



# HPLC Columns

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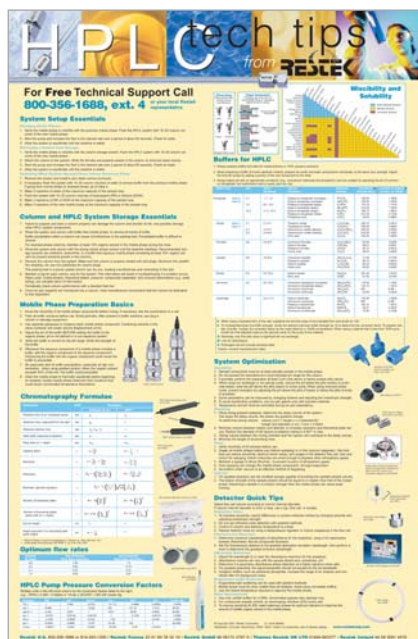




### ordering note

For assistance in selecting an HPLC column, please contact Restek Technical Service at 814-353-1300 or 800-356-1688 (ext. 4) or support@restek.com.

### free literature



#### HPLC Tech Tips Wall Chart

Almost everything you need to remember about HPLC, condensed into 3 feet by 2 feet: mobile phase basics, buffers (types, pKa values, pH ranges, formula masses, more), miscibility and solubility chart (invaluable!), system setup and optimization, detector tips, pressure conversion factors, most-used chromatographic equations, and column storage essentials.

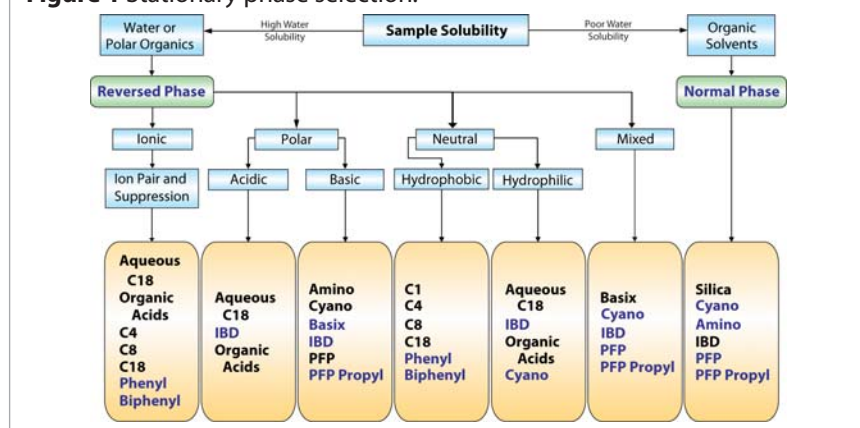
Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat.# 59894A

### Selecting an HPLC Column

Choosing the best column for your application requires consideration of stationary phase chemistry, retention capacity, particle size, and column dimensions. Identifying the best stationary phase for your separation is the most critical step of column selection, and your decision should be based on sample solubility and the chemical differences among the compounds of interest. Figure 1 is a handy tool for stationary phase selection.

**Figure 1** Stationary phase selection.



Reversed phase columns (e.g. alkyl, phenyl, cyano) work well for water-soluble hydrophobic compounds. Some stationary phases incorporate both polar and nonpolar functionality and can be used in either reversed phase or normal phase modes (e.g. Ultra IBD, Allure® Basix, and Allure® PFP Propyl). While straight chain alkyl stationary phases (e.g. C18) are historically the most commonly used, many newer phases provide better separations. Alkyl phases are best suited for analyzing neutral compounds with a high ratio of carbon:heteroatoms where the major distinction among analytes is their hydrophobicity. However, for analyzing compounds that are highly polar, aromatic, or halogenated, nonalkyl stationary phases often provide significantly better selectivity (Figure 2).

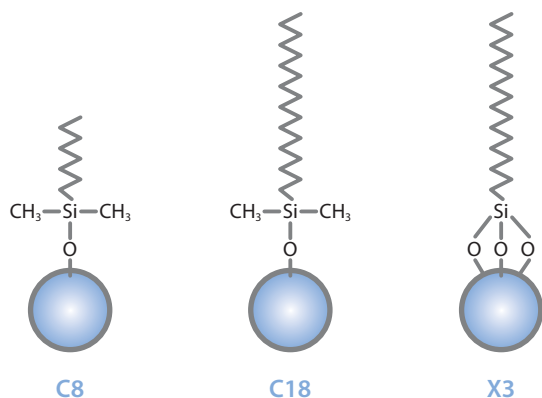
Retention capacity is another important consideration and is influenced by surface area and carbon load (% carbon in the packing material). Allure® columns were designed for maximum retention using a high density of ligands bonded to a large surface area silica. Ultra, Pinnacle® II and Pinnacle® DB columns have the same high ligand density, but are more moderately retentive due to their lower surface areas. Surface area is inversely proportional to pore size; thus, larger pore sizes result in less retention. However, wide pore (e.g. 300Å) packings, such as Viva, are ideal when analyzing larger molecules, as a larger pore size is necessary to allow the analytes to 'fit' into the pores.

Particle size and column dimensions also influence column choice. In selecting a particle size, the primary consideration is efficiency (plates/meter) versus column pressure. A 3µm column will have approximately 50% more efficiency than a 5µm column, if all other conditions are constant for both columns. As particle size is further decreased (e.g. <2µm), theoretically, efficiencies will increase proportionally, based on the Van Deemter equation (and the usable flow rate range is much wider). Please note that column backpressure also increases as particle size decreases. Column dimensions include internal diameter and length, where the most commonly used internal diameter (ID) for HPLC columns is 4.6mm. In theory, resolution and pressure should be independent of column ID as long as flow rate is adjusted to maintain the same mobile phase linear velocity (flow rate is proportional to column cross-sectional area). Table I shows the approximate optimum flow rates for four column IDs.

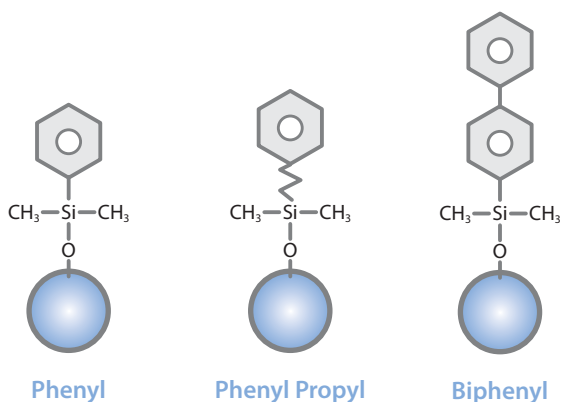
**Table I** Approximate optimum flow rates for various analytical column IDs.

ID (mm)	5µm Particles Optimum Flow Rate (mL/min.)	3µm Particles Optimum Flow Rate (mL/min.)
4.6	1.00	1.5
3.2	0.50	0.73
2.1	0.20	0.31
1.0	0.05	0.07

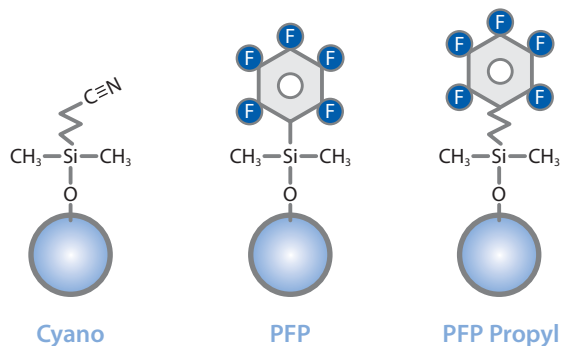


**Figure 2** Stationary phase comparison.**Alkyl phases (e.g. C18)**

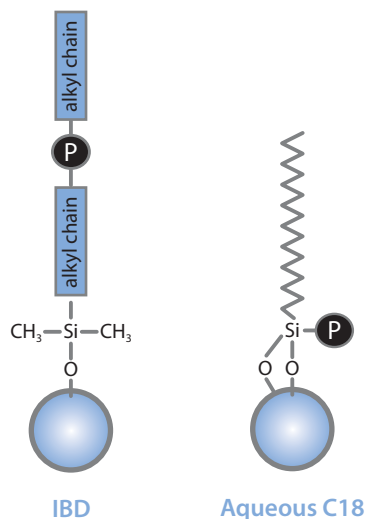
Alkyl-based stationary phases, such as C18, are best suited for analyzing hydrophobic molecules with a high carbon:heteroatom ratio.

**Phenyl & Biphenyl phases**

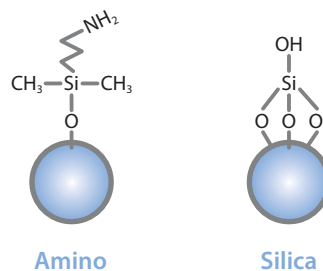
Phenyl stationary phases interact with compounds containing aromatic groups or unsaturated bonds through  $\pi$ - $\pi$  interactions. The biphenyl stationary phase has even greater interaction due to the higher concentration of aromatic rings.

**Cyano & Fluorinated phases**

Fluorinated phases, such as the pentafluorophenyl propyl (PFP propyl), and cyano-based phases interact strongly with basic, nitrogen-containing and halogenated analytes.

**Modified Alkyl Phases**

An alkyl-based stationary phase with either an embedded polar group or a polar side chain has significantly greater interaction with polar compounds than a traditional alkyl phase.

**Amino and Silica Phases**

Amino and silica phases are traditionally used for the normal phase separation of polar analytes.





Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications
Pinnacle DB C18	Y	140	11	Hydrophobic C18 phase suitable for analyses of a wide range of compounds, from acidic through slightly basic.
Pinnacle DB Aqueous C18	—	140	6	Ideal for applications that require highly aqueous mobile phases, such as organic acids and water-soluble vitamins.
Pinnacle DB C8	Y	140	6	Applications similar to Pinnacle DB C18, but with less hydrophobic retention. Less retention can be useful for shortening analysis time, if resolution is adequate.
Pinnacle DB PFP Propyl	Y	140	6	Exhibits excellent peak shapes for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.
Pinnacle DB Biphenyl	Y	140	8	Excellent choice for the analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.
Pinnacle DB Cyano	Y	140	4	Suitable for a wide range of compounds, from acidic through slightly basic. Also useful for confirmation of analyses on a C18 or C8 column. Can be used in normal phase or reversed phase mode of separation.
Pinnacle DB Phenyl	Y	140	5.3	Suitable for polar aromatic compounds, fatty acids, purines and pyrimidines.
Pinnacle DB Silica	—	140	—	Normal phase mode of separation.
Pinnacle DB IBD	Y	140	—	A polar group assists in deactivating surface silanols and contributes to unique separation selectivities for acids, bases, zwitterions, and other polar compounds.
Pinnacle DB PAH	Y	140	—	Ideal for polycyclic aromatic hydrocarbons.
Pinnacle DB X3 C18	Y	140	—	Fast analysis.
Pinnacle II C18	Y	110	13	Superior general purpose C18 for nonbasic analytes.
Pinnacle II PAH	Y	110	—	Maximum resolution of polycyclic aromatic hydrocarbons.
Pinnacle II C8	Y	110	7	Superior general purpose C8 for nonbasic analytes.
Pinnacle II Cyano	Y	110	4	Superior general purpose cyano for weakly-basic analytes. Used in either normal or reversed phase analyses.
Pinnacle II Phenyl	Y	110	6	Superior general purpose phenyl for neutral analytes.
Pinnacle II Amino	N	110	2	Excellent general purpose amino phase. Excellent choice for mono- and di-saccharide analysis.
Pinnacle II Biphenyl	Y	110	—	Multiple aromatic ring structures; excellent for explosives.
Pinnacle II Silica	—	110	—	Ideal for polar analytes.
Allure C18	Y	60	27	Ideal for MS and light-scattering detection of neutral to slightly polar solutes. Separates basic compounds, showing good deactivation; excellent for explosives or steroids.
Allure Aqueous C18	N	60	—	Ideal for analyses that require >90% water in the mobile phase. Excellent for highly water soluble or poorly organic soluble compounds. Excellent for water-soluble vitamins and organic acids. More retention than Ultra Aqueous columns.
Allure AK	Y	60	—	Ideal for the analysis of aldehydes and ketones as DNPH derivatives.
Allure Basix	Y	60	12	Ideal for LC/MS of basic solutes. Excellent for basic pharmaceuticals or other amine-containing compounds.
Allure PFP Propyl	Y	60	17	Ideal for MS, ELSD, or NPD detection of nucleosides, nucleotides, purines, pyrimidines, or halogenated compounds.
Allure Organic Acids	N	60	—	Excellent resolution of challenging organic acids.
Allure Biphenyl	Y	60	23	Multiple ring structure; excellent for aromatic and unsaturated compounds. Increased retention over traditional phenyl phases.
Allure Silica	—	60	—	Most retentive phase for normal phase separation.
Ultra C18	Y	100	20	Ideal for anilines, barbiturates, carbonyls, fat-soluble vitamins, fatty acids, glycerides, phthalates, PTH amino acids, steroids, other acids.
Ultra Aqueous C18	N	100	15	Ideal for analyses that require >90% water in the mobile phase. Excellent for highly water soluble or poorly organic soluble compounds. Excellent for water-soluble vitamins and organic acids.
Ultra IBD	N	100	12	A polar group assists in deactivating surface silanols and contributes to unique separation selectivities for acids, bases, zwitterions, and other polar compounds.
Ultra C8	Y	100	12	Selectivity and peak shape similar to Ultra C18, but less hydrophobic retention.
Ultra C4	Y	100	9	Ideal for peptides and small proteins.
Ultra C1	—	100	5	Alternative selectivity to Ultra C18 or C8 columns, especially for polar analytes. Shortest chain alkyl phase available for reversed phase separations.

pH ranges and temperature limits: see product listings on pages listed here.

Column lifetime will be shorter when operating at pH and/or temperature extremes.



Chromatographic Properties	Similar Phases	USP Code	Page #
Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding.	Hypersil BDS C18, Zorbax Eclipse XDB-C18, Spherisorb ODS	L1	301
Highly selective phase for polar analytes. Compatible with highly aqueous (up to 100%) mobile phases. Silica manufactured by Restek.	Aquasil C18, AQUA C18, Hypersil Gold AQ, YMC ODS-Aq	L1	304
Highly base-deactivated spherical silica manufactured by Restek. Monomeric C8 bonding. Similar to Pinnacle DB C18, but the shorter alkyl chain provides less hydrophobic retention.	Hypersil BDS C8, Spherisorb C8	L7	301
Highly base-deactivated spherical silica manufactured by Restek. Unique pentafluorophenyl phase with a propyl spacer.	Discovery HS F5	L43	303
Highly base-deactivated spherical silica manufactured by Restek. Unique reversed phase material that displays both increased retention and selectivity for aromatic and/or unsaturated compounds when compared to conventional alkyl and phenyl phases.	unique <b>column</b>	L11	303
Highly base-deactivated spherical silica manufactured by Restek. Cyano bonding.	Hypersil BDS Cyano, Spherisorb Cyano, Zorbax Eclipse XDB-CN	L10	302
Highly base-deactivated spherical silica manufactured by Restek. Phenyl bonding.	Hypersil BDS Phenyl, Spherisorb Phenyl Zorbax Eclipse XDB-Phenyl	L11	302
Highly base-deactivated spherical silica manufactured by Restek.	—	L3	304
One of a group of intrinsically base-deactivated (IBD) phases, with a polar group within, or intrinsic to, the alkyl bonded phase. Provides unique selectivity and high level of base deactivation while reducing or eliminating the need for mobile phase additives.	unique <b>column</b>	—	305
Specifically designed to resolve complex mixtures of polycyclic aromatic hydrocarbons.	unique <b>column</b>	—	305
A dense trifunctionally bonded C18 alkyl phase for reversed phase separations.	T3	—	305
Intermediate carbon load and surface area, suitable for a wide range of neutral to acidic compounds. Silica manufactured by Restek.	Hypersil ODS	L1	306
Proprietary stationary phase; resolves 16 PAHs in US EPA Method 610. Silica manufactured by Restek.	unique <b>column</b>	—	306
Provides shorter retention times for hydrophobic compounds than C18. Silica manufactured by Restek.	Hypersil C8	L7	307
More rugged than bare silica for normal phase analyses. Silica manufactured by Restek.	Hypersil CPS	L10	307
Offers unique selectivity versus traditional alkyl chain phases, especially for aromatic compounds. Silica manufactured by Restek.	Hypersil Phenyl	L11	308
Silica manufactured by Restek.	Hypersil APS 2 Amino, Spherisorb Amino	L8	308
Silica manufactured by Restek. Unique biphenyl phase.	unique <b>column</b>	L11	309
Superior value phase for normal phase separation of polar analytes. Lower retention than Ultra C18. Silica manufactured by Restek.	Hypersil Silica	L3	309
Most retentive phase for hydrophobic and slightly polar analytes. Mobile phase containing higher percentage of organic modifier contributes to higher sensitivity in ESI-based LC/MS.	Ultracarb C18, BetaMax Neutral, Discovery C18	L1	310
Highly retentive and selective for reversed phase separations of polar analytes. Highly base deactivated. Compatible with highly aqueous (up to 100%) mobile phases.	unique <b>column</b>	L1	311
Highly retentive, highly selective phase, developed specifically for the analysis of aldehydes and ketones as DNPH derivatives.	unique <b>column</b>	—	313
Highly retentive phase for analytes containing amino functionality.	BetaMax Base, Maxsil CN	L10	310
A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. Excellent for beta-blockers, halogenated compounds, nucleosides, nucleotides, pyridines, pyrimidines, tricyclic antidepressants.	Discovery HS F5	L43	311
Single 30cm column performs equally to two C18 columns in series. (AOAC Method 986.13)	unique <b>column</b>	—	312
High purity, highly retentive phase for aromatic and unsaturated compounds.	unique <b>column</b>	L11	312
High purity, highly retentive phase for normal phase separation of polar analytes. Very high surface area.	Maxsil Si	L3	313
A very retentive, high-purity phase that exhibits excellent peak shape for a wide range of compounds. Recommended as a general purpose reversed phase column.	Discovery C18, Symmetry C18, Hypersil Gold C18, Luna C18, Zorbax C18, Kromasil C18, LiChrospher RP-18, Inertsil ODS-2, Develosil C18	L1	314
Highly retentive and selective for reversed phase separations of polar analytes. Highly base deactivated. Compatible with highly aqueous (up to 100%) mobile phases.	AQUA C18, Aquasil C18, Hypersil Gold AQ, YMC ODS-Aq	L1	315
One of a group of intrinsically base-deactivated (IBD) phases, with a polar group within, or intrinsic to, the alkyl bonded phase. Provides unique selectivity and high level of base deactivation while reducing or eliminating the need for mobile phase additives.	SymmetryShield, Discovery ABZ & ABZ+, Prism	—	315
Very retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds.	Luna C8, Symmetry C8, Hypersil Gold C8	L7	314
Exceptionally stable C4 packing, with high bonding coverage and silanol base-deactivation. Exhibits shorter retention than C18 or C8 phases.	Supelcosil Butyl (C4), Delta-Pak C4	L26	316
Exceptionally stable C1 packing resists hydrolysis, even under acidic mobile phase conditions. Least retentive reversed phase hydrocarbon packing.	Spherisorb C1	L13	316

Continued on next page...





Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications
Ultra Cyano	Y	100	8	Excellent for basic pharmaceuticals, steroids (normal or reversed phase conditions), or other basic compounds.
Ultra Phenyl	Y	100	10	Ideal for fatty acids, polycyclic aromatic hydrocarbons, purines and pyrimidines, and polar aromatics.
Ultra Amino	N	100	2	Superior general purpose amino phase. Ideal for carbohydrates.
Ultra PFP	Y	100	7	Ideal for taxol and precursors, or halogenated compounds, amines, esters, or ketones.
Ultra Silica	—	100	—	Ideal for normal phase applications.
Ultra Carbamate	—	100	—	Rapid analysis of carbamates.
Ultra Quat	—	100	—	Proprietary phase for the analysis of paraquat and diquat and other quaternary amines.
Viva C18	Y	300	9	Proteins and other higher molecular weight compounds.
Viva C8	Y	300	5	Proteins and other higher molecular weight compounds. Less retentive than C18 phase.
Viva C4	Y	300	3.5	Proteins and other higher molecular weight compounds. Less retentive than C18 and C8 phases.
Viva Biphenyl	Y	300	6.7	Exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays.
Viva PFP Propyl	Y	300	5	Exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.
Viva Silica	—	300	—	Normal phase applications for highly retained high molecular weight compounds.

pH ranges and temperature limits: see product listings on pages listed here.

Column lifetime will be shorter when operating at pH and/or temperature extremes.

## US Pharmacopeia Cross Reference

<b>L1</b>	Octadecyl silane chemically bonded to porous silica or ceramic microparticles, 1.7 to 10µm in diameter, or a monolithic rod. <i>Pinnacle DB C18 (p. 301), Pinnacle DB Aqueous C18 (p. 304), Pinnacle II C18 (p. 306), Allure C18 (p. 310), Allure Aqueous C18 (p. 311), Ultra C18 (p. 314), Ultra Aqueous C18 (p. 315), Viva C18 (p. 321)</i>
<b>L3</b>	Porous silica particles, 5 to 10µm in diameter. <i>Pinnacle DB Silica (p. 304), Pinnacle II Silica (p. 309), Allure Silica (p. 313), Ultra Silica (p. 319), Viva Silica (p. 323)</i>
<b>L7</b>	Octylsilane chemically bonded to totally porous silica particles, 1.7 to 10µm in diameter. <i>Pinnacle DB C8 (p. 301), Pinnacle II C8 (p. 307), Ultra C8 (p. 314), Viva C8 (p. 321)</i>
<b>L8</b>	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 3 to 10µm in diameter. <i>Pinnacle II Amino (p. 308), Ultra Amino (p. 318)</i>
<b>L10</b>	Nitrile groups chemically bonded to porous silica particles, 3 to 10µm in diameter. <i>Pinnacle DB Cyano (p. 302), Pinnacle II Cyano (p. 307), Allure Basix (p. 310), Ultra Cyano (p. 317)</i>
<b>L11</b>	Phenyl groups chemically bonded to porous silica particles, 1.7 to 10µm in diameter. <i>Pinnacle DB Phenyl (p. 302), Pinnacle DB Biphenyl (p. 303), Pinnacle II Phenyl (p. 308), Pinnacle II Biphenyl (p. 309), Allure Biphenyl (p. 312), Ultra Phenyl (p. 317), Viva Biphenyl (p. 322)</i>
<b>L13</b>	Trimethylsilane chemically bonded to porous silica particles, 3 to 10µm in diameter. <i>Ultra C1 (p. 316)</i>
<b>L26</b>	Butyl silane chemically bonded to totally porous silica particles, 3 to 10µm in diameter. <i>Ultra C4 (p.316), Viva C4 (p.322)</i>
<b>L43</b>	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10µm in diameter. <i>Pinnacle DB PFP Propyl (p. 303), Allure PFP Propyl (p. 311), Ultra PFP (p. 318), Viva PFP Propyl (p. 322)</i>



### Chromatographic Properties

High-purity cyano phase with reduced silanol activity. Often a better choice than C18 for basic pharmaceuticals. Cyano is the most stable bonded phase for normal phase mode.

High-purity, highly retentive, base-deactivated phase with alternate selectivity to hydrocarbon phases, especially for aromatic analytes.

Recommended for normal phase analyses of mono- and disaccharides and other similar compounds. Can also serve as a weak anion exchanger, with aqueous buffers.

A pentafluorophenyl phase. Unique selectivity by interaction with functional groups of organohalogens or other basic analytes.

High purity, high surface area.

Proprietary stationary phase can process up to twice as many samples per hour, compared to a conventional C18 phase.

High purity silica.

Silica manufactured by Restek. Greatest large-pore surface ratio in the market.

Silica manufactured by Restek. Greatest large-pore surface ratio in the market.

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### Similar Phases

Platinum CN, Develosil Cyano, Luna CN, Hypersil Gold CN

Platinum Phenyl, Supelcosil Phenyl, Betasil Phenyl

Platinum Amino, Develosil NH2

Fluopase PFP, Fluosep-RP Phenyl, Curosil PFP

—

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BioBasic 18, Symmetry 300 C18, Jupiter 300 C18, Zorbax 300 OSB C18, Synchropak C18, 208 TP C18

BioBasic 8, Zorbax 300 OSB C8, Synchropak C8, 208 TP C8

BioBasic 4, Symmetry 300 C4, Jupiter 300 C4, Synchropak C4, 208 TP C4

unique [column](#)

unique [column](#)

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INNOVATIVE PRODUCTS

### HPLC Column Selection Guide

Call Restek Technical Service, or your local distributor, for the right column for your application.

**RESTEK** Chromatography Products

## free literature

### HPLC Column Selection Guide

A useful chart to keep with your workbooks, or post on a wall. Quickly scan important characteristics of Restek HPLC columns. Includes brief, practical guidelines for choosing stationary phase, particle size, pore diameter, and column dimensions. Also includes USP designations for each phase and lists similar phases from other suppliers.

Call Restek at 800-356-1688 or 814-353-1300, ext. 5, or contact your Restek representative, to request your free copy!

lit. cat.# 59454D

## tech tip

### Managing High Backpressure

High backpressure is one of the most common problems encountered in HPLC analyses. Normal column backpressure is observed after a new column has been installed and equilibrated with mobile phase. Unfortunately, this pressure often will increase as the column is used because particles collect on the column inlet frit. These particles can be sample impurities, mobile phase contaminants, or materials from the injector or autosampler rotor seal.

In addition to increasing backpressure, particles on the frit can cause split peaks, peak tailing, and, eventually, over-pressure shut-down. In some circumstances, these problems can be corrected by back-flushing the column. However, in many cases the result is an unusable column.

To minimize backpressure problems, all samples and mobile phase solvents must be filtered before use, and rotor seals should be changed on a routine basis. Along with these preventive measures, it is advisable to use precolumn filters such as the Trident guard column protection system. Particles build up on the inexpensive, replaceable frit in the filter, instead of on the permanent frit at the column inlet.





**Restek's popular Pinnacle® DB HPLC columns are available in a <2µm particle size.** Ruggedness and reproducibility are guaranteed, as we control every step in the process, from base silica to bonded phase to final packed column. The silica particles are classified and selected to give an exceptionally tight distribution around 1.9µm, while eliminating <1µm particles that can contribute to a poorly packed bed. Highly base-deactivated Pinnacle® DB stationary phases are an excellent choice when analyzing a wide range of compounds, from acidic to basic. To optimize your ultra high pressure HPLC methods, reach for Restek small particle HPLC columns!

### 1.9µm Pinnacle® DB UHPLC Columns

#### Physical Characteristics:

particle size: 1.9µm  
pore size: 140Å  
endcap: yes

pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek.

Length	2.1mm ID	
	cat.#	price
<b>Pinnacle DB C18 1.9µm Columns</b>		
30mm	9414232	
50mm	9414252	
100mm	9414212	
<b>Pinnacle DB Silica 1.9µm Columns</b>		
30mm	9410232	
50mm	9410252	
100mm	9410212	
<b>Pinnacle DB PFP Propyl 1.9µm Columns</b>		
30mm	9419232	
50mm	9419252	
100mm	9419212	
<b>Pinnacle DB Biphenyl 1.9µm Columns</b>		
30mm	9409232	
50mm	9409252	
100mm	9409212	
<b>Pinnacle DB Aqueous C18 1.9µm Columns</b>		
30mm	9418232	
50mm	9418252	
100mm	9418212	
<b>NEW! Pinnacle DB IBD 1.9µm Columns</b>		
30mm	9425232	
50mm	9425252	
100mm	9425212	
<b>Pinnacle DB Cyano 1.9µm Columns</b>		
30mm	9416232	
50mm	9416252	
100mm	9416212	
<b>NEW! Pinnacle DB C8 1.9µm Columns</b>		
30mm	9413232	
50mm	9413252	
100mm	9413212	
<b>NEW! Pinnacle DB PAH 1.9µm Columns</b>		
30mm	9470232	
50mm	9470252	
100mm	9470212	
<b>NEW! Pinnacle DB X3 C18 1.9µm Columns</b>		
30mm	9424232	
50mm	9424252	
100mm	9424212	



### free literature

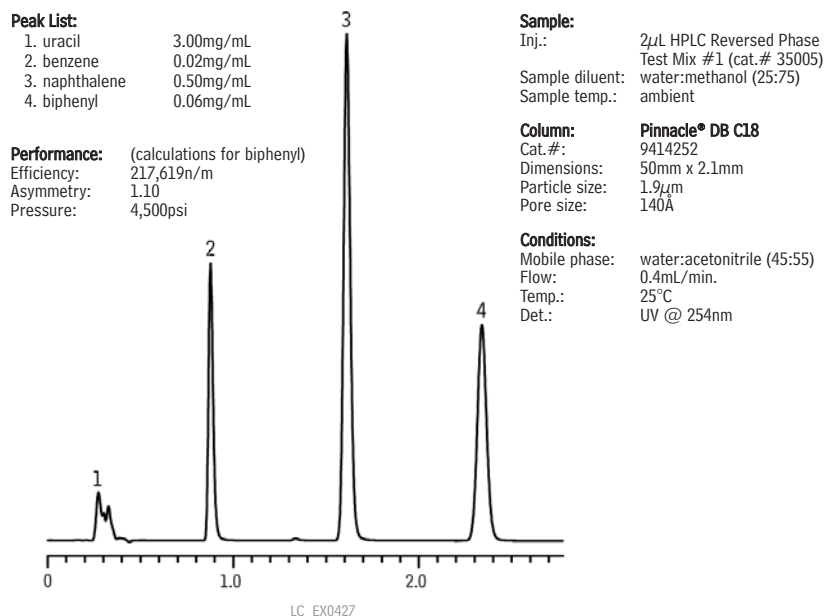
Optimize Selectivity & Efficiency in UHPLC Separations

Download your free copy from [www.restek.com](http://www.restek.com).

Applications Note  
lit. cat.# 580202



**Figure 1** Excellent peak symmetry and efficiency on a 1.9 $\mu$ m Pinnacle® DB C18 column, using a reversed phase test mix.



Anthony Hahn, Customer Service

## Restek Customer Service

### In the U.S.

Call: 800-356-1688 (ext. 3) or 814-353-1300 (ext. 3)

Monday–Friday 8:00 a.m.–6:00 p.m. ET

Fax: 814-353-1309—24-hours a day

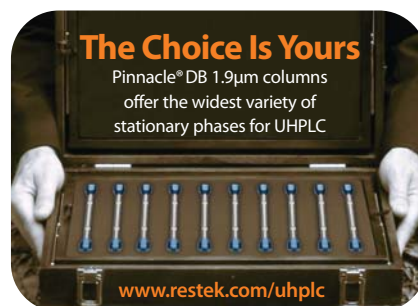
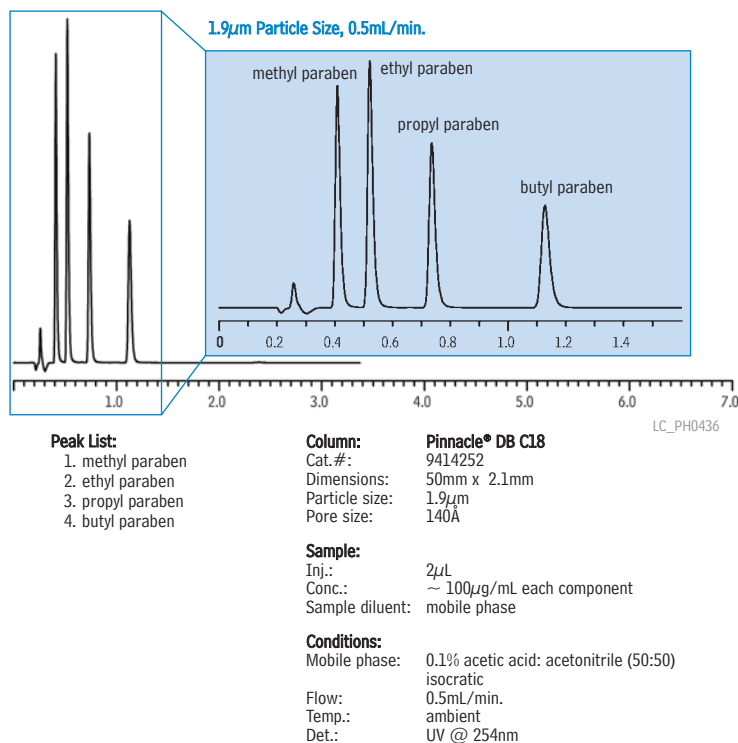
Online: [www.restek.com](http://www.restek.com)—24-hours a day

### Outside the U.S.

Contact your Restek representative:

Refer to our list on pages 4-5 or visit our website at [www.restek.com](http://www.restek.com)

**Figure 2** Parabens on a 1.9 $\mu$ m Pinnacle® DB C18 column.







- High quality, Restek manufactured packing materials.
- Superior packing technology ensures rugged, reproducible columns.
- Wide range of phases and dimensions available—please inquire.

### ordering note

Looking for another stationary phase or capillary dimension?

Please contact Restek Technical Service at 814-353-1300 or 800-356-1688 (ext. 4) or support@restek.com to inquire.

## Restek Capillary HPLC Columns

### Physical Characteristics:

#### Allure® Basix:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 12%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Allure® PFP Propyl:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 17%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Ultra C18:

particle size: 3µm, spherical  
pore size: 100Å  
carbon load: 20%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Allure® Biphenyl:

particle size: 3µm, spherical  
pore size: 60Å  
carbon load: 23%  
endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Ultra Aqueous C18:

particle size: 3µm, spherical  
pore size: 100Å  
carbon load: 15%  
endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Viva C18:

particle size: 3µm, spherical  
pore size: 300Å  
carbon load: 9%  
endcap: yes  
pH range: 2.5 to 10  
temperature limit: 80°C

### Chromatographic Properties:

Available in a wide variety of stationary phases for acidic to basic compounds. Columns are suitable for small molecules using Allure® and Ultra phases and large biomolecules using Viva C18.

Length	0.3mm ID	
	cat. #	PRICE
<b>Allure Basix 3µm Capillary Columns</b>		
50mm	916135B	
150mm	916136B	
<b>Allure Biphenyl 3µm Capillary Columns</b>		
50mm	916635B	
150mm	916636B	
<b>Allure PFP Propyl 3µm Capillary Columns</b>		
50mm	916935B	
150mm	916936B	
<b>Ultra Aqueous C18 3µm Capillary Columns</b>		
50mm	917835B	
150mm	917836B	
<b>Ultra C18 3µm Capillary Columns</b>		
50mm	917435B	
150mm	917436B	
<b>Viva C18 3µm Capillary Columns</b>		
50mm	951435B	
150mm	951436B	



**"We focus on developing cutting-edge LC column chemistries with exacting standards and total process control. Our goal is to help customers increase productivity by providing exceptional columns and accessories, matched to their specific analytical needs."**

#### Restek's HPLC Group

pictured: Shane Stevens, Larry Peters, Terry Cressman, Randy Romesberg, Steve Kozel, Bruce Albright, Vernon Bartlett, Frank Dorman (not pictured: Mike Kochakian)



## Pinnacle® DB Columns: 1.9, 3, or 5µm particle sizes; 140Å pore size

Prepared using a highly base-deactivated silica support; ideal for analyses of basic compounds, or bases mixed with acids/neutrals. Silica manufactured at Restek, for total control of quality and reproducibility.

