: 30" – 0 to 200psig  
 Inlet gauge: 0 to 4000psig  
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N <sub>2</sub> , He, Ar)	ea.	20646
CGA 350 (H <sub>2</sub> , P <sub>2</sub> )	ea.	20647
CGA 590 (Air)	ea.	20648

## Ultra-High-Purity Chrome-Plated Brass Line Regulator

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20psi or more.
- Same purity protection as high-pressure cylinder regulators.

Inlet connections: 1/4" FPT  
 Outlet assembly: 1/4" FPT port



Fitting	Outlet Gauge	Outlet Pressure	qty.	cat.#
1/4" female NPT ports*	30" - 0 to 100psig	0-50psig	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig	0-100psig	ea.	22452

\*Order appropriate male connector, pipe-to-tube fittings.

## Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to the delivery of pure gas to your instrument. Restek's Stainless Steel Tubing is specially cleaned for inertness by using the procedure for processing our Silcosteel® and Siltek®-treated products, because scrupulously clean parts are a prerequisite for a quality coating.



### ordering note

Required length in meters  
 x 3.2808 = length in feet.

An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item:

# of Pieces	Added Charge
5 to 15	\$50
16 to 30	\$100
31 to 75	\$150
76 to 99	\$200
100 to 200	\$250

Tubing Dimensions		Length (per-foot pricing on 26 feet or more)		
		25 Feet	26–100 Feet	> 100 Feet*
ID (in.)	OD (in.)	cat.#	cat.#	cat.#
0.01" ID	1/32" OD	21500	21501	21502
0.02" ID	1/16" OD	21503	21504	21505
0.03" ID	1/8" OD	21506	21507	21508
0.04" ID	3/16" OD	21509	21510	21511
0.085" ID	3/8" OD	21512	21513	21514
0.21" ID	1/2" OD	21515	21516	21517

\*The availability of long lengths (continuous lengths up to 500 feet) is subject to inventory constraints. Please inquire before ordering.

## Cleaned Copper Tubing

- Adheres to ASTM B-280.
- Precleaned and ready to use.
- Use for plumbing GC systems.

ID	OD	Wall	qty.	cat.#
0.065"	1/8"	0.030"	50 ft.	21590
0.190"	1/4"	0.030"	50 ft.	21592

### GC Installation Kit

This kit contains the tubing and fittings needed to add an additional GC to your lab bench. Also included are four 1/8-inch tees, so carrier, fuel, and other GC gases can be routed to the new inlet or detector from existing gas lines. Order additional parts, such as purifiers or regulators, separately to customize the GC installation to your specifications. Kit includes: one tubing cutter, one 1/8-inch x 1/4-inch reamer, one 7/16-inch wrench, one 1/2-inch wrench, four 1/8-inch brass tees, ten 1/8-inch brass nuts, ten brass front and back ferrules, and 50 feet (15.2 meters) of our instrument-grade cleaned 1/8-inch copper tubing.



Description	qty.	cat.#
GC Installation Kit	kit	21325

### 1/16-Inch Tubing Cutter

- Produces square, smooth cuts in 1/16-inch tubing.
- Eliminates tubing distortion.
- Replaceable cutting wheel.



Description	qty.	cat.#
1/16" Tubing Cutter	ea.	20192
Replacement Cutting Wheels	3-pk.	20185

### Ridgid® Tubing Cutter

- Excellent for cutting 1/8- or 1/4-inch metal tubing.
- Compact size is ideal for tight spaces.
- Replaceable cutting wheel.



Description	qty.	cat.#
Ridgid® Tubing Cutter for 1/8" or 1/4" metal tubing	ea.	23011
Replacement Cutting Wheels	2-pk.	23012

### Tubing Reamer

- Removes burrs from stainless steel tubing.
- For 1/4- or 1/8-inch tubing.
- Non-slip safety design.



Description	qty.	cat.#
Tubing Reamer	ea.	20134

### Tubing Dressing Tool

Same tool as included with the SSI tube cutting machine.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/4" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191

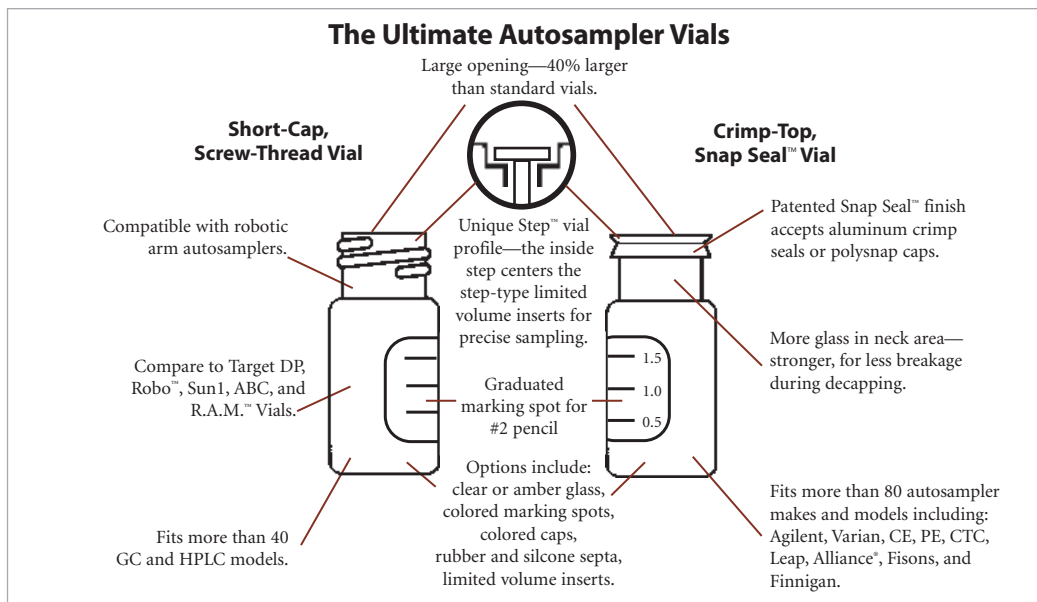


### 1/16-Inch Tubing Cutting Pliers

- Ideal for cutting 1/16-inch tubing.
- Cuts quickly, reducing distortion.
- Cuts clean, eliminating need for deburring.



Description	qty.	cat.#
1/16" Tubing Cutting Pliers	ea.	20193



## For a highly inert surface, we recommend Siltek® deactivation for your vials:

- Maximizes inertness, minimizes sample breakdown—ideal for difficult matrices and reactive compounds.
- Inert over a wide sample pH range.
- Low bleed.
- Thermally stable.

Our proprietary Siltek® deactivation process (US patent # 6,444,326) produces a highly inert glass surface that features high temperature stability, extreme durability, and low bleed. Try Siltek® deactivated vials for better recovery of sample analytes.

For Siltek® vials, add the corresponding suffix number to the vial catalog number.

Qty.	Siltek® Deactivation	
100-pk.	-222	addl. cost
1000-pk.	-223	addl. cost

## instrument reference

PerkinElmer Instrument Model #	11mm Crimp-Top	9mm Short-Cap, Screw-Thread	8mm Crimp-Top 8 x 30mm	Headspace	8mm Screw-Thread
AI-1	X	X	X		
ISS 100, LC 600 42 vial tray	X	X			
ISS 200	X	X		X	
Integral 4000	X			X	
Autosystem GC 420/B, 4900	X			X	X
F40, F45, HS 6, HS 40				X	
LC 600 (60), AS100/B, 300, 8300, AS2000, LC 30, 2000, B 2000			X		

**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 31** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**Limited Volume Inserts for 2mL Crimp-Top & Short-Cap, Screw-Thread Vials**

Description	100-pk.	1000-pk.
50µL Glass, Big Mouth, Bottom Spring	24513	21782
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777
250µL Glass, Big Mouth Insert w/ Glass Flange (Step™ Design)*	24516	21779
350µL Glass, Flat Bottom Insert	21780	24517
350µL Glass, Flat Bottom Insert w/ ID Ring	24692	24693
250µL Polypropylene, Big Mouth, Bottom Spring	24518	—
250µL Polypropylene, Big Mouth, Top Flange	24519	—
250µL Polypropylene, Big Mouth, No Spring	24520	—

\*Not to be used with 9mm screw-thread vials.

**Limited Volume Vials, 11mm Crimp-Top**

Description	100-pk.	1000-pk.
100µL Polypropylene	24651	24652
100µL Glass Insert/Clear Plastic Vial	24653	—

**instrument **reference******For 11mm Crimp-Top Vials**

Manufacturer	Instrument/Model #
PerkinElmer	Autosystem GC, AI-1, Integral 4000, ISS 100, ISS 200, LC 600 42 vial tray, 420/B, 4900

## 9mm Screw-Thread Vials / 8mm Crimp-Top Vials

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.



Ideal for autosamplers that process 12 x 32mm crimp-top vials.

Are you tired of dealing with crimp-top vials, but worried about using screw-thread vials with your autosampler? If you want the performance of a crimp-top vial with the convenience of a screw-thread vial, these vials are the answer for you.

### 9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

### 9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—

## instrument reference

### For 9mm Short-Cap, Screw-Thread Vials

Manufacturer	Instrument/Model #
PerkinElmer	AI-1, ISS 100, ISS 200, LC 600 42 vial tray

### 8mm Crimp-Top Vials, 0.8mL, 8 x 30mm

#### 0.8mL Crimp-Top Vials—8 x 30mm, 8mm Crimp

Description	100-pk.	1000-pk.
0.8mL Clear Flat Bottom Vials	24695	24696

#### 8mm Aluminum Seals w/Septa

Description	100-pk.	1000-pk.
Silver Seals w/Clear PTFE/Natural Rubber Septa	21757	21758

### 8mm Crimper and Decapper

Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736

### For 8mm Crimp-Top Vials, 8 x 30mm

Manufacturer	Instrument/Model #
PerkinElmer	LC 600 (60), AS100/B, 300, 8300, AI-1, AS2000, LC 30, 2000, B 2000

**Screw-Thread Vials, 12 x 32mm, 8mm/425 Thread****Fit all 2.0mL, 12 x 32mm, Screw-Thread Vial-Based Autosamplers.**

These vials provide the most secure environment for your sample, because evaporation is minimized. We offer both deactivated (on request) and non-deactivated vials.

**Screw-Thread Vials—12 x 32mm, 8mm/425 Thread**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, White Graduated Marking Spot	24619	24620
2.0mL Amber Vial, White Graduated Marking Spot	24621	24622

**8mm Pre-Assembled Caps and Septa**

Description	100-pk.	1000-pk.
8/425 Black Cap w/ Red PTFE/Silicone Septa, 0.065"	21149	21720
8/425 Black Top Hat™ PTFE/Silicone Septa	21721	21722

**Pre-Assembled Vial Kits: 8mm/425 Screw-Thread, Unmarked Vials, Septa, and Caps**

Caps attached to vials.

Description	100-pk.	1000-pk.
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24630	24631
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.045"	24632	24633
Clear Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24634	24635
Amber Vial, Black Cap, Red PTFE/Silicone Septa, 0.065"	24636	24637

**Convenience Kits: Vials w/Pre-Assembled Caps and Septa Packed Separately****(Black Polypropylene Open-Hole Caps and 8mm Red PTFE/Silicone Septa, 0.065")**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, Silcote™ CL7-Deactivated	24638	24639
2.0mL Amber Vial, Silcote™ CL7-Deactivated	24640	24641
2.0mL Clear Vial, untreated	21192	21193
2.0mL Amber Vial, untreated	21194	21195

**8mm/425 Thread Polypropylene Caps for 8mm Screw-Thread Vials**

Description	100-pk.	1000-pk.
Black, Open-Hole Cap	21176	21177



8mm (2.0mL)  
Screw-Thread Vial

**instrument reference****For 8mm Screw-Thread Vials**

Manufacturer	Instrument/Model #
PerkinElmer	Autosystem GC, 420/B, 4900

## Headspace Vials



### Headspace Autosampler Vials\*

Description	100-pk.	1000-pk.
a) 6mL Clear Vial	21166	21167
10mL Clear Vial, Flat Bottom	24683	24684
b) 10mL Clear Vial, Rounded Bottom	21164	21165
20mL Clear Vial, Flat Bottom	24685	24686
c) 20mL Clear Vial, Rounded Bottom	21162	21163
27mL Clear Vial	21160	21161

\*a) - c) designated in instrument reference chart below.

### 20mm Aluminum Seals w/Septa, Assembled



Description	100-pk.	1000-pk.
Silver Seal w/ PTFE/Gray Butyl Rubber	21761	21762
Silver Seal w/ PTFE/Silicone	21763	21764
Pressure Release Silver Seal w/ PTFE/Gray Butyl Rubber Septum	21765	21766
Pressure Release Silver Seal w/ PTFE/Silicone Septum	21767	21768
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 8mm Hole	22831	22832
20mm Magnetic Crimp Cap w/Teflon®/Silicone Septum (tan/white) with 5mm Hole	22833	22834
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 8mm Hole	22835	22836
20mm Magnetic Crimp Cap w/PTFE/Butyl Septum with 5mm Hole	22837	22838

5mm hole is compatible with the following systems: Carlo Erba HS500/HS800, CTC 500, Fisons HS500/HS800 and Varian/Chrompack 9020/25. 8mm hole is compatible with the Combi Pal.

## instrument reference

### For Headspace Vials

Manufacturer	Instrument/Model #
a) PerkinElmer	ISS 200
b) PerkinElmer	Autosystem GC, F40, F45, HS 6, Integral 4000, HS 40
c) PerkinElmer	Autosystem GC, F40, F45, HS 6, Integral 4000, HS 40

### Aluminum Seal Crimpers and Decappers

Safer than removing caps with pliers, knife or screwdriver blade!



Decapper



Crimper

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!

Description	qty.	cat. #
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738



**Hand-held Rechargeable Crimpers and Rechargeable Decappers**

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.

**Decapping has never been easier!**

one...



two...



three!



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK



### did you know?

Syringes and needles manufactured by Hamilton Company and SGE are intended for scientific research and laboratory use only and are not intended for human *in vivo* use.

Restek offers complementing lines of syringes from Hamilton & SGE.

- Hamilton: The historical leader in precision fluid measuring devices for more than 50 years, with a commitment to precision, quality, and accuracy.
- SGE: More than 35 years of providing a comprehensive range of analytical syringes unsurpassed in design, quality, and performance.

### Needle Gauge Chart

Gauge	Nominal OD		Nominal ID	
26s	0.019 in.	0.47mm	0.0050 in.	0.13mm
26	0.018 in.	0.46mm	0.0102 in.	0.26mm
25	0.021 in.	0.51mm	0.0102 in.	0.26mm
23s	0.025 in.	0.64mm	0.0060 in.	0.15mm
23	0.025 in.	0.64mm	0.0132 in.	0.34mm
22s	0.028 in.	0.72mm	0.0060 in.	0.15mm
22	0.028 in.	0.72mm	0.0162 in.	0.41mm

### Needle Point Style

Restek offers several different point styles on syringe and needle products. Choose one depending on your application.



**Point Style 2, BV:** beveled needle tip. Recommended for optimum septum penetration and prevention of septum coring.



**Point Style 3, LC:** square/blunt needle tip. For use with HPLC injection valves and for sample pipetting.



**Point Style 5:** conical needle with side hole. Liquid samples are filled and dispensed through the side hole.



**Point Style H:** domed needle tip with a side hole. Liquid samples are filled and dispensed through the side hole. The solid tip minimizes septum damage.



**Point Style Agilent/Cone:** Special conical style needle point used exclusively on syringes for autosamplers.

### Syringe Termination

From cemented to removable needles and from Teflon® luer-lock to special syringe fittings, syringe barrel terminations create the interface between a syringe and its mating connection. For your reference, we have listed the Hamilton/SGE designations for the most common terminations below.



#### N, Cemented Needle / F, Fixed:

Needle cemented into the glass syringe barrel at a point corresponding to the zero graduation mark. Not autoclavable.



#### KH, Knurled Hub / R, Removable:

Used on 7000 Series Hamilton syringes, exclusively. Knurled hub enables 6000 psig maximum injection pressures and the attachment of a spacer for repeatable-depth injections. Autoclavable when disassembled.



#### RN, Removable Needle / R, Removable:

Needle seats precisely to the zero graduation mark of the syringe. Allows the use of different specification needles on the same syringe barrel. Autoclavable when disassembled.



#### TLL, Teflon® Luer-Lock / LL, Luer Lock / LT, Luer Tip:

Male luer taper with nickel-plated brass hub accepts and locks into place luer hub needles and connectors. Autoclavable when disassembled.

**Autosampler Syringes for PerkinElmer Autosystem™ and Clarus 500 GCs**

- Hamilton syringes are designed and tested to meet critical autosampler performance.
- Needle point styles are developed to withstand multiple and rapid injections through a septum.



Hamilton 5µL Autosampler Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat.#	qty.	Restek cat.#
5µL	ASN	23	2.756"	3	75ASN/PE	88035	ea.	24953
5µL	ASN	26	2.756"	3	75ASN/PE	88040	ea.	24952



SGE 5µL Autosampler Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat.#	qty.	Restek cat.#
0.5µL	R	23	70mm	Cone	0.5BR-PE-0.63	000478	ea.	24811
0.5µL	R	26	70mm	Cone	0.5BR-PE-0.47	000475	ea.	24810
5µL	F	23	70mm	Cone	5F-PE-0.63	001954	ea.	24813
5µL	F	23	70mm	Cone	5F-PE-GT-0.63*	001957	ea.	24815
5µL	F	26	70mm	Cone	5F-PE-0.47	001953	ea.	24812
5µL	F	26	70mm	Cone	5F-PE-GT-0.47*	001955	ea.	24814
50µL	F	23	70mm	Cone	50F-PE-0.63	004670	ea.	24816

\*Gas-tight.

**Guide to Needle Termination Codes****Hamilton:**

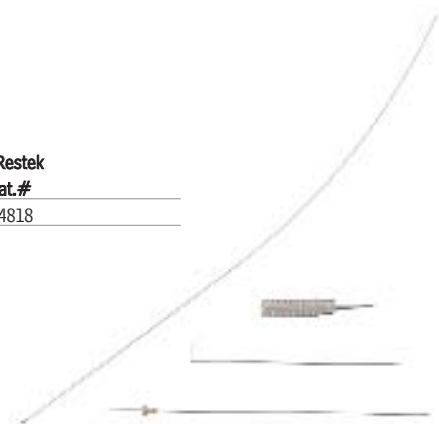
(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler Cemented Needle  
 (ASRN) Autosampler Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip

**Replacement Needles for PerkinElmer Autosampler Syringes****Needle and Plunger Kits**

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
0.5µL	23	70mm	Cone	033765	kit	24818



## Standard Microliter Volume Syringes

### Standard Microliter Volume Syringes

- Economical.
- Available with cemented needles (N/F) or removable needles (RN/R).
- Each syringe plunger and barrel assembly is manufactured as one working unit; components are not interchangeable or individually replaceable.



Hamilton 700 Series Microliter Syringe

#### Hamilton Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	Hamilton cat. #	qty.	Restek cat. #
5 $\mu$ L	N	26s	2"/51mm	2	75N	87900	ea.	24938
5 $\mu$ L	RN	26s	2"/51mm	2	75RN	87930	ea.	24617
10 $\mu$ L	N	26s	2"/51mm	2	701N	80300	ea.	20174
10 $\mu$ L	N	26s	2"/51mm	2	701N	80366	6-pk.	20175
10 $\mu$ L	RN	26s	2"/51mm	2	701RN	80330	ea.	24530
25 $\mu$ L	N	22s	2"/51mm	2	702N	80400	ea.	24531
10 $\mu$ L	N	26s	2"/51mm	5	701NPT5	80339	ea.	24967
*25 $\mu$ L	RN	22s	2"/51mm	2	702RN	80430	ea.	24532
50 $\mu$ L	N	22s	2"/51mm	2	705N	80500	ea.	24533
*50 $\mu$ L	RN	22s	2"/51mm	2	705RN	80530	ea.	24534
100 $\mu$ L	N	22s	2"/51mm	2	710N	80600	ea.	24535
*100 $\mu$ L	RN	22s	2"/51mm	2	710RN	80630	ea.	24536
250 $\mu$ L	N	22s	2"/51mm	2	725N	80700	ea.	24537
*250 $\mu$ L	RN	22s	2"/51mm	2	725RN	80730	ea.	24538
500 $\mu$ L	N	22	2"/51mm	2	750N	80800	ea.	24539
*500 $\mu$ L	RN	22	2"/51mm	2	750RN	80830	ea.	24540



SGE Standard Microliter Volume Syringe

#### SGE Syringes

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	SGE cat. #	qty.	Restek cat. #
5 $\mu$ L	F	26	50mm	2	5F**	001000	ea.	24700
*5 $\mu$ L	R	26	50mm	2	5R**	001050	ea.	24701
10 $\mu$ L	F	26	50mm	2	10F**	002000	ea.	24702
10 $\mu$ L	F	26	50mm	2	SK-10F**	002030	6-pk.	24715
*10 $\mu$ L	R	26	50mm	2	10R**	002050	ea.	24703
*10 $\mu$ L	R	26	50mm	2	SK-10R**	002080	6-pk.	24716
25 $\mu$ L	F	25	50mm	2	25F	003000	ea.	24704
*25 $\mu$ L	R	25	50mm	2	25R	003050	ea.	24705
50 $\mu$ L	F	25	50mm	2	50F	004000	ea.	24706
*50 $\mu$ L	R	25	50mm	2	50R	004050	ea.	24707
100 $\mu$ L	F	25	50mm	2	100F	005000	ea.	24708
*100 $\mu$ L	R	25	50mm	2	100R	005050	ea.	24709
250 $\mu$ L	F	25	50mm	2	250F	006000	ea.	24710
*250 $\mu$ L	R	25	50mm	2	250R	006050	ea.	24711
500 $\mu$ L	F	25	50mm	2	500F	007000	ea.	24712
*500 $\mu$ L	R	25	50mm	2	500R	007050	ea.	24713

\*For replacement RN/R needles, see page 36.

\*\*With plunger protection.



**Teflon® Tip, Gas-Tight Syringes**

- Suitable for gases or liquids for maximum inertness.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.



Hamilton 1700/1000 Series Gas-Tight Syringe

**Hamilton Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton			Restek
					Model	cat. #	qty.	cat. #
10µL	N	26s	2"/51mm	2	1701	80000	ea.	24557
10µL	RN	26s	2"/51mm	2	1701	80030	ea.	24558
25µL	N	22s	2"/51mm	2	1702	80200	ea.	24559
25µL	RN	22s	2"/51mm	2	1702	80230	ea.	24560
50µL	N	22s	2"/51mm	2	1705	80900	ea.	24561
50µL	RN	22s	2"/51mm	2	1705	80930	ea.	24562
100µL	N	22s	2"/51mm	2	1710	81000	ea.	24563
100µL	RN	22s	2"/51mm	2	1710	81030	ea.	24564
250µL	N	22s	2"/51mm	2	1725	81100	ea.	24567
250µL	RN	22s	2"/51mm	2	1725	81130	ea.	24568
500µL	LTN	22	2"/51mm	2	1750	81217	ea.	24571
500µL	RN	22	2"/51mm	2	1750	81230	ea.	24572
1mL	LTN	22	2"/51mm	2	1001	81317	ea.	24575
1mL	RN	22	2"/51mm	2	1001	81330	ea.	24576
1mL	TLL	*	—	w/out slots	1001	81320	ea.	24578
2.5mL	TLL	*	—	w/out slots	1002	81420	ea.	24584
2.5mL	RN	22	2"/51mm	2	1002	81430	ea.	24582
2.5mL	N	22	2"/51mm	2	1002	81417	ea.	24581
5mL	TLL	*	—	w/out slots	1005	81520	ea.	20178
10mL	TLL	*	—	w/out slots	1010	81620	ea.	20179
25mL	TLL	*	—	w/out slots	1025	82520	ea.	24591
50mL	TLL	*	—	w/out slots	1050	85020	ea.	24717

**Guide to Needle Termination Codes****Hamilton:**

(N) Cemented Needle  
 (RN) Removable Needle  
 (ASN) Autosampler  
 Cemented Needle  
 (ASRN) Autosampler  
 Removable Needle  
 (TLL) Teflon® Luer Lock  
 (KH) Knurled Hub  
 (LT) Luer Tip  
 (LTN) Luer Tip Cemented  
 Needle

**SGE:**

(F) Fixed Needle  
 (R) Removable Needle  
 (LL) Luer Lock  
 (LT) Luer Tip



SGE Gas-Tight Syringe

**SGE Syringes**

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE			Restek
					Model	cat. #	qty.	cat. #
10µL	F	26	50mm	2	10F-GT	002200	ea.	24725
10µL	R	26	50mm	2	10R-GT	002250	ea.	24726
25µL	F	25	50mm	2	25F-GT	003200	ea.	24727
25µL	R	25	50mm	2	25R-GT	003250	ea.	24728
50µL	F	25	50mm	2	50F-GT	004200	ea.	24729
50µL	R	25	50mm	2	50R-GT	004250	ea.	24730
100µL	F	25	50mm	2	100F-GT	005200	ea.	24734
100µL	R	25	50mm	2	100R-GT	005250	ea.	24735
100µL	LL	*	—	—	100F-LL-GT	005230	ea.	24737
250µL	F	25	50mm	2	250F-GT	006200	ea.	24738
250µL	R	25	50mm	2	250R-GT	006250	ea.	24739
250µL	LL	*	—	—	250F-LL-GT	006230	ea.	24741
500µL	F	25	50mm	2	500F-GT	007200	ea.	24742
500µL	R	25	50mm	2	500R-GT	007250	ea.	24743
1mL	R	23	50mm	2	1MR-GT	008100	ea.	24750
1mL	LL	*	—	—	1MDF-LL-GT	008025	ea.	24752
2.5mL	LL	*	—	—	2.5MDF-LL-GT	008425	ea.	24755
5mL	LL	*	—	—	5MDR-LL-GT	008760	ea.	24757
10mL	LL	*	—	—	10MDR-LL-GT	008960	ea.	24759
25mL	LL	*	—	—	25MDR-LL-GT	009462	ea.	24760
50mL	LL	*	—	—	50MR-LL-GT	009660	ea.	24761
100mL	LL	*	—	—	100MR-LL-GT	009760	ea.	24762

\*Needles sold separately. See page 36.

