Dynamic Adsorbents, Inc.

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YOUR SORBENT SOURCE FOR PURIFICATION & SEPARATION TECHNOLOGY

What we're on about !

Dynamic Adsorbents, Inc. develops and provides products for the purification and separation of contaminants in various pharmaceuticals and chemicals as well as the removal of microbes and pollutants in air and water. Our goal is to make our environment a safer place to live and work.

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Dynamic Adsorbents for Chromatography

DAI's adsorbents for Chromatography are manufactured to exact physical-chemical specifications to ensure reproducibility of the chromatographic process.

Continuous Quality Control ensures the availability of a standardized product that will provide reproducible results day to day, lab to lab, process to process, worldwide. Dynamic's sorbents originate from the same starting material. Thus, the analyst can freely use small particles for HPLC, HPTLC and larger particles for Prep LC and Process utilizing similar separation conditions to achieve the desired results, and freely move from one technique to another.

Standardized Alumina has become synonymous with DYNAMIC ADSORBENTS, INCORPORATED. Never before has an adsorbent been more precisely standardized and introduced to such a high degree of reproducibility when used in laboratory and plant operations.

This leadership lended its impulses to all other DYNAMIC ADSORBENTS' products such as Silica Gels and products for Thin Layer Chromatography, Liquid Chromatography and the preparative link between TLC and Column Chromatography: Dry Column Chromatography (DCC).

DAI's ADSORBENTS:

Controlled Physical Characteristics

Particle Size
Particle Shape
Surface Area
Surface Chemistry

Reproducible Chromatographic Performance

Resolution
Reproducibility
Selectivity
Capacity
Analytical to Prep
High Recovery
Economy of Scale

Particle Size Conversion Table

MESH	MICRONS
400	37
230	63
230-400	37-63
150-230	63-100
70-230	63-200
70-150	100-200
30-70	200-500

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ALUMINA

DAI's Alumina for chromatography has contributed to the continued growing use of this material in a diverse number of applications. Indeed the major reasons for this growth has been our contribution to the standardization of the manufacturing process. This has resulted in standardized grades of Alumina that are very well controlled and defined. Alumina, by being amphoteric (acting either as a base or an acid as well as being configured as neutral) provides the chromatographer the ability to separate a multitude of compounds over and above silica gels. Alumina can act as a weak ion exchanger demonstrating anionic or cationic properties while additionally acting as an adsorbent. Alumina due to its unique biological characteristics is a special sorbent for use in separation sciences.

Activity:

Super Activity I
Standard (Std) Activity I - IV
pH: Acid (A) Basic (B) Neutral (N)
Stepless Deactivation behavior
Constant Deactivation behavior
Controlled Chromatographic Parameters
Controlled Surface Area, Porosity

Application	Recommended Alumina
ALKALOIDS Isolation from ergot, opium, rauwolfia , and other alkaloids	Basic, medium activity, Speciality
ANTIBIOTICS Isolation, purification	Neutral
ESSENTIAL OILS Removal of terpenes	Basic, Neutral
PLANT EXTRACTION Isolation of active substances	Basic, Neutral, Acid
DEHYDRATION OF ORGANIC SOLVENTS	Basic. highly active, Dryspheres™
ENZYMES Purfication	Neutral
GLYCOSIDES Isolation of digitalis, strophantus, glycosides, etc.	Neutral
REMOVAL OF LEAD Cations from water	See Specialty Types
NEUTRACEUTICALS Taxols and derivatives, baccatine, II derivatives, paclitaxel, derivatives, etc.	Basic, Neutral, see decolorization & specialty types
HORMONES Isolation and purfication of synthetic products, of ketosteroids from neutral materials. etc.	Neutral
PURIFICATION OF ORGANIC SOLVENTS for analytical and technical purposes	Basic, highly active, Dryspheres™
OILS Clarification of fatty oils, separation of fatty acids	Basic
PCB'S Remove from solvents, Transformer oils	Alumina " C "
REMOVAL OF PEROXIDES from organic solvents	Basic, highly active
REMOVAL OF PYROGENS from injectable solutions and infusions	Alumina P

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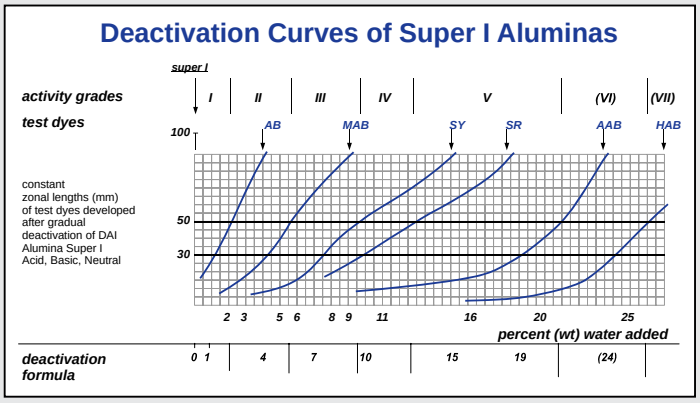
Super I

Super Activity I Aluminas are unique as DAI's products; they demonstrate approximately twice the capacity as compared to Standard Activity I; Surface modifications available are "A" (Acid), "B" (Basic), and "N" (Neutral). Super Activity I Aluminas constitute the starting material for the Dynamic Adsorbents line of Aluminas. Therefore, it is easy to change between various modes of chromatography. A special feature of Super Activity I is absolutely constant deactivation behavior valid for the deactivation process as well as when in contact with the chromatographic solvent.

Standard Activity I

Alumina Standard Activity I is available with various surface modifications to facilitate the separation of a wide range of compounds. In addition to pH the activity of the surface of alumina can mediate the separation. It is simple to adjust the activity by adjusting the water content of the material. (Alternatively other polar media can replace water)

- Use high activity Alumina (Std Act I, Super Act I) for the separation of polar samples in nonpolar solvent systems and for the purification of solvents. (*see next page*)...
- Use lower activity Alumina for less polar samples. (See Deactivation Protocols Pg. 6)



Symbols of test dyes on the deactivation curves:

AB	Azobenzene
MAB	Methoxy azobenzene
SY	Sudan yellow
SR	Sudan red
AAB	p-amino azobenzene
HAB	p-hydroxy azobenzene

Dynamic Adsorbents' Aluminas
Analytical, Prep LC, Sample Processing

DCC Alumina

DCC - Dry column chromatography is a versatile Prep LC method that bridges the gap between analytical TLC and preparative column chromatography. (Request DCC Application Guide)

'Flash" Alumina

Flash Chromatography is a rapid Prep LC technique that facilitates the separation of 0.1 - 10 g of material via simple economical laboratory protocols. (Request "Flash" Application Guide)

Activity II, III

Alumina II - III sorbents are economical adsorbents of medium activity. Use this material for general purpose scouting and in cases where the use of carbon black is precluded due to its organic nature. Also, use Alumina II - III as a replacement for organic/polymeric ion exchangers, especially when it is necessary to overcome temperature and radiation cleavage problems.

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Alumina C (for PCB Removal)

Alumina C is a chemically and physically modified Alumina for the analysis and removal of PCB's. This material will find wide use and application in/for:

- Analysis
- Environmental Clean-Up
- Solvent Purification
- Electric Utilities: Transformer Oil
- Soil, Water Studies

(Request the Alumina Environmental Product Bulletin for other environmental applications)

Alumina P for Pyrogen Removal

This material was developed specifically for the removal of Pyrogens in solution. Pyrogens are typically complex carbohydrates which preferentially adsorb to Alumina P. Ideal for antibiotic production and other types of bio-technology products.

Alumina R

Alumina R is an Alumina which is used for purifying, separatiing, and product formulations in the radio-active field; used for the production of various generators where one isotope is retained while the other is eluted. Mainly its improved exchange properties and the constant elution behavior will contribute to its reliability.

Alumina for Dioxin Analysis

AL 5788 has been developed for doing dioxin analysis. It is a 50-200 micron particle.

Alumina for Solvent Purification

Alumina is an ideal media for many solvent clean-up applications.

Speciality Aluminas

ALUMINA for Pilot and Process

Based on DAI's expertise, Aluminas can be produced according to customer's specifications. They are used for batch processes as well as for production size chromatography. Please request information and technical assistance.

DRYSPHERE™

Drysphere™ is new high technology, Dust free, spherical activated Alumina manufactured and designed to optimize desiccant performance.

Request the Drysphere™ Product Bulletin.

AL 2000 - For Removal of Lead from Water

AL 2000 is a large particle (+200 micron) specially modified, chemically treated Alumina that has been designed for the removal of metal ions, especially dissolved lead and other cations from water. Request the AL 2000 Product Bulletin.

AL 2100 - Scavenger Alumina for Process Clean-up

Scavenger Activated Alumina is used for process scale removal of impurities. Its high macroporosity improves diffusion rates and the high surface area provides enhanced capacity.

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Typical Applications

- Removal of peroxides from hydrocarbons and ethers
- Peroxide adsorption from solvents for ultraviolet spectroscopy
- Dehydration of organic solvents with superactive adsorbents
- Removal of alcohol from chloroform
- Purification of organic solvents for optical purposes
- Purification of hydrocarbons and silicone oil for UV spectroscopy

AL 2300 - For Bio-Mass Clean-up

AL 2300 is designed for removing bio-mass in nutraceutical or natural product purification.

