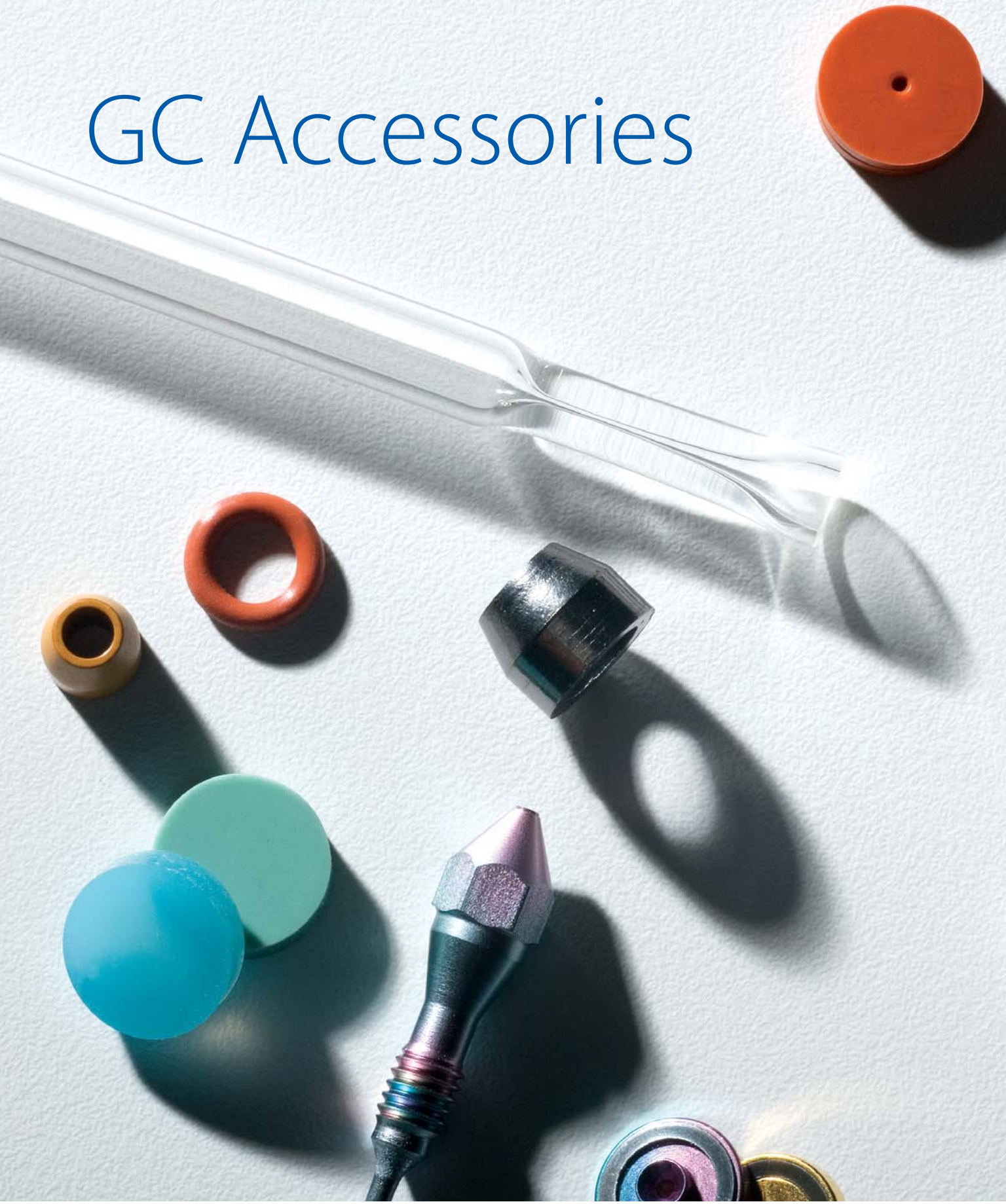
GC Accessories



GC Accessories

Instrument Supplies

Top: Ken Poorman, International Customer Service Representative and Michele Richner, Assembly Technician

Bottom: Wes Heaton, Vendor Quality Technician

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 7.2-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 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. Liquid leak detectors should not be used 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 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 7.2-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, 7.2-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.

Mike Goss
Instrument Innovations Specialist
8+ years of service!

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.

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

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

Leak Detector; FastPack Inlet Kits; Merlin Microseal Septa

Gow-Mac Mini Gas Leak Detector (Model 21-070)

- Compact, portable, hand-held design.
- Responds in less than 2 seconds to trace leaks of gases with thermal conductivities different from air.
- Leaks indicated by an LED bar graph and audible alarm.
- Rechargeable battery or line-operated.
- Low battery indicator.
- Pen-type, Teflon®-lined probe.
- Detects helium leaks at ≥1 x 10^{-5}cc/sec.
- Auto zero, push-button control.

Description	qty.	cat.#
Gow-Mac Mini Gas Leak Detector (115 volts)	ea.	22450

FastPack Inlet Kits make routine injection port maintenance easy!

FastPack Inlet Kits for Agilent GCs

- Convenient: all the parts you need in one package—no hunting for individual items.
- Economical: costs less than the sum of the individual parts.
- Clean: Mylar® bag is factory sealed; no contamination of the products from weeks in the lab.

FastPack Inlet Kits are a great way to make routine maintenance easy. Each kit includes one each:

- Inlet liner (choose from three popular styles).
- Viton® O-ring.
- 0.8mm ID gold-plated inlet seal and washer.
- 11mm Thermolite® septum.

Each kit is factory-sealed in a Mylar® bag.

1 pack includes 5 maintenance kits

Deactivated Liner	cat.#	1 pack (5 kits)	5-19 packs	20 or more packs
4mm Splitless	21101			
4mm Splitless Gooseneck	21102			
4mm Split with Wool*	21104			

*Liner dimensions are 4mm ID, 6.3mm OD, 78.5mm long. Liners in other kits are 6.5mm OD.

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.

Nut

Septa

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 (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

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 precleaned glass jars.

Now precision molded!

Septum Diameter	25-pk.	50-pk.	100-pk.
5mm (3/16")	27120	27121	27122
6mm (1/4")	27123	27124	27125
7mm	27126	27127	27128
8mm	27129	27130	27131
9mm	27132	27133	27134
9.5mm (3/8")	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 precleaned glass jars.
- Ideal for SPME.

Now precision molded!

Septum Diameter	50-pk.	100-pk.
9mm	27156	27157
9.5mm (3/8")	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

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 precleaned glass jars.
- Each batch GC-FID tested.
- Bleed and temperature optimized; ideal for demanding GC and GC/MS applications.

Now precision molded!

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

HANDY septum size chart

Instrument	Septum Diameter (mm)
Agilent (HP)	
5880A, 5890, 6850, 6890, 7890, PTV	11
5700, 5880	9.5/10
On-Column Injection	5
Thermo Scientific	
TRACE™ GC	17
GCQ w/TRACE™, PTV	17
8000 series	17
Finnigan (TMQ)	
GC 9001	9.5
GCQ	9.5
QCQ™	9.5
TRACE™ 2000	9.5
Gow-Mac	
6890 series	11
All other models	9.5
PerkinElmer	
Sigma series	11
900,990	11
8000 series	11
Auto SYS™	11
Auto SYS™ XL	11
Pye/Unicam	
All models	7
Shimadzu	
All models	Plug
SRI	
All models	Plug
Tracor	
540	11.5
550,560	9.5
220,222	12.5
Varian	
Injector type:	
Packed column	9.5/10
Split/splitless 1078/1079	10/11
1177	9
1075/1077	11

tech tip

Tips for Handling Septa

All septa, regardless of composition, puncturability, or resistance to thermal degradation will fail if they are mishandled. Overtightening a septum nut invariably will reduce septum lifetime by increasing coring/splitting. All septa contain volatile materials (e.g., phthalates) that are released when the septum is heated (septum bleed). 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 are conditioned and are ready to use without delay.

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 #	10-pk. cat.#	50-pk. cat.#
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 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

Viton® O-Rings for Apex Liners

Description	Max. temp.	qty.	cat.#
Viton® O-rings for APEX liners	250°C	25-pk.	22067

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

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

Inlet Liner Seals for Thermo Scientific TRACE™ PTV

Description	Max. temp.	Similar to TS part #	qty.	cat.#
Inlet Liner Seals for Thermo Scientific TRACE™ PTV	450°C	29013417	2-pk.	21392

Graphite Sealing Ring for Thermo Scientific 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

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

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

Make Life Easier (MLE) Tool Kits, Inlet and FID Maintenance Kits

Make Life Easier (MLE) Capillary Tool Kits, Inlet and FID Maintenance Kits

- Include the most common consumable GC supplies and tools.
- All parts meet or exceed performance by instrument manufacturer's parts.
- Parts list makes reordering easy.

Inlet Kit

FID Kit for Agilent 6850/6890/7890 GCs

Inlet kit includes:

- 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" x 5/16" wrench.
- Septum puller.
- Installation gauge.
- Wire cleaning brush.
- Jet reamers/ferrule removers.
- Inlet liner removal tool.
- Septa nut removal tool.

FID kits include:

- 1/4", 0.4, 0.5, and 0.8mm ID graphite ferrules.
- 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 6890/6850/7890 GCs.
- FID flow measuring adaptor.
- 1/4" x 5/16" wrench.
- Installation gauge.
- Wire cleaning brush.
- High-performance Siltek® treated FID jet for either Agilent 5890 (adaptable jet) or 6890/6850/7890 (dedicated jet) GCs.
- Spanner wrench.
- FID jet removal tool.

All MLE Capillary Tool Kits include these components:

- 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
- 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)

MLE Capillary Tool Kit for Agilent GCs (cat.# 22186) also includes:

- capillary installation gauge for Agilent GCs
- injector wrench for Agilent GCs
- septum nut removal tool
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

MLE Capillary Tool Kit for PerkinElmer GCs (cat.# 22185) also includes:

- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

MLE Capillary Tool Kit for Shimadzu GCs (cat.# 22182) also includes:

- capillary installation gauge for Shimadzu GCs
- injector wrench for Shimadzu GCs
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench

MLE Capillary Tool Kit for Thermo Scientific GCs (cat.# 22183) also includes:

- capillary installation gauge for Thermo Scientific GCs
- liner cap removing tool for Thermo Scientific GCs
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench

MLE Capillary Tool Kit for Varian GCs (cat.# 22184) also includes:

- capillary installation gauge for Varian GCs
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

MLE Capillary Tool Kit for Agilent GCs

Description	qty.	cat.#
Inlet Maintenance Kit for Agilent 5890/6850/6890/7890 GCs	kit	22181
FID Maintenance Kit for Agilent 5890 GCs	kit	22180
FID Maintenance Kit for Agilent 6850/6890/7890 GCs	kit	22179
MLE Capillary Tool Kit for Agilent GCs	kit	22186
MLE Capillary Tool Kit for PerkinElmer GCs	kit	22185
MLE Capillary Tool Kit for Shimadzu GCs	kit	22182
MLE Capillary Tool Kit for Thermo Scientific GCs	kit	22183
MLE Capillary Tool Kit for Varian GCs	kit	22184

new!

Inlet and FID kits have been updated with new tools!

All liners are
100%
deactivated

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

A) Straight Tube

B) Gooseneck

C) Recessed Gooseneck

D) Double Gooseneck

E) Recessed Double Gooseneck

F) Drilled Uniliner®

hole near top

hole near bottom

G) Splitless with Wool

Inlet Liners for Splitless Injection—Benefits & Drawbacks

The residence time of the sample in a splitless liner is dependent on liner geometry, gas velocity, and sample vaporization time. Splitless liners usually are designed as straight tubes, with alternative designs, such as a gooseneck restriction, which help contain the sample cloud in the injector and minimize the breakdown of compounds sensitive to catalytic decomposition from contact with metal inlet parts. Liners packed with wool help promote sample vaporization, as well as trap nonvolatile residue to prevent column contamination. 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 analytes 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

Benefits:
- Decreases sample contact with metal inlet parts.
- Improves sample transfer to column.

Drawbacks:
- No known drawbacks.

C) Recessed Gooseneck

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

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

Benefits:
- Decreases sample backflash.
- Decreases injection port discrimination.

Drawbacks:
- Cannot be packed with wool—only *recessed* double goosenecks can be packed with wool.
- Difficult to clean.

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.
- Can be packed with wool.

Drawbacks:
- Higher cost than straight splitless liners.

F) Drilled Uniliner®

A hole drilled into this liner allows direct injection in EPC systems and reduces sample discrimination, compared to typical splitless injections. The Drilled Uniliner® with the hole near the bottom is recommended for semivolatile analysis or when compounds of interest could be affected by a tailing solvent peak. The Drilled Uniliner® with the hole near the top is recommended for aqueous injections, chlorinated pesticides, as well as analysis in which the compounds of interest elute away from the solvent peak.

Benefits:
- Excellent transfer of analytes to column.
- Decreases injection port discrimination.
- Removes excess solvent vapor.
- Eliminates the need for wool.
- Less adsorption—no sample contact with metal parts below liner.

Drawbacks:
- Higher amounts of nonvolatile materials transferred to column.

G) Splitless with Wool

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.

Inlet Liners for Split Injection—Benefits & Drawbacks

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 don't degrade or adsorb onto the hot glass surface.

To trap nonvolatile 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.

All liners are **100%** deactivated

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

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; 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[1].
- Vaporizes up to 5µL samples.
- 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.

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.

G) *mini*-Lam Split Liner

The flow principle is basically the same as in the laminar cup splitter. The *mini*-Lam liner design incorporates a shortened, inverted laminar cup. Use a two-hole ferrule to adapt the *mini*-Lam liner for dual-column analysis in a capillary injection port.

Benefits:
- Similar to laminar cup splitter, but less expensive.
- Vaporizes up to 4µL samples.
- Ideal for high molecular weight compounds.
- Easy to clean.

Drawbacks:
- No known drawbacks.

H) Precision™ Liner

Wool is placed at the injection point to maximize vaporization and help wipe the needle during injection. Wool stays in position during pressure pulses in the inlet and during injection.

Benefits:
- Maximizes vaporization.
- Improved reproducibility.

Drawbacks:
- No known drawbacks.

A) Split Liner with Wool

B) Laminar Cup Splitter

C) Frit Splitter

D) Cup Splitter

E) Cyclosplitter®

F) Baffle Splitter

G) *mini*-Lam Split Liner

H) Precision™ Liner

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

All liners are
100%
deactivated

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

free literature

A Guide to Direct and On-column Flash Vaporization Injection

Download your free copy from www.restek.com

Technical Guide
lit. cat.# 59882A

A) Standard Uniliner®

B) Open-Top Uniliner®

C) Cyclo-Uniliner®

D) Drilled Uniliner®

hole near top

hole near bottom

Hole makes direct injection possible with EPC-equipped Agilent 6890 GCs!

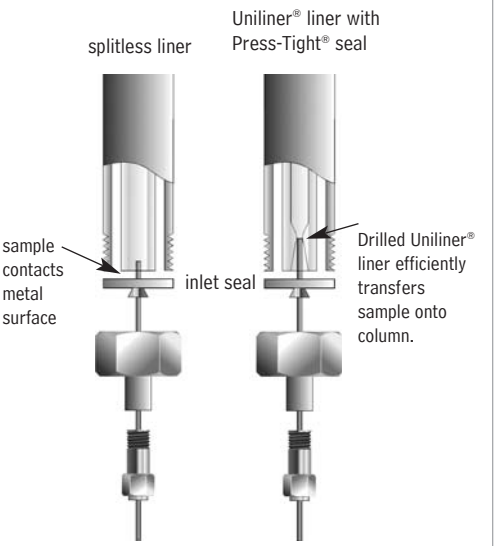
Direct Injection Mode Using a Uniliner® Liner — An Alternative to Splitless Injections!

Many problems associated with splitless analysis occur because there is a gap around the outside of the column and the inside of the liner. Sample vapors deposit on the metal inlet parts or fall below the tip of the column and are swept out of the split vent during the purge-on mode. The diagram illustrates how the gentle Press-Tight® taper in a Uniliner® liner eliminates sample contact with the hot, catalytic metal disk surface (inlet seal), by making a leak-tight connection between the column and liner.

A splitless injection mimics a direct injection when the inlet is configured to the purge-off mode. The purge-on mode simply sweeps the sample vapors that may have contacted the metal inlet seal away from the inlet. Analysts can replace a splitless liner with a Uniliner® liner and obtain additional benefits over a traditional splitless analysis. Adsorption of active compounds is greatly reduced, peak areas for higher molecular weight compounds are increased (i.e., less discrimination) and, because all of the sample is delivered to the head of the column, sensitivity is enhanced over conventional splitless analysis.

A Uniliner® liner can be used as a direct replacement for a splitless liner. It is easily installed in a splitless inlet in almost the same manner as a splitless liner, except that it must be operated continuously in the purge-off mode. The tight seal between the column inlet and the Press-Tight® taper prevents the sample from escaping out of the split vent. Uniliner® liners should be operated at column flow rates between 5 and 10cc/min., to minimize peak tailing and to sharpen early-eluting peaks. The taper is designed to accommodate 0.32 or 0.53mm ID columns. Request Restek's Guide to Direct/On-Column Flash Vaporization Injections (lit. cat.# 59882A) for more information on optimizing direct injections.

A Uniliner® liner prevents the sample from contacting metal parts at the base of a splitless injection port. This eliminates many problems, such as reduced response for high molecular weight compounds, adsorption, and catalytic desorption in the inlet, providing overall higher sensitivity.



Inlet Liners for Direct Injection

A) Standard Uniliner® Liner

The buffer volume chamber contains the sample vapor cloud and prevents contact with metal injection port parts. Peak tailing is reduced and larger injections can be made. Because of the hourglass design, samples should be relatively clean or dirt might be funneled into the column inlet.

B) Open-Top Uniliner® Liner

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

C) Cyclo-Uniliner® Liner

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

D) Drilled Uniliner® Liner

Ideal for use with EPC-equipped GC systems. The hole equalizes pressure and maximizes sensitivity. The Drilled Uniliner® with the hole near the bottom is recommended for semivolatile analysis or when compounds of interest could be affected by a tailing solvent peak. The Drilled Uniliner® with the hole near the top is recommended for aqueous injections, chlorinated pesticides, as well as analysis in which the compounds of interest elute away from the solvent peak.

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.

Base Deactivation

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

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.

Matt Lininger
Instrument Innovations
Engineer
3+ years of service!

All liners are
100%
deactivated

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

Siltek® Deactivation for Liners—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) for liners 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

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)

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!

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

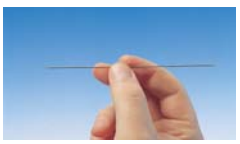
Ideal for amines and other basic compounds.

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

tech tip

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.



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

Eliminates user variation!

Inlet Liner Packing Tool

- Position wool reproducibly every time.
- Accurate to a specific, measured depth.

Loosen the nut on the side of the tool and adjust the gauge to the manufacturer's recommended depth.

Place a plug of loosely bound wool at the top of the inlet liner.

Insert the liner packing tool into the liner until the tool bottoms out. Remove the tool. The wool is positioned correctly in the liner and the liner is ready for use.

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

Sue Benes
GC Accessories Product Marketing Manager

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

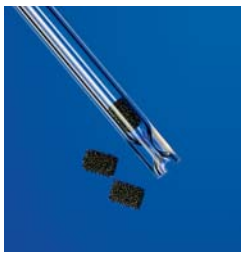
†CarboFrit™ inserts require a neck greater than 2mm.

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.

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 nonvolatile 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

No more burned fingers!

- 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

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 nonreproducible 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.

Supplies for Agilent Instruments: Inlet Liners

COLUMN INSTALLS THIS END

Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	cat.# ea.	5-pk.	25-pk.
 2mm Splitless	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
 4mm Splitless	trace samples >2µL	4.0 ID 6.5 OD x 78.5	210-3003 (ea.) 210-3003-5 (5-pk.)	20772	20773	20774
 Siltek® 4mm Splitless	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20772-214.1	20773-214.5	20774-214.25
 4mm Splitless w/ Wool	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
 2mm Splitless (quartz)	trace samples <2µL	2.0 ID 6.5 OD x 78.5	18740-80220 (ea.) 5183-4707 (5-pk.)	20914	20915	—
 4mm Splitless (quartz)	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20912	20913	—
 4mm Splitless (quartz) w/ Wool	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	22403	22404	—
 Gooseneck Splitless (2mm)	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	20795	20796	20797
 Siltek® Gooseneck Splitless (2mm)	trace samples <2µL	2.0 ID 6.5 OD x 78.5	—	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 (ea.) 5183-4695 (5-pk.) 5183-4696 (25-pk.)	20798	20799	20800
 Siltek® Gooseneck Splitless (4mm)†	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	20798-214.1	20799-214.5	20800-214.25
 Gooseneck Splitless (4mm) w/ Wool†	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
 Siltek® Gooseneck Splitless (4mm) w/ Wool†	trace samples >2µL	4.0 ID 6.5 OD x 78.5	—	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 (ea.) 5183-4705 (5-pk.) 5183-4706 (25-pk.)	20784	20785	20786
 Siltek® Double Gooseneck Splitless (4mm)	trace, active samples >2µL	4.0 ID 6.5 OD x 78.5	—	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
 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
 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/ 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)**	trace, 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% deactivated

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

Supplies for Agilent Instruments: Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for Agilent 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	18740-80200 (ea.) 5183-4709 (5-pk.)	20972	20973	—
 4mm Split w/ Wool	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
 Siltek® 4mm Split w/ Wool	universal, use with Agilent 7673 autosampler	4.0 ID 6.3 OD x 78.5	—	20781-213.1	20782-213.5	20783-213.25
 Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 78.5	—	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 (ea.) 5183-4699 (5-pk.)	20709	20710	—
 Siltek® Cup Splitter	high & low MW compounds	4.0 ID 6.3 OD x 78.5	—	20709-214.1	20710-214.5	—
 Cyclosplitter®	dirty samples, many injections before cleaning required	4.0 ID 6.3 OD x 78.5	—	20706	20707	20708
 2mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	2.0 ID 6.3 OD x 78.5	—	20823	20824	—
 4mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	210-4004-5 (5-pk.)	21022	21023	20979
 Siltek® 4mm Split Precision™ Liner w/ Wool	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	—	21022-213.1	21023-213.5	20979-213.25
 4mm Gooseneck Precision™ Liner	dirty samples, trace samples	4.0 ID 6.3 OD x 78.5	210-4022-5 (5-pk.) **new!**	22983	22984	22985

Split/Splitless Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 Low Pressure Drop Liner w/ Wool	universal, use with Agilent 6890 GCs	4.0 ID 6.3 OD x 78.5	5183-4647 (ea.) 5183-4701 (5-pk.)	21032	21033	—
 Low Pressure Drop Liner w/ Wool	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

PTV Liners for Agilent GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Agilent part #	ea.	cat.# 5-pk.	25-pk.
 PTV On-Column Liner	allows on-column injection with a 0.53mm ID column	1.7 ID 3.0 OD x 71	**new!**	24976	24977	—

CIS4 and PTV Liners for Agilent GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Agilent part#	cat.# 10-pk.
 Straight Glass	general use	2.0 ID 3.0 OD x 71	5183-2036	21157
 Baffled Glass	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	5183-2037	21704
 Siltek® Baffled Glass	active compounds, drugs, pesticides	1.5 ID 3.0 OD x 71	—	21704-214.10
 Glass w/ Wool	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.
 SPME Liner	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.

Supplies for Agilent Instruments: Inlet Liners

COLUMN INSTALLS THIS END

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	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

All liners are **100% deactivated**
All liners are shipped intermediate polarity (IP) deactivated unless otherwise requested.

DI Liners for Agilent GCs (For 0.25/0.32/0.53mm ID Columns)	Benefits/Uses***	ID*/OD & Length (mm)	Similar to Agilent part #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
Drilled Uniliner® (hole near top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21054	21055	20998
Siltek® Drilled Uniliner® (hole near 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 near 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 near top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	20508	20509	—
Double Gooseneck Drilled Uniliner® (hole near 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 near 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® liner 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® Liners

Use the Drilled Uniliner® liner with the hole near the bottom for semivolatile analysis or when compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® liner with the hole near the top for chlorinated pesticides analysis, 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
Cyclosplitter®	20726	20729
Split/Splitless w/Wool	21700	21701

Supplies for Agilent Instruments: O-Rings, Liner Seals, & Septa

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 #	10-pk. cat.#	50-pk. cat.#
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, 7890, PTV	11
5700, 5880	9.5/10
On-Column Injection	5

Septa for Agilent GCs

- Preconditioned and ready to use.
- Packaged in precleaned glass jars.

Now precision molded!

Thermolite® Septa

IceBlue™ Septa

BTO® Septa

Septum Diameter	25-pk.	50-pk.	100-pk.
Thermolite® Septa (usable to 340°C inlet temp.)			
5mm (3/16")	27120	27121	27122
9.5mm (3/8")	27135	27136	27137
10mm	27138	27139	27140
11mm (7/16")	27141	27142	27143
IceBlue™ Septa (usable to 250°C inlet temp.)			
9.5mm (3/8")		27158	27159
10mm		27160	27161
11mm (7/16")		27162	27163
BTO® Septa (usable to 400°C inlet temp.)			
5mm CenterGuide™		27100	27101
9.5mm (3/8")		27106	27107
10mm		27108	27109
11mm (7/16") CenterGuide™		27110	27111

also available

See **page 134** for Merlin Microseal Septa.

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

Supplies for Agilent Instruments: Septum Nuts, Injection Tools

Knurled Septum Nuts for Agilent 5890/6890/6850/7890 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 5890/6890/6850/7890 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 5890/6890/6850/7890 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 5890/6890/6850/7890 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

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

Supplies for Agilent Instruments: Column Nuts, Installation Gauge

Capillary Column Nuts for Agilent 5890/6890/7890 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.#
For use with "compact" Agilent-style ferrules.			
Stainless Steel Capillary Column Nut	5181-8830	2-pk.	21884
Brass Capillary Column Nut	5181-8830	2-pk.	21878
For use with standard 1/16"-type ferrules.*			
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 Nuts

- Rapidly tighten without wrenches; avoid stripped threads.
- Either version can be used with 0.25, 0.32, or 0.53mm ID columns.

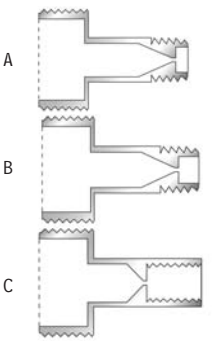
cat.# 21312

Description	qty.	cat.#
For use with "compact" Agilent-style ferrules.		
Finger-Tight Capillary Column Nut	ea.	21311
For use with standard ferrules.		
Finger-Tight Capillary Column Nut	ea.	21312

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	Similar to Agilent part #	qty.	cat.#
For use with "compact" Agilent-style ferrules.			
A) Finger-Tight Capillary Column Nuts	5020-8293 5020-8292	2-pk.	21040
For use with standard 1/16"-type ferrules.			
B) Finger-Tight Capillary Column Nuts	5020-8293 5020-8292	2-pk.	21041
For use with standard 1/16" compression fittings			
C) Finger-Tight Capillary Column Nuts		2-pk.	21042



also **available**

Ferrules
See **pages 217-219** for our complete listing of ferrules.

Capillary Installation Gauge

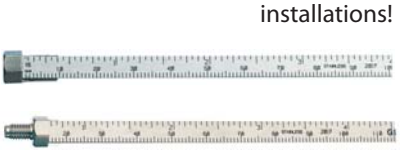
- Seats graphite* ferrules onto column for consistent installations.
- Prevents crushed column ends.
- Made from high-quality stainless steel.

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

restek
innovation!

A Dual Vespel® Ring Inlet Seal eliminates the need for a washer!

Dual Vespel® Ring Inlet Seals for Agilent GCs

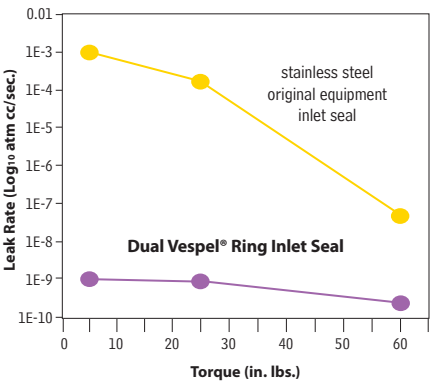
- Vespel® ring embedded in bottom surface eliminates need for washer.
- Vespel® ring embedded in top surface reduces operator variability by requiring minimal torque to seal.
- Prevents oxygen from permeating into the carrier gas, increasing column lifetime.

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 patented 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.

Patented.

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

new!

Dual Vespel® Ring Cross-Disk Inlet Seals for Agilent GCs

- Ideal for high-flow split applications.
- Washerless, leak-tight seals.

0.8mm ID Dual Vespel® Ring Cross-Disk Inlet Seal	2-pk.	10-pk.
Gold-Plated	22083	22084
Siltek® Treated	22085	22086
Stainless Steel	22087	22088

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.

Note: The 1.2mm inlet seal is recommended for use with Vespel®/graphite ferrules or when installing two columns using a two-hole ferrule.

Replacement Inlet Seals for Agilent GCs

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.