## Gas-Tight Syringe Replacement Needles

### Teflon® Tip, Gas-Tight Syringe Replacement Needles for Removable Needle Syringes

Materials: stainless steel needle, nickel plated brass hub

#### Needles for Hamilton Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
5–100µL	26s	2"	2	7758-02	6-pk.	24939
5–100µL	22s	2"	2	7758-03	6-pk.	24940
250µL–10mL	22	2"	2	7779-01	6-pk.	24942
250µL–10mL	26s	2"	2	7779-02	6-pk.	24943
250µL–10mL	22s	2"	2	7779-03	6-pk.	24944

#### Needles for SGE Syringes

Syringe Volume	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
5µL	26	50mm	2	036110	5-pk.	24802
10µL	23	50mm	2	037111	5-pk.	24804
10µL	26	50mm	2	037110	5-pk.	24803
25–500µL	23	50mm	2	038111	5-pk.	24806
25–500µL	25	50mm	2	038110	5-pk.	24805
1–2.5mL	23	50mm	2	039110	5-pk.	24807

### Gas-Tight Syringe Replacement Needles for Luer-Lock Syringes

#### Needles for Hamilton Syringes

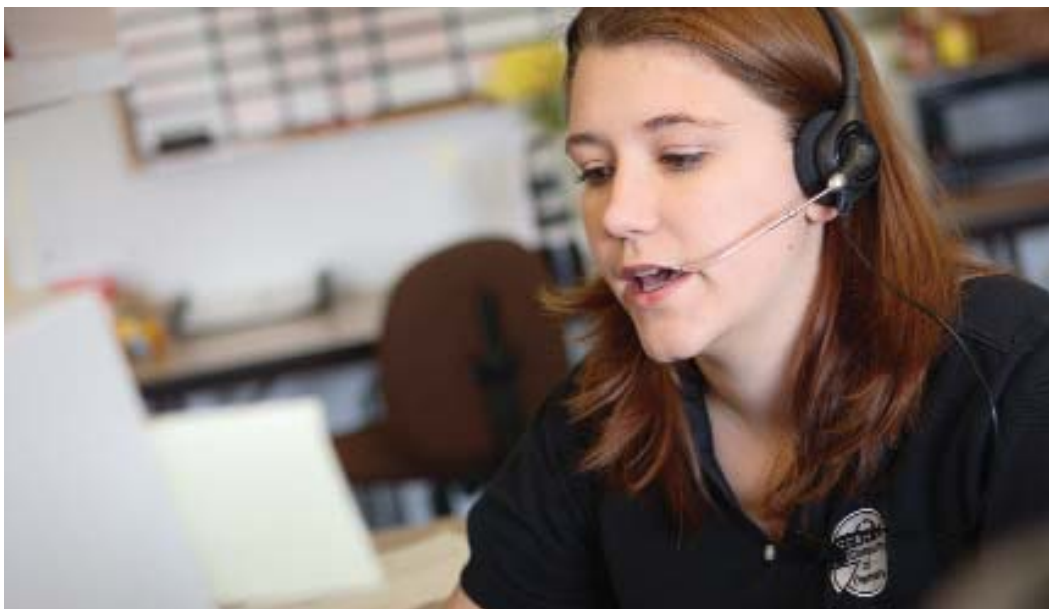
Hub Material	Needle Gauge	Needle Length	Point Style	Hamilton cat.#	qty.	Restek cat.#
metal	26s	2"/51mm	2	90053	6-pk.	20133
metal	25s	1.97"	3	90049*	6-pk.	24605
metal	22s	2"/51mm	2	90051	6-pk.	24606
Kel-F® (Teflon® tip)	26s	2"/51mm	2	90153	6-pk.	24607
Kel-F® (Teflon® tip)	25s	1.97"	3	90149*	6-pk.	24608
Kel-F® (Teflon® tip)	22s	2"/51mm	2	90151	6-pk.	24609

\*For Waters U6K injection valve.

#### Needles for SGE Syringes

Hub Material	Needle Gauge	Needle Length	Point Style	SGE cat.#	qty.	Restek cat.#
metal	23	50mm	2	039802	5-pk.	24763
metal	22	2"/51mm	3	039895**	2-pk.	24765
metal	18	50mm	2	039842	5-pk.	24764

\*\*For Rheodyne®/Valco® valves.



## In the U.S.

**Call:** 800-356-1688 (ext. 3) or 814-353-1300 (ext. 3)  
Monday–Friday 8:00 a.m.–6:00 p.m.  
Eastern Standard Time

**Fax:** 814-353-1309—24-hours a day

**Online:** [www.restek.com](http://www.restek.com)—24-hours a day

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**Contact your Restek representative:**

Refer to our website at [www.restek.com](http://www.restek.com)



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- Innovative **products**  
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# HPLC Products

2007/08 Edition

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hplc accessories

hplc replacement parts

analytical reference materials

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**New**

**1.9 $\mu$ m Pinnacle™ DB**

Small Particle HPLC Columns

See page 8 for details.

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**New** 1.9 $\mu$ m Pinnacle™ DB  
Small Particle HPLC Columns

See page 8 for details.



# What's New

## HPLC Columns

**Small particle HPLC columns:**

our popular Pinnacle™ DB packings in 1.9µm particle size. Pages 8-9.

**Capillary HPLC columns** for micro LC. Page 11.

**pHidelity™ C18 columns:** pH stable columns—up to pH 12. Page 10.

**Allure® Biphenyl columns:** enhanced selectivity for unsaturated compounds. Now in both 3µm & 5µm particle sizes. Page 20.

**Allure® AK columns:** resolve 13 carbonyl compounds in 15 minutes. Page 21.

**New phases on Viva Wide Pore silica: Viva Biphenyl and Viva PFP Propyl HPLC columns,** Restek manufactured wide pore Viva silica. Page 30.

**Restek is now your primary source for all Kromasil® columns and packings.** Pages 32-33.

## HPLC Accessories

**Outlet cap, outlet cap & gold seal assembly, and connecting tubing** for Agilent instruments. Page 41.

**Capillary assemblies** for Agilent systems. Page 40.

**Syringes for CTC/Leap instruments.** Page 65.

**Two-way, three-way, prime/purge, and check valves.** Page 45.

**Restek Pack in a Box Kit:**

everything you need to pack your own analytical HPLC columns. Page 59.

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## Column Selection



**Becky Wittrig**  
HPLC Products  
Marketing Manager  
6+ years of service!

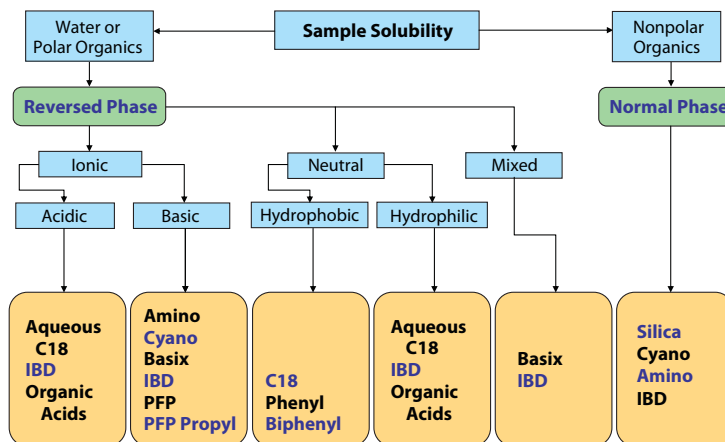
### ordering note

For assistance in selecting an HPLC column, please contact Restek Technical Service at 814-353-1300 or 800-356-1688 (ext. 4) or support@restek.com.

### Selecting an HPLC Column

Choosing the best column for your application requires consideration of stationary phase chemistry, retention capacity, particle size, and column dimensions. Identifying the best stationary phase for your separation is the most critical step of column selection, and your decision should be based on sample solubility and the chemical differences among the compounds of interest. Figure 1 is a handy tool for stationary phase selection.

**Figure 1** Stationary phase selection.



Reversed phase columns (e.g. alkyl, phenyl, cyano) work well for water-soluble hydrophobic compounds. Some stationary phases incorporate both polar and nonpolar functionality and can be used in either reversed phase or normal phase modes (e.g. Ultra IBD, Allure® Basix, and Allure® PFP Propyl). While straight chain alkyl (e.g. C18) stationary phases are historically the most commonly used, many newer phases provide better separations. Alkyl phases are best suited for analyzing neutral compounds with a high ratio of carbon:heteroatoms where the major distinction among analytes is their hydrophobicity. However, for analyzing compounds that are highly polar, aromatic, or halogenated, nonalkyl stationary phases often provide significantly better selectivity (Figure 2).

Retention capacity is another important consideration and is influenced by surface area and carbon load (% carbon in the packing material). Allure® columns were designed for maximum retention using a high density of ligands bonded to a large surface area silica. Ultra, Kromasil®, Pinnacle™ II and Pinnacle™ DB columns have the same high ligand density, but are more moderately retentive due to their lower surface areas. Surface area is inversely proportional to pore size; thus, larger pore sizes result in less retention. However, wide pore (e.g. 300Å) packings, such as Viva, are ideal when analyzing larger molecules, as a larger pore size is necessary to allow the analytes to 'fit' into the pores.

Particle size and column dimensions also influence column choice. In selecting a particle size, the primary consideration is efficiency (plates/meter) versus column pressure. A 3µm column will have approximately 50% more efficiency than a 5µm column, if all other conditions are constant for both columns. As particle size is further decreased (e.g. <2µm), theoretically, efficiencies will increase proportionally, based on the Van Deemter equation (and the usable flow rate range is much wider). Please note that column backpressure also increases as particle size decreases. Column dimensions include internal diameter and length, where the most commonly used internal diameter (ID) for HPLC columns is 4.6mm. In theory, resolution and pressure should be independent of column ID as long as flow rate is adjusted to maintain the same mobile phase linear velocity (flow rate is proportional to column cross-sectional area). Table I shows the approximate optimum flow rates for four column IDs.

**Table I** Approximate optimum flow rates for various analytical column IDs.

ID (mm)	5µm Particles Optimum Flow Rate (mL/min.)	3µm Particles Optimum Flow Rate (mL/min.)
4.6	1.00	1.5
3.2	0.50	0.73
2.1	0.20	0.31
1.0	0.05	0.07

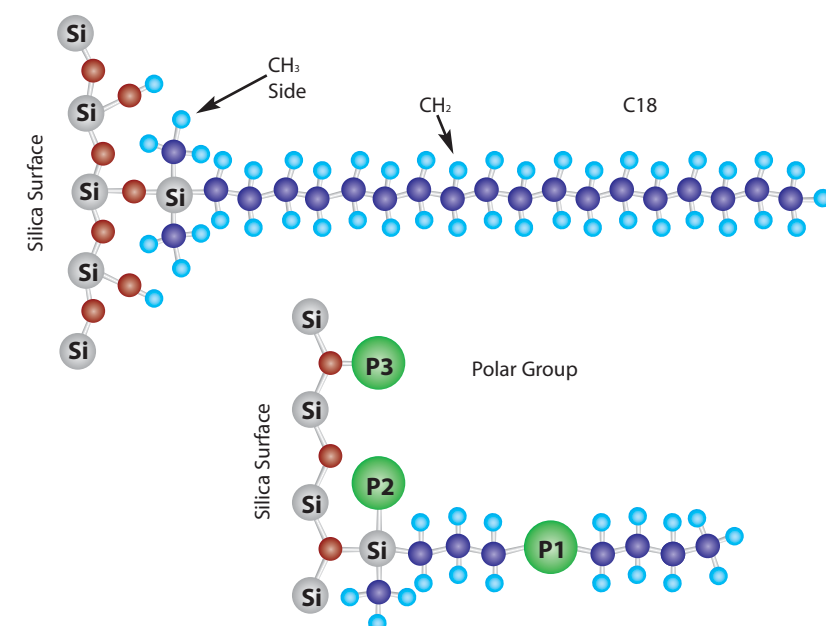


### HPLC Tech Tips Wall Chart

Almost everything you need to remember about HPLC, condensed into 3 feet by 2 feet: mobile phase basics, buffers (types, pK<sub>a</sub> values, pH ranges, formula masses, more), miscibility and solubility chart (invaluable!), system setup and optimization, detector tips, pressure conversion factors, most-used chromatographic equations, column storage essentials.

(lit. cat. # 59894A)

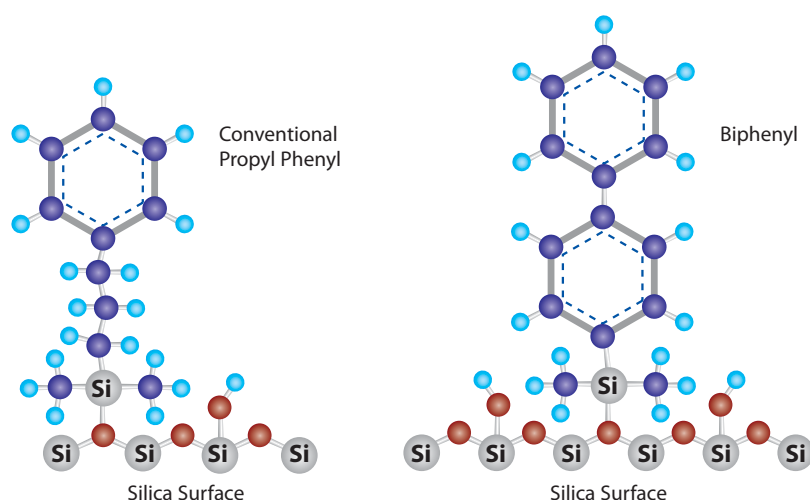


**Figure 2** Stationary phase comparison.**Alkyl phases (e.g. C18)**

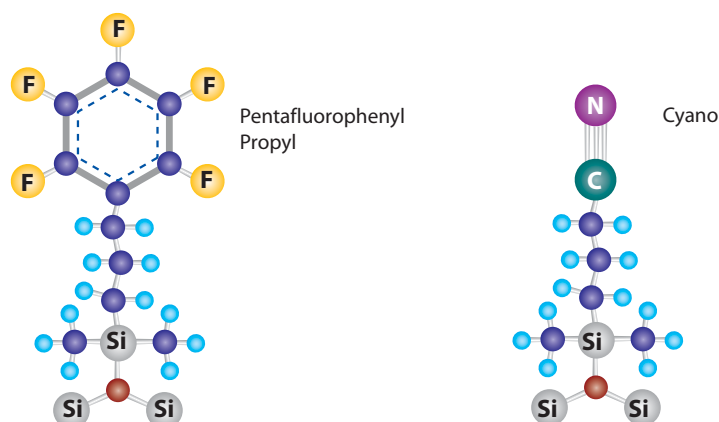
Alkyl-based stationary phases, such as C18, are best suited for analyzing hydrophobic molecules with a high carbon:heteroatom ratio.

**Alkyl phase with polar functional group**

An alkyl-based stationary phase with either an embedded polar group (P1), a polar side chain (P2), or a polar end-cap (P3), has significantly greater interaction with polar compounds than a traditional alkyl phase.

**Phenyl & Biphenyl phases**

Phenyl stationary phases interact with compounds containing aromatic groups or unsaturated bonds through  $\pi$ - $\pi$  interactions. The biphenyl stationary phase has even greater interaction due to the higher concentration of aromatic rings.

**Cyano & Fluorinated phases**

Fluorinated phases (such as the pentafluorophenyl propyl (PFP propyl)) and cyano-based phases interact strongly with basic, nitrogen-containing and halogenated analytes.

## Physical Characteristics of Restek HPLC Columns

Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications
Pinnacle™ DB C18	Y	140	11	Hydrophobic C18 phase suitable for analyses of a wide range of compounds, from acidic through slightly basic.
Pinnacle™ DB C8	Y	140	6	Applications similar to Pinnacle™ DB C18, but with less hydrophobic retention. Less retention can be useful for shortening analysis time, if resolution is adequate.
Pinnacle™ DB Cyano	Y	140	4	Suitable for a wide range of compounds, from acidic through slightly basic. Also useful for confirmation of analyses on a C18 or C8 column. Can be used in normal phase or reversed phase mode of separation.
Pinnacle™ DB Phenyl	Y	140	5.3	Suitable for polar aromatic compounds, fatty acids, purines and pyrimidines.
Pinnacle™ DB Silica	NA	140	NA	Normal phase mode of separation.
Pinnacle™ II C18	Y	110	13	Superior general purpose C18 for non-basic analytes.
Pinnacle™ II PAH	Y	110	—	Maximum resolution of polynuclear aromatic hydrocarbons.
Pinnacle™ II C8	Y	110	7	Superior general purpose C8 for non-basic analytes.
Pinnacle™ II Cyano	Y	110	4	Superior general purpose cyano for weakly-basic analytes. Used in either normal or reversed phase analyses.
Pinnacle™ II Phenyl	Y	110	6	Superior general purpose phenyl for neutral analytes.
Pinnacle™ II Amino	N	110	2	Excellent general purpose amino phase. Excellent choice for carbohydrate analysis.
Pinnacle™ II Biphenyl	Y	110	—	Multiple aromatic ring structures; excellent for explosives.
Pinnacle™ II Silica	NA	110	NA	Ideal for polar analytes.
Allure® C18	Y	60	27	Ideal for MS and light-scattering detection of neutral to slightly polar solutes. Separates basic compounds, showing good deactivation; excellent for explosives or steroids.
Allure® Aqueous C18	N	60	—	Ideal for analyses that require >90% water in the mobile phase. Excellent for highly water soluble or poorly organic soluble compounds. Excellent for water-soluble vitamins and organic acids. More retention than Ultra Aqueous columns.
Allure® AK	Y	60	—	Ideal for the analysis of aldehydes and ketones as DNPH derivatives.
Allure® Basix	Y	60	12	Ideal for LC/MS of basic solutes. Excellent for basic pharmaceuticals or other amine-containing compounds.
Allure® PFP Propyl	Y	60	17	Ideal for MS, ELSD, or NPD detection of nucleosides, nucleotides, purines, pyrimidines, or halogenated compounds.
Allure® Organic Acids	N	60	NA	Excellent resolution of challenging organic acids.
Allure® Biphenyl	Y	60	23	Multiple ring structure; excellent for aromatic and unsaturated compounds. Increased retention over traditional phenyl phases.
Allure® Silica	NA	60	NA	Highly retentive phase for normal phase separation.
Ultra C18	Y	100	20	Ideal for anilines, barbiturates, carbonyls, fat-soluble vitamins, fatty acids, glycerides, phthalates, PTH amino acids, steroids, other acids.
Ultra Aqueous C18	N	100	15	Ideal for analyses that require >90% water in the mobile phase. Excellent for highly water soluble or poorly organic soluble compounds. Excellent for water-soluble vitamins and organic acids.
Ultra IBD	N	100	12	A polar group assists in deactivating surface silanols and contributes to unique separation selectivities for acids, bases, zwitterions, and other polar compounds.
Ultra C8	Y	100	12	Selectivity and peak shape similar to Ultra C18, but less hydrophobic retention.
Ultra C4	Y	100	9	Ideal for peptides and small proteins.
Ultra C1	NA	100	5	Alternative selectivity to Ultra C18 or C8 columns, especially for polar analytes. Shortest chain alkyl phase available for reversed phase separations.
Ultra Cyano	Y	100	8	Excellent for basic pharmaceuticals, steroids (normal or reversed phase conditions), or other basic compounds.
Ultra Phenyl	Y	100	10	Ideal for fatty acids, polynuclear aromatic hydrocarbons, purines and pyrimidines, and polar aromatics.
Ultra Amino	N	100	2	Superior general purpose amino phase. Ideal for carbohydrates.

pH ranges and temperature limits: see product listings on pages listed here.

Column lifetime will be shorter when operating at pH and/or temperature extremes.

# Physical Characteristics of Restek HPLC Columns

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HPLC COLUMNS

Chromatographic Properties	Similar Phases	USP Code	Page #
Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding.	Hypersil® BDS C18, Zorbax® Eclipse XDB-C18	L1	12
Highly base-deactivated spherical silica manufactured by Restek. Monomeric C8 bonding. Similar to Pinnacle™ DB C18, but the shorter alkyl chain provides less hydrophobic retention.	Hypersil® BDS C8	L7	12
Highly base-deactivated spherical silica manufactured by Restek. Cyano bonding.	Hypersil® BDS Cyano, Zorbax® Eclipse XDB-CN	L10	13
Highly base-deactivated spherical silica manufactured by Restek. Phenyl bonding.	Hypersil® BDS Phenyl, Zorbax® Eclipse XDB-Phenyl	L11	13
Highly base-deactivated spherical silica manufactured by Restek.	—	L3	13
Intermediate carbon load and surface area, suitable for a wide range of neutral to acidic compounds. Silica manufactured by Restek.	Hypersil® ODS, Spherisorb® ODS	L1	14
Proprietary stationary phase; resolves 16 PAHs in US EPA Method 610. Silica manufactured by Restek.	Unique	—	14
Provides shorter retention times for hydrophobic compounds than C18. Silica manufactured by Restek.	Hypersil® C8, Spherisorb® C8	L7	15
More rugged than bare silica for normal phase analyses. Silica manufactured by Restek.	Hypersil® CPS, Spherisorb® Cyano	L10	15
Offers unique selectivity versus traditional alkyl chain phases, especially for aromatic compounds. Silica manufactured by Restek.	Hypersil® Phenyl, Spherisorb® Phenyl	L11	16
Silica manufactured by Restek.	Hypersil® APS 2 Amino, Spherisorb® Amino	L8	16
Silica manufactured by Restek. Unique biphenyl phase.	Unique	L11	17
Superior value phase for normal phase separation of polar analytes. Lower retention than Ultra C18. Silica manufactured by Restek.	Hypersil® Silica	L3	17
Most retentive phase for hydrophobic and slightly polar analytes. Mobile phase containing higher percentage of organic modifier contributes to higher sensitivity in ESI-based LC/MS.	Ultracarb® C18, BetaMax® Neutral, Discovery® C18	L1	18
Highly retentive and selective for reversed phase separations of polar analytes. Highly base deactivated. Compatible with highly aqueous (up to 100%) mobile phases.	—	L1	19
Highly retentive, highly selective phase, developed specifically for the analysis of aldehydes and ketones as DNPH derivatives.	Unique	—	21
Highly retentive phase for analytes containing amino functionality.	BetaMax® Base, Maxsil™ CN	L10	18
A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. Excellent for beta-blockers, halogenated compounds, nucleosides, nucleotides, pyridines, pyrimidines, tricyclic antidepressants.	Discovery® HS F5	—	19
Single 30cm column performs equally to two C18 columns in series. (AOAC Method 986.13)	Unique	—	20
High purity, highly retentive phase for aromatic and unsaturated compounds.	Unique	L11	20
High purity, highly retentive phase for normal phase separation of polar analytes. Very high surface area.	Maxsil™ Si	L3	21
A very retentive, high-purity phase that exhibits excellent peak shape for a wide range of compounds. Recommended as a general purpose reversed phase column.	Discovery® C18, Symmetry® C18, Hypersil® Gold C18, Luna® C18, Zorbax® C18, Kromasil® C18, LiChrospher® RP-18, Inertsil® ODS-2, Develosil® C18	L1	22
Highly retentive and selective for reversed phase separations of polar analytes. Highly base deactivated. Compatible with highly aqueous (up to 100%) mobile phases.	AQUA® C18, Aquasil C18, Hypersil® Gold AQ, YMC® ODS-Aq	L1	23
One of a group of intrinsically base-deactivated (IBD) phases, with a polar group within, or intrinsic to, the alkyl bonded phase. Provides unique selectivity and high level of base deactivation while reducing or eliminating the need for mobile phase additives.	SymmetryShield™, Discovery® ABZ & ABZ+, Prism™	—	22
Very retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds.	Luna® C8, Symmetry® C8, Hypersil® Gold C8	L7	23
Exceptionally stable C4 packing, with high bonding coverage and silanol base-deactivation. Exhibits shorter retention than C18 or C8 phases.	Supelcosil™ Butyl (C4), Delta-Pak™ C4	L26	24
Exceptionally stable C1 packing resists hydrolysis, even under acidic mobile phase conditions. Least retentive reversed phase hydrocarbon packing.	Spherisorb® C1	L13	24
High-purity cyano phase with reduced silanol activity. Often a better choice than C18 for basic pharmaceuticals. Cyano is the most stable bonded phase for normal phase mode.	Platinum™ CN, Develosil® Cyano, Luna® CN, Hypersil® Gold CN	L10	25
High-purity, highly retentive, base-deactivated phase with alternate selectivity to hydrocarbon phases, especially for aromatic analytes.	Platinum™ Phenyl, Supelcosil™ Phenyl, Betasil® Phenyl	L11	25
Recommended for normal phase analyses of mono- and disaccharides and other similar compounds. Can also serve as a weak anion exchanger, with aqueous buffers.	Platinum™ Amino, Develosil® NH2	L8	26

Continued on next page. . .

# Physical Characteristics of HPLC Columns; USP Descriptions

Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications
Ultra PFP	Y	100	7	Ideal for taxol and precursors, or halogenated compounds, amines, esters, or ketones.
Ultra Silica	NA	100	NA	Ideal for normal phase applications.
Ultra Carbamate		100		Rapid analysis of carbamates.
Ultra Quat	—	100	—	Proprietary phase for the analysis of paraquat and diquat and other quaternary amines.
Kromasil® C18	Y	100	20	
Kromasil® C8	Y	100	12	
Kromasil® C4	Y	100	8	
Kromasil® C1	Y	100	—	
Kromasil® Phenyl	Y	100	14	
Kromasil® Amino	Y	100	1.7% nitrogen	
Kromasil® Silica	—	100	—	
Viva Wide Pore C18	Y	300	9	Proteins and other higher molecular weight compounds.
Viva Wide Pore C8	Y	300	5	Proteins and other higher molecular weight compounds. Less retentive than C18 phase.
Viva Wide Pore C4	Y	300	3.5	Proteins and other higher molecular weight compounds. Less retentive than C18 and C8 phases.
Viva Wide Pore Biphenyl	Y	300	6.7	Exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays.
Viva Wide Pore PFP Propyl	Y	300	5	Exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.
Viva Wide Pore Silica	—	300	—	Normal phase applications for highly retained high molecular weight compounds.
pHidility® C18	NA	200	—	Hydrophobic C18 phase suitable for analyzing a wide range of compounds; enhanced stability under basic and acidic conditions.

pH ranges and temperature limits: see product listings on pages listed here.

Column lifetime will be shorter when operating at pH and/or temperature extremes.