AL 5000 for Removal of LEAD and other Heavy Metals from Water

AL 5000 is a +50 micron spheriodal Alumina that can readily remove Lead and other heavy metals from Water. Metal Cation selectivity is Fe III> Cr III> Al III> Pb> Ag II> Zn II> Co II> Cd II.

AL 5005 for Decolorization

AL 5005 is a 50 micron spheroidal, macroporous high surface area, high performance Alumina for the removal of color, dyes and clean-up of water.

AL 5500 for Arsenic Removal from Water

AL 5500 is a specific macropore designed for the removal of arsenic from water or air vapor. Ideal for run-off water contaminated with arsenic.

AL 5900 Activated Wide-Pore Aluminas

Wide-Pore aluminas are available in various pore sizes up to a macropore of 1000Å . Ideal for biotechnology, environmental, and petroleum uses.

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Introduction

Dynamic Adsorbents, Inc. Aluminas are unique products; e.g., Super I, Std Act I, etc: High activity Alumina can be used for polar samples in nonpolar solvents, and for the purification of solvents. Lower activities of Alumina can readily be obtained by the addition of polar media, especially water. Thus, each problem can be resolved via the adjustment of the sorption system, as required for each problem.

Special Features

Super I Aluminas show an approximate double capacity as compared to Activity I. Super I does not have to be deactivated in steps. By following the appropriate deactivation curves, deactivation can be achieved in minute increments.

Deactivation behavior by the procedure described below makes it relatively easy to obtain the desired activity.

Deactivation Behavior

By the following procedures below, it is relatively easy to obtain the desired Activity.

Deactivation Behavior - Alumina

Activity Grade

Alumina Type	Super I	I	II	III	IV	V	
Super I - A,B,N	0	1	4	7	10	19%	Water Added
Std Act I - A,B,N	na	0	3	6	10	15%	Water Added

A = Acid, **B** = Basic, **N** = Neutral

Alumina Deactivation Protocols

Deactivation Procedure(s)

The % water addition shown above are based upon weight / weight relationships; these relationships are critical and any deviation will/could result in obtaining improper *activities.*

To reproducively obtain the desired *activity*, weigh an appropriate amount of Alumina into a stoppered glass bottle. Add the appropriate weight of water to the Alumina and close the bottle. For example, 97 g of Alumina + 3 g H_20 = 3% water addition.

Shake well until all lumps disappear. Wait until the mixture has cooled to room temperature. Keep the container closed so that equilibrium conditions remain constant.

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Typical Chromatography Uses

DAI Applications	Adsorbent Used
Acids, Aromatic	
Isomeric aminobenzoic acids	Alumina, Silica
Esters of phthalic acids	Alumina, Silica
Amines, Aromatic	
Isomeric phenylendiamines	Alumina, Silica
Isomeric aminobenzoic acids	Alumina, Silica
Isomeric nitroaniline	Alumina, Silica
Aniline, di-, tri-phenylamine, napthylamine	Silica
Analgesics, Pharmaceutical Formulations	
Amidopryin, antipyrin	Alumina, Silica
Phenacetin, caffeine	Alumina
Isopropylephenazone, phenacetin, phenazone	Alumina
Phenacetin, acetylsalicylic acid	Alumina
Phenacetin, salicylic acid, acetylsalicylic acid	Silica
Phenacetin, salicylic acid, acetylsalicylic acid	Silica
Mandelic acid benzyl ester, ortho ethoxybenzamide, isopropylphenazone	Silica
Isopropylphenazone, phenacetin	Silica
Isopropylphenazone, ortho ethoxybenzamide caffeine, mandelic acid benzyl ester	Alumina
Phenacetin, codeine	Alumina, Silica
Barbituates	
Pheno-, cyclo-, hexo-barbital	Alumina
Methyl, hexo-, pheno-barbital	Silica
Dyes, Test Mixture	
Azobenzene, butter yellow, Sudan Red G, indophenol blue	Alumina, Silica
Esters, Aromatic	
Phthalates	Alumina, Silica
insecticides	
Aldrin, Heptachlor, DDT	Alumina, Silica
Nitrocompounds, Aromatic	
Nitroaniline, isomeric	Alumina, Silica
Nitrophenols, isomeric	Alumina, Silica
Ultrapyrin, ethoxybenzamine, d-propoxyphene, HCI, NAPAP	Alumina
Orthoethoxybenzamide, d-propoxyphene HCI, NAPAP	Silica
Isoaminile	Silica
Orciprenaline	Silica
Isoaminile, orciprenaline	Silica
Phenols	
Nitrophenols, isomeric	Alumina, Silica
Plasticizers	
Phthalates	Alumina, Silica
Test Mixture, Dyes	
Azobenzene, butter yellow, Sudan Red G, indophenol blue	Alumina, Silica

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Dynamic Adsorbents, Inc. Silica Gels are carefully manufactured and Quality Assured to provide the ideal Laboratory and Pilot Process chromatographic material. We control the manufacturing process from raw material to finished product. We carefully control the physical characteristics of pore size, surface area, particle size and surface chemistry ensuring reproducible optimized chromatographic behavior for:

k' - uniform capacity
- reproducible selectivity
R_S - improved resolution
N - excellent performance

Reproducible performance is delivered regardless of the technique used, especially when transferring from one technique to another.

Technique

"Flash" Chromatography
Column Chromatography
DCC - Dry Column Chromatography
Large Column Chromatography
TLC, HPTLC, HPLC

Application

Prep LC. Request "Flash", DCC, Application Guide(s)

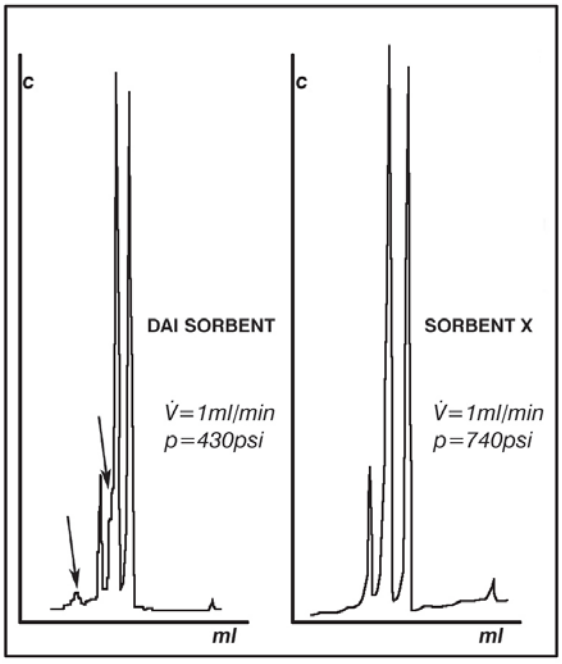
Pilot - Prep - Process
Analytical QC Methods Development

Silica Gel Prep LC

Flash Chromatography

"Flash Chromatography" is a rapid form of preparative column chromatography- Prep LC based upon "an air pressure driven hybrid of medium and short column chromatography optimized for rapid separation." This approach was pioneered by W.C. Still at Columbia University, and described in J. Org Chem 43, 2923 (1978). Separation was based upon the relatively inexpensive apparatus used.

Flash Chromatography is typically used to prepare 0.1-10.0 g of material in less than 15 minutes and is especially useful when the differences on TLC are greater than 0.15 Rf units. Clearly, Flash Chromatography is a simple and economical approach to Prep LC.



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Flash Chromatography is a type of preparative liquid chromatography used for the separation of organic compounds. This is adsorption chromatography for the routine purification of organic compounds. By using the flash technique chromatographers can scale up normal phase chemistries from thin layer chromatography (TLC) helping to satisfy the demands of the pharmaceutical and biotech industries in the transition to large scale purification of organic compounds and peptides. The technique utilizes an air pressure driven hybrid of medium pressure and short column chromatography optimized for particularly rapid separations. [1]

Flash is very similar to traditional column chromatography except that solvent is driven through the column by applying positive pressure. Resolution is measured in terms of the ratio of retention time (r) to peak width (w, w/2). The technique simply uses a set of chromatography columns and flow controller valves. Modern flash chromatography systems are very convenient, being sold as prepackaged plastic cartridges with solvent being pumped through the cartridge.

Flash and Gravity Column Chromatography

Column chromatography (which is the basis for Flash Chromatography) follows the same principles as thin layer chromatography (TLC). The main difference is that TLC separates miniscule amounts of material whereas column chromatography can be used to separate large amounts of material. If the solvent flows down the column by gravity or percolation the technique is called gravity column chromatography. If the solvent is forced down the column by positive air pressure it is called Flash Chromatography. The term flash chromatography was first used by Dr. W. Clark at Columbia University because the technique allows organic compounds to be purified “in a flash”.

Column chromatography involves stationary and mobile phases. In column chromatography the stationary phase (a solid absorbent) is placed in a vertical column and the mobile phase (liquid) is added to the top and flows down through the column by either gravity or external pressure. In column chromatography the stationary phase is most commonly either silica ($Si0_2$) or alumina (Al_2O_3). The columns packed with silica usually have a defined particle size of 40-60 microns. The mobile phase is normally a mixture of hexane and ethyl acetate. Mobile phases with low viscosity require smaller particle sizes. The stationary phase is normally more polar than the mobile phase.