Single-Column Installation (0.8mm Opening) Replacement Inlet Seal	Similar to Agilent part #	2-pk.	10-pk.
Gold-Plated	18740-20885	21317	21318
Siltek® Treated		21319	21320
Stainless Steel	18740-20880	21315	21316
0.25/0.32mm ID Dual-Column Installation (1.2mm Opening) **Replacement Inlet Seal**		**2-pk.**	**10-pk.**
Gold-Plated		21305	21306
Siltek® Treated		21307	21308
Stainless Steel		20390	20391
0.53mm ID Dual-Column Installation (1/16-inch Opening) **Replacement Inlet Seal**		**2-pk.**	**10-pk.**
Stainless Steel		20392	20393

All seals include washers.

Replacement Inlet Seal Washers

Description	Similar to Agilent part #	qty.	cat.#
Replacement Inlet Seal Washers	5061-5869	15-pk.	21710

Cross-Disk Inlet Seals 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

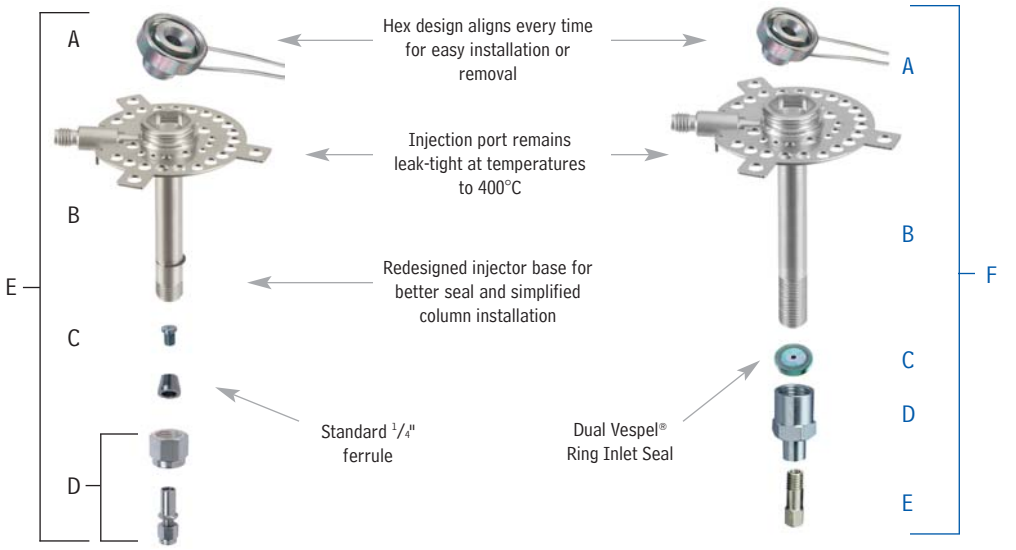
Description	Similar to Agilent part #	qty.	cat.#
Silver PTV Seals for Agilent 6890 GCs	5182-9763	5-pk.	21409

restek **exclusive**!

SureFit Split/Splitless Injection Ports for Agilent 6890 GCs

Uses Restek Enhanced Base Fitting (cat.# 23046)

Uses Manufacturer's-Style Inlet Seal and Reducing Nut (cat.# 23049)



please **note**

Special dual-taper, 1/4-inch ID Vespel®/graphite ferrules fit over split liners (6.3mm OD) (cat.# 20290). Ferrules with slightly enlarged ID, required for splitless liners (6.5mm OD) also available (cat.# 20291).

*Injection port assembly kit does not include inlet liner, 1/16" capillary ferrule, or split/splitless liner ferrules. Order separately.

SureFit Split/Splitless Injection Ports for Agilent 6890 GCs

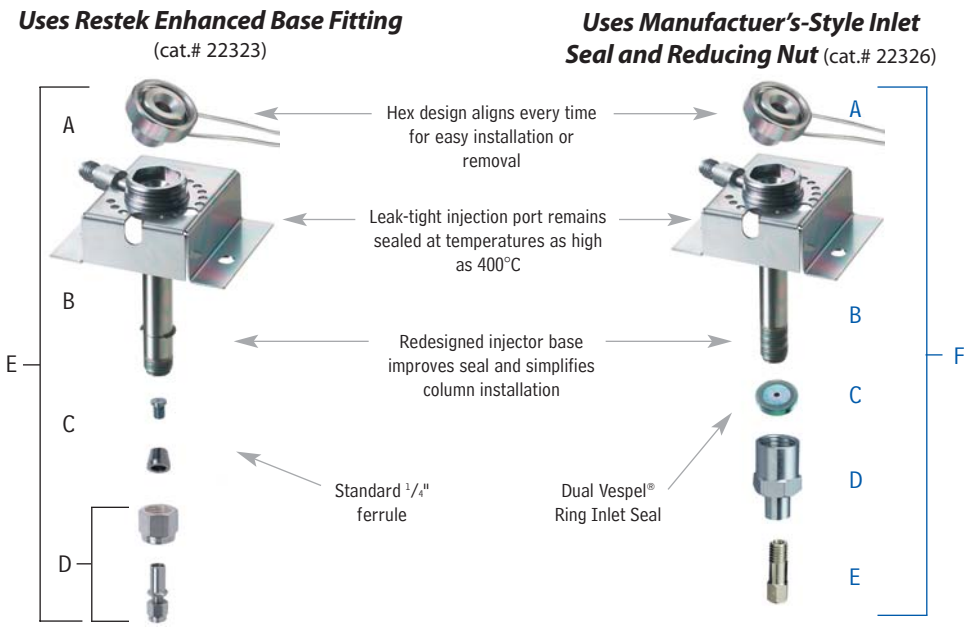
Uses Restek Enhanced Base Fitting

Description	qty.	cat.#
E) **Injection Port Assembly Kit** includes:* Siltek® split/splitless weldment, Siltek® shell weldment, base fitting, Siltek® base screw, septum nut, 1/16" and 1/4" stainless steel nuts, 1/4" graphite ferrule	kit	23046
A) Siltek® Split/Splitless Weldment for Restek Injection Port for 6890	ea.	23047
B) Siltek® Shell Weldment for Restek Injection Port for 6890	ea.	23048
Optional Siltek® Split/Splitless Weldment for Restek Injection Port for 6890	ea.	23051
Ferrules for split liners (6.3mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20290
Ferrules for splitless liners (6.5mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20291
C) Siltek® Base Screws for Restek Injection Port for 5890/6890	10-pk. 50-pk.	21631 21632
Gold-Plated Base Screws for Restek Injection Port for 5890/6890	2-pk. 10-pk.	21629 21630
Autosampler & PTV Septum Nut (for 23-gauge needles)	ea.	20631
D) Base Fitting for Restek Injection Port for 5890/6890	ea.	21626

Uses Manufacturer's-Style Reducing Nut and Inlet Seal

Description	qty.	cat.#
F) **Injection Port Assembly Kit** includes:* Siltek® split/splitless weldment, Siltek® shell weldment, septum nut, Siltek® Dual Vespel® Ring Inlet Seal, Agilent-style stainless steel reducing nut, Agilent-style stainless steel capillary nut	kit	23049
A) Siltek® Split/Splitless Weldment for Restek Injection Port for 6890	ea.	23047
B) Siltek® Shell Weldment for Restek Injection Port for 6890 (uses standard Agilent inlet seals)	ea.	23050
Optional Siltek® Split/Splitless Weldment for Restek Injection Port for 6890	ea.	23051
Ferrules for split liners (6.3mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20290
Ferrules for splitless liners (6.5mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20291
Autosampler & PTV Septum Nut (for 23-gauge needles)	ea.	20631
D) Reducing Nut	ea.	22078
E) Stainless Steel Capillary Column Nut	2-pk.	21884
C) Siltek® 0.8mm ID Dual Vespel® Ring Inlet Seal	2-pk. 10-pk.	21242 21243

SureFit Split/Splitless Injection Ports for Agilent 5890 GCs



restek **exclusive!**

Donna Lidgett
GC Accessories Product Marketing Manager
21+ years of service!

SureFit Split/Splitless Injection Ports for Agilent 5890 GCs

Uses Restek Enhanced Base Fitting

Description	qty.	cat.#
E) **Injection Port Assembly Kit** includes:* Siltek® split/splitless weldment, Siltek® shell weldment, base fitting, Siltek® base screw, septum nut, 1/16" and 1/4" stainless steel nuts, 1/4" graphite ferrule	kit	22323
A) Siltek® Split/Splitless Weldment for Restek 5890 Injection Port	ea.	22324
B) Siltek® Shell Weldment for Restek 5890 Injection Port	ea.	22325
Ferrules for split liners (6.3mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20290
Ferrules for splitless liners (6.5mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20291
C) Siltek® Base Screws for Restek Injection Port for 5890/6890	10-pk. 50-pk.	21631 21632
Gold-Plated Base Screws for Restek Injection Port for 5890/6890	2-pk. 10-pk.	21629 21630
Autosampler & PTV Septum Nut (for 23-gauge needles)	ea.	20631
D) Base Fitting for Restek Injection Port for 5890/6890	ea.	21626

Uses Manufacturer's-Style Inlet Seal and Reducing Nut

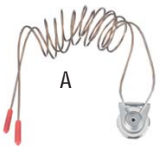
Description	qty.	cat.#
F) **Injection Port Assembly Kit** includes:* Siltek® split/splitless weldment, Siltek® shell weldment, septum nut, Siltek® Dual Vespel® Ring Inlet Seal, Agilent-style stainless steel reducing nut, Agilent-style stainless steel capillary nut	kit	22326
A) Siltek® Split/Splitless Weldment for Restek 5890 Injection Port	ea.	22324
B) Siltek® Split/Splitless Shell Weldment for Restek Injection Port for 5890/6890 (uses standard Agilent inlet seals)	ea.	22327
Ferrules for split liners (6.3mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20290
Ferrules for splitless liners (6.5mm OD): 1/4" dual-taper Vespel®/graphite	10-pk.	20291
Autosampler & PTV Septum Nut (for 23-gauge needles)	ea.	20631
D) Reducing Nut	ea.	22078
E) Stainless Steel Capillary Column Nut	2-pk.	21884
C) Siltek® 0.8mm ID Dual Vespel® Ring Inlet Seal**	2-pk. 10-pk.	21242 21243

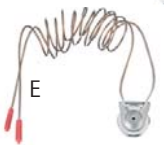
please **note**

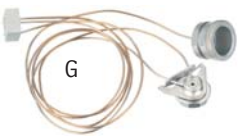
Special dual-taper, 1/4-inch ID Vespel®/graphite ferrules fit over split liners (6.3mm OD) (cat.# 20290). Ferrules with slightly enlarged ID, required for splitless liners (6.5mm OD) also available (cat.# 20291).

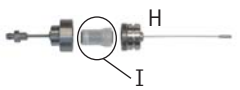
*Injection port assembly kit does not include inlet liner, 1/16" capillary ferrule, or split/splitless liner ferrules. Order separately.

For more inlet seals, refer to **pages 150-151.









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
C) 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.#
D) Replacement Weldment with EPC	G1544-60575	ea.	22674
Siltek® Weldment with EPC**	G1544-60575	ea.	22672
E) Replacement Weldment*	19251-60575	ea.	20265
Siltek® Weldment**	19251-60575	ea.	20267
F) Replacement Shell Weldment	G1544-80570	ea.	22673
Siltek® Shell Weldment**	G1544-80570	ea.	22671
G) 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.#
H) Optional Split Vent Trap Assembly for Agilent 6890/6850 GCs	G1544-60610	kit	23031
I) Replacement Traps (2) and O-rings (4)	G1544-80530	kit	23032

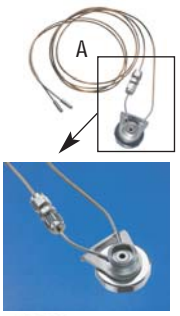
also **available**

Looking for autosampler syringes?
Restek carries a full line of autosampler syringes for Agilent instruments from both Hamilton and SGE. See **pages 278 to 280** or visit **www.restek.com** and search on syringes.

Supplies for Agilent Instruments: Injection Port Replacement Parts

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.

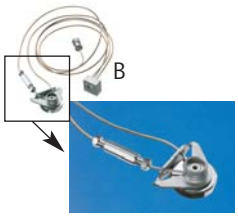


For Agilent GCs with Tekmar Purge and Trap Systems

Description	qty.	cat.#
Weldment for Agilent 6890 GCs	ea.	22664
Weldment for Agilent 6890 GCs with optional canister filter	ea.	22668
A) Weldment for Agilent 5890 GCs	ea.	22666

For Agilent GCs with OI Purge and Trap Systems

Description	qty.	cat.#
B) 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

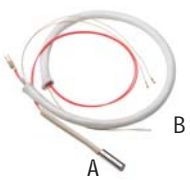
- Kit includes 3 O-rings, 2 plugs, 1 mounting screw and 1 test block.

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 manufacturer's 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 manufacturer's performance.

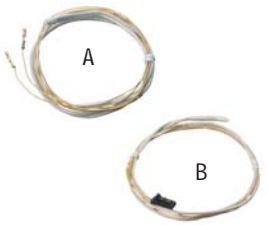
Description	Similar to Agilent part #	qty.	cat.#
Heat Sink for Agilent 5890 GCs	18740-20940	ea.	20409

Heater Block Retaining Nuts for Agilent GC Split/Splitless Injectors

- Aluminum construction.
- Meet or exceed manufacturer's 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

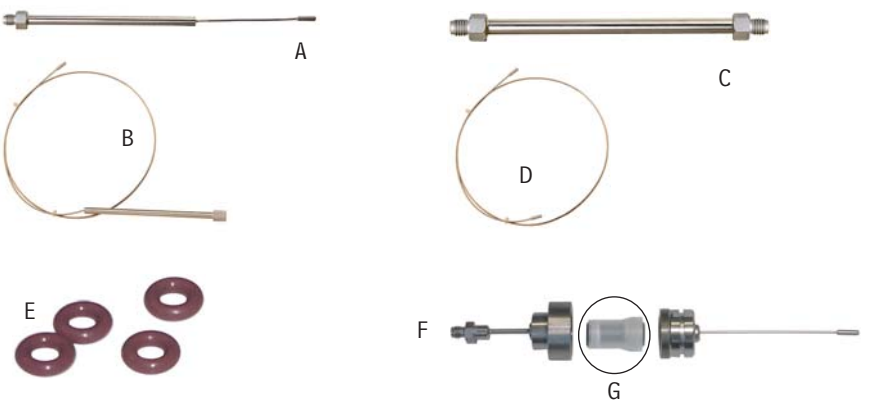
Increase the versatility of your Agilent 5890/6890 GC by replacing the existing 30psig (207kPa) backpressure regulator and gauge with our 60psig (414kPa) regulator. Enables you to use longer 60m and 105m columns as well as shorter 10m columns. Includes complete instructions.

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 Split Vent 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.#
mini-Lam DI Tee Kit (Includes all fittings and ferrules)	kit	20436
Replacement 4mm *mini*-Lam 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 147) 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).

Supplies for Agilent Instruments: Replacement Parts and Tool Kits

new!

Oven Flapper Assemblies

- Ensure even and consistent column heating, run after run, by replacing the oven flapper assembly when the insulation becomes damaged or worn.
- Replacement Insulation Gasket and Hardware Kit includes the insulation gasket, 2 screws and 2 nuts.
- Meets or exceeds manufacturer's performance.
- Insulation is replaceable, using Restek's Oven Flapper Assemblies.

Description	Similar to Agilent part #	qty.	cat.#
Oven Flapper Assembly for Agilent 5890 GCs	05890-80560	ea.	22994
Oven Flapper Assembly for Agilent 6890 GCs	G1530-80560	ea.	22995
Replacement Insulation Gasket and Hardware Kit*		kit	22996

*Fits Restek's Oven Flapper Assembly only.

Air Diverter for Agilent GCs

- Divert GC exhaust heat away from the lab bench.
- Meets or exceeds manufacturer's performance.
- Easy to install—no tools required.

Description	Similar to Agilent part #	qty.	cat.#
Air Diverter for Agilent 5890/6890 GCs	19247-60510 G1530-80650	ea.	22076

Make Life Easier (MLE) Capillary Tool Kit for Agilent GCs

Everything you need in one complete kit!

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 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 Agilent GCs	kit	22186

Direct Injection (DI) Inserts and Liner Adaptor for 1/4-Inch Packed Column Injection Ports (for 0.25, 0.32, & 0.53mm ID columns)

All liners are **100% deactivated**

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

SILTEK® version available.

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

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

also **available**

Looking for autosampler vials?
Restek carries a full line of autosampler vials for all of Agilent's autosamplers. See **pages 259 to 275** or visit **www.restek.com** and search on autosampler vial.

1/16-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.25 or 0.32mm ID capillary columns)

For use with 0.25/0.32mm ID 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
0.25/0.32mm ID Dual-Column Installation (1.2mm Opening) Replacement Inlet Seal	2-pk.	20390
0.25/0.32mm ID Dual-Column Installation (1.2mm Opening) Replacement Inlet Seal	10-pk.	20391

1/8-Inch Capillary Inlet Adaptor Fitting Kit

(Split/splitless fitting for 0.53mm ID capillary columns)

For use with 0.53mm ID 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) Replacement Inlet Seal	2-pk.	20392
0.53mm ID Dual-Column Installation (1/16-inch opening) Replacement Inlet Seal	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.	Vespel®/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)

DI Tee Kit

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

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

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.

Make your injection port threads like new!

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

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

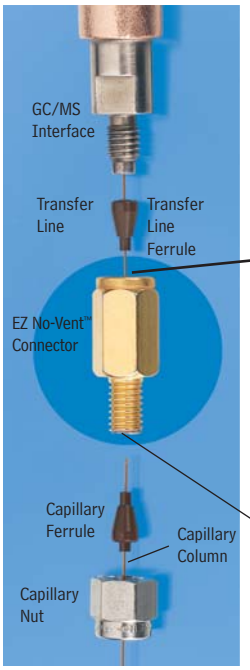
Injection Port Split/Splitless Weldment Retaining Ring Pliers

- 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, 5973, or 5975 GC/MS.



Change columns in minutes—without venting!

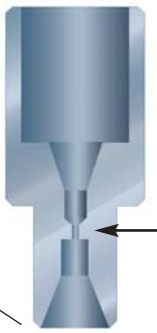


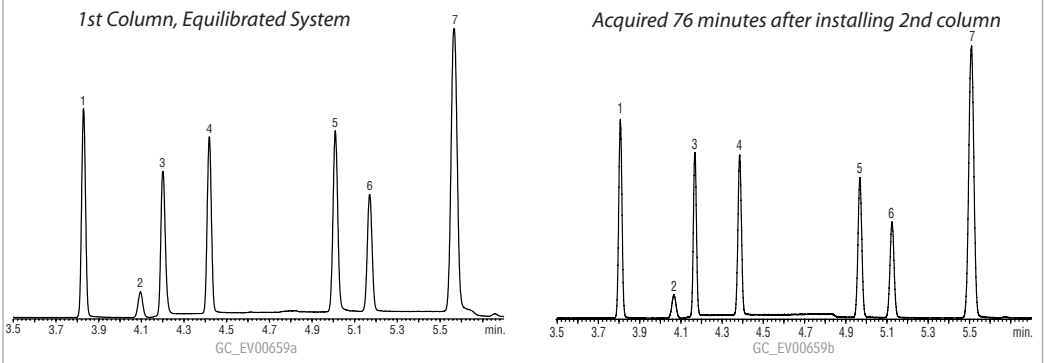
Figure 1 The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Laser drilled to 100µm ID

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 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:	35-550amu
Tune	BFB
Ionization:	EI

Kit installs easily, without special tools or plumbing.

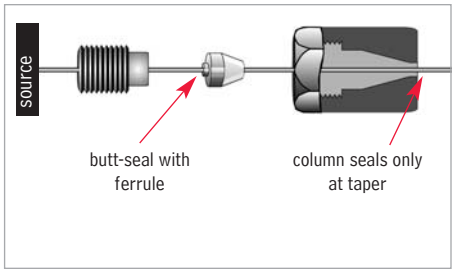
Description	qty.	cat.#
EZ No-Vent™ Connector Kit for Agilent 5971/5972 and 5973 GC/MS Kit includes: EZ No-Vent™ Connector, two 0.4mm ID ferrules for capillary column, two 0.4mm ID ferrules for transfer line, 100µm deactivated transfer line (3 ft.), column plug, column nut.	kit	21323
Replacement ferrules 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

MSD Conversion Fitting

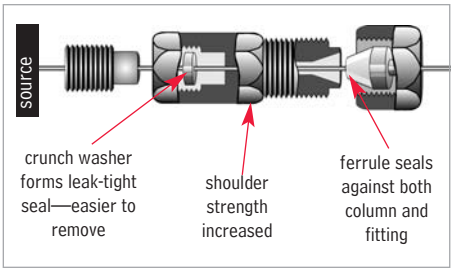
- A flat, soft aluminum sealing ring deforms and butt-seals against the MSD interface.
- A standard Vespel® ferrule seals the column and $^{1}/_{16}$-inch stainless steel nut.
- Fitting is constructed of nickel-plated brass for longevity and softness.
- Use any standard Vespel® or Vespel®/graphite $^{1}/_{16}$-inch ferrule.
- Includes a $^{1}/_{16}$-inch stainless steel nut and two replacement sealing rings. Order ferrules separately.

Agilent'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.

Agilent Design



Improved Restek Design



Description	qty.	cat.#
MSD Conversion Fitting	ea.	21314
Replacement Ring Seal for MSD Conversion Fitting	2-pk.	21313

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.

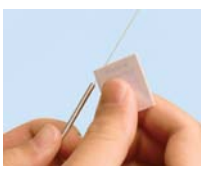
Improved design!

Description	Similar to Agilent part #	qty.	cat.#
(Detector) MSD Source Nut	05988-20066	2-pk.	20643

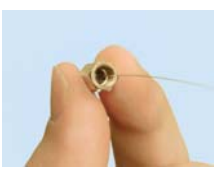
Capillary Installation Gauge for Agilent 5973/5975 MS

- 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.

Tom Kane
Product Development Manager

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 manufacturer's 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 manufacturer's 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 manufacturer's 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 manufacturer's 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	qty.	cat.#
Rough Pump Oil for MSD Pumps	1 liter	22687

Ion Source Cleaning Powder

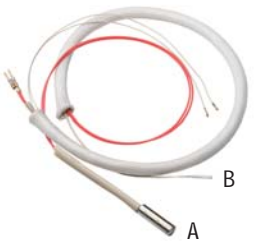
- Use this aluminium oxide powder to clean surfaces that contact the sample or ion beam when you encounter poor sensitivity and inadequate abundances at high masses.

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 manufacturer's 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

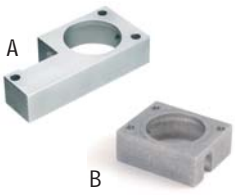
- Meets or exceeds manufacturer's performance.

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
A) FID Collector Housing Kit for Agilent 6890/7890 GCs (includes collector body, silicone washer, nut, and mount)	G1531-20550	kit	23045
FID Collector Housing for Agilent 6890/7890 GCs	G1531-20740	ea.	23044
B) Replacement Silicone Washers for FID Collector Housing for Agilent 5890/6890/7890 GCs	5180-4165	12-pk.	23064

FID Collector Mount for Agilent GCs

- Meets or exceeds manufacturer's 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 6890/7890 GCs	G1531-20550	ea.	23043



FID Base Weldment for Agilent GCs

- Meets or exceeds manufacturer's 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

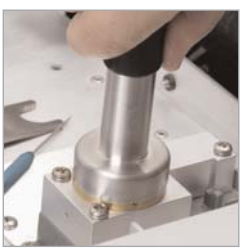
Note: 6890 GC connections to EPC modules are not compatible with the 7890 EPC modules.

Spanner Wrench for Agilent 5890/6890/6850/7890 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 5890/6890/6850/7890 FID Collector Assembly	19231-00130	ea.	22329

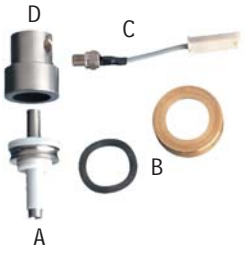
Direct Replacement FID Collector Assembly Kit for Agilent 5890 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds manufacturer's performance.

Description	Similar to Agilent part #	qty.	cat.#
FID Collector Assembly Kit (includes insulators)	19231-60690	kit	23010
FID Collector Assembly Kit w/Siltek® Ignitor Castle	—	kit	21131

Replacement FID Parts for Agilent 5890 GCs

- Meets or exceeds manufacturer's performance.



Description	Similar to Agilent part #	qty.	cat.#
A) FID Collector (includes insulators)	19231-20970 19231-20960 19231-20950	ea.	21138
B) FID Collector Nut and Washer	19231-20940 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

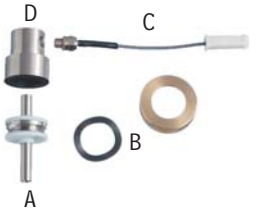
*Also fits OI Analytical 4410 detector (similar to OI part # 191833).

SILTEK® versions available.

Direct Replacement FID Collector Assembly Kit for Agilent 6890/6850/7890 GCs

- Constructed of high-quality stainless steel.
- Meets or exceeds manufacturer's performance.

Description	Similar to Agilent part #	qty.	cat.#
FID Collector Assembly Kit (includes insulator)	G1531-60690	kit	21699
FID Collector Assembly Kit w/Siltek® Ignitor Castle	—	kit	21132



Replacement FID Parts for Agilent 6890/6850/7890 GCs

- Meets or exceeds manufacturer's performance.

Description	Similar to Agilent part #	qty.	cat.#
A) FID Collector (includes insulators)	G1531-20690 G1531-20700	ea.	21139
B) FID Collector Nut and Washer	19231-20940 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 5890/6890/6850/7890 GCs

- Makes setting flows easy.
- Meets or exceeds manufacturer's performance.

Rugged design!

Description	Similar to Agilent part #	qty.	cat.#
FID Flow Measuring Adaptor	19301-60660	ea.	21000

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 (1724kPa), outlet pressures of 0 to 60psi (0-414kPa).

Description	qty.	cat.#
FID Gauge Pack for Agilent 5890 GCs	ea.	22071

FID 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, for use with active compounds.

Capillary Adaptable FID Replacement Jet for Agilent 5890/6890/6850 GCs

0.011-Inch ID Tip	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard, 0.011-Inch ID Tip	19244-80560	ea.	20670	3-pk.	20671
High-Performance Siltek® Treated, 0.011-Inch ID Tip	19244-80560	ea.	20672	3-pk.	20673

Capillary Dedicated FID Replacement Jet for Agilent 6890/6850/7890 GCs

0.011-Inch ID Tip	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard, 0.011-Inch ID Tip	G1531-80560	ea.	21621	3-pk.	21682
High-Performance Siltek® Treated, 0.011-Inch ID Tip	G1531-80560	ea.	21620	3-pk.	21683

Packed Column FID Replacement Jets for Agilent 5890/6890/6850 GCs

0.018-Inch ID Tip	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard, 0.018-Inch ID Tip	18710-20119	ea.	21694	3-pk.	21695
High-Performance Siltek® Treated, 0.018-Inch ID Tip	18710-20119	ea.	21696	3-pk.	21697

0.030-Inch ID Tip	Similar to Agilent part #	qty.	cat.#	qty.	cat.#
Standard, 0.030-Inch ID Tip	18789-80070	ea.	21688	3-pk.	21689
High-Performance Siltek® Treated, 0.030-Inch ID Tip	18789-80070	ea.	21686	3-pk.	21687

tech tip

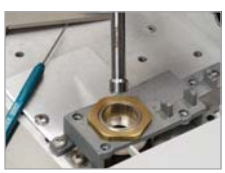
Which FID Jet Should I Use?

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 5890/6890/6850/7890 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 5890/6890/6850/7890 FIDs	ea.	22328

Torx® Screwdriver Set

- Set includes TR-10, TR-15, and TR-20.
- Ideal for performing routine maintenance on Agilent 6890 and 7890 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

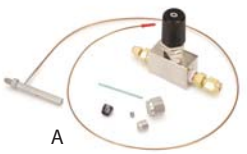
- Easy to use, sturdy, compact stainless steel fitting.
- 1/16-inch nut uses standard graphite or Vespel®/graphite ferrules.
- Wrench pad won't turn when installing a capillary column.
- Includes 1/4- and 1/16-inch stainless steel nuts, and 1/4-inch Vespel® and 0.4mm ID graphite ferrules.

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 manufacturer's performance.

Description	Similar to Agilent part #	qty.	cat.#
FID/NPD Capillary Adaptor Fitting	19244-80610	ea.	22077


A


B


C

ECD/FID Dual-Purpose Make-Up Gas Kit for Agilent 5890 GCs

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.

Description	Similar to Agilent part #	qty.	cat.#
A) ECD/FID Dual-Purpose Make-Up Gas Kit Includes: make-up gas fitting, Siltek® treated guide, 1/4" nut and ferrule, 1/16" nut, 0.4mm ID graphite ferrule, and fine metering valve		kit	21300
B) Replacement Make-up Gas Fitting Kit Includes: make-up gas fitting, 1/4" nut and ferrule, 1/16" nut, 0.4mm ID graphite ferrule		kit	21324
C) ECD/FID Replacement Fitting Kit with Flow Manifold Connection Includes: replacement fitting, 1/4" nut, Vespel®/graphite ferrule, 1/16" nut, 0.4mm ID graphite ferrule, Siltek® treated guide		kit	21301
Replacement ECD Siltek® Metal Liner		2-pk.	21302
new! Replacement ECD Fused Silica Liner	19233-20625	ea. 5-pk.	27192 27193
new! Replacement Micro ECD Liner	G2397-20540	ea. 5-pk.	27190 27191

Supplies for Agilent Instruments: Replacement Cables

Replacement Cables for Agilent GCs, Integrators, & Autosamplers

- Priced less than original equipment.
- Instructions and wiring diagrams included.
- Manufactured with only the highest-quality components.

did you **know**?