## US Pharmacopoeia Cross Reference

<b>L1</b>	Octadecyl silane chemically bonded to porous silica or ceramic microparticles, 1.7 to 10µm in diameter, or a monolithic rod. <i>Allure® C18 (p. 18), Pinnacle™ DB C18 (p. 12), Pinnacle™ II C18 (p. 14), Ultra C18 (p. 22), Allure® Aqueous C18 (p. 19), Ultra Aqueous C18 (p. 23), Viva C18 (p. 29), Kromasil® C18 (p. 32)</i>
<b>L3</b>	Porous silica particles, 5 to 10µm in diameter. <i>Allure® Silica (p. 21), Pinnacle™ DB Silica (p. 13), Pinnacle™ II Silica (p. 17), Ultra Silica (p. 27), Viva Silica (p. 31), Kromasil® Silica (p. 33)</i>
<b>L7</b>	Octylsilane chemically bonded to totally porous silica particles, 1.7 to 10µm in diameter. <i>Pinnacle™ DB C8 (p. 12), Pinnacle™ II C8 (p. 15), Ultra C8 (p. 22), Viva C8 (p. 29), Kromasil® C8 (p. 33)</i>
<b>L8</b>	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 3 to 10µm in diameter. <i>Pinnacle™ II Amino (p. 16), Ultra Amino (p. 26), Kromasil® Amino (p. 33)</i>
<b>L10</b>	Nitrile groups chemically bonded to porous silica particles, 3 to 10µm in diameter. <i>Pinnacle™ DB Cyano (p. 13), Pinnacle™ II Cyano (p. 15), Ultra Cyano (p. 25), Allure® Basix (p. 18)</i>
<b>L11</b>	Phenyl groups chemically bonded to porous silica particles, 1.7 to 10µm in diameter. <i>Pinnacle™ DB Phenyl (p. 13), Pinnacle™ II Phenyl (p. 16), Ultra Phenyl (p. 25), Allure® Biphenyl (p. 20), Pinnacle™ II Biphenyl (p. 17), Viva Biphenyl (p. 30), Kromasil® Phenyl (p. 33)</i>
<b>L13</b>	Trimethylsilane chemically bonded to porous silica particles, 3 to 10µm in diameter. <i>Ultra C1 (p. 24), Kromasil® C1 (p. 33)</i>
<b>L26</b>	Butyl silane chemically bonded to totally porous silica particles, 3 to 10µm in diameter. <i>Ultra C4 (p.24), Viva C4 (p.30), Kromasil® C4 (p.32)</i>
<b>L43</b>	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10µm in diameter. <i>Allure® PFP Propyl (p. 19), Ultra PFP (p. 26), Viva PFP Propyl (p. 30)</i>

# Physical Characteristics of HPLC Columns; USP Descriptions

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HPLC COLUMNS

Chromatographic Properties	Similar Phases	USP Code	Page #
A pentafluorophenyl phase. Unique selectivity by interaction with functional groups of organohalogenes or other basic analytes.	Fluophase® PFP, Fluosep®-RP Phenyl, Curosil™ PFP	L43	26
High purity, high surface area.	—	L3	27
Proprietary stationary phase can process up to twice as many samples per hour, compared to a conventional C18 phase.	Unique	—	27
High purity silica.	Unique	—	28
High purity phase with excellent peak shape for a wide range of compounds. Good general purpose reversed phase column.	Discovery® C18, Symmetry® C18, Hypersil® Gold C18, Luna® C18, Zorbax® C18, LiChrospher® RP-18, Inertsil® ODS-2, Develosil® C18	L1	32
High purity, reversed phase packing for a wide range of compounds.	Luna® C8, Symmetry® C8, Hypersil® Gold C8	L7	33
High purity, reversed phase packing for a wide range of compounds. Less retentive than C18 and C8.	Supelcosil™ Butyl (C4), Delta-Pak™ C4	L26	32
High purity, reversed phase packing for a wide range of compounds. Less retentive than C18, C8, and C4.	Spherisorb® C1	L13	33
High purity, base deactivated reversed phase packing. Alternate selectivity to alkyl phases.	Platinum™ Phenyl, Supelcosil™ Phenyl, Betasil® Phenyl	L11	33
High purity, base deactivated reversed phase packing. Alternate selectivity to alkyl phases.	Platinum™ Amino, Develosil® NH2	L8	33
High purity, base deactivated packing.	—	L3	33
Silica manufactured by Restek.	BioBasic® 18, Symmetry® 300 C18, Jupiter® 300 C18, Zorbax® 300 OSB C18, Synchronapak® C18, 208 TP C18	L1	29
Silica manufactured by Restek.	BioBasic® 8, Zorbax® 300 OSB C8, Synchronapak® C8, 208 TP C8	L7	29
Silica manufactured by Restek.	BioBasic® 4, Symmetry® 300 C4, Jupiter® 300 C4, Synchronapak® C4, 208 TP C4	L26	30
Silica manufactured by Restek.	Unique	L11	30
Silica manufactured by Restek.	Unique	L43	30
Silica manufactured by Restek.	—	L3	31
Excellent stability under extreme pH conditions. True C18 selectivity in a silica-based stationary phase.	Unique	—	10

## tech tip

### Managing High Backpressure

High backpressure is one of the most common problems encountered in HPLC analyses. Normal column backpressure is observed after a new column has been installed and equilibrated with mobile phase. Unfortunately, this pressure often will increase as the column is used because particles collect on the column inlet frit. These particles can be sample impurities, mobile phase contaminants, or materials from the injector or autosampler rotor seal.

In addition to increasing backpressure, particles on the frit can cause split peaks, peak tailing, and, eventually, over-pressure shut-down. In some circumstances, these problems can be corrected by back-flushing the column. However, in many cases the result is an unusable column.

To minimize backpressure problems, all samples and mobile phase solvents must be filtered before use, and rotor seals should be changed on a routine basis. Along with these preventive measures, it is advisable to use precolumn filters such as the Trident™ guard column protection system. Particles build up on the inexpensive, replaceable frit in the filter, instead of on the permanent frit at the column inlet.



## Free Literature

### HPLC Column Selection Guide

A useful chart to keep with your workbooks, or post on a wall. Quickly scan important characteristics of Restek HPLC columns. Includes brief, practical guidelines for choosing stationary phase, particle size, pore diameter, and column dimensions. Also includes USP designations for each phase and lists similar phases from other suppliers. (lit. cat.# 59454C)

# New 1.9 $\mu$ m Pinnacle™ DB C18

## Small Particle HPLC Columns

### free literature

#### HPLC Small Particle Columns

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat.# 580147A

**Restek's popular Pinnacle™ DB HPLC columns are now available in a <2 $\mu$ m particle size.**

Ruggedness and reproducibility are guaranteed, as we control every step in the process, from base silica to bonded phase to final packed column. The silica particles are classified and selected to give an exceptionally tight distribution around 1.9 $\mu$ m, while eliminating <1 $\mu$ m particles that can contribute to a poorly packed bed. Highly base-deactivated Pinnacle™ DB stationary phases are an excellent choice when analyzing a wide range of compounds, from acidic to basic. To optimize your ultra high pressure HPLC methods, reach for Restek small particle HPLC columns!



### 1.9 $\mu$ m Pinnacle™ DB C18 HPLC Columns

#### Physical Characteristics:

particle size: 1.9 $\mu$ m  
pore size: 140Å  
carbon load: 11%

endcap: yes  
pH range: 2.5 - 10  
temperature limit: 80°C

#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding.

Length	2.1mm ID cat.#
1.9 $\mu$ m Columns	
30mm	9414232
50mm	9414252
100mm	9414212

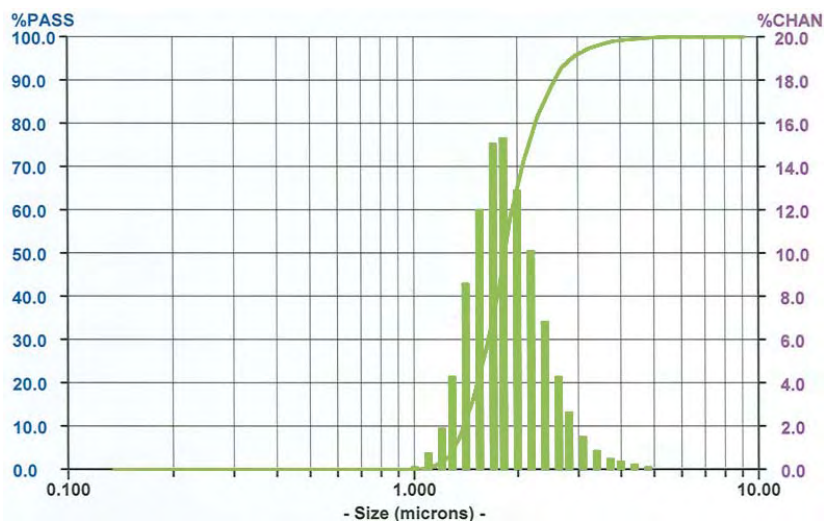
**Additional phases available June 2007!**

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Tel: 03 9762 2034 Fax: 03 9761 1169 [www.chromtech.net.au](http://www.chromtech.net.au) [info@chromtech.net.au](mailto:info@chromtech.net.au)

**Figure 1**—Pinnacle™ DB silica particle size distribution chart shows an exceptionally tight, symmetrical distribution around 1.9µm with no <1µm particles.



**Rick Lake**  
Innovations Chemist  
2+ years of service!

**Figure 2**—Excellent peak symmetry and efficiency on a 1.9µm Pinnacle™ DB C18 column, using a reversed phase test mix.

**Peak List:**

1. uracil	3.00 mg/mL
2. benzene	0.02 mg/mL
3. naphthalene	0.50 mg/mL
4. biphenyl	0.06 mg/mL

**Performance:** (calculations for biphenyl)  
Efficiency: 217,619 n/m  
Asymmetry: 1.10  
Pressure: 4,500 psi

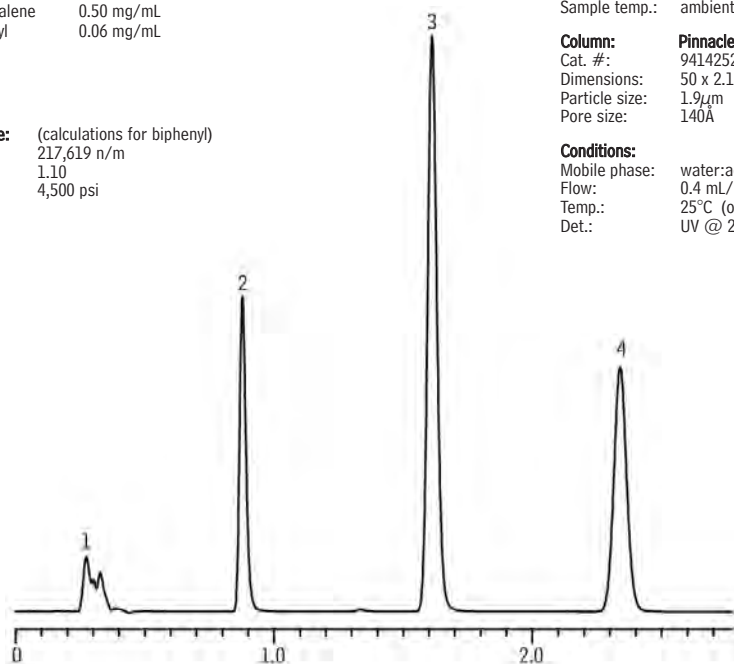
**Sample:**

Inj.: 2µL  
Sample diluent: water:methanol (25:75)  
Sample temp.: ambient

**Column:** Pinnacle™ DB C18  
Cat. #: 9414252  
Dimensions: 50 x 2.1mm  
Particle size: 1.9µm  
Pore size: 140Å

**Conditions:**

Mobile phase: water:acetonitrile (45:55)  
Flow: 0.4 mL/min.  
Temp.: 25°C (or ambient)  
Det.: UV @ 254nm



LC\_EX0427

**pHidelity® C18 Columns**

- Stable under extreme pH conditions.
- Patented technology protects the silica particle from dissolution.
- True C18 selectivity.

Application	Page #
Basic Drugs .....	94
Serotonin Reuptake Inhibitors .....	90

Restek is pleased to offer pHidelity® C18 columns, designed for analyses that require extreme pH conditions. Using technology patented by Selerity Technologies (US Patent 2005/0191503A1), pHidelity® silica-based columns have exceptional stability under aggressive pH conditions.

In pHidelity® columns, a polycarbosilane barrier layer protects the silica particle from extremely basic conditions. This layer, with multiple points of attachment to the silica particle, yields a modified surface with enhanced stability. A second layer is then attached, providing the functional group (C18). Using this approach to shield the silica surface, a highly durable stationary phase is created.

Even after 50 hours of exposure to base (pH 10) at 60°C, a pHidelity® column maintains its original column efficiency. (A decrease in column efficiency indicates the dissolution of support silica and loss from the column.) This exceptional performance ensures pHidelity® columns offer greater resolution under harsh mobile phase conditions and will continue to resolve your target compounds over a long column lifetime. A pHidelity® column also maintains a very consistent capacity factor,  $k'$ , after exposure to pH 10 and 60°C. Under extremely basic conditions, a decrease in retention time indicates loss of both support silica and bonded phase. Backpressure in the pHidelity® C18 column is very stable, indicating little or no degradation of the packing material.

The patented process used to protect the support silica in pHidelity® columns ensures more consistent retention times over the lifetime of the column.

**pHidelity® C18 Columns****Physical Characteristics:**

particle size: 3 $\mu$ m

pore size: 140Å

pH limit: up to 12

temperature limit: 80°C

**Chromatographic Properties:**

Excellent stability under extreme pH conditions. True C18 selectivity in a silica-based stationary phase.

	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#
<b>3<math>\mu</math>m Columns</b>			
30mm	9579332	9579333	9579335
50mm	9579352	9579353	9579355
100mm	9579312	9579313	9579315
150mm	9579362	9579363	9579365

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

## Restek Capillary HPLC Columns

- High quality, Restek manufactured packing materials.
- Superior packing technology ensures rugged, reproducible columns.
- Wide range of phases and dimensions available—please inquire.

new!



**Bruce Albright**  
HPLC Innovations Chemist  
4+ years of service!



### Physical Characteristics:

#### Allure® Basix:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 12%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Ultra Aqueous C18:

particle size: 3µm, spherical  
pore size: 100Å  
endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Allure® Biphenyl:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 23%  
endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Ultra C18:

particle size: 3µm, spherical  
pore size: 100Å  
carbon load: 20%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Allure® PFP Propyl:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 17%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Viva C18:

particle size: 3µm, spherical  
pore size: 300Å  
carbon load: 9%  
endcap: yes  
pH range: 2.5 to 10  
temperature limit: 80°C

### Chromatographic Properties:

Available in a wide variety of stationary phases for acidic to basic compounds. Columns are suitable for small molecules using Allure® and Ultra phases and large biomolecules using Viva C18.

Length	0.3mm ID cat. #
<b>Allure® Basix 3µm Capillary Columns</b>	
50mm	916135B
150mm	916136B
<b>Allure® Biphenyl 3µm Capillary Columns</b>	
50mm	916635B
150mm	916636B
<b>Allure® PFP Propyl 3µm Capillary Columns</b>	
50mm	916935B
150mm	916936B
<b>Ultra Aqueous C18 3µm Capillary Columns</b>	
50mm	917835B
150mm	917836B
<b>Ultra C18 3µm Capillary Columns</b>	
50mm	917435B
150mm	917436B
<b>Viva C18 3µm Capillary Columns</b>	
50mm	951435B
150mm	951436B

### ordering note

Looking for another stationary phase or capillary dimension?

Please contact Restek Technical Service at 814-353-1300 or 800-356-1688 (ext. 4) or support@restek.com to inquire.

# Pinnacle™ DB C18 and C8 Columns

## Pinnacle™ DB Columns: 3 or 5µm particle sizes; 140Å pore size

Prepared using a highly base-deactivated silica support; ideal for analyses of basic compounds, or bases mixed with acids/neutrals. Silica manufactured at Restek, for total control of quality and reproducibility.

### Pinnacle™ DB C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: yes  
pore size: 140Å      pH range: 2.5 - 10  
carbon load: 11%      temperature limit: 80°C

#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding. Hydrophobic C18 phase suitable for analyses of a wide range of compounds, from acidic through slightly basic. Replaces Hypersil® BDS C18 and Pinnacle™ ODS Amine.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9414331	9414332	9414333	9414335
50mm	9414351	9414352	9414353	9414355
100mm	9414311	9414312	9414313	9414315
<b>5µm Columns</b>				
30mm	9414531	9414532	9414533	9414535
50mm	9414551	9414552	9414553	9414555
100mm	9414511	9414512	9414513	9414515
150mm	9414561	9414562	9414563	9414565
200mm	9414521	9414522	9414523	9414525
250mm	9414571	9414572	9414573	9414575



also **available**

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### Pinnacle™ DB C8 Columns (USP L7)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: yes  
pore size: 140Å      pH range: 2.5 - 10  
carbon load: 6%      temperature limit: 80°C

#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C8 bonding. Similar to Pinnacle™ DB C18, but the shorter alkyl chain provides less hydrophobic retention. Less retention can be useful for shortening analysis time, if resolution is adequate. Replaces Hypersil® BDS C8 and Pinnacle™ C8 Amine.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9413331	9413332	9413333	9413335
50mm	9413351	9413352	9413353	9413355
100mm	9413311	9413312	9413313	9413315
<b>5µm Columns</b>				
30mm	9413531	9413532	9413533	9413535
50mm	9413551	9413552	9413553	9413555
100mm	9413511	9413512	9413513	9413515
150mm	9413561	9413562	9413563	9413565
200mm	9413521	9413522	9413523	9413525
250mm	9413571	9413572	9413573	9413575



## ordering **note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add “-700” to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Pinnacle™ DB Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 140Å  
carbon load: 4%

endcap: yes  
pH range: 2.5 - 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated spherical silica manufactured by Restek. Cyano bonding. Suitable for analyses of a wide range of compounds, from acidic through slightly basic. Also useful for confirmation of analyses on a C18 or C8 column. Can be used in normal phase or reversed phase mode of separation. Replaces Hypersil® BDS Cyano and Pinnacle™ Cyano Amine.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9416531	9416532	9416533	9416535
50mm	9416551	9416552	9416553	9416555
100mm	9416511	9416512	9416513	9416515
150mm	9416561	9416562	9416563	9416565
200mm	9416521	9416522	9416523	9416525
250mm	9416571	9416572	9416573	9416575

**Pinnacle™ DB Phenyl Columns (USP L11)****Physical Characteristics:**

particle range: 5µm, spherical  
pore size: 140Å  
carbon load: 5.3%

endcap: yes  
pH range: 2.5 - 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated spherical silica manufactured by Restek. Pinnacle™ DB Phenyl columns offer alternate selectivity to straight chain hydrocarbon phases, especially for aromatic analytes. Replaces Hypersil® BDS Phenyl and Pinnacle™ Phenyl Amine.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9415531	9415532	9415533	9415535
50mm	9415551	9415552	9415553	9415555
100mm	9415511	9415512	9415513	9415515
150mm	9415561	9415562	9415563	9415565
200mm	9415521	9415522	9415523	9415525
250mm	9415571	9415572	9415573	9415575

**Pinnacle™ DB Silica Columns (USP L3)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 140Å  
carbon load: none

endcap: no  
pH range: 2.5 - 10  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated spherical silica manufactured by Restek. Useful for normal phase separations. Replaces Hypersil® BDS and Pinnacle™ Amine.

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9410531	9410532	9410533	9410535
50mm	9410551	9410552	9410553	9410555
100mm	9410511	9410512	9410513	9410515
150mm	9410561	9410562	9410563	9410565
200mm	9410521	9410522	9410523	9410525
250mm	9410571	9410572	9410573	9410575

# Pinnacle™ II C18 and PAH Columns

## Pinnacle™ II Columns: 3µm or 5µm particles; 110Å pore size

Silica manufactured at Restek, for total control of quality and reproducibility. Excellent replacement for the original Hypersil® material. Physical and chromatographic properties similar to our original Pinnacle™ materials, but with greater lot-to-lot uniformity.

Application	Page #
Allicin .....	77
Capsaicinoids .....	79
Morphine Sulfate .....	85
Phenolic Antioxidants .....	77, 79

### Pinnacle™ II C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 13%

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Excellent choice as a general purpose C18 column. Intermediate carbon loading and surface area, suitable for a wide range of acidic to neutral hydrophobic compounds. Replaces Hypersil® ODS and Pinnacle™ C18.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9214331	9214332	9214333	—	9214335
50mm	9214351	9214352	9214353	—	9214355
100mm	9214311	9214312	9214313	—	9214315
<b>5µm Columns</b>					
30mm	9214531	9214532	9214533	—	9214535
50mm	9214551	9214552	9214553	—	9214555
100mm	9214511	9214512	9214513	9214514	9214515
150mm	9214561	9214562	9214563	9214564	9214565
200mm	9214521	9214522	9214523	—	9214525
250mm	9214571	9214572	9214573	—	9214575

### Pinnacle™ II PAH Columns

#### Physical Characteristics:

particle size: 4µm, spherical  
pore size: 110Å

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Developed specifically for challenging analyses of polynuclear aromatic hydrocarbons. The Pinnacle™ II PAH stationary phase incorporates a proprietary C18 bonding that enables unique shape selectivity to resolve to baseline all 16 PAHs listed in US EPA Method 610. Every lot of Pinnacle™ II PAH bonded phase material is tested to ensure baseline resolution of the Method 610 PAHs, using a simple water/acetonitrile mobile phase gradient. Further, because we make Pinnacle™ II PAH columns using our own silica, we have greater control over quality and reproducibility. Replaces Pinnacle™ PAH columns.

If you are analyzing PAHs, Pinnacle™ II PAH columns are the reliable, cost-effective columns you need.

Application	Page #
PAHs .....	76

	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#
<b>4µm Columns</b>			
50mm	9219452	9219453	9219455
100mm	9219412	9219413	9219415
150mm	9219462	9219463	9219465
200mm	9219422	9219423	9219425
250mm	9219472	9219473	9219475

## a plus 1 story

"The Pinnacle™ II PAH column gives an excellent separation of the 18 target PAHs that we commonly analyze. Column lifetime far exceeded our expectations—after more than 5000 injections, the columns still maintain resolution and peak shape. Other PAH columns typically had lifetimes of 2000 to 2500 injections. We actually had one Pinnacle™ II PAH column last for more than 10,000 injections!"

Norm Farmer, Technical Director, Accutest Laboratories



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new and  
Improved!

**Pinnacle™ II C8 Columns (USP L7)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 7%

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C

**Chromatographic Properties:**

Reliable performance and symmetrical peaks for neutral to acidic compounds. Provides shorter retention times for hydrophobic compounds, compared to C18 phases. Replaces Hypersil® C8 and Pinnacle™ C8.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9213331	9213332	9213333	—	9213335
50mm	9213351	9213352	9213353	—	9213355
100mm	9213311	9213312	9213313	—	9213315
<b>5µm Columns</b>					
30mm	9213531	9213532	9213533	—	9213535
50mm	9213551	9213552	9213553	—	9213555
100mm	9213511	9213512	9213513	9213514	9213515
150mm	9213561	9213562	9213563	9213564	9213565
200mm	9213521	9213522	9213523	—	9213525
250mm	9213571	9213572	9213573	—	9213575

Application	Page #
Parabens .....	78

**Pinnacle™ II Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 4%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Can be used in either reversed phase or normal phase mode. More rugged than bare silica for normal phase applications. Replaces Hypersil® Cyano and Pinnacle™ CN.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9216331	9216332	9216333	9216335
50mm	9216351	9216352	9216353	9216355
100mm	9216311	9216312	9216313	9216315
<b>5µm Columns</b>				
30mm	9216531	9216532	9216533	9216535
50mm	9216551	9216552	9216553	9216555
100mm	9216511	9216512	9216513	9216515
150mm	9216561	9216562	9216563	9216565
200mm	9216521	9216522	9216523	9216525
250mm	9216571	9216572	9216573	9216575

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Corticosteroids .....	91
Piperine .....	79

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**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

# Pinnacle™ II Phenyl and Amino Columns

## Pinnacle™ II Phenyl Columns (USP L11)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 6%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

The Pinnacle™ II Phenyl phase offers unique selectivity versus traditional alkyl chain phases, especially for aromatic compounds. Replaces Hypersil® Phenyl and Pinnacle™ Phenyl.

Restek  
Manufactured  
Silica

Application	Page #
Parabens .....	78
Sorbic & Benzoic Acids ...	79

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9215331	9215332	9215333	9215335
50mm	9215351	9215352	9215353	9215355
100mm	9215311	9215312	9215313	9215315
<b>5µm Columns</b>				
30mm	9215531	9215532	9215533	9215535
50mm	9215551	9215552	9215553	9215555
100mm	9215511	9215512	9215513	9215515
150mm	9215561	9215562	9215563	9215565
200mm	9215521	9215522	9215523	9215525
250mm	9215571	9215572	9215573	9215575

also available

More chromatograms  
available!

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our annual product catalog.

## Pinnacle™ II Amino Columns (USP L8)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 2%  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

HPLC analysis using an amino-based stationary phase is the most popular technique for routine analyses of simple sugars, using isocratic elution (e.g., acetonitrile:water, 75:25) and a refractive index detector (RID) or an evaporative light scattering detector (ELSD). The Pinnacle™ II Amino column is ideal for mono- and disaccharide analyses. Replaces Hypersil® Amino and Pinnacle™ Amino.

Restek  
Manufactured  
Silica

Application	Page #
Lactulose Concentrate .....	95
Maple Syrup .....	81
Sugars .....	81

Length	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9217331	9217332	9217333	9217335
50mm	9217351	9217352	9217353	9217355
100mm	9217311	9217312	9217313	9217315
<b>5µm Columns</b>				
30mm	9217531	9217532	9217533	9217535
50mm	9217551	9217552	9217553	9217555
100mm	9217511	9217512	9217513	9217515
150mm	9217561	9217562	9217563	9217565
200mm	9217521	9217522	9217523	9217525
250mm	9217571	9217572	9217573	9217575

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add “-700” to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.



## Pinnacle™ II Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 110Å

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



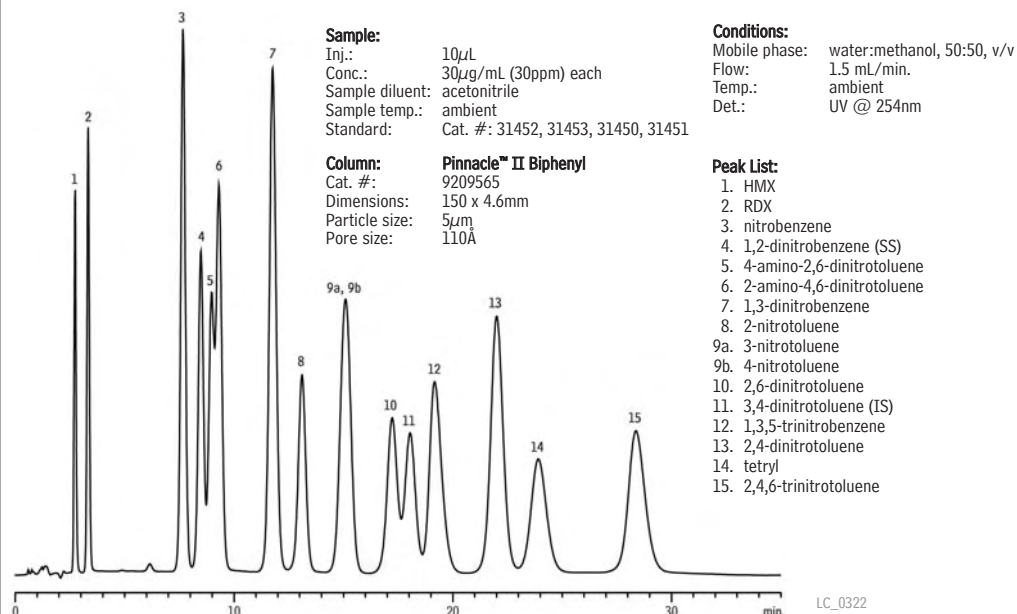
### Chromatographic Properties:

The Pinnacle™ II Biphenyl phase offers alternate selectivity to straight-chain hydrocarbon phases, and enhanced selectivity and retention for unsaturated compounds, compared to traditional phenyl phases. An excellent confirmation column for explosive compounds, as in EPA method 8330.

Application	Page #
Explosives	17, 70

Length	4.6mm ID cat.#
5µm Column	
150mm	9209565
250mm	9209575

### Explosives by US EPA Method 8330 on a Pinnacle™ II Biphenyl column.



## Pinnacle™ II Silica Columns (USP L3)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: none

endcap: no  
pH range: 2.5 to 10  
temperature limit: 80°C



### Chromatographic Properties:

Good general purpose packing for normal phase separations. Moderate surface area. Replaces Hypersil® and Pinnacle™ Silica.