By increasing the polarity of the solvent system all components of the mixture move faster. By lowering the polarity all components move more slowly.

The eluting power of organic solvents
The highest polarity being the most powerful eluters (at the top of the list)

Acetic acid
Alcohol
Acetone
Ethyl acetate
Diethyl ether
Halogenated hydrocarbons (methylene chloride)
Toluene
Alkanes (hexanes, petroleum ether)

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CHROMATOGRAPHY

The impure mixture to be analyzed by column chromatography is applied to the top of the column. The liquid solvent (eluent) is passed through the column by gravity or by the application of gas pressure (normally nitrogen or compressed air).

The chromatography column is filled with the stationary phase adsorbent and impure product is placed as a solution on the top of the stationary phase. As solvent (the mobile phase) is flushed through the column compounds the impure product passes slowly down through the stationary phase. The speed at which each compound travels down the column is determined by a number of factors including the particle size of the stationary phase, the polarity of the mobile phase and solvent flow rate. Each compound will partition between the mobile and the stationary phases differently. They will take different times to pass through the column and each of the partitions is then collected separately. The advantage of flash chromatography is that pressure is used to rapidly push all the air from the stationary phase material (silica or alumina) and to speed up the purification process.
Component retention on TLC plates is measured in terms of retention factor (Rf). Using Flash chromatography retention is measured in column volumes (CV). There is a reciprocal relationship between Rf and CV:

CV = 1/Rf
Therefore methods developed using TLC are generally transferred to flash chromatography.

A low Rf (0.15-0.35) is preferred because a lower Rf means a greater CV due to the reciprocal relationship. Large CV's indicate an increased contact time with the stationary phase, improving the changes of component resolution. Since CV is a measure of compound retention, then CV is a measure of compound resolution. Using flash purification, CV dictates the sample load range possible for any given cartridge size. For two adjacent components a large column volume is desirable.

1. Rapid Chromatographic Technique for Preparative Separations with Moderate Resolution, Still WC, Kahn, M, Mitra, A, Journal of Organic Chemistry, Vol. 43, No 14 1978 pp. 2923-25

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Silica based Flash Chromatography demands using materials consistent in grade, particle size and quality. In response to the demands and requests of chromatographers DAI has developed a superior Flash Grade Silica. This new product ensures more uniform silica packed columns and cartridges, providing separation chemists and chromatographers with enhanced resolution and separation capabilities.

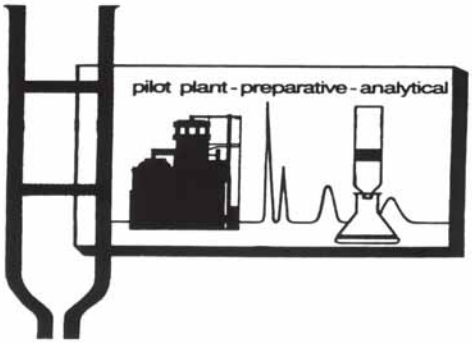
The particle size for the uniform DAI Flash Grade Silica measures 32-63 microns. More than 90% of all silica particles in the DAI Flash Silica product lie within this defined size range. For you the chromatographer the benefits are obvious.

This product contains a very low level of fines, which are small particles measuring less than 32 microns in size. Fines cause back pressure increases and column clogging, particularly dangerous when performing MPLC (medium pressure liquid chromatography) or when using glass columns for product separation. Small particles (fines) may pass through filters, and as such can contaminate final product purification, rendering product isolation useless. DAI has the lowest level of fines in any silica offered for the chromatography market today. Offering Flash grade silica with less fines provides a regular, stable and reproducible chromatography bed with a fast, even flow rate.

Just as bad as small particle fines are large particles for product isolation and purification. Large particle size allows solvent to flow quickly through the column which impairs separation. Within a column solvent will take the path of least resistance, flowing around pockets of small particles. Uneven flow greatly affects chromatographic separation, because yield peaks will have different retention times depending on the flow path through the column. As the product being isolated exits the column, the compound gives peaks which may be broad and poorly separated. The goal for the chromatographer is to achieve product yield as well defined as possible.

It is very import to start with a clean particle size distribution silica gel when performing separations. Uneven flow of solvent through a column leads to broad peaks which are poorly separated from other components. More even particle distribution provides better defined Gaussian peaks, yielding purer products.

Many silica get manufacturers offer 40 micron size silica gels. With more than 90% of silica gel particles in the defined range (32-63 microns) the DAI Flash grade silica provides 18-24% more consistency than any competitive vendor. It is manufactured to satisfy the rigorous specifications of our demanding customers, you the separation scientist.
Separation chemists need to remember that not all 40-63 micron silica gels are the same. Try using this DAI superior high purity, clean particle size product for your separations. The rewarding results will display the benefits, with reproducible lot to lot consistency in product yield.



Sorbent

Results were less than acceptable when large 63-200 microns (70-230 mesh) material was used, but remarkably improved when a mean of 40 micron (32-63 micron) material was in the column. Equally important: particle sizes less than 40 microns offered no significant improvement in resolution in this system. Ideally, use Dynamic's “Flash” Silica Gel 40 micron Cat. #02826-25.

Apparatus

The column is a flat bottom 18 inch glass tube fined with a Teflon stopcock and topped with 24/40 standard taper glass joint, “Columns without fritted glass bed are generally preferred because they have less dead volume than the standard fritted type.” Stills’ group described the flow controller as a “simple variable bleed device.”

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Sorbent Selection

Use an analytical TLC plate to scout for the best solvents and to optimize separations. The desired Rf of the component should be 0.35 with a sRf of 0.15. Use Dynamic Adsorbents' TLC plate, Silica Gel, 20x20, Cat. #84101, or Silica Gel F-254, 20x20 Cat. #84111.

The following Dynamic Adsorbents' "Flash" Silica Gel Sorbent Catalog #'s are recommended: 02826-25, 02826-05, 02826-1, 02826-2, 02826-5.

Column Selection

Select a column that is 10, 20, 40 mm id based upon preparative requirements. Indeed, Prof. Still *et al* offered this selection table.

Column Diameter (mm)	Volume of Eluant* (ml)	Sample Load (mg) ΔR_f>0.2	Sample Load (mg) ΔR_f>0.1	Fraction Size (ml)
10	100	100	40	5
20	200	400	160	10
30	400	900	360	20
40	600	1600	600	30
50	1000	2500	1000	50

*Typical volume required for equilibration of the column and elution.

Technique

Dry pack "Flash" Silica Gel into the appropiate column to a height of 6" - 10" depending upon the resolution required. Gently tap vertically to pack the gel. Clamp and assemble. Fill with solvent, pressure slightly to compress the Silica Gel and force solvent and air thru the column. The top of the column should not be allowed to run dry.

Apply the samples as a 20 - 25% solution and elute at a flow rate of 2 inches/minute.

Time

Fast. Generally 5 - 10 minutes.

Results

Gram quantities. Typically 0.5 - 2.0 g. Can be increased to 10g if less resolution is required and/or larger columns are used.

Summary

Flash Chromatography is a fast, cost efficient Prep LC approach. Separations are based upon traditionally obtained TLC results which are simply extrapolated to prep scale. Best of all, elaborate equipment and the purchase of expensive equipment is not necessary.

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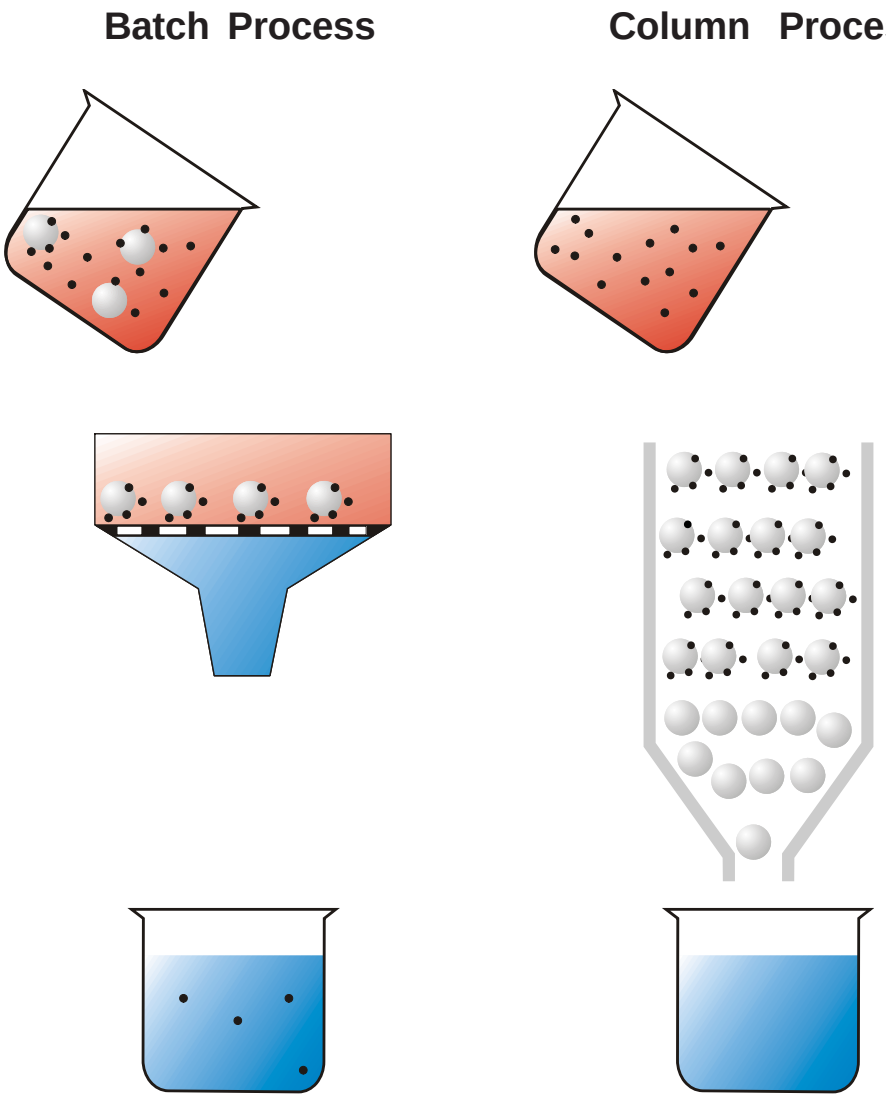
Purification by Adsorption