Restek provides pin schematics.

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

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

Replacement Parts for Agilent Autosamplers

- All parts meet or exceed manufacturer's performance.

Injector Mounting Posts and Parking Post for Agilent Autosamplers

new!

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 for use with 6850/6890 GCs	G2613-20500	ea.	21172
D) Parking Post for Agilent 7673/7683 Series Autosamplers for use with 5890/6890/7890 GCs	05890-61525	ea.	22343

Turret Tray Assembly for Agilent 5890/6890 GC

- Holds sample, waste and solvent vials.

Description	Similar to Agilent part #	qty.	cat.#
Turret Tray Assembly for Agilent 5890/6890 GC	07673-60605	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

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

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

Supplies for Varian Instruments: Inlet Liners

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	190010905	20721	20722	20723
 4mm Splitless	trace samples >2µL	4.0 ID 6.3 OD x 74	—	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	190010901	20792	20793	20794
 Laminar Cup Splitter	high MW compounds	4.0 ID 6.3 OD x 72	190010902	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	190010903	20715	20716	20717
 Baffle Splitter	compounds with close boiling points	4.0 ID 6.3 OD x 72	190010904	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	—

*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**

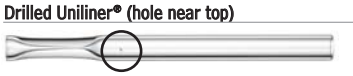
For descriptions of liner deactivations, packings, and tools, see **pages 141-143**.

Supplies for Varian Instruments: Inlet Liners

COLUMN INSTALLS THIS END

SPI Liners for Varian GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
 0.5mm SPI	high linearity for 0.25 & 0.32mm ID columns	0.53 ID 4.6 OD x 54	190010906	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	190010907	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	190010908	20850	20851	20852

Liners for Varian 1177 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.	25-pk.
 4mm Split w/Glass Frit	universal	4.0 ID 6.3 OD x 78.5	—	21045	21046	—
 Siltek® 4mm Split w/Glass Frit	universal	4.0 ID 6.3 OD x 78.5	—	21045-214.1	21046-214.5	—
 4mm Split w/ Wool	universal	4.0 ID 6.3 OD x 78.5	392611934	—	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	392599903	—	21077	—
 Gooseneck Splitless (4mm)	trace samples <2µL	4.0 ID 6.5 OD x 78.5	392611927	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	392611936	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 near top)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21470	21471
 Drilled Uniliner® (hole near bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.3 OD x 78.5	—	21468	21469

*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**

For descriptions of liner deactivations, packings, and tools, see **pages 141-143**.

Supplies for Varian Instruments: Inlet Liners

COLUMN INSTALLS THIS END

Liners for Varian 1078/1079 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Varian part #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
 1078/1079 Split w/ Frit	dirty samples, non-active compounds	3.4 ID 5.0 OD x 54	392611946	21708	21709	—
 Siltek® 1078/1079 Split w/ Frit	dirty samples, non-active compounds	3.4 ID 5.0 OD x 54	—	21708-214.1	21709-214.5	—
 1078/1079 Splitless	trace samples <2µL	2.0 ID 5.0 OD x 54	392611947	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	392611949	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	392611948	21714	21715	21716
 1078/1079 Split Precision™ Liner w/ Wool	dirty samples, trace samples	3.4 ID 5.0 OD x 54	—	21024	21025	—

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.	
 Drilled Uniliner® (hole near top)	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 54	—	24974	24975	new!
 Drilled Uniliner® (hole near bottom)	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 54	—	22280	22281	

*Nominal ID at syringe needle expulsion point.

tech tip

Drilled Uniliner® Liners

Use the Drilled Uniliner® liner with the hole near the bottom for semivolatile analysis or when compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® liner with the hole near the top for chlorinated pesticides analysis, 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 manufacturer's performance.

Description	Max. temp.	Similar to Varian part #	10-pk. cat.#	50-pk. cat.#
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

Now precision molded!

Septa for Varian GCs

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

Septum Diameter	25-pk.	50-pk.	100-pk.
Thermolite® Septa (usable to 340°C inlet temp.)			
9mm	27132	27133	27134
9.5mm (3/8")	27135	27136	27137
10mm	27138	27139	27140
11mm (7/16")	27141	27142	27143

IceBlue™ Septa (usable to 250°C inlet temp.)			
9mm	—	27156	27157
9.5mm (3/8")	—	27158	27159
10mm	—	27160	27161
11mm (7/16")	—	27162	27163

BTO® Septa (usable to 400°C inlet temp.)			
9mm CenterGuide™	—	27104	27105
9.5mm (3/8")	—	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.

Make Life Easier (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/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)

Everything you need in one complete kit!

Eberhardt Kuhn
Sales & Distribution Manager for Asia, Pacific, and India
3+ years of service!

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

Supplies for Varian Instruments: EZ NO-Vent™ GC/MS Connector

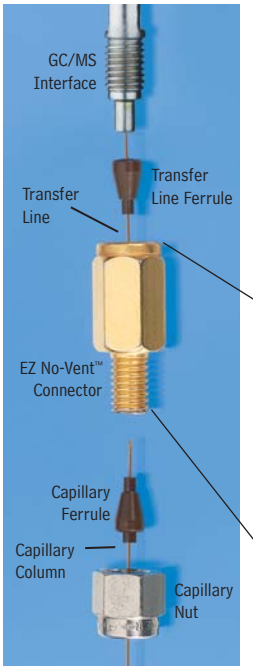
restek
innovation!
Change columns in minutes—without venting!

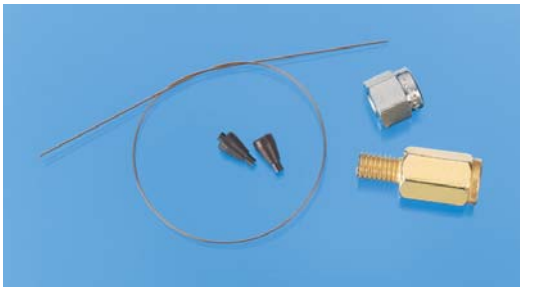
EZ No-Vent™ GC Column-Mass Spectrometer Connector

- 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
3+ years of service!





Kit installs easily, without special tools or plumbing.

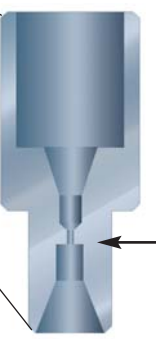


Figure 1 The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Laser drilled to100µm ID

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 nonstandard nut.
- Quick and simple installation.
- Ideal for two-hole ferrule installation.

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

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

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—see pages 217-219.

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.

Make your injection port threads like new!

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

also **available**

Looking for autosampler syringes?
Restek carries a full line of autosampler syringes for Varian instruments from both Hamilton and SGE. See **page 282** or visit **www.restek.com** and search on syringes.

Supplies for Shimadzu Instruments: Inlet Liners

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
 Cyclosplitter®	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 99	—	20870	20871	—
 Laminar Cup Splitter	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.
 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 (0.25/0.32/0.53mm 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	—
 Cyclosplitter®	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 95	—	22072	22073	—

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.
3.5mm Splitless	universal, trace samples	3.5 ID 5.0 OD x 95	221-48335-01	22286	22287	—
 Double Gooseneck	reduces backflash and catalytic decomposition	3.5 ID 5.0 OD x 95	—	20958	20959	20960
 Single Gooseneck	reduces backflash, also operates in DI mode	3.5 ID 5.0 OD x 95	—	20961	20962	20963

*Nominal ID at syringe needle expulsion point.

ordering **note**

For descriptions of liner deactivations, packings, and tools, see **pages 141-143**.

All liners are **100%** deactivated

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

Supplies for Shimadzu Instruments: Inlet Liners

Split/Splitless Liners for Shimadzu 17A, 2010, and 2014 GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to Shimadzu part #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
 Split/Splitless w/ Wool	universal, for most common analyses	3.5 ID 5.0 OD x 95	221-41444-00	20955	20956	20957
 Siltek® Split/Splitless w/ Wool	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 #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
 SPME Liner	ideal for low volume SPME applications	.75 ID 5.0 OD x 95	—	22278	22279	—

DI Liners for Shimadzu 17A, 2010, and 2014 GCs (0.25/0.32/0.53mm ID)	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
 Uniliner® w/ Wool	trace, dirty, high MW active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21713	21719	—
 Open-top Drilled Uniliner® (hole near top)	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21285	21286	—
 Open-top Drilled Uniliner® (hole near bottom)	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21287	21288	—
 Gooseneck Drilled Uniliner® (hole near top)	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21289	21290	—
 Gooseneck Drilled Uniliner® (hole near bottom)	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 95	—	21291	21292	—

tech tip

Drilled Uniliner® Liners

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

Liners for Shimadzu 17A PTV GCs	Benefits/Uses	ID*/OD & Length (mm)	Similar to Shimadzu part #	cat.# ea.	cat.# 5-pk.	cat.# 25-pk.
 17A PTV Liner w/ Wool	trace, dirty, high & low MW active samples	1.6 ID 4.0 OD x 95	225-09212-01	21705	21706	21707

*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

Supplies for Shimadzu Instruments: Column Inlet Parts

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 (usable to 340°C inlet temp.)		IceBlue™ Septa (usable to 250°C inlet temp.)		BTO® Septa (usable 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.#
Septum Nut for Shimadzu 17A, 2010, and 2014 GCs	221-41286-00 221-44584-00	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 manufacturer's 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 manufacturer's 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 $^{1}/_{4}$-inch 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 Fitting for Shimadzu Packed Column GCs	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

Make Life Easier (MLE) Capillary Tool Kit for Shimadzu GCs

Everything you need in one complete kit!

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/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 Shimadzu GCs	kit	22182

did you **know**?

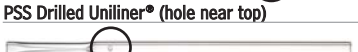
Restek offers a full line of Parker gas generators.
Gas generators are a safe and cost-effective alternative to gas cylinders. See **pages 242-245** for more information.

Supplies for PerkinElmer Instruments: Inlet Liners

COLUMN INSTALLS THIS END

Split Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	cat.# ea.	5-pk.	25-pk.
 Baffle Splitter	universal, for most common analyses	3.5 ID 5.0 OD x 100	N6502008	20736	20737	—
 Cup Splitter	high & low MW compounds	3.5 ID 5.0 OD x 100	—	20739	20740	—
 Cyclosplitter®	dirty samples, many injections before cleaning required	3.5 ID 5.0 OD x 100	—	20745	20746	—
 Auto SYS™ Splitter w/ Wool	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6502009	20832	20833	20834
 Siltek® Auto SYS™ Splitter w/ Wool	universal for most common analyses	4.0 ID 6.2 OD x 92.1	N6502010	20832-213.1	20833-213.5	20834-213.25
 Auto SYS™ Cup Splitter	high & low MW compounds	4.0 ID 6.2 OD x 92.1	N6502011	20835	20836	—
 Auto SYS™ Cyclosplitter®	dirty samples, many injections before cleaning required	4.0 ID 6.2 OD x 92.1	N6502012	20910	20911	—
 Auto SYS™ Laminar Cup Splitter	high MW compounds	4.0 ID 6.2 OD x 92.1	—	20827	20828	—
 Auto SYS™ Split Precision™ Liner w/ Wool	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 #	cat.# ea.	5-pk.	25-pk.
 Splitless (2mm ID)	trace samples	2.0 ID 5.0 OD x 100	N6502007	20730	20731	20732
 Auto SYS™ Splitless	headspace & purge & trap	1.0 ID 6.2 OD x 92.1	N6502006	21272	21273	21274
 Auto SYS™ Splitless w/ Wool (2mm ID)	trace samples	2.0 ID 6.2 OD x 92.1	N6121021	20829	20830	20831
 Siltek® Auto SYS™ Splitless w/ Wool (2mm ID)	trace samples	2.0 ID 6.2 OD x 92.1	N6502004	20829-213.1	20830-213.5	20831-213.25
 Auto SYS™ Double Gooseneck	trace, active samples up to 4µL	4.0 ID 6.2 OD x 92.1	N6502003	20853	20854	—
 Auto SYS™ Cyclo Double Gooseneck	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 #	cat.# ea.	5-pk.	25-pk.
PSS Split/Splitless (1mm ID)	trace samples	1.0 ID 4.0 OD x 86.2	N6121006	20738	20741	—
 Auto SYS™ XL PSS Split/Splitless w/ Wool	most common analyses	2.0 ID 4.0 OD x 86.2	N6121004	21717	21718	—
 PSS Drilled Uniliner® (hole near top)	trace, active samples, high recovery & linearity	2.0 ID 4.0 OD x 86.2	—	22986	22987	new!
 PSS Drilled Uniliner® (hole near bottom)	trace, active samples, high recovery & linearity	2.0 ID 4.0 OD x 86.2	—	22988	22989	new!

*Nominal ID at syringe needle expulsion point.

ordering **note**

For descriptions of liner deactivations, packings, and tools, see **pages 141-143**.

All liners are **100%** deactivated

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

Supplies for PerkinElmer Instruments: Inlet Liners

COLUMN INSTALLS THIS END

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.
 Zero Dilution Inner Liner	headspace analysis	1.0 ID 2.0 OD x 73	N1011446	22990	22991	—
 Zero Dilution Outer Liner	headspace analysis	2.5 ID 6.2 OD x 90	N1011445	22992	22993	—

Zero Dilution Liners for PerkinElmer GCs with PSS Inlets	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 Zero Dilution Inner Liner	headspace analysis	1.0 ID 2.0 OD x 73	N1011446	22990	22991	—
 Zero Dilution Outer Liner	headspace analysis	2.5 ID 4.2 OD x 83	N1011447	24978	24979	new!

PTV Liners for PerkinElmer GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
PTV Press-Tight®	high linearity for 0.25, 0.32, & 0.53mm ID columns	1.0 ID 2.0 OD x 88	—	20733	20734	20735
PTV Injector	high linearity	1.0 ID 2.0 OD x 88	—	20742	20743	20744

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.
 Uniliner®	trace, active samples, high recovery & linearity	3.5 ID 5.0 OD x 100	N6502018	20855	20856	—
 Cyclo-Uniliner®	trace, dirty, active samples, high linearity	3.5 ID 5.0 OD x 100	N6502019	20857	20858	—
 Auto SYS™ Open-top Uniliner® w/ Wool	trace, dirty, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502016	20837	20838	—
 Auto SYS™ Cyclo-Uniliner®	trace, dirty, high MW active samples, high linearity	4.0 ID 6.2 OD x 92.1	N6502017	20839	20840	—

DI Liners for PerkinElmer GCs (For 0.32/0.53mm ID Columns)	Benefits/Uses	ID*/OD & Length (mm)	Similar to PE part #	ea.	cat.# 5-pk.	25-pk.
 Auto SYS™ Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6121022	20819	20822	—
 Auto SYS™ Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502013	21293	21294	—
 Auto SYS™ Gooseneck Drilled Uniliner® (hole on top)	trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502014	21295	21296	—
 Auto SYS™ Gooseneck Drilled Uniliner® (hole on bottom)	trace, active samples, high recovery & linearity	4.0 ID 6.2 OD x 92.1	N6502015	21297	21298	—

*Nominal ID at syringe needle expulsion point.

tech tip

Drilled Uniliner® Liners

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

Supplies for PerkinElmer Instruments: O-Rings, Injector/Detector

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

- Preconditioned and ready to use.
- Packaged in precleaned glass jars.

Now precision molded!

Thermolite® Septa (usable to 340°C inlet temp.)

qty.	cat.#
25-pk.	27141
50-pk.	27142
100-pk.	27143

IceBlue™ Septa (usable to 250°C inlet temp.)

qty.	cat.#
50-pk.	27162
100-pk.	27163

BTO® Septa (usable 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 manufacturer's 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.
- Meet or exceed manufacturer's performance.
- Siltek® treated version available for increased inertness.

Description	Similar to PE part #	qty.	cat.#
For use with PE style capillary nuts			
A) Injector Adaptor for PerkinElmer Auto SYS™ XL	N6100157	ea.	22318
B) Siltek® Treated Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22320
For use with 1/16" compression style nuts			
C) Injector Adaptor for PerkinElmer Auto SYS™ XL	—	ea.	22319
D) 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.
- Meet or exceed manufacturer's performance.

Description	Similar to PE part #	qty.	cat.#
A) For use with PE style capillary nuts			
FID Capillary Column Adaptor for PerkinElmer Auto SYS™ XL	N6120020	ea.	22608
B) For use with 1/16" compression style nuts			
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 manufacturer's performance.

Description	Similar to PE part #	qty.	cat.#
FID Jet for PerkinElmer Auto SYS™ XL and Clarus 500	N6100361	ea.	23038
Auto-Ignite FID Replacement Part Kit for PerkinElmer Auto SYS™ XL and Clarus 500	N6103167 N6103175 N6101085 N6001204 09912223	kit	23061
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

Make Life Easier (MLE) Capillary Tool Kit for PerkinElmer GCs

Everything you need in one complete kit!

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

Supplies for Thermo Scientific Instruments: Inlet Liners

Split Liners for Thermo Scientific 4000-5000-6000 Series GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	cat.# ea.	cat.# 5-pk.	cat.# 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 #	cat.# ea.	cat.# 5-pk.	cat.# 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 #	cat.# ea.	cat.# 5-pk.	cat.# 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™ & Focus SSL	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	cat.# ea.	cat.# 5-pk.	cat.# 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™ & Focus SSL	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	cat.# ea.	cat.# 5-pk.	cat.# 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.

ordering **note**

For descriptions of liner deactivations, packings, and tools, see **pages 141-143**.

All liners are **100%** deactivated

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

Supplies for Thermo Scientific Instruments: Inlet Liners, Seals

COLUMN INSTALLS THIS END

Split Liners for Thermo Scientific TRACE™ PTV	Benefits/Uses:	ID*/OD & Length (mm)	Similar to TS part #	cat.# ea.	cat.# 5-pk.	cat.# 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.**	**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 near top)	trace, active samples, high recovery, & linearity	5.0 ID 8.0 OD x 105	—	22411	22412	—
Drilled Uniliner® (hole near 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

Drilled Uniliner® Liners

Use the Drilled Uniliner® liner with the hole near the bottom for semivolatile analysis or when compounds of interest could be affected by a tailing solvent peak. Use the Drilled Uniliner® liner with the hole near the top for chlorinated pesticides analysis, 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 Thermo Scientific TRACE™ PTV

Description	Max. temp.	Similar to TS part #	qty.	cat.#
Inlet Liner Seals for Thermo Scientific TRACE™ PTV	450°C	29013417	2-pk.	21392

Graphite Sealing Ring for Thermo Scientific 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

Supplies for Thermo Scientific Instruments: Septa, Ferrules

Septa for Thermo Scientific GCs

- Preconditioned and ready to use.
- Packaged in precleaned glass jars.

Now precision molded!

Septum Diameter	25-pk.	50-pk.	100-pk.
Thermolite® Septa (usable to 340°C inlet temp.)			
9mm	27132	27133	27134
9.5mm (3/8")	27135	27136	27137
17mm	27150	27151	27152
IceBlue™ Septa (usable to 250°C inlet temp.)			
9mm	—	27156	27157
9.5mm (3/8")	—	27158	27159
17mm	—	27168	27169
BTO® Septa (usable to 400°C inlet temp.)			
9mm CenterGuide™	—	27104	27105
9.5mm (3/8")	—	27106	27107
17mm CenterGuide™	—	27116	27117

Thermolite® Septa

IceBlue® Septa

BTO® Septa

HANDY
septum size chart

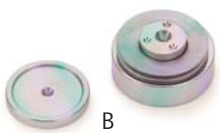
Instrument	Septum Diameter (mm)
Thermo Scientific	
TRACE™ GC, GCQ w/TRACE™, PTV, 8000 series	17
Finnigan (TMQ)	
GC 9001, GCQ, QCQ™, TRACE™ 2000	9.5

Septa Holder Kits for Thermo Scientific TRACE™ and Focus SSL

- Includes septum support and holder.
- Made from high-quality stainless steel.

Description	Similar to TS part #	qty.	cat.#
A) Septa Holder for Thermo Scientific TRACE™ and Focus SSL	233 030 15 350 054 335	kit	21299
B) Silcosteel®-AC Treated Septa Holder for Thermo Scientific TRACE™ and Focus SSL **new!**	233 030 15 350 054 33	kit	24972

A



B

Septum Cap for Split/Splitless Injector on Thermo Scientific TRACE™ and Focus SSL

new!

Description	Similar to TS part #	qty.	cat.#
Septum Cap for Split/Splitless Injector on Thermo Scientific TRACE™ and Focus SSL	350 01 050	ea.	24971

Silver Seals for Thermo Scientific 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

A

B

Adapters for Capillary Columns on Thermo Scientific TRACE™ and Focus SSL

- Use same installation distance as manufacturer's adapters.
- Made of high-quality stainless steel.

Description	Similar to TS part #	qty.	cat.#
For use with standard 1/16" ferrules.			
A) Adapter for Capillary Column on Detector Base	—	ea.	24916
B) Adapter for Capillary Column on Split/Splitless Injector	—	ea.	24917
For use with M4 ferrules. new!			
C) Adapter for Capillary Column on Detector Base	347 25 436	2-pk.	24969
D) Adapter for Capillary Column on Split/Splitless Injector	347 05 451	ea.	24970

Graphite Ferrules—For M4 Fittings for Thermo Scientific 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

new!

Fixing Nut for Capillary Column for Split/Splitless Injector on Thermo Scientific TRACE™ and Focus SSL

- Made of high-quality stainless steel.

Description	Similar to TS part #	qty.	cat.#
Fixing Nut for Capillary Column for Split/Splitless Injector on Thermo Scientific TRACE™ and Focus SSL	350 32 423	5-pk.	24973

new!

Nut for Terminal Fitting for Thermo Scientific TRACE™ GCs

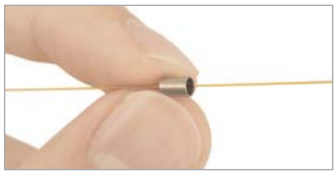
Description	Similar to TS part #	qty.	cat.#
Nut for Terminal Fitting for Thermo Scientific TRACE™ GCs	350 221 25	2-pk.	24896

Capillary Installation Gauge for Thermo Scientific 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 Thermo Scientific 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

Make Life Easier (MLE) Capillary Tool Kit for Thermo Scientific GCs

Everything you need in one complete kit!

Includes:

- capillary installation gauge for Thermo Scientific GCs
- liner cap removing tool for Thermo Scientific 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/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 Thermo Scientific GCs	kit	22183

Transfer Line Reducing Kit for Thermo Scientific TRACE™ and Focus DSQ Mass Spectrometers

- Meets or exceeds manufacturer's performance.

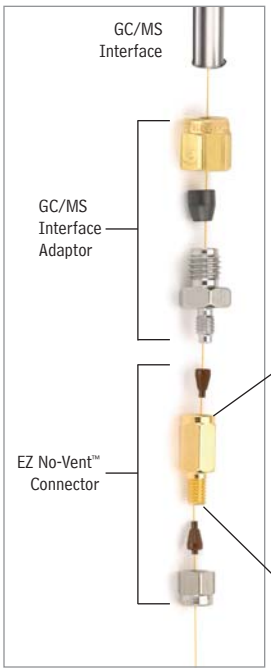
Description	Similar to TS part #	qty.	cat.#
Transfer Line Reducing Kit for Thermo Scientific TRACE™ and Focus DSQ Mass Spectrometers	76458-2014s 76458-2009s A0101-03151	kit	22082

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.



Kit installs easily, without special tools or plumbing.

Nicole Bartley
Customer Service Representative
2+ years of service!

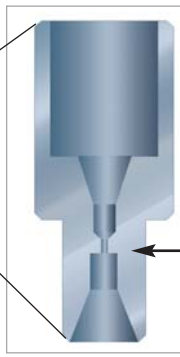


Figure 1 The EZ No-Vent™ connector incorporates a laser machined orifice for optimal flow through the fitting. Coupled with the 100µm ID transfer line, it minimizes the amount of oxygen entering the MS, which eliminates the need for purge gases.

Description	qty.	cat.#
EZ No-Vent™ Connector Kit for 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.	kit	22454
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
Open-End Wrenches (3/8" x 7/16")	2-pk.	22455

Supplies for APEX and ATAS: Liners

Liners for APEX ProSep 800 & ProSep 800 Plus GCs

COLUMN INSTALLS THIS END

Liners for APEX for ProSep 800 & ProSep 800 Plus GCs	Benefits/Uses:	ID*/OD & Length (mm)	Similar to APEX part #	cat.# ea.
Mega IV (4.0mm ID)	injections ≤125µL	4.0 ID 6.0 OD x 243	L-00410	21075
Micro I (1.0mm ID)	injections ≤5µL	1.0 ID 6.0 OD x 243	L-00110	21073
MIDI II (2.0mm ID)	injections ≤25µL	2.0 ID 6.0 OD x 243	L-00210	21074

*Nominal ID at syringe needle expulsion point.

Viton® O-Rings for Apex Liners

Description	Max. temp.	qty.	cat.#
Viton® O-rings for APEX liners	250°C	25-pk.	22067

Liners for ATAS Injectors

COLUMN INSTALLS THIS END

Liners for ATAS Injectors	Benefits/Uses:	ID*/OD & Length (mm)	Similar to ATAS part #	ea.	cat.# 5-pk.
ATAS Open Liner, 3mm	universal	3.0 ID 5.0 OD x 80	—	22415	22416
ATAS Open Liner, 1mm	trace, active samples <1µL	1.0 ID 5.0 OD x 80	A100049	22417	22418
ATAS Fritted Gooseneck	dirty samples	3.0 ID 5.0 OD x 80	A100126	22419	22420

All liners are **100% deactivated**

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

ordering **note**

For descriptions of liner deactivations, packings, and tools, see **pages 141-143**.

a **plus 1** story

"Restek's technical support and preparation of our custom calibration standards, as well as their innovative column technology, has significantly increased the productivity of our GC/MS analyses."

Dan Wright, Laboratory Director, Shealy Environmental Services, Inc.

Converting Packed Inlets to Capillary Column Use

Two types of inlet conversion kits are available for a 1/4-inch packed column injection port to fit either 0.32 or 0.53mm ID capillary columns: the Vu-Tight liner and the Uniliner® liner with adaptor (next page). The Vu-Tight liner fits directly into the 1/4-inch injection port and allows visual confirmation of the connection between the column and the liner. The Uniliner® liner and adaptor work together to allow either direct or on-column injection when using 0.53mm ID columns. Both systems incorporate a Press-Tight® connection between the liner and column inlet, minimize dead volume, and reduce solvent peak tailing.

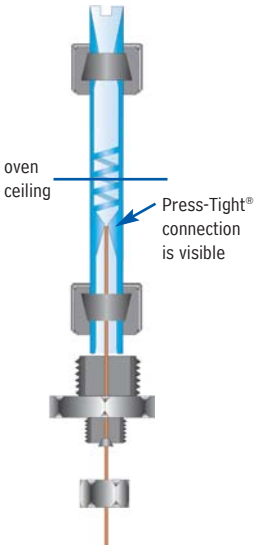
Features of Both Conversion Kits:

- Fit Agilent, Varian, and other common GCs with 1/4-inch packed column injection ports (with maximum insertion depth of 4 inches).
- Install easily within fifteen minutes.
- Accommodate either 0.32 or 0.53mm ID fused silica columns (tubing OD ≥ 0.5mm).
- Liners are deactivated and extremely inert.
- Liners designed to accept dirty samples are available for either system.
- Press-Tight® connections between the liner and column inlet minimize dead volume, reduce solvent peak tailing, and sharpen early-eluting components.

it's a fact

Vu-Tight Inlet Liners

The 1/4-inch Vu-Tight liner fits directly into a 1/4-inch injection port. The connection between the liner and the column is in the GC oven, allowing visual confirmation of the seal. Problems, such as a crushed column end in the Press-Tight® taper, can be detected easily, making proper installation worry-free. The Cyclo Vu-Tight liner prevents non-volatile residue from contaminating the column.



Vu-Tight Inlet Liners for 1/4-Inch Packed Injection Port Conversion

- Visually observe the Press-Tight® connection between the column end and liner.
- Fit 0.32 and 0.53mm ID capillary columns (column ODs from 0.5mm to 0.8mm).
- Slotted top prevents obstruction of carrier gas flow.
- Two designs available.
- Operate in the direct injection mode.

Vu-Tight Inlet Liners for 1/4-Inch Packed Injection Port Conversion

Can easily be packed with wool for dirty samples.

Description	qty.	cat.#
Vu-Tight DI Liner	ea.	20342
Vu-Tight DI Liner	5-pk.	20343
Vu-Tight DI Liner	25-pk.	20344

Cyclo Vu-Tight DI Liner (1/4-inch OD)

Ideal for dirty samples. Spiral bore prevents nonvolatile residue from contaminating the column.