Application	Page #
Hydrocodone Bitartrate	85
Tocopherols	77

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9210331	9210332	9210333	9210335
50mm	9210351	9210352	9210353	9210355
100mm	9210311	9210312	9210313	9210315
<b>5µm Columns</b>				
30mm	9210531	9210532	9210533	9210535
50mm	9210551	9210552	9210553	9210555
100mm	9210511	9210512	9210513	9210515
150mm	9210561	9210562	9210563	9210565
200mm	9210521	9210522	9210523	9210525
250mm	9210571	9210572	9210573	9210575

## Allure® C18 and Basix Columns

### Allure® Columns: 3µm or 5µm particles; 60Å pore size

Small pore size in a high-purity, Type B silica provides a large surface area. High carbon loads, highly retentive. An excellent choice for light scattering (ELSD) and MS detectors, in which more organic solvent in the mobile phase gives better sensitivity.

Application	Page #
Antibiotics .....	.89
Herbicides .....	.73
Pesticides .....	.74

### Allure® C18 Columns (USP L1)

#### Excellent Columns for LC/MS and ELSD

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical	endcap: fully endcapped
pore size: 60Å	pH range: 2.5 to 7.5
carbon load: 27%	temperature limit: 80°C

##### Chromatographic Properties:

Most retentive of our alkyl stationary phases due to large surface area of the base silica and high-density bondings. Provides excellent peak shapes for a wide range of compounds.

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9164331	9164332	9164333	9164335
50mm	9164351	9164352	9164353	9164355
100mm	9164311	9164312	9164313	9164315
<b>5µm Columns</b>				
30mm	9164531	9164532	9164533	9164535
50mm	9164551	9164552	9164553	9164555
100mm	9164511	9164512	9164513	9164515
150mm	9164561	9164562	9164563	9164565
200mm	9164521	9164522	9164523	9164525
250mm	9164571	9164572	9164573	9164575

also available

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Application	Page #
Acetaminophen/Narcotic Analgesics .....	.84
Acetaminophen, Pseudoephedrine & Caffeine .....	.96
Antiarrhythmics .....	.86, 87
Antidepressants .....	.89
Albuterol .....	.91
Herbicides .....	.72
Ibuprofen & Pseudoephedrine .....	.96
Sedatives .....	.95
Steroid Hormones .....	.94
Sulfamethoxazole .....	.89

### Allure® Basix Columns (USP L10)

#### Excellent Columns for LC/MS and ELSD

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical	endcap: fully endcapped
pore size: 60Å	pH range: 2.5 to 7.5
carbon load: 12%	temperature limit: 80°C

##### Chromatographic Properties:

Highly retentive propyl cyano phase. Excellent choice for basic compounds and for analytes containing amine group functionality.

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9161331	9161332	9161333	9161335
50mm	9161351	9161352	9161353	9161355
100mm	9161311	9161312	9161313	9161315
<b>5µm Columns</b>				
30mm	9161531	9161532	9161533	9161535
50mm	9161551	9161552	9161553	9161555
100mm	9161511	9161512	9161513	9161515
150mm	9161561	9161562	9161563	9161565
200mm	9161521	9161522	9161523	9161525
250mm	9161571	9161572	9161573	9161575

## Allure® PFP Propyl Columns (USP L43) Excellent Columns for LC/MS and ELSD

### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: fully endcapped  
pore size: 60Å      pH range: 2.5 to 7.5  
carbon load: 17%      temperature limit: 80°C

### Chromatographic Properties:

A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. An excellent phase for separating nucleosides, nucleotides, purines, pyrimidines, halogenated compounds, β-blockers, and tricyclic antidepressants.

Application	Page #
Catecholamines .....	.68
Cocaine/Ecgonine Methyl Ester .....	.67
Nucleic Acid Bases .....	.66
Pesticides .....	.74

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3µm Columns</b>				
30mm	9169331	9169332	9169333	9169335
50mm	9169351	9169352	9169353	9169355
100mm	9169311	9169312	9169313	9169315
<b>5µm Columns</b>				
30mm	9169531	9169532	9169533	9169535
50mm	9169551	9169552	9169553	9169555
100mm	9169511	9169512	9169513	9169515
150mm	9169561	9169562	9169563	9169565
200mm	9169521	9169522	9169523	9169525
250mm	9169571	9169572	9169573	9169575

## Allure® Aqueous C18 Columns (USP L1) Excellent Columns for LC/MS and ELSD

### Physical Characteristics:

particle size: 5µm spherical      endcap: no  
pore size: 60Å      pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Highly retentive and selective phase for separating polar analytes, including polar acidic compounds. Compatible with highly aqueous (up to 100%) mobile phases. Highly base deactivated. An excellent choice when analyzing a wide range of compounds, as in LC/MS screening methods.

	1.0mm ID cat.#	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>				
30mm	9168531	9168532	9168533	9168535
50mm	9168551	9168552	9168553	9168555
100mm	9168511	9168512	9168513	9168515
150mm	9168561	9168562	9168563	9168565
200mm	9168521	9168522	9168523	9168525
250mm	9168571	9168572	9168573	9168575

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

# Allure® Biphenyl and Organic Acids Columns

## Allure® Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 60Å  
carbon load: 23%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**new!**

### Chromatographic Properties:

Highly retentive and selective for aromatic and unsaturated compounds. Increased retention and selectivity, compared to phenyl phases. Excellent selectivity for steroids, tetracyclines, explosives, and other unsaturated compounds.

## free literature

### Allure® Biphenyl HPLC Columns Flyer

Analyses of corticosteroids, contraceptive steroids, and endogenous steroid hormones show the unique separation mechanism of the Allure® Biphenyl phase - pi-pi interactions - provides markedly better selectivity, relative to a C18 or phenyl phase, for molecules that differ in the number or positions of multiple bonds. For saturated analytes the Allure® Biphenyl phase has retention and selectivity similar to a C18 phase, but superior to a phenyl phase.

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lit. cat.# 580015

Application	Page #
Carboxylic Acids .....	.80
Fruit Juice Acids .....	.81

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9166331	9166332	9166333	9166335
50mm	9166351	9166352	9166353	9166355
100mm	9166311	9166312	9166313	9166315
<b>5µm Columns</b>				
30mm	9166531	9166532	9166533	9166535
50mm	9166551	9166552	9166553	9166555
100mm	9166511	9166512	9166513	9166515
150mm	9166561	9166562	9166563	9166565
200mm	9166521	9166522	9166523	9166525
250mm	9166571	9166572	9166573	9166575

## Allure® Organic Acids Columns

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Allure® Organic Acids columns provide enhanced retention and selectivity for polar organic acids, allowing the separation to be performed on a single 30cm column. An Allure® Organic Acids column effectively resolves key organic acids such as tartaric and quinic acids, using the chromatographic conditions specified in AOAC method 986.13. Retention is stable and reproducible, even with the 100% aqueous mobile phase specified in the AOAC method.

Length	3.2mm ID	4.6mm ID
	cat.#	cat.#
<b>5µm Column</b>		
150mm	9165563	9165565
250mm		9165575
300mm		9165585

Note: Other dimensions available on request.

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Allure® Silica Columns (USP L3)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly retentive phase for normal phase separations. Very high surface area, Type B silica packing.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9160331	9160332	9160333	9160335
50mm	9160351	9160352	9160353	9160355
100mm	9160311	9160312	9160313	9160315
<b>5µm Columns</b>				
30mm	9160531	9160532	9160533	9160535
50mm	9160551	9160552	9160553	9160555
100mm	9160511	9160512	9160513	9160515
150mm	9160561	9160562	9160563	9160565
200mm	9160521	9160522	9160523	9160525
250mm	9160571	9160572	9160573	9160575

**Allure® AK Columns****new!****Physical Characteristics:**

particle size: 5µm  
pore size: 60Å

endcap: yes  
pH range: 2.5 - 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

This highly retentive, highly selective phase, unique to Restek, was developed specifically for the analysis of aldehydes and ketones as DNPH derivatives. Allure® AK is a reversed phase HPLC material that has the unique ability to separate all thirteen carbonyl compounds specified in California Air Resources Board (CARB) Method # 1004, using a simple acetonitrile/water gradient, in less than 15 minutes. Other columns require long analysis times or the use of tetrahydrofuran.

Application	Page #
Carbonyls .....	21, 69

Length	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns with Trident™ Integral Inlet Fittings</b>		
200mm	9159523-700	9159525-700

**Carbonyls by CARB Method 1004 on an Allure® AK column.**

**Sample:**  
Sample: dinitrophenylhydrazine (DNPH)  
derivatives of aldehydes/ketones  
Inj.: 10µL  
Conc.: 3µg/mL each analyte, as  
aldehyde/ketone  
Sample diluent: acetonitrile

**Column:**  
Allure® AK  
Cat.#: 9159525-700  
Dimensions: 200 x 4.6mm  
Particle size: 5µm  
Pore size: 60Å

**Conditions:**  
Mobile phase: A) water : B) acetonitrile  
Time (min.) %B  
0 60  
8 70  
10 100

Flow: 1.5mL/min.  
Temp.: 30°C  
Det.: UV @ 360nm

**Peak**

DNPH derivative of:

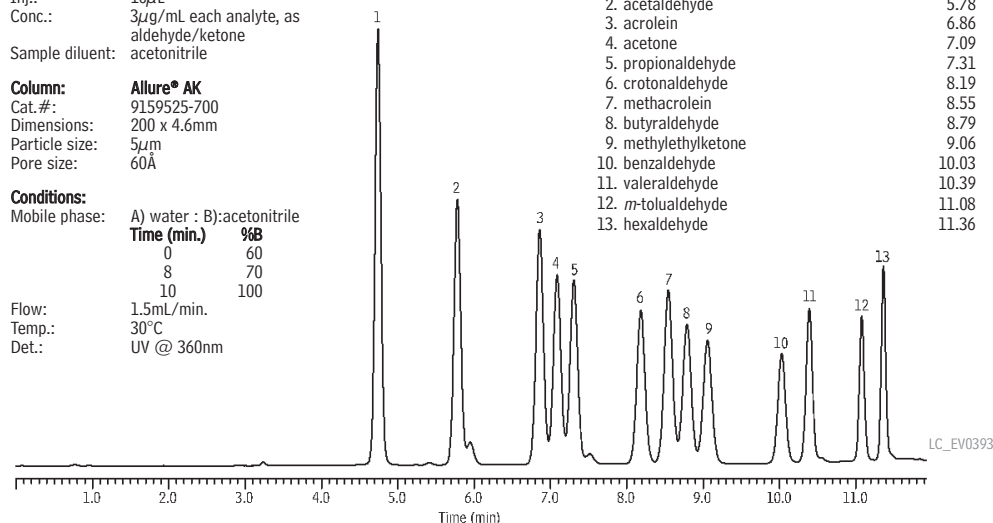
1. formaldehyde
2. acetaldehyde
3. acrolein
4. acetone
5. propionaldehyde
6. crotonaldehyde
7. methacrolein
8. butyraldehyde
9. methylethylketone
10. benzaldehyde
11. valeraldehyde
12. *m*-tolualdehyde
13. hexaldehyde

**Ret. Time  
(min.)**

4.74  
5.78  
6.86  
7.09  
7.31  
8.19  
8.55  
8.79  
9.06  
10.03  
10.39  
11.08  
11.36



**Frank Dorman**  
Director of Technical  
Development  
11+ years of service!



# Ultra C18 and C8 Columns

## Ultra Columns: 3µm or 5µm particles; 100Å pore size

Our broadest selection of stationary phases, including unique phases. High density bondings, for maximum retention. High-purity, Type B silica gives excellent peak shapes for a wide range of compounds.

### Ultra C18 Columns (USP L1)

#### Excellent for a wide range of analyses

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: fully endcapped  
pore size: 100Å      pH range: 2.5 to 7.5  
carbon load: 20%      temperature limit: 80°C

##### Chromatographic Properties:

A retentive, high-purity packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose reversed phase column.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9174331	9174332	9174333	—	9174335
50mm	9174351	9174352	9174353	—	9174355
100mm	9174311	9174312	9174313	—	9174315
<b>5µm Columns</b>					
30mm	9174531	9174532	9174533	—	9174535
50mm	9174551	9174552	9174553	—	9174555
100mm	9174511	9174512	9174513	9174514	9174515
150mm	9174561	9174562	9174563	9174564	9174565
200mm	9174521	9174522	9174523	—	9174525
250mm	9174571	9174572	9174573	—	9174575

### Ultra C8 Columns (USP L7)

#### Excellent for a wide range of analyses

##### Physical Characteristics:

particle size: 3µm or 5µm, spherical      endcap: fully endcapped  
pore size: 100Å      pH range: 2.5 to 7.5  
carbon load: 12%      temperature limit: 80°C

##### Chromatographic Properties:

A retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds. Less retention for neutral, hydrophobic compounds, compared to the Ultra C18 column.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
30mm	9103331	9103332	9103333	—	9103335
50mm	9103351	9103352	9103353	—	9103355
100mm	9103311	9103312	9103313	—	9103315
<b>5µm Columns</b>					
30mm	9103531	9103532	9103533	—	9103535
50mm	9103551	9103552	9103553	—	9103555
100mm	9103511	9103512	9103513	9103514	9103515
150mm	9103561	9103562	9103563	9103564	9103565
200mm	9103521	9103522	9103523	—	9103525
250mm	9103571	9103572	9103573	—	9103575

Application	Page #
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Vanillin & Ethyl Vanillin	82



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## Ultra Aqueous C18 Columns (USP L1)

## Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

## Chromatographic Properties:

Highly retentive and selective for reversed phase separations of polar analytes. Highly base-deactivated. Compatible with highly aqueous (up to 100%) mobile phases.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9178331	9178332	9178333	9178335
50mm	9178351	9178352	9178353	9178355
100mm	9178311	9178312	9178313	9178315
<b>5µm Columns</b>				
30mm	9178531	9178532	9178533	9178535
50mm	9178551	9178552	9178553	9178555
100mm	9178511	9178512	9178513	9178515
150mm	9178561	9178562	9178563	9178565
200mm	9178521	9178522	9178523	9178525
250mm	9178571	9178572	9178573	9178575

Application	Page #
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## Ultra IBD Columns

## Specialized Columns for Mixed Polar and Nonpolar Compounds

## Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 12%

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

## Chromatographic Properties:

An intrinsically base-deactivated (IBD) phase, containing a polar group within, or intrinsic to, the hydrocarbon bonded phase. Unique selectivity and a high level of base deactivation, while reducing or eliminating the need for mobile phase additives.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9175331	9175332	9175333	9175335
50mm	9175351	9175352	9175353	9175355
100mm	9175311	9175312	9175313	9175315
<b>5µm Columns</b>				
30mm	9175531	9175532	9175533	9175535
50mm	9175551	9175552	9175553	9175555
100mm	9175511	9175512	9175513	9175515
150mm	9175561	9175562	9175563	9175565
200mm	9175521	9175522	9175523	9175525
250mm	9175571	9175572	9175573	9175575

Application	Page #
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ordering **note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

## Ultra C4 and C1 Columns

### Ultra C4 Columns (USP L26)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 9%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Exceptionally stable C4 packing, with high bonding coverage and base deactivation. Less retention than C18 or C8 phases.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>3µm Columns</b>								
30mm	9102331		9102332		9102333		9102335	
50mm	9102351		9102352		9102353		9102355	
100mm	9102311		9102312		9102313		9102315	
<b>5µm Columns</b>								
30mm	9102531		9102532		9102533		9102535	
50mm	9102551		9102552		9102553		9102555	
100mm	9102511		9102512		9102513		9102515	
150mm	9102561		9102562		9102563		9102565	
200mm	9102521		9102522		9102523		9102525	
250mm	9102571		9102572		9102573		9102575	

also available

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### Ultra C1 Columns (USP L13)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 5%

pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Exceptionally stable C1 phase. Least retentive reversed phase hydrocarbon packing.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>3µm Columns</b>								
30mm	9101331		9101332		9101333		9101335	
50mm	9101351		9101352		9101353		9101355	
100mm	9101311		9101312		9101313		9101315	
<b>5µm Columns</b>								
30mm	9101531		9101532		9101533		9101535	
50mm	9101551		9101552		9101553		9101555	
100mm	9101511		9101512		9101513		9101515	
150mm	9101561		9101562		9101563		9101565	
200mm	9101521		9101522		9101523		9101525	
250mm	9101571		9101572		9101573		9101575	

### ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Ultra Cyano Columns (USP L10)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 8%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

Application	Page #
Antiarrhythmics .....	85

**Chromatographic Properties:**

High-purity cyano phase with few silanol sites. Often a better choice than C18 phases for basic pharmaceuticals, especially regarding peak shape and selectivity. Cyano phases are more rugged than bare silica for normal phase analyses because they are less sensitive to small amounts of water in the mobile phase.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat. #	cat. #	cat. #	cat. #
<b>3µm Columns</b>				
30mm	9106331	9106332	9106333	9106335
50mm	9106351	9106352	9106353	9106355
100mm	9106311	9106312	9106313	9106315
<b>5µm Columns</b>				
30mm	9106531	9106532	9106533	9106535
50mm	9106551	9106552	9106553	9106555
100mm	9106511	9106512	9106513	9106515
150mm	9106561	9106562	9106563	9106565
200mm	9106521	9106522	9106523	9106525
250mm	9106571	9106572	9106573	9106575

**Ultra Phenyl Columns (USP L11)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 10%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

Application	Page #
Guaifenesin/Codeine .....	96

**Chromatographic Properties:**

High-purity, highly retentive, base-deactivated phase with alternative selectivity to straight chain hydrocarbon phases, especially for aromatic analytes.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat. #	cat. #	cat. #	cat. #
<b>3µm Columns</b>				
30mm	9105331	9105332	9105333	9105335
50mm	9105351	9105352	9105353	9105355
100mm	9105311	9105312	9105313	9105315
<b>5µm Columns</b>				
30mm	9105531	9105532	9105533	9105535
50mm	9105551	9105552	9105553	9105555
100mm	9105511	9105512	9105513	9105515
150mm	9105561	9105562	9105563	9105565
200mm	9105521	9105522	9105523	9105525
250mm	9105571	9105572	9105573	9105575



**Vernon Bartlett**  
HPLC Senior Innovations  
Chemist  
9+ years of service!

**a plus 1 story**

"After the disaster of 9/11, Diazald®, a highly explosive compound used in herbicide analysis, was immediately controlled by the U.S. government which made shipment impossible. Restek was instrumental in helping me to develop an isocratic HPLC method that did not require the use of Diazald®. This method is not only safer, but it saves us time and money. Thanks, Restek!"

**Chris Domaradzki**, Organics Manager, Environmental Testing Laboratories

# Ultra Amino and PFP Columns

## Ultra Amino Columns (USP L8)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 2%

pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Recommended for normal phase analyses of mono- and disaccharides, or similar compounds.

also available

More chromatograms available!

Visit [www.restek.com](http://www.restek.com) or see our annual product catalog.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9107331	9107332	9107333	9107335
50mm	9107351	9107352	9107353	9107355
100mm	9107311	9107312	9107313	9107315
<b>5µm Columns</b>				
30mm	9107531	9107532	9107533	9107535
50mm	9107551	9107552	9107553	9107555
100mm	9107511	9107512	9107513	9107515
150mm	9107561	9107562	9107563	9107565
200mm	9107521	9107522	9107523	9107525
250mm	9107571	9107572	9107573	9107575

## Ultra PFP Columns (USP L43)

### Unique Selectivity

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 7%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

A pentafluorophenyl phase. Unique selectivity for compounds containing organohalogens or other basic functional groups.

Application	Page #
Digitalis Extract . . . . .	.86
Levothyroxine . . . . .	.94
Purines/Pyrimidines . . . . .	.67

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9176331	9176332	9176333	9176335
50mm	9176351	9176352	9176353	9176355
100mm	9176311	9176312	9176313	9176315
<b>5µm Columns</b>				
30mm	9176531	9176532	9176533	9176535
50mm	9176551	9176552	9176553	9176555
100mm	9176511	9176512	9176513	9176515
150mm	9176561	9176562	9176563	9176565
200mm	9176521	9176522	9176523	9176525
250mm	9176571	9176572	9176573	9176575



**Randy Romesberg**  
HPLC Senior Innovations  
Chemist  
12+ years of service!

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Ultra Silica Columns (USP L3)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: none

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

High surface area, Type B silica packing.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9100331	9100332	9100333	9100335
50mm	9100351	9100352	9100353	9100355
100mm	9100311	9100312	9100313	9100315
<b>5µm Columns</b>				
30mm	9100531	9100532	9100533	9100535
50mm	9100551	9100552	9100553	9100555
100mm	9100511	9100512	9100513	9100515
150mm	9100561	9100562	9100563	9100565
200mm	9100521	9100522	9100523	9100525
250mm	9100571	9100572	9100573	9100575

**Ultra Carbamate Columns****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

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exclusive!

Application	Page #
Pesticides (Carbamates) . . .	73

**Chromatographic Properties:**

Restek chemists developed the Ultra Carbamate column specifically for carbamates analysis. The unique packing separates 10 target carbamates in just over 10 minutes. The column is compatible with fluorescence or LC/MS detection.\* An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column. In addition to increased sample throughput, this much faster analysis will significantly reduce solvent usage—and the costs of disposing of solvent waste.

	1.0mm ID	2.1mm ID	3.2mm ID	4.0mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>					
50mm	9177351	9177352	9177353	9177354	9177355
100mm	9177311	9177312	9177313	—	9177315
<b>5µm Columns</b>					
250mm	—	—	—	—	9177575

\*For post-column derivatization / fluorescence detection applications for a 4.6mm ID column the total system dead volume, including the post-column reactor, must be less than 650µL. For standard post-column reactor systems, we recommend a 250 x 4.6mm, 5µm column. Call Restek technical service for more information.

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innovation!

Faster analyses and reduced solvent use!  
An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column.



also available

We also have syringe filters!  
See [www.restek.com](http://www.restek.com)

# Ultra Quat Columns

restek  
innovation!

An Ultra Quat column and Ultra Quat Reagent Solution eliminate the need for ion pairing reagents in paraquat/diquat analysis.

## Ultra Quat Columns

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

restek  
exclusive!

### Chromatographic Properties:

A retentive, high-purity, base deactivated reversed phase packing. Ideal for the analysis of paraquat and diquat or other quaternary amines when used with Ultra Quat Reagent Solution mobile phase additive (cat. # 32441).

Length	4.6mm ID
5µm Column	cat. #
150mm	9181565

Application	Page #
Paraquat/Diquat	.....28, 75

## Ultra Quat Reagent Solution

Use with Ultra Quat HPLC column. Dilute to 1 liter mobile phase, per instructions.

In water, 20mL/bottle

cat. # 32441 (ea.)

## Paraquat & Diquat Calibration Mix

diquat dibromide      paraquat dichloride  
1,000µg/mL each in water, 1mL/ampul  
cat. # 32437 (ea.)

## for more info

For more information about the Ultra Quat system, review Restek Advantage 2004 vol. 3 at [www.restek.com](http://www.restek.com).

## free literature

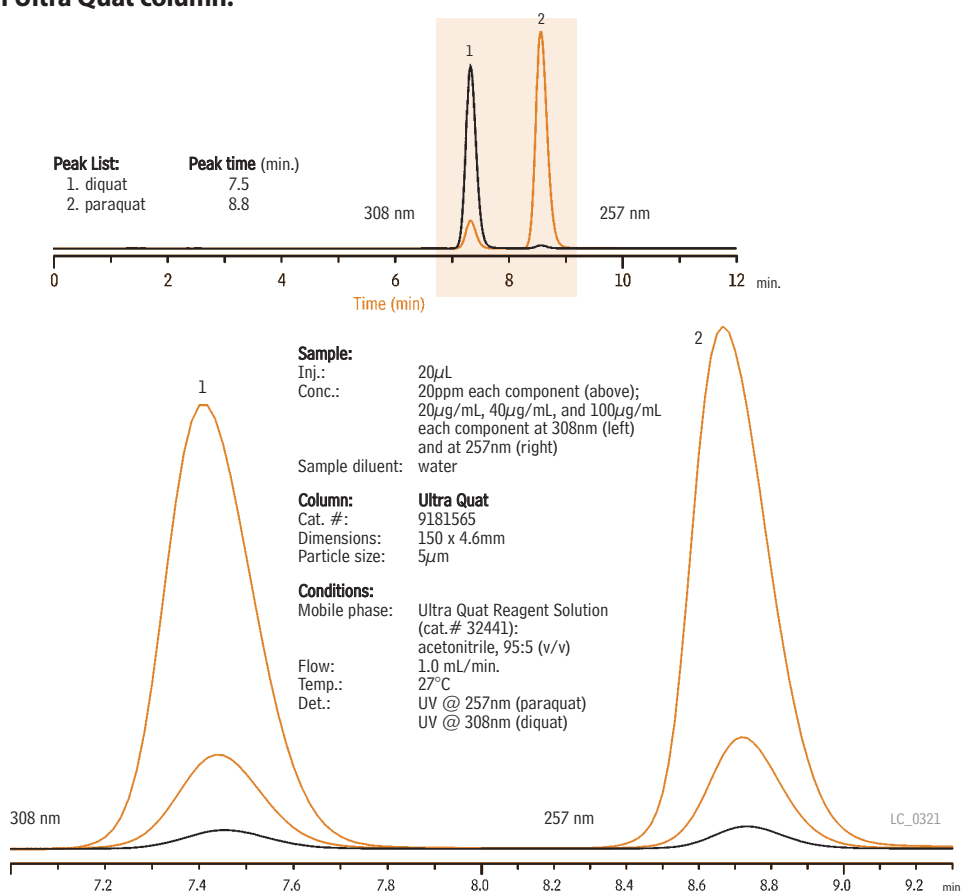
### Simple, Sensitive HPLC/UV Analysis for Paraquat and Diquat

These highly charged quaternary amines are poorly retained on alkyl stationary phases. Using only acetonitrile, water, and a solvation-blocking reagent, our separation system alters the interactions among analyte, mobile phase, and stationary phase, and promotes solubility of the analytes in the stationary phase. In our system, the detection limit is 6ppb for either herbicide, and the analysis is completed in less than 10 minutes. An optimized solid phase extraction cartridge concentrates the herbicides for the analysis.

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat. # 580006

## Consistent resolution, retention times, and peak symmetry for paraquat and diquat on an Ultra Quat column.



RESTEK

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Australian Distributors

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ECH nology '07

**Viva Wide Pore HPLC Columns: 3µm or 5µm particles; 300Å pore size**

- Excellent for separating peptides or proteins.
- Rugged, spherical particles, with 300Å pore size.
- High proportion of pore/surface area available to large molecules.

Viva columns are based on a wide pore material we designed for optimal large molecule separations. In developing Viva silica, we found that although many commercial wide-pore silicas meet the standard 300Å mean pore size, most have very broad distributions about this mean, with a significant portion of their pore volume falling below 150Å. This means a large portion of the surface area is unavailable to larger molecules. Viva columns have a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation.