Purity Of Samples Running → Through

- **Batch Process**: Equilibrium Concentrations of Contaminant Still Present
- **Column Process**: Chromatographically Pure Substance

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Dynamic Adsorbents Inc.'s technology and experience has resulted in one of the broadest TLC-HPTLC-"S" HPTLC programs in the world. Our TLC-HPTLC program is one of the most complete. Included in the program are Silica Gels, Aluminas, Cellulose and PEI Cellulose. In addition, we supply these materials in a broad variety of layers and plate types.

THE DYNAMIC TLC PROGRAM

Layer Code/Type	Layer Description	Feature/Benefits
Analytical TLC		
HLO	Hard-Layer: Organic Binder HLO the most abrasion resistant high resolution TLC product available in our program. Write directly on the plate. Outstanding detectability, sensitivity; Minimal breakage.	▪ High Resolution ▪ Standard of the Industry ▪ Durable Reflective Surface
Alumina A, B, N	Select the pH most appropriate to your separation, **A**=Acid, **B**=Basic, **N**=Neutral. Alumina is stable a pH 4 - 14 and can be used to separate most compounds, especially basic.	▪ Ideal for the Separation of Basic Compounds ▪ Standardized Particle for TLC, Prep TLC ▪ Stable Reproducible Layer
PEI - Cellulose	Ideal Anion ion-exchanger for many life science applications e.g. nucleic acid compositions. Keep refrigerated at 4ºCelcius to avoid discolorization.	▪ Long Chain Anion Exchanger ▪ Bio-Life Science Applicaitons ▪ Stable Reproducible Layer
Cellulose	Available as microcrystalline, Avicel, and Native (MN layers for the separation of polar compounds via liquid - liquid partition chromatography.	▪ Liquid-Liquid Partition Separation Mechanism ▪ Ideal for Polar Analytes ▪ Available as Crystalline or Native Fibers
HPTLC and "S" - HPTLC Advanced Layers		
HPTLC	A 5 micron particle, 200 micron thick layer, suitable for very difficult separations. Spots of 1-2 mm will optimize separations. Three to five times the resolving power of TLC. Fast development time.	▪ Obtain 3-5,000 Theoretical Plates /5 cm ▪ Ideal for the Most Difficult Separations ▪ Resolution similar to HPTLC
"S" HPTLC	The ultimate in separating power; 3-10 times the resolving power of TLC. Technology and separation dependant on a 3 micron particle; 100 micron layer. Separate nanogram - picogram quantities. Spots of 1-2 mm will optimize separations.	▪ Smallest TLC Particle (micron), Highest Resolution ▪ Fast Analyses ▪ Thin, Highly Reflective Surface

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Prep TLC

Prep TLC

Select 100, 200, 250, 500, 1,000, and 2000 micron layers according to the amount of material to be separated.

- Readily Isolate mgm - gms
- Standardized Particle for Prep TLC, Prep LC
- Wide Variety of Prep TLC Layers

"S" HPTLC

The ultimate in separating power; 3-10 times the resolving power of TLC. Technology and separation dependant on a 3 micron particle; 100 micron layer. Separate nanogram - picogram quantities. Spots of 1-2 mm will optimize separations.

- Smallest TLC Particle (micron), Highest Resolution
- Fast Analyses
- Thin, Highly Reflective Surface

Selected Backings

Glass Backing

Use glass for optimum separation and with aggressive mobile phases. Inert backing will not react with selected detection sprays. Easy to handle. Best resolution.

- Resistant to Virtually all Sprays, Eluants
- Rigid Support for Optimum Resolution
- Available in Micro-Macro Sizes

Plastic and Aluminum Backing

Unbreakable and easy to handle. Cut into any size. Easy to isolate one spot for subsequent elution/detection. Can be easily included (attached) to lab reports.

- Cut into Virtually any Size
- Readily Isolate any Spot for Subsequent Detection
- Ideal for Documentation

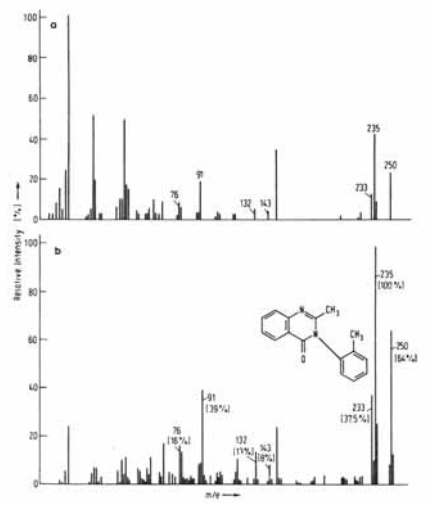
Applications

Separation of Phenothiazine Derivatives on Basic Aluminum Oxide TLC Plates

Phenothiazine salts migrate little, if at all, on acid aluminum oxide plates. On layers of neutral and more particularly basic Aluminum Oxide TLC layers, good migration is achieved by virtue of exchange processes (simular to those with alkaloid salts on aluminum oxide layers). Benzene is a suitable developing solvent with the addition of 5% acetone. Dragendorff reagent is used as a developer. If the acetone content is increased, the R_f-value becomes greater.

	Pure substance	Drops	Ampoules
Phenothiazine	R_F-value	R_F-value	R_F-value
Megaphen	0.51	0.54	0.53
Verophen	0.31	0.36	0.40
Atosil	0.58	0.56	0.61
Lorusil	0.22	—	0.24
Randolectil	0.23	—	0.23
Neurocil	0.71	—	0.71
Latibon	0.84	—	0.85
Andantol	0.42	—	0.48

Identification of Methaqualone in Tissue and Blood via TLC and Mass Spectrometry



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It is difficult to distinguish between methaqualone and substances with simular Rf-values via thin-layer chromatography. If this problem arises, methaqualone may be identified by the mass spectrum of the substances adhering to the adsorbent.

Chromatographic examination of autopsy-blood extract contaminated with decomposistion products of hemoglobin, was carried out on Silica Gel F TLC, using chloroform/acetone 9+1 (v/v) and Dragendorff reagent, and showed a substance spot at Rf= 0.80-0.83.

The reference substances showed the following Rf values:

Methaqualone=0.84

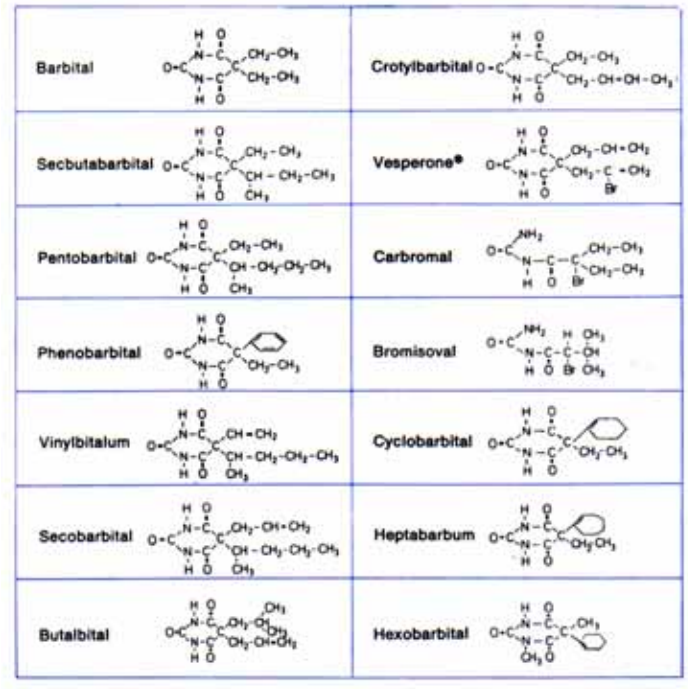
Gluethimide=0.78

For improving the differentiation, the spot detected on the plate under UV-light was scraped off, the sample was extracted with diethyl ether, decanted, enriched in a small amount of Silica Gel and placed directly into the ion-source of the mass spectrometer. The attached figure shows the mass spectra of the sample and of the pure substance methaqualone.