Description	qty.	cat.#
Cyclo Vu-Tight DI Liner	ea.	20787
Cyclo Vu-Tight DI Liner	5-pk.	20788

Vu-Tight Installation Fittings Kit

Includes a 1/4-inch stainless steel nut and graphite ferrule for attaching the liner to the GC inlet and a 1/4 to 1/16-inch stainless steel reducer, plus a 1/4-inch and 0.5mm ID graphite ferrule for attaching the column to the liner.

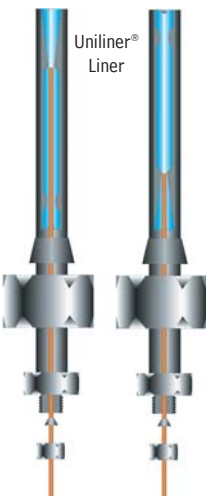
Description	qty.	cat.#
Vu-Tight Installation Fittings Kit	kit	20504

it's a **fact**

Uniliner® Liner for 1/4-Inch Packed Injection Port Conversion

- Reduces solvent tailing.
- Versatile—0.53mm ID version can be used in the direct (DI) or on-column (OC) injection mode.
- Incorporates a gentle taper that seals the column and reduces dead volume in direct injection mode.
- Available in various designs.

On-column injections can be performed only with 0.53mm ID columns because 26-gauge needles do not fit into the bore of 0.32mm ID columns, or into the Unliner® liner taper.



Description	Column ID Injection Mode*	ea. cat.#	5-pk. cat.#
Uniliner® Liner (small buffer volume chamber 60mm long, for injections ≤2µL) 	0.53mm ID DI or OC	20902	20903
Uniliner® Liner (large buffer volume chamber 85mm long, for injections ≤4µL) 	0.32 & 0.53mm DI only	20308	20309
	0.53mm DI or OC	20301	20305
Cyclo-Uniliner® Liner (for active, dirty samples) 	0.32 & 0.53mm DI only	20319	20320
Open-Top Uniliner® Liner (packed with wool) 	0.32 & 0.53mm DI only	20315	20316
Low Volume/Purge & Trap Uniliner® Liner (1mm ID x 5mm OD: use in 1/4" injection ports to troubleshoot purge & trap units) 	0.32 & 0.53mm DI only	20307	20314

Uniliner® Liner Adaptor (required for installing Uniliner® liners in 1/4" injection ports)

Includes 1/4-inch nut & graphite ferrule, 1/16-inch nut, and 0.8mm ID graphite ferrule.

	Stainless Steel	Siltek® Treated
For injection ports <8cm	20310	22282
For injection ports 8-15cm	20311	
For Shimadzu	20312	

Ferrules for Uniliner® Liner Adaptor — cat.# 20234 (5-pk.)

*DI = direct injection, OC = on-column injection

Note: a Uniliner® liner must be used with a Uniliner® Liner Adaptor (cat.# 20310 or 20311) for 1/4-inch injection ports. Remember to include a liner adaptor when ordering a Uniliner® liner, unless you are purchasing replacement Uniliner® liners.

tech tip

Minimizing Backflash

Backflash occurs when the volume of the sample vapor exceeds the buffer volume of the injection liner. This phenomenon causes poor reproducibility, tailing analyte peaks, a broad solvent peak, ghost peaks, and nonlinear responses. You can minimize backflash by using a solvent that has a low expansion volume, injecting less sample, installing an injector liner with a larger volume, or reducing the injector temperature.

Injection Port Conversion Chart

	Uniliner® Liner Set-Up			Vu-Tight Fitting	
Instrument	Uniliner® Liner: cat.# 20301, 20305, 20308, 20309, 20315, 20316, 20319, 20320, 20902, & 20903	Liner Adaptor: cat.# 20310	Liner Adaptor Fitting*: cat.# 20312	Vu-Tight Fitting Kit: cat.# 20504 Liner: cat.# 20342, 20343, 20344, 20787, & 20788	Vu-Tight Fitting Kit: cat.# 20504
Agilent GCs (1/4-inch injection ports) Models: 5700, 5710, 5711, 5712, 5830, 5840, 5880, 5890, 6850, 6890	✓	✓		✓	✓
Varian GCs (1/4-inch injection ports) Models: 1200, 1400, 2100, 2400, 3300-3700, 4400, 4600, 6000	✓	✓		✓	✓
Tracor GCs (1/4-inch injection ports) Models: 540, 550, 560, 565, 570	✓	✓		✓	✓
Packard Becker GCs (1/4-inch injection ports) Models: 427, 428, 429, 430, 433, 436, 437, 438	✓	✓		✓	✓
Gow-Mac GCs (1/4-inch injection ports) Models: 69-750, 69-550	✓	✓		✓	✓
HNU GCs (1/4-inch injection ports) Models: 301, 401, 421	✓	✓		✓	✓
Shimadzu Packed Column GCs (5mm injection ports)** Models: GC-4, GC-6 thru 9, GC-14, GC-15, GC-16, GC-17, Mini, 2010	✓		✓		
PerkinElmer GCs (1/4-inch injection ports) Models: Sigma, 1B-4B, 300, 2001, 2100	✓	✓		✓	✓
PerkinElmer Auto SYS™*	✓				

*Does not require Uniliner® liner adaptor.
**See page 183 for 5mm Stainless Steel Uniliner® Liner Adaptor Fitting.

Micropacked Inlet Conversion Kits

Convert a capillary GC split/splitless inlet for use with 1/16" OD micropacked columns.

- For use with Agilent 5890 and 6890 GCs.
- Sample pathways deactivated for ultimate inertness.

Siltek® Treated Metal Liner Installation Guide

4mm Splitless Liner

Description	qty.	cat.#
Micropacked Column Adaptor Kit for Split/Splitless Injection* **		
Complete kit with FID and injection port adaptors		
Kit includes: Dual Vespel® Ring Inlet Seal, large bore; reducing nut, large bore; FID adaptor, large bore; 1/4" ferrule, Vespel®/graphite; 1/4" nut, stainless steel; 1/16" ferrules, Vespel®/graphite (2); 4mm splitless liner, intermediate polarity deactivated; 1/16" nuts, stainless steel (2)	kit	22424
Micropacked Column Adaptor Kit for On-Column Injection* **		
Complete kit with FID and injection port adaptors		
Kit includes: Dual Vespel® Ring Inlet Seal, large bore; reducing nut, large bore; FID adaptor, large bore; 1/4" ferrule, Vespel®/graphite; 1/4" nut, stainless steel; 1/16" ferrules, Vespel®/graphite (2); Siltek® treated metal liner installation guide; 1/16" nuts, stainless steel (2)	kit	22425
Micropacked Column Adaptor Kit for Split/Splitless Injection		
Injection Port Adaptor Kit		
Kit includes: Dual Vespel® Ring Inlet Seal, large bore; reducing nut, large bore; 1/16" ferrule, Vespel®/graphite; 1/16" nut, stainless steel; 4mm splitless liner, intermediate polarity deactivated	kit	22426
Micropacked Column Adaptor Kit for On-Column Injection		
Injection Port Adaptor Kit		
Kit includes: Dual Vespel® Ring Inlet Seal, large bore; reducing nut, large bore; 1/16" ferrule, Vespel®/graphite; Siltek® treated metal liner installation guide; 1/16" nut, stainless steel	kit	22427
Micropacked Column Adaptor Kit for FID* **		
FID Adaptor Kit		
Kit includes: FID adaptor, large bore; 1/4" ferrule, Vespel®/graphite; 1/4" nut, stainless steel; 1/16" nut, stainless steel; 1/16" ferrule, Vespel®/graphite	kit	22428
Replacement Inlet Seals for Micropacked Column Adaptor		
Dual Vespel® Ring Inlet Seals, large bore (2)	2-pk.	22429
Replacement Metal Liner Installation Guide for On-Column Injection		
Siltek® treated metal liner installation guide	ea.	22430
Replacement 4mm Splitless Liner	ea.	20772

Large-Bore Dual Vespel® Ring Inlet Seals

A) Large-Bore FID Adaptor,
B) 1/16" SS Nut,
C) 1/4" SS Nut,
D) 1/4" Vespel®/Graphite Ferrule

Large-Bore Reducing Nut

1/16" Vespel®/Graphite Ferrules

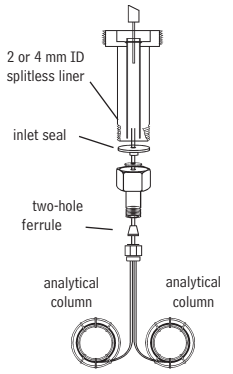
***For use with packed column FIDs only.

Jamie Hubler
Customer Service Representative
2+ years of service!

Dual-Column Analysis: Which technique is right for you?

Split/Splitless Injection

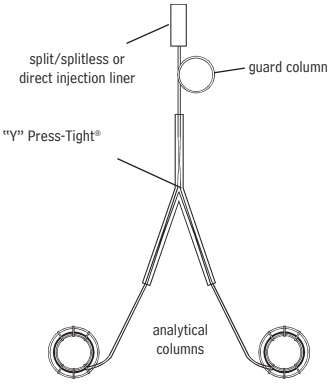
Two-hole ferrules allow dual-column confirmational analysis in the same split/splitless inlet.



0.25 and 0.32mm ID columns can be used with standard 1/16-inch inlet fittings (cat. # 20633). 0.53mm ID columns require 1/8-inch fittings (cat. # 20645) to allow both columns to fit side by side in the injector. Use either straight or extended gooseneck split/splitless liners.

Split/Splitless or Direct Injection

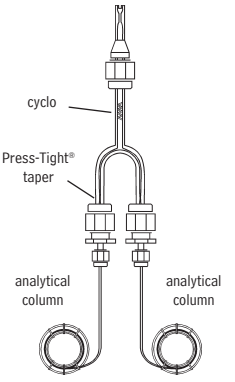
The "Y" Press-Tight® configuration allows dual columns to be used in either a split/splitless or direct injection inlet.



The "Y" Press-Tight® configuration offers versatility because it allows any diameter column or guard column to be connected to a split/splitless or direct injection liner.

Direct Injection

The direct injection "T" allows two 0.32 or 0.53mm ID columns to be connected to one 1/4-inch packed column inlet.



The direct injection "T" incorporates a glass spiral to ensure complete vaporization prior to splitting the sample onto two columns. The dual sealing mechanisms increase ease of use and confidence in the connection relative to the "Y" Press-Tight® configuration.

Analyzing the same sample on two columns of different polarity can increase both the qualitative and quantitative reliability. However, having to repeat the analysis on a second column will significantly reduce sample throughput. The simple solution to improving analytical reliability without reducing sample throughput is to use a simultaneous dual-column technique. This involves connecting two capillary columns to one GC inlet and connecting each column to its own detection system. Both columns are usually of the same internal diameter so the flow rates are balanced and similar amounts of the analytes are directed onto each column. This approach will result in confirmational analysis without reducing sample throughput. Simultaneous dual-column analysis has become a more routine technique used by laboratories involved with complex analyses in complicated matrices.

Split or Splitless Injectors

Split or splitless injections are the easiest dual-column analyses to perform. Both columns can be inserted into the split/splitless inlet fitting and terminate in the inlet liner. Columns with internal diameters of 0.32mm or less (or 0.5mm OD) can be inserted directly into the 1/16-inch standard capillary fitting (cat.# 20633, page 202) by using a two-hole capillary ferrule. Columns with internal diameters of 0.53mm cannot be inserted into a standard 1/16-inch capillary fitting because the outside column diameter (0.8mm) is too large for both to fit simultaneously. Special fittings that use a 1/8-inch fitting and 1/8-inch, two-hole ferrule can be used for 0.53mm ID column (cat.# 20645, page 202).*

On-column or Direct Injections

On-column or direct injections require a Press-Tight® connection to the inlet liner. Usually a section of 0.53mm ID guard tubing is attached to one leg of a Press-Tight® "Y" connector (cat.# 20405, page 203). Analysts must use columns of equivalent length and ID so that the flow through both legs of the "Y" is similar, or the detector response will differ. Another approach is to use a Dual-Column Direct Injection Tee (cat.# 20412, page 201) or *mini*-Lam Direct Injection Tee (cat.# 20436, page 201), that is installed into the injector, with each column connected to the remaining legs of the tee. The Dual-Column Direct Injection Tee has a vaporization chamber to reduce sample backflash and a glass spiral to ensure sufficient vaporization and to reduce discrimination or preferential splitting. The *mini*-Lam Direct Injection Tee is similar—it incorporates an inverted cup in place of the glass spiral. More information on these types of injection tees is given on the facing page.

*Instrument-specific fittings for performing dual column analyses can be found in the Supplies for Agilent and Supplies for Varian sections.

Packed Column Inlet Fittings
(Direct Injection into 0.32 or 0.53mm ID Capillary Columns)

DI Tee Kit

Dual-Column Direct Injection Tee
A Dual-Column Direct Injection Tee was developed for 1/4-inch packed column inlets. The tee is designed with a glass spiral prior to the split point to promote sample vaporization and to provide even sample distribution to the two columns. The glass spiral also traps dirty sample residue and minimizes the need for guard columns. High molecular weight contaminants are trapped in the first turn of the spiral, allowing up to four times more injections than conventional inlet liners packed with wool. Inlet maintenance and downtime are significantly reduced. A Press-Tight® taper in each outlet leg facilitates a perfect dead-volume-free connection to each analytical column (OD ranging from 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

Graphite Replacement Ferrules

ID	fitting size	qty.	cat.#
0.5mm	1/16"	10-pk.	20201
	1/16"	50-pk.	20228
0.8mm	1/16"	10-pk.	20202
	1/16"	50-pk.	20224
1/4-inch	1/4"	10-pk.	20210

Dual-Column *mini*-Lam Direct Injection Tee for 1/4-Inch Packed Column Inlets
Based on Dr. Konrad Grob's work, we manufacture a *mini*-Lam direct injection tee that allows complete vaporization and permits larger sample volumes.[1]

The *mini*-Lam Direct Injection Liner is designed to fit 1/4-inch packed column injectors. A Press-Tight® taper in each outlet leg makes a perfect, dead-volume-free connection with each analytical column (OD ranging from 0.4 to 0.8mm) and allows visual confirmation of the column connection. The open-top design makes it easy to pack with glass wool to keep sample residue from contaminating the cup. The complete *mini*-Lam Dual Column Direct Injection Kit includes a deactivated 1/4-inch glass tee, 1/4-inch nut and ferrule, two 1/4-inch to 1/16-inch reducing unions, and ferrules. Deactivated replacement glass tees also are available.

Description	qty.	cat.#
mini-Lam DI Tee Kit (Includes all fittings and ferrules)	kit	20436
Replacement 4mm *mini*-Lam DI Tee	ea.	20435

[1]K. Grob, HRC & CC, 15 (1992), 190.

mini-Lam DI Tee Kit

Dual-Column Analysis: Split/Splitless Fittings

1/16-Inch Capillary Inlet Adaptor Fitting Kit

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
0.25/0.32mm ID Dual-Column Installation (1.2mm Opening) Replacement Inlet Seal	2-pk.	20390
0.25/0.32mm ID Dual-Column Installation (1.2mm Opening) Replacement Inlet Seal	10-pk.	20391

1/8-Inch Capillary Inlet Adaptor Fitting Kit

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.

ordering **note**

For replacement ferrules, see **pages 217-219**.

Description	qty.	cat.#
1/8-Inch Capillary Inlet Adaptor Fitting Kit	kit	20645
0.53mm ID Dual-Column Installation (1/16-inch Opening) Replacement Inlet Seal	2-pk.	20392
0.53mm ID Dual-Column Installation (1/16-inch Opening) Replacement Inlet Seal	10-pk.	20393

Save time and money with our inlet splitter guide for Varian GCs!

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.

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

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

also **available**

Please see a detailed gc column ferrule product listing on **pages 217–219**.

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

also available

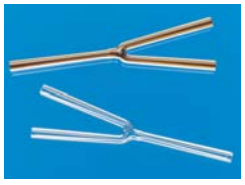
For added confidence, use a SeCure™ "Y" connector—see page 223.

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).

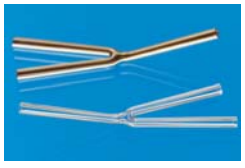
Description	ea.	3-pk.
Universal "Y" Press-Tight® Connector	20405	20406
Deactivated Universal "Y" Press-Tight® Connector	20405-261	20406-261
Siltek® Treated Universal "Y" Press-Tight® Connector	20485	20486



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



also available

See the complete connector product listing on pages 220–227.

Polyimide Resin

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

Description	qty.	cat.#
Polyimide Resin	5 grams	20445

Fused Silica Guard Columns

5-Meter Guard Columns & Transfer Lines (Single-Pack)

Nominal ID	Nominal OD	cat.#
0.05mm*	0.363 ± 0.012mm	10040
0.10mm*	0.363 ± 0.012mm	10041
0.15mm	0.363 ± 0.012mm	10042
0.18mm	0.37 ± 0.04mm	10046
0.25mm	0.37 ± 0.04mm	10043
0.32mm	0.45 ± 0.04mm	10044
0.53mm	0.69 ± 0.05mm	10045

5-Meter Guard Columns & Transfer Lines (Six-Pack)

Nominal ID	Nominal OD	cat.#
0.25mm	0.37 ± 0.04mm	10043-600
0.32mm	0.45 ± 0.04mm	10044-600
0.53mm	0.69 ± 0.05mm	10045-600

Add suffix "-600" to any guard column to order a six-pack.

also available

See pages 26–30 for a complete listing of guard columns.

ELCD/PFPD Replacement Parts

Don McCandless
Head Coach
18+ years of service!

ELCD Nickel Reaction Tubes

- Pretreated for maximum sensitivity.
- Quality-controlled for reliability.
- Available for many popular models.

	To replace these instrument part numbers:					Order these Restek part numbers:	
ELCD Model #	Tremetrics	Varian	PerkinElmer	Shimadzu	O.I. Analytical	qty.	cat.#
Hall 1000	117459-0003	00-997625-12	N660-1072	220-90435-00	—	2-pk.	21581
O.I. 4420	—	—	—	—	260323	2-pk.	21582

Replacement Accessories for Hall 1000

ELCD Nickel Reaction Tube Nut

High-quality stainless steel ELCD nut mounts nickel reaction tube into ELCD.

Description	qty.	cat.#
ELCD Nickel Reaction Tube Nut	2-pk.	21584

$^{1}/_{16}$-Inch Vespel®/Graphite Sealing Ring

Installs onto the nickel reaction tube after the screw. Easily compresses on the reaction tube to provide a leak-tight seal and prevent detector oxidation.

Description	qty.	cat.#
$^{1}/_{16}$-Inch Vespel®/Graphite Sealing Ring	2-pk.	21583

Cleaned Teflon® Transfer Lines for ELCDs

We stringently clean our ELCD Teflon® transfer lines with an HCl solution to remove any contaminants, then rinse with methanol. Convenient 6.5-inch precut pieces directly interface the nickel reaction tube and conductivity cell in Tracor, Tremetrics, O.I., and many other ELCDs.

Description	qty.	cat.#
Teflon® Transfer Lines for ELCDs, $^{1}/_{16}$" OD x 0.020" ID (five 6.5-inch lines)	5-pk.	20121

Purge-and-Trap Spargers for Tekmar 2000, 3000, or 3100

- Available with uniform frits, to ensure maximum purging efficiency.
- Use nonfritted spargers for wastewater samples.
- Manufactured to tight tolerances to ensure a leak-tight seal.

Description	qty.	cat.#
Fritted Spargers		
5mL Fritted Sparger, 1/2-inch mount	ea.	21150
10mL Fritted Sparger, 1/2-inch mount	ea.	26138
25mL Fritted Sparger, 1/2-inch mount	ea.	21151
Non-Fritted Spargers		
5mL Non-Fritted Sparger, 1/2-inch mount	ea.	26139
10mL Non-Fritted Sparger, 1/2-inch mount	ea.	26140
25mL Non-Fritted Sparger, 1/2-inch mount	ea.	26141

Moisture Control By-Pass Lines for Tekmar Instruments

- Increase response for ketones, alcohols, and acetates.
- Silcosteel®-deactivated tubing for increased inertness.
- Suitable for US EPA Methods 8260, 524.2, and OLM4.1.
- Easily attaches in minutes.

Description	qty.	cat.#
Moisture Control By-Pass Line for Tekmar 3000 Purge & Trap	ea.	21035
Moisture Control By-Pass Line for Tekmar 3100 Purge & Trap	ea.	21109

Photoionization Lamps

Model 108-10.0/10.6 offers both 10.0 and 10.6 eV potential, has a 0.781" base diameter, and is used in Tracor, OI, and Baseline instruments. Model 103 has a 1.375" base and is used in HNU and SRI detectors. Model 108-BTEX lamp's higher output makes it ideal for detection of BTEX compounds.

The lamp polishing kit contains iron oxide cleaning compound, swabs, and instructions.

Model 103 C

Model 108

Model 108-BTEX

Features	Benefits
Longer life.	More for your money with each lamp.
Model 108-BTEX has 33% more output than older models.	Operate continuously at 1 ma and 250°C for 6 months and still have better than 50% of the initial output.
Lamps individually tested.	Your lamp will work to specifications.
Variety of models.	Among the best lamps available for most instrumentation.

Description	eV Rating	Base	qty.	cat. #
PID Lamp, Model 103 C	10.2	1.375"	ea.	20676
PID Lamp, Model 108	10.0/10.6	0.781"	ea.	20675
PID Lamp, Model 108-BTEX	10.0/10.6	0.781"	ea.	23020
PID Lamp Polishing Kit			kit	20674

Column Installation

Top: Jason Martin, Buyer/Planner

Bottom: Scott Grossman and Amanda Rigdon, Application Chemists

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 7.2-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 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. Liquid leak detectors should not be used 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 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 7.2-volt Ni-MH battery (included).

Leak Detector Facts

Detectable Gases:	helium, nitrogen, argon, and carbon dioxide
Battery:	Rechargeable Ni-MH, 7.2-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

Flow Meter, Methane Cylinder Kit, Column Rinsing Kit

Soap Film Bubble Flowmeters

- 1mL flowmeter measures flows between 0.1 and 10cc/min.
- 50mL flowmeter designed for flows between 10 and 300cc/min.
- Includes a reservoir bulb, twenty-four inches (60cm) 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

cat.# 20197

Methane Cylinder Kit

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 our Methane Cylinder Kit. The kit includes a Scotty® 14 cylinder containing 1% methane in helium, a MINICYL® regulator, a syringe adaptor, and a package of twenty-five septa for the adaptor.

Description	qty.	cat.#
Methane Cylinder Kit	kit	20197
Replacement Septa for Syringe Adaptor	25-pk.	20198
Replacement Methane Cylinder	ea.	20199

Column not included.

Capillary Column Rinsing Reservoir Kit

Restore the performance of bonded-phase capillary columns by dissolving and removing soluble, nonvolatile residue, using this reservoir kit. The 50mL rinsing reservoir is equipped with $^1/_4$-inch inlet and outlet connections and includes a built-in fritted disk to prevent particulate matter from contaminating the column. The kit includes: reservoir, pressure regulator, fittings, ferrules, and tubing. Reservoir also available separately.

Description	qty.	cat.#
Rinsing Reservoir Complete Kit	kit	20612
Rinsing Reservoir only	ea.	20613

it's a **fact**

Restek On-The-Road training seminars are full-day courses presented in an engaging multimedia format. They are equally valuable to beginning chromatographers, those who have moderate experience and want a better understanding of the subject matter, and those interested in the "best practices" and latest technologies. **No sales pitch is presented**, just the facts on how to make your chromatography results better. The bulk of each course is lecture, but numerous demonstrations and problem-solving exercises facilitate and reinforce the understanding of important principles. See **page 11** for more information.

Make Life Easier (MLE) Capillary Tool Kits

Everything you need in one complete kit!

All kits include these components:

- 1/8", 3/16", 1/4" nylon brushes
- 1/4", 3/8", 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
- 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)

For Agilent GCs
(cat.# 22186)

MLE Capillary Tool Kit for Agilent GCs (cat.# 22186) also includes:

- capillary installation gauge for Agilent GCs
- injector wrench for Agilent GCs
- septum nut removal tool
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

For PerkinElmer GCs
(cat.# 22185)

MLE Capillary Tool Kit for PerkinElmer GCs (cat.# 22185) also includes:

- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

For Shimadzu GCs
(cat.# 22182)

MLE Capillary Tool Kit for Shimadzu GCs (cat.# 22182) also includes:

- capillary installation gauge for Shimadzu GCs
- injector wrench for Shimadzu GCs
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench

For Thermo
Scientific GCs
(cat.# 22183)

MLE Capillary Tool Kit for Thermo Scientific GCs (cat.# 22183) also includes:

- capillary installation gauge for Thermo Scientific GCs
- liner cap removing tool for Thermo Scientific GCs
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench

For Varian GCs
(cat.# 22184)

MLE Capillary Tool Kit for Varian GCs (cat.# 22184) also includes:

- capillary installation gauge for Varian GCs
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

Description	qty.	cat.#
MLE Capillary Tool Kit for Agilent GCs	kit	22186
MLE Capillary Tool Kit for PerkinElmer GCs	kit	22185
MLE Capillary Tool Kit for Shimadzu GCs	kit	22182
MLE Capillary Tool Kit for Thermo Scientific GCs	kit	22183
MLE Capillary Tool Kit for Varian GCs	kit	22184

did you **know**?

Make Life Easier!
MLE Tool Kits conveniently provide the tools that make it easier to install and maintain capillary columns!

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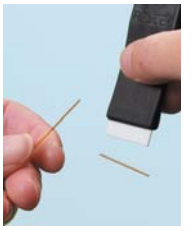
innovation!

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	qty.	cat.#
Scoring Wafer with Handle	2-pk.	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.

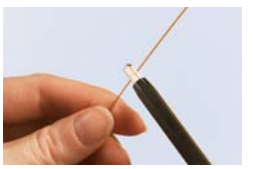
Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.

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

Description	qty.	cat.#
Ceramic Scoring Wafers	5-pk.	20116

Sapphire Scribe

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



One quick stroke...

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

Description	qty.	cat.#
Sapphire Scribe	ea.	20182

cat.# 23026

cat.# 23027

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).

Description	qty.	cat.#
Shortix® Capillary GC Column Cutter	ea.	23026
Maintenance Kit for Shortix® Capillary GC Column Cutter (includes diamond cutting wheel, O-rings, and a tool to open the 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	qty.	cat.#
Capillary Column Caps	10-pk.	21044

Capillary Installation Gauge

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

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innovation!
Easily seat ferrules for consistent installations!

A) for Agilent-style fittings (compact ferrules)

B) for $^{1}/_{16}$" fittings ($^{1}/_{16}$" ferrules)

C) for Thermo Scientific TRACE™ & Focus SSL (M4 ferrules)

D) for Varian GCs for use with $^{1}/_{16}$" ferrules

E) for Shimadzu 17A, 2010, and 2014 GCs

Using the capillary installation gauge for Agilent-style fittings.

Install the column nut and ferrule onto the column. Slide the column into the installation gauge to the recommended insertion distance. Finger-tighten the nut.

Tighten the assembly to ensure a properly seated ferrule. Loosen the assembly and remove the 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.

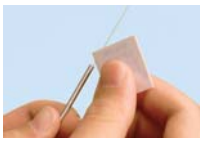
Description	qty.	cat.#
A) Capillary Installation Gauge for Agilent-style fittings (compact ferrules)	ea.	21034
B) Capillary Installation Gauge for $^{1}/_{16}$" fittings ($^{1}/_{16}$" ferrules)	ea.	21399
C) Capillary Installation Gauge for Thermo Scientific TRACE™ & Focus SSL (M4 ferrules)	ea.	22330
D) Capillary Installation Gauge for Varian GCs for use with $^{1}/_{16}$" ferrules	ea.	22335
E) Capillary Installation Gauge for Shimadzu 17A, 2010, and 2014 GCs	ea.	22333

*Recommended for use with graphite ferrules.

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.



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

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Inlet Liner Removal Tool

No more burned fingers!

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

Gently push the liner removal tool onto the liner in the injection port, with a slight circular motion.

Slowly pull the liner out of the injection port.

Use the liner removal tool to place a new liner into the injection port, avoiding hot metal surfaces.

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

Inlet Liner Packing Tool

- Position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!

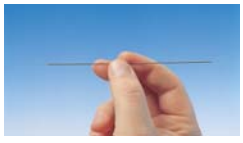
Loosen the nut on the side of the tool and adjust the gauge to the manufacturer's recommended depth.

Place a plug of loosely bound wool at the top of the inlet liner.

Insert the liner packing tool into the liner until the tool bottoms out. Remove the tool. The wool is now positioned correctly in the liner and the liner is ready for use.

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

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

Rethreading Tool

Achieve a better seal!

cat.# 23018

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

damaged threads

Repeated installation, removal, and temperature changes cause wear and damage to threads on GC parts. This can cause a poor seal, and oxygen can enter the system, compromising analytical results and possibly destroying expensive analytical columns.