### Pinnacle® DB C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical  
pore size: 140Å  
carbon load: 11%

endcap: yes  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C18 bonding. Hydrophobic C18 phase suitable for analyses of a wide range of compounds, from acidic through slightly basic. Replaces Hypersil® BDS C18 and Pinnacle® ODS Amine.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9414232					
50mm			9414252					
100mm			9414212					
<b>3µm Columns</b>								
30mm	9414331		9414332		9414333		9414335	
50mm	9414351		9414352		9414353		9414355	
100mm	9414311		9414312		9414313		9414315	
<b>5µm Columns</b>								
30mm	9414531		9414532		9414533		9414535	
50mm	9414551		9414552		9414553		9414555	
100mm	9414511		9414512		9414513		9414515	
150mm	9414561		9414562		9414563		9414565	
200mm	9414521		9414522		9414523		9414525	
250mm	9414571		9414572		9414573		9414575	



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### Pinnacle® DB C8 Columns (USP L7)

#### Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical  
pore size: 140Å  
carbon load: 6%

endcap: yes  
pH range: 2.5 to 10  
temperature limit: 80°C



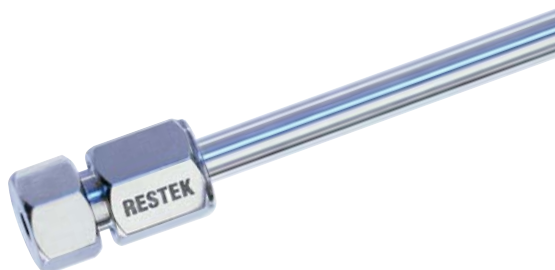
#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Monomeric C8 bonding. Similar to Pinnacle® DB C18, but the shorter alkyl chain provides less hydrophobic retention. Less retention can be useful for shortening analysis time, if resolution is adequate. Replaces Hypersil® BDS C8 and Pinnacle® C8 Amine.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9413232					
50mm			9413252					
100mm			9413212					
<b>3µm Columns</b>								
30mm	9413331		9413332		9413333		9413335	
50mm	9413351		9413352		9413353		9413355	
100mm	9413311		9413312		9413313		9413315	
<b>5µm Columns</b>								
30mm	9413531		9413532		9413533		9413535	
50mm	9413551		9413552		9413553		9413555	
100mm	9413511		9413512		9413513		9413515	
150mm	9413561		9413562		9413563		9413565	
200mm	9413521		9413522		9413523		9413525	
250mm	9413571		9413572		9413573		9413575	



1.9µm Pinnacle® DB columns. See pages 298-299 for more information.







## Pinnacle® DB Cyano Columns (USP L10)

### Physical Characteristics:

particle size: 1.9µm or 5µm, spherical  
pore size: 140Å  
carbon load: 4%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Cyano bonding. Suitable for analyses of a wide range of compounds, from acidic through slightly basic. Also useful for confirmation of analyses on a C18 or C8 column. Can be used in normal phase or reversed phase mode of separation. Replaces Hypersil® BDS Cyano and Pinnacle® Cyano Amine.



also  
available

**Prep Columns**  
See page 325.

**Bulk Packing Materials**  
See page 326.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9416232					
50mm			9416252					
100mm			9416212					
<b>5µm Columns</b>								
30mm	9416531		9416532		9416533		9416535	
50mm	9416551		9416552		9416553		9416555	
100mm	9416511		9416512		9416513		9416515	
150mm	9416561		9416562		9416563		9416565	
200mm	9416521		9416522		9416523		9416525	
250mm	9416571		9416572		9416573		9416575	

## Pinnacle® DB Phenyl Columns (USP L11)

### Physical Characteristics:

particle range: 5µm, spherical  
pore size: 140Å  
carbon load: 5.3%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Pinnacle® DB Phenyl columns offer alternate selectivity to straight chain hydrocarbon phases, especially for aromatic analytes. Replaces Hypersil® BDS Phenyl and Pinnacle® Phenyl Amine.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9415531		9415532		9415533		9415535	
50mm	9415551		9415552		9415553		9415555	
100mm	9415511		9415512		9415513		9415515	
150mm	9415561		9415562		9415563		9415565	
200mm	9415521		9415522		9415523		9415525	
250mm	9415571		9415572		9415573		9415575	



## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.





## Pinnacle® DB PFP Propyl Columns (USP L43)

### Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical  
pore size: 140Å  
carbon load: 6%  
endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Pinnacle® DB PFP Propyl, a unique pentafluorophenyl phase with a propyl spacer, uses a highly base-deactivated spherical silica manufactured by Restek. This highly base-deactivated packing exhibits excellent peak shapes for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9419232					
50mm			9419252					
100mm			9419212					
<b>3µm Columns</b>								
30mm	9419331		9419332		9419333		9419335	
50mm	9419351		9419352		9419353		9419355	
100mm	9419311		9419312		9419313		9419315	
150mm	9419361		9419362		9419363		9419365	
<b>5µm Columns</b>								
30mm	9419531		9419532		9419533		9419535	
50mm	9419551		9419552		9419553		9419555	
100mm	9419511		9419512		9419513		9419515	
150mm	9419561		9419562		9419563		9419565	
200mm	9419521		9419522		9419523		9419525	
250mm	9419571		9419572		9419573		9419575	



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## for more info

See pages 298-299 for more information on our 1.9µm Pinnacle® DB columns.

## Pinnacle® DB Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical  
pore size: 140Å  
carbon load: 8%  
endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Pinnacle® DB Biphenyl is a unique reversed phase material that displays both increased retention and selectivity for aromatic and/or unsaturated compounds when compared to conventional alkyl and phenyl phases. Highly base-deactivated spherical silica manufactured by Restek. An excellent choice for the analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9409232					
50mm			9409252					
100mm			9409212					
<b>3µm Columns</b>								
30mm	9409331		9409332		9409333		9409335	
50mm	9409351		9409352		9409353		9409355	
100mm	9409311		9409312		9409313		9409315	
150mm	9409361		9409362		9409363		9409365	
<b>5µm Columns</b>								
30mm	9409531		9409532		9409533		9409535	
50mm	9409551		9409552		9409553		9409555	
100mm	9409511		9409512		9409513		9409515	
150mm	9409561		9409562		9409563		9409565	
200mm	9409521		9409522		9409523		9409525	
250mm	9409571		9409572		9409573		9409575	



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## free literature

Resolution Evolution:  
Biphenyl-Next Generation  
of Phenyl Columns

Download your free copy  
from [www.restek.com](http://www.restek.com).

Flyer  
lit. cat.# GNFL1096





### Pinnacle® DB Aqueous C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical  
pore size: 140Å  
carbon load: 6%

pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

Highly selective phase for polar analytes. Compatible with highly aqueous (up to 100%) mobile phases. Silica manufactured by Restek.

### for more info

See pages 298-299 for more information on our 1.9µm Pinnacle® DB columns.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9418232					
50mm			9418252					
100mm			9418212					
<b>3µm Columns</b>								
30mm	9418331		9418332		9418333		9418335	
50mm	9418351		9418352		9418353		9418355	
100mm	9418311		9418312		9418313		9418315	
150mm	9418361		9418362		9418363		9418365	
<b>5µm Columns</b>								
30mm	9418531		9418532		9418533		9418535	
50mm	9418551		9418552		9418553		9418555	
100mm	9418511		9418512		9418513		9418515	
150mm	9418561		9418562		9418563		9418565	
200mm	9418521		9418522		9418523		9418525	
250mm	9418571		9418572		9418573		9418575	

### Pinnacle® DB Silica Columns (USP L3)

#### Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical  
pore size: 140Å  
carbon load: none

endcap: no  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Highly base-deactivated spherical silica manufactured by Restek. Useful for normal phase separations. Replaces Hypersil® BDS and Pinnacle® Amine.

### also available

#### HPLC Syringes

See pages 285-289.



Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>1.9µm Columns</b>								
30mm			9410232					
50mm			9410252					
100mm			9410212					
<b>3µm Columns</b>								
30mm	9410331		9410332		9410333		9410335	
50mm	9410351		9410352		9410353		9410355	
100mm	9410311		9410312		9410313		9410315	
150mm	9410361		9410362		9410363		9410365	
<b>5µm Columns</b>								
30mm	9410531		9410532		9410533		9410535	
50mm	9410551		9410552		9410553		9410555	
100mm	9410511		9410512		9410513		9410515	
150mm	9410561		9410562		9410563		9410565	
200mm	9410521		9410522		9410523		9410525	
250mm	9410571		9410572		9410573		9410575	

### ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.



### Pinnacle® DB X3 C18 UHPLC Columns

- Higher stability in acidic and highly aqueous conditions.
- Improved peak shape for basic compounds.
- Greater retention of hydrophilic compounds.



#### Physical Characteristics:

particle size: 1.9µm	endcap: yes
pore size: 140Å	pH range: 2.5 to 7.5
	temperature limit: 80°C

#### Chromatographic Properties:

A dense trifunctionally bonded C18 alkyl phase for reversed phase separations.

Length	2.1mm ID	
	cat.#	price
<b>1.9µm Columns</b>		
30mm	9424232	
50mm	9424252	
100mm	9424212	



### Pinnacle® DB PAH UHPLC Columns

- Complete resolution of EPA 610 PAHs in less than 4 minutes.
- Greatly reduces run times, increasing sample throughput.



#### Physical Characteristics:

particle size: 1.9µm	endcap: yes
pore size: 140Å	pH range: 2.5 to 7.5
	temperature limit: 80°C

#### Chromatographic Properties:

Specifically designed to resolve complex mixtures of polycyclic aromatic hydrocarbons.

Length	2.1mm ID	
	cat.#	price
<b>1.9µm Columns</b>		
30mm	9470232	
50mm	9470252	
100mm	9470212	



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### Pinnacle® DB IBD UHPLC Columns

#### Physical Characteristics:

particle size: 1.9µm	endcap: yes
pore size: 140Å	pH range: 2.5 to 7.5
	temperature limit: 80°C



#### Chromatographic Properties:

An intrinsically base-deactivated (IBD) phase, containing a polar group within, or intrinsic to, the hydrocarbon bonded phase. Unique selectivity and a high level of base deactivation, while reducing or eliminating the need for mobile phase additives.

Length	2.1mm ID	
	cat.#	price
<b>1.9µm Columns</b>		
30mm	9425232	
50mm	9425252	
100mm	9425212	





### Pinnacle® II Columns: 3µm or 5µm particles; 110Å pore size

Silica manufactured at Restek, for total control of quality and reproducibility. Excellent replacement for the original Hypersil® material. Physical and chromatographic properties similar to our original Pinnacle® materials, but with greater lot-to-lot uniformity.

#### Pinnacle® II C18 Columns (USP L1)

##### Physical Characteristics:

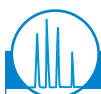
particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 13%

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



##### Chromatographic Properties:

Excellent choice as a general purpose C18 column. Intermediate carbon loading and surface area, suitable for a wide range of acidic to neutral hydrophobic compounds. Replaces Hypersil® ODS and Pinnacle® C18.



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Allicin .....	510
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	1.0mm ID		2.1mm ID		3.2mm ID		4.0mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>										
30mm	9214331		9214332		9214333		—	—	9214335	
50mm	9214351		9214352		9214353		—	—	9214355	
100mm	9214311		9214312		9214313		—	—	9214315	
<b>5µm Columns</b>										
30mm	9214531		9214532		9214533		—	—	9214535	
50mm	9214551		9214552		9214553		—	—	9214555	
100mm	9214511		9214512		9214513		9214514		9214515	
150mm	9214561		9214562		9214563		9214564		9214565	
200mm	9214521		9214522		9214523		—	—	9214525	
250mm	9214571		9214572		9214573		—	—	9214575	

#### Pinnacle® II PAH Columns

##### Physical Characteristics:

particle size: 4µm, spherical  
pore size: 110Å

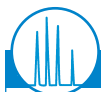
endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



##### Chromatographic Properties:

Developed specifically for challenging analyses of polycyclic aromatic hydrocarbons. The Pinnacle® II PAH stationary phase incorporates a proprietary C18 bonding that enables unique shape selectivity to resolve to baseline all 16 PAHs listed in US EPA Method 610. Every lot of Pinnacle® II PAH bonded phase material is tested to ensure baseline resolution of the Method 610 PAHs, using a simple water/acetonitrile mobile phase gradient. Further, because we make Pinnacle® II PAH columns using our own silica, we have greater control over quality and reproducibility. Replaces Pinnacle® PAH columns.

If you are analyzing PAHs, Pinnacle® II PAH columns are the reliable, cost-effective columns you need.



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	2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price
<b>4µm Columns</b>						
50mm	9219452		9219453		9219455	
100mm	9219412		9219413		9219415	
150mm	9219462		9219463		9219465	
200mm	9219422		9219423		9219425	
250mm	9219472		9219473		9219475	





## Pinnacle® II C8 Columns (USP L7)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 7%

endcap: fully endcapped  
pH range: 2.5 to 10  
temperature limit: 80°C



### Chromatographic Properties:

Reliable performance and symmetrical peaks for neutral to acidic compounds. Provides shorter retention times for hydrophobic compounds, compared to C18 phases. Replaces Hypersil® C8 and Pinnacle® C8.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.0mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>										
30mm	9213331		9213332		9213333		—	—	9213335	
50mm	9213351		9213352		9213353		—	—	9213355	
100mm	9213311		9213312		9213313		—	—	9213315	
<b>5µm Columns</b>										
30mm	9213531		9213532		9213533		—	—	9213535	
50mm	9213551		9213552		9213553		—	—	9213555	
100mm	9213511		9213512		9213513		9213514		9213515	
150mm	9213561		9213562		9213563		9213564		9213565	
200mm	9213521		9213522		9213523		—	—	9213525	
250mm	9213571		9213572		9213573		—	—	9213575	



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## Pinnacle® II Cyano Columns (USP L10)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 4%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

Can be used in either reversed phase or normal phase mode. More rugged than bare silica for normal phase applications. Replaces Hypersil® Cyano and Pinnacle® CN.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9216331		9216332		9216333		9216335	
50mm	9216351		9216352		9216353		9216355	
100mm	9216311		9216312		9216313		9216315	
<b>5µm Columns</b>								
30mm	9216531		9216532		9216533		9216535	
50mm	9216551		9216552		9216553		9216555	
100mm	9216511		9216512		9216513		9216515	
150mm	9216561		9216562		9216563		9216565	
200mm	9216521		9216522		9216523		9216525	
250mm	9216571		9216572		9216573		9216575	



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Piperine .....513

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add “-700” to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.



also  
**available**

Prep Columns  
See page 325.

Bulk Packing Materials  
See page 326.





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Parabens	511
Sorbic & Benzoic Acids	513

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### Pinnacle® II Phenyl Columns (USP L11)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 6%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

The Pinnacle® II Phenyl phase offers unique selectivity versus traditional alkyl chain phases, especially for aromatic compounds. Replaces Hypersil® Phenyl and Pinnacle® Phenyl.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9215331		9215332		9215333		9215335	
50mm	9215351		9215352		9215353		9215355	
100mm	9215311		9215312		9215313		9215315	
<b>5µm Columns</b>								
30mm	9215531		9215532		9215533		9215535	
50mm	9215551		9215552		9215553		9215555	
100mm	9215511		9215512		9215513		9215515	
150mm	9215561		9215562		9215563		9215565	
200mm	9215521		9215522		9215523		9215525	
250mm	9215571		9215572		9215573		9215575	

### Pinnacle® II Amino Columns (USP L8)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: 2%

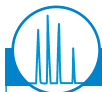
endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

HPLC analysis using an amino-based stationary phase is the most popular technique for routine analyses of simple sugars, using isocratic elution (e.g., acetonitrile:water, 75:25) and a refractive index detector (RID) or an evaporative light scattering detector (ELSD). The Pinnacle® II Amino column is ideal for mono- and disaccharide analyses. Replaces Hypersil® Amino and Pinnacle® Amino.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9217331		9217332		9217333		9217335	
50mm	9217351		9217352		9217353		9217355	
100mm	9217311		9217312		9217313		9217315	
<b>5µm Columns</b>								
30mm	9217531		9217532		9217533		9217535	
50mm	9217551		9217552		9217553		9217555	
100mm	9217511		9217512		9217513		9217515	
150mm	9217561		9217562		9217563		9217565	
200mm	9217521		9217522		9217523		9217525	
250mm	9217571		9217572		9217573		9217575	



	Page #
Lactulose Concentrate	532
Maple Syrup	515
Sugars	515

also available

HPLC Syringes  
See pages 285-289



### ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.



## Pinnacle® II Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 110Å

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



### Chromatographic Properties:

The Pinnacle® II Biphenyl phase offers alternate selectivity to straight-chain hydrocarbon phases, and enhanced selectivity and retention for unsaturated compounds, compared to traditional phenyl phases. An excellent confirmation column for explosive compounds, as in EPA method 8330.

Length	4.6mm ID cat.# price
5µm Column	
150mm	9209565
250mm	9209575



Explosives .....Page #

Explosives .....501

### Explosives by US EPA Method 8330B on a Pinnacle® II Biphenyl column.

#### Column:

Pinnacle® II Biphenyl  
Cat.#: 9209565-700  
Dimensions: 150mm x 4.6mm  
Particle size: 5µm  
Pore size: 110Å

#### Sample:

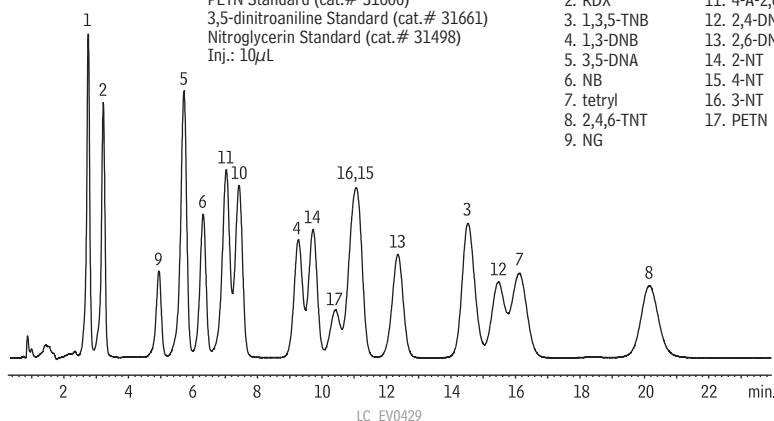
50µg/mL each compound diluted in acetonitrile  
8330 Calibration Mix #1 (cat.# 31450)  
8330 Calibration Mix #2 (cat.# 31451)  
PETN Standard (cat.# 31600)  
3,5-dinitroaniline Standard (cat.# 31661)  
Nitroglycerin Standard (cat.# 31498)  
Inj.: 10µL

#### Conditions:

Mobile phase: water:methanol  
(45:55 v/v)  
Flow: 1.2mL/min.  
Temp.: 30°C  
Det.: UV detection @ 210nm

#### Peak List

- |              |                 |
|--------------|-----------------|
| 1. HMX       | 10. 2-A-4,6-DNT |
| 2. RDX       | 11. 4-A-2,6-DNT |
| 3. 1,3,5-TNB | 12. 2,4-DNT     |
| 4. 1,3-DNB   | 13. 2,6-DNT     |
| 5. 3,5-DNA   | 14. 2-NT        |
| 6. NB        | 15. 4-NT        |
| 7. tetryl    | 16. 3-NT        |
| 8. 2,4,6-TNT | 17. PETN        |
| 9. NG        |                 |



## free literature

### Resolution Evolution: Biphenyl-Next Generation of Phenyl Columns

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## Pinnacle® II Silica Columns (USP L3)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 110Å  
carbon load: none

endcap: no  
pH range: 2.5 to 10  
temperature limit: 80°C



### Chromatographic Properties:

Good general purpose packing for normal phase separations. Moderate surface area. Replaces Hypersil® and Pinnacle® Silica.