Quantities of about 15-20 µg. of methaqualone can be reliably detected by means of this procedure.

Detection of Barbituric Acid Derivatives by TLC and Mass Spectrometry in Autopsy Material

The following substances could be identified:



The identification of about 20-25µg of 12 barbiturates as well as Cabromal and Bromisoval, which are often present in pharmaceutical specialties together with 4 barbituric acids, is possible by mean of a combination of thin-layer chromatography and mass spectrometry.

Autopsy material is extracted with a solution of tartaric 5. acid in ethanol after homogenization. the ethanaol is evaporated and the residue dissolved by warm water.

After filtration, the tartaric filtrate is extracted with ether and the ether dried over sodium sulfate and evaporated. Urine, after addition of hydrochloric acid (pH 3-4), is exhaustively extracted by ether. The ether is dried over sodium sulfate, treated with a small amount of active carbon and Aluminum Oxide neutral, Act. 1, for a short time, and finely evaporated.

The residue is chromatographed on Silica Gel GF TLC with the solvent chloroform/acetone 9:1. For the detection of substance spots the thin-layer chromatograms are sprayed with mercurous-(I)-nitrate, Zwikkers reagent, and mercurous-(II) sulfate/diphenylcarbazone.

Two samples each of the test material are spotted adjacent to each other. Both samples are primarily evaluated under UV-light. One sample is used for a color test and the corresponding zones of the second sample for the mass spectrometry. For this purpose the single spots are scrapped off, extracted by ether, and the ether is decanted and evaporated. The substances so enriched are brought directly into the ion source of the mass spectrometer. They allow mass spectra, which can be reliably evaluated.

Identification of Selected Pesticides via Thin-Layer Chromatography

For the dectection of pesticide residues in food many methods are published, which in most cases require a considerable amount of apparatus, reagents and time. The separation technique should allow quick detection of the quantity of pesticide residue without much expediture, and only with small amounts of solvents. This preliminary data will then dictate whether a precise determination of the identified pesticide should follow or whether the approximate value obtained by spot comparison is sufficient.

Summary of 15 substances to be detected include:

1. Chlorinated hydrocarbons:
   DDT, deildrin, aldrin, lidane, endsulfan (I and II) as well as pentachloronitrobenzene(PCNB) and tetrachloronitrobenzene (TCNB)

2. Phosphoric acid esters
   Parathion, dimethoate, bromophos

3. Fungicides:
   Pentachloronitrobenzene (PCNB)
   tetrachloronitrobenzene (TCNB), dichlofluanid as well as its metabolite DMSA

4. Bacteriostatics:
   IPC (N-phenyl isopropyl carbamate; propham

5. Herbicides:
   N-(3-chloro-4methypheny)
   -2-methypentanamide (solan)

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Technique: The plant material is macerated with hexaneisopropyl alcohol (70:30); active substances are transferred into the hexane phase. After drying and removal of pigments a combination column (Alumina basic, activity V and Na_2S04 on top) the yellow extract yield is directly spotted on a thin layer plate. Length of run always 17 cm. If too much water is present, it should first be treated with acetonitrile. The sensitivity is usually at 2-6 µg of each active substance, but with DDT even 0.5 µg can be detected.

1. Chlorinated hydrocarbons are separated on Silica Gel G TLC in hexane/chloroform (9:1). Detection by spraying with $AgNO_{3*}$

Aldrin	R_1 0.83
PCNB	R_1 0.71
DDT	R_1 0.64
Lindane	R_1 0.22
Endosulfan	R_1 0.15
Dieldrin	R_1 0.08

2. Phosphoric acid esters are separated on Silica Gel G TLC or on TLC-plates, pre-coated with Silica Gel F 254 in hexane/acetone (4:1).

Parathon	R_1 0.45
Bromophos	R_1 0.70
Dimethoate	R_1 0.66

3-5. Fungicides, bacteriostatics and herbicides are separated in the same manner P-esters on TLC plates, pre-coated with Silica Gel F 254, then diazotised, coupled and the color products evaluated in UV and visible light.

PCNB	R_1 0.97	
TCNB	R_1 0.97	reddish
Solan	R_1 0.49	blue
IPC	R_1 0.52	yellowish
Dichlofluanid	R_1 0.39	
DMSA	R_1 0.19	violet red

Thin-Layer Chromatography of Selected Indanol Derivatives of Pharmaceutical Interest

7-Chloro-4-hydroxy indan, 4-hydroxy-1, 5, 7-trimethyl indan and other indanol derivatives demonstrate excellent bactericidal, fungicidal and amebicidal properties. Thin-layer chromatography was found to be ideal for qualitative and quantitative control of these substances in pharmaceutical specialities.

Method: Silica Gel GF TLC

Solvent Systems:

I Water-saturated chloroform
II Benzen/chloroform/abs, alcohol 4
III Chloroform/abs. alcohol 4:1:1
IV Benzene
V Carbon tetrachloride

Direction: After development the thin-layer plates should be dried. Under UV 254 mm the substances appeared as dark spots against the greenish fluorescent background. If the fluorescent indicator is not available, the plates should be sprayed with an aqueous potassium permanganate solution (1%): yellow spots indicate the position of the various compounds on violet brown background.

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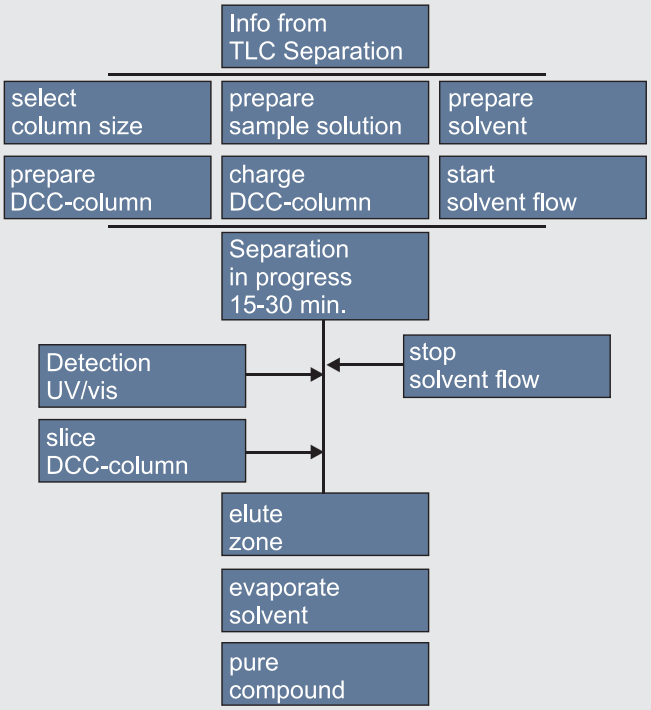
Substances	R_1 - Values with various Solvent systems on Silica Gel F-254				
	I	II	III	IV	V
4-Hydroxy Indan	0.31	0.84	0.78	0.25	Start
5-Hydroxy Indan	0.22	0.82	0.72	0.18	Start
7-chloro-4-hydroxy Indan	0.28	0.78	0.72	0.23	Start
5,7-Dichloro-4-hydroxy Indan	0.69	0.89	0.91	0.63	0.31
7-chloro-4-hydroxy Indan-on (1)	0.60	0.92	0.94	0.34	0.08
5-Acetyl Indan	0.60	0.92	0.94	0.34	0.05
5-Amino Indan	0.79	Front	0.94	0.83	0.38
4-Hydroxy - 1,5,7-trimethl Indan	0.59	0.89	0.84	0.44	0.07

DCC is a versatile Prep LC method

Basically, any sample that can be separated on silica gel or neutral alumina TLC plate can also be separated by the corresponding DCC-setup. The dry-column procedure has been success fully applied for the preparation of dye-stuffs, alkaloids, and other heterocyclic substances which are known to be separated on other types of columns, but, with considerable difficulties. Lipids have also been successfully separated.

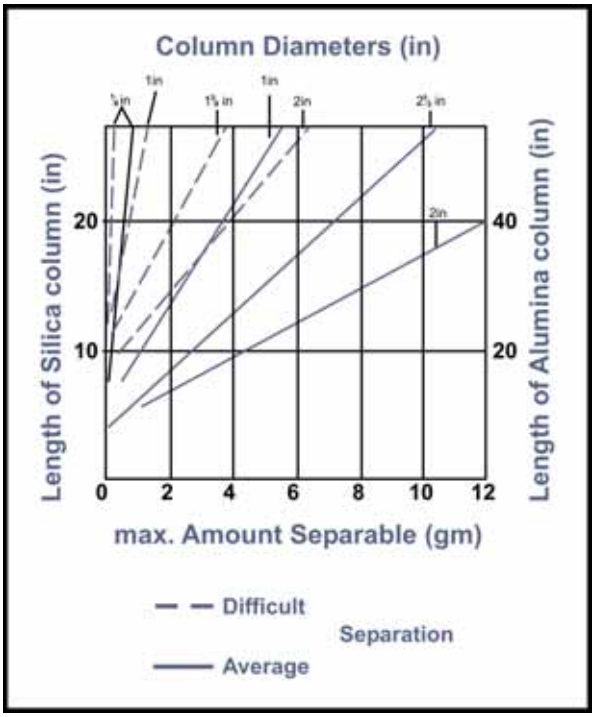
DCC bridges the gap between analytical TLC and preparative classical column chromatography. The cost is much less than the cost incurred in instrumental pressure associated with preparative liquid chromatography.