**Viva C18 Columns (USP L1)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical	endcap: yes
pore size: 300Å	pH range: 2.5 to 10
carbon load: 9%	temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose column for analyzing large molecules and biomolecules.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>3µm Columns</b>				
30mm	9514331	9514332	9514333	9514335
50mm	9514351	9514352	9514353	9514355
100mm	9514311	9514312	9514313	9514315
150mm	9514361	9514362	9514363	9514365
<b>5µm Columns</b>				
30mm	9514531	9514532	9514533	9514535
50mm	9514551	9514552	9514553	9514555
100mm	9514511	9514512	9514513	9514515
150mm	9514561	9514562	9514563	9514565
200mm	9514521	9514522	9514523	9514525
250mm	9514571	9514572	9514573	9514575

**Viva C8 Columns (USP L7)****Physical Characteristics:**

particle size: 5µm, spherical	endcap: yes
pore size: 300Å	pH range: 2.5 to 7.5
carbon load: 5%	temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Less retention in reversed phase assays than Viva C18.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>5µm Columns</b>				
30mm	9513531	9513532	9513533	9513535
50mm	9513551	9513552	9513553	9513555
100mm	9513511	9513512	9513513	9513515
150mm	9513561	9513562	9513563	9513565
200mm	9513521	9513522	9513523	9513525
250mm	9513571	9513572	9513573	9513575

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

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innovation!**

Viva silica has a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation of large molecules and biomolecules.

Application	Page #
Peptides .....	.68
Proteins .....	.68

← **new!****ordering note**

If you need another column dimension or phase, please call for a quote.

**also available**

3µm particles are available for all Viva phases—please inquire.



**Tawnya Childs**  
Call Center Manager  
10+ years of service!

# Viva C4, Biphenyl and PFP Propyl Columns



**Tim Herring**  
Technical Service  
Specialist  
3+ years of service!

## Viva C4 Columns (USP L26)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 3.5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Less retention in reversed phase assays than Viva C18 or Viva C8.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>5µm Columns</b>								
30mm	9512531		9512532		9512533		9512535	
50mm	9512551		9512552		9512553		9512555	
100mm	9512511		9512512		9512513		9512515	
150mm	9512561		9512562		9512563		9512565	
200mm	9512521		9512522		9512523		9512525	
250mm	9512571		9512572		9512573		9512575	

**new!**

## Viva Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 5µm  
pore size: 300Å  
carbon load: 6.7%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

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**exclusive!**

### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays. Highly retentive and selective phase for aromatic and unsaturated compounds, with increased retention, relative to phenyl phases.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>5µm Columns</b>								
30mm	9516531		9516532		9516533		9516535	
50mm	9516551		9516552		9516553		9516555	
100mm	9516511		9516512		9516513		9516515	
150mm	9516561		9516562		9516563		9516565	
200mm	9516521		9516522		9516523		9516525	
250mm	9516571		9516572		9516573		9516575	

for **more info**

For more information,  
request our Viva Wide Pore  
HPLC Columns flyer.  
lit. cat.# 59939

also **available**

3µm particles are available  
for all Viva phases—please  
inquire.

**new!**

## Viva PFP Propyl Columns (USP L43)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#		cat.#		cat.#		cat.#	
<b>5µm Columns</b>								
30mm	9519531		9519532		9519533		9519535	
50mm	9519551		9519552		9519553		9519555	
100mm	9519511		9519512		9519513		9519515	
150mm	9519561		9519562		9519563		9519565	
200mm	9519521		9519522		9519523		9519525	
250mm	9519571		9519572		9519573		9519575	



**Viva Silica Columns (USP L3)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 300Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds in normal phase separations.

	1.0mm ID	2.1mm ID	3.2mm ID	4.6mm ID
Length	cat.#	cat.#	cat.#	cat.#
<b>5µm Columns</b>				
30mm	9510531	9510532	9510533	9510535
50mm	9510551	9510552	9510553	9510555
100mm	9510511	9510512	9510513	9510515
150mm	9510561	9510562	9510563	9510565
200mm	9510521	9510522	9510523	9510525
250mm	9510571	9510572	9510573	9510575

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident™ Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident™ Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 37.

For guard cartridges for these columns, see page 39.

**Fast LC Method Development Kits**

Fast, efficient separations in an economical cartridge format. The design allows rapid substitution of one cartridge for another. The holder is available with either standard fittings or with a universal PEEK® tip fitting. The universal fitting gives the user the option of threading the column directly into the detector inlet, reducing system dwell volume. The cartridges are 30mm long, with either 2.1mm or 4.0mm ID. The 2.1mm and 4.0mm ID cartridges have the same outside diameter, so the holder will accept either.

Each kit includes four 3µm Fast LC Cartridges: Ultra C18 (USP L1), Ultra Aqueous C18 (USP L1), Ultra Cyano (USP L10), Ultra PFP (USP L43), and a Fast LC cartridge holder.

**Fast LC Development Kits**

Description	qty.	cat.#
Fast LC Development Kit, four 30 x 2.1mm columns	kit	25296
Fast LC Development Kit, four 30 x 4.0mm columns	kit	25297

**3µm Fast LC Cartridges**

Description	Length	2.1mm ID	4.0mm ID
Ultra C18 Fast LC Cartridge	30mm	91743320	91743340
Ultra Aqueous C18 Fast LC Cartridge	30mm	91783320	91783340
Ultra Cyano Fast LC Cartridge	30mm	91063320	91063340
Ultra PFP Fast LC Cartridge	30mm	91763320	91763340

**Fast LC Cartridge Holders**

Description	qty.	cat.#
Fast LC Cartridge Holder with PEEK® Tip	ea.	25298
Fast LC Cartridge Holder with Standard Fittings	ea.	25299



Fast LC saves time and conserves solvent.

**also available**

Additional column kits and Fast LC cartridges are available. Please call for more information.

**Kromasil® Chromatography Products**

- Perfectly spherical, totally porous HPLC silica products from Kromasil.
- Wide range of bonded phases and particle sizes.
- Excellent chemical purity and stability, for highly efficient, reproducible separations.

Kromasil® HPLC silica products consist of highly spherical, porous particles in sizes from 3.5µm to 16µm and larger. The surface properties of the silica have been optimized, and include a narrow pore size distribution and a well-defined pore structure. For chromatographic separations, these properties ensure higher efficiencies, lower pressure drops, and excellent lot-to-lot reproducibility.

Kromasil® spherical silicas are produced using a sol-gel technique, which yields a mechanically strong particle with a large surface area (330m<sup>2</sup>/g for 100Å silica). Metal impurities are carefully monitored, as trace metals in the silica structure increase the surface acidity and can lead to tailing peaks for basic or chelating compounds. Typical metal content for Kromasil® silicas is shown in Table I.

Kromasil® bonded phases are manufactured using monofunctional silanes, for higher surface coverage and greater reproducibility. Bonding is followed by an end-capping procedure, which further increases chemical stability.

Restek offers all Kromasil® phases, in a full range of column dimensions and silica particle sizes. A sampling of our product offering is shown here. For further information about Kromasil® products available from Restek, please contact Restek technical service at 800-356-1688, ext. 4, 814-353-1300, ext. 4, or support@restek.com

**Table I** Typical chemical purity for Kromasil® spherical silicas.

Metal	Content (ppm)
Na	<20
Al	<10
Fe	<10

Values based on AAS or ICP measurements.

**Kromasil® HPLC Columns****Physical Characteristics:**

particle size: 3.5µm or 5µm, spherical  
pore size: 100Å

endcap: fully endcapped  
pH range: 1.5 to 10

**Kromasil® C18 Columns (USP L1)**

average carbon load: 20%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3.5µm Columns</b>			
30mm	9204332	—	9204335
50mm	9204352	—	9204355
100mm	9204312	—	9204315
150mm	9204362	—	9204365
<b>5µm Columns</b>			
30mm	9204532	9204533	9204535
50mm	9204552	9204553	9204555
100mm	9204512	9204513	9204515
150mm	9204562	9204563	9204565
200mm	9204522	9204523	9204525
250mm	9204572	9204573	9204575

**also available**

For guard cartridges for these columns, see page 39.

**Kromasil® C4 Columns (USP L26)**

average carbon load: 8%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
30mm	9202532	9202533	9202535
50mm	9202552	9202553	9202555
100mm	9202512	9202513	9202515
150mm	9202562	9202563	9202565
200mm	9202522	9202523	9202525
250mm	9202572	9202573	9202575

**Kromasil® C8 Columns (USP L7)**

average carbon load: 12%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>3.5µm Columns</b>			
30mm	9203332	—	9203335
50mm	9203352	—	9203355
100mm	9203312	—	9203315
150mm	9203362	—	9203365
<b>5µm Columns</b>			
30mm	9203532	9203533	9203535
50mm	9203552	9203553	9203555
100mm	9203512	9203513	9203515
150mm	9203562	9203563	9203565
200mm	9203522	9203523	9203525
250mm	9203572	9203573	9203575



**Sean Nolan**  
Materials Manager  
7+ years of service!

**Kromasil® C1 Columns (USP L13)**

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
30mm	9201532	9201533	9201535
50mm	9201552	9201553	9201555
100mm	9201512	9201513	9201515
150mm	9201562	9201563	9201565
200mm	9201522	9201523	9201525
250mm	9201572	9201573	9201575

**Kromasil® Phenyl Columns (USP L11)**

average carbon load: 14%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
50mm	9205552	9205553	9205555
150mm	9205562	9205563	9205565
250mm	9205572	9205573	9205575

**Kromasil® Amino Columns (USP L8)**

nitrogen load: 1.7%

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
50mm	9207552	9207553	9207555
150mm	9207562	9207563	9207565
250mm	9207572	9207573	9207575

**Kromasil® Silica Columns (USP L3)**

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>5µm Columns</b>			
30mm	9200532	9200533	9200535
50mm	9200552	9200553	9200555
100mm	9200512	9200513	9200515
150mm	9200562	9200563	9200565
200mm	9200522	9200523	9200525
250mm	9200572	9200573	9200575

**also available**

Other Kromasil® column dimensions, phases, and particle sizes are available. Please contact Technical Service at 800-356-1688 or 814-353-1300, ext. 4, to inquire.

**free literature****Kromasil® Columns & Bulk Packings**

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat.# 580089

## Prep Columns



Supersize without surprise!

### HPLC Prep Columns

- Easy scale-up from Restek analytical columns.
- Popular bonded phases.

Restek makes it easy to scale up your separations. We offer a wide range of semi-preparative and preparative-scale columns packed with many of our popular Ultra, Allure®, Pinnacle™ DB, and Pinnacle™ II bonded phases on a 5µm spherical silica. Other stationary phases and particle sizes are available—if you need a phase on 7µm, 10µm or 15µm particles, please call.

### Pinnacle™ DB HPLC Prep Columns

Dimensions Length x ID	Pinnacle™ DB C18 cat.#	Pinnacle™ DB C8 cat.#	Pinnacle™ DB Cyano cat.#	Pinnacle™ DB Silica cat.#
50 x 10mm	9414557	9413557	9416557	9410557
50 x 21.2mm	9414558	9413558	9416558	9410558
50 x 30mm	9414559	9413559	9416559	9410559
50 x 50mm	9414550	9413550	9416550	9410550
100 x 10mm	9414517	9413517	9416517	9410517
100 x 21.2mm	9414518	9413518	9416518	9410518
100 x 30mm	9414519	9413519	9416519	9410519
100 x 50mm	9414510	9413510	9416510	9410510
150 x 10mm	9414567	9413567	9416567	9410567
150 x 21.2mm	9414568	9413568	9416568	9410568
150 x 30mm	9414569	9413569	9416569	9410569
150 x 50mm	9414560	9413560	9416560	9410560
250 x 10mm	9414577	9413577	9416577	9410577
250 x 21.2mm	9414578	9413578	9416578	9410578
250 x 30mm	9414579	9413579	9416579	9410579
250 x 50mm	9414570	9413570	9416570	9410570

### Pinnacle™ II HPLC Prep Columns

Dimensions Length x ID	Pinnacle™ II C18 cat.#	Pinnacle™ II C8 cat.#	Pinnacle™ II Cyano cat.#	Pinnacle™ II Silica cat.#
50 x 10mm	9214557	9213557	9216557	9210557
50 x 21.2mm	9214558	9213558	9216558	9210558
50 x 30mm	9214559	9213559	9216559	9210559
50 x 50mm	9214550	9213550	9216550	9210550
100 x 10mm	9214517	9213517	9216517	9210517
100 x 21.2mm	9214518	9213518	9216518	9210518
100 x 30mm	9214519	9213519	9216519	9210519
100 x 50mm	9214510	9213510	9216510	9210510
150 x 10mm	9214567	9213567	9216567	9210567
150 x 21.2mm	9214568	9213568	9216568	9210568
150 x 30mm	9214569	9213569	9216569	9210569
150 x 50mm	9214560	9213560	9216560	9210560
250 x 10mm	9214577	9213577	9216577	9210577
250 x 21.2mm	9214578	9213578	9216578	9210578
250 x 30mm	9214579	9213579	9216579	9210579
250 x 50mm	9214570	9213570	9216570	9210570

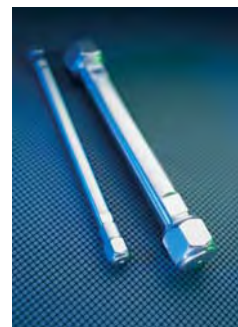


### ordering note

We strongly recommend ordering a semi-prep or prep column only after scouting the desired separation on an equivalent analytical-scale column. Because we cannot re-use a column or the silica it contains once it has left our facility, we cannot accept returns of large-scale columns (except in cases of our error).

## Allure® HPLC Prep Columns

Dimensions Length x ID	Allure® C18 cat. #	Allure® Basix cat. #	Allure® PFP Propyl cat. #	Allure® Silica cat. #
50 x 10mm	9164557	9161557	—	9160557
50 x 21.2mm	9164558	9161558	—	9160558
50 x 30mm	9164559	9161559	—	9160559
50 x 50mm	9164550	9161550	—	9160550
100 x 10mm	9164517	9161517	—	9160517
100 x 21.2mm	9164518	9161518	—	9160518
100 x 30mm	9164519	9161519	—	9160519
100 x 50mm	9164510	9161510	—	9160510
150 x 10mm	9164567	9161567	—	9160567
150 x 21.2mm	9164568	9161568	9169568	9160568
150 x 30mm	9164569	9161569	9169569	9160569
150 x 50mm	9164560	9161560	—	9160560
250 x 10mm	9164577	9161577	—	9160577
250 x 21.2mm	9164578	9161578	—	9160578
250 x 30mm	9164579	9161579	—	9160579
250 x 50mm	9164570	9161570	—	9160570



## Ultra HPLC Prep Columns

Dimensions Length x ID	Ultra C18 cat. #	Ultra Aqueous C18 cat. #	Ultra C8 cat. #	Ultra IBD cat. #	Ultra Cyano cat. #	Ultra Phenyl cat. #	Ultra PFP cat. #	Ultra Silica cat. #
50 x 10mm	9174557	9178557	9103557	9175557	9106557	9105557	9176557	9100557
50 x 21.2mm	9174558	9178558	9103558	9175558	9106558	9105558	9176558	9100558
50 x 30mm	9174559	9178559	9103559	9175559	9106559	9105559	9176559	9100559
50 x 50mm	9174550	9178550	9103550	9175550	9106550	9105550	9176550	9100550
100 x 10mm	9174517	9178517	9103517	9175517	9106517	9105517	9176517	9100517
100 x 21.2mm	9174518	9178518	9103518	9175518	9106518	9105518	9176518	9100518
100 x 30mm	9174519	9178519	9103519	9175519	9106519	9105519	9176519	9100519
100 x 50mm	9174510	9178510	9103510	9175510	9106510	9105510	9176510	9100510
150 x 10mm	9174567	9178567	9103567	9175567	9106567	9105567	9176567	9100567
150 x 21.2mm	9174568	9178568	9103568	9175568	9106568	9105568	9176568	9100568
150 x 30mm	9174569	9178569	9103569	9175569	9106569	9105569	9176569	9100569
150 x 50mm	9174560	9178560	9103560	9175560	9106560	9105560	9176560	9100560
250 x 10mm	9174577	9178577	9103577	9175577	9106577	9105577	9176577	9100577
250 x 21.2mm	9174578	9178578	9103578	9175578	9106578	9105578	9176578	9100578
250 x 30mm	9174579	9178579	9103579	9175579	9106579	9105579	9176579	9100579
250 x 50mm	9174570	9178570	9103570	9175570	9106570	9105570	9176570	9100570

## ordering note

We strongly recommend ordering a semi-prep or prep column only after scouting the desired separation on an equivalent analytical-scale column. Because we cannot re-use a column or the silica it contains once it has left our facility, we cannot accept returns of large-scale columns (except in cases of our error).

## Kromasil® Prep Columns

Dimensions Length x ID	Kromasil® C18 cat. #	Kromasil® C8 cat. #
50 x 10mm	9204557	9203557
50 x 21.2mm	9204558	9203558
50 x 30mm	9204559	9203559
150 x 10mm	9204567	9203567
150 x 21.2mm	9204568	9203568
150 x 30mm	9204569	9203569
250 x 10mm	9204577	9203577
250 x 21.2mm	9204578	9203578
250 x 30mm	9204579	9203579

new!

## Bulk Packing Materials

### Bulk Packing Materials

#### Use our bulk packing materials to pack your own columns!

Restek is among the small group of column manufacturers capable of producing their own high purity silica. We offer our Pinnacle™ II and Pinnacle™ DB silica and bonded phases in bulk. Pinnacle™ II is an excellent replacement for Hypersil® silica. Pinnacle™ DB is a highly base-deactivated material for analyses of basic compounds and an excellent alternative to Hypersil® BDS silica. Bonded phases from our Ultra, Allure®, and Viva lines also are available in bulk.

Our extensive QC program ensures the high quality and reproducibility of these silicas. Each lot of material is tested for mean particle size and distribution, pore diameter, surface area, and total metals analysis. You can be confident that you are getting consistent, high quality product.

Use these materials for easy scale up to preparative scale chromatography, or for packing your own columns.

### Bulk Packing Materials

Description	min. qty.	cat.#	5-99 grams	100-499 grams	500-999 grams	≥1000 grams
<b>3µm Pinnacle™ II Bulk Packing Materials</b>						
Pinnacle™ II C8 Bulk Packing	5g	92133				
Pinnacle™ II C18 Bulk Packing	5g	92143				
Pinnacle™ II Cyano Bulk Packing	5g	92163				
Pinnacle™ II Phenyl Bulk Packing	5g	92153				
<b>5µm Pinnacle™ II Bulk Packing Materials</b>						
Pinnacle™ II Amino Bulk Packing	5g	92175				
Pinnacle™ II C8 Bulk Packing	5g	92135				
Pinnacle™ II C18 Bulk Packing	5g	92145				
Pinnacle™ II Cyano Bulk Packing	5g	92165				
Pinnacle™ II Phenyl Bulk Packing	5g	92155				
<b>5µm Pinnacle™ DB Bulk Packing Materials</b>						
Pinnacle™ DB C18 Bulk Packing	5g	94145				
Pinnacle™ DB C8 Bulk Packing	5g	94135				
Pinnacle™ DB Cyano Bulk Packing	5g	94165				
Description	qty.	cat.#	1-9 bottles	10-49 bottles	50-99 bottles	≥100 bottles
<b>5µm Ultra Bulk Packing Materials</b>						
Ultra C1 Bulk Packing	10g/btl.	91015				
Ultra C4 Bulk Packing	10g/btl.	91025				
Ultra C8 Bulk Packing	10g/btl.	91035				
Ultra C18 Bulk Packing	10g/btl.	91745				
Ultra Amino Bulk Packing	10g/btl.	91075				
Ultra Cyano Bulk Packing	10g/btl.	91065				
Ultra Phenyl Bulk Packing	10g/btl.	91055				

### Silica Bulk Materials

Description	min. qty.	cat.#	5-99 grams	100-499 grams	500-999 grams	≥1000 grams
<b>Silica Bulk Materials</b>						
Pinnacle™ II Silica Bulk Packing, 3µm	5g	92103				
Pinnacle™ II Silica Bulk Packing, 5µm	5g	92105				
Pinnacle™ DB Silica Bulk Packing, 5µm	5g	94105				
	qty.	cat.#	1-9 bottles	10-49 bottles	50-99 bottles	≥100 bottles
Ultra Silica Bulk Packing, 5µm	10g/btl.	91005				

new!

### Kromasil® Bulk Packings

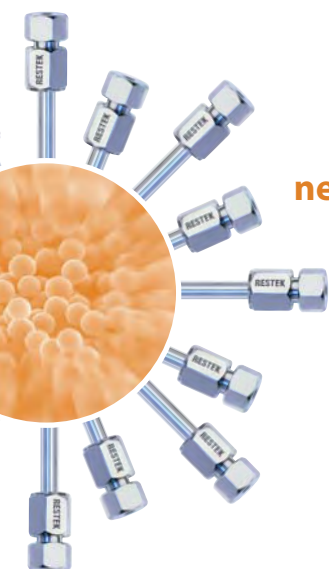
- High-purity packing materials in 10 and 16µm.
- All Kromasil® phases available, please inquire.

Description	min. qty.	cat.#	200-499 grams	500-999 grams	≥1000 grams
Kromasil® 100Å Silica, 10µm	200g	92000			
Kromasil® 100Å Silica, 16µm	200g	92001			
Kromasil® 100Å C8, 10µm	200g	92030			
Kromasil® 100Å C8, 16µm	200g	92031			
Kromasil® 100Å C18, 10µm	200g	92040			
Kromasil® 100Å C18, 16µm	200g	92041			
Kromasil® 100Å Chiral DMB, 10µm	200g	92080			
Kromasil® 100Å Chiral DMB, 16µm	200g	92081			
Kromasil® 100Å Chiral TBB, 10µm	200g	91990			
Kromasil® 100Å Chiral TBB, 16µm	200g	91991			



### also available

Other stationary phases and particle sizes are available; please inquire.



**RESTEK**

**HRMalytic RESTEK**  
 Australian Distributors **ECH nology**  
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'07

## Restek's Exclusive Trident™ Integral System

- Convenient and economical leak-free guard cartridge system, extremely easy to install.
- Versatile configuration protects against all levels of contamination.
- Integral design eliminates troublesome tubing connections.

The system's foundation consists of the analytical column configured with our exclusive Trident™ end fitting and XF fitting. This configuration contains the standard internal frit as well as a replaceable cap frit, which easily can be changed without disturbing the packed bed. Changing the external frit can reverse the effects of accumulated particles, such as high backpressure or peak distortion. To obtain this basic configuration, simply order any Restek HPLC column, and add the suffix -700 to the catalog number for the column. (Nominal additional charge. )

For maximum protection against contaminants and particulate matter, the system can be configured with an integral guard cartridge holder (XG-XF), a guard cartridge, and a replaceable external frit. To obtain this configuration, simply order any Restek HPLC column, add the suffix -700 to the catalog number for the column, and order the appropriate XG-XF male fitting (cat.# 25026 or 25062, below) and Trident™ guard cartridges (page 39).

Description	qty.	cat.#
XG-XF Fitting for 10mm Guard Cartridge	ea.	25026
XG-XF Fitting for 20mm Guard Cartridge	ea.	25062
Replacement XF Filter Fitting	ea.	25024
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023
Replacement Cap Frits: 2mm, 2.0µm	5-pk.	25057

## Trident™ Integral Guard System



Assembled column with Trident™ integral guard system



Column with Trident™ Integral Inlet Fitting (to order add "-700" to catalog number of column) and guard cartridge, XG-XF fitting, cap frit, and XF end fitting.



Remove the XF end fitting and install the guard cartridge in the end of the column.



Add the XG-XF fitting (order cat.#25026 for 10mm guard cartridges, cat.#25062 for 20mm guard cartridges).



Re-install the XF end fitting with cap frit.



The cap frit can be easily replaced if it becomes contaminated/plugged.



**Lori McGarry**  
Environmental  
Health & Safety Officer  
1+ year of service!

# Trident™ Direct Guard Cartridge System / Cartridge Holders



**Trident™ Direct**  
provides three levels  
of protection



**Trident™ Direct**  
high-pressure filter  
Protection against  
particulate matter.



**Trident™ Direct 10mm**  
guard cartridge holder  
with filter  
Protection against  
particulate matter and  
moderate protection  
against irreversibly  
adsorbed compounds.



**Trident™ Direct 20mm**  
guard cartridge holder  
with filter  
Protection against  
particulate matter and  
maximum protection  
against irreversibly  
adsorbed compounds.

## Trident™ Direct Guard Cartridge System

Easy to Use, Low Dead Volume—The Ultimate Combination of Convenience and Column Protection  
Unlike “one size fits all” guard systems, the Trident™ Direct system gives you the power to select the right level of protection for your analysis. The system offers three levels of protection and guard cartridges in four dimensions, with a variety of bonded phases to match your analytical column. The economical, leak-free cartridge design provides an unprecedented combination of convenience, economy, and reliability. The foundation of the Trident™ Direct system is a reusable direct connect holder that easily attaches to any HPLC column using CPI- or Waters-style end fittings.\* The system is available in configurations to match different protection level needs: in-line filter, in-line filter with holder for 10mm guard cartridge, and in-line filter with holder for 20mm guard cartridge. The guard cartridges are available in 2.1 and 4.0mm ID and are interchangeable within the appropriate length holder.

\*The standard PEEK™ tip in Trident™ Direct systems is compatible with Parker®, Upchurch®, Valco®, and other CPI-style fittings. To use Trident™ Direct systems with Waters-style end fittings, replace the tip with cat.# 25088.

Description	qty.	cat.#
High-pressure filter	ea.	25082
10mm guard cartridge holder without filter	ea.	25083
10mm guard cartridge holder with filter	ea.	25084
20mm guard cartridge holder without filter	ea.	25085
20mm guard cartridge holder with filter	ea.	25086
Connection tip for Waters-style end fittings	ea.	25088
PEEK™ tip standard fittings	ea.	25087
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023
Replacement Cap Frits: 2mm, 2.0µm	5-pk.	25057



Cap frits

## Trident™ HPLC In-Line Guard Cartridge Holders

A Trident™ in-line guard cartridge holder can be used with almost any HPLC column by connecting it with a short piece of 1/16" tubing, appropriate nuts and ferrules, or finger-tight fittings. The system can be used with Restek columns, or with columns from other manufacturers. Holders are available for either 10mm or 20mm guard cartridges. Either size can be purchased with or without a prefilter, which provides added protection against the particles that can shorten the lifetime of the guard cartridge.

Description	qty.	cat.#
Holder for 10mm guard cartridge	ea.	25021
Holder with filter for 10mm guard cartridge	ea.	25040
Holder for 20mm guard cartridge	ea.	25061
Holder with filter for 20mm guard cartridge	ea.	25060
Replacement Cap Frits: 4mm, 2.0µm*	5-pk.	25022
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023
Replacement Cap Frits: 2mm, 2.0µm*	5-pk.	25057

\*Standard porosity.