	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price	cat.#	price
3µm Columns								
30mm	9210331		9210332		9210333		9210335	
50mm	9210351		9210352		9210353		9210355	
100mm	9210311		9210312		9210313		9210315	
5µm Columns								
30mm	9210531		9210532		9210533		9210535	
50mm	9210551		9210552		9210553		9210555	
100mm	9210511		9210512		9210513		9210515	
150mm	9210561		9210562		9210563		9210565	
200mm	9210521		9210522		9210523		9210525	
250mm	9210571		9210572		9210573		9210575	



Hydrocodone Bitartrate .....Page #

Hydrocodone Bitartrate .....520

Tocopherols .....510





### Allure® Columns: 5µm particles; 60Å pore size

Small pore size in a high-purity, Type B silica provides a large surface area. High carbon loads, highly retentive. An excellent choice for light scattering (ELSD) and MS detectors, in which more organic solvent in the mobile phase gives better sensitivity.

### Allure® C18 Columns (USP L1) Excellent Columns for LC/MS and ELSD

#### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 60Å  
carbon load: 27%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Most retentive of our alkyl stationary phases due to large surface area of the base silica and high-density bondings. Provides excellent peak shapes for a wide range of compounds.



	Page #
Antibiotics	526
Herbicides	504
Pesticides	506

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9164531		9164532		9164533		9164535	
50mm	9164551		9164552		9164553		9164555	
100mm	9164511		9164512		9164513		9164515	
150mm	9164561		9164562		9164563		9164565	
200mm	9164521		9164522		9164523		9164525	
250mm	9164571		9164572		9164573		9164575	

### Allure® Basix Columns (USP L10) Excellent Columns for LC/MS and ELSD

#### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 60Å  
carbon load: 12%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Highly retentive propyl cyano phase. Excellent choice for basic compounds and for analytes containing amine group functionality.



	Page #
Acetaminophen, Narcotic Analgesics	519
Albuterol	528
Antiarrhythmics	521, 522
Antibiotics	526
Antidepressants	527
Herbicides	503
Ibuprofen & Pseudoephedrine	533
Sedatives	532
Steroids	530

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9161531		9161532		9161533		9161535	
50mm	9161551		9161552		9161553		9161555	
100mm	9161511		9161512		9161513		9161515	
150mm	9161561		9161562		9161563		9161565	
200mm	9161521		9161522		9161523		9161525	
250mm	9161571		9161572		9161573		9161575	



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**Allure® PFP Propyl Columns (USP L43)**  
**Excellent Columns for LC/MS and ELSD****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 60Å  
carbon load: 17%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. An excellent phase for separating nucleosides, nucleotides, purines, pyrimidines, halogenated compounds, β-blockers, and tricyclic antidepressants.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9169531		9169532		9169533		9169535	
50mm	9169551		9169552		9169553		9169555	
100mm	9169511		9169512		9169513		9169515	
150mm	9169561		9169562		9169563		9169565	
200mm	9169521		9169522		9169523		9169525	
250mm	9169571		9169572		9169573		9169575	



	Page #
Antibiotics	524
Benzodiazepines	498
Catecholamines	494
Cocaine, Ecgonine Methyl Ester	497
Nucleic Acid Bases	493
Opiates	496
System Suitability Mix	499

**Allure® Aqueous C18 Columns (USP L1)**  
**Excellent Columns for LC/MS and ELSD****Physical Characteristics:**

particle size: 5µm spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly retentive and selective phase for separating polar analytes, including polar acidic compounds. Compatible with highly aqueous (up to 100%) mobile phases. Highly base deactivated. An excellent choice when analyzing a wide range of compounds, as in LC/MS screening methods.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9168531		9168532		9168533		9168535	
50mm	9168551		9168552		9168553		9168555	
100mm	9168511		9168512		9168513		9168515	
150mm	9168561		9168562		9168563		9168565	
200mm	9168521		9168522		9168523		9168525	
250mm	9168571		9168572		9168573		9168575	

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.

**also available**

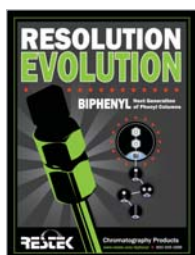
**Prep Columns**  
See page 324.

**Bulk Packing Materials**  
See page 326.





	Page #
Antibiotics	526
Cannabinoids	496
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Steroids	529



### free literature

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## Allure® Biphenyl Columns (USP L11)

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 60Å  
carbon load: 23%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Highly retentive and selective for aromatic and unsaturated compounds. Increased retention and selectivity, compared to phenyl phases. Excellent selectivity for steroids, tetracyclines, explosives, and other unsaturated compounds.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9166531		9166532		9166533		9166535	
50mm	9166551		9166552		9166553		9166555	
100mm	9166511		9166512		9166513		9166515	
150mm	9166561		9166562		9166563		9166565	
200mm	9166521		9166522		9166523		9166525	
250mm	9166571		9166572		9166573		9166575	

## Allure® Organic Acids Columns

### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

Allure® Organic Acids columns provide enhanced retention and selectivity for polar organic acids, allowing the separation to be performed on a single 30cm column. An Allure® Organic Acids column effectively resolves key organic acids such as tartaric and quinic acids, using the chromatographic conditions specified in AOAC method 986.13. Retention is stable and reproducible, even with the 100% aqueous mobile phase specified in the AOAC method.

Length	3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price
<b>5µm Column</b>				
150mm	9165563		9165565	
250mm			9165575	
300mm			9165585	

Note: Other dimensions available on request.



	Page #
Carboxylic Acids	514
Fruit Juice Acids	514, 515

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.





**Allure® Silica Columns (USP L3)****Physical Characteristics:**

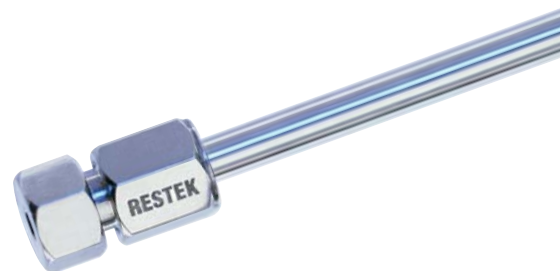
particle size: 5µm, spherical  
pore size: 60Å

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly retentive phase for normal phase separations. Very high surface area, Type B silica packing.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9160531		9160532		9160533		9160535	
50mm	9160551		9160552		9160553		9160555	
100mm	9160511		9160512		9160513		9160515	
150mm	9160561		9160562		9160563		9160565	
200mm	9160521		9160522		9160523		9160525	
250mm	9160571		9160572		9160573		9160575	

**Allure® AK Columns****Physical Characteristics:**

particle size: 5µm  
pore size: 60Å

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

This highly retentive, highly selective phase, unique to Restek, was developed specifically for the analysis of aldehydes and ketones as DNPH derivatives. Allure® AK is a reversed phase HPLC material that has the unique ability to separate all thirteen carbonyl compounds specified in California Air Resources Board (CARB) Method # 1004, using a simple acetonitrile/water gradient, in less than 15 minutes. Other columns require long analysis times or the use of tetrahydrofuran.

Length	3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price
<b>5µm Columns with Trident Integral Inlet Fittings</b>				
200mm	9159523-700		9159525-700	



	Page #
Carbonyls .....	500

**Carbonyls by CARB Method 1004 on an Allure® AK column.**

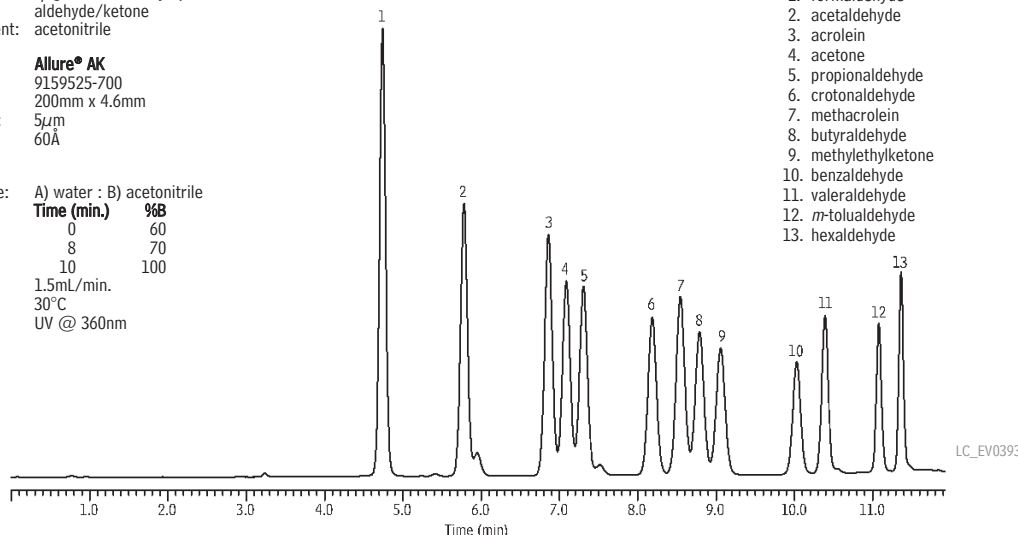
**Sample:**  
Inj.: 10µL  
Conc.: 3µg/mL each analyte, as aldehyde/ketone  
Sample diluent: acetonitrile

**Column:** Allure® AK  
Cat.#: 9159525-700  
Dimensions: 200mm x 4.6mm  
Particle size: 5µm  
Pore size: 60Å

**Conditions:**  
Mobile phase: A) water : B) acetonitrile  
Time (min.) %B  
0 60  
8 70  
10 100

Flow: 1.5mL/min.  
Temp.: 30°C  
Det.: UV @ 360nm

Peak	Ret. Time (min.)
DNPH derivatives of:	
1. formaldehyde	4.74
2. acetaldehyde	5.78
3. acrolein	6.86
4. acetone	7.09
5. propionaldehyde	7.31
6. crotonaldehyde	8.19
7. methacrolein	8.55
8. butyraldehyde	8.79
9. methyl ethyl ketone	9.06
10. benzaldehyde	10.03
11. valeraldehyde	10.39
12. m-tolualdehyde	11.08
13. hexaldehyde	11.36







	Page #
Acetaminophen, Narcotic Analgesics	519
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Beclomethasone	523
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Explosives	501
Herbicides	502
Hydrocodone Bitartrate, Acetaminophen	533
Nitrofurantol Metabolites	517
Vitamins (Fat Soluble)	512

### Ultra Columns: 3µm or 5µm particles; 100Å pore size

Our broadest selection of stationary phases, including unique phases. High density bondings, for maximum retention. High-purity, Type B silica gives excellent peak shapes for a wide range of compounds.

#### Ultra C18 Columns (USP L1)

##### Excellent for a wide range of analyses

###### Physical Characteristics:

particle size: 3µm or 5µm, spherical	endcap: fully endcapped
pore size: 100Å	pH range: 2.5 to 7.5
carbon load: 20%	temperature limit: 80°C

###### Chromatographic Properties:

A retentive, high-purity packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose reversed phase column.

	1.0mm ID		2.1mm ID		3.2mm ID		4.0mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>										
30mm	9174331		9174332		9174333		—	—	9174335	
50mm	9174351		9174352		9174353		—	—	9174355	
100mm	9174311		9174312		9174313		—	—	9174315	
<b>5µm Columns</b>										
30mm	9174531		9174532		9174533		—	—	9174535	
50mm	9174551		9174552		9174553		—	—	9174555	
100mm	9174511		9174512		9174513		9174514		9174515	
150mm	9174561		9174562		9174563		9174564		9174565	
200mm	9174521		9174522		9174523		—	—	9174525	
250mm	9174571		9174572		9174573		—	—	9174575	



	Page #
Oxycodone	520
Vanillin & Ethyl Vanillin	516

#### Ultra C8 Columns (USP L7)

##### Excellent for a wide range of analyses

###### Physical Characteristics:

particle size: 3µm or 5µm, spherical	endcap: fully endcapped
pore size: 100Å	pH range: 2.5 to 7.5
carbon load: 12%	temperature limit: 80°C

###### Chromatographic Properties:

A retentive, high-purity, base-deactivated reversed phase packing that exhibits excellent peak shape for a wide range of compounds. Less retention for neutral, hydrophobic compounds, compared to the Ultra C18 column.

	1.0mm ID		2.1mm ID		3.2mm ID		4.0mm ID		4.6mm ID	
Length	cat.#	price	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>										
30mm	9103331		9103332		9103333		—	—	9103335	
50mm	9103351		9103352		9103353		—	—	9103355	
100mm	9103311		9103312		9103313		—	—	9103315	
<b>5µm Columns</b>										
30mm	9103531		9103532		9103533		—	—	9103535	
50mm	9103551		9103552		9103553		—	—	9103555	
100mm	9103511		9103512		9103513		9103514		9103515	
150mm	9103561		9103562		9103563		9103564		9103565	
200mm	9103521		9103522		9103523		—	—	9103525	
250mm	9103571		9103572		9103573		—	—	9103575	





**Ultra Aqueous C18 Columns (USP L1)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 15%

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly retentive and selective for reversed phase separations of polar analytes. Highly base-deactivated. Compatible with highly aqueous (up to 100%) mobile phases.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9178331		9178332		9178333		9178335	
50mm	9178351		9178352		9178353		9178355	
100mm	9178311		9178312		9178313		9178315	
<b>5µm Columns</b>								
30mm	9178531		9178532		9178533		9178535	
50mm	9178551		9178552		9178553		9178555	
100mm	9178511		9178512		9178513		9178515	
150mm	9178561		9178562		9178563		9178565	
200mm	9178521		9178522		9178523		9178525	
250mm	9178571		9178572		9178573		9178575	



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**Ultra IBD Columns****Specialized Columns for Mixed Polar and Nonpolar Compounds****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 12%

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

An intrinsically base-deactivated (IBD) phase, containing a polar group within, or intrinsic to, the hydrocarbon bonded phase. Unique selectivity and a high level of base deactivation, while reducing or eliminating the need for mobile phase additives.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9175331		9175332		9175333		9175335	
50mm	9175351		9175352		9175353		9175355	
100mm	9175311		9175312		9175313		9175315	
<b>5µm Columns</b>								
30mm	9175531		9175532		9175533		9175535	
50mm	9175551		9175552		9175553		9175555	
100mm	9175511		9175512		9175513		9175515	
150mm	9175561		9175562		9175563		9175565	
200mm	9175521		9175522		9175523		9175525	
250mm	9175571		9175572		9175573		9175575	



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**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.





### Ultra C4 Columns (USP L26)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 9%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Exceptionally stable C4 packing, with high bonding coverage and base deactivation. Less retention than C18 or C8 phases.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat. #	price	cat. #	price	cat. #	price	cat. #	price
<b>3µm Columns</b>								
30mm	9102331		9102332		9102333		9102335	
50mm	9102351		9102352		9102353		9102355	
100mm	9102311		9102312		9102313		9102315	
<b>5µm Columns</b>								
30mm	9102531		9102532		9102533		9102535	
50mm	9102551		9102552		9102553		9102555	
100mm	9102511		9102512		9102513		9102515	
150mm	9102561		9102562		9102563		9102565	
200mm	9102521		9102522		9102523		9102525	
250mm	9102571		9102572		9102573		9102575	



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**chromatograms?**

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### Ultra C1 Columns (USP L13)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 5%  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Exceptionally stable C1 phase. Least retentive reversed phase hydrocarbon packing.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat. #	price	cat. #	price	cat. #	price	cat. #	price
<b>3µm Columns</b>								
30mm	9101331		9101332		9101333		9101335	
50mm	9101351		9101352		9101353		9101355	
100mm	9101311		9101312		9101313		9101315	
<b>5µm Columns</b>								
30mm	9101531		9101532		9101533		9101535	
50mm	9101551		9101552		9101553		9101555	
100mm	9101511		9101512		9101513		9101515	
150mm	9101561		9101562		9101563		9101565	
200mm	9101521		9101522		9101523		9101525	
250mm	9101571		9101572		9101573		9101575	

also  
**available**

**Prep Columns**

See page 324.

**Bulk Packing Materials**

See page 326.



### ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.





## Ultra Cyano Columns (USP L10)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 8%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

High-purity cyano phase with few silanol sites. Often a better choice than C18 phases for basic pharmaceuticals, especially regarding peak shape and selectivity. Cyano phases are more rugged than bare silica for normal phase analyses because they are less sensitive to small amounts of water in the mobile phase.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9106331		9106332		9106333		9106335	
50mm	9106351		9106352		9106353		9106355	
100mm	9106311		9106312		9106313		9106315	
<b>5µm Columns</b>								
30mm	9106531		9106532		9106533		9106535	
50mm	9106551		9106552		9106553		9106555	
100mm	9106511		9106512		9106513		9106515	
150mm	9106561		9106562		9106563		9106565	
200mm	9106521		9106522		9106523		9106525	
250mm	9106571		9106572		9106573		9106575	



Antiarrhythmics .....520

## Ultra Phenyl Columns (USP L11)

### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 10%  
endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

### Chromatographic Properties:

High-purity, highly retentive, base-deactivated phase with alternative selectivity to straight chain hydrocarbon phases, especially for aromatic analytes.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9105331		9105332		9105333		9105335	
50mm	9105351		9105352		9105353		9105355	
100mm	9105311		9105312		9105313		9105315	
<b>5µm Columns</b>								
30mm	9105531		9105532		9105533		9105535	
50mm	9105551		9105552		9105553		9105555	
100mm	9105511		9105512		9105513		9105515	
150mm	9105561		9105562		9105563		9105565	
200mm	9105521		9105522		9105523		9105525	
250mm	9105571		9105572		9105573		9105575	

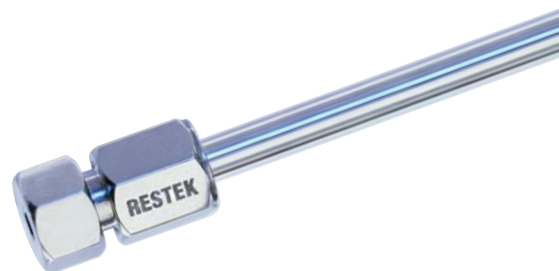


Guaifenesin, Codeine .....533

also **available**

### HPLC Syringes

See pages 285-289.