DCC employs a very simple technique



Dry Column Chromatography (DCC)

The load sample versus adsorbent is maintained at approximately less than 1:500 in TLC while the ratio is 1:300 or even higher for DCC.



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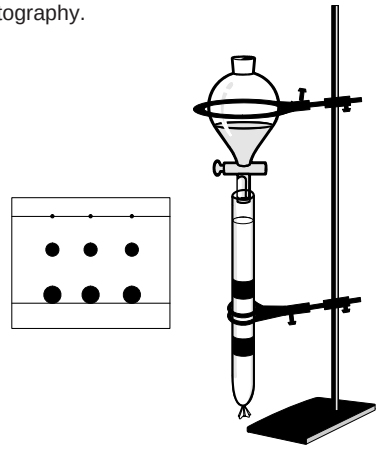
The Dry-Column Technique

bridges the gap between preparation column chromatography and analytical thin-layer chromatography.



Dry Column Chromatography

This is a unique and simple method for purifying material. It is inexpensive and fast. It is single column elution technique.

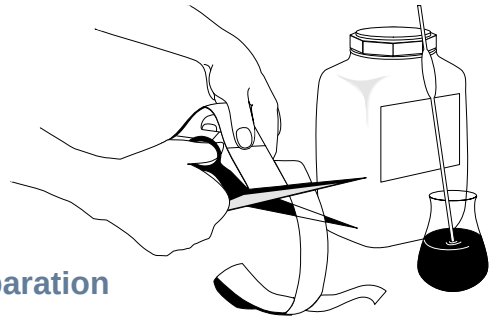
Below is a schematic form of the method.

DCC: The Proceedure

Simplified Proceedures

1. Use the same solvent system that was developed on a TLC plate
2. Cut the nylon tube to the desired length.

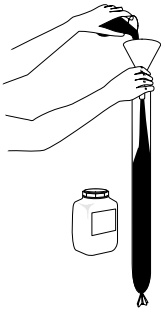
   Special note: to isolate 1 gram of material use approx. 300 grams of sorbent in a 1 meter x 40 mm tube.



Preparation

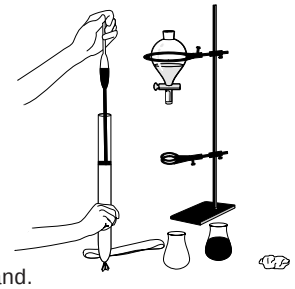
3. Close the tube by rolling up the end and securing it by a seal or clip/staple.
4. Insert a small pad or wad of glass wool at the bottom of the column; pierce holes at the bottom with a needle.
5. Dry fill the column to ¾ of the length.

Filling The Column



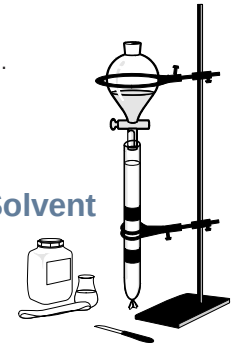
6. The sample to be separated should be combined with at least ten times its weight of the same sorbent in a conical test tube.
7. Add an additional cm of sorbent on top of the sample followed by a small pad of glass wool or a carefully placed cm layer of sorbent.

Applying The Sample

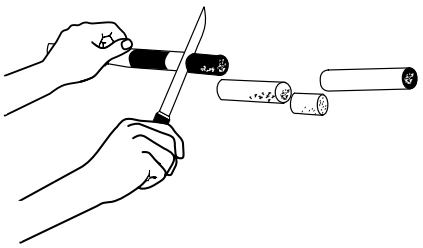


8. Fasten the tube to a clamp on a stand.
9. Open the stopcock of the solvent reservoir and add solvent until it reaches the bottom of the column. Then Stop. Elapsed time approximately 30 minutes.
10. Find the location of the separated bands by visible, UV, UV quenching. Alternatively, cut a 1/16" vertical slice off the tube. Spray the exposed area with a visualization reagent and align with the untreated column to identify (mark) the separated bands.
11. Mark the location of the bands on the nylon tube.
12. Remove the column from the clamp.
13. Slice the column into the desired sections.
14. Elute the pure compounds from the sliced sections with polar solvents.

Adding Appropriate Solvent



Recovery Of The Sample



References:

B. Love and K.M. Snyder, Chem Ind. (London) 1965, 15
B. Love and M.M. Goodman Chem. Ind.(London) 1967, 2026

NYLON FOIL TUBING FOR DCC

DCC is very simple and economical because the sorbent filled into nylon tubing (other types of columns , such as, glass, etc., may also be used). This tube is sold folded and in rolls. It is easy to remove possible creases by blowing a hot air stream through the tubing. Shaking the tubing in acetone prior to the hot air treatment facilitates this "ironing" of the nylon tube.

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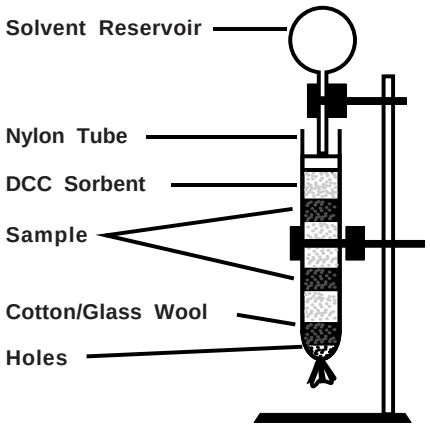
DRY COLUMN CHROMATOGRAPHY DCC COMPARED TO TLC

CHROMATOGRAPHIC PARAMETERS	TLC	DCC
Solvent Reservoir	tank	overhead
Solvent Force	capillary	gravity
"Charge" Addition of Sample	pipene	pipette
Support	glass, plastic	nylon tubes
Sorbent	silica, alumina	silica. alumina
Sorbent Activity	low	low
Equilibrium with solvent vapor	partial (sometimes controlled)	none
Dimensions of sorbent bed	width:thick:length 200 :1: 200	width:thick:length 1 :1: 20
Detection	visible, UV spray techniques	visible, UV
Techniques for Recovery	scrape off elute	cut into sections elute

DCC: THE PROCEDURE.

A simple and efficient Prep LC technique



Simplified Procedure(s)

1. Use the same solvent system that was developed on a TLC plate.
2. Cut the nylon tube to the desired length. Special note: to isolate 1 g of material use approx. 300 g of sorbent in a 1 meter x 40 mm nylon tube.
3. Close the tube by rolling up the end and securing it by a seal or clip/staple.
4. Insert a small pad or wad of glass wool at the bottom of the column; then pierce holes at the bottom with a needle.
5. Dry-fill the column to 3/4 of the length.
6. The sample to be separated should be combined with approx. 10 times its weight of the same sorbent in a conical test tube. Evaporate off the solvent and place the dried sample-sorbent charge to the top of the column, careful to keep the sample-sorbent as an even layer.
7. Add an additional cm of sorbent on top of the sample charge followed by a small pad of glass wool.
8. Fasten the tube to a clamp on a stand.
9. Open the cock of the solvent resevoir and add Solvent until it reaches the bottom of the column. Stop. Elapsed time approx. 30 min.
10. Find the location of the separated bands by visible, UV, UV quenching. Alternatively, cut a 1/16" slice off the tube. Spray with visualization reagent and align with the untreated column to identify (mark) the separated bands.
11. Mark the location of the bands on the nylon tube.
12. Remove the column from the clamp.
13. Slice column into desired sections with a knife.
14. Elute the pure compounds from the sliced sections with polar solvents

References:
B. Loev and K.M. Snyder Chem. Ind. (London) 1965, 15
B. Loev and MM Goodman Chem. Ind. (London) 1967, 2026

Miscellanious

Polyamide

Polyamide is based on Nylon 6. Due to its activation process it exhibits a constant selectivity toward flavones, chalkones, anthraquinones, aromatic nitro compounds, DNP amino acids, phenols, carbonic acids, acid amides, sulphonic acids and amides of sulphonic acids as well as towards amines and quinones.

Forces which contribute to the separation involve hydrogen bonding between the nitro groups, the phenolic protons, the carboxyl groups etc. of the sample and the free amino groups of the sorbent.

Nylon Foil Tubing

DCC is simple and economical because the sorbent is filled into nylon tubing (other types of columns such as glass etc. may also be used). This tube is sold folded and in rolls. It is easy to remove possible creases by blowing a hot air stream through the tubing. Shaking the tubing in acetone prior to the hot air treatment facilities "ironing" of the nylon tubing. (See Price List)

Florisil PR

Florisil PR is a new selective adsorbent, specially processed to give consistent results when used for column cleanup and separation of chlorinated pesticide residue prior to identification and measurement of the pesticide by gas, thin layer or paper chromatography.