Simply screw the rethreading tool onto the part, unscrew, and inspect the threads. Repeat as necessary. When done, wipe threads clean with methanol to remove any debris.

repaired threads

Description	qty.	cat.#
Rethreading Tool for $^{1}/_{16}$" compression fitting	ea.	23016
Rethreading Tool for $^{1}/_{8}$" compression fitting	ea.	23017
Rethreading Tool for $^{1}/_{4}$" compression fittings (Agilent split/splitless injection ports)	ea.	23018
Rethreading Tool for $^{7}/_{16}$" compression fitting (Varian injection ports)	ea.	23019
Rethreading Tool for $^{1}/_{4}$" Varian-style capillary column fittings	ea.	21893

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

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

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

Open-End Wrench Set

High-quality 1/4" x 5/16", 3/8" x 7/16", 7/16" x 1/2", and 1/2" x 9/16" wrenches for tightening a wide variety of chromatography 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 (1/4" x 5/16")	2-pk.	20110
Open-End Wrenches (3/8" x 7/16")	2-pk.	22455

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

12 Piece Ball-Point Hex Key Set

Includes 12 hex keys (Allen wrenches): .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32", 1/4", and 5/16".

Description	qty.	cat.#
12 Piece Ball-Point Hex Key Set	set	22998

Column Installation Tools

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 Tube Brushes/Surface Brush

Unlike brass brushes that can leave a metal residue, these stainless steel tube brushes ($^3/_8$-, $^3/_{16}$-, and $^1/_4$-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

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 (30cm) long.

Description	qty.	cat.#
Nylon Tube Brushes and Pipe Cleaner	4-piece set	20108

4" Tapered Needle Files

These files can be used for a multitude of purposes. They are especially useful for removing ferrules that are lodged in injector or detector ports.

Description	qty.	cat.#
4" Tapered Needle Files	2-pk.	20106

MXT™ Needle Files

Multi-purpose files, especially useful for cutting Silcosteel® treated stainless steel columns.

Description	qty.	cat.#
MXT™ Needle Files	2-pk.	21601

Mini Hand Drill Set

Drill ferrules to the proper ID in seconds! Includes three drills, for use with 0.25, 0.32, and 0.53mm ID (0.4, 0.5, and 0.8mm OD) capillary columns.

Description	qty.	cat.#
Mini Hand Drill Set	3-piece set	20122

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. Ideal for removing ferrules that have become stuck in fittings.

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

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

Temperature Measuring Stick

- Verify GC oven or polymer temperature.
- Quick measurements via sensor in the measuring tip.
- Swivel head can turn 180°.
- Wide measuring range: -50°C to +350°C.

Description	qty.	cat.#
Temperature Measuring Stick	ea.	22066

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

FIX-IT Laboratory Swiss Army Knife

- 15-function tool includes inlet liner remover, screwdrivers, scissors, blade, and tweezers.
- Includes a magnifying glass to check column end cuts.
- Genuine Swiss Army quality with 5-year warranty.
- Every GC analyst should have one!

Description	qty.	cat.#
FIX-IT Laboratory Swiss Army Knife	ea.	23013

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

save **money**!

You can save money on column installation tools by purchasing the new MLE Capillary Tool Kits described on **page 209.**

Septum Nut Removal Tool for Agilent 5890/6890/6850/7890 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 5890/6890/6850/7890 GCs	ea.	24918

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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.

Description	Similar to TS part #	qty.	cat.#
Liner Cap Removing Tool for Thermo Scientific GCs	205-070-10	ea.	24937

GC Inlet and FID Maintenance Kits

Steve Kreiser
Director of Quality
11+ years of service!

Inlet and FID Maintenance Kits

- Include the most common consumable GC supplies and tools.
- All parts meet or exceed performance by instrument manufacturer's parts.
- Parts list makes reordering easy.

Inlet Maintenance Kit for Agilent 5890/6850/ 6890/7890 GCs

FID Kit for Agilent 5890 GCs

FID Kit for Agilent 6850/6890/7890 GCs

also **available**

MLE Capillary Tool Kits.
See **page 209**.

Inlet kit includes:

- 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.
- $^1/_4$" x $^5/_{16}$" wrench.
- Septum puller.
- Installation gauge.
- Wire cleaning brush.
- Jet reamers/ferrule removers.
- Inlet liner removal tool.
- Septa nut removal tool.

FID kits include:

- $^1/_4$", 0.4, 0.5, and 0.8mm ID graphite ferrules.
- FID/NPD capillary adaptor.
- Capillary nuts.
- Jet reamers/ferrule removers.
- $^1/_4$" nut.
- Scoring wafer.
- Capillary column caps.
- Ignitor for either Agilent 5890 or 6890/6850/7890 GCs.
- FID flow measuring adaptor.
- $^1/_4$" x $^5/_{16}$" wrench.
- Installation gauge.
- Wire cleaning brush.
- High-performance Siltek® treated FID jet for either Agilent 5890 (adaptable jet) or 6890/6850/7890 (dedicated jet) GCs.
- Spanner wrench.
- FID jet removal tool.

new and **improved!**

Now with even more tools!

Description	qty.	cat.#
Inlet Maintenance Kit for Agilent 5890/6850/6890/7890 GCs	kit	22181
FID Maintenance Kit for Agilent 5890 GCs	kit	22180
FID Maintenance Kit for Agilent 6850/6890/7890 GCs	kit	22179

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

Graphite Ferrules
- Preconditioned 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® ferrules

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

Available in Vespel®, graphite, or Vespel®/graphite.

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

Available in graphite or Vespel®/graphite.

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

Available in Vespel®, graphite, or Vespel®/graphite.

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

Available in graphite or Vespel®/graphite.

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

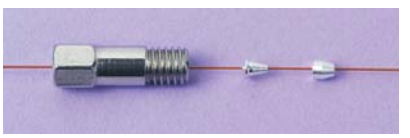
Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

Alumaseal™ Ferrules*

- Aluminum construction—will not crack or fragment; no more ferrule fragments in the transfer line.
- 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.

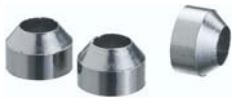
Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128

Graphite Ferrules—For M4 Fittings for Thermo Scientific 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

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.

Terri Sowerby
Shipping/Assembly Manager
3+ years of service!

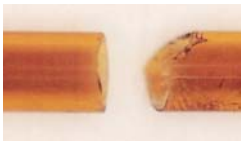
Stainless Steel Jet Reamers

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants. Ideal for removing ferrules that have become stuck in fittings.

Dislodge ferrules or remove silica deposits with the Jet Reamer/ Ferrule Remover.

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

Press-Tight® Connectors: Overview



Make a clean, square cut for optimum connector performance. The cut on the right will produce a poor seal.

A brown ring indicates a proper seal.

For a secure, reliable connection, use a Vu2 Union™ Connector. See **page 222**.

Restek Press-Tight® Connectors

Press-Tight® connectors are lightweight, quickly installed, and easy to use. They connect fused silica tubing having outside diameters ranging from 0.33 to 0.74mm (Restek 0.1 to 0.53mm ID). Press-Tight® connectors do not cause solvent tailing, or adsorb active compounds. We have thoroughly investigated the taper angle and tolerances to ensure a leak-tight fit on every connector.

Press-Tight® connectors most often are used to connect a guard column to an analytical column. They also are used to connect columns differing in polarity, for unique separations, or to repair a broken column. Mass spectroscopists use Press-Tight® connectors for connecting analytical columns to smaller-diameter transfer lines.

How does a Press-Tight® connector work?

A Press-Tight® connector forms a leak-tight seal through concentric compressive forces as the tubing end is pushed into a tightly controlled radial restriction. These forces are strong enough to form a leak-tight seal under the normal pressures used in capillary GC. The seal is further strengthened as the polyimide resin coating on the exterior of the column bonds to the inner surface of the connector after several thermal cycles to 200°C.

Obtaining a leak-tight seal:

To achieve optimum performance from these connectors, begin with a properly cut fused silica column or retention gap end. Even if you use polyimide resin for extra insurance, a poorly cut capillary column will make an inadequate seal.

Press the cut ends into the connector, then establish a flow, and leak-check the seal with a Restek Electronic Leak Detector (cat.# 22451, page 207) before heating the system. The seal is made permanent as the polyimide resin coating on the column bonds to the inner surface of the connector after several thermal cycles to 200°C.

Can the connection be strengthened?

Absolutely. A curable polyimide resin (cat.# 20445, page 221) is available to create a strong, permanent seal. A Vu2 Union™ connector creates a secondary seal to ensure a leak-tight connection. However, clean, square cut ends and a good press-tight seal still must be made for the connection to be effective.

What is the maximum temperature for a Press-Tight® connector?

Press-Tight® connectors are effective at oven temperatures to 325°C, the temperature at which the polyimide coating on the column decomposes and the connection will begin to leak. We strongly recommend using a Vu2 Union™ (page 222) or SeCure™ "Y" Connector (page 223) connector if oven temperatures will exceed 325°C for prolonged periods of time.

Can Press-Tight® connectors be used with MXT® columns?

No. To achieve a leak-tight fused silica to stainless steel connection, we recommend an MXT™ connector (see page 226).

Let Restek make the guard column/transfer line connection for you!

We will connect a guard column/transfer line to any analytical column, using a Vu2 Union™ connector. We will leak-check the connection and confirm analytical integrity by analyzing a test mixture. To order a preconnected guard column/transfer line, add the three-digit suffix from the chart below to any analytical column catalog number. Example: A 5m, 0.32mm ID guard column connected to a 30m, 0.32mm ID, 1.0µm Rtx®-5 column is cat.# 10254-163.

5m Guard Column/Transfer Line ID	cat.# suffix	Additional Cost*
0.15mm	-160	
0.18mm	-161	
0.25mm	-162	
0.32mm	-163	
0.53mm	-164	

10m Guard Column/Transfer Line ID	cat.# suffix	Additional Cost*
0.25mm	-165	
0.32mm	-166	
0.53mm	-167	

*Additional cost will be added to the price of the column.

for **more** info

These guard columns are intermediate polarity (IP) deactivated.

For more information about guard columns and other deactivations, see **pages 26–30**.

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 nonpolar 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 nonpolar 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

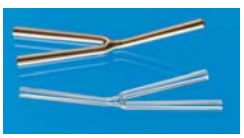
An alternative method of performing dual-column confirmational analyses!

- 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 nonpolar 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

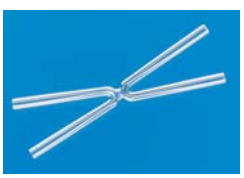
- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and nonpolar compounds.
- Siltek® treated connectors 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 nonpolar 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

Vu2 Union™ Connectors

Patent pending.

Secure, reliable column-to-column connections!

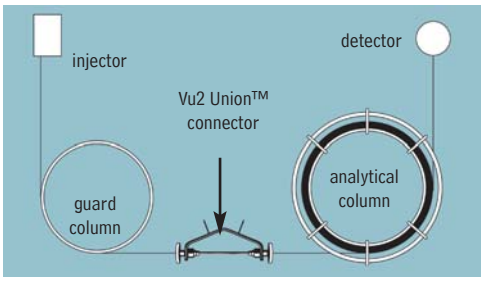
NOTE: This product is not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (page 224).

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.

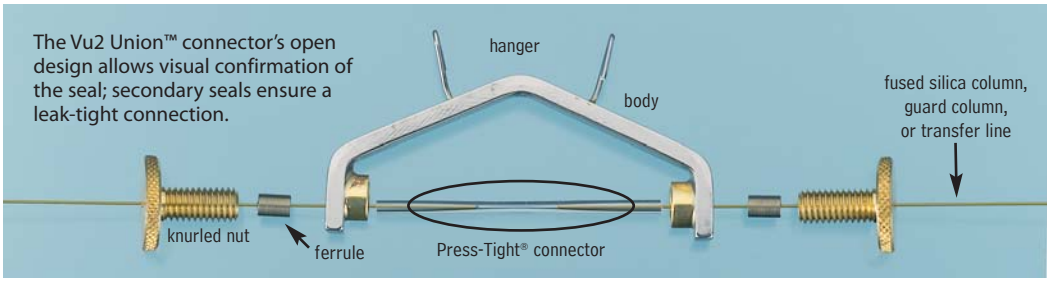


How does a Vu2 Union™ connector work?

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.



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

SeCure™ "Y" Connector Kits

restek innovation!

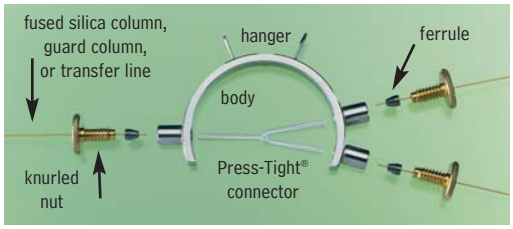
- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added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

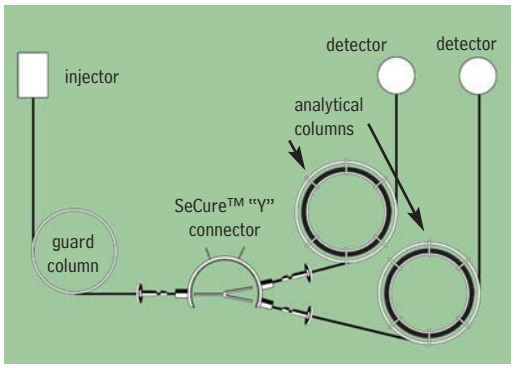
Patent pending.

Secure, reliable column-to-column connections!

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.



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

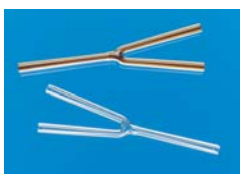
a plus 1 story

"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

Vacuum Vu-Union® & Gerstel GRAPHPAK® Connectors

Vacuum Vu-Union® Connector for GC/MS Applications

- Connects analytical column to MS transfer line.
- Use under vacuum conditions.
- Use only with Vu-Union® Vespel®/graphite ferrules—order ferrules separately.
- Includes metal housing body, one deactivated tapered glass insert, and Vu-Union® Helping Hand.
- Fits column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

A specifically designed Vu-Union® glass insert permits more torque to be applied to the ferrules without fear of cracking the insert. The hex end nuts enable you to use wrenches to tighten the end fittings.

Description	qty.	cat.#
Vacuum Vu-Union® Connector (with the Helping Hand)	ea.	20427
Replacement Inserts	3-pk.	20428

Kim Holliday
Southwest/Mountain States Sales Representative
16+ years of service!

Vu-Union® Helping Hand

The Helping Hand is designed to hold in place the metal housing of the Vacuum Vu-Union® connector. This allows you to easily assemble the columns in the glass insert and tighten the nuts. The Helping Hand is included with the Vacuum Vu-Union® connector.

Vu-Union® Vespel®/Graphite Ferrules

- Use with Vacuum Vu-Union® connectors.
- 60% Vespel®/40% graphite.
- 400°C maximum operating temperature.

Ferrule ID	Fits Column	qty.	cat.#
0.3mm	< 0.22mm ID/< 0.4mm OD	10-pk.	20423
0.4mm	0.25mm ID/0.4mm OD	10-pk.	20420
0.5mm	0.32mm ID/0.5mm OD	10-pk.	20421
0.8mm	0.45/0.53mm ID/0.8mm OD	10-pk.	20422

Gerstel GRAPHPACK® 3D/2 Connectors

GRAPHPACK® technology provides a complete system that quickly and reliably makes a leak-tight, low-dead-volume connection. The central component is a metal-jacketed graphite ferrule—the ideal seal for GC applications.

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

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.

please note

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

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.

SILTEK® treated

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

Restek recommends 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

Replacement Nut

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

MXT™ Connectors for Metal Tubing

please note

Use for metal-to-metal connections.

SILTEK® treated

MXT™ Low-Dead-Volume Connector Kits for Metal Columns

These low-dead-volume connectors are Siltek® treated and are deactivated to make them inert to active compounds, just like our MXT® columns. They can be used at temperatures up to 400°C without degrading the deactivated layer. Purchase the appropriate ferrules for connecting 0.28 or 0.53mm ID tubing.

MXT™ Low-Dead-Volume Connector Kits for Metal Columns

- Connect a guard column/transfer line to an MXT® stainless steel column.
- Low thermal mass tracks rapid oven temperature programming.

Each kit contains the MXT™ union, two 1/32-inch ferrules and nuts.

Description	qty.	cat.#
For 0.28mm ID MXT® Columns	kit	20397
For 0.53mm ID MXT® Columns	kit	20394

MXT™ Low-Dead-Volume "Y" Connector Kits for Metal Columns

- Connect two MXT® columns to one inlet or one MXT® column to two detectors.

Each kit contains the MXT™ union, three 1/32-inch ferrules and nuts.

Description	qty.	cat.#
For 0.28mm ID MXT® Columns	kit	20396
For 0.53mm ID MXT® Columns	kit	20395

1/32-Inch Stainless Steel Replacement Ferrules for MXT™ Connectors

Ferrule ID	Fits Column ID	qty.	cat.#
0.59mm	0.28mm	10-pk.	20398
0.79mm	0.53mm	10-pk.	20399

1/32-Inch Replacement Nut

Description	qty.	cat.#
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 (listed above); for fused silica tubing, use Valcon polyimide adaptor ferrules (see page 225).

Zero-Dead-Volume Valco® Internal Union

Ends of tubing seat squarely at bottoms of fitting details. 300 series stainless steel. For 1/16" 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

also **available**

Treated Fittings!
See pages 392-393 for our Siltek®/Sulfinert® treated and Silcosteel®-CR treated fittings.

Zero-Dead-Volume Valco® Internal Reducing Union

Connect two sizes of tubing, using zero-dead-volume fittings on each end. For 1/8" to 1/16" OD tubing. Stainless steel ferrules included.

Description	Union Bore	Valco® #	qty.	cat.#
Internal Reducing Union	0.25mm	ZRU21C	ea.	20151
Internal Reducing Union	0.75mm	ZRU21	ea.	20152
Internal Reducing Union	1/16"	ZRU21T	ea.	20153

Zero-Dead-Volume Valco® Internal Tee

Connect three lines. 300 series stainless steel; stainless steel ferrules included. For 1/16" OD tubing.

Description	Union Bore	Valco® #	qty.	cat.#
Internal Tee	0.25mm	ZT1C	ea.	20154
Internal Tee	0.75mm	ZT1	ea.	20155

Zero-Dead-Volume Valco® Internal Cross

Connect four lines. 300 series stainless steel; stainless steel ferrules included. For 1/16" OD tubing.

Description	Union Bore	Valco® #	qty.	cat.#
Internal Cross	0.25mm	ZX1C	ea.	20156
Internal Cross	0.75mm	ZX1	ea.	20157

Male Pipe to Valco® Internal Adapter

Makes a minimum volume connection from a female pipe fitting on a pressure gauge or regulator to a Valco® zero-dead-volume fitting. 300 series stainless steel; stainless steel ferrules included.

Description	Fitting Size	Bore	Valco® #	qty.	cat.#
1/8" NPT Male Internal Adapter	1/16" ZDV	1.0mm	PZA21	ea.	20158
1/4" NPT Male Internal Adapter	1/16" ZDV	1.0mm	PZA41	ea.	20159


cat.# 20159


cat.# 20158

Nuts & Ferrules for Valco® Connectors

Description	Valco® #	qty.	cat.#
1/16" Stainless Steel Ferrules	ZF1-10	10-pk.	20286
1/16" Stainless Steel Nuts	ZN1-10	10-pk.	20287


cat.# 20286


cat.# 20287

1/16-Inch Valco® Adaptor Ferrules

Tubing OD	Tubing ID	Valco® #	Valcon Polyimide qty.	Valcon Polyimide cat.#	Polyimide qty.	Polyimide cat.#
0.25–0.4mm	0.1-0.25mm	FS1.4-5	5-pk.	20142	2-pk.	21015
0.4–0.5mm	0.32mm	FS1.5-5	5-pk.	20143	2-pk.	21016
0.5–0.8mm	0.53mm	FS1.8-5	5-pk.	20144	—	—
0.8mm (1/32")	—	FS1.9-5	5-pk.	20145	—	—

Column Installation

Top: Jason Martin, Buyer/Planner

Bottom: Scott Grossman and Amanda Rigdon, Application Chemists

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 7.2-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 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. Liquid leak detectors should not be used 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 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 7.2-volt Ni-MH battery (included).

Leak Detector Facts

Detectable Gases:	helium, nitrogen, argon, and carbon dioxide
Battery:	Rechargeable Ni-MH, 7.2-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

Flow Meter, Methane Cylinder Kit, Column Rinsing Kit

Soap Film Bubble Flowmeters

- 1mL flowmeter measures flows between 0.1 and 10cc/min.
- 50mL flowmeter designed for flows between 10 and 300cc/min.
- Includes a reservoir bulb, twenty-four inches (60cm) 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

cat.# 20197

Methane Cylinder Kit

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 our Methane Cylinder Kit. The kit includes a Scotty® 14 cylinder containing 1% methane in helium, a MINICYL® regulator, a syringe adaptor, and a package of twenty-five septa for the adaptor.

Description	qty.	cat.#
Methane Cylinder Kit	kit	20197
Replacement Septa for Syringe Adaptor	25-pk.	20198
Replacement Methane Cylinder	ea.	20199

Column not included.

Capillary Column Rinsing Reservoir Kit

Restore the performance of bonded-phase capillary columns by dissolving and removing soluble, nonvolatile residue, using this reservoir kit. The 50mL rinsing reservoir is equipped with $^1/_4$-inch inlet and outlet connections and includes a built-in fritted disk to prevent particulate matter from contaminating the column. The kit includes: reservoir, pressure regulator, fittings, ferrules, and tubing. Reservoir also available separately.

Description	qty.	cat.#
Rinsing Reservoir Complete Kit	kit	20612
Rinsing Reservoir only	ea.	20613

it's a **fact**

Restek On-The-Road training seminars are full-day courses presented in an engaging multimedia format. They are equally valuable to beginning chromatographers, those who have moderate experience and want a better understanding of the subject matter, and those interested in the "best practices" and latest technologies. **No sales pitch is presented**, just the facts on how to make your chromatography results better. The bulk of each course is lecture, but numerous demonstrations and problem-solving exercises facilitate and reinforce the understanding of important principles. See **page 11** for more information.

Make Life Easier (MLE) Capillary Tool Kits

Everything you need in one complete kit!

All kits include these components:

- 1/8", 3/16", 1/4" nylon brushes
- 1/4", 3/8", 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
- 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)

For Agilent GCs
(cat.# 22186)

MLE Capillary Tool Kit for Agilent GCs (cat.# 22186) also includes:

- capillary installation gauge for Agilent GCs
- injector wrench for Agilent GCs
- septum nut removal tool
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

For PerkinElmer GCs
(cat.# 22185)

MLE Capillary Tool Kit for PerkinElmer GCs (cat.# 22185) also includes:

- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

For Shimadzu GCs
(cat.# 22182)

MLE Capillary Tool Kit for Shimadzu GCs (cat.# 22182) also includes:

- capillary installation gauge for Shimadzu GCs
- injector wrench for Shimadzu GCs
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench

For Thermo
Scientific GCs
(cat.# 22183)

MLE Capillary Tool Kit for Thermo Scientific GCs (cat.# 22183) also includes:

- capillary installation gauge for Thermo Scientific GCs
- liner cap removing tool for Thermo Scientific GCs
- 6mm x 7mm open end wrench
- 8mm x 10mm open end wrench
- 16mm x 17mm open end wrench

For Varian GCs
(cat.# 22184)

MLE Capillary Tool Kit for Varian GCs (cat.# 22184) also includes:

- capillary installation gauge for Varian GCs
- 7/16" x 1/2" open end wrench
- 1/2" x 9/16" open end wrench

Description	qty.	cat.#
MLE Capillary Tool Kit for Agilent GCs	kit	22186
MLE Capillary Tool Kit for PerkinElmer GCs	kit	22185
MLE Capillary Tool Kit for Shimadzu GCs	kit	22182
MLE Capillary Tool Kit for Thermo Scientific GCs	kit	22183
MLE Capillary Tool Kit for Varian GCs	kit	22184

did you **know**?

Make Life Easier!
MLE Tool Kits conveniently provide the tools that make it easier to install and maintain capillary columns!

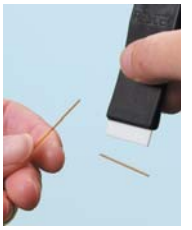
restek
innovation!

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	qty.	cat.#
Scoring Wafer with Handle	2-pk.	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.

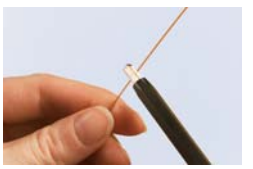
Exert just enough pressure to put a slight arc in the tubing. The tubing should fall off or break with a slight tap of the wafer.

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

Description	qty.	cat.#
Ceramic Scoring Wafers	5-pk.	20116

Sapphire Scribe

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



One quick stroke...

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

Description	qty.	cat.#
Sapphire Scribe	ea.	20182

cat.# 23026

cat.# 23027

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).

Description	qty.	cat.#
Shortix® Capillary GC Column Cutter	ea.	23026
Maintenance Kit for Shortix® Capillary GC Column Cutter (includes diamond cutting wheel, O-rings, and a tool to open the 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	qty.	cat.#
Capillary Column Caps	10-pk.	21044

Capillary Installation Gauge

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

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Easily seat ferrules for consistent installations!

A) for Agilent-style fittings (compact ferrules)

B) for $^{1}/_{16}$" fittings ($^{1}/_{16}$" ferrules)

C) for Thermo Scientific TRACE™ & Focus SSL (M4 ferrules)

D) for Varian GCs for use with $^{1}/_{16}$" ferrules

E) for Shimadzu 17A, 2010, and 2014 GCs

Using the capillary installation gauge for Agilent-style fittings.

Install the column nut and ferrule onto the column. Slide the column into the installation gauge to the recommended insertion distance. Finger-tighten the nut.

Tighten the assembly to ensure a properly seated ferrule. Loosen the assembly and remove the 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.

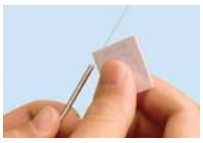
Description	qty.	cat.#
A) Capillary Installation Gauge for Agilent-style fittings (compact ferrules)	ea.	21034
B) Capillary Installation Gauge for $^{1}/_{16}$" fittings ($^{1}/_{16}$" ferrules)	ea.	21399
C) Capillary Installation Gauge for Thermo Scientific TRACE™ & Focus SSL (M4 ferrules)	ea.	22330
D) Capillary Installation Gauge for Varian GCs for use with $^{1}/_{16}$" ferrules	ea.	22335
E) Capillary Installation Gauge for Shimadzu 17A, 2010, and 2014 GCs	ea.	22333

*Recommended for use with graphite ferrules.

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.



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

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Inlet Liner Removal Tool

No more burned fingers!

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

Gently push the liner removal tool onto the liner in the injection port, with a slight circular motion.

Slowly pull the liner out of the injection port.

Use the liner removal tool to place a new liner into the injection port, avoiding hot metal surfaces.

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

Inlet Liner Packing Tool

- Position wool reproducibly every time.
- Accurate to a specific, measured depth.

Eliminates user variation!

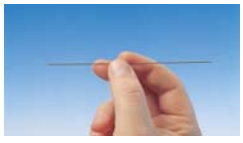
Loosen the nut on the side of the tool and adjust the gauge to the manufacturer's recommended depth.

Place a plug of loosely bound wool at the top of the inlet liner.

Insert the liner packing tool into the liner until the tool bottoms out. Remove the tool. The wool is now positioned correctly in the liner and the liner is ready for use.

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

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

Rethreading Tool

Achieve a better seal!

cat.# 23018

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

damaged threads

Repeated installation, removal, and temperature changes cause wear and damage to threads on GC parts. This can cause a poor seal, and oxygen can enter the system, compromising analytical results and possibly destroying expensive analytical columns.

Simply screw the rethreading tool onto the part, unscrew, and inspect the threads. Repeat as necessary. When done, wipe threads clean with methanol to remove any debris.

repaired threads

Description	qty.	cat.#
Rethreading Tool for $^{1}/_{16}$" compression fitting	ea.	23016
Rethreading Tool for $^{1}/_{8}$" compression fitting	ea.	23017
Rethreading Tool for $^{1}/_{4}$" compression fittings (Agilent split/splitless injection ports)	ea.	23018
Rethreading Tool for $^{7}/_{16}$" compression fitting (Varian injection ports)	ea.	23019
Rethreading Tool for $^{1}/_{4}$" Varian-style capillary column fittings	ea.	21893

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

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

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

Open-End Wrench Set

High-quality 1/4" x 5/16", 3/8" x 7/16", 7/16" x 1/2", and 1/2" x 9/16" wrenches for tightening a wide variety of chromatography 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 (1/4" x 5/16")	2-pk.	20110
Open-End Wrenches (3/8" x 7/16")	2-pk.	22455

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

12 Piece Ball-Point Hex Key Set

Includes 12 hex keys (Allen wrenches): .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32", 1/4", and 5/16".

Description	qty.	cat.#
12 Piece Ball-Point Hex Key Set	set	22998

Column Installation Tools

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 Tube Brushes/Surface Brush

Unlike brass brushes that can leave a metal residue, these stainless steel tube brushes ($^3/_8$-, $^3/_{16}$-, and $^1/_4$-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

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 (30cm) long.

Description	qty.	cat.#
Nylon Tube Brushes and Pipe Cleaner	4-piece set	20108

4" Tapered Needle Files

These files can be used for a multitude of purposes. They are especially useful for removing ferrules that are lodged in injector or detector ports.

Description	qty.	cat.#
4" Tapered Needle Files	2-pk.	20106

MXT™ Needle Files

Multi-purpose files, especially useful for cutting Silcosteel® treated stainless steel columns.