Holder for 10mm  
guard cartridge



Holder with filter for  
10mm guard cartridge



Holder for 20mm  
guard cartridge



Holder with filter for  
20mm guard cartridge

## Trident™ HPLC Guard Cartridges

Guard Cartridges	3-pk. (10 x 2.1mm)	3-pk. (10 x 4.0mm)	2-pk. (20 x 2.1mm)	2-pk. (20 x 4.0mm)
Allure® AK <b>new!</b>	—	915950210	—	—
Allure® Basix	916150212	916150210	916150222	916150220
Allure® C18	916450212	916450210	916450222	916450220
Allure® PFP Propyl	916950212	916950210	916950222	916950220
Allure® Silica	916050212	916050210	916050222	916050220
Allure® Organic Acids	916550212	916550210	916550222	916550220
Allure® Aqueous C18	916850212	916850210	916850222	916850220
Allure® Biphenyl	916650212	916650210	916650222	916650220
pHidelity® C18	957930212	957930210	957930222	957930220
Pinnacle™ II Amino	921750212	921750210	921750222	921750220
Pinnacle™ II C8	921350212	921350210	921350222	921350220
Pinnacle™ II C18	921450212	921450210	921450222	921450220
Pinnacle™ II Cyano	921650212	921650210	921650222	921650220
Pinnacle™ II PAH	921950212	921950210	921950222	921950220
Pinnacle™ II Phenyl	921550212	921550210	921550222	921550220
Pinnacle™ II Biphenyl	—	920950210	—	920950220
Pinnacle™ II Silica	921050212	921050210	921050222	921050220
Pinnacle™ DB C8	941350212	941350210	941350222	941350220
Pinnacle™ DB C18	941450212	941450210	941450222	941450220
Pinnacle™ DB Cyano	941650212	941650210	941650222	941650220
Pinnacle™ DB Phenyl	941550212	941550210	941550222	941550220
Pinnacle™ DB Silica	941050212	941050210	941050222	941050220
Ultra Amino	910750212	910750210	910750222	910750220
Ultra Aqueous C18	917850212	917850210	917850222	917850220
Ultra C1	910150212	910150210	910150222	910150220
Ultra C4	910250212	910250210	910250222	910250220
Ultra C8	910350212	910350210	910350222	910350220
Ultra C18	917450212	917450210	917450222	917450220
Ultra Carbamate	917750212	917750210	917750222	917750220
Ultra Cyano	910650212	910650210	910650222	910650220
Ultra IBD	917550212	917550210	917550222	917550220
Ultra PFP	917650212	917650210	917650222	917650220
Ultra Phenyl	910550212	910550210	910550222	910550220
Ultra Silica	910050212	910050210	910050222	910050220
Ultra Quat	918150212	918150210	918150222	918150220
Viva C18	951450212	951450210	951450222	951450220
Viva C8	951350212	951350210	951350222	951350220
Viva C4	951250212	951250210	951250222	951250220
Viva PFP Propyl <b>new!</b>	951950212	951950210	951950222	951950220
Viva Biphenyl <b>new!</b>	951650212	951650210	951650222	951650220
Viva Silica	951050212	951050210	951050222	951050220
Kromasil® C1	920150212	920150210	—	920150220
Kromasil® C4	920250212	920250210	—	920250220
Kromasil® C8	920350212	920350210	—	920350220
Kromasil® C18	920450212	920450210	—	920450220
Kromasil® Amino	920750212	920750210	920750222	920750220
Kromasil® Phenyl	920550212	920550210	920550222	920550220
Kromasil® Silica	920050212	920050210	—	920050220



10 & 20mm Guard Cartridges

# Replacement Parts

## Restek Replacement Parts for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#
Preventive Maintenance Kit (Includes: rotor seal, needle seat, needle assembly, seat cap)	1050	01078-68721	kit	25259
Autosampler Preventive Maintenance Kit (Includes: rotor seal, needle assembly, needle seat)	1100	G1313-68709	kit	25271
Pump Maintenance Kit (Includes: PTFE frit, outlet cap, active inlet cartridge, gold disk seal, 2 piston seals, glass solvent filter)	1050 & 1100	G1311-68710	kit	25270
Outlet Ball Valve, Binary Pump	1100	G1312-60012	ea.	25267
Outlet Ball Valve	1050 & 1100	G1311-60012	ea.	25276
Sieves for Outlet Valve	1050 & 1100	5063-6505	10-pk.	25266
Check Valve Cartridge Assembly	1090	79835-67101	ea.	25344
Piston Seals, Teflon® w/Graphite	1050 & 1100	5063-6589	2-pk.	22482
Piston Seals, Teflon® w/Graphite	1050 & 1100	5063-6589	10-pk.	22483
Piston Seals (Black)	1090	5062-2494	4-pk.	25347
Seal Wash Kit, Binary Pump (4 seals, 4 gaskets)	1100	—	kit	25268
Seal Wash Kit (2 seals, 2 gaskets)	1100	—	kit	25269
Wash Seal	1050 & 1100	0905-1175	ea.	25277
Sapphire Piston	1050 & 1100	5063-6586	ea.	25273
Sapphire Piston	1090	6980-0672	ea.	25345
Needle Seat	1050	79846-67101	ea.	25258
Needle Seat	1090	79846-67101	ea.	25348
Needle Seat Assembly	1100	G1313-87101	ea.	25265
Needle Assembly	1100	G1313-87201	ea.	25278
Rotor Seal (not for use with 7125 injection valve)	1050	0101-0626	ea.	25272
Rotor Seal	1100	0100-1853	ea.	25275
Rotor Seal (Rheodyne®-style)	1090	0101-0623	ea.	25349
Frits, PTFE	1050 & 1100	01018-22707	5-pk.	25466
Seal, Gold Disk (outlet)	1050 & 1100	5001-3707	ea.	25467
Outlet Cap	1050 & 1100	5062-2485	4-pk.	25139
Outlet Cap & Gold Seal Assembly	1050 & 1100	—	2-pk.	25140
Connecting Tube	1050 & 1100	G1311-67304	ea.	25058
Bottle Head Assembly	—	G1311-60003	ea.	25059
Detector Lamp, 1090 DA, 1050 VW/DA/MWD	1090, 1050	79883-60002	ea.	25260
Lamp, DAD G1315A, G1365A	1100	2140-0590	ea.	25261
Lamp, VWD G1314A	1100	G1314-60100	ea.	25262
8453 Deuterium Lamp	—	2140-0605	ea.	25263
G1321 Fluorescence Detector Flash Lamp	—	2140-0600	ea.	25264
Lamp, DAD Long Life Deuterium (2000 hours)	1100	5181-1530	ea.	25399



Outlet Ball Valve



Needle Seat Assembly



Lamp, VWD G1314A

new!

## Capillary Stainless Steel Tubing Assemblies for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#
Capillary SS Tubing, 130mm x 0.17mm ID, with fittings	1090	01090-87305	ea.	26525
Capillary SS Tubing, 800mm x 0.17mm ID, with fittings	1050	01078-87305	ea.	26526
Capillary SS Tubing, 180mm x 0.17mm ID, with fittings	1100	G1313-87305	ea.	26527
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01018-67305	ea.	26528
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01078-87306	ea.	26529
Seat Capillary, SS Tubing, 0.17mm ID	1050	01078-87303	ea.	26530
Capillary SS Tubing, 105mm x 0.17mm ID	—	5021-1816	ea.	26531
Mixing Capillary Assembly	1100	G1312-67302	ea.	26532
Capillary SS Tubing, Valve to Metering Head	1100	G1313-87301	ea.	26533
Capillary SS Tubing, 150mm x 0.17mm ID	—	5021-1817	ea.	26534
Capillary SS Tubing, 280mm x 0.17mm ID	—	5021-1818	ea.	26535
Capillary SS Tubing, 400mm x 0.17mm ID	—	5021-1819	ea.	26536
1/16" SS Fitting, Front and Back Ferrules	—	5062-2418	10-pk.	26537



Capillary SS Tubing with fittings



Mixing Capillary Assembly

## Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

Easily install the gold seal into the outlet cap.

new!



Put Outlet Cap on male part of Assembly Tool.

Push the Assembly Tool together.

Hold onto Outlet Cap and pull Assembly Tool apart.

Put Gold Seal over pin on male part of Assembly Tool.

Push the Assembly Tool together and press the Gold Seal in the Outlet Cap.

Pull the Assembly Tool apart and remove assembled Outlet Cap and Gold Seal.



### Description

Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

qty.

ea.

cat.#

24989

## Restek Replacement Parts for Beckman HPLC Systems

Description	Model #	Similar to Beckman part #	qty.	cat.#
Inlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240720	ea.	25439
Outlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240721	ea.	25440
Inlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240620	ea.	25441
Outlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240621	ea.	25442
Guide Sleeve for Graphite Plunger Guide	110 Series Pumps	243713	ea.	25444
Outlet Check Filter Frit Assembly	110 Series Pumps	240619	ea.	25445
Piston Guide Assembly	110 Series and 112 Pumps	243045	ea.	25446
Plunger	110 Series and 112 Pumps	243053	ea.	25447
Plunger Seal	110 Series Pumps	887138	ea.	25448
Plunger Seal	112 Pumps	236797	ea.	25449
	114M, 116, 118, 125, 126, 127, 128 Pumps			
Sapphire Plunger		240714	ea.	25450
Plunger Seal	114M, 116, 118, 126, 127, 128 Pumps	241037	ea.	25451
Pump Seal, Gold*	114, 116, 125, 126, 127, 128 Pumps	241037	ea.	25452
Plunger Wash Seal	125, 126, 127, 128 Pumps	728772	ea.	25453
Deuterium Lamp	DU60, 62, 64, 65	596791	ea.	25454

\*Ultra-high molecular weight polyethylene (UHMWPE).



Outlet Check Valve Assembly



Sapphire Plunger

## Restek Replacement Parts for Hitachi HPLC Systems

Description	Model #	Similar to Hitachi part #	qty.	cat.#
SS Check Valve Cartridges (1/16" Ruby Ball)	655/6000/6200	AN0-085	2-pk.	25455
Inlet Check Valve Assembly	655/6000/6200	AN0-0833	ea.	25456
Outlet Check Valve Assembly	655/6000/6200	AN0-0834	ea.	25457
Plunger Assembly	655, 6000, 6200, 7100	810-1033	ea.	25458
Plunger Seal	L655A, 6000, 6200, 7100	655-1080	ea.	25459
Plunger Seal, Gold	655, 6000, 6200, 7100	655-1080	ea.	25460
Inlet Check Valve Assembly	L-7100	AN0-0836	ea.	25461
Outlet Check Valve Assembly	L-7100	AN0-0837	ea.	25462
Rotor Assembly for Dilutor Valve	AS-7200 Autosampler	810-3085	ea.	25463
Rotor Seal Kit	AS-7200, AS-7250 Injection Valve	AN0-0818	ea.	25464
Deuterium Lamp, Prealigned	L4000, L4200, L4250, L7400	885-3570	ea.	25465



# Replacement Parts

## Restek Replacement Parts for PerkinElmer HPLC Systems



Description	Model #	Similar to PerkinElmer part #	qty.	cat.#
Inlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540177	ea.	25438
Outlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540197	ea.	25437
High Pressure Seal Kit	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	2540275	ea.	25433
Standard High Pressure Seal	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	9907324	ea.	25434
Low Pressure Seal	PE Series 200 Pumps	9907339	ea.	25435
Needle	PE Series 200 Pumps	N2930023	ea.	25432
Deuterium Lamp	PE Lambda--2, 5, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 40, 800, 900	B0160917	ea.	25436
Deuterium Lamp	PE 200/785A	N2920149	ea.	25431

## Restek Replacement Parts for Shimadzu HPLC Systems



Description	Model #	Similar to Shimadzu part #	qty.	cat.#
Inlet Check Valve	LC-6A, LC-10AS	228-12353-91	ea.	25287
Inlet Check Valve	LC-600, LC-9A, LC-10AD	228-18522-91	ea.	25295
Inlet Check Valve	LC-10ADvp	228-39093-92	ea.	24984
Inlet Check Valve	LC-10AT, LC-10ATvp	228-32166-91	ea.	26521
Outlet Check Valve	LC-6A, LC-10AS	228-09054-93	ea.	25288
Outlet Check Valve Rebuild Kit	LC-6A, LC-10AS	228-11200-91	2-pk.	25289
Outlet Check Valve	LC-600, LC-9A, LC-10AD, LC-10AT	228-18522-92	ea.	25282
Outlet Check Valve	LC-10ADvp, LC-10ATvp	228-34976-91	ea.	24983
Plunger Seal	LC-6A	228-11999-00	ea.	25285
Plunger Seal, Polyethylene	LC-10AS, LC-10AT, LC-10ATvp	228-21975-00	ea.	25290
Plunger Seal	LC-600, LC-9A, LC-10AD	228-18745-00	ea.	25293
Plunger Seal	LC-10ADvp	228-35146-00	ea.	24980
Plunger Seal, Gold	LC-10ADvp	228-32628-00	ea.	24981
Plunger Seal	SIL-10ADvp, LC-10ATvp	228-35145-00	ea.	24985
Plunger Rinse Seal	LC-10AS	228-28499-00	ea.	25292
Sapphire Plunger	LC-6A	228-12904-93	ea.	25286
Sapphire Plunger	LC-10AS	228-17019-93	ea.	25291
Sapphire Plunger	LC-600, LC-9A, LC-10AD	228-18523-91	ea.	25294
Needle Seal	SIL-10A, 10XL, 10ADvp	228-33355-04	ea.	25468
Rotor Seal	SIL-10ADvp	228-21217-97	ea.	24986
Rotor Seal Assembly	SIL-10A, 10AXL	228-21217-91	ea.	25469
Stator Assembly	SIL-10A, 10AXL	228-21220-91	ea.	25470
Syringe, 500µL	SIL-10A, 10AXL	228-25237-04	ea.	25471
Plunger Assembly, Ceramic	LC-10ADvp	228-35601-91	ea.	25472
Plunger Assembly, Ceramic	LC-10ATvp	228-35009-92	ea.	25473
Plunger Assembly, Sapphire	LC-10ADvp	228-35601-92	ea.	24982
Deuterium Lamp	SPD-6A	062-65056-02	ea.	25283
Deuterium Lamp	SPD-10A, 10AV, M20A	228-34016-02	ea.	25284



**Julie Kowalski**  
Innovations Chemist  
2+ years of service!

## Restek Replacement Parts for Thermo Separation HPLC Systems

Description	Model #	Similar to SP/TSP part #	qty.	cat. #
Inlet Check Valve Assembly	SP8800 & P-Series Pumps	A3495-010	ea.	25474
Outlet Check Valve Assembly	SP8800 Series Pumps	A3490-010	ea.	25475
Piston	SP8800 & P-Series Pumps	A3102-010	ea.	25476
Back-up Seal	SP8800 & P-Series Pumps	A2963-010	ea.	25477
Plunger Seal, Gold Superseal	SP8800 & P-Series Pumps	A2962-010	ea.	25478
Check Valve and Transducer Assembly	P-Series Pumps	A3990-010	ea.	25479
Kel-F® Washer	P-Series Pumps	A2973-010	ea.	25480
Rotor Seal Assembly, Rheodyne® 7010	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	7010-039	ea.	25481
	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	A3588-020	ea.	25482
Syringe Assembly, 250µL	8800 Series	3301-0100	ea.	25483
Lamp, UV	Linear UV-200, 203, 204, 205, 206, and UV 100, 150, 1000, and 2000 Detectors	9551-0023	ea.	25484



Piston



Syringe Assembly, 250µL



Lamp, UV

Description	Model #	Similar to TSP part #	qty.	cat. #
Check Valve Cartridge	LDC Constametric Pumps	900946	ea.	25485
Sapphire Plunger	LDC Constametric Pumps	801306	ea.	25486
Plunger Seal Kit, Gold	LDC Constametric Pumps	31-36-00754	ea.	25487
Plunger Seal, Black	LDC Constametric Pumps	206129001	ea.	25488
Plunger Seal, Gold	LDC Constametric Pumps	206156001	ea.	25489
Lamp, Deuterium	LDC SM-I, II, III, 3000, 3100, 3100X, and 4000 Detectors	108035	ea.	25490
Lamp, Deuterium Pre-aligned	LDC 3200 and 4100 Detectors	900918001	ea.	25491

## Restek Rheodyne® Style Replacement Parts for Waters HPLC Systems

Description	Similar to Rheodyne® part #	qty.	cat. #
7010 Vespel® Rotor Seal	7010-039	ea.	25279
7125 Vespel® Rotor Seal	7125-047	ea.	25280
Isolation Seal, 7010	7010-015	ea.	25281

For easy access to Rheodyne® fittings, use a ValvTool Wrench—see page 54.



## Restek Replacement Parts for Waters Detectors

Description	Model #	Similar to Waters part #	qty.	cat. #
Window Gasket	484, 486, 490	80335	ea.	25423
Lamp Side Gasket	484, 486, 490	80336	ea.	25424
Quartz Lens	486	80687	ea.	25427
Xenon Lamp (w/o holder or mirror)	470	—	ea.	25404
Xenon Lamp	474	—	ea.	25405
Deuterium Lamp (UV/Vis)	480, 481	99499	ea.	25403
Deuterium Lamp (UV/Vis)	484	80357	ea.	25406
Deuterium Lamp (UV/Vis)	486	80678	ea.	25407
Deuterium Lamp	996, 2996	WAT052586	ea.	25408
Deuterium Lamp	2487	WAS081142	ea.	25409
Deuterium Lamp, long life (2000 hours)*	486	80678	ea.	25410

\*Standard lamps have nominal 1000 hour life.

also **available**

HPLC autosampler syringes.  
See **pages 64-65**.

# Replacement Parts

## Restek Replacement Parts for Waters HPLC Systems



Preventative Maintenance Kit for 717 Autosampler

new!



Inlet Check Valve Assembly



717 Seal Pack (Rebuilt) with Needle

new!

Description	Model #	Similar to Waters part #	qty.	cat. #
Preventative Maintenance Kit Includes: sparge diffuser, filter insert, compression screws, SS ferrule, battery for 2690/717, 250µL WISP™ syringe, seal wash plunger seal kits (2), wash tube seal kits (4), 2690 seal pack rebuild kit (steel bodies not included), 2690 head plunger seal kits (2), solvent reservoir 20µm filters (4), Alliance® check valve cartridges (2), Alliance® plunger assemblies (2), 2690 face seals (4)	Alliance® 2690, 2695	WAT270944	kit	25143
Preventative Maintenance Kit Includes: PerformancePLUS™ cartridges (2), sparge diffusers (4), Super Seals™ (2), solvent reservoir 20µm filters (2), sapphire plungers (2), reference valve rebuild kit, inlet manifold kit	600 Pump	WAT052675	kit	25144
Preventative Maintenance Kit Includes: 717 seal pack with needle, filter insert, 250µL WISP™ syringe	717 Autosampler	WAT052669	kit	25145
Preventative Maintenance Kit Includes: 616/326/625 plunger assemblies (2), pump seal kit, sparge diffusers (4), solvent reservoir 20µm filters (4), 616 cartridge assemblies (4)	616 Pump	WAT052672	kit	25146
Preventative Maintenance Kit Includes: PerformancePLUS™ check valves (2), sparge diffuser, solvent 10µm filter, sapphire plungers (2), plunger seals (2)	515 Pump	WAT052587	kit	26519
Inlet Check Valve Assembly	M6KA, 501, 510, 515, 590, 600E	33679, 25214	ea.	25360
Inlet Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	25203	ea.	25361
Inlet Check Valve Rebuild Kit	M6KA, 501, 510, 515, 590, 600E	60495	2-pk.	25362
Outlet Check Valve Assembly (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25030	ea.	25363
Outlet Check Valve Housing (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25212	ea.	25364
Outlet Check Valve Rebuild Kit (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	26016	2-pk.	25365
Outlet Check Valve Assembly (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25216	ea.	25366
Outlet Check Valve Housing (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25207	ea.	25367
Outlet Check Valve Rebuild Kit (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	26014	2-pk.	25368
Inlet Check Valve Assembly, 225µL (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	60307	ea.	25369
PerformancePLUS™ Check Valve Cartridge	M6KA, 501, 510, 515, 590, 600E	700000254	2-pk.	25370
Check Valve Rebuild Kit (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	88223	2-pk.	25371
PerformancePLUS™ Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	—	ea.	25372
Check Valve Cartridges	Alliance®	WAT270941	2-pk.	25373
Super Seal™ for Analytical Heads	M6KA, 501, 510, 515, 590, 600E	22946, 22934	ea.	25374
Plunger Seal, Gold for Analytical Heads*	M6KA, 501, 510, 515, 590, 600E	22934	ea.	25375
Plunger Seal, Black for graphite-filled Teflon®	M6KA, 501, 510, 515, 590, 600E	26613	ea.	25378
Plunger Seal, Black for EF Heads	510, 590, 600E	26644	ea.	25379
Plunger Seal, Gold for EF Heads	510, 590, 600E	26644	ea.	25380
Seal Wash Plunger Seal	Alliance®	WAT271018	2-pk.	25386
Head Plunger Seal Kit	Alliance®	WAT270938	2-pk.	25387
Head Plunger Seal Kit (Black)	Alliance®	WAT271066	2-pk.	25388
Insert Seal Parts Kit	M6KA, 501, 510, 515, 590, 600E	60012	kit	25389
Sapphire Plunger	M6KA, 510, 590, 600	25656	ea.	25381
Sapphire Plunger (Extended Flow)	510, 590, 600E	60304	ea.	25382
Sapphire Plunger	M45, M501	26524	ea.	25383
Sapphire Plunger Assembly Kit	M515	WAS207069	ea.	25384
Sapphire Plunger	616, 625, 626	31788	ea.	25420
Sapphire Plunger	Alliance®	WAT270959	ea.	25385
Pressure Transducer	M6KA, M45, 501, 510, 590, 600E	WAT060329	ea.	25391
Draw-Off Tube Assembly	510, 515, 600, 610	25470	ea.	25392
Inlet Manifold Kit	M45, 501, 510, 590, 600E	60448	kit	25412
Ferrule, Stainless Steel	515	22330	ea.	25417
Wash Face Seal	Alliance® 2690	WAT271017	ea.	25428
Wash Tube Seal Kit	Alliance® 2690	WAT270940	4-pk.	25429
Rebuild Kit, Reference Valve	600 Pump	25746	ea.	25492
Compression Screws, Stainless Steel	Alliance® 2690	—	2-pk.	25493
Battery	Alliance® 2690, 717, 486, 484	—	ea.	25494
Seal Pack Rebuild Kit, without Seal Wash Tube Assembly	Alliance® 2690	WAT271019	ea.	25495
717 Seal Pack (Rebuilt) with Needle	717 Autosampler	4559	ea.	25496
Seal Kit, Pump	616 Pump, 626, 625	31790	ea.	25497
Cartridge Assembly, Stainless Steel	616 Pump	24960	ea.	25498

\*Ultra-high molecular weight polyethylene (UHMWPE).

### ASI Piston Seals for Agilent HPLC Systems

Over time the piston seal in every HPLC system becomes worn and must be replaced. Our piston seals are constructed of Teflon® material with an additive that reduces their tendency to “cold flow” and improves their wear characteristics. Teflon® seals are more resistant to any HPLC solvent than UHMWPE seals, but they are less wear resistant and rugged. For Agilent 1050 and 1100 HPLC systems.

Description	qty.	cat.#
ASI Piston Seal	ea.	25175
ASI Piston Seal	10-pk.	25176



### ASI Check Valves

ASI subjects each valve to a rigorous series of tests, including self-priming capability, which means you typically won't need a syringe or draw-off valves to prime your pump. A high-pressure test ensures that the valve will not leak, even at pressures up to 12,000psi (82,737kPa). A low-pressure test verifies that the valve closes properly, even without a high backpressure force. The cartridge design allows easy, convenient replacement of worn or damaged valves.

#### ASI Check Valves for Agilent 1050 & 1100

Description	Material	qty.	cat.#
Outlet Check Valve (cartridge and housing)	Sapphire & Ruby Ball & Seat	ea.	25170
Outlet Check Valve (cartridge and housing)	Ceramic Ball & Seat	ea.	25173
Outlet Cartridges	Sapphire & Ruby Ball & Seat	ea.	25171
Outlet Cartridges	Ceramic Ball & Seat	ea.	25174
Outlet Housing	—	ea.	25172



Inlet and Outlet Check Valves for Waters Instruments

#### ASI Check Valves for Waters Alliance® Model 2690

Description	Material	qty.	cat.#
Inlet and Outlet Cartridges	Sapphire & Ruby Ball & Seat	ea.	25160
Inlet and Outlet Cartridges	Ceramic Ball & Seat	ea.	25162

### Valves for HPLC

Our valves have low internal volumes and are rated to 15,000psi (103,421kPa). They feature a 2-piece stem assembly in which the rotating upper shank is coupled through a ball joint to a static lower stem. Only fingertight torque is required to make the seal.

Description	qty.	cat.#
Two-Way Through Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26400
Two-Way Angle Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26401
Three-Way Bottom Vent Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26402
Side Vent Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26403
Dual Stem Three Way Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26404
Prime/Purge Valve for HPLC, 1/4-28 Flanged Seat, Stainless Steel, with Tubing and Fittings	ea.	26406
Prime/Purge Valve Repair Kit for Prime/Purge Valve	kit	26407

new!



Side Vent Valve

### In-Line Check Valves for HPLC

Our 316 stainless steel in-line check valves have a soft seat and 1/16" fittings. Nuts and ferrules are included.

Description	qty.	cat.#
Check Valve, Soft Seat, for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26405

new!





### High-Pressure Frit-Type In-Line Filter

Restek's high-pressure in-line filter is a stand-alone version of the Trident™ column protection system, specifically designed for ease of use, low dead-volume, and flexibility. The filter has a replaceable, PEEK™ encapsulated 316 stainless steel frit with a surface area of 12mm<sup>2</sup>. The standard frit with 2.0μm porosity may be replaced with an optional 0.5μm porosity frit. Use of this filter can greatly extend column life, thereby reducing costs and saving maintenance time. Tubing OD 1/16"; connectors—CPI.

Description	Porosity	qty.	cat.#
Frit-Type In-Line Filter	2.0μm	ea.	25041
Replacement Cap Frits: 4mm	0.5μm	5-pk.	25023
Replacement Cap Frits: 4mm	2.0μm	5-pk.	25022



### High-Pressure Cup-Type In-Line Filter

This high-pressure cup-type filter can be used in fluid streams operating to 15,000psi (103,421kPa). The cup-shaped filter elements have a large (2.5 cm<sup>2</sup>) surface area to give long operating lifetime. Mounted in screw-type adapters, they are easily removed for cleaning. Normally, backflushing and cleaning in an ultrasonic bath with an appropriate solvent will restore them. If they become permanently clogged, replacement elements are available.

Housings and all wetted parts are 316 stainless steel. Filters are packaged with gland nuts and ferrules. A bulkhead type fitting is available for thru-panel mounting. Tubing OD 1/16"; connectors—CPI.

Description	Porosity	qty.	cat.#
Cup-Type In-Line Filter	0.5μm	ea.	25000
Cup-Type In-Line Filter	2.0μm	ea.	25001
Replacement Filter Elements & Seals	0.5μm	2-pk.	25002
Replacement Filter Elements & Seals	2.0μm	2-pk.	25003



### Low-Pressure Slip-On Inlet Filter for Mobile Phase Reservoir

A type 316 stainless steel tip with a Tefzel® collar seals to a corrosion-resistant type 316 stainless steel filter element. The slip-on filter easily attaches to the pump inlet line, without the use of wrenches. The universal tip accommodates standard Teflon® tubing inner diameters. The cylindrical filter is standard 10μm porosity. 1/8" OD. Fits Altex, ISCO, LDC, Varian, Waters, PerkinElmer, and other pumps.

Description	qty.	cat.#
Slip-on Inlet Filter	ea.	25008



### Low-Pressure CPI Inlet Filter for Mobile Phase Reservoir

A 316 stainless steel knurled cap and Tefzel® CPI ferrule seal to 1/8" OD Teflon® tubing when finger-tightened onto the precision-machined filter holder. The filter element is replaceable. Standard 10μm porosity protects delicate pump components from particles but introduces very little pressure drop. 1/8" OD. May be used as a helium sparging diffuser.