This material is packed in Alumina Bottles to ensure purity during storage, shipment, use.

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Alumina			
Layer Type	**Catalog No.**	**Particle Size**	**Qty**
Alumina Basic Act I	02078-05	50-200µ	500g
	02078-1	50-200µ	1kg
	02078-5	50-200µ	5kg
	02078-50	50-200µ	50kg
Alumina Neutral Act I	02135-05	50-200µ	500g
	02135-1	50-200µ	1kg
	02135-5	50-200µ	5kg
	02135-50	50-200µ	50kg
Alumina Acid Act I	02159-05	50-200µ	500g
	02159-1	50-200µ	1kg
	02159-5	50-200µ	5kg
	02159-20	50-200µ	50kg
Alumina Basic Super I	04577-05	50-200µ	500g
	04577-1	50-200µ	1kg
	04577-5	50-200µ	5kg
	04577-50	50-200µ	50kg
Alumina Neutral Super I	04589-05	50-200µ	500g
	04589-1	50-200µ	1kg
	04589-5	50-200µ	5kg
	04589-50	50-200µ	50kg
Alumina Acid Super I	04601-05	50-200µ	500g
	04601-1	50-200µ	1kg
	04601-5	50-200µ	5kg
	04601-50	50-200µ	50kg
Alumina Act II-III	04694-05	50-200µ	500g
	04694-5	50-200µ	5kg
	04694-50	50-200µ	50kg
Alumina Neutral for HPLC and Prep LC Flash LC	02142	5µ	10g
	02143	5µ	100g
	02148	10µ	10g
	02149	10µ	10g
	02151	15µ	10g
	02152	15µ	100g
	02156	25µ	10g
	02157	25µ	100g
	02061-05	**32-63µ**	500g
	02061-1	**32-63µ**	1kg
	02061-5	**32-63µ**	5kg
Active Alumina Neutral for HPLC/Flash	02058	18-32µ	10kg
	02059	18-32µ	100g
	02062-05	**32-63µ**	500g
Active Alumina Acid for HPLC	02063	18-32µ	100g
Active Alumina Basic for HPLC	02065	18-32µ	100g
Prices and specifications subject to change, request current quote.			

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Alumina			
Layer Type	**Catalog No.**	**Particle Size**	**Qty**
Alumina Basic for TLC	04341-1	5-15µ	1kg
	04341-50	5-15µ	50kg
Alumina Neutral for TLC	04344-1	5-15µ	1kg
	04344-50	5-15µ	50kg
Alumina Acid for TLC	04347-1	5-15µ	1kg
	04347-50	5-15µ	50kg
Alumina with Gypsum for TLC	04413-1	5-15µ	1kg
	04413-50	5-15µ	50kg
Alumina for PCB Removal (Alumina C)	02103-1	50-200µ	1kg
	02103-50	50-200µ	50kg
Alumina for Pyrogen Removal	02120-1	50-200µ	1kg
	02120-50	50-200µ	50kg
Alumina for Bio-Mass Clean-Up	02300-1	50-150µ	1kg
	02300-5	50-150µ	5kg
	02300-25	50-150µ	25kg
	02300-50	50-150µ	50kg
Alumina for Process Clean-Up (Scavenger)	04100-1	150-600µ	1kg
	04100-5	150-600µ	5kg
	04100-25	150-600µ	25kg
	04102-1	600-1200µ	1kg
	04102-5	600-1200µ	5kg
	04102-25	600-1200µ	25kg
	04104-1	1200-2400µ	1kg
	04104-5	1200-2400µ	5kg
	04104-25	1200-2400µ	25kg
Alumina for Decolorization	05005-1	30-200µ	1kg
	05005-5	30-200µ	5kg
	05005-25	30-200µ	25kg
	05005-50	30-200µ	50kg
Alumina for Dioxin Analysis	05788-05	50-200µ	500g
	05788-1	50-200µ	1kg
	05788-5	50-200µ	5kg
	05788-25	50-200µ	25kg
Alumina for Arsenic Removal	995500-98		25kg
Alumina for Radioactive Clean-Up	06031-05	50-150µ	500g
	06031-50	50-150µ	50kg
Specialty Sorbents	09602	Polyamide for CC	250g
	09603	Polyamide for TLC	250g
	09604	Polyamide Prep Scale	250g
	09605	Polyamide Large Scale	250g
	09804	Florisil PR, 60-100 Mesh	500g

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Alumina				
Layer Type	**Catalog No.**	**Pore**	**Particle Size**	**Qty**
Alumina Wide Pore Adsorbents for Biotechnology	591371	300A	5µ	10g
	591372	300A	10µ	10g
	591373	300A	15µ	10g
	591374	300A	25µ	100g
	591375	300A	32-63µ	1kg
	591376	300A	63-100µ	1kg
	591377	300A	100-200µ	1kg
	591378	300A	50-200µ	1kg
	591971	300A	5µ	10g
	591972	1000A	10µ	10g
	591973	1000A	15µ	10g
	591974	1000A	25µ	10g
	591975	1000A	32-63µ	1kg
	591976	1000A	63-100µ	1kg
	591977	1000A	100-200µ	1kg
	591978	1000A	50-200µ	1kg

Alumina				
Layer Type	**Catalog No.**	**Particle Distribution**	**Indicator**	**Qty**
Alumina Dry Column Chromatography	4514-05	63-200µ	F-254	500g
	04514-5	63-200µ	F-254	5kg
	04514-50	63-200µ	F-254	50g

Alumina				
Layer Type	**Catalog No.**	**Diameter**	**Description**	**Qty**
Drysphere Desiccant	01001-05	1/8 inch	w/o indicator	500g
	01001-10	1/8 inch	w/o indicator	10kg
	01001-25	1/8 inch	w/o indicator	25kg
	01001-50	1/8 inch	w/o indicator	50kg
	01005-05	1/8 inch	20% indicator	500kg
	01005-10	1/8 inch	20% indicator	10kg
	01005-25	1/8 inch	20% indicator	25kg
	01005-50	1/8 inch	20% indicator	50kg
	01006-05	1/8 inch	100% indicator	500kg
	01006-10	1/8 inch	100% indicator	10kg
	01006-25	1/8 inch	100% indicator	25kg
	01006-50	1/8 inch	100% indicator	50kg
	01010-1	1/4 inch	w/o indicator	1kg
Note: 1/16 inch available, please inquire for pricing.				

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Atlernate size packaging available, please inquire.

Silica			
Layer Type	**Catalog No.**	**Description**	**Qty**
Silica Active, 60A	02749	18-32µ	10g
	02805	18-32µ	100g
	02750	32-63µ	500g
	02766	32-100µ	500g
	02767	63-100µ	500g
	02769	63-200µ	500kg
	02751-05	100-200µ	500g
	02751-1	100-200µ	1kg
	02751-2	100-200µ	2.5kg
	02751-5	100-200µ	5kg
	02751-25	100-200µ	25kg
	02770	200-500µ	500kg
Silica Gel MPLC, 60A	04668-05	0-63µ	500g
	04668-1	0-63µ	1kg
	04668-2	0-63µ	2.5kg
	04668-5	0-63µ	5kg
	04668-25	0-63µ	25kg
	02745	18-32µ	10g
	02757	18-32µ	100g
	02830-05	18-32µ	500g
	02830-1	18-32µ	1kg
	02830-2	18-32µ	2.5kg
	02830-5	18-32µ	5kg
	02830-7	18-32µ	25kg
	02830-25	18-32µ	500kg
	02759-05	32-100µ	500g
	02759-1	32-100µ	1kg
	02759-2	32-100µ	2.5kg
	02759-5	32-100µ	5kg
	02759-25	32-100µ	25kg
Silica Gel Classic Column, 60A	04660-05	63-100µ	500g
	04660-1	63-100µ	1kg
	04660-2	63-100µ	2.5kg
	04660-5	63-100µ	5kg
	04660-25	63-100µ	25kg
	04667-05	63-200µ	500g
	04667-1	63-200µ	1kg
	04667-2	63-200µ	2.5kg
	04667-5	63-200µ	5kg
	04667-25	63-200µ	25kg
	02761-05	100-200µ	500g
	02761-1	100-200µ	1kg
	02761-2	100-200µ	2.5kg
	02761-5	100-200µ	5kg
	02761-25	100-200µ	25kg
	02809-05	200-500µ	500g
	02809-1	200-500µ	1kg
	02809-2	200-500µ	2.5kg
	02809-5	200-500µ	5kg
	02809-25	200-500µ	25kg