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### Ultra Amino Columns (USP L8)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 2%

encap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

Recommended for normal phase analyses of mono- and disaccharides, or similar compounds.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9107331		9107332		9107333		9107335	
50mm	9107351		9107352		9107353		9107355	
100mm	9107311		9107312		9107313		9107315	
<b>5µm Columns</b>								
30mm	9107531		9107532		9107533		9107535	
50mm	9107551		9107552		9107553		9107555	
100mm	9107511		9107512		9107513		9107515	
150mm	9107561		9107562		9107563		9107565	
200mm	9107521		9107522		9107523		9107525	
250mm	9107571		9107572		9107573		9107575	

### Ultra PFP Columns (USP L43)

#### Unique Selectivity

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: 7%

endcap: fully endcapped  
pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

A pentafluorophenyl phase. Unique selectivity for compounds containing organohalogens or other basic functional groups.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9176331		9176332		9176333		9176335	
50mm	9176351		9176352		9176353		9176355	
100mm	9176311		9176312		9176313		9176315	
<b>5µm Columns</b>								
30mm	9176531		9176532		9176533		9176535	
50mm	9176551		9176552		9176553		9176555	
100mm	9176511		9176512		9176513		9176515	
150mm	9176561		9176562		9176563		9176565	
200mm	9176521		9176522		9176523		9176525	
250mm	9176571		9176572		9176573		9176575	

### ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.





**Ultra Silica Columns (USP L3)****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å  
carbon load: none

endcap: no  
pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

High surface area, Type B silica packing.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9100331		9100332		9100333		9100335	
50mm	9100351		9100352		9100353		9100355	
100mm	9100311		9100312		9100313		9100315	
<b>5µm Columns</b>								
30mm	9100531		9100532		9100533		9100535	
50mm	9100551		9100552		9100553		9100555	
100mm	9100511		9100512		9100513		9100515	
150mm	9100561		9100562		9100563		9100565	
200mm	9100521		9100522		9100523		9100525	
250mm	9100571		9100572		9100573		9100575	

**Ultra Carbamate Columns****Physical Characteristics:**

particle size: 3µm or 5µm, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Restek chemists developed the Ultra Carbamate column specifically for carbamates analysis. The unique packing separates 10 target carbamates in just over 10 minutes. The column is compatible with fluorescence or LC/MS detection.\* An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column. In addition to increased sample throughput, this much faster analysis will significantly reduce solvent usage—and the costs of disposing of solvent waste.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.0mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>										
50mm	9177351		9177352		9177353		9177354		9177355	
100mm	9177311		9177312		9177313		—	—	9177315	
<b>5µm Columns</b>										
250mm	—	—	—	—	—	—	—	—	9177575	

\*For post-column derivatization/fluorescence detection applications for a 4.6mm ID column the total system dead volume, including the post-column reactor, must be less than 650µL. For standard post-column reactor systems, we recommend a 250mm x 4.6mm, 5µm column. Contact Restek technical service or your Restek representative for more information.

restek **exclusive!**

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restek **innovation!****Faster analyses and reduced solvent use!**

An Ultra Carbamate column can process as many as 3 to 4 samples per hour, versus less than 2 samples per hour on a general-purpose C18 column.

also **available**

We also have syringe filters!  
See **page 363**.





Paraquat, Diquat .....505

### Ultra Quat Columns

#### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 100Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

#### Chromatographic Properties:

A retentive, high-purity, base deactivated reversed phase packing. Ideal for the analysis of paraquat and diquat or other quaternary amines when used with Ultra Quat Reagent Solution mobile phase additive (cat.# 32441).

Length	4.6mm ID
5µm Column	cat.# price
150mm	9181565

### free literature

#### Simple, Sensitive HPLC/UV Analysis for Paraquat and Diquat

Download your free copy from [www.restek.com](http://www.restek.com).

Applications Note  
lit. cat. # 580006

### restek **innovation!**

An Ultra Quat column and Ultra Quat Reagent Solution eliminate the need for ion pairing reagents in paraquat/diquat analysis.

#### Ultra Quat Reagent Solution

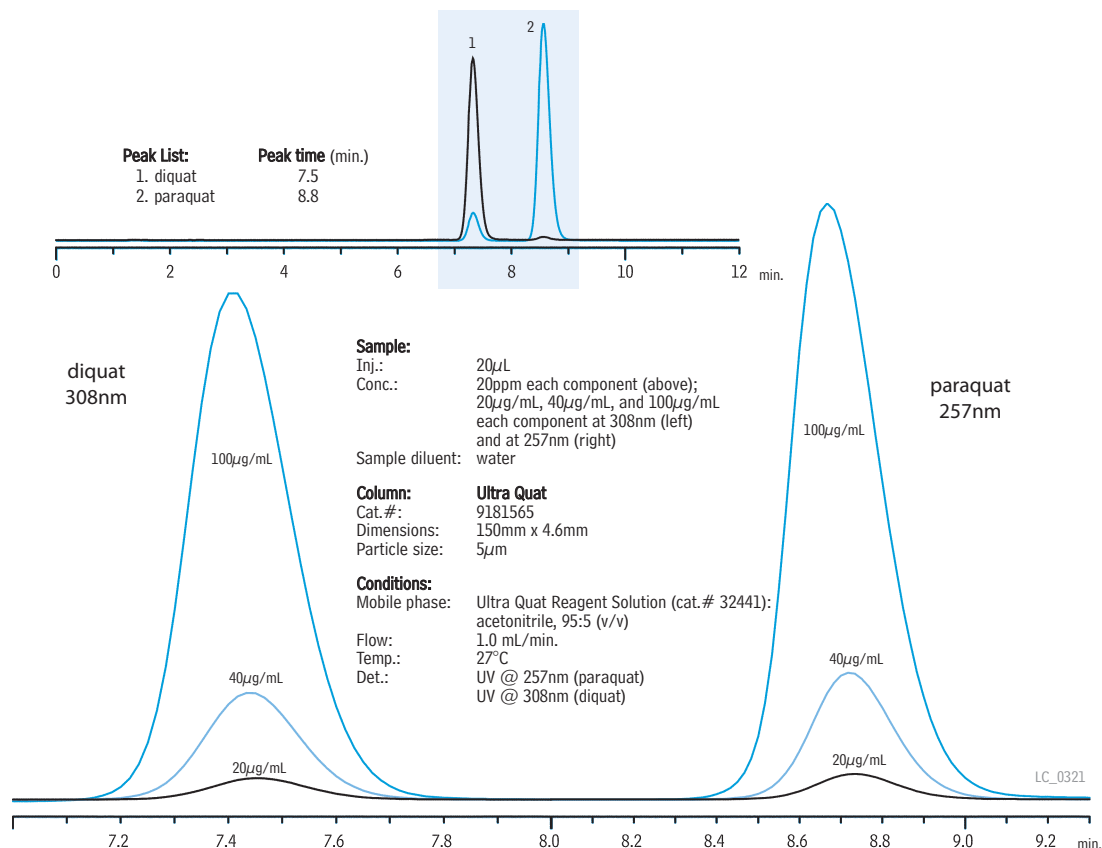
Use with Ultra Quat HPLC column.  
Dilute to 1 liter water, per instructions.

In water, 20mL/bottle  
cat. # 32441 (ea.)

#### Paraquat & Diquat Calibration Mix

diquat dibromide paraquat dichloride  
1,000µg/mL each in water, 1mL/ampul  
cat. # 32437 (ea.)

### Consistent resolution, retention times, and peak symmetry for paraquat and diquat on an Ultra Quat column.





## Viva Wide Pore HPLC Columns: 3µm or 5µm particles; 300Å pore size

- Excellent for separating peptides or proteins.
- Rugged, spherical particles, with 300Å pore size.
- High proportion of pore/surface area available to large molecules.

Viva columns are based on a wide pore material we designed for optimal large molecule separations. In developing Viva silica, we found that although many commercial wide-pore silicas meet the standard 300Å mean pore size, most have very broad distributions about this mean, with a significant portion of their pore volume falling below 150Å. This means a large portion of the surface area is unavailable to larger molecules. Viva columns have a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation.

### Viva C18 Columns (USP L1)

#### Physical Characteristics:

particle size: 3µm or 5µm, spherical  
pore size: 300Å  
carbon load: 9%

endcap: yes  
pH range: 2.5 to 10  
temperature limit: 80°C



#### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Excellent general-purpose column for analyzing large molecules and biomolecules.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>3µm Columns</b>								
30mm	9514331		9514332		9514333		9514335	
50mm	9514351		9514352		9514353		9514355	
100mm	9514311		9514312		9514313		9514315	
150mm	9514361		9514362		9514363		9514365	
<b>5µm Columns</b>								
30mm	9514531		9514532		9514533		9514535	
50mm	9514551		9514552		9514553		9514555	
100mm	9514511		9514512		9514513		9514515	
150mm	9514561		9514562		9514563		9514565	
200mm	9514521		9514522		9514523		9514525	
250mm	9514571		9514572		9514573		9514575	

### Viva C8 Columns (USP L7)

#### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Less retention in reversed phase assays than Viva C18.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9513531		9513532		9513533		9513535	
50mm	9513551		9513552		9513553		9513555	
100mm	9513511		9513512		9513513		9513515	
150mm	9513561		9513562		9513563		9513565	
200mm	9513521		9513522		9513523		9513525	
250mm	9513571		9513572		9513573		9513575	

## ordering note

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.

## restek innovation!

Viva silica has a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation of large molecules and biomolecules.



	Page #
Oxytocin	495
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Proteins	495

## ordering note

Other column dimensions and phases are available. Please call for a quote.

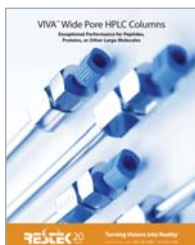
## also available

3µm particles are available for all Viva phases—please inquire.



## HPLC COLUMNS

### Viva Wide Pore Columns



#### free literature

##### Viva Wide Pore HPLC Columns

Download your free copy from [www.restek.com](http://www.restek.com).

Flyer  
lit. cat# 59939

### Viva C4 Columns (USP L26)

#### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 3.5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds. Less retention in reversed phase assays than Viva C18 or Viva C8.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9512531		9512532		9512533		9512535	
50mm	9512551		9512552		9512553		9512555	
100mm	9512511		9512512		9512513		9512515	
150mm	9512561		9512562		9512563		9512565	
200mm	9512521		9512522		9512523		9512525	
250mm	9512571		9512572		9512573		9512575	

### also available

3µm particles are available for all Viva phases—please inquire.

### Viva Biphenyl Columns (USP L11)

#### Physical Characteristics:

particle size: 5µm  
pore size: 300Å  
carbon load: 6.7%

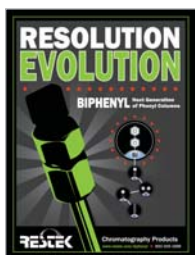
endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C

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exclusive!

#### Chromatographic Properties:

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays. Highly retentive and selective phase for aromatic and unsaturated compounds, with increased retention, relative to phenyl phases.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9516531		9516532		9516533		9516535	
50mm	9516551		9516552		9516553		9516555	
100mm	9516511		9516512		9516513		9516515	
150mm	9516561		9516562		9516563		9516565	
200mm	9516521		9516522		9516523		9516525	
250mm	9516571		9516572		9516573		9516575	



#### free literature

##### Resolution Evolution: Biphenyl-Next Generation of Phenyl Columns

Download your free copy from [www.restek.com](http://www.restek.com).

Flyer  
lit. cat# GNFL1096

### Viva PFP Propyl Columns (USP L43)

#### Physical Characteristics:

particle size: 5µm, spherical  
pore size: 300Å  
carbon load: 5%

endcap: yes  
pH range: 2.5 to 7.5  
temperature limit: 80°C



#### Chromatographic Properties:

A pentafluorophenyl phase with a propyl spacer. Highly retentive for basic analytes. Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9519531		9519532		9519533		9519535	
50mm	9519551		9519552		9519553		9519555	
100mm	9519511		9519512		9519513		9519515	
150mm	9519561		9519562		9519563		9519565	
200mm	9519521		9519522		9519523		9519525	
250mm	9519571		9519572		9519573		9519575	

### also available

#### HPLC Syringes

See pages 285-289.





**Viva Silica Columns (USP L3)****Physical Characteristics:**

particle size: 5µm, spherical  
pore size: 300Å

pH range: 2.5 to 7.5  
temperature limit: 80°C

**Chromatographic Properties:**

Highly base-deactivated wide pore packing that exhibits excellent peak shape for a wide range of compounds in normal phase separations.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
<b>5µm Columns</b>								
30mm	9510531		9510532		9510533		9510535	
50mm	9510551		9510552		9510553		9510555	
100mm	9510511		9510512		9510513		9510515	
150mm	9510561		9510562		9510563		9510565	
200mm	9510521		9510522		9510523		9510525	
250mm	9510571		9510572		9510573		9510575	



also  
**available**

**Prep Columns**  
See page 325.

**ordering note**

To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

Nominal additional charge

Example: 100mm x 4.6mm ID Ultra C18 column with Trident Integral Inlet Fitting: 9174315-700

Also order an XG-XF fitting (cat.#25026 or 25062), see page 327.

For guard cartridges for these columns, see page 329.

**Fast LC Method Development Kits**

Fast, efficient separations in an economical cartridge format. The design allows rapid substitution of one cartridge for another. The holder is available with either standard fittings or with a universal PEEK™ tip fitting. The universal fitting gives the user the option of threading the column directly into the detector inlet, reducing system dwell volume. The cartridges are 30mm long, with either 2.1mm or 4.0mm ID. The 2.1mm and 4.0mm ID cartridges have the same outside diameter, so the holder will accept either.

Each kit includes four 3µm Fast LC Cartridges: Ultra C18 (USP L1), Ultra Aqueous C18 (USP L1), Ultra Cyano (USP L10), Ultra PFP (USP L43), and a Fast LC cartridge holder.

**Fast LC Development Kits**

Description	qty.	cat.#	price
Fast LC Development Kit, four 30mm x 2.1mm columns	kit	25296	
Fast LC Development Kit, four 30mm x 4.0mm columns	kit	25297	

**3µm Fast LC Cartridges**

Description	Length	2.1mm ID	4.0mm ID	price
Ultra C18 Fast LC Cartridge	30mm	91743320	91743340	
Ultra Aqueous C18 Fast LC Cartridge	30mm	91783320	91783340	
Ultra Cyano Fast LC Cartridge	30mm	91063320	91063340	
Ultra PFP Fast LC Cartridge	30mm	91763320	91763340	

**Fast LC Cartridge Holders**

Description	qty.	cat.#	price
Fast LC Cartridge Holder with PEEK Tip	ea.	25298	
Fast LC Cartridge Holder with Standard Fittings	ea.	25299	



**Fast LC saves time  
and conserves solvent.**

also **available**

Additional column kits and Fast LC cartridges are available. Please call for more information.



### HPLC Prep Columns

- Easy scale-up from Restek analytical columns.
- Popular bonded phases.

Restek makes it easy to scale up your separations. We offer a wide range of semi-preparative and preparative-scale columns packed with many of our popular Ultra, Allure®, Pinnacle® DB, Pinnacle® II, and Viva bonded phases on a 5µm spherical silica. Other stationary phases and particle sizes are available—if you need a phase on 7µm, 10µm or 15µm particles, please call.

### ordering note

We strongly recommend ordering a semi-prep or prep column only after evaluating the desired separation on an equivalent analytical-scale column. Because we cannot re-use a column or the silica it contains once it has left our facility, we cannot accept returns of large-scale columns (except in cases of our error).

The relative mass capacity when comparing phases by surface area is: **Allure>Ultra>Pinnacle II>Pinnacle DB>Viva**



### Allure® HPLC Prep Columns

Small pore size in a high-purity, Type B silica provides a large surface area. High carbon loads, highly retentive.

Dimensions Length x ID	Allure C18 cat.#	Allure Basix cat.#	Allure Biphenyl cat.#	Allure PFP Propyl cat.#	Allure Silica cat.#	price
50 x 10mm	9164557	9161557	9166557	9169557	9160557	enquire
50 x 21.2mm	9164558	9161558	9166558	9169558	9160558	enquire
50 x 30mm	9164559	9161559	9166559	9169559	9160559	enquire
50 x 50mm	9164550	9161550	9166550	9169550	9160550	enquire
100 x 10mm	9164517	9161517	9166517	9169517	9160517	enquire
100 x 21.2mm	9164518	9161518	9166518	9169518	9160518	enquire
100 x 30mm	9164519	9161519	9166519	9169519	9160519	enquire
100 x 50mm	9164510	9161510	9166510	9169510	9160510	enquire
150 x 10mm	9164567	9161567	9166567	9169567	9160567	enquire
150 x 21.2mm	9164568	9161568	9166568	9169568	9160568	enquire
150 x 30mm	9164569	9161569	9166569	9169569	9160569	enquire
150 x 50mm	9164560	9161560	9166560	9169560	9160560	enquire
250 x 10mm	9164577	9161577	9166577	9169577	9160577	enquire
250 x 21.2mm	9164578	9161578	9166578	9169578	9160578	enquire
250 x 30mm	9164579	9161579	9166579	9169579	9160579	enquire
250 x 50mm	9164570	9161570	9166570	9169570	9160570	enquire

### Ultra HPLC Prep Columns

Our broadest selection of stationary phases, including unique phases. High density bondings, for maximum retention. High-purity, Type B silica gives excellent peak shapes for a wide range of compounds.