Description	qty.	cat.#
CPI Inlet Filter	ea.	25009
Replacement Elements: 10μm filter	2-pk.	25010

### also available

Trident™ Direct high-pressure filter—  
protection against particulate matter.  
See page 38 for details.

### Mobile Phase Sparge Filter; Inlet Filter

The 2 $\mu$ m helium sparge filter is an inexpensive way to prepare and maintain mobile phases free of dissolved gas. Both filters are made from 316 stainless steel and PEEK™ and are compatible with most solvents.

Description	qty.	cat. #
Mobile Phase Sparge Filter: 2 $\mu$ m	ea.	25311
Inlet Filter: 10 $\mu$ m	ea.	25312
Inlet Filter: 20 $\mu$ m	ea.	25313

### Last Drop Filter

The flat filter element sits parallel to the bottom of the mobile phase reservoir, allowing the filter to draw 98% of the mobile phase without drawing air into the system. Conventional cylindrical mobile phase filters begin to draw air into the system when approximately 10% of the solvent remains in the reservoir. The Last Drop Filter allows more analyses per batch of mobile phase and helps reduce hazardous waste. 22.1mm OD.

Description	qty.	cat. #
Last Drop Filter: 2 $\mu$ m	ea.	25314
Last Drop Filter: 10 $\mu$ m	ea.	25315

### Kontes Membrane Microfiltration Glassware

47mm filtration apparatus with fritted glass support is recommended for routine filtration of corrosive liquids and removal of particles from HPLC solvents. The ground joint connection eliminates phthalate contamination that can occur when using silicone or neoprene stoppers. The support base has a coarse porosity glass frit and an integral vacuum connection, located above the drip tip to prevent contamination of the vacuum line with filtrate droplets. Each apparatus includes a funnel, an anodized aluminum clamp, a 47mm fritted glass support base, and a filtration flask.

Kontes All-Glass Microfiltration Apparatus	qty.	cat. #
300mL Funnel, 1000mL Flask	ea.	KT953825-0000
500mL Funnel, 2000mL Flask	ea.	KT953835-0000
1000mL Funnel, 4000mL Flask	ea.	KT953845-0000
Replacement Parts for Kontes Microfiltration Apparatus	qty.	cat. #
40/35 PTFE Joint Sleeve	6-pk.	KT676001-4035
Flask Cap, 40/35 Outer Joint	ea.	KT953830-0000
Fritted Glass Support, 47mm, 40/35 Joint	ea.	KT953826-0000
Glass Funnel, 47mm, 100mL	ea.	KT953761-0000
Glass Funnel, 47mm, 300mL	ea.	KT953751-0000
Glass Funnel, 47mm, 500mL	ea.	KT953771-0000
Glass Funnel, 47mm, 1000mL	ea.	KT953781-0000
Flask, 1000mL, 40/35 Joint	ea.	KT953827-0000
Flask, 2000mL, 40/35 Joint	ea.	KT953828-0000
Flask, 4000mL, 40/35 Joint	ea.	KT953829-0000
Aluminum Clamp, 47mm	ea.	KT953753-0000
Membrane Filters	qty.	cat. #
Polypropylene Membrane Filters, 47mm, 0.45 $\mu$ m	100-pk.	26396
Polypropylene Membrane Filters, 47mm, 0.22 $\mu$ m	100-pk.	26397
Nylon Membrane Filters, 47mm, 0.45 $\mu$ m	100-pk.	26398
Nylon Membrane Filters, 47mm, 0.22 $\mu$ m	100-pk.	26399

### tech tip

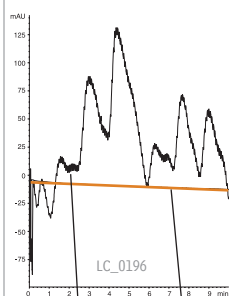
#### Mobile Phase Additives

Mobile phase additives such as triethylamine, trifluoroacetic acid, and ion-pairing reagents can compete with sample ions, decreasing sensitivity and, in some cases, reducing sample ion intake into the MS. To obtain symmetric peaks and/or sufficient retention, use base deactivated, state-of-the-art Type B silica packings that minimize the need for additives.



new!

### Degasys Ultimate Degasser provides highly stable baselines



Mobile Phase: water:methanol  
50:50  
Flow: 1.0 mL/min.  
Det.: UV @ 210nm

### Mobile Phase Degasser

Dissolved oxygen can cause flow rate instability and increased baseline noise. Also, it has a quenching effect on fluorescence detection and increases the background of UV detectors. Dissolved gases can out-gas in the HPLC system, forming bubbles in check valves, at connections, or in detector flow cells.

In-line vacuum degassing is more effective at removing dissolved gas from mobile phases than sonication or helium sparging. In-line degassers work by withdrawing gas across a gas-permeable membrane encased in a sealed chamber. Traditionally, the membrane has been made of PTFE tubing, but the Degasys Ultimate Degasser uses tubing composed of an amorphous fluoropolymer that is 200 to 300 times more gas permeable than PTFE. This translates into the ability to use shorter tubing for removing dissolved gas. This new material also has better tubular burst strength than PTFE. To prevent cross contamination, each channel on this Degasys unit is individually encased within its own vacuum chamber.



#### Specifications:

Residual Oxygen <sup>1</sup>	Pressure Loss <sup>1</sup>	Internal Volume	Wetted Parts	Max Flow Rate
0.9ppm	0.24psi (1.65kPa)	500μL	Teflon® AF, PTFE, ETFE, PPS	7mL/min./channel

<sup>1</sup> At a flow rate of 1mL/min.

Description	qty.	cat.#
110V Mobile Phase Degasser (4 Channel, 7mL/min./channel)	ea.	25189
220V Mobile Phase Degasser (4 Channel, 7mL/min./channel)	ea.	25194

Do not use the Degasys system with solutions containing TFA at concentrations greater than 5%.

### Solvent Debubbler

Bubbles in an HPLC system can cause check valve malfunctions and pump cavitation, seriously affecting pump performance. The debubbler removes bubbles from the fluid stream before it enters the pump.

Special geometry at the base of the housing allows bubbles entrained in the inlet fluid stream to rise and be trapped in the reservoir. The gas/liquid interface is easily visible through the translucent wall of the device. Loosening the airtight cap releases the trapped gas. The debubbler is fitted with a bracket and universal connecting tips.



Description	qty.	cat.#
Solvent Debubbler with Bracket	ea.	25014

### Sonic Debubbler

- Fast.
- Easy to use.
- Less solvent waste; less clean-up.

Just touch the Sonic Debubbler to the inlet line or check valve — sonic vibrations will quickly dislodge or redissolve trapped air bubbles. Reduces downtime or conversion time from one mobile phase to another.



Description	qty.	cat.#
Sonic Debubbler (110V)	ea.	20444
Sonic Debubbler (220V)	ea.	25098



CE



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Technical Service  
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8+ years of service!

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'07

**Opti-Cap™ Bottle Top**

The most economical way to helium-sparge and deliver HPLC mobile phases. The Opti-Cap™ top fits all standard GL45 bottles and has two 1/8-inch holes and one 1/16-inch hole for tubing.

Description	qty.	cat.#
Opti-Cap™ (Cap and PEEK™ Plug)	ea.	25300
Opti-Cap™ Kit (Opti-Cap™, 3 meters of tubing, sparging filters)	kit	25301
Opti-Cap™ Kit with 1L Bottle	kit	25302
Opti-Cap™ Kit with 2L Bottle	kit	25303
Related items and replacement parts	qty.	cat.#
SS Mobile Phase Mobile Phase Sparge Filter: 2µm	ea.	25311
Mobile Phase Inlet Filter: 10µm	ea.	25312
Teflon® Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307
Teflon® Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306
PEEK™ Plug, 1/4"-28 threads	3-pk.	25319
1L Graduated Safety-Coated Bottle – GL-45 threads	ea.	25304
2L Graduated Safety-Coated Bottle – GL-45 threads	ea.	25305



Opti-Cap™ Kit with bottle

**Eco-Cap Bottle Top, PTFE**

Fits all standard GL-45 bottles; has two 1/8-inch holes and one 1/16-inch hole for tubing.

Description	qty.	cat.#
Eco-Cap Bottle Top, includes 1 Male Luer Plug	ea.	25395

**Hub-Cap 4 Liter Bottle Tops**

Most bottles use a GL45 cap. New Hub-Cap bottle tops are a great way to neatly keep your mobile phase lines where they belong. Use instead of parafilm, aluminum foil, or tape on your mobile phase reservoirs.



new!



Hub-Cap (assembly of the bottle cap and plug)

Description	qty.	cat.#
Hub-Cap (assembly of the bottle cap and plug)	kit	26541
Hub-Cap Multi-pack	3-pk.	26542

**Hub-Cap Adapters**

Allow the use of the Opti-Cap™ with 4-liter solvent bottles.

Description	qty.	cat.#
Hub-Cap Adapter	ea.	26538
Hub-Cap Adapter Multi-pack	3-pk.	26539
Hub-Cap Adapter and Opti-Cap™	kit	26540

new!



Hub-Cap Adapter

Hub-Cap Adapter and Opti-Cap™

**Hub-Cap Filter Kit**

Kit includes: bottle adapter, bottle adapter nut, filter inlet cap, grid support, vacuum hose barb, tube compression fitting, 47mm grid, 47mm .22µm filter membrane, 47mm .45µm filter membrane, 1/4" OD x 1/8" ID ultra chemical resistant, Teflon® FEP lined Tygon® tubing (3'), 6" x 6" box with shrink wrap insert.

Description	qty.	cat.#
Hub-Cap Filter Kit	kit	26395

Replacement Membrane Filters	qty.	cat.#
Polypropylene Membrane Filters, 47mm, 0.45µm	100-pk.	26397
Polypropylene Membrane Filters, 47mm, 0.22µm	100-pk.	26397
Nylon Membrane Filters, 47mm, 0.45µm	100-pk.	26398
Nylon Membrane Filters, 47mm, 0.22µm	100-pk.	26399

new!

# Column Heater and Heater/Cooler, Gas Trapping System

new!

## Sidewinder™ Column Heater

- Easy to set up!
- Operation range: 5°C above ambient to 85°C,  $\pm 1^\circ\text{C}$ .
- Lightweight, compact design fits in small spaces.
- Column holder can be placed in any orientation.



Sidewinder™ temperature control module

This unique design completely encloses any HPLC analytical column up to 25cm in length. Two lengths of heater jackets are available: the short column holder accommodates columns up to 10cm in length, while the long column holder holds columns up to 25cm in length. The control module provides optimum heating performance, accuracy to within  $1^\circ\text{C}$ , and stability to within  $0.1^\circ\text{C}$ . The new Sidewinder™ controller has fast 10Hz sampling for improved responsiveness. Power requirements: 24V control unit for maximum stability; RS232 control allows external programming.

Description	qty.	cat.#
Temperature Control Module and Long Column Holder, 25cm Holder	ea.	26516
Temperature Control Module and Short Column Holder, 10cm Holder	ea.	26517

## Sidewinder™ Heater/Cooler Temperature Control Module

- Operation range: 5-55°C,  $\pm 0.2^\circ\text{C}$ .
- Ability to program multiple temperature points.
- Accommodates columns up to 30cm in length and 7.8mm ID.
- Compact design.



The Sidewinder™ heater/cooler unit has a doubly insulated cover to maintain the programmed temperature to within  $0.2^\circ\text{C}$ . The 24V control unit provides maximum stability and rapid equilibration times; RS232 control allows external programming.

Description	qty.	cat.#
Sidewinder™ Heater/Cooler Temperature Control Module	ea.	26518

All Sidewinder™ temperature control products carry the value recognized CE mark. Each unit meets the demanding electromagnetic emission standards of the new European Union Directives, United States standards, and Canadian standards.

## Mobile Phase Pre-heater

- Heats mobile phase before it enters a heated column.
- Minimizes temperature changes, to help keep analyte peaks sharp.



Description	qty.	cat.#
Mobile Phase Pre-heater	ea.	22484

## it's a fact

A Super-Clean™ quick-change cartridge system efficiently removes hydrocarbons from nitrogen!



Charcoal Filters

## Super-Clean™ Gas Trapping System for LC/MS

- Changing filters is quick and easy.
- Up to 20L of hydrocarbon-free nitrogen per minute.

The Super-Clean™ Gas Trapping System is the latest technology in cartridge-style gas filtration for purifying nitrogen, and is ideal for use in LC/MS systems. The two-position baseplate (installed in the gas line) allows cartridges to be exchanged without introducing oxygen into the system. Spring-loaded check valves seal when a cartridge is removed and open only when a new cartridge has been locked in place. There is no need for loosening and tightening fittings every time you change cartridges, and your system cannot become contaminated during the changing process.

To meet the high flow needs of the LC/MS system, the charcoal-filled cartridges are positioned and connected in parallel. The incoming gas stream is split equally between the cartridges, and the two streams are rejoined after purification but before the gas exits the baseplate. This approach allows longer contact between the nitrogen and the adsorbent, ensuring higher gas purity and eliminating a potential source of contaminants to your analyses.

A handy date wheel, included with the system, indicates the cartridge installation date and the recommended replacement date.

Description	qty.	cat.#
Super-Clean™ Gas-Trapping System (2-position baseplate, 2 charcoal filters)	ea.	22062
2-Position Baseplate (1/4" Fittings)	ea.	22060
Replacement Hydrocarbon (Charcoal) Filters	2-pk.	22061

2-Position Base Plate



### PEEK™ Survival Kit for HPLC

The PEEK™ Survival Kit is an invaluable parts kit that contains tubing, fittings, and tools essential for setting up and maintaining your HPLC system: PEEK™ tubing, connectors, and elbows, Teflon® tubing, a tubing cutter and extra blades, a ValvTool wrench, open-end wrenches, and more.



PEEK™ Survival Kit

#### For start-up and maintenance in all HPLC systems.

Description	qty.	cat.#
PEEK™ Survival Kit for HPLC	kit	25322

Contents:		
Description	qty.	cat.#
PEEK™ Column Connector (beige, round body)	10-pk.	25015
PEEK™ Tubing, 1/16" OD x 0.005" ID x 3m (red stripe)	ea.	25065
PEEK™ Tubing, 1/16" OD x 0.007" ID x 3m (yellow stripe)	ea.	25066
PEEK™ Tubing, 1/16" OD x 0.010" ID x 3m (blue stripe)	ea.	25067
PEEK™ Tubing Elbow 90°	5-pk.	25308
PEEK™ Tubing Elbow 180°	5-pk.	25309
Teflon® Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306
Teflon® Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307
Tubing Clip	5-pk.	25310
ValvTool Wrench	ea.	25321
Open-End Wrenches (1/4" x 5/16")	2-pk.*	20110
Clean-Cut™ Tubing Cutter	ea.	25069
Replacement Blade for Clean-Cut™ Cutter	ea.	25070
PEEK™ Union Connector 1/16"	2-pk.	25323
Mobile Phase Sparge Filter: 2µm	ea.	25311
Inlet Filter: 10µm	ea.	25312

\*Kit contains 1 wrench, replacement (cat.# 20110) is 2-pk.

### Stainless Steel Survival Kit for HPLC

The stainless steel survival kit contains a wide range of tubing, fittings, and tools necessary to set up and maintain your HPLC system: a selection of lengths and IDs of 1/16-inch tubing, plus nuts, ferrules, a ValvTool wrench, and a zero-dead-volume union.



Stainless Steel Survival Kit

Description	qty.	cat.#
Stainless Steel Survival Kit for HPLC	kit	25097

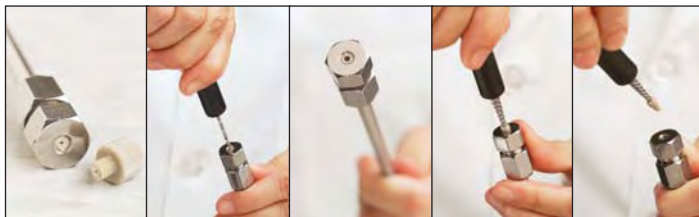
Contents:			
Description	color	qty.	cat.#
HPLC Capillary Tubing, SS 1/16" x 0.005" x 5cm	red	3-pk.	25240
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 10cm	red	3-pk.	25241
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 20cm	red	3-pk.	25242
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 30cm	red	3-pk.	25243
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 5cm	gray	3-pk.	25244
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 10cm	gray	3-pk.	25245
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 20cm	gray	3-pk.	25246
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 30cm	gray	3-pk.	25247
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 5cm	blue	3-pk.	25248
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 10cm	blue	3-pk.	25249
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 20cm	blue	3-pk.	25250
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 30cm	blue	3-pk.	25251
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 5cm	yellow	3-pk.	25252
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 10cm	yellow	3-pk.	25253
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 20cm	yellow	3-pk.	25254
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 30cm	yellow	3-pk.	25255
1/16" Rheodyne® Style Nut		10-pk.	25095
1/16" Rheodyne® Style Ferrule		10-pk.	25096
ValvTool Wrench		ea.	25321
1/16" Stainless Steel Ferrules		10-pk.	20286
1/16" Stainless Steel Nuts		10-pk.	20287
Zero-Dead-Volume Internal Union		ea.	20148

#### it's a **fact**

Survival Kits are convenient and economical, compared to ordering individual items!

**PEEK™ Fitting Extractor**

Drill into the broken fitting, then screw the extractor into the fitting and remove it easily. Eliminates the need for heat or other techniques that could damage your column.



Description	qty.	cat.#
PEEK™ Fitting Extractor	ea.	25325

**PEEK™ Union Connector**

Allows you to quickly and reliably connect two pieces of 1/16-inch tubing. 0.3mm union bore. End fittings included.



Description	qty.	cat.#
PEEK™ Union Connector 1/16"	2-pk.	25323

**Zero-Dead-Volume Internal Union**

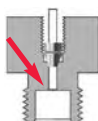
Ends of tubing seat squarely at bottoms of fitting details. 300 series stainless steel. For 1/16-inch OD tubing. Stainless steel ferrules included.



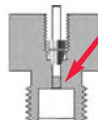
Description	Union Bore	Valco® #	qty.	cat.#
Internal Union	0.15mm	ZU1XC	ea.	20147
Internal Union	0.25mm	ZU1C	ea.	20148
Internal Union	0.75mm	ZU1	ea.	20149
Internal Union	1/16"	ZU1T	ea.	20150

**Figure 1**

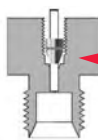
Incompatible fittings create problems.



Tubing and ferrule seated correctly



Tubing not seated, causing dead volume



Ferrule can't seal

**Improving Column Connections**

A good connection is necessary for trouble-free chromatography. Connecting incompatible fittings from different manufacturers can result in leaks, poor peak shape, and increased void volume (Figure 1). Each type of end-fitting has a unique seat depth or style. Generally, Restek, Valco®, Parker, and Upchurch® Scientific fittings are interchangeable; whereas Waters, SSI, Rheodyne®, and Gasukura fittings are not (Figure 2).

Our wrenchless universal 10-32 PEEK™ column connector (cat.# 25015, page 54) can be used with any style of end fitting, and all 1/16-inch tubing. It is reusable and will adjust to any seat, depth, or style.

**Figure 2** Fitting styles differ among various manufacturers.

Parker



Valco®



Waters



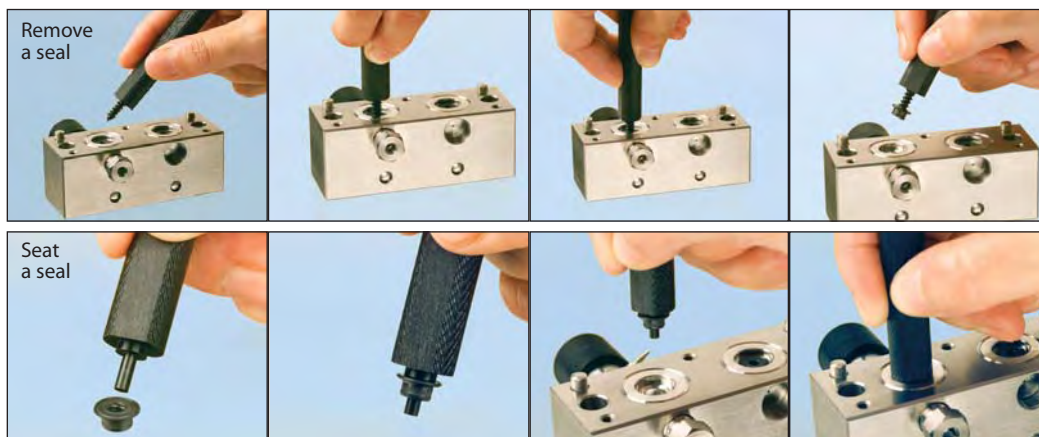
Rheodyne®



Swagelok® Parker A-Lok

**HPLC Piston Seal Insertion Tool**

Simplify pump maintenance: use one end to remove your old seal, then simply slip your new seal on the other end and push it flush into position. The tool cannot mar the surrounding metal surface of the pump housing.



Use the flat side of the Piston Seal Insertion Tool to seat a Waters face seal.

Description	qty.	cat.#
HPLC Piston Seal Insertion Tool	ea.	21356

**Secure-Fit Fittings**

A good connection between HPLC components is necessary for trouble-free chromatography. Secure-Fit connectors from Restek and Selerity Technologies ensure a consistent, leak-free seal—and they eliminate excess dead volume! An internal spring mechanism holds the capillary tubing at the proper depth in the female fitting. This seal is maintained while you finger-tighten the nut. These fittings are available in stainless steel or PEEK™, and in a variety of tubing lengths and internal diameters.

**Stainless Steel Secure-Fit Fittings—Single Connector**

Length	0.005" ID	0.007" ID	0.010" ID
6cm	25181	25185	25190
10cm	25182	25186	25191
20cm	25183	25187	25192
30cm	25184	25188	25193
50cm	26510	26511	26512

**Stainless Steel Secure-Fit Fittings—Two Connectors**

Length	0.005" ID	0.007" ID	0.010" ID
10cm	25208	25211	25214
20cm	25209	25212	25215
30cm	25210	25213	25216
50cm	26513	26514	26515

**PEEK™ Secure-Fit Fittings—Single Connector**

Length	0.005" ID	0.007" ID	0.010" ID
6cm	25230	25234	25217
10cm	25231	25235	25218
20cm	25232	25236	25219
30cm	25233	25237	25220

**PEEK™ Secure-Fit Fittings—Two Connectors**

Length	0.005" ID	0.007" ID	0.010" ID
10cm	25221	25224	25227
20cm	25222	25225	25228
30cm	25223	25226	25229



Stainless Steel Secure-Fit Fitting

## Connectors, Tubing Accessories



### PEEK™ Tubing Elbows

Tubing Elbows (90° and 180°) are ideal for routing 1/16-inch PEEK™ tubing through your system. Simply snap the tubing into the elbow. Prevent pinching of PEEK™ tubing which can cause high pressure.

Description	qty.	cat.#
PEEK™ Tubing Elbow 90°	5-pk.	25308
PEEK™ Tubing Elbow 180°	5-pk.	25309



### Tubing Dressing Tool

Opens stainless steel tubing bore and removes burrs. For 1/16-inch OD tubing or 1/8-inch OD tubing.

Description	qty.	cat.#
1/16" Tubing Dressing Tool	ea.	20188
Replacement Insert for 1/16" Tubing Dressing Tool	ea.	20189
1/8" Tubing Dressing Tool	ea.	20190
Replacement Insert for 1/8" Tubing Dressing Tool	ea.	20191



### Clean-Cut™ Tubing Cutter

- Burr-free, perpendicular cuts that will not distort the tubing OD or close the ID.
- Use on PEEK™, Teflon®, Tefzel®, other polymeric tubing.

Description	qty.	cat.#
Clean-Cut™ Tubing Cutter	ea.	25069
Replacement Blade for Clean-Cut™ Cutter	ea.	25070

For stainless steel tubing cutters, see our general catalog or website.



### Universal 10-32 PEEK™ Column Connectors and Plugs

Universal PEEK™ Connectors allow easy installation of all 1/16-inch tubing, including stainless steel. See "Improving Column Connections" data on page 52.

Description	qty.	cat.#
PEEK™ Column Connector (beige, round body)	10-pk.	25015
PEEK™ Column Plug (black)	10-pk.	25016
PEEK™ Fingertight Fittings (blue, flat-sided)	10-pk.	25324



### Rheodyne® Style Nut and Ferrule

Replacement long nut for connecting stainless steel tubing to a Rheodyne® 6-port valve or other Rheodyne® part.

Description	qty.	cat.#
1/16" Rheodyne® Style Nut	10-pk.	25095
1/16" Rheodyne® Style Ferrule	10-pk.	25096



### ValvTool Wrench

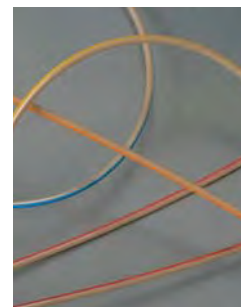
The ValvTool is a time-saving device that provides easy access to many hard-to-reach Rheodyne® or Valco® valves. For 1/4-inch nuts.

Description	qty.	cat.#
ValvTool Wrench	ea.	25321

**Inert PEEK™ Tubing**

- Replaces stainless steel, titanium, Teflon® or Tefzel® tubing.
- Less oxygen permeable and more temperature resistant (to 250°C) than Teflon® or Tefzel® tubing.
- Use with PEEK™ fingertight or flangeless fittings.
- Use to 7,000psi (48,263kPa).

Description	Color Code	qty.	cat.#
PEEK™ Tubing, 1/16" OD x 0.0025" ID x 1m	pink dash stripe	3-pk.	25320
PEEK™ Tubing, 1/16" OD x 0.005" ID x 3m	red stripe	ea.	25065
PEEK™ Tubing, 1/16" OD x 0.007" ID x 3m	yellow stripe	ea.	25066
PEEK™ Tubing, 1/16" OD x 0.010" ID x 3m	blue stripe	ea.	25067
PEEK™ Tubing, 1/16" OD x 0.020" ID x 3m	orange stripe	ea.	25068

**HPLC Stainless Steel Capillary Tubing**

- 316 grade stainless steel.
- Precise pre-cut lengths.
- Smooth surface finish.
- Ultra clean.

Whether you need to replace system tubing as part of your troubleshooting or are looking to reduce the dwell volume of your system as you move to narrower columns, Restek has the quality tubing in the lengths and IDs you need. Each ID is color-coded so it is easy to identify and replace correctly.

Length	qty.	0.005" ID (red) cat.#	0.007" ID (gray) cat.#	0.010" ID (blue) cat.#	0.020" ID (yellow) cat.#
1/16" OD					
5cm	3-pk.	25240	25244	25248	25252
10cm	3-pk.	25241	25245	25249	25253
20cm	3-pk.	25242	25246	25250	25254
30cm	3-pk.	25243	25247	25251	25255

**Teflon® Tubing**

- Ideal for mobile phase inlet lines.
- Chemically inert.
- Use to 500psi (3,447kPa) and 80°C.

Description	qty.	cat.#
Teflon® Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306
Teflon® Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307

**Tubing Clip**

Securely holds 1/16-inch or 1/8-inch tubing in beaker, flask, or bottle up to 4mm thick.

Description	qty.	cat.#
Tubing Clip	5-pk.	25310



## Flow Splitters, Static Mixers

### QuickSplit™ Post-Column Flow Splitters

Fluid resistor technology eliminates adjustments to capillary tubing for optimizing split ratio. Wide range of interchangeable resistors available.