Description	qty.	cat.#
MXT™ Needle Files	2-pk.	21601

Mini Hand Drill Set

Drill ferrules to the proper ID in seconds! Includes three drills, for use with 0.25, 0.32, and 0.53mm ID (0.4, 0.5, and 0.8mm OD) capillary columns.

Description	qty.	cat.#
Mini Hand Drill Set	3-piece set	20122

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. Ideal for removing ferrules that have become stuck in fittings.

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

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

Temperature Measuring Stick

- Verify GC oven or polymer temperature.
- Quick measurements via sensor in the measuring tip.
- Swivel head can turn 180°.
- Wide measuring range: -50°C to +350°C.

Description	qty.	cat.#
Temperature Measuring Stick	ea.	22066

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

FIX-IT Laboratory Swiss Army Knife

- 15-function tool includes inlet liner remover, screwdrivers, scissors, blade, and tweezers.
- Includes a magnifying glass to check column end cuts.
- Genuine Swiss Army quality with 5-year warranty.
- Every GC analyst should have one!

Description	qty.	cat.#
FIX-IT Laboratory Swiss Army Knife	ea.	23013

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

save **money**!

You can save money on column installation tools by purchasing the new MLE Capillary Tool Kits described on **page 209.**

Septum Nut Removal Tool for Agilent 5890/6890/6850/7890 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 5890/6890/6850/7890 GCs	ea.	24918

restek
innovation!

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.

Description	Similar to TS part #	qty.	cat.#
Liner Cap Removing Tool for Thermo Scientific GCs	205-070-10	ea.	24937

GC Inlet and FID Maintenance Kits

Steve Kreiser
Director of Quality
11+ years of service!

Inlet and FID Maintenance Kits

- Include the most common consumable GC supplies and tools.
- All parts meet or exceed performance by instrument manufacturer's parts.
- Parts list makes reordering easy.

Inlet Maintenance Kit for Agilent 5890/6850/ 6890/7890 GCs

FID Kit for Agilent 5890 GCs

FID Kit for Agilent 6850/6890/7890 GCs

also **available**

MLE Capillary Tool Kits.
See **page 209**.

Inlet kit includes:

- 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.
- $^1/_4$" x $^5/_{16}$" wrench.
- Septum puller.
- Installation gauge.
- Wire cleaning brush.
- Jet reamers/ferrule removers.
- Inlet liner removal tool.
- Septa nut removal tool.

FID kits include:

- $^1/_4$", 0.4, 0.5, and 0.8mm ID graphite ferrules.
- FID/NPD capillary adaptor.
- Capillary nuts.
- Jet reamers/ferrule removers.
- $^1/_4$" nut.
- Scoring wafer.
- Capillary column caps.
- Ignitor for either Agilent 5890 or 6890/6850/7890 GCs.
- FID flow measuring adaptor.
- $^1/_4$" x $^5/_{16}$" wrench.
- Installation gauge.
- Wire cleaning brush.
- High-performance Siltek® treated FID jet for either Agilent 5890 (adaptable jet) or 6890/6850/7890 (dedicated jet) GCs.
- Spanner wrench.
- FID jet removal tool.

new and **improved!**

Now with even more tools!

Description	qty.	cat.#
Inlet Maintenance Kit for Agilent 5890/6850/6890/7890 GCs	kit	22181
FID Maintenance Kit for Agilent 5890 GCs	kit	22180
FID Maintenance Kit for Agilent 6850/6890/7890 GCs	kit	22179

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

Graphite Ferrules
- Preconditioned 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® ferrules

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

Available in Vespel®, graphite, or Vespel®/graphite.

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

Available in graphite or Vespel®/graphite.

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

Available in Vespel®, graphite, or Vespel®/graphite.

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

Available in graphite or Vespel®/graphite.

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

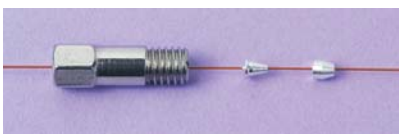
Fitting Size	Ferrule ID	qty.	Vespel®/Graphite
1/16"	no hole	10-pk.	20240

Alumaseal™ Ferrules*

- Aluminum construction—will not crack or fragment; no more ferrule fragments in the transfer line.
- 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.

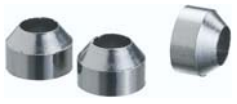
Fitting Size	Ferrule ID	qty.	cat.#
1/16"	1/16"	10-pk.	21122
1/16"	0.4mm	10-pk.	21123
1/16"	0.5mm	10-pk.	21124
1/16"	0.8mm	10-pk.	21125
1/8"	1/8"	10-pk.	21126
3/16"	3/16"	10-pk.	21127
1/4"	1/4"	10-pk.	21128

Graphite Ferrules—For M4 Fittings for Thermo Scientific 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

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.

Terri Sowerby
Shipping/Assembly Manager
3+ years of service!

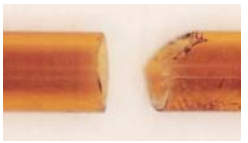
Stainless Steel Jet Reamers

A great tool for cleaning detector jets and other small orifices. Serrated design is optimal for removing silica deposits and other contaminants. Ideal for removing ferrules that have become stuck in fittings.

Dislodge ferrules or remove silica deposits with the Jet Reamer/ Ferrule Remover.

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

Press-Tight® Connectors: Overview



Make a clean, square cut for optimum connector performance. The cut on the right will produce a poor seal.

A brown ring indicates a proper seal.

For a secure, reliable connection, use a Vu2 Union™ Connector. See **page 222**.

Restek Press-Tight® Connectors

Press-Tight® connectors are lightweight, quickly installed, and easy to use. They connect fused silica tubing having outside diameters ranging from 0.33 to 0.74mm (Restek 0.1 to 0.53mm ID). Press-Tight® connectors do not cause solvent tailing, or adsorb active compounds. We have thoroughly investigated the taper angle and tolerances to ensure a leak-tight fit on every connector.

Press-Tight® connectors most often are used to connect a guard column to an analytical column. They also are used to connect columns differing in polarity, for unique separations, or to repair a broken column. Mass spectroscopists use Press-Tight® connectors for connecting analytical columns to smaller-diameter transfer lines.

How does a Press-Tight® connector work?

A Press-Tight® connector forms a leak-tight seal through concentric compressive forces as the tubing end is pushed into a tightly controlled radial restriction. These forces are strong enough to form a leak-tight seal under the normal pressures used in capillary GC. The seal is further strengthened as the polyimide resin coating on the exterior of the column bonds to the inner surface of the connector after several thermal cycles to 200°C.

Obtaining a leak-tight seal:

To achieve optimum performance from these connectors, begin with a properly cut fused silica column or retention gap end. Even if you use polyimide resin for extra insurance, a poorly cut capillary column will make an inadequate seal.

Press the cut ends into the connector, then establish a flow, and leak-check the seal with a Restek Electronic Leak Detector (cat.# 22451, page 207) before heating the system. The seal is made permanent as the polyimide resin coating on the column bonds to the inner surface of the connector after several thermal cycles to 200°C.

Can the connection be strengthened?

Absolutely. A curable polyimide resin (cat.# 20445, page 221) is available to create a strong, permanent seal. A Vu2 Union™ connector creates a secondary seal to ensure a leak-tight connection. However, clean, square cut ends and a good press-tight seal still must be made for the connection to be effective.

What is the maximum temperature for a Press-Tight® connector?

Press-Tight® connectors are effective at oven temperatures to 325°C, the temperature at which the polyimide coating on the column decomposes and the connection will begin to leak. We strongly recommend using a Vu2 Union™ (page 222) or SeCure™ "Y" Connector (page 223) connector if oven temperatures will exceed 325°C for prolonged periods of time.

Can Press-Tight® connectors be used with MXT® columns?

No. To achieve a leak-tight fused silica to stainless steel connection, we recommend an MXT™ connector (see page 226).

Let Restek make the guard column/transfer line connection for you!

We will connect a guard column/transfer line to any analytical column, using a Vu2 Union™ connector. We will leak-check the connection and confirm analytical integrity by analyzing a test mixture. To order a preconnected guard column/transfer line, add the three-digit suffix from the chart below to any analytical column catalog number. Example: A 5m, 0.32mm ID guard column connected to a 30m, 0.32mm ID, 1.0µm Rtx®-5 column is cat.# 10254-163.

5m Guard Column/Transfer Line ID	cat.# suffix	Additional Cost*
0.15mm	-160	
0.18mm	-161	
0.25mm	-162	
0.32mm	-163	
0.53mm	-164	

10m Guard Column/Transfer Line ID	cat.# suffix	Additional Cost*
0.25mm	-165	
0.32mm	-166	
0.53mm	-167	

*Additional cost will be added to the price of the column.

for **more** info

These guard columns are intermediate polarity (IP) deactivated.

For more information about guard columns and other deactivations, see **pages 26–30**.

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 nonpolar 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 nonpolar 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

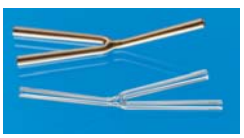
An alternative method of performing dual-column confirmational analyses!

- 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 nonpolar 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

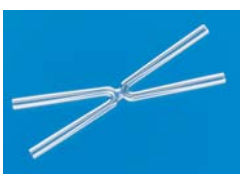
- Perform confirmation analysis with a single injection.
- Made from inert fused silica.
- Inlet and outlet ends conform to the column curvature—alleviates column-end connection strain.
- Deactivated Press-Tight® connectors assure better recovery of polar and nonpolar compounds.
- Siltek® treated connectors 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 nonpolar 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

Vu2 Union™ Connectors

Patent pending.

Secure, reliable column-to-column connections!

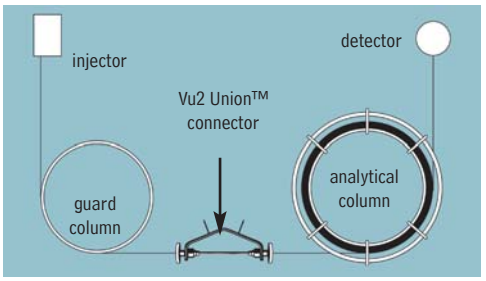
NOTE: This product is not recommended for GC column-to-MS connections—use the Vacuum Vu-Union® (page 224).

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.

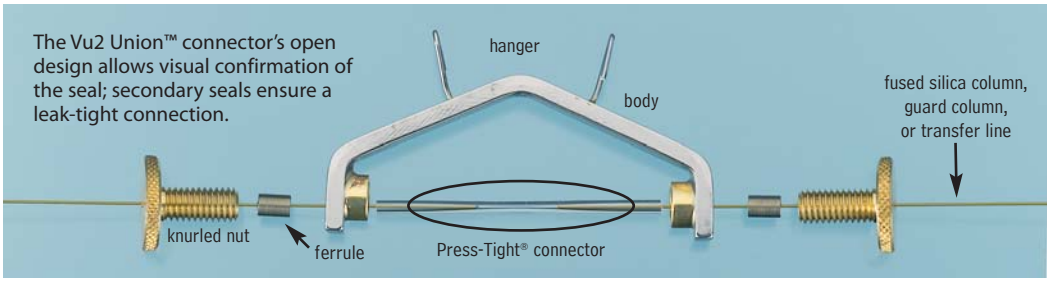


How does a Vu2 Union™ connector work?

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.



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

SeCure™ "Y" Connector Kits

restek innovation!

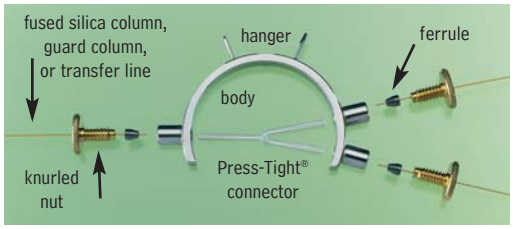
- Connect two analytical columns to a transfer line or guard column.
- Use standard "Y" Press-Tight® connectors and 1/16" graphite ferrules.
- Reliable seal integrity, will not unexpectedly disconnect during temperature-programmed analyses.
- Open design allows visual confirmation of the seal for added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

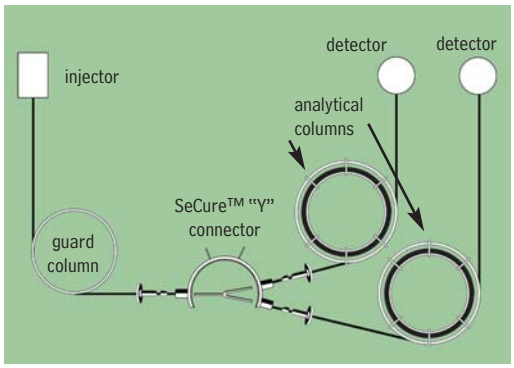
Patent pending.

Secure, reliable column-to-column connections!

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.



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

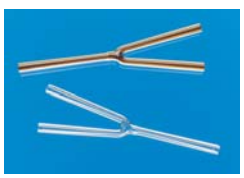
a plus 1 story

"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

Vacuum Vu-Union® & Gerstel GRAPHPAK® Connectors

Vacuum Vu-Union® Connector for GC/MS Applications

- Connects analytical column to MS transfer line.
- Use under vacuum conditions.
- Use only with Vu-Union® Vespel®/graphite ferrules—order ferrules separately.
- Includes metal housing body, one deactivated tapered glass insert, and Vu-Union® Helping Hand.
- Fits column ODs from 0.33–0.74mm (Restek 0.1mm–0.53mm ID).

A specifically designed Vu-Union® glass insert permits more torque to be applied to the ferrules without fear of cracking the insert. The hex end nuts enable you to use wrenches to tighten the end fittings.

Description	qty.	cat.#
Vacuum Vu-Union® Connector (with the Helping Hand)	ea.	20427
Replacement Inserts	3-pk.	20428

Kim Holliday
Southwest/Mountain States Sales Representative
16+ years of service!

Vu-Union® Helping Hand

The Helping Hand is designed to hold in place the metal housing of the Vacuum Vu-Union® connector. This allows you to easily assemble the columns in the glass insert and tighten the nuts. The Helping Hand is included with the Vacuum Vu-Union® connector.

Vu-Union® Vespel®/Graphite Ferrules

- Use with Vacuum Vu-Union® connectors.
- 60% Vespel®/40% graphite.
- 400°C maximum operating temperature.

Ferrule ID	Fits Column	qty.	cat.#
0.3mm	< 0.22mm ID/< 0.4mm OD	10-pk.	20423
0.4mm	0.25mm ID/0.4mm OD	10-pk.	20420
0.5mm	0.32mm ID/0.5mm OD	10-pk.	20421
0.8mm	0.45/0.53mm ID/0.8mm OD	10-pk.	20422

Gerstel GRAPHPACK® 3D/2 Connectors

GRAPHPACK® technology provides a complete system that quickly and reliably makes a leak-tight, low-dead-volume connection. The central component is a metal-jacketed graphite ferrule—the ideal seal for GC applications.

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

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.

please note

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

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.

SILTEK® treated

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

Restek recommends 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

Replacement Nut

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

MXT™ Connectors for Metal Tubing

please note

Use for metal-to-metal connections.

SILTEK® treated

MXT™ Low-Dead-Volume Connector Kits for Metal Columns

These low-dead-volume connectors are Siltek® treated and are deactivated to make them inert to active compounds, just like our MXT® columns. They can be used at temperatures up to 400°C without degrading the deactivated layer. Purchase the appropriate ferrules for connecting 0.28 or 0.53mm ID tubing.

MXT™ Low-Dead-Volume Connector Kits for Metal Columns

- Connect a guard column/transfer line to an MXT® stainless steel column.
- Low thermal mass tracks rapid oven temperature programming.

Each kit contains the MXT™ union, two 1/32-inch ferrules and nuts.

Description	qty.	cat.#
For 0.28mm ID MXT® Columns	kit	20397
For 0.53mm ID MXT® Columns	kit	20394

MXT™ Low-Dead-Volume "Y" Connector Kits for Metal Columns

- Connect two MXT® columns to one inlet or one MXT® column to two detectors.

Each kit contains the MXT™ union, three 1/32-inch ferrules and nuts.

Description	qty.	cat.#
For 0.28mm ID MXT® Columns	kit	20396
For 0.53mm ID MXT® Columns	kit	20395

1/32-Inch Stainless Steel Replacement Ferrules for MXT™ Connectors

Ferrule ID	Fits Column ID	qty.	cat.#
0.59mm	0.28mm	10-pk.	20398
0.79mm	0.53mm	10-pk.	20399

1/32-Inch Replacement Nut

Description	qty.	cat.#
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 (listed above); for fused silica tubing, use Valcon polyimide adaptor ferrules (see page 225).

Zero-Dead-Volume Valco® Internal Union

Ends of tubing seat squarely at bottoms of fitting details. 300 series stainless steel. For 1/16" 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

also **available**

Treated Fittings!
See pages 392-393 for our Siltek®/Sulfinert® treated and Silcosteel®-CR treated fittings.

Zero-Dead-Volume Valco® Internal Reducing Union

Connect two sizes of tubing, using zero-dead-volume fittings on each end. For 1/8" to 1/16" OD tubing. Stainless steel ferrules included.

Description	Union Bore	Valco® #	qty.	cat.#
Internal Reducing Union	0.25mm	ZRU21C	ea.	20151
Internal Reducing Union	0.75mm	ZRU21	ea.	20152
Internal Reducing Union	1/16"	ZRU21T	ea.	20153

Zero-Dead-Volume Valco® Internal Tee

Connect three lines. 300 series stainless steel; stainless steel ferrules included. For 1/16" OD tubing.

Description	Union Bore	Valco® #	qty.	cat.#
Internal Tee	0.25mm	ZT1C	ea.	20154
Internal Tee	0.75mm	ZT1	ea.	20155

Zero-Dead-Volume Valco® Internal Cross

Connect four lines. 300 series stainless steel; stainless steel ferrules included. For 1/16" OD tubing.

Description	Union Bore	Valco® #	qty.	cat.#
Internal Cross	0.25mm	ZX1C	ea.	20156
Internal Cross	0.75mm	ZX1	ea.	20157

Male Pipe to Valco® Internal Adapter

Makes a minimum volume connection from a female pipe fitting on a pressure gauge or regulator to a Valco® zero-dead-volume fitting. 300 series stainless steel; stainless steel ferrules included.

Description	Fitting Size	Bore	Valco® #	qty.	cat.#
1/8" NPT Male Internal Adapter	1/16" ZDV	1.0mm	PZA21	ea.	20158
1/4" NPT Male Internal Adapter	1/16" ZDV	1.0mm	PZA41	ea.	20159


cat.# 20159


cat.# 20158

Nuts & Ferrules for Valco® Connectors

Description	Valco® #	qty.	cat.#
1/16" Stainless Steel Ferrules	ZF1-10	10-pk.	20286
1/16" Stainless Steel Nuts	ZN1-10	10-pk.	20287

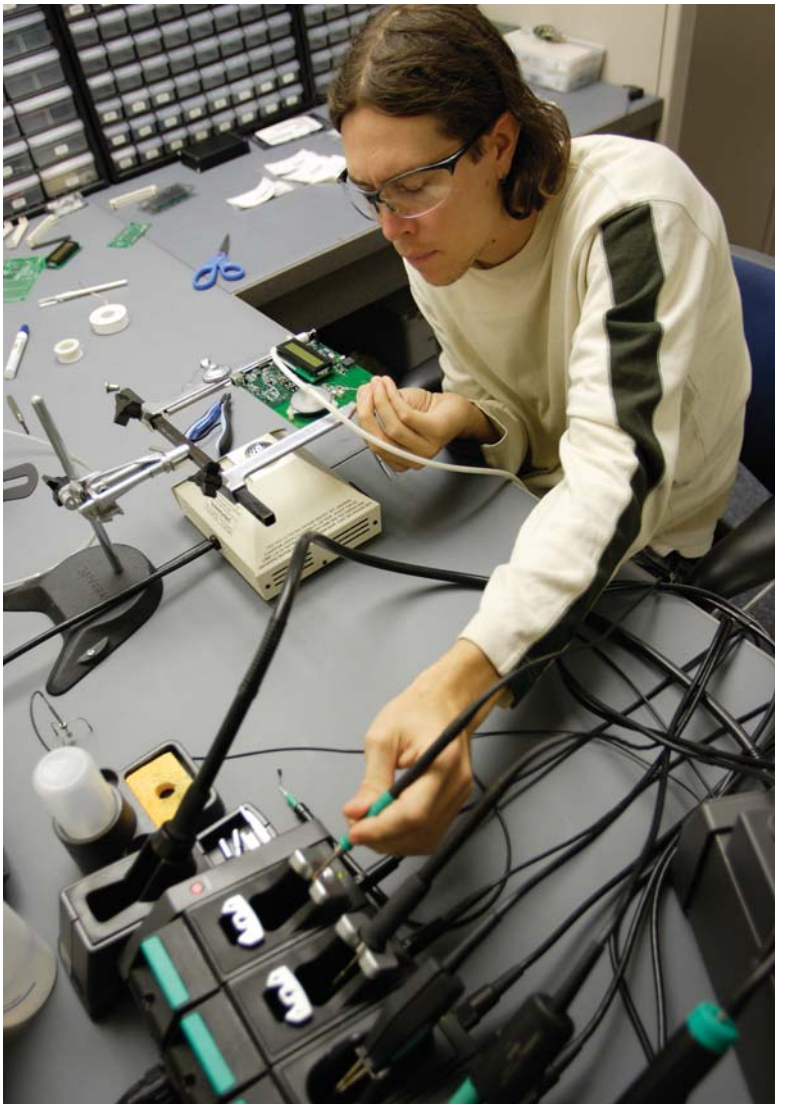

cat.# 20286


cat.# 20287

1/16-Inch Valco® Adaptor Ferrules

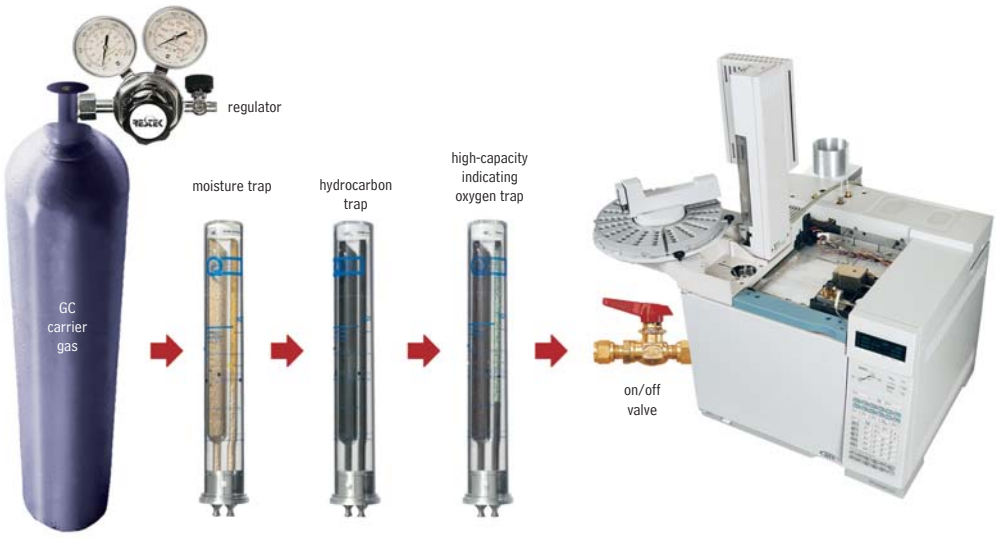
Tubing OD	Tubing ID	Valco® #	Valcon Polyimide qty.	Valcon Polyimide cat.#	Polyimide qty.	Polyimide cat.#
0.25–0.4mm	0.1-0.25mm	FS1.4-5	5-pk.	20142	2-pk.	21015
0.4–0.5mm	0.32mm	FS1.5-5	5-pk.	20143	2-pk.	21016
0.5–0.8mm	0.53mm	FS1.8-5	5-pk.	20144	—	—
0.8mm (1/32")	—	FS1.9-5	5-pk.	20145	—	—

Purus Gas Systems



Top: Brandon Tarr, Product Development Engineer

Bottom: Steve Kozel, U.S. Sales & Distribution Manager



PURUS

for **more** info

Questions about which carrier gas purifier to use?
Call 800-356-1688 or 814-353-1300, ext. 4, or contact your Restek representative to discuss your application with our technical service chemists.

Why do I need to use traps and where should I install them?
Carrier gas must contain less than 1ppm of oxygen, water vapor, or any other trace contaminant, to prevent column degradation, shortened column lifetime, and increased stationary phase bleed. Contaminants cause ghost peaks to appear during temperature programming and degrade the validity of analytical data. Make-up gas also should be contaminant-free, or baseline fluctuations and excessive detector noise can occur; detector gases should be free of water and hydrocarbons, or excessive baseline noise can result. Gas purifiers remove these contaminants from gas sources, thereby improving system performance.

Moisture Removal
Moisture in carrier gas lines will prematurely degrade oxygen and hydrocarbon traps and increase detector noise (particularly with ECDs). As a precaution, we highly recommend installing a moisture trap before the hydrocarbon and oxygen traps on all carrier gas lines. Our favorite trap is the Super-Clean™ Ultra-High Capacity Moisture Filter (cat.# 22028, pg. 234).

Hydrocarbon Removal
Use a hydrocarbon trap if your gas has a potential source of hydrocarbon contaminants (e.g., an oil pump in an air compressor) or if you suspect you are observing carrier gas ghost peaks. Install the hydrocarbon trap after the moisture trap, to prevent moisture from degrading the hydrocarbon-trapping ability of the activated carbon in the hydrocarbon trap. We recommend the Super-Clean™ Ultra-High Capacity Hydrocarbon Filter (cat.# 22030, pg. 234).

Oxygen Removal
Oxygen is a column killer. It is present even in UHP gases, as minute leaks at fittings allow oxygen to influx against the concentration gradient. There are many choices for oxygen removal—the Super-Clean™ Ultra-High Capacity Oxygen Filter (cat.# 22029, pg. 234) is popular with Restek chemists. Because oxygen can enter a gas line at any fitting, the oxygen trap should be the last connection before the gas line enters the chromatograph.

tech tip

Carrier Gas Purity
Carrier gas should contain less than 1ppm of oxygen, moisture, or other trace contaminants, to prevent column degradation, increase column lifetime, and decrease stationary phase bleed.

The expense of using high-purity gases in combination with carrier gas line purifiers will be offset by longer column lifetime and less GC maintenance.

did you **know**?

Trap replacement made simple!
Try the Super-Clean™ Triple Filter Carrier Gas Cleaning Kit (cat.# 22019, pg. 234) —it removes moisture, hydrocarbons, and oxygen in one easy-to-change, economical cartridge.

GC ACCESSORIES | PURUS GAS SYSTEMS

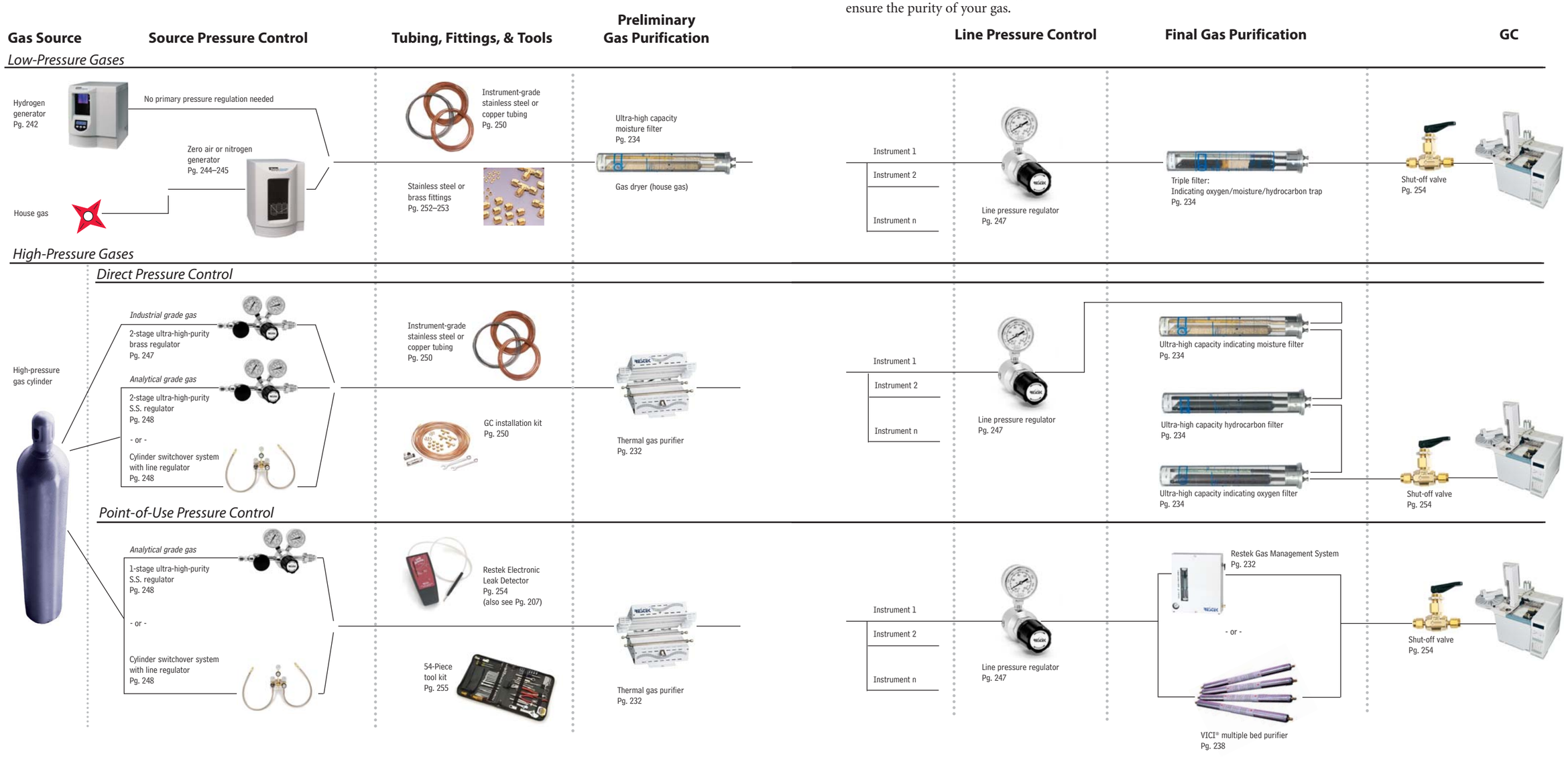
Purus Gas Systems

We know how important high-purity gas is to the success of your analysis. To provide you with the products and services you need to achieve a first-quality gas delivery system, Restek has created Purus Gas Systems. Purus Gas Systems are application-specific assemblies of the finest products and technical expertise for a systematic approach to gas handling. "Systematic" means that every product needed to deliver research purity gas is available from one source, at the level of quality you expect from Restek. We will not only supply products, we will work with you to design the best gas system for your application.