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Silica

Layer Type	Catalog No.	Description	Qty
Silica for TLC 5-15µ 60A	04671-05		500g
	04671-1		1kg
	04671-2		2.5kg
	04671-5		5kg
	04671-25		25kg
	04674-05	with Gypsum	500kg
	04674-1	with Gypsum	1kg
	04674-2	with Gypsum	2.5kg
	04674-5	with Gypsum	5kg
	04674-25	with Gypsum	25kg
	04677-05	with F-254	500kg
	04677-1	with F-254	1kg
	04677-2	with F-254	2.5kg
	04677-5	with F-254	5kg
	04677-25	with F-254	25kg
	04680-05	with Gypsum and F-254	500kg
	04680-1	with Gypsum and F-254	1kg
	04680-2	with Gypsum and F-254	2.5kg
	04680-5	with Gypsum and F-254	5kg
	04680-25	with Gypsum and F-254	25kg
Silica for PREP TLC, 60A	04682-1	with Gypsum and F-254	1kg
	04682-5	with Gypsum and F-254	1kg
Silica for HPLC and FLASH GRADE	02790	5µ	10g
	02791	5µ	100g
	02793	10µ	10g
	02794	10µ	100g
	02796	15µ	10g
	02797	15µ	100g
Silica Flash, 60A	02826-05	32-63µ	500g
	02826-1	32-63µ	1kg
	02826-2	32-63µ	2.5kg
	02826-5	32-63µ	5kg
	02826-25	32-63µ	25kg
Silica Wide Pore (150A)*	03227-05	100-200 mesh	500g
	03227-1	100-200 mesh	1kg
	03227-2	100-200 mesh	5kg
	03227-5	100-200 mesh	
	03227-25	100-200 mesh	50kg
Silica Wide Pore (200A)*	03327-05	100-200 mesh	500g
	03327-1	100-200 mesh	1kg
	03327-2	100-200 mesh	5kg
	03327-5	100-200 mesh	50kg
	03327-25	100-200 mesh	50kg
Silica Wide Pore (500A)*	03427-05	100-250µ	500g
Silica Wide Pore (1000A)*	Inquire for availability and pricing		
***Please Note: Other particle distributions may be available, please inquire.**			
Prices and specifications subject to change, request current quote.			

Silica Gel DCC

Layer Type	Catalog No.	Particle Distribution	Indicator	Qty
Silica Dry Column Chromatography	04530-05	63-200µ	F-254	500g
	04530-1	63-200µ	F-254	1kg
	04530-3	63-200µ	F-254	3kg
	04530-5	63-200µ	F-254	5kg
	04530-25	63-200µ	F-254	25kg
	04630-25	63-200µ	w/o F-254	25kg

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Glass Backed TLC					
Layer Type	**Catalog No.**	**Indicator**	**Plate Size**	**Thickness**	**Qty/Box**
Alumina Basic	81101	w/o	20 x 20cm	250µ	25
	81111	F-254	20 x 20cm	250µ	25
	81103	w/o	5 x 20cm	250µ	25
	81113	F-254	5 x 20cm	250µ	25
	81104	w/o	2.5 x 7.5cm	250µ	25
	81114	F-254	2.5 x 7.5cm	250µ	25
Alumina Neutral	82101	w/o	20 x 20cm	250µ	25
	82111	F-254	20 x 20cm	250µ	25
	82103	w/o	5 x 20cm	250µ	25
	82113	F-254	5 x 20cm	250µ	25
	82104	w/o	2.5 x 7.5cm	250µ	25
	82114	F-254	2.5 x 7.5cm	250µ	25
Alumina G	90101	w/o	20 x 20cm	250µ	25
	90111	F-254	20 x 20cm	250µ	25
	90103	w/o	5 x 20cm	250µ	25
	90113	F-254	5 x 20cm	250µ	25
	90104	w/o	2.5 x 7.5cm	250µ	25
	90114	F-254	2.5 x 7.5cm	250µ	25
	90301	w/o	20 x 20cm	1000µ	15
	90311	F-254	20 x 20cm	1000µ	15
Silica Gel, Hard Layer, Organic Binder	84101	w/o	20 x 20cm	250µ	25
	84111	F-254	20 x 20cm	250µ	25
	84102	w/o	10 x 20cm	250µ	25
	84112	F-254	10 x 20cm	250µ	25
	84103	w/o	5 x 20cm	250µ	25
	84113	F-254	5 x 20cm	250µ	25
	84104	w/o	2.5 x 7.5cm	250µ	25
	84114	F-254	2.5 x 10cm	250µ	25
	84201	w/o	20 x 20cm	500µ	20
	84211	F-254	20 x 20cm	500µ	20
	84202	w/o	10 x 20cm	500µ	20
	84212	F-254	10 x 20cm	500µ	20
	84301	w/o	20 x 20cm	1000µ	15
	84311	F-254	20 x 20cm	1000µ	15
	84302	w/o	10 x 20cm	1000µ	15
	84312	F-254	10 x 20cm	1000µ	15
	84501	w/o	20 x 20cm	2000µ	12
	84511	F-254	20 x 20cm	2000µ	12
	84502	w/o	10 x 20cm	2000µ	12
	84512	F-254	10 x 20cm	2000µ	12
Silica Gel, HPTLC	86002	w/o	10 x 20cm	2000µ	25
	86012	F-254	10 x 20cm	2000µ	25
	86005	w/o	10 x 10cm	2000µ	25
	86015	F-254	10 x 10cm	2000µ	25
	86004	w/o	5 x 5cm	2000µ	25
	86014	F-254	5 x 5cm	2000µ	25
Cellulose	89101	w/o	20 x 20cm	250µ	25
	89111	F-254	20 x 20cm	250µ	25
	89102	w/o	10 x 20cm	250µ	25
	89112	F-254	10 x 20cm	250µ	25
	89103	w/o	5 x 20cm	250µ	25
	89113	F-254	5 x 20cm	250µ	25
	89201	w/o	20 x 20cm	500µ	25
	89211	F-254	20 x 20cm	500µ	25
	89202	w/o	10 x 20cm	500µ	25
	89212	F-254	10 x 20cm	500µ	25
Reversed Phase C-18	93111	F-254	20 x 20cm	250µ	25
	93112	F-254	10 x 20cm	250µ	25
	93113	F-254	5 x 20cm	250µ	25

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Aluminum Backed TLC

Layer Type	Catalog No.	Indicator	Plate Size	Thickness	Qty/Box
Alumina Neutral, Hard Layer	62001	w/o	20x20cm	200µ	25
	62011	F-254	20x20cm	200µ	25
	62003	w/o	5x20cm	200µ	25
	62013	F-254	5x20cm	200µ	25
Alumina Basic, Hard Layer	63001	w/o	20x20cm	200µ	25
	63011	F-254	20x20cm	200µ	25
	63003	w/o	5x20cm	200µ	25
	63013	F-254	5x20cm	200µ	25
	63018	F-254	4X8cm	200µ	25
Cellulose 300, Hard Layer	64601	w/o	20x20cm	200µ	25
	64611	F-254	20x20cm	200µ	25
Reversed Phase C-18	65018	F-254	4X8cm	200µ	25

FOR PRICES PLEASE SEE SUPPLEMENT

Price & specifications subject to change without notice

Plastic Backed TLC

Layer Type	Catalog No.	Indicator	Plate Size	Thickness	Qty/Box
Alumina Neutral, Hard Layer	72001	w/o	20 x 20cm	200µ	25
	72011	F-254	20 x 20cm	200µ	25
Alumina Basic, Hard Layer	73001	w/o	20 x 20cm	200µ	25
	73011	F-254	20 x 20cm	200µ	25
Cellulose 300, Hard Layer	74601	w/o	20 x 20cm	100µ	25
	74611	F-254	20 x 20cm	100µ	25
Cellulose PEI,* Hard Layer	78601	w/o	20 x 20cm	100µ	25
	78611	F-254	20 x 20cm	100µ	25
Silica Gel, Hard Layer	79001	w/o	20 x 20cm	200µ	25
	79011	F-254	20 x 20cm	200µ	25
	79003	w/o	5 x 20cm	200µ	25
	79013	F-254	5 x 20cm	200µ	25
	79006	w/o	2.5 x 7.5cm	200µ	25
	79016	F-254	2.5 x 7.5cm	200µ	25
	79018	F-254	4 x 8cm	200µ	25

Note: All TLC plates are glass backed unless otherwise noted.

* PEI - Polyethylene
* Store at 4°C. If stored at room temperature, they may turn yellow, slightly affecting separation.
Pre-develop in distilled water to minimize yellow color.

TLC Accessories

Catalog No.	Description
01-100	Tank for (20x20cm Plates)
01-101	Tank for (10x20cm Plates)
01-102	LID for Catalog # 01-100, 01-101
01-105	Glass for TLC Plate, 20x20cm, 1 box of 25
01-108	TLC Adsorbent Scrapper
01-109	5 replacement blades for 01-108
01-114	1.0 µL vials 100/pk
01-115	2.0 µL vials 100/pk
01-116	3.0 µL vials 100/pk
01-117	4.0 µL vials 100/pk
01-118	5.0 µL vials 100/pk
01-119	8.0 µL vials 100/pk
01-120	10.0 µL vials 100/pk
01-121	15.0 µL vials 100/pk
01-122	16.0 µL vials 100/pk
01-0123	20.0 µL vials 100/pk

Nylon Tubing

Catalog No.	Description
09652	1" Flat Outside Diameter x 20 Meters
09653	1½" Flat Outside Diameter x 20 Meters
09654	2" Flat Outside Diameter x 20 Meters
09655	2½"" Flat Outside Diameter x 20 Meters
09656	3" Flat Outside Diameter x 20 Meters
09662	6" Flat Outside Diameter x 20 Meters

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