### Fixed Flow Splitters for HPLC & LC/MS

- Split ratio not affected by changes in viscosity or pressure.
- High operating pressure limit: 10,000psi (68,948kPa).
- Low dead volume - negligible effect on analyte bandwidth.
- Total flow: 0.1–5.0mL/min.

### Adjustable Flow Splitter

- Adjustable metering valve gives convenient control of split ratio.
- Split ratio not affected by changes in viscosity or pressure.
- High operating pressure limit: 5,000psi (34,474kPa).
- Low dead volume - negligible effect on analyte bandwidth.
- Total flow: 0.1–5.0mL/min.



Description	Split Ratio	qty.	cat.#
Binary Fixed Flow Splitter	100:01:00	ea.	25326
	50:01:00	ea.	25327
	20:01	ea.	25328
	10:01	ea.	25329
	5:01	ea.	25330
Replacement Fixed Flow Splitter Resistor Set	100:01:00	ea.	25331
	50:01:00	ea.	25332
	20:01	ea.	25333
	10:01	ea.	25334
	5:01	ea.	25335
Adjustable Flow Splitter	5:1 to 100:1	ea.	25336
	1:1 to 20:1	ea.	25337
	new! 50:1 to 1000:1	ea.	26416
Replacement Adjustable Flow Splitter Resistor Set	5:1 to 100:1	ea.	25338
	1:1 to 20:1	ea.	25339

### did you know?

We are pleased to offer HPLC accessory items from Analytical Scientific Instruments (ASI). ASI specializes in HPLC system components and parts that often exceed the original equipment manufacturer's performance. See [page 45](#).

### HyperShear™ HPLC Mixers

- Reduced baseline noise.
- Increased sensitivity.
- Improved gradient accuracy, for more reproducible results.
- Increased reaction efficiency in post-column derivatization.



An efficient cross-flow shearing mechanism and interchangeable cartridges produce vortex shear mixing over a wide range of flows. Stainless steel or PEEK™.

### HyperShear™ Static In-Line Mixers

Description	qty.	Stainless Steel		PEEK™	
		cat.#		cat.#	
new! < 1µL In-Line Mixer	ea.	26409		ea.	26410
25µL In-Line Mixer	ea.	26411		ea.	26412
50µL In-Line Mixer	ea.	25341		ea.	26413
150µL In-Line Mixer	ea.	25342		ea.	26414
250µL In-Line Mixer	ea.	25343		ea.	26415

### Ternary Tee Mixer

Description	qty.	cat.#
25µL Ternary Tee Mixer	ea.	25138



**FlatLine™ Pulse Damper**

- Rupture-proof, no diaphragm—minimal risk of failure or leaks.
- Clean flush-out design—no sample carryover.
- Low internal volume—negligible effect on analyte bandwidth.

The ASI FlatLine™ Pulse Damper combines performance and reliability in a simple, easy-to-use housing. Standard 10-32 inlet and outlet ports allow quick connection into virtually any HPLC system. Solid core technology provides reliable long-term operation without the down time associated with ruptured or leaking membrane dampers. 600–700µL internal volume at ambient pressure.

Description	qty.	cat.#
FlatLine™ Pulse Damper	ea.	25340

**MicroPulse™ Pulse Dampers**

- Compact unit (2.5" x 1.5") can be placed almost anywhere.
- Small, 150µL dead volume at atmospheric pressure.
- PEEK™ unit can withstand pressures to 5,000psi (34,474kPa).
- 316 Stainless steel unit can withstand pressures to 6,000psi (41,369kPa).

Improves system baseline stability while increasing the total system volume by only 150µL. The MicroPulse™ pulse damper is ideal for applications where minimizing the total system volume is critical. Stainless steel and PEEK™ options for a wide range of applications.

Description	qty.	cat.#
MicroPulse™ Pulse Damper, Stainless Steel	ea.	25238
MicroPulse™ Pulse Damper, PEEK®	ea.	25239

**LO-Pulse® Pulse Damper**

The LO-Pulse® Pulse Damper is a patented, wide-dynamic-range 316 stainless steel device that smooths pulsations and maintains constant flow at system pressures up to 6,000psi (41,369kPa). The flow path volume is only 0.9mL and the path is efficiently swept, eliminating solvent memory effects when changing mobile phases.

The LO-Pulse® pulse damper also is available in a space-saving, economical kit that includes hardware for mounting the pulse damper on a bracket, or for installing feet on it for bench-top use.

Description	qty.	cat.#
Model LP-21 LO-Pulse® Pulse Damper	ea.	25012
Pulse Damper Kit	kit	25013



LO-Pulse®  
Pulse Damper Kit

**Backpressure Regulators**

Backpressure regulators can improve detector performance by preventing bubble formation in the detector flow cell. They also are useful in post-column reaction lines and between detectors and fraction collectors in preparatory work. Regulators are superior to more specific alternative solutions, like small-bore tubing, in which pressure varies with flow rate.

Our end-of-line and flow-through backpressure regulators are adjustable to assure constant backpressure over a wide range of mobile-phase viscosities and flow rates. The end-of-line model is available with 1/4-28 plastic flange-type fittings or high-pressure 1/16-inch compression fittings; this design adjusts from 15 to 60psi (103 to 414kPa). The flow-through design has 1/16-inch compression fittings and is adjustable from 7 to 75psi (48 to 517kPa).

Description	qty.	cat.#
A) Backpressure Regulator: end-of-line, 1/16-inch OD tubing, flanged	ea.	25017
B) Backpressure Regulator: end-of-line, high-pressure seat	ea.	25018
C) Backpressure Regulator: flow-through, 5µL internal volume	ea.	25020





### HPLC Column Tubing

Restek tubing is manufactured from fine, chromatographic-grade 316 stainless steel. It is corrosion resistant, ultrasonically cleaned and passivated. We polish the tubing and promise a burr-free cut. You can use this tubing immediately—there is no need for any additional treatment.

Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>1/4" OD Tubing</b>			
30mm	25100	25106	25112
50mm	25101	25107	25113
100mm	25102	25108	25114
150mm	25103	25109	25115
200mm	25104	25110	25116
250mm	25105	25111	25117



### 1/4-Inch HPLC Frits

We manufacture our frits from fine, chromatographic-grade 316 stainless steel, and we offer sizes to fit most column and pore sizes. To choose the correct frit, check its pore size compatibility with the particle size of the packing in the column (see chart at left). If the packing has a smaller particle size than the pore size of the frit, the packing can clog the frit.

Packing particle size	Use this pore size:
3–4 $\mu$ m	0.5 $\mu$ m
5–20 $\mu$ m	2.0 $\mu$ m

ID	Pore Size	qty.	cat.#
4.6mm	2.0 $\mu$ m	10-pk.	25071
4.6mm	0.5 $\mu$ m	10-pk.	25072
3.2mm	2.0 $\mu$ m	10-pk.	25073
3.2mm	0.5 $\mu$ m	10-pk.	25074
2.1mm	2.0 $\mu$ m	10-pk.	25075
2.1mm	0.5 $\mu$ m	10-pk.	25076

### Column End-Fittings

1/4-inch end-fittings are compatible with Valco® and Parker fittings.



Description	qty.	cat.#
Column End-Fitting for 4.6mm Column	ea.	25077
Column End-Fitting Flat Bottom	ea.	25078

### Empty Chromatography Columns

- 316 stainless steel tubing complete with end-fittings, frits, nuts, and ferrules.
- Preassembled prior to shipment, unless otherwise requested.
- Internal 1/16-inch seats are compatible with Valco® and Parker fittings.



Length	2.1mm ID cat.#	3.2mm ID cat.#	4.6mm ID cat.#
<b>1/4" OD Tubing</b>			
30mm	25118	25124	25130
50mm	25119	25125	25131
100mm	25120	25126	25132
150mm	25121	25127	25133
200mm	25122	25128	25134
250mm	25123	25129	25135

## Restek Pack in a Box Kit

Restek's new Pack in a Box Kit is a complete column-packing system. Everything you need to pack your own analytical HPLC columns is included: pump, reservoir, column hardware, packing material, and system control software (computer not included). Detailed packing instructions and a video also are included. The packing pump is electric, so no pressurized air is required.

Description	qty.	cat.#
Pack in a Box Kit	kit	26408

new!



## HPLC Organizers



LCLocker™ HPLC Organizer



Deluxe BenchBooster™ Organizer



Mini pHPerch™ Storage Unit



TopLoader™ BalanceBank™ Storage Unit



**Bill Grove**  
Instrument Innovations  
1+ year of service!



HPLC 30-Column Storage Cabinet



Book Holders



Open Supply Bins, 13-bin unit



Glove Box Dispensers

Description	dimensions	qty.	cat.#
LCLocker™	24 x 12 x 6"	ea.	25149
BenchBooster™	24 x 7 x 12"	ea.	25150
Mini pHPerch™	13 x 12 x 6"	ea.	25147
TopLoader™	12 x 12 x 7"	ea.	25148
30 Column Cabinet	17 <sup>3</sup> / <sub>8</sub> x 15 x 2 <sup>7</sup> / <sub>8</sub> "	ea.	25159
Book Holder, Small	0.75" ID	ea.	25151
Book Holder, Large	1.5" ID	ea.	25152
Open Supply Bin, 4-bin Unit	24 x 12 x 10"	ea.	25153
Open Supply Bin, 5-bin Unit	12 x 16 x 10.5"	ea.	25154
Open Supply Bin, 13-bin Unit	12 x 7.5 x 12"	ea.	25155
Glove Box Dispenser, Single	5 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25156
Glove Box Dispenser, Double	10 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25157
Glove Box Dispenser, Triple	15 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25158

\*Please note: Accessories and supplies in photographs are not included.

## HPLC Pump Pressure Conversion Table

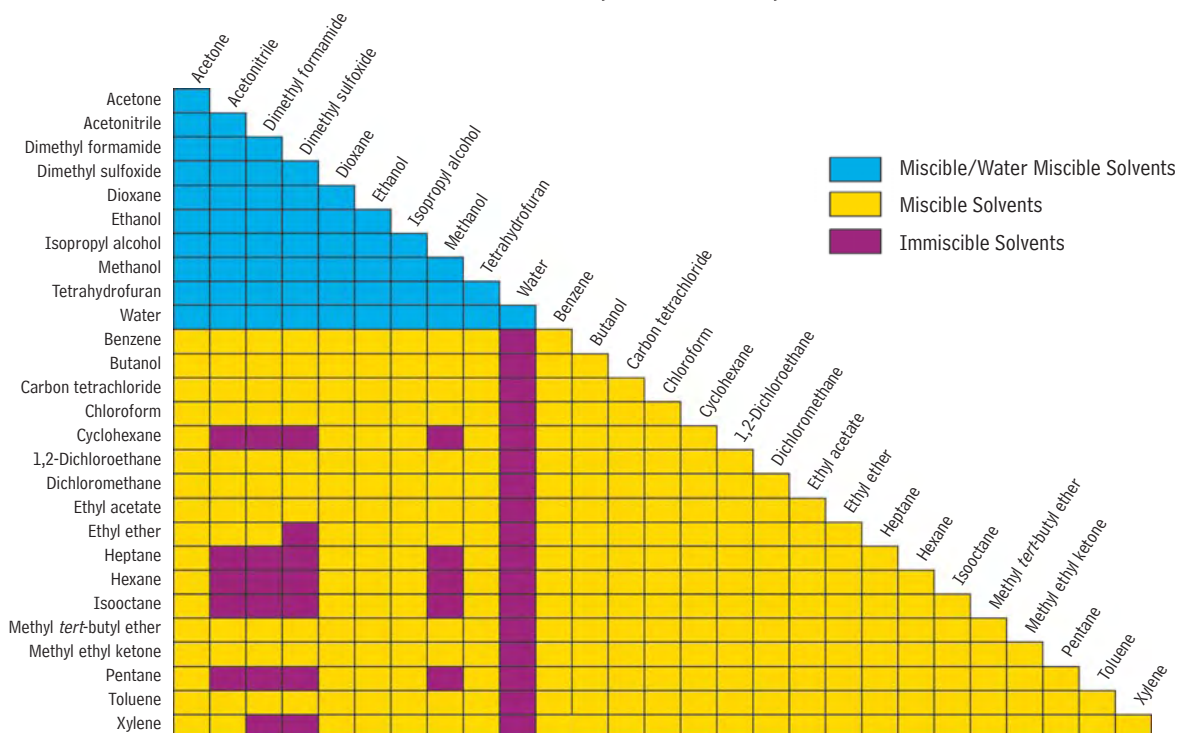
Pressure	psi	atm	kg/cm <sup>2</sup>	torr	kPa	bar	inches Hg
1 psi =	1	0.068	0.0703	51.713	6.8948	0.06895	2.0359
1 atm =	14.696	1	1.0332	760	101.32	1.0133	29.921
1 kg/cm <sup>2</sup> =	14.223	0.967	1	735.5	98.06	0.9806	28.958
1 torr =	0.0193	0.00132	0.00136	1	0.1330	0.00133	0.0394
1 kPa =	0.1450	0.00987	0.0102	7.52	1	0.0100	0.2962
1 bar =	14.5038	0.9869	1.0197	751.88	100	1	29.5300
1 in Hg =	0.49112	0.0334	0.0345	25.400	3.376	0.03376	1

Multiply units in the left-most column by the conversion factors listed in the columns to the right.

e.g., 10 psi x 0.068 = 0.68atm

10 bar x 29.5300 = 295.300 inches Hg

## Solvent Miscibility and Solubility



**Crimp-Top Vials, 2.0mL, 12 x 32mm, 11mm Crimp Finish**

White graduated marking spots are a standard feature unless otherwise noted.

**Crimp-Top Vials, Snap Seal™ Style—12 x 32mm, 11mm Crimp**

Description	100-pk.	1000-pk.
2.0mL Clear Glass Vial w/White Graduated Marking Spot	24383	24384
2.0mL Amber Glass Vial w/White Graduated Marking Spot	24385	24386
2.0mL Clear Glass Vial without Graduated Marking Spot	21152	21153

**11mm Aluminum Crimp Seals with Septa**

Description	100-pk.	500-pk.	1000-pk.
Silver Seal, PTFE/Natural Rubber Septa	21174	—	21175
Blue Seal, PTFE/Red Rubber Septa	24351	—	24352
Green Seal, PTFE/Red Rubber Septa	24353	—	24354
Red Seal, PTFE/Red Rubber Septa	24355	—	24356
Yellow Seal, PTFE/Red Rubber Septa	24357	—	24358
Mixed Colors, PTFE/Rubber Septa	—	21724	—
Silver Seal, PTFE/Silicone Septa	24359	—	24360
Blue Seal, PTFE/Silicone Septa	24361	—	24362
Green Seal, PTFE/Silicone Septa	24363	—	24364
Red Seal, PTFE/Silicone Septa	24365	—	24366
Yellow Seal, PTFE/Silicone Septa	24367	—	24368
Mixed Colors, PTFE/Silicone Septa	—	21725	—
Silver Seal, PTFE/Silicone/PTFE Septa	24369	—	24370

for **more** infosee **page 62** for electronic crimpers and decappers.**Convenience Kits: Vials, Caps, & Septa**

Vials packaged in a clear-lid tray. Caps with septa packaged in a plastic bag.

Description	100-pk.	1000-pk.
2.0mL Clear Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24671	24672
2.0mL Amber Vial, <b>deactivated</b> , PTFE/Natural Rubber Silver Seal	24673	24674
2.0mL Clear Vial, untreated, PTFE/Natural Rubber Silver Seal	21196	21197
2.0mL Amber Vial, untreated, PTFE/Natural Rubber Silver Seal	21198	21199
2.0mL Clear Vial, untreated, PTFE/Silicone Silver Seal	24646	24647
2.0mL Amber Vial, untreated, PTFE/Silicone Silver Seal	24648	24649

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening****Fit all 2.0mL, 12 x 32mm, Crimp-Top Vial Based Autosamplers.**

- Shorter screw cap allows the robotic autosampler to function properly.
- Wider opening prevents syringe problems.
- Dimensions are effectively identical to the crimp-top vial.
- Variety of colors and liner material.

**9mm Short-Cap, Screw-Thread Vials, 12 x 32mm, 9mm Opening**

Description	100-pk.	1000-pk.
2.0mL Clear Vial, w/White Graduated Marking Spot	21140	21141
2.0mL Amber Vial, w/White Graduated Marking Spot	21142	21143
2.0mL Clear Vial, without Graduated Marking Spot	21154	21155

**9mm Thread Pre-Assembled Short-Cap, Screw-Vial Closures**

Description	100-pk.	500-pk.	1000-pk.
Blue Cap, PTFE/Red Rubber Liner	24473	—	24474
Mixed Colors, PTFE/Red Rubber Liner	—	24668	—
Blue Cap, PTFE/Silicone Liner	24485	—	24486
Green Cap, PTFE/Silicone Liner	24487	—	24488
Yellow Cap, PTFE/Silicone Liner	24493	—	24494
Mixed Colors, PTFE/Silicone Liner	—	24669	—
Blue Cap, PTFE/Silicone/PTFE Liner	24497	—	24498
Black Cap, PTFE/Silicone/PTFE Liner	24495	—	24496
Mixed Colors, PTFE/Silicone/PTFE Liner Cap	—	24670	—



## Crimpers and Decappers

Safer than removing caps with pliers, knife or screwdriver blade!



Decapper



Crimper

### Aluminum Seal Crimpers and Decappers

The crimper is adjustable for optimized sealing performance and is comfortable enough for prolonged use. If you need to save, transfer, or dispose of your samples, our decapper allows you to remove a crimp-top cap safely and easily. Far safer than removing caps with pliers, knife or screwdriver blades, etc. If you aren't currently using a seal decapper, we recommend you order one today!

Description	qty.	cat.#
8mm Crimper	ea.	21735
8mm Decapper	ea.	21736
11mm Crimper	ea.	21170
11mm Decapper	ea.	21171
13mm Crimper	ea.	21739
13mm Decapper	ea.	21740
20mm Crimper	ea.	21737
20mm Decapper	ea.	21738



### Hand-held Rechargeable Crimpers and Rechargeable Decappers

- Easy to use; comfortable grip.
- Hundreds of operations from one charge.
- Adjustable crimping force.
- All kits include battery charger.



CE

Powered by a standard Black and Decker Versapak® battery, these electronic tools for 11mm or 20mm caps will cycle hundreds of times on a single charge. The cycle is controlled precisely, through an internal counter, and is adjusted with two buttons on the side of the case. The tools fit comfortably in the hand and weigh approximately 600 grams. The jaws can be positioned easily around closely-spaced vials in standard autosampler trays. Each kit includes the tool, a Versapak® Gold rechargeable battery, which uses environmentally friendly NiMH technology, and a charger. Recharging generally takes 6-9 hours.

### Decapping has never been easier!

one. . .

two. . .

three!



The Electronic Crimper fits around vials in standard autosampler trays. The adjustable setting provides a precision crimp, vial after vial.



Description	qty.	cat.#
11mm Electronic Crimper (110 volt battery charger)	kit	22853
11mm Electronic Crimper (220 volt European battery charger)	kit	22853-EUR
11mm Electronic Crimper (220 volt UK battery charger)	kit	22853-UK
11mm Electronic Decapper (110 volt battery charger)	kit	22854
11mm Electronic Decapper (220 volt European battery charger)	kit	22854-EUR
11mm Electronic Decapper (220 volt UK battery charger)	kit	22854-UK
20mm Electronic Crimper (110 volt battery charger)	kit	22851
20mm Electronic Crimper (220 volt European battery charger)	kit	22851-EUR
20mm Electronic Crimper (220 volt UK battery charger)	kit	22851-UK
20mm Electronic Decapper (110 volt battery charger)	kit	22852
20mm Electronic Decapper (220 volt European battery charger)	kit	22852-EUR
20mm Electronic Decapper (220 volt UK battery charger)	kit	22852-UK

## Screw-Thread Step™ Vials, 4.0mL, WISP™ 48 Style, 13mm/425 Screw-Thread

## WISP™ 48 Screw-Thread Step™ Vials (15 x 45mm, 13/425 Screw-Thread)

Description	100-pk.	1000-pk.
4.0mL Clear Step™ Vial, White Grad. Marking Spot	24654	24655
4.0mL Amber Step™ Vial, White Grad. Marking Spot	24656	24657

## Caps and Septa

Description	100-pk.	1000-pk.
Top Hat™, PTFE/Silicone Septa	21745	21746
Pre-Assembled, Red PTFE/Silicone, 0.065"	21743	21744
Caps, Black, Polypropylene, Open-Hole	21741	21742
Septa, Red PTFE/Silicone, 0.040"	21751	21752
Septa, Red PTFE/Silicone, 0.060"	21749	21750

## Limited Volume Inserts

Description	100-pk.	1000-pk.
500µL, Glass, WISP™, Flat Bottom*	21787	21788

\*Also fit 4.0mL Snap Seal™ Vials (see our general catalog or website).



4.0mL Clear Step™ Vial

## Shell Vials, 1.0mL, WISP™ 96 Style, 8 x 40mm

## WISP™ 96 Style, 8 x 40mm Shell Vials

Description	200-pk.	1000-pk.
1.0mL Clear Vial	24662	24663
1.0mL Amber Vial	24664	24665
1.0mL Polypropylene Vial	24678	24679
700µL Limited Volume Polypropylene Vial	24680	24681

## 8mm Starburst Plugs

Description	200-pk.	1000-pk.
Snap Plug, Clear Polyethylene	21769	21770
Snap Plug, Conical, Clear Polyethylene	21771	21772
Snap Plug, Silicone Lined, Clear Polyethylene	21773	21774

## Limited Volume Inserts for Shell Vials

Description	100-pk.	1000-pk.
250µL Glass, Big Mouth Insert w/ Bottom Spring	21776	21777



# LC Autosampler Syringes

## Syringes for Agilent 1090 & 1100 LC Autosamplers



25µL, 1/4-32 UNEF Thread

### SGE Syringes

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
25µL	25D-HP1090-GT	003670	ea.	22290
250µL	250D-HP1090-GT	006670	ea.	22291

## Syringe for Hitachi LC Autosamplers



500µL, M10 X1 Thread

### SGE Syringe

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
500µL	500C-HITACHI	007660	ea.	22292

## Syringes for PerkinElmer LC Autosamplers



250µL, 1/4-28 UNF Thread

### SGE Syringes

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
50µL	50D-CX-GT	004995	ea.	22295
100µL	100D-CX-GT	005990	ea.	22296
250µL	250D-CX-GT	006995	ea.	22297
500µL	500D-CX-GT	007995	ea.	22298
1mL	1MD-C-GT	008185	ea.	22299

## Syringes for Waters WISP™ LC Autosamplers



250µL, 1/4-28 UNF Thread

### SGE Syringes

Volume	SGE		qty.	Restek
	Model	cat.#		cat.#
25µL	25D-WISP	003990	ea.	22293
250µL	250D-WISP	006690	ea.	22294

## Syringes for Waters WISP™ LC Autosamplers

Teflon® PTFE-tipped plungers



### Hamilton Syringes

Volume	Hamilton		qty.	Restek
	Model	cat.#		cat.#
25µL	1702	80020	ea.	24528
250µL	1725	80024	ea.	24529

## Syringes for CTC/LEAP LC Autosamplers



new!

### Hamilton Syringes

Hamilton 10µL LC Autosampler Syringe

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	Hamilton Model	cat. #	qty.	Restek cat. #
10µL	N	22s	2"/51mm	3	701N	203073	ea.	22743
25µL	N	22s	2"/51mm	3	1702N	203075	ea.	22744
100µL	N	22s	2"/51mm	3	1710N Slim Line*	203077	ea.	22745
100µL	N	22	2"/51mm	3	1710N	203235	ea.	22746
250µL	N	22	2"/51mm	3	1725N	203079	ea.	22747
500µL	N	22	2"/51mm	3	1750N	203349	ea.	22748

\*Barrel O.D. = 6.7mm; all other 25µL and 100µL syringes have a 7.9mm barrel O.D.



new!

### SGE Syringes

SGE 10µL LC Autosampler Syringe

Volume	Needle Term.	Needle Gauge	Needle Length	Point Style	SGE Model	cat. #	qty.	Restek cat. #
10µL	F	22s	2"/51mm	LC	10F-CTC-LC	002710	ea.	22737
25µL	F	22s	2"/51mm	LC	25F-C/TLC	003984	ea.	22738
25µL*	R	22s	2"/51mm	LC	25R-C/T-GT-LC	003985	ea.	22739
50µL*	F	22s	2"/51mm	LC	50F-C/T-GT-LC	004810	ea.	22740
100µL*	R	22s	2"/51mm	LC	100R-C/T-GT-LC	005330	ea.	22741
500µL*	F	22s	2"/51mm	LC	500F-CTC-GT-LC(0.41)	007720	ea.	22742

\*Gas-Tight syringe.

## Analytical Reference Materials

### HPLC Normal Phase Test Mix #1

Routine analysis using this mix can assist in determining the need to perform column and/or system maintenance.

benzene	1.00mg/mL	benzyl alcohol	3.00
benzaldehyde	0.04	4-methoxybenzyl alcohol	2.00
In hexane, 1mL/ampul			
cat. # 35004 (ea.)			

No data pack available.

### HPLC Reversed Phase Test Mix #1

Routine analysis using this mix can assist in determining the need to perform column and/or system maintenance.

benzene	3.00mg/mL	naphthalene	0.50
uracil	0.02	biphenyl	0.06
In methanol:water (75:25), 1mL/ampul			
cat. # 35005 (ea.)			

No data pack available.

### HPLC Performance Test Mix

The National Institute of Standards and Technology (NIST) formulated a mixture that is highly effective for characterizing HPLC columns for efficiency, void volume, methylene selectivity, retentiveness, and activity toward chelators and organic bases. Results can be used for column classification, column selection, monitoring column performance over time, or for quality control. We test our material against the NIST 870 standard.

amitriptyline hydrochloride	2800µg/mL	quinizarin	94
ethylbenzene	1700	toluene	1400
In methanol, 1mL/ampul		uracil	28
cat. # 31699 (ea.)			

### HPLC OQ Linearity Test Mix Kit

Linear detector responses to concentration variations are an important part of operation qualification (OQ) for HPLC instruments. Our kit of five aqueous solutions of caffeine can be used to generate simple plots of UV response versus concentration. Certificate of Analysis includes caffeine concentration, calculated variance in preparing each mixture, a linearity plot, and coefficient of determination ( $r^2$ ) for the linear plot.

Caffeine at 5.0, 25.0, 125.0, 250.0, 500.0 µg/mL in water in a five ampul kit.

1mL each of these mixtures.

cat. # 31805 (kit)

No data pack available.

### Carbohydrate HPLC Performance Check Mix

Performance qualification (PQ) determines the precision of the HPLC system. Our performance check mix for HPLC / RI consists of five simple sugars in varied concentrations. We prepare the reference material in water, lyophilize it, and pack it dry for enhanced stability.

glucose	2.0mg	maltose	4.5
fructose	2.1	sucrose	4.0
lactose	4.4		

Dry components in 4mL screw-cap vial.

Reconstitute in 1mL acetonitrile:water (75:25) to 2.0, 2.1, 4.4, 4.5, 4.0 mg/mL, respectively.

cat. # 31809 (ea.)

No data pack available.