Restek provides the following total gas system solution:

- Restek gas purifiers provide cost-effective gas purity assurance.
- Restek stainless steel and copper tubing, precleaned and ready to use.
- Parker A-Lok® tube fittings consistently deliver high-quality performance.
- Extensive line of hand tools to make your work easier and faster, including Restek's Electronic Leak Detector.
- Gas generators for an uninterupted supply of gas.
- Gas regulators for optimum line pressure control of all your chromatography gases.

Restek's Technical Service Team, 800-356-1688 or 814-353-1300, ext. 4, or your Restek representative, can answer your questions and provide system-design advice. From the gas source to your point of use, we offer the products and services that ensure the purity of your gas.



www.restek.com

Thermal Gas Purifier

Single-Tube Model

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.

Dual-Tube Model

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 nonreversible, 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.

Restek Single-Tube Thermal Gas Purifier, 110 Volt (1 tube included)**	qty.	cat.#
1/8" Fittings	ea.	21496
1/4" Fittings	ea.	21497
Restek Dual-Tube Thermal Gas Purifier, 110 Volt (2 tubes included)**	**qty.**	**cat.#**
1/8" Fittings	ea.	21498
1/4" Fittings	ea.	21499
Replacement Getter Tube	**qty.**	**cat.#**
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).

Dimensions: 13" x 1/2"
(33 x 1.3 cm)

did you **know**?

Getter material is the physical material placed in a vacuuming tube that binds residual gases to the surface, maintaining or increasing the vacuum.

Always know the status of the Thermal Gas Purifier getter tube: change tube when pressure drops.

Gas Pressure Gauge Kit

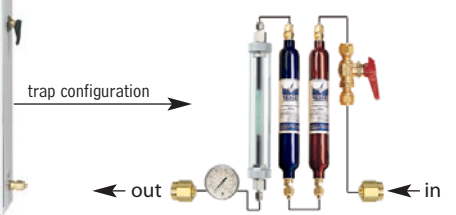
- Use an in-line pressure gauge to indicate when the Thermal Gas Purifier getter tube should be replaced.
- Includes 1/8" tee and 0–100 psi (0-689kPa) gauge.

Description	qty.	cat.#
In-line Gas Pressure Gauge Kit for Thermal Gas Purifiers	kit	21657

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.

Dimensions: 12" x 14" x 3"
(30.5 x 35.6 x 7.6 cm)



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.

Description	qty.	cat.#
Restek Gas Management System (includes fittings for 1/8" and 1/4" gas line)	ea.	21999
Replacement Traps	**qty.**	**cat.#**
High-Capacity Moisture Trap, 1/8" Nickel-Plated Brass Fittings	ea.	21997
Capillary-Grade Hydrocarbon Trap, 1/8" Nickel-Plated Brass Fittings	ea.	21991
Indicating Oxygen Trap, 1/8" Nickel-Plated Brass Fittings	ea.	22010

Super-Clean™ Gas Filters

- High-purity output ensures 99.9999% pure gas (at max. flow of 2L/min.).
- "Quick connect" fittings for easy, leak-tight cartridge changes.
- Glass inside to prevent diffusion; polycarbonate housing 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 base plate allows cartridges to be exchanged without introducing oxygen, moisture and hydrocarbons. 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 base plates, you can purify all GC gas streams at one location. Figure 1 shows some possible filter cartridge combinations using these base plates. Any combination is possible because any Restek Super-Clean™ gas filter cartridge can be used with any Restek base plate.

High-purity output for improved sensitivity (Table I)

The Triple Gas Filter cartridge (cat.# 22020) is ideal for purifying carrier gas. This trap contains oxygen, moisture, and hydrocarbon scrubbers and indicators for oxygen and moisture in one cartridge. The purity of your carrier gas after flowing through the Triple Gas Filter is better than six-9s (99.9999% pure at max. flow of 2L/min.), 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.

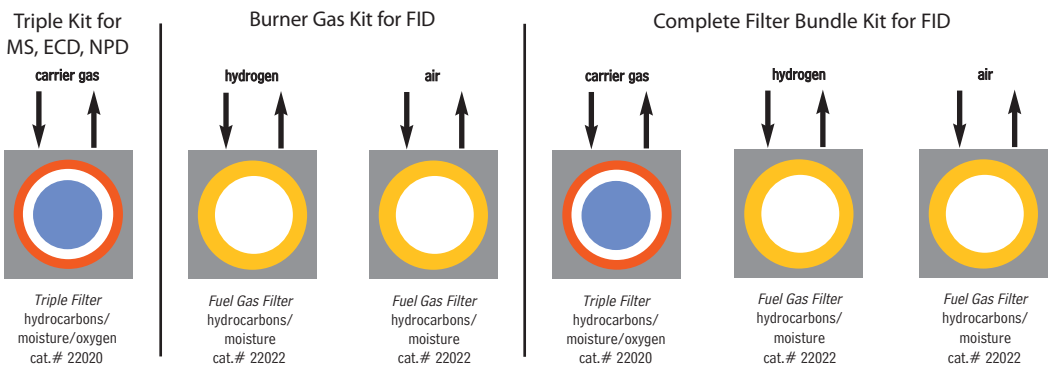


Table I Each Super-Clean™ gas filter provides high-purity outlet gas.

Type of Filter	Outlet Gas Quality (%)	Maximum Pressure/ Maximum Flow Rates	Use for:	Indicator Color Change	Capacity H_2O (g)	Capacity O_2 (mL)	Capacity Hydrocarbons (g)	Estimated Lifetime (years)
Moisture cat.# 22028	>99.9999	11 bar 159psi/ 7 L/min.	Inert carrier gas Air Hydrogen	Yellow/orange 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[3]	>2
Fuel Gas[1] cat.# 22022	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas Air Hydrogen	Yellow/orange to clear	3.5	—	24[3]	>1.5
Triple[2] cat.# 22020	>99.9999	11 bar 159psi/ 7L/min.	Inert carrier gas	Yellow/orange to clear Green to grey	1.8	500	4[3]	>1
Helium Specific[2] cat.# 21982	>99.9999	11 bar 159psi/ 7L/min.	Helium	Yellow/orange to clear Green to grey	1.8	500	—	>1

[1]Removes hydrocarbons, moisture.
[2]Removes hydrocarbons, moisture, oxygen.

did you know?

All Super-Clean™ gas 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
Restek highly recommends 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 are listed on pages 234 and 235.

Super-Clean™ Gas Filters and Base Plates

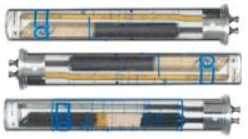
All traps measure:
10⅝" x 1¾" (27 x 4.4 cm)
Each base plate unit measures:
4" x 4" x 1⅞"
(10.2 x 10.2 x 4.8 cm)

Super-Clean™ Gas Filter and Base Plate Kits

Description	qty.	cat.#
Carrier Gas Cleaning Kit (includes mounting base plate, ⅛" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Triple Gas Filter)	kit	22019
Fuel Gas Purification Kit (includes mounting base plate, ⅛" inlet/outlet fittings, and hydrocarbon/moisture Fuel Gas Filter)	kit	22021

Replacement Gas Filters

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



Gas Filter Bundle Kit

- Ideal for use in combination with 3-position base plate—purchase separately.

Description	qty.	cat.#
Gas Filter Bundle Kit	kit	22031

Super-Clean™ Ultra-High Capacity Gas 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™ Gas Filter and Kit

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

Description	qty.	cat.#
Helium-Specific Carrier Gas Cleaning Kit (includes mounting base plate, ⅛" inlet/outlet fittings, and oxygen/moisture/hydrocarbon Helium-Specific Filter)	kit	21983
Replacement Helium-Specific Gas Filter (removes oxygen, moisture and hydrocarbons)	ea.	21982

Filter Base Plates

- Standard base plate fittings are ⅛". To adapt to ¼", order ⅛" to ¼" tube-end unions.
- Base plates fit all Super-Clean™ gas filters listed above.

		Brass	new! Stainless Steel	
Description	qty.	cat.#	qty.	cat.#
Single-Position Filter Base Plate	ea.	22025	ea.	22344
2-Position Filter Base Plate	ea.	22026	ea.	22345
3-Position Filter Base Plate	ea.	22027	ea.	22346

Wall Mounting Bracket

- Base plates can be mounted by using screws and the mounting holes on the base plate, or by using this optional wall mounting bracket.

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

Replacement O-Rings for Cartridge Base Plates

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

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

⅛-Inch to ¼-Inch Tube-End Unions

- To adapt ⅛" Super-Clean™ base plate fittings to ¼", use ⅛" to ¼" tube-end unions.

		Brass		Stainless Steel
Description	qty.	cat.#	qty.	cat.#
⅛" to ¼" Tube-End Unions	5-pk.	21833	2-pk.	21933

Super-Clean™ Gas Trapping System for LC/MS

Quick-change cartridge system for removing hydrocarbon impurities from nitrogen

- 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 base plate (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 activated 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 base plate. 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. A special particle filter is included with the high flow base plate to be installed at the gas outlet. This exchangeable particle cup filter has a nominal pore size of 0.5µm and is recommended to be used to help remove potential dust from the charcoal, which could enter into the nebulizer gas stream and possibly damage the LC/MS system.

Table I Super-Clean™ Gas Filters provide high-purity outlet gas

Type of filter	Max. Flow	Outlet Gas Quality %	Maximum Pressure	Estimated Lifetime
Hydrocarbon (charcoal)	20L/min.	99.9999%	11 bar/159psi	3 to 6 months

20L of purified nitrogen per minute!

Super-Clean™ Gas Trapping System for LC/MS

Description	qty.	cat.#
Super-Clean™ Gas-Trapping System (2-position base plate, 2 charcoal filters)	ea.	22062
2-Position Base Plate (1/4" Fittings) for use with hydrocarbon filters (cat.# 22061)	ea.	22060
Replacement Hydrocarbon (Charcoal) Filters	2-pk.	22061

Stephanie Sunner & Tim Herring

a **plus 1** story

"West Coast companies often have to deal with East Coast companies closing by 2:00 pm Pacific time and grumpy people itching to leave. Not so with Restek! When I called at 2:55 pm (Pacific) on a Friday, Stephanie was kind enough to not only answer my questions, but forward me immediately to Tim at technical service so that I could catch him before he left - and then stayed late to help me set up an account. Tim deserves kudos, too, for not only being extremely friendly, but also being able to identify a part with no serial number and a label from a different company! Awesome service!"

Tim S., Research Scientist, a West Coast pharmaceutical company

also **available**

Looking for a nitrogen generator for your LC/MS? Restek offers a full line of Parker LC/MS generators. See **page 245**.

Super-Clean™ Click-On Purification Gas Traps

Click-On Inline Super-Clean™ Purification Gas 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 Gas Trap is ideal for GC/MS.

Using the same features and benefits as the Super-Clean™ base-plates and filters (page 234), Click-On adaptor connectors allow cartridges to be exchanged without introducing oxygen, moisture, and hydrocarbons. 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 gas trap is changed, and your system will not become contaminated during the process.

The Triple Gas 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 gas trap is packed and purged under helium and contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Click-On Traps measure: 8 1/2" x 1 1/4" (21.6 x 3.2cm)

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_2O (g)	Capacity O_2 (mL)	Hydrocarbons[3] (g)	Estimated Lifetime (years)
Moisture cat.#22467	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H_2	15	NA	NA	>3
Oxygen cat.#22468	>99.9999	11 bar 160psi	25	Inert carrier gas	NA	2000	NA	>3
Hydrocarbon cat.#22466	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H_2	NA	NA	24	>3
Fuel Gas[1] cat.#22465	>99.9999	11 bar 160psi	25	Inert carrier gas, helium, air, H_2	7	NA	12	>2
Triple[2] cat.#22464	>99.9999	11 bar 160psi	25	Inert carrier gas	4	1000	8	>2

[1]Removes hydrocarbons, moisture.
[2]Removes hydrocarbons, moisture, oxygen.
[3]As *n*-butane.

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™ Gas 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

Super-Clean™ Click-On Purification Gas Traps

Click-On Inline Super-Clean™ Replacement Gas 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 Gas 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™ Gas Trap and Connector Kits

Description	qty.	cat.#
Kits		
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
Replacement Trap		
Helium-Specific Replacement Triple Trap (removes oxygen, moisture and hydrocarbons)	ea.	22473

did you know?

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

tech tip

Install an indicator after the Click-On inline gas 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

Each connector is 2 3/8" (6cm) in length.

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

Each double connector is 3" (8cm) in length.

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

Description	qty.	cat.#
Wall-Mounting Clamps for Click-On Inline Super-Clean™ Gas 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-Specific Purifier Modules

Dimensions: 21" x 1½"
(53.3 x 3.8 cm)

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.
- Prepurged 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 prepurged 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 (6895kPa)
Maximum Recommended Flow	500mL/min.
Pressure Drop from 120psi (827 kPa) inlet at at 0-500mL/min.:	<0.20psi (1.4kPa)
End Fittings	compression, 1/8" or 1/4", stainless steel
Shipping Weight	3.04 lb. (1300 g)

Please Note: We recommend using an indicating oxygen trap (e.g., cat.# 22029, pg. 234) downstream from a VICI® Mat/Sen® purifier to continually ensure gas purity and indicate absolute change-out time.

it's a **fact**

The nitrogen module is excellent for LC/MS systems.

Gas-Specific Purifier Module	Max Pressure	Compression Tube Fittings ¼-inch qty.	¼-inch cat.#	⅛-inch qty.	⅛-inch cat.#
Helium Purifier Module	1000psi, 6895kPa	ea.	22600	ea.	22601
Hydrogen Purifier Module	1000psi, 6895kPa	ea.	22602	ea.	22603
Nitrogen Purifier Module*	1000psi, 6895kPa	ea.	22604	ea.	22605
Air Purifier Module	1000psi, 6895kPa	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.

a **plus 1** story

"We enjoy doing business with Restek. Their technical knowledge and willingness to back their products help us to maximize the performance of our chromatography instruments."

Jean-François Vergelin, Département de Seine et Marne, Direction de l'Eau et de l'Environnement, Laboratoire Départemental d'Analyse des eaux (Melun, France)

High-Capacity Indicating Oxygen Trap

- Indicator changes color from dark blue to black as oxygen & water are trapped.
- Lasts longer than three smaller traps.
- Use with all carrier gases.
- Ambient operating temperature, 100psi (689kPa) operating pressure.
- Built-in frit traps microparticles.
- Outlet gas purity: $O_2 <$ 0.1ppm when inlet does not exceed 15ppm.
  $H_2O <$ 0.5ppm when inlet does not exceed 10ppm.
- Includes cartridge housing and one cartridge.
- Maximum operating pressure: 150psi (1034kPa).
- Maximum flow: 16.5L/min.

Dimensions: 9¼" x 2"
(23.5 x 5.1 cm)

Description	qty.	cat.#
High-Capacity Indicating Oxygen Trap, 1/8" Compression Tube Brass Fittings	ea.	20624
High-Capacity Indicating Oxygen Trap, 1/4" Compression Tube Brass Fittings	ea.	20623
Replacement Cartridge (fits 1/4" or 1/8" housing)	ea.	20625
Replacement O-Rings (5 small O-rings and 5 large O-rings)	kit	22081

Indicating Oxygen Trap

- Indicator changes color from light green to grey as oxygen is trapped.
- Heavy-walled glass body prevents oxygen & water infusion.
- Prepurged for fast stabilization.
- 100psi (689kPa) maximum operating pressure.
- Reduces oxygen to 0.1ppm.

Dimensions: 10" x 1¼"
(25.4 x 3.2 cm)

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

High-Capacity Oxygen Trap

- Removes up to 600mg of oxygen or 2g of water.
- Long life—typically purifies more than five 200ft³ cylinders.
- Reduces oxygen to 15ppb.
- Maximum operating pressure: 250psi (1724kPa).
- Flow: 3L/min. @ 32psi (221kPa).

Dimensions: 11" x 1½"
(27.9 x 3.8 cm)

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

Rechargeable Molecular Sieve S-Trap

- Traps water vapor; increases column and oxygen trap lifetime.
- Reduces baseline noise from sensitive detectors such as ECDs and mass spectrometers.
- Activated and ready to use.
- Reduces water to less than 1ppm.
- Fits in GC oven for easy thermal recharging.
- Maximum flow: 1L/min.

Dimensions: 6¾" x 5⅝"
(17.1 x 14.3 cm)

Description	qty.	cat.#
Rechargeable Molecular Sieve S-Trap, 1/8" Brass Fittings	ea.	20686
Rechargeable Molecular Sieve S-Trap, 1/4" Brass Fittings	ea.	20685

tech tip

Carrier Gas Purity

Carrier gas should contain less than 1ppm of oxygen, moisture, or other trace contaminants, to prevent column degradation, increase column lifetime, and decrease stationary phase bleed.

The expense of using high-purity gases in combination with carrier gas line purifiers will be offset by longer column lifetime and less GC maintenance.

High-Capacity Moisture Trap

Dimensions: 11" x 1½"
(27.9 x 3.8 cm)

- Purged with ultra-high-purity helium; ready to use.
- Reduces water to less than 15ppb.
- Maximum operating pressure: 250psi (1724kPa).
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
High-Capacity Moisture Trap, ⅛" Nickel-Plated Brass Fittings	ea.	21997
High-Capacity Moisture Trap, ¼" Nickel-Plated Brass Fittings	ea.	20638

Indicating Moisture Trap

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

- Reduces water to less than 10ppb; indicator changes color from blue to pink at 5% relative humidity.
- Prepurged 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: 100psi (689kPa).

Description	qty.	cat.#
Indicating Moisture Trap, ⅛" Nickel-Plated Brass Fittings	ea.	22014
Indicating Moisture Trap, ¼" Nickel-Plated Brass Fittings	ea.	22015

Capillary-Grade Hydrocarbon Trap

Dimensions: 11" x 1½"
(27.9 x 3.8 cm)

- 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 (1724kPa).

Description	qty.	cat.#
Capillary-Grade Hydrocarbon Trap, ⅛" Nickel-Plated Brass Fittings	ea.	21991
Capillary-Grade Hydrocarbon Trap, ¼" Nickel-Plated Brass Fittings	ea.	21992

Refillable Hydrocarbon Trap

Dimensions: 9¼" x 2¼"
(23.5 x 5.7 cm)

- Removes trace impurities from carrier gas: reduces organics to 0.1ppm (assuming 100ppm input).
- 20µm frit prevents gas contamination by purifier particles.
- Stops carrier gas contaminants from interfering with purge & trap systems.
- Refillable and rechargeable.
- Maximum operating pressure: 250psi (1724kPa).
- Maximum flow: 1.25L/min.

Description	qty.	cat.#
Refillable Hydrocarbon Trap, ⅛" Nickel-Plated Brass Fittings	ea.	22012
Refillable Hydrocarbon Trap, ¼" Nickel-Plated Brass Fittings	ea.	22013
Carbon Refill (two recharges)	pint	20626

Hydrocarbon S-Trap

Dimensions: 6¾" x 5⅝"
(17.1 x 14.3 cm)

- Removes hydrocarbons and other contaminants from the gas stream.
- Reduces organics to 0.1ppm (assuming 100ppm input).
- Each trap individually activated to ensure maximum efficiency.
- Fits in GC oven for easy thermal recharging.
- Maximum operating pressure: 60psi (414kPa).

Description	qty.	cat.#
Hydrocarbon S-Trap, ⅛" Brass Fittings	ea.	22016

Indicating Hydrocarbon Trap for Air Compressors

Dimensions: 6" x 1¾"
(15.2 x 4.4 cm)

- Pass compressed air from an oil-filled air compressor through this trap, to remove oil vapors and mist.
- Indicator changes from pale pink to deep pink.

Description	qty.	cat.#
Indicating Hydrocarbon Trap for Air Compressors, ⅛" Brass Fittings	ea.	20637
Indicating Hydrocarbon Trap for Air Compressors, ¼" Brass Fittings	ea.	20636

High-Capacity Split Vent Trap

- Reduces the release of hazardous materials from the capillary split vent into the lab.
- Lasts approximately 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

Dimensions: 6" x 1"
(15.2 x 2.5 cm)

ECD Vent Trap

- Reduces the release of hazardous materials from the ECD vent into the lab.
- Includes connecting lines and mounting kit.

Description	qty.	cat.#
ECD Vent Trap	ea.	22017

Dimensions: 6" x 1"
(15.2 x 2.5 cm)

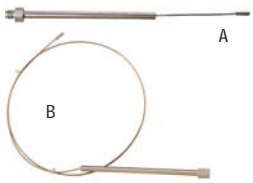
Replacement Chemical Traps for Agilent GCs

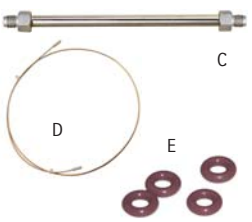
- Easy to install.
- Attach to same fittings as original equipment.
- Built-in frits retain fine particles; adsorbents remove both moiture and hydrocarbons.

tech tip

Eliminate ghost peaks—change your chemical trap often!

Description	Similar to Agilent part #	qty.	cat.#
A) Replacement Split Vent 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





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 7.2-volt battery.

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

Small, compact unit—easy to hold and operate.

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 Accessory Kit

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

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

Hydrogen Gas Generators

Parker Balston® Hydrogen Generators

- Proton Exchange Membrane (PEM) cell eliminates the need for liquid electrolytes.
- Reliably generate 99.9995% pure hydrogen—for better chromatography.
- Eliminates high-pressure cylinders—greater convenience and improved lab safety.
- Compact unit, requiring only one square foot of bench space.
- Quick and easy to service and maintain; unique display lighting changes color for easy status checks and water level indication.
- Comes with a set of universal power adapters for US, European, and Asian plug types.

Fuel-grade high purity hydrogen generators are safer alternatives to high-pressure gas cylinders. The new Proton Exchange Membrane (PEM) cell eliminates the use of liquid electrolytes with hydrogen generators. Deionized water is all that is required to generate hydrogen for weeks of continuous operation. With an output capacity of up to 510cc/minute, one generator can supply 99.9995% pure hydrogen for up to several FIDs. Based on cylinder gas savings alone, a hydrogen generator pays for itself in one or two years.

new and improved!

Hydrogen PEM generators now come with a set of universal power adapters for US, European, and Asian plug types.

CE

Produced and supported by an ISO 9001 registered organization, Parker Balston® hydrogen generators are the first built to meet the toughest laboratory standards in the world: CSA, UL, IEC 1010, and CE Mark. A great safety feature is the built-in sensing circuit, which shuts the generator down if a hydrogen leak is detected.

Specifications

Purity:	99.9995% pure hydrogen
Delivery Pressure:	10-100psig ± 1psig (69-689kPa ± 7kPa)
Outlet Port:	1/8" compression
Electrical Requirements:	100-230VAC/50-60Hz
Physical Dimensions:	17.12"h x 13.46"w x 17.95"d (43.48 x 34.19 x 45.6cm)
Shipping Weight:	40 lbs. (18kg) dry

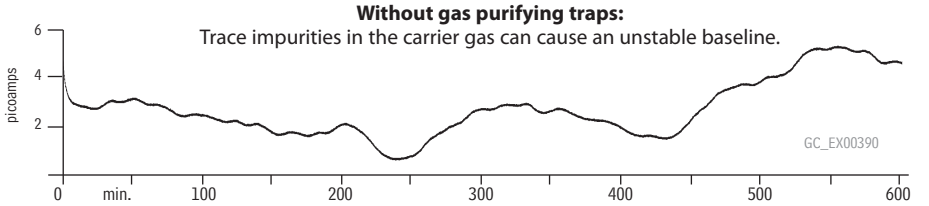
Description	Capacity	qty.	cat.#
Hydrogen Generator H2PEM-100	100cc/min.	ea.	23065
Hydrogen Generator H2PEM-165	165cc/min.	ea.	23066
Hydrogen Generator H2PEM-260	260cc/min.	ea.	23067
Hydrogen Generator H2PEM-510	510cc/min.	ea.	23068
Replacement and Maintenance Components for Hydrogen Generators (for all models listed above)			
Replacement Desiccant Cartridge for H2PEM Generators		ea.	23069
6-Month Maintenance Kit for H2PEM Generators (Includes: 1 deionizer cartridge, 1 water filter, 3 environmental filters)		kit	23070
24-Month Maintenance Kit for H2PEM Generators (Includes: 1 deionizer cartridge, 1 water filter, 3 environmental filters, 1 water level sensor, 1 water pump, and 1 desiccant cartridge)		kit	23071

tech tip

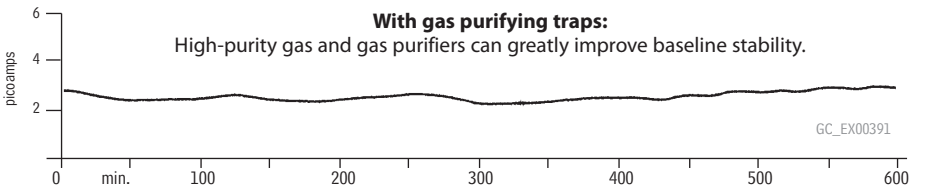
Gas generators are an economical source of pure gases, and eliminate the inconvenience and danger of high-pressure cylinders.

The combination of high-purity gas and gas purifying traps can save analytical time in the long run.

Without gas purifying traps:
Trace impurities in the carrier gas can cause an unstable baseline.



With gas purifying traps:
High-purity gas and gas purifiers can greatly improve baseline stability.



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Parker Balston® Hydrogen Generators

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Fast Facts
lit. cat.# 580053A

Parker Balston® 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 gas cylinders.
- Silent operation, minimal operator attention required.

Parker Balston® Gas Stations provide both UHP grade hydrogen gas and zero grade air for flame ionization detectors. The system is specifically designed to supply 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.

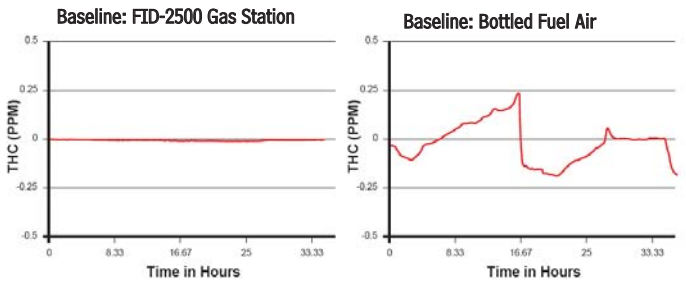
Specifications

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 (414kPa)
Zero Air Outlet Pressure:	40-125 psig* (276-862kPa)
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)

*Zero air inlet requires minimum of 40psig (276kPa) compressed air pressure.

Produce zero air and pure hydrogen from one unit!

Compare baselines produced by a Parker Balston® FID Gas Station and bottled fuel air. The baseline produced by the Parker Balston® Generator is flat, with no fluctuations or peaks; the chromatogram from the bottled air fuel supply has many peaks ranging from 0.25 ppm to -0.25 ppm total hydrocarbons.



free literature

FID Gas Stations

Download your free copy from www.restek.com.

Fast Facts
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	ea.	21671
FID Gas Station Maintenance Kit Includes 1 desiccant cartridge, 1 resin bed cartridge, 1 filter cartridge)	ea.	24915

ordering note

For **international orders**, please add the appropriate power cord suffix from the table below.

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

Zero Air Generators

Parker Filtration

Parker Balston® Zero Air Generators

- Turn in-house compressed air into ultra-pure air (<0.1ppm total hydrocarbons).
- Remove hydrocarbons to less than 0.1ppm by catalytic oxidation.
- Operate at 40 to 125psi (276-862kPa).
- Typical payback is less than one year, based on cylinder costs.
- Install easily and take up little bench space.
- Maintenance kits include a one year supply of prefilters and final filter.