Dimensions Length x ID	Ultra C18 cat.#	Ultra Aqueous C18 cat.#	Ultra C8 cat.#	Ultra IBD cat.#	Ultra Cyano cat.#	Ultra Phenyl cat.#	Ultra PFP cat.#	Ultra Silica cat.#	price
50 x 10mm	9174557	9178557	9103557	9175557	9106557	9105557	9176557	9100557	enquire
50 x 21.2mm	9174558	9178558	9103558	9175558	9106558	9105558	9176558	9100558	enquire
50 x 30mm	9174559	9178559	9103559	9175559	9106559	9105559	9176559	9100559	enquire
50 x 50mm	9174550	9178550	9103550	9175550	9106550	9105550	9176550	9100550	enquire
100 x 10mm	9174517	9178517	9103517	9175517	9106517	9105517	9176517	9100517	enquire
100 x 21.2mm	9174518	9178518	9103518	9175518	9106518	9105518	9176518	9100518	enquire
100 x 30mm	9174519	9178519	9103519	9175519	9106519	9105519	9176519	9100519	enquire
100 x 50mm	9174510	9178510	9103510	9175510	9106510	9105510	9176510	9100510	enquire
150 x 10mm	9174567	9178567	9103567	9175567	9106567	9105567	9176567	9100567	enquire
150 x 21.2mm	9174568	9178568	9103568	9175568	9106568	9105568	9176568	9100568	enquire
150 x 30mm	9174569	9178569	9103569	9175569	9106569	9105569	9176569	9100569	enquire
150 x 50mm	9174560	9178560	9103560	9175560	9106560	9105560	9176560	9100560	enquire
250 x 10mm	9174577	9178577	9103577	9175577	9106577	9105577	9176577	9100577	enquire
250 x 21.2mm	9174578	9178578	9103578	9175578	9106578	9105578	9176578	9100578	enquire
250 x 30mm	9174579	9178579	9103579	9175579	9106579	9105579	9176579	9100579	enquire
250 x 50mm	9174570	9178570	9103570	9175570	9106570	9105570	9176570	9100570	enquire



Prep columns now available in even more phases.





### Pinnacle® II HPLC Prep Columns

Silica manufactured at Restek, for total control of quality and reproducibility. Excellent replacement for the original Hypersil® material.

Dimensions	Pinnacle II C18	Pinnacle II C8	Pinnacle II Cyano	Pinnacle II Silica	
Length x ID	cat.#	cat.#	cat.#	cat.#	price
50 x 10mm	9214557	9213557	9216557	9210557	
50 x 21.2mm	9214558	9213558	9216558	9210558	enquire
50 x 30mm	9214559	9213559	9216559	9210559	enquire
50 x 50mm	9214550	9213550	9216550	9210550	enquire
100 x 10mm	9214517	9213517	9216517	9210517	
100 x 21.2mm	9214518	9213518	9216518	9210518	enquire
100 x 30mm	9214519	9213519	9216519	9210519	enquire
100 x 50mm	9214510	9213510	9216510	9210510	enquire
150 x 10mm	9214567	9213567	9216567	9210567	
150 x 21.2mm	9214568	9213568	9216568	9210568	enquire
150 x 30mm	9214569	9213569	9216569	9210569	enquire
150 x 50mm	9214560	9213560	9216560	9210560	enquire
250 x 10mm	9214577	9213577	9216577	9210577	enquire
250 x 21.2mm	9214578	9213578	9216578	9210578	enquire
250 x 30mm	9214579	9213579	9216579	9210579	enquire
250 x 50mm	9214570	9213570	9216570	9210570	enquire

Pinnacle II not recommended for basic analytes.



### Pinnacle® DB HPLC Prep Columns

Prepared using a highly base-deactivated silica support; ideal for analyses of basic compounds, or bases mixed with acids/neutrals.

Silica manufactured at Restek, for total control of quality and reproducibility.

Dimensions	Pinnacle DB C18	Pinnacle DB Aqueous C18	Pinnacle DB C8	Pinnacle DB Biphenyl	Pinnacle DB Cyano	Pinnacle DB IBD	Pinnacle DB PFP Propyl	Pinnacle DB Silica	
Length x ID	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	price
50 x 10mm	9414557	9418557	9413557	9409557	9416557	9425557	9419557	9410557	
50 x 21.2mm	9414558	9418558	9413558	9409558	9416558	9425558	9419558	9410558	enquire
50 x 30mm	9414559	9418559	9413559	9409559	9416559	9425559	9419559	9410559	enquire
50 x 50mm	9414550	9418550	9413550	9409550	9416550	9425550	9419550	9410550	enquire
100 x 10mm	9414517	9418517	9413517	9409517	9416517	9425517	9419517	9410517	enquire
100 x 21.2mm	9414518	9418518	9413518	9409518	9416518	9425518	9419518	9410518	enquire
100 x 30mm	9414519	9418519	9413519	9409519	9416519	9425519	9419519	9410519	enquire
100 x 50mm	9414510	9418510	9413510	9409510	9416510	9425510	9419510	9410510	enquire
150 x 10mm	9414567	9418567	9413567	9409567	9416567	9425567	9419567	9410567	enquire
150 x 21.2mm	9414568	9418568	9413568	9409568	9416568	9425568	9419568	9410568	enquire
150 x 30mm	9414569	9418569	9413569	9409569	9416569	9425569	9419569	9410569	enquire
150 x 50mm	9414560	9418560	9413560	9409560	9416560	9425560	9419560	9410560	enquire
250 x 10mm	9414577	9418577	9413577	9409577	9416577	9425577	9419577	9410577	enquire
250 x 21.2mm	9414578	9418578	9413578	9409578	9416578	9425578	9419578	9410578	enquire
250 x 30mm	9414579	9418579	9413579	9409579	9416579	9425579	9419579	9410579	enquire
250 x 50mm	9414570	9418570	9413570	9409570	9416570	9425570	9419570	9410570	enquire

### Viva HPLC Prep Columns

Viva columns are based on a wide pore material we designed for optimal large molecule separations. Viva columns have a narrow distribution about the mean pore size, permitting a larger portion of the silica surface to play a role in the separation.

Dimensions	Viva C18	Viva C8	Viva C4	
Length x ID	cat.#	cat.#	cat.#	price
50 x 10mm	9514557	9513557	9512557	enquire
50 x 21.2mm	9514558	9513558	9512558	enquire
50 x 30mm	9514559	9513559	9512559	enquire
50 x 50mm	9514550	9513550	9512550	enquire
100 x 10mm	9514517	9513517	9512517	enquire
100 x 21.2mm	9514518	9513518	9512518	enquire
100 x 30mm	9514519	9513519	9512519	enquire
100 x 50mm	9514510	9513510	9512510	enquire
150 x 10mm	9514567	9513567	9512567	enquire
150 x 21.2mm	9514568	9513568	9512568	enquire
150 x 30mm	9514569	9513569	9512569	enquire
150 x 50mm	9514560	9513560	9512560	enquire
250 x 10mm	9514577	9513577	9512577	enquire
250 x 21.2mm	9514578	9513578	9512578	enquire
250 x 30mm	9514579	9513579	9512579	enquire
250 x 50mm	9514570	9513570	9512570	enquire

### ordering note

We strongly recommend ordering a semi-prep or prep column only after evaluating the desired separation on an equivalent analytical-scale column. Because we cannot re-use a column or the silica it contains once it has left our facility, we cannot accept returns of large-scale columns (except in cases of our error).







### also available

Other stationary phases and particle sizes are available; please inquire.

## Bulk Packing Materials

Use our bulk packing materials to pack your own columns!

Restek is among the small group of column manufacturers capable of producing their own high purity silica. We offer our Pinnacle® II and Pinnacle® DB silica and bonded phases in bulk. Pinnacle® II is an excellent replacement for Hypersil® silica. Pinnacle® DB is a highly base-deactivated material for analyses of basic compounds and an excellent alternative to Hypersil® BDS silica. Bonded phases from our Ultra, Allure®, and Viva lines also are available in bulk.

Our extensive QC program ensures the high quality and reproducibility of these silicas. Each lot of material is tested for mean particle size and distribution, pore diameter, surface area, and total metals analysis. You can be confident that you are getting consistent, high-quality product.

Use these materials for easy scale up to preparative scale chromatography, or for packing your own columns.

## Bulk Packing Materials

Description	min. qty.	cat.#	5-99 grams	100-499 grams	500-999 grams	≥1000 grams
<b>3µm Pinnacle II Bulk Packing Materials</b>						
Pinnacle II C8 Bulk Packing	5g	92133	/g	/g	/g	/g
Pinnacle II C18 Bulk Packing	5g	92143	/g	/g	/g	/g
Pinnacle II Cyano Bulk Packing	5g	92163	/g	/g	/g	/g
Pinnacle II Phenyl Bulk Packing	5g	92153	/g	/g	/g	/g
<b>5µm Pinnacle II Bulk Packing Materials</b>						
Pinnacle II Amino Bulk Packing	5g	92175	/g	/g	/g	/g
Pinnacle II C8 Bulk Packing	5g	92135	/g	/g	/g	/g
Pinnacle II C18 Bulk Packing	5g	92145	/g	/g	/g	/g
Pinnacle II Cyano Bulk Packing	5g	92165	/g	/g	/g	/g
Pinnacle II Phenyl Bulk Packing	5g	92155	/g	/g	/g	/g
<b>5µm Pinnacle DB Bulk Packing Materials</b>						
Pinnacle DB C18 Bulk Packing	5g	94145	/g	/g	/g	/g
Pinnacle DB C8 Bulk Packing	5g	94135	/g	/g	/g	/g
Pinnacle DB Cyano Bulk Packing	5g	94165	/g	/g	/g	/g
Description	qty.	cat.#	1-9 bottles	10-49 bottles	50-99 bottles	≥100 bottles
<b>5µm Ultra Bulk Packing Materials</b>						
Ultra C1 Bulk Packing	10g/btl.	91015	/btl.	/btl.	/btl.	/btl.
Ultra C4 Bulk Packing	10g/btl.	91025	/btl.	/btl.	/btl.	/btl.
Ultra C8 Bulk Packing	10g/btl.	91035	/btl.	/btl.	/btl.	/btl.
Ultra C18 Bulk Packing	10g/btl.	91745	/btl.	/btl.	/btl.	/btl.
Ultra Amino Bulk Packing	10g/btl.	91075	/btl.	/btl.	/btl.	/btl.
Ultra Cyano Bulk Packing	10g/btl.	91065	/btl.	/btl.	/btl.	/btl.
Ultra Phenyl Bulk Packing	10g/btl.	91055	/btl.	/btl.	/btl.	/btl.

## Silica Bulk Materials

Description	min. qty.	cat.#	5-99 grams	100-499 grams	500-999 grams	≥1000 grams
<b>Silica Bulk Materials</b>						
Pinnacle II Silica Bulk Packing, 3µm	5g	92103	/g	/g	/g	/g
Pinnacle II Silica Bulk Packing, 5µm	5g	92105	/g	/g	/g	/g
Pinnacle DB Silica Bulk Packing, 5µm	5g	94105	/g	/g	/g	/g
Description	qty.	cat.#	1-9 bottles	10-49 bottles	50-99 bottles	≥100 bottles
Ultra Silica Bulk Packing, 5µm	10g/btl.	91005	/btl.	/btl.	/btl.	/btl.



### Restek's Exclusive Trident Integral System

- Convenient and economical leak-free guard cartridge system, extremely easy to install.
- Versatile configuration protects against all levels of contamination.
- Integral design eliminates troublesome tubing connections.

The system's foundation consists of the analytical column configured with our exclusive Trident end fitting and XF fitting. This configuration contains the standard internal frit as well as a replaceable cap frit, which easily can be changed without disturbing the packed bed. Changing the external frit can reverse the effects of accumulated particles, such as high backpressure or peak distortion. To obtain this basic configuration, simply order any Restek HPLC column, and add the suffix -700 to the catalog number for the column. (Nominal additional charge. )

For maximum protection against contaminants and particulate matter, the system can be configured with an integral guard cartridge holder (XG-XF), a guard cartridge, and a replaceable external frit. To obtain this configuration, simply order any Restek HPLC column, add the suffix -700 to the catalog number for the column, and order the appropriate XG-XF male fitting (cat.# 25026 or 25062, below) and Trident guard cartridges (page 329).



Shannon Rishell, Customer Service

### Restek Customer Service

#### In the U.S.

Call: 800-356-1688 (ext. 3) or 814-353-1300 (ext. 3)

Monday–Friday 8:00 a.m.–6:00 p.m. ET

Fax: 814-353-1309—24-hours a day

Online: [www.restek.com](http://www.restek.com)—24-hours a day

#### Outside the U.S.

Contact your Restek representative:  
Refer to our list on pages 4-5 or visit our  
website at [www.restek.com](http://www.restek.com)

Description	qty.	cat.#	price
XG-XF Fitting for 10mm Guard Cartridge	ea.	25026	
XG-XF Fitting for 20mm Guard Cartridge	ea.	25062	
Replacement XF Filter Fitting	ea.	25024	
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022	
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023	
Replacement Cap Frits: 2mm, 2.0µm	5-pk.	25057	
Replacement Cap Frits: 2mm, 0.5µm	5-pk.	25990	

NEW!

### Trident Integral Guard System

Trident End Fitting



Trident end fitting with XF fitting removed

XF fitting

Cap Frit

Adding a guard cartridge to Trident end fitting

XF fitting

XG-XF Fitting

Guard Cartridge

Cap Frit

Trident end fitting assembled with guard cartridge





### Trident Direct 10mm guard cartridge holder with filter

#### Components



#### Assembled



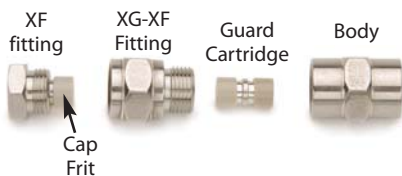
#### Installed onto column



Cap frits

### Trident In-Line 10mm guard cartridge holder with filter

#### Components



#### Assembled



#### Installed onto column



### Trident Direct Guard Cartridge System

Easy to Use, Low Dead Volume—The Ultimate Combination of Convenience and Column Protection

Unlike “one size fits all” guard systems, the Trident Direct system gives you the power to select the right level of protection for your analysis. The system offers three levels of protection and guard cartridges in four dimensions, with a variety of bonded phases to match your analytical column. The economical, leak-free cartridge design provides an unprecedented combination of convenience, economy, and reliability. The foundation of the Trident Direct system is a reusable direct connect holder that easily attaches to any HPLC column using CPI- or Waters-style end fittings.\* The system is available in configurations to match different protection level needs: in-line filter, in-line filter with holder for 10mm guard cartridge, and in-line filter with holder for 20mm guard cartridge. The guard cartridges are available in 2.1 and 4.0mm ID and are interchangeable within the appropriate length holder.



25082  
Protection against  
particulate matter.



25084  
Protection against particulate matter  
and moderate protection against  
irreversibly adsorbed compounds.



25086  
Protection against particulate  
matter and maximum  
protection against irreversibly  
adsorbed compounds.

#### Description

Description	qty.	cat.#	price
High-pressure filter	ea.	25082	
10mm guard cartridge holder without filter	ea.	25083	
10mm guard cartridge holder with filter	ea.	25084	
20mm guard cartridge holder without filter	ea.	25085	
20mm guard cartridge holder with filter	ea.	25086	
Connection tip for Waters-style end fittings	ea.	25088	
PEEK tip standard fittings	ea.	25087	
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022	
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023	
Replacement Cap Frits: 2mm, 2.0µm	5-pk.	25057	
Replacement Cap Frits: 2mm, 0.5µm	5-pk.	25990	

\*The standard PEEK tip in Trident Direct systems is compatible with Parker, Upchurch Scientific, Valco, and other CPI-style fittings. To use Trident Direct systems with Waters-style end fittings, replace the tip with cat.# 25088.

### Trident HPLC In-Line Guard Cartridge Holders

A Trident in-line guard cartridge holder can be used with almost any HPLC column by connecting it with a short piece of 1/16" tubing, appropriate nuts and ferrules, or finger-tight fittings. The system can be used with Restek columns, or with columns from other manufacturers. Holders are available for either 10mm or 20mm guard cartridges. Either size can be purchased with or without a prefilter, which provides added protection against the particles that can shorten the lifetime of the guard cartridge.



25021



25040



25061



25060

#### Description

Description	qty.	cat.#	price
Holder for 10mm guard cartridge	ea.	25021	
Holder with filter for 10mm guard cartridge	ea.	25040	
Holder for 20mm guard cartridge	ea.	25061	
Holder with filter for 20mm guard cartridge	ea.	25060	
Replacement Cap Frits: 4mm, 2.0µm*	5-pk.	25022	
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023	
Replacement Cap Frits: 2mm, 2.0µm*	5-pk.	25057	
Replacement Cap Frits: 2mm, 0.5µm	5-pk.	25990	

\*Standard porosity.



**Trident HPLC Guard Cartridges**

Guard Cartridges	3-pk. (10 x 2.1mm)	3-pk. (10 x 4.0mm)	2-pk. (20 x 2.1mm)	2-pk. (20 x 4.0mm)	PRICE
Allure AK	—	915950210	—	—	
Allure Basix	916150212	916150210	916150222	916150220	
Allure C18	916450212	916450210	916450222	916450220	
Allure PFP Propyl	916950212	916950210	916950222	916950220	
Allure Silica	916050212	916050210	916050222	916050220	
Allure Organic Acids	916550212	916550210	916550222	916550220	
Allure Aqueous C18	916850212	916850210	916850222	916850220	
Allure Biphenyl	916650212	916650210	916650222	916650220	
Pinnacle II Amino	921750212	921750210	921750222	921750220	
Pinnacle II C8	921350212	921350210	921350222	921350220	
Pinnacle II C18	921450212	921450210	921450222	921450220	
Pinnacle II Cyano	921650212	921650210	921650222	921650220	
Pinnacle II PAH	921950212	921950210	921950222	921950220	
Pinnacle II Phenyl	921550212	921550210	921550222	921550220	
Pinnacle II Biphenyl	—	920950210	—	920950220	
Pinnacle II Silica	921050212	921050210	921050222	921050220	
Pinnacle DB C8	941350212	941350210	941350222	941350220	
Pinnacle DB C18	941450212	941450210	941450222	941450220	
Pinnacle DB Aqueous C18	941850212	941850210	941850222	941850220	
Pinnacle DB Biphenyl	940950212	940950210	940950222	940950220	
Pinnacle DB PFP Propyl	941950212	941950210	941950222	941950220	
Pinnacle DB Cyano	941650212	941650210	941650222	941650220	
Pinnacle DB Phenyl	941550212	941550210	941550222	941550220	
Pinnacle DB Silica	941050212	941050210	941050222	941050220	
Ultra Amino	910750212	910750210	910750222	910750220	
Ultra Aqueous C18	917850212	917850210	917850222	917850220	
Ultra C1	910150212	910150210	910150222	910150220	
Ultra C4	910250212	910250210	910250222	910250220	
Ultra C8	910350212	910350210	910350222	910350220	
Ultra C18	917450212	917450210	917450222	917450220	
Ultra Carbamate	917750212	917750210	917750222	917750220	
Ultra Cyano	910650212	910650210	910650222	910650220	
Ultra IBD	917550212	917550210	917550222	917550220	
Ultra PFP	917650212	917650210	917650222	917650220	
Ultra Phenyl	910550212	910550210	910550222	910550220	
Ultra Silica	910050212	910050210	910050222	910050220	
Ultra Quat	918150212	918150210	918150222	918150220	
Viva C18	951450212	951450210	951450222	951450220	
Viva C8	951350212	951350210	951350222	951350220	
Viva C4	951250212	951250210	951250222	951250220	
Viva PFP Propyl	951950212	951950210	951950222	951950220	
Viva Biphenyl	951650212	951650210	951650222	951650220	
Viva Silica	951050212	951050210	951050222	951050220	



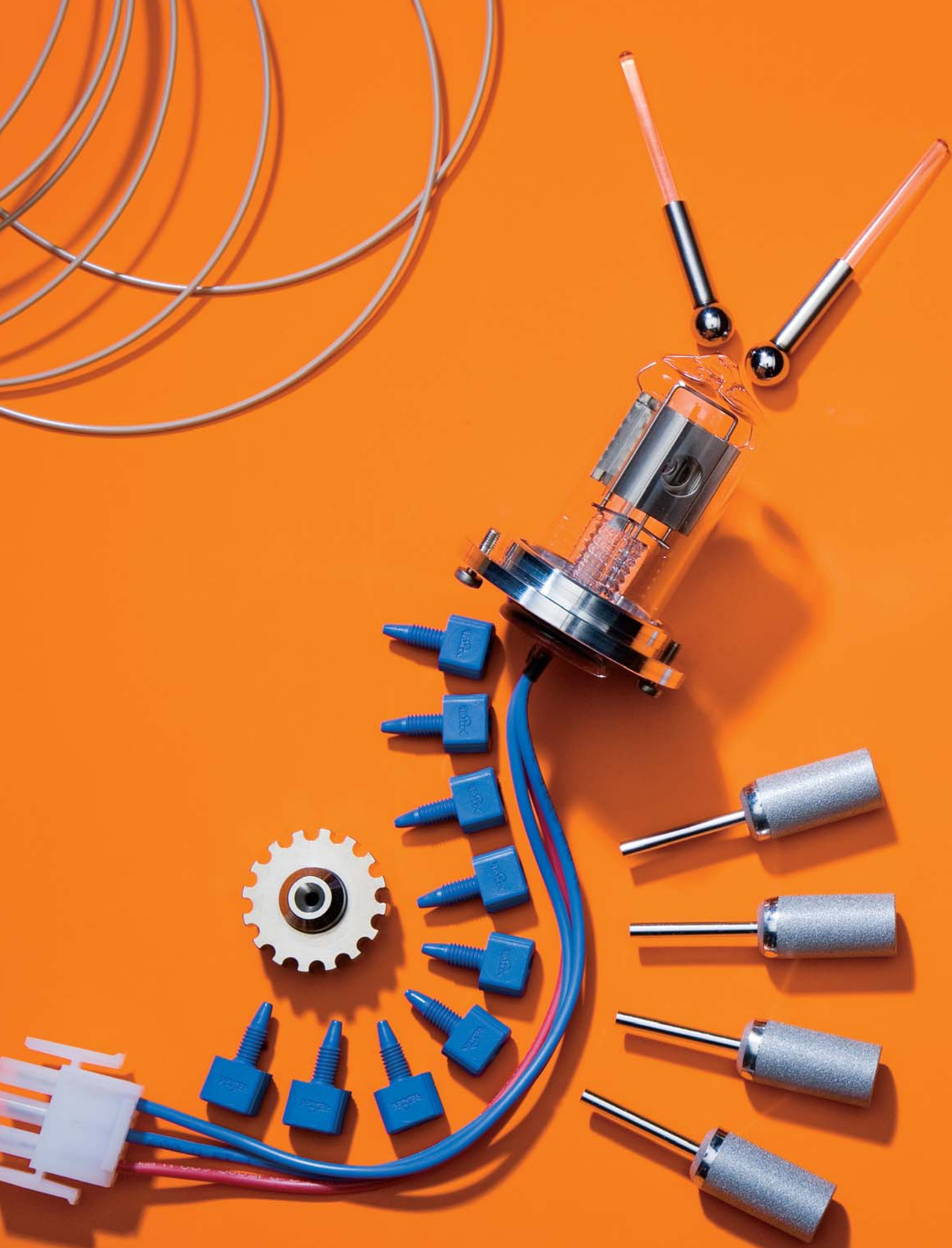
10 & 20mm Guard Cartridges



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# HPLC Accessories

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### Restek Replacement Parts for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#	price
Preventive Maintenance Kit (Includes: rotor seal, needle seat, needle assembly, seat cap)	1050	01078-68721	kit	25259	
Autosampler Preventive Maintenance Kit (Includes: rotor seal, needle assembly, needle seat)	1100	G1313-68709	kit	25271	
Pump Maintenance Kit (Includes: PTFE frit, outlet cap, active inlet cartridge, gold disk seal, 2 piston seals, glass solvent filter)	1050, 1100	G1311-68710	kit	25270	
Outlet Ball Valve, Binary Pump	1100, 1200	G1312-60012	ea.	25267	
Outlet Ball Valve	1050, 1100, 1200	G1311-60012	ea.	25276	
Sieves for Outlet Valve	1050, 1100, 1200	5063-6505	10-pk.	25266	
Check Valve Cartridge Assembly	1090	79835-67101	ea.	25344	
Piston Seals, Teflon w/Graphite, Black*	1050, 1100, 1200	5063-6589	2-pk.	22482	
Piston Seals, Teflon w/Graphite, Black*	1050, 1100, 1200	5063-6589	10-pk.	22483	
Piston Seals (Black)	1090	5062-2494	4-pk.	25347	
Seal Wash Kit, Binary Pump (4 seals, 4 gaskets)	1100	—	kit	25268	
Seal Wash Kit (2 seals, 2 gaskets)	1050, 1100	—	kit	25269	
Wash Seal	1050, 1100, 1200	0905-1175	ea.	25277	
Sapphire Piston	1050, 1100, 1200	5063-6586	ea.	25273	
Sapphire Piston	1090	6980-0672	ea.	25345	
Needle Seat	1050	79846-67101	ea.	25258	
Needle Seat	1090	79846-67101	ea.	25348	
Needle Seat Assembly	1100	G1313-87101	ea.	25265	
Needle Assembly	1100	G1313-87201	ea.	25278	
Rotor Seal					
(not for use with 7125 injection valve)	1050	0101-0626	ea.	25272	
Rotor Seal	1100	0100-1853	ea.	25275	
Rotor Seal (Rheodyne-style)	1090	1535-4048	ea.	25349	
Frits, PTFE	1050, 1100, 1200	01018-22707	5-pk.	25466	
Seal, Gold Disk (outlet)	1050, 1100, 1200	5001-3707	ea.	25467	
Outlet Cap	1050, 1100	5062-2485	4-pk.	25139	
Outlet Cap & Gold Seal Assembly	1050, 1100	—	2-pk.	25140	
Connecting Tube	1050, 1100	G1311-67304	ea.	25058	
Bottle Head Assembly	—	G1311-60003	ea.	25059	
Detector Lamp, 1090 DA, 1050 VW/DA/MWD	1090, 1050	79883-60002	ea.	25260	
Lamp, DAD G1315A, G1365A	1100, 1200	2140-0590	ea.	25261	
Lamp, VWD G1314A	1100, 1200	G1314-60100	ea.	25262	
8453 Deuterium Lamp	—	2140-0605	ea.	25263	
G1321 Fluorescence Detector Flash Lamp	—	2140-0600	ea.	25264	
Lamp, DAD Long Life Deuterium (2000 hours)	1100	5181-1530	ea.	25399	
Helium Tubing, 5m, PTFE, 0.057" ID	1050, 1100	5062-2461	ea.	24990	
Injector Lubricant, PTFE, 10g	1050, 1100	79841-65501	ea.	26520	

\*Graphite-filled Teflon; best for organic solvents.

### Capillary Stainless Steel Tubing Assemblies for Agilent HPLC Systems

Description	Model #	Similar to Agilent part #	qty.	cat.#	price
Capillary SS Tubing, 130mm x 0.17mm ID, with fittings	1090	01090-87305	ea.	26525	
Capillary SS Tubing, 800mm x 0.17mm ID, with fittings	1050	01078-87305	ea.	26526	
Capillary SS Tubing, 180mm x 0.17mm ID, with fittings	1100	G1313-87305	ea.	26527	
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01018-67305	ea.	26528	
Capillary SS Tubing, 700mm x 0.25mm ID, with fittings	1050	01078-87306	ea.	26529	
Seat Capillary, SS Tubing, 0.17mm ID	1050	01078-87303	ea.	26530	
Capillary SS Tubing, 105mm x 0.17mm ID	—	5021-1816	ea.	26531	
Mixing Capillary Assembly	1100	G1312-67302	ea.	26532	
Capillary SS Tubing, Valve to Metering Head	1100	G1313-87301	ea.	26533	
Capillary SS Tubing, 150mm x 0.17mm ID	—	5021-1817	ea.	26534	
Capillary SS Tubing, 280mm x 0.17mm ID	—	5021-1818	ea.	26535	
Capillary SS Tubing, 400mm x 0.17mm ID	—	5021-1819	ea.	26536	
3/16" SS Fitting, Front and Back Ferrules	—	5062-2418	10-pk.	26537	



## Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems

Easily install the gold seal into the outlet cap.



Put Outlet Cap on male part of Assembly Tool.



Push the Assembly Tool together, then hold on to Outlet Cap and pull Assembly Tool apart.



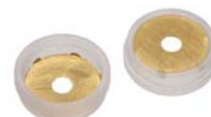
Put Gold Seal over pin on male part of Assembly Tool.



Push the Assembly Tool together and press the Gold Seal into the Outlet Cap.



Pull the Assembly Tool apart and remove assembled Outlet Cap and Gold Seal.



25140

### Description

Description	qty.	cat.#	price
Outlet Cap and Gold Seal Assembly Tool for Agilent 1050 & 1100 HPLC Systems	ea.	24989	
Seal, Gold Disk (outlet)	ea.	25467	
Outlet Cap	4-pk.	25139	
Outlet Cap & Gold Seal Assembly	2-pk.	25140	

## Restek Replacement Parts for Beckman HPLC Systems

Description	Model #	Similar to Beckman part #	qty.	cat.#	price
Inlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240720	ea.	25439	
Outlet Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240721	ea.	25440	
Inlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240620	ea.	25441	
Outlet Check Valve Cartridge for Check Valve Assembly	110A&B, 112, 114M, 116, 118, 125, 126, 127, 128 Pumps	240621	ea.	25442	
Guide Sleeve for Graphite Plunger Guide	110 Series Pumps	243713	ea.	25444	
Outlet Check Filter Frit Assembly	110 Series Pumps	240619	ea.	25445	
Piston Guide Assembly	110 Series and 112 Pumps	243045	ea.	25446	
Plunger	110 Series and 112 Pumps	243053	ea.	25447	
Plunger Seal	110 Series Pumps	887138	ea.	25448	
Sapphire Plunger	114M, 116, 118, 125, 126, 127, 128 Pumps	240714	ea.	25450	
Plunger Seal	114M, 116, 118, 126, 127, 128 Pumps	241037	ea.	25451	
Pump Seal, Gold**	114, 116, 125, 126, 127, 128 Pumps	241037	ea.	25452	
Plunger Wash Seal	125, 126, 127, 128 Pumps	728772	ea.	25453	
Deuterium Lamp	DU60, 62, 64, 65	596791	ea.	25454	

\*\*Ultra-high molecular weight polyethylene (UHMWPE); increased resistance to abrasion, best for buffers.



25440



25450

## Restek Replacement Parts for Hitachi HPLC Systems

Description	Model #	Similar to Hitachi part #	qty.	cat.#	price
SS Check Valve Cartridges (1/16" Ruby Ball)	655/6000/6200	AN0-085	2-pk.	25455	
Inlet Check Valve Assembly	655/6000/6200	AN0-0833	ea.	25456	
Outlet Check Valve Assembly	655/6000/6200	AN0-0834	ea.	25457	
Plunger Assembly	655, 6000, 6200, 7100	810-1033	ea.	25458	
Plunger Seal, Black*	L655A, 6000, 6200, 7100	655-1080	ea.	25459	
Plunger Seal, Gold**	655, 6000, 6200, 7100	655-1080	ea.	25460	
Inlet Check Valve Assembly	L-7100	AN0-0836	ea.	25461	
Outlet Check Valve Assembly	L-7100	AN0-0837	ea.	25462	
Rotor Assembly for Dilutor Valve	AS-7200 Autosampler	810-3085	ea.	25463	
Rotor Seal Kit	AS-7200, AS-7250	AN0-0818	ea.	25464	
Deuterium Lamp, Prealigned	L4000, L4200, L4250, L7400	AN0-0424	ea.	25465	

\*Graphite-filled Teflon; best for organic solvents.

\*\*Ultra-high molecular weight polyethylene (UHMWPE); increased resistance to abrasion, best for buffers.

25459

25460



25465

25458





### Restek Replacement Parts for PerkinElmer HPLC Systems

Description	Model #	Similar to PE part #	qty.	cat.#	price
Inlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540177	ea.	25438	
Outlet Check Valve	PE 200, 4, 250, 400, 410, 620	2540197	ea.	25437	
High Pressure Seal Kit	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	2540275	ea.	25433	
Standard High Pressure Seal, Gold**	PE Series 200 Pumps--1, 2, 3, 3B, 4, 10, 250, 400, 410, 620, Int. 4000 Pump	9907324	ea.	25434	
Low Pressure Seal, Gold**	PE Series 200 Pumps	9907339	ea.	25435	
Needle	PE Series 200 Pumps	N2930023	ea.	25432	
Deuterium Lamp	PE Lambda--2, 5, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 40, 800, 900	B0160917	ea.	25436	
Deuterium Lamp	PE 200/785A	N2920149	ea.	25431	

\*\*Ultra-high molecular weight polyethylene (UHMWPE); increased resistance to abrasion, best for buffers.

### Restek Replacement Parts for Shimadzu HPLC Systems

Description	Model #	Similar to Shimadzu part #	qty.	cat.#	price
Inlet Check Valve	LC-6A, LC-10AS	228-12353-91	ea.	25287	
Inlet Check Valve	LC-600, LC-9A, LC-10AD	228-18522-91	ea.	25295	
Inlet Check Valve	LC-10ADvp	228-39093-92	ea.	24984	
Inlet Check Valve	LC-10AT, LC-10ATvp	228-32166-91	ea.	26521	
Outlet Check Valve	LC-6A, LC-10AS	228-09054-93	ea.	25288	
Outlet Check Valve Rebuild Kit	LC-6A, LC-10AS	228-11200-91	2-pk.	25289	
Outlet Check Valve	LC-600, LC-9A, LC-10AD, LC-10AT	228-18522-92	ea.	25282	
Outlet Check Valve	LC-10ADvp, LC-10ATvp	228-34976-91	ea.	24983	
Plunger Seal, Gold**	LC-6A	228-11999-00	ea.	25285	
Plunger Seal, Polyethylene, Gold**	LC-10AS, LC-10AT, LC-10ATvp	228-21975-00	ea.	25290	
Plunger Seal	LC-600, LC-9A, LC-10AD	228-18745-00	ea.	25293	
Plunger Seal, Black*	LC-10ADvp, LC 20AD	228-35146-00	ea.	24980	
Plunger Seal, Gold**	LC-10ADvp	228-32698-00	ea.	24981	
Plunger Seal, Black*	SIL-10ADvp, LC-10ATvp	228-35145-00	ea.	24985	
Plunger Rinse Seal	LC-10AS	228-28499-00	ea.	25292	
Sapphire Plunger	LC-6A	228-12904-93	ea.	25286	
Sapphire Plunger	LC-10AS	228-17019-93	ea.	25291	
Sapphire Plunger	LC-600, LC-9A, LC-10AD	228-18523-91	ea.	25294	
Needle Seal	SIL-10A, 10XL, 10ADvp	228-33355-04	ea.	25468	
Rotor Seal	SIL-10ADvp	228-21217-97	ea.	24986	
Rotor Seal Assembly	SIL-10A, 10AXL	228-21217-91	ea.	25469	
Stator Assembly	SIL-10A, 10AXL	228-21220-91	ea.	25470	
Syringe, 500µL	SIL-10A, 10AXL	228-25237-04	ea.	25471	
Plunger Assembly, Ceramic	LC-10ADvp	228-35601-91	ea.	25472	
Plunger Assembly, Ceramic	LC-10ATvp	228-35009-92	ea.	25473	
Plunger Assembly, Sapphire	LC-10ADvp	228-35601-92	ea.	24982	
Deuterium Lamp	SPD-6A	062-65056-02	ea.	25283	
Deuterium Lamp	SPD-10A, 10AV, M20A	228-34016-02	ea.	25284	

\*Graphite-filled Teflon; best for organic solvents.

\*\*Ultra-high molecular weight polyethylene (UHMWPE); increased resistance to abrasion, best for buffers.



## Catch the Buzz

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## Restek Replacement Parts for Thermo Separation HPLC Systems

Description	Model #	Similar to SP/TSP part #	qty.	cat.#	price
Inlet Check Valve Assembly	SP8800 & P-Series Pumps	A3495-010	ea.	25474	
Outlet Check Valve Assembly	SP8800 Series Pumps	A3490-010	ea.	25475	
Piston	SP8800 & P-Series Pumps	A3102-010	ea.	25476	
Back-up Seal	SP8800 & P-Series Pumps	A2963-010	ea.	25477	
Plunger Seal, Gold**	SP8800 & P-Series Pumps	A2962-010	ea.	25478	
Superseal	P-Series Pumps	A3990-010	ea.	25479	
Check Valve and Transducer Assembly	P-Series Pumps	A2973-010	ea.	25480	
Kel-F Washer	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	7010-039	ea.	25481	
Rotor Seal Assembly, Rheodyne 7010	TSP AS100, 300, 1000, 3000, 3500, 8875, and 8880 Autosamplers	A3588-020	ea.	25482	
Syringe Assembly, 250µL	8800 Series	3301-0100	ea.	25483	
Syringe, 500µL	Linear UV-200, 203, 204, 205, 206, and UV 100, 150, 1000, and 2000 Detectors	9551-0023	ea.	25484	
Lamp, UV					
Description	Model #	Similar to TSP part #	qty.	cat.#	price
Check Valve Cartridge	LDC Constametric Pumps	900946	ea.	25485	
Sapphire Plunger	LDC Constametric Pumps	801306	ea.	25486	
Plunger Seal Kit, Gold**	LDC Constametric Pumps	31-36-00754	ea.	25487	
Plunger Seal, Black*	LDC Constametric Pumps	206129001	ea.	25488	
Plunger Seal, Gold**	LDC Constametric Pumps	206156001	ea.	25489	
Lamp, Deuterium	LDC SM-I, II, III, 3000, 3100, 3100X, and 4000 Detectors	108035	ea.	25490	

\*Graphite-filled Teflon; best for organic solvents.

\*\*Ultra-high molecular weight polyethylene (UHMWPE); increased resistance to abrasion, best for buffers.



25474



25475



25482



25483


25481  
(both sides shown)

## Restek Rheodyne® Style Replacement Parts for Waters HPLC Systems

Description	Model #	Similar to Rheodyne part #	qty.	cat.#	price
7010 Vespel Rotor Seal		7010-039	ea.	25279	
7125 Vespel Rotor Seal		7125-047	ea.	25280	
Isolation Seal, 7010		7010-015	ea.	25281	

For easy access to Rheodyne fittings, use a ValvTool Wrench—see page 347.

## Restek Replacement Parts for Waters Detectors

Description	Model #	Similar to Waters part #	qty.	cat.#	price
Window Gasket	484, 486, 490	80335	ea.	25423	
Lamp Side Gasket	484, 486, 490	80336	ea.	25424	
Quartz Lens	486	80687	ea.	25427	
Xenon Lamp (w/o holder or mirror)	470	—	ea.	25404	
Xenon Lamp	474	—	ea.	25405	
Deuterium Lamp (UV/Vis)	480, 481	99499	ea.	25403	
Deuterium Lamp (UV/Vis)	484	80357	ea.	25406	
Deuterium Lamp (UV/Vis)	486	80678	ea.	25407	
Deuterium Lamp	996, 2996	WAT052586	ea.	25408	
Deuterium Lamp	2487	WAS081142	ea.	25409	
Deuterium Lamp, long life (2,000 hours)*	486	80678	ea.	25410	

\*Standard lamps have nominal 1,000-hour life.



25404



25408



25409

also **available**

HPLC autosampler syringes. See **pages 288-289**.





### Restek Replacement Parts for Waters HPLC Systems



25145



25360



25496

Description	Model #	Similar to Waters part #	qty.	cat.#	price
Preventative Maintenance Kit Includes: sparge diffuser, filter insert, compression screws, SS ferrule, battery for 2690/717, 250µL WISP syringe, seal wash plunger seal kits (2), wash tube seal kits (4), 2690 seal pack rebuild kit (steel bodies not included), 2690 head plunger seal kits (2), solvent reservoir 20µm filters (4), Alliance check valve cartridges (2), Alliance plunger assemblies (2), 2690 face seals (4)	Alliance 2690, 2695	WAT270944	kit	25143	
Preventative Maintenance Kit Includes: PerformancePLUS cartridges (2), sparge diffusers (4), Super Seals (2), solvent reservoir 20µm filters (2), sapphire plungers (2), reference valve rebuild kit, inlet manifold kit	600 Pump	WAT052675	kit	25144	
Preventative Maintenance Kit Includes: 717 seal pack with needle, filter insert, 250µL WISP syringe	717 Autosampler	WAT052669	kit	25145	
Preventative Maintenance Kit Includes: 616/326/625 plunger assemblies (2), pump seal kit, sparge diffusers (4), solvent reservoir 20µm filters (4), 616 cartridge assemblies (4)	616 Pump	WAT052672	kit	25146	
Preventative Maintenance Kit Includes: PerformancePLUS check valves (2), sparge diffuser, solvent 10µm filter, sapphire plungers (2), plunger seals (2)	515 Pump	WAT052587	kit	26519	
Inlet Check Valve Assembly	M6KA, 501, 510, 515, 590, 600E	33679, 25214	ea.	25360	
Inlet Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	25203	ea.	25361	
Inlet Check Valve Rebuild Kit	M6KA, 501, 510, 515, 590, 600E	60495	2-pk.	25362	
Outlet Check Valve Assembly (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25030	ea.	25363	
Outlet Check Valve Housing (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	25212	ea.	25364	
Outlet Check Valve Rebuild Kit (Actuator Style)	M6KA, 501, 510, 515, 590, 600E	26016	2-pk.	25365	
Outlet Check Valve Assembly (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25216	ea.	25366	
Outlet Check Valve Housing (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	25207	ea.	25367	
Outlet Check Valve Rebuild Kit (Ball & Seat Style)	M6KA, 501, 510, 515, 590, 600E	26014	2-pk.	25368	
Inlet Check Valve Assembly, 225µL (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	60307	ea.	25369	
PerformancePLUS Check Valve Cartridge	M6KA, 501, 510, 515, 590, 600E	700000254	2-pk.	25370	
Check Valve Rebuild Kit (Extended Flow)	M6KA, 501, 510, 515, 590, 600E	88223	2-pk.	25371	
PerformancePLUS Check Valve Housing	M6KA, 501, 510, 515, 590, 600E	—	ea.	25372	
Check Valve Cartridges	Alliance	WAT270941	2-pk.	25373	
Super Seal for Analytical Heads	M6KA, 501, 510, 515, 590, 600E	22946, 22934	ea.	25374	
Plunger Seal, Gold for Analytical Heads**	M6KA, 501, 510, 515, 590, 600E	22934	ea.	25375	
Plunger Seal, Black for graphite-filled Teflon*	M6KA, 501, 510, 515, 590, 600E	26613	ea.	25378	
Plunger Seal, Black for EF Heads*	510, 590, 600E	26644	ea.	25379	
Plunger Seal, Gold for EF Heads**	510, 590, 600E	26644	ea.	25380	
Seal Wash Plunger Seal	Alliance	WAT271018	2-pk.	25386	
Head Plunger Seal Kit	Alliance	WAT270938	2-pk.	25387	
Head Plunger Seal Kit (Black)	Alliance	WAT271066	2-pk.	25388	
Insert Seal Parts Kit	M6KA, 501, 510, 515, 590, 600E	60012	kit	25389	
Sapphire Plunger	M6KA, 510, 590, 600	25656	ea.	25381	
Sapphire Plunger (Extended Flow)	510, 590, 600E	60304	ea.	25382	
Sapphire Plunger	M45, M501	26524	ea.	25383	
Sapphire Plunger Assembly Kit	M515	WAS207069	ea.	25384	
Sapphire Plunger	616, 625, 626	31788	ea.	25420	
Sapphire Plunger	Alliance	WAT270959	ea.	25385	
Draw-Off Tube Assembly	510, 515, 600, 610	25470	ea.	25392	
Inlet Manifold Kit	M45, 501, 510, 590, 600E	60448	kit	25412	
Ferrule, Stainless Steel	515	22330	ea.	25417	
Wash Face Seal	Alliance 2690	WAT271017	ea.	25428	
Wash Tube Seal Kit	Alliance 2690	WAT270940	4-pk.	25429	
Rebuild Kit, Reference Valve	600 Pump	25746	ea.	25492	
Compression Screws, Stainless Steel	Alliance 2690	—	2-pk.	25493	
Battery	Alliance 2690, 717, 486, 484	—	ea.	25494	
Seal Pack Rebuild Kit, without Seal Wash Tube Assembly	Alliance 2690	WAT271019	ea.	25495	
717 Seal Pack (Rebuild) with Needle	717 Autosampler	4559	ea.	25496	
Seal Kit, Pump	616 Pump, 626, 625	31790	ea.	25497	
Cartridge Assembly, Stainless Steel	616 Pump	24960	ea.	25498	

\*Graphite-filled Teflon; best for organic solvents.

\*\*Ultra-high molecular weight polyethylene (UHMWPE); increased resistance to abrasion, best for buffers.





### ASI Piston Seals for Agilent HPLC Systems

Over time the piston seal in every HPLC system becomes worn and must be replaced. Our piston seals are constructed of Teflon® material with an additive that reduces their tendency to “cold flow” and improves their wear characteristics. Teflon® seals are more resistant to any HPLC solvent than UHMWPE seals, but they are less wear-resistant and rugged. For Agilent 1050 and 1100 HPLC systems.

Description	qty.	cat.#	price
ASI Piston Seal	ea.	25175	
ASI Piston Seal	10-pk.	25176	



### ASI Check Valves

ASI subjects each valve to a rigorous series of tests, including self-priming capability, which means you typically won't need a syringe or draw-off valves to prime your pump. A high-pressure test ensures that the valve will not leak, even at pressures up to 12,000psi (82,737kPa). A low-pressure test verifies that the valve closes properly, even without a high backpressure force. The cartridge design allows easy, convenient replacement of worn or damaged valves.

#### ASI Check Valves for Agilent 1050 & 1100

Description	Material	qty.	cat.#	price
Outlet Check Valve (cartridge and housing)	Sapphire & Ruby Ball & Seat	ea.	25170	
Outlet Check Valve (cartridge and housing)	Ceramic Ball & Seat	ea.	25173	
Outlet Cartridges	Sapphire & Ruby Ball & Seat	ea.	25171	
Outlet Cartridges	Ceramic Ball & Seat	ea.	25174	
Outlet Housing	—	ea.	25172	

#### ASI Check Valves for Waters Alliance® Model 2690

Description	Material	qty.	cat.#	price
Inlet and Outlet Cartridges	Sapphire & Ruby Ball & Seat	ea.	25160	
Inlet and Outlet Cartridges	Ceramic Ball & Seat	ea.	25162	



### Valves for HPLC

Our valves have low internal volumes and are rated to 15,000psi (103,421kPa). They feature a 2-piece stem assembly in which the rotating upper shank is coupled through a ball joint to a static lower stem. Only fingertight torque is required to make the seal.

Description	qty.	cat.#	price
Two-Way Through Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26400	
Two-Way Angle Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26401	
Three-Way Bottom Vent Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26402	
Side Vent Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26403	
Dual Stem Three Way Valve for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26404	
Prime/Purge Valve for HPLC, 1/4-28 Flanged Seat, Stainless Steel, with Tubing and Fittings	ea.	26406	
Prime/Purge Valve Repair Kit for Prime/Purge Valve	kit	26407	



### In-Line Check Valves for HPLC

Our 316 stainless steel in-line check valves have a soft seat and 1/16" fittings. Nuts and ferrules are included.

Description	qty.	cat.#	price
Check Valve, Soft Seat, for HPLC, 1/16" Fittings, 1/4-28, Stainless Steel, Includes Nuts and Ferrules	ea.	26405	

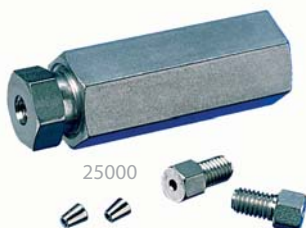




### High-Pressure Frit-Type In-Line Filter

Restek's high-pressure in-line filter is a stand-alone version of the Trident column protection system, specifically designed for ease of use, low dead-volume, and flexibility. The filter has a replaceable, PEEK™ encapsulated 316 stainless steel frit with a surface area of 12mm². The standard frit with 2.0µm porosity may be replaced with an optional 0.5µm porosity frit. Use of this filter can greatly extend column life, thereby reducing costs and saving maintenance time. Tubing 1/16" OD; connectors—CPI.

Description	Porosity	qty.	cat.#	price
Frit-Type In-Line Filter	2.0µm	ea.	25041	
Replacement Cap Frits: 4mm, 0.5µm		5-pk.	25023	
Replacement Cap Frits: 4mm, 2.0µm		5-pk.	25022	



### High-Pressure Cup-Type In-Line Filter

This high-pressure cup-type filter can be used in fluid streams operating to 15,000psi (103,421kPa). The cup-shaped filter elements have a large (2.5 cm²) surface area to give long operating lifetime. Mounted in screw-type adapters, they are easily removed for cleaning. Normally, backflushing and cleaning in an ultrasonic bath with an appropriate solvent will restore them. If they become permanently clogged, replacement elements are available.

Housings and all wetted parts are 316 stainless steel. Filters are packaged with gland nuts and ferrules. A bulkhead type fitting is available for thru-panel mounting. Tubing 1/16" OD; connectors—CPI.

Description	Porosity	qty.	cat.#	price
Cup-Type In-Line Filter	0.5µm	ea.	25000	
Cup-Type In-Line Filter	2.0µm	ea.	25001	
Replacement Filter Elements & Seals	0.5µm	2-pk.	25002	
Replacement Filter Elements & Seals	2.0µm	2-pk.	25003	



### Low-Pressure Slip-On Inlet Filter for Mobile Phase Reservoir

A type 316 stainless steel tip with a Tefzel® collar seals to a corrosion-resistant type 316 stainless steel filter element. The slip-on filter easily attaches to the pump inlet line, without the use of wrenches. The universal tip accommodates standard Teflon® tubing inner diameters. The cylindrical filter is standard 10µm porosity. 1/8" OD. Fits Altex, ISCO, LDC, Varian, Waters, PerkinElmer, and other pumps.

Description	qty.	cat.#	price
Slip-on Inlet Filter	ea.	25008	



### Low-Pressure CPI Inlet Filter for Mobile Phase Reservoir

A 316 stainless steel knurled cap and Tefzel® CPI ferrule seal to 1/8" OD Teflon® tubing when finger-tightened onto the precision-machined filter holder. The filter element is replaceable. Standard 10µm porosity protects delicate pump components from particles but introduces very little pressure drop. 1/8" OD. May be used as a helium sparging diffuser.

Description	qty.	cat.#	price
CPI Inlet Filter	ea.	25009	
Replacement Elements: 10µm filter	2-pk.	25010	



also available

Trident Direct high-pressure filter—  
protection against particulate matter.  
See page 328 for details.



**Mobile Phase Sparge Filter; Inlet Filter**

The 2 $\mu$ m helium sparge filter is an inexpensive way to prepare and maintain mobile phases free of dissolved gas. Both filters are made from 316 stainless steel and PEEK™ and are compatible with most solvents.



Description	qty.	cat.#	price
Mobile Phase Sparge Filter: 2 $\mu$ m	ea.	25311	
Inlet Filter: 10 $\mu$ m	ea.	25312	
Inlet Filter: 20 $\mu$ m	ea.	25313	



Polypropylene Membrane Filters

KT953825-0000

**Last Drop Filter**

The flat filter element sits parallel to the bottom of the mobile phase reservoir, allowing the filter to draw 98% of the mobile phase without drawing air into the system. Conventional cylindrical mobile phase filters begin to draw air into the system when approximately 10% of the solvent remains in the reservoir. The Last Drop Filter allows more analyses per batch of mobile phase and helps reduce hazardous waste. 22.1mm OD.



Description	qty.	cat.#	price
Last Drop Filter: 2 $\mu$ m	ea.	25314	
Last Drop Filter: 10 $\mu$ m	ea.	25315	

**Membrane Microfiltration Glassware**

47mm filtration apparatus with fritted glass support is recommended for routine filtration of corrosive liquids and removal of particles from HPLC solvents. The ground joint connection eliminates phthalate contamination that can occur when using silicone or neoprene stoppers. The support base has a coarse porosity glass frit and an integral vacuum connection, located above the drip tip to prevent contamination of the vacuum line with filtrate droplets. Each apparatus includes a funnel, an anodized aluminum clamp, a 47mm fritted glass support base, and a filtration flask.

All-Glass Microfiltration Apparatus	qty.	cat.#	price
300mL Funnel, 1000mL Flask	ea.	KT953825-0000	
500mL Funnel, 2000mL Flask	ea.	KT953835-0000	
1000mL Funnel, 4000mL Flask	ea.	KT953845-0000	
Replacement Parts for Microfiltration Apparatus	qty.	cat.#	price
40/35 PTFE Joint Sleeve	6-pk.	KT676001-4035	
Flask Cap, 40/35 Outer Joint	ea.	KT953830-0000	
Fritted Glass Support, 47mm, 40/35 Joint	ea.	KT953826-0000	
Glass Funnel, 47mm, 100mL	ea.	KT953761-0000	
Glass Funnel, 47mm, 300mL	ea.	KT953751-0000	
Glass Funnel, 47mm, 500mL	ea.	KT953771-0000	
Glass Funnel, 47mm, 1000mL	ea.	KT953781-0000	
Flask, 1000mL, 40/35 Joint	ea.	KT953827-0000	
Flask, 2000mL, 40/35 Joint	ea.	KT953828-0000	
Flask, 4000mL, 40/35 Joint	ea.	KT953829-0000	
Aluminum Clamp, 47mm	ea.	KT953753-0000	
Membrane Filters	qty.	cat.#	price
Polypropylene Membrane Filters, 47mm, 0.45 $\mu$ m	100-pk.	26396	
Polypropylene Membrane Filters, 47mm, 0.22 $\mu$ m	100-pk.	26397	
Nylon Membrane Filters, 47mm, 0.45 $\mu$ m	100-pk.	26398	
Nylon Membrane Filters, 47mm, 0.22 $\mu$ m	100-pk.	26399	



### Mobile Phase Degasser

Dissolved oxygen can cause flow rate instability