Specifications

Maximum Zero Air Flow Rate:	75-83NA	1 lpm
	HPZA-3500	3.5 lpm
	HPZA-7000	7 lpm
	HPZA-18000	18 lpm
	HPZA-30000	30 lpm
Outlet Hydrocarbon Concentration (as methane):	75-83NA	< 0.1 ppm
	HPZA-30000	< 0.1 ppm
	Other Models	< .05 ppm
Minimum/Maximum Inlet Air Pressure:	40 psig/125 psig (276/862kPa)	
Maximum Inlet Hydrocarbon Concentration (as methane):	100 ppm	
Pressure Drop at Maximum Flow Rate:	4 psi (28kPa) differential	
Maximum Inlet Air Temperature:	78°F (25°C)	
Inlet/Outlet Ports:	1/4" NPT (female)	
Start-up Time to Specified Hydrocarbon Concentration:	45 minutes	
Electrical Requirements:	75-83NA	120 VAC/60 Hz, 0.5 amps
	Other Models	120 VAC/60 Hz, 3.5 amps
Dimensions:	75-83NA	12"h x 10"w x 3"d (30cm x 25cm x 8cm)
	Other Models	16"h x 11"w x 13"d (42cm x 27cm x 34cm)
Shipping Weight:	75-83NA	7 lbs. (3 kg)
	Other Models	41 lbs. (19 kg)

Model	Number of FIDs*
75-83NA	Up to 3
HPZA-3500	Up to 11
HPZA-7000	Up to 23
HPZA-18000	Up to 60
HPZA-30000	Up to 100

*based on a 300 cc/min. fuel air rate

Zero Air Generator	Capacity	qty.	cat. #
Zero Air Generator Model 75-83NA	1000cc/min.	ea.	20684
Zero Air Generator Model 75-83NA with United Kingdom Power Cord	1000cc/min.	ea.	20684-550
Zero Air Generator Model HPZA-3500	3500cc/min.	ea.	20680
Zero Air Generator Model HPZA-3500 with European Power Cord	3500cc/min.	ea.	20680-551
Zero Air Generator Model HPZA-7000	7000cc/min.	ea.	20681
Zero Air Generator Model HPZA-18000	18,000cc/min.	ea.	20682
Zero Air Generator Model HPZA-30000	30,000cc/min.	ea.	20683
Maintenance Kits (includes a one-year supply of prefilters and final filter)		**qty.**	**cat. #**
Maintenance Kit for Model 75-83NA		kit	21646
Maintenance Kit for Models HPZA-3500, HPZA-7000, HPZA-18000, HPZA-30000		kit	21647
Replacement Catalyst Towers	**Capacity**	**qty.**	**cat. #**
Replacement Catalyst Tower for Model 75-83NA	1000cc/min.	ea.	22005
Replacement Catalyst Tower for Model HPZA-3500	3500cc/min.	ea.	22004
Replacement Catalyst Tower for Model HPZA-7000	7000cc/min.	ea.	22006
Replacement Catalyst Tower for Model HPZA-18000	18,000cc/min.	ea.	22007
Replacement Catalyst Tower for Model HPZA-30000	30,000cc/min.	ea.	22008

ordering **note**

For **international orders**, please add the appropriate power cord suffix from the table below.

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Zero Air Generators

Download your free copy from www.restek.com.

Fast Facts
lit. cat.# 580050

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

Parker Balston® Nitrogen Gas Generators

- Turn compressed air into ultra-pure nitrogen (up to 99.9995%).
- Flows from 1 to 75+ lpm.
- Require only a compressed air source and 110 volt AC power.
- Safe, reliable, low maintenance.
- Maintenance kits include replacement filters.
- N2-14 and N2-14A can be used for LC/MS.

Model: N2-14

Specifications

	Model HPN2-1100 or UHPN2-1100	Model HPN2-2000	Model N2-14 or N2-14A
Maximum Nitrogen Flow Rate:	See Flow Table	2 lpm	78scfh** at 95% purity
Nitrogen Purity:	99.9999%	99.99%	95.0%–99.5%
Maximum Nitrogen Outlet Pressure:	See Flow Table	90 psig	
CO Concentration:	< 1.0 ppm	NA	
CO_2 Concentration:	< 1 ppm	< 1 ppm	
O_2 Concentration:	< 1 ppm	< 100 ppm	
H_2O Concentration:	≤ 2 ppm	≤ 2 ppm	
Hydrocarbon Concentration[1]:	< 0.1 ppm	NA	
Argon Concentration[2]:	0.9%	0.9%	
Atmospheric Dewpoint:			-58°F (-50°C)
Suspended Liquids:			None
Particles > 0.01μm:			None
Oxygen Analyzer:			Included with Model 75-720NA
Commercially Sterile:			Yes
Minimum/Maximum Inlet Pressure:	60 psig/125 psig (414/862kPa)	75 psig/120 psig (517/827kPa)	60 psig/145 psig (414/1,000kPa)
Maximum Pressure Drop (99% N_2 Purity, 125 psig):			10 psig (69kPa)
Recommended Inlet Temperature:	≤ 78°F (25°C)	≤ 78°F (25°C)	≤ 68°F (25°C) (Max.)
Ambient Operating Temperature:	60°F–100°F (16°C–38°C)	40°F–100°F (4°C–38°C)	110°F (43°C) (Max.)
Maximum Air Consumption:	42 lpm (1.5 scfm)*	42 lpm (1.5 scfm)*	
Inlet Connection:	1/4" NPT (female)	1/4" NPT (female)	1/4" NPT
Outlet Connection:	1/4" compression	1/8" NPT compression	1/8" NPT
Electrical Requirements[3]:	120 VAC/60 Hz	120 VAC/60 Hz	N2-14: None N2-14A: 120 VAC/60 Hz/25 Watts
Dimensions:	35"h x 12"w x 16"d (89cm x 30cm x 41cm)	35"h x 12"w x 16"d (89cm x 30cm x 41cm)	50"h x 16"w x 16"d (127cm x 41cm x 41cm)
Shipping Weight:	115 lbs. (52 kg)	115 lbs. (52 kg)	N2-14: 75 lbs. (34 kg) N2-14A: 80 lbs. (36 kg)

[1]Models HPN2-1100 and HPN2-2000 do not remove hydrocarbons.
[2]Purity specification for nitrogen does not include argon concentration.
[3]Power consumption is:
Model HPN2-1100 = 25 Watts
Model UHPN2-1100 = 700 Watts
Model HPN2-2000 = 25 Watts

Flow Table for Models HPN2-2000, HPN2-1100, and UHPN2-1100

Inlet Air Pressure	Maximum Outlet Flow (cc/min.)	Maximum Outlet Pressure
	Models HPN2-1100 and UHPN2-1100	
125 psig (862kPa)	1100	85 psig (586kPa)
110 psig (758kPa)	1000	75 psig (517kPa)
100 psig (689kPa)	900	65 psig (448kPa)
90 psig (621kPa)	800	60 psig (414kPa)
80 psig (552kPa)	700	50 psig (345kPa)
70 psig (483kPa)	600	45 psig (310kPa)
60 psig (414kPa)	500	35 psig (241kPa)
	Model HPN2-2000	
75-120 psig (517-827kPa)	2000	90 psig (621kPa)

Nitrogen Generators for LC/MS or General Purpose	qty.	cat.#
Nitrogen Generator N2-14 (general purpose) 78 scfh** max. flow at 95% purity	ea.	20677
Nitrogen Generator N2-14 with European Power Cord	ea.	20677-551
Nitrogen Generator N2-14A (general purpose w/oxygen analyzer) 78 scfh** max. flow at 95% purity	ea.	21652

Nitrogen Generators	qty.	cat.#
Nitrogen Generator HPN2-2000 (high purity—99.99%) 2.0 lpm max. flow	ea.	21654
Nitrogen Generator HPN2-1100 (ultra-high purity—99.9995%) 1.1 lpm max. flow	ea.	21653
Nitrogen Generator UHPN2-1100 (ultra-high purity—99.9995%); [HC<0.1ppm] 1.1 lpm max. flow	ea.	20697

Maintenance Kits	qty.	cat.#
Maintenance Kit for Models N2-14, N2-14A, 75-72, 75-720NA	kit	21648
Maintenance Kit for Models HPN2-1100, HPN2-2000, 76-96, 76-92	kit	21649
Maintenance Kit for Models UHPN2-1100, 76-94	kit	21655

*Standard cubic feet per minute.

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Nitrogen Generators

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Fast Facts
lit. cat.# 580052

ordering note

For **international orders**, please add the appropriate power cord suffix from the table on the previous page.

Gas Pressure Regulators: Introduction

Introduction to Gas Pressure Regulators

Mike Zezzo
Mid-Atlantic States
Sales Representative
9+ years of service!

General Purpose or Analytical?
General-purpose gas regulators usually are best suited for applications involving gases that are less than 99.995% pure: pneumatically-actuated valves and autosamplers, blanketing, inert atmospheres, and any other application not directly integrated with analytical data production. General purpose gas regulators have nylon-reinforced neoprene diaphragms that provide very good pressure control but are prone to air and moisture diffusion and hydrocarbon off-gassing.

Analytical regulators are recommended for applications in which maintaining the purity of a gas or mixture is the overriding concern, i.e., for applications requiring gases that are greater than 99.995% pure. They are commonly used in analytical labs. Analytical regulators have stainless steel diaphragms for pressure control. Stainless steel is not subject to the diffusion and off-gassing associated with neoprene diaphragms, and is easily purged of atmospheric contaminants when put into service.

Dual- or Single-Stage?
Dual-stage gas regulators reduce the source pressure to outlet pressure in two steps. The first stage reduces the inlet pressure to about three times the maximum working pressure. Outlet pressure gas regulation is controlled by the second stage and is set through the use of an adjusting knob. This two-step gas regulation is highly recommended for services requiring a near constant delivery pressure as the source pressure decays, including chromatographic analyses.

Single-stage gas regulators perform the same function as dual-stage gas regulators, but in a single step-down from source pressure to outlet pressure. For this reason, the outlet pressure cannot be as accurately maintained as the source pressure decays. We highly recommend that single-stage gas regulators be used only in circumstances in which the operator can monitor and adjust the regulator as needed, when the regulator is supplied with a nearly constant source pressure, or when additional pressure regulation is supplied downstream.

Brass or Stainless Steel?
Analytical gas regulators made from brass bar stock provide optimum performance for most analytical applications. Brass provides excellent strength and cleanliness and the machined bar stock design has less dead volume than forged-body gas regulators, making purging of atmospheric contaminants faster and more assured.

Gas regulators with stainless steel bodies were designed for delivering corrosive gases that would be incompatible with brass. With the advent of semiconductor manufacturing and high sensitivity analytical techniques, stainless steel also has proven to be a better surface for removing "sticky" atmospheric contaminants that interfere with detectors downstream. Unless these gas regulators are used in an all-stainless-steel system that incorporates welded tubing and special fittings, and in which rigorous cleaning and proper gas management are practiced, the extra expense relative to brass is not justified.

Overview of Restek's Chrome-Plated Brass and Stainless Steel Body Ultra-High-Purity Gas Regulators

These regulators feature metal-to-metal seals throughout for long-term leak-tightness, and a metal diaphragm outlet valve ensures gas purity. Each regulator is helium leak-test-certifiable to $1x10^{-8}$scc/sec. and is fully assembled and tested for your convenience. 100psig maximum delivery pressure supports EPC operation. Maximum inlet pressure is 3000psig. Chrome-plated brass bar stock construction minimizes dead volume. Stainless steel construction is more easily purged of atmospheric contaminants, and is more resistant to attack from dry corrosive gases.

Ultra-High-Purity Brass Body Gas Regulators

These regulators are the best choice when using ultra-high-purity carrier gas for sensitive GC applications using MS, PID, HID, or ECD detection methods. They feature reduced internal dead-volume, relative to stainless steel bodies. The stainless steel gas regulator diaphragm minimizes nonmetal parts, to help ensure ultra-high gas purity, and the metal valve diaphragm ensures leak-free shut-off. Oxidation-resistant chrome plating maintains a like-new appearance.

Dual-Stage Ultra-High-Purity Chrome-Plated Brass Gas 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 gas regulators.

Outlet pressure: 0 to 100psig (0-689kPa)
Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
Inlet gauge: 0 to 4000psig (0-27,579kPa)
Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N_2 He, Ar)	ea.	21667
CGA 350 (H_2, P_5)	ea.	21668
CGA 590 (Air)	ea.	21669

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

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

Outlet pressure: 0 to 100psig (0-689kPa)
Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
Inlet gauge: 0 to 4000psig (0-27,579kPa)
Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N_2, He, Ar)	ea.	20646
CGA 350 (H_2, P_5)	ea.	20647
CGA 590 (Air)	ea.	20648

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

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20psig (138kPa) 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 (0-689kPa)	0-50psig (0-345kPa)	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig (0-1379kPa)	0-100psig (0-689kPa)	ea.	22452

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

Male Connector, Pipe-to-Tube Fittings


male connector


tube end reducer

Fitting Type	Size (inches)	Parker #	Similar to Swagelok®	Brass qty.	Brass cat.#	Stainless Steel qty.	Stainless Steel cat.#
Male Connector	1/4" to 1/4" NPT	4 MSC 4N	400-1-4	10-pk.	21842	2-pk.	21942
Male Connector	1/8" to 1/4" NPT	2 MSC 4N	200-1-4	10-pk.	21844	2-pk.	21944
Tube End Reducer	1/4" tube to 1/8"	4 TUR 2	200-R-4	5-pk.	21834	2-pk.	21934

Ultra-High-Purity Stainless Steel Body Gas Regulators

These regulators are the standard for ultra-high-purity and corrosion-resistant pressure regulation. They are more easily purged of atmospheric components, compared to brass gas regulators, making them ideal for the most demanding applications. Gas regulation performance is equal to our brass body gas regulators. For use in all-stainless steel systems where welded tubing and special fittings are used, and rigorous cleaning and proper gas management are practiced.

Dual-Stage Ultra-High-Purity Stainless Steel Gas Regulators

- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.

Outlet pressure: 0 to 100psig (0-689kPa)
Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
Inlet gauge: 0 to 4000psig (0-27,579kPa)
Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N_2, He, Ar)	ea.	20662
CGA 350 (H_2, P_5)	ea.	20663
CGA 590 (Air)	ea.	20664

Single-Stage Ultra-High-Purity Stainless Steel Gas Regulators

- Use when there is secondary pressure requirement downstream.
- Identical gas purity protection as with our dual-stage gas regulators.

Outlet pressure: 0 to 100psig (0-689kPa)
Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
Inlet gauge: 0 to 4000psig (0-27,579kPa)
Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N_2, He, Ar)	ea.	20665
CGA 350 (H_2, P_5)	ea.	20666
CGA 590 (Air)	ea.	20667

Critical Purity Automatic Switchover System for Noncorrosive Service

High-purity automatic switchover systems provide a continuous supply of high purity gas to the laboratory, process, or instrument, to allow you to replace a depleted gas source without interruption in the supply of gas. Continuous supply is achieved by setting the two regulators at slightly different pressures, to discharge one side of the system at a time. These models include flexible, all-stainless-steel pigtails with armor casing. The CGA connection on each pigtail has a check valve in the gland to prevent contamination and minimize purging requirements.

Switching pressure:
200psig/170psig
(1379/1172kPa)
Inlet connections:
flexible SS pigtails (36")
Line regulator:
0 to 100psig (0-689kPa)

Brass Automatic Switchover System with Line Regulator	qty.	cat.#
CGA 580 (N_2, He, Ar)	ea.	20668580
CGA 350 (H_2, P_5)	ea.	20668350
CGA 590 (Air)	ea.	20668590
Stainless Steel Automatic Switchover System with Line Regulator	**qty.**	**cat.#**
CGA 580 (N_2, He, Ar)	ea.	21593580
CGA 350 (H_2, P_5)	ea.	21593350
CGA 590 (Air)	ea.	21593590

Protocol Station

The protocol station is designed for convenient wall mounting of high-purity gas regulators. Wall mounting provides ease of use, prevents gas regulator damage, and improves safety. Either chrome-plated brass or 316 stainless steel option is complete with a 3-foot, flexible, all-stainless-steel pigtail with armor casing. The CGA connection on the pigtail has an integral check valve in the gland to prevent contamination during cylinder changeout.

Chrome-Plated Brass Protocol Station*	qty.	cat.#
CGA 580 (N_2, He, Ar)	ea.	21347
CGA 350 (H_2, P_5)	ea.	21348
CGA 590 (Air)	ea.	21349
Stainless Steel Protocol Station*	**qty.**	**cat.#**
CGA 580 (N_2, He, Ar)	ea.	21327
CGA 350 (H_2, P_5)	ea.	21328
CGA 590 (Air)	ea.	21329

*Pressure regulator not included. Order separately.

CGA Fittings

CGA-specified nuts and nipples with internal frit, 1/4-inch NPT nickel-plated brass.

Description	qty.	cat.#
CGA 580 Fitting, (N_2, He, Ar)	ea.	21336
CGA 350 Fitting, (H_2, P_5)	ea.	21337
CGA 590 Fitting, (Air)	ea.	21338

Flexible Stainless Steel Hoses

Description	qty.	cat. #
Flexible Stainless Steel Hose, 36", 1/4" Female NPT Fittings	ea.	21339
Flexible Stainless Steel Hose, 18", 1/4" Female NPT Fittings	ea.	21340
Flexible SS Hose, 36", with Stainless Steel CGA 580	ea.	21344
Flexible SS Hose, 36", with Stainless Steel CGA 350	ea.	21345
Flexible SS Hose, 36", with Stainless Steel CGA 590	ea.	21346

Flammable Gas Flash Arrestor—Factory Mutual Approved*

- Gas flow shuts off in the event of a flashback.
- Flame extinguished—flame front prevented from reaching the gas supply.
- No gas flow restriction under normal operating conditions.

Description	qty.	cat.#
Flammable Gas Flash Arrestor, Brass Body	ea.	21334

*Approved for brass body servicing hydrogen, acetylene, propane, or natural gas only.

Backpressure Gas Regulator

Capillary GC inlet systems have backpressure regulators to maintain a constant upstream pressure and rapidly respond to catastrophic leaks. The 0–60psig (0-414kPa) operating range is sufficient to operate a 105m, 0.25mm ID column at its optimum flow rate.

Description	qty.	cat.#
Backpressure Gas Regulator	ea.	20635

MINICYL Regulator

This compact general purpose regulator has many laboratory applications including air-drying glassware, sparging or evaporating solutions, and controlling pneumatic valves. It is constructed of lightweight aluminum with an elastomer diaphragm. Includes a 0–60psig (0-414kPa) gauge and either 1/8- or 1/4-inch tube fittings.

Description	qty.	cat.#
MINICYL Regulator, 1/8" Fittings	ea.	20610
MINICYL Regulator, 1/4" Fittings	ea.	20611

Cylinder Valve Wrench

This specially-designed wrench enables easy opening of cylinder valves that are fitted with a hand wheel. It is also suitable for removing difficult cylinder caps.

Description	qty.	cat.#
Cylinder Valve Wrench	ea.	21321

Universal Cylinder Wrench

Use this versatile wrench for tightening gauges and gas regulator CGA fittings to cylinder outlets and pipe thread connections.

Description	qty.	cat.#
Universal Cylinder Wrench	ea.	21322

Wall-Mount Gas Cylinder Holder

Prevent serious injuries! This holder is designed to prevent free-standing gas cylinders from tipping over and injuring personnel. The cast aluminum holder can be secured to a wall or the side of a work bench. The mount will secure a cylinder from 4–15 inches in diameter.

Description	qty.	cat.#
Wall-Mount Gas Cylinder Holder	ea.	21333

Instrument-Grade Tubing

ordering note

Required length in meters x 3.2808 = length in feet.

Instrument-Grade Welded and Drawn 304 Grade Stainless Steel Tubing

Clean tubing is critical to ensure 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	1/16" 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.

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

precleaned

All tubing is precleaned and ready to use.

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 gas 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 carrier gas stream, elevating background noise and causing down time.

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.
- Nonslip safety design.

Description	qty.	cat.#
Tubing Reamer	ea.	20134

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).

8" x 6 1/4" x 4 1/4"
(20.3 x 15.9 x 10.8 cm)
Weight: 11 lbs. (5.0 kg)

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

Tube & Pipe Fittings

also available

For Siltek®/Sulfinert® and Silcosteel®-CR-treated fittings, see **pages 392-393.**

Tube & Pipe Fittings

The Instrumentation Group of Parker Balston® Corporation designs and manufactures a top-quality line of components and systems for use in process instrumentation, semiconductor manufacturing, and analytical instrumentation. Parker's product quality and delivery have made them a world-wide leader—and this is the level of quality and service Restek wants to deliver to you.

Fitting Type	Parker #	Similar to Swagelok® #	Size	Brass qty.	Brass cat.#	316 Grade Stainless Steel qty.	316 Grade Stainless Steel cat.#
nut 	1 Nu 1	102-1	1/16"	20-pk.	21800	5-pk.	21900
	2 Nu 2	202-1	1/8"	40-pk.	21801	10-pk.	21901
	4 Nu 4	402-1	1/4"	40-pk.	21802	10-pk.	21902
front ferrule 	1 FF 1	103-1	1/16"	20-pk.	21803	10-pk.	21903
	2 FF 2	203-1	1/8"	40-pk.	21804	20-pk.	21904
	4 FF 4	403-1	1/4"	40-pk.	21805	20-pk.	21905
back ferrule 	1 BF 1	104-1	1/16"	20-pk.	21806	10-pk.	21906
	2 BF 2	204-1	1/8"	40-pk.	21807	20-pk.	21907
	4 BF 4	404-1	1/4"	40-pk.	21808	20-pk.	21908
nut & ferrule set 	—	—	1/16"	10-pk.	21809	2-pk.	21909
	—	—	1/8"	20-pk.	21810	5-pk.	21910
	—	—	1/4"	20-pk.	21811	5-pk.	21911
plug 	1 BLP 1	100-P	1/16"	5-pk.	21815	2-pk.	21915
	2 BLP 2	200-P	1/8"	10-pk.	21816	4-pk.	21916
	4 BLP 4	400-P	1/4"	10-pk.	21817	4-pk.	21917
union 	1 SC 1	100-6	1/16"	3-pk.	21818	ea.	21918
	2 SC 2	200-6	1/8"	5-pk.	21819	2-pk.	21919
	4 SC 4	400-6	1/4"	5-pk.	21820	2-pk.	21920
reducing union 	2 RU 1	200-6-1	1/8" to 1/16"	5-pk.	21823	ea.	21923
	4 RU 1	400-6-1	1/4" to 1/16"	5-pk.	21824	2-pk.	21924
	4 RU 2	400-6-2	1/4" to 1/8"	5-pk.	21825	2-pk.	21925

Parker's (A-Lok) two-piece ferrules and NPT fittings are ideal for installing new equipment, modifying existing instrumentation, or replacing worn connections.

Size	Parker #	Similar to Swagelok®	Brass qty.	Brass cat.#	316 Grade Stainless Steel qty.	316 Grade Stainless Steel cat.#	Fitting Type
1/16"	1 ET 1	100-3	2-pk.	21826	ea.	21926	 tee
1/8"	2 ET 2	200-3	2-pk.	21827	ea.	21927	
1/4"	4 ET 4	400-3	2-pk.	21828	ea.	21928	
1/8"	2 ECR 2	200-4	2-pk.	21829	ea.	21929	 cross
1/4"	4 ECR 4	400-4	2-pk.	21830	ea.	21930	
A B 1/8" tube to 1/16"	2 TUR 1	100-R-2	5-pk.	21831	2-pk.	21931	A B  tube end reducer
1/4" tube to 1/16"	4 TUR 1	100-R-4	5-pk.	21832	2-pk.	21932	
1/8" tube to 1/4"	2 TUR 4	400-R-2	5-pk.	21833	2-pk.	21933	
1/4" tube to 1/8"	4 TUR 2	200-R-4	5-pk.	21834	2-pk.	21934	
1/8"	2 PC 2	201-PC	5-pk.	21835	2-pk.	21935	 port connector
1/4"	4 PC 4	401-PC	10-pk.	21836	2-pk.	21936	
1/8" tube to 1/4"	2 PC 4	401-PC-2	5-pk.	21837	2-pk.	21937	
A B 1/8" to 1/8" NPT	2 MSC 2N	200-1-2	10-pk.	21841	2-pk.	21941	A B  male connector
1/4" to 1/4" NPT	4 MSC 4N	400-1-4	10-pk.	21842	2-pk.	21942	
1/16" to 1/8" NPT	1 MSC 2N	100-1-2	5-pk.	21843	2-pk.	21943	
1/8" to 1/4" NPT	2 MSC 4N	200-1-4	10-pk.	21844	2-pk.	21944	
1/4" to 1/8" NPT	4 MSC 2N	400-1-2	10-pk.	21845	2-pk.	21945	
A B 1/8" to 1/8" NPT	2 FSC 2N	200-7-2	5-pk.	21846	2-pk.	21946	A B  female connector
1/4" to 1/4" NPT	4 FSC 4N	400-7-4	5-pk.	21847	2-pk.	21947	
1/4" to 1/8" NPT	4 FSC 2N	400-7-2	5-pk.	21848	2-pk.	21948	
1/8" male*	2A-Q4VN	QC4D-200	—	—	ea.	21957	 male & female quick couplings
1/8" male	2A-Q4P	QC4S-200	—	—	ea.	21958	
1/8" female*	2A-Q4CN	QC4B-200	—	—	ea.	21959	
1/4" male*	4A-Q4VN	QC4D-400	—	—	ea.	21960	
1/4" male	4A-Q4P	QC4S-400	—	—	ea.	21961	
1/4" female*	4A-Q4CN	QC4B-400	—	—	ea.	21962	

*Includes self-sealing shut-off valve.

Gas Valves, Leak Detector, GC Installation Kit

Toggle-valve—instant on/off control

Ball valve—leak-free bidirectional sealing

Plug valve—leak-free at wide temperature swings

cat.# 22202

cat.# 22200

cat.# 22209 Optional knob for accurate control of low flow

Parker Balston® Shut-Off Gas Valves

Parker toggle gas valves are ideal for applications in which instant on/off gas control is necessary. They are rated to 200psig at 21°C and have a maximum operating temperature of 148°C. Ball valves have a floating ball to assist sealing and to reduce operating torque, and dual seats to provide leak-tight bidirectional sealing. They are rated to 1500psig at 21°C and have a maximum operating temperature of 177°C. Perfect for instrument supply lines, plug valves work well in any application requiring throttling or on/off operations. Parker plug valves remain leak-free even when subjected to wide temperature swings. They are rated to 3000psig at 21°C and have a maximum operating temperature of 205°C.

	1/8" Brass		1/4" Brass		1/8" Stainless Steel		1/4" Stainless Steel	
Valve Type	cat.#	ea.	cat.#	ea.	cat.#	ea.	cat.#	ea.
Toggle	22188		22189		22190		22191	
Ball	22192		22193		22194		22195	
Plug	22196		22197		22198		22199	

Parker Balston® Precision Metering Gas Valves

Precision metering gas valves provide accurate, stable control of low gas and liquid flow rates. The valve stem threads do not contact the fluid stream, making these valves ideal for high-purity applications. The O-ring seal and stem threads are coated with a low vapor pressure, silicone lubricant for optimum performance. An optional vernier turn-counter knob allows repeatable flow settings for standardized operating processes.

	1/8" Nickel-Plated Brass		1/4" Nickel-Plated Brass		1/8" Stainless Steel		1/4" Stainless Steel	
Valve Type	cat.#	ea.	cat.#	ea.	cat.#	ea.	cat.#	ea.
Metering, straight	22200		22201		22204		22205	
Metering, right angle	22202		22203		22206		22207	
Vernier Knob for Metering Valve: cat.# 22209 (ea.)								

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 7.2-volt battery.

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.

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

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

54-Piece Tool Kit

A must-have for every lab—all the tools you need in one place! Set comes with screwdrivers, pliers, wrenches, sockets, scissors, clamps, and more. Durable, zippered, notebook-style carrying case for easy transport.

Description	qty.	cat.#
54-Piece Tool Kit	kit	23004

Plier Set

Includes 6-inch nose/side cutter, 6-inch wire cutter, and 6-inch adjusting pliers.

Description	qty.	cat.#
Plier Set	set	23033

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

12 Piece Ball-Point Hex Key Set

Includes 12 hex keys (Allen wrenches): .050", $^{1}/_{16}$", $^{5}/_{64}$", $^{3}/_{32}$", $^{7}/_{64}$", $^{1}/_{8}$", $^{9}/_{64}$", $^{5}/_{32}$", $^{3}/_{16}$", $^{7}/_{32}$", $^{1}/_{4}$", and $^{5}/_{16}$".

Description	qty.	cat.#
12 Piece Ball-Point Hex Key Set	set	22998

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

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

5-in-1 Magnetic Screwdriver

Magnetic power tip holds bits and screws securely.

Description	qty.	cat.#
5-in-1 Magnetic Screwdriver	set	23002

Ratchet Wrenches

Easier to use in confined spaces, compared to adjustable wrenches.

Description	qty.	cat.#
$^{3}/_{8}$" Ratchet Wrench	ea.	23005
$^{1}/_{2}$" Ratchet Wrench	ea.	23006
$^{7}/_{16}$" Ratchet Wrench	ea.	23007
$^{9}/_{16}$" Ratchet Wrench	ea.	23008

Wrench Set

Includes 4-inch, 6-inch, and 8-inch adjustable wrenches.

Description	qty.	cat.#
Wrench Set	set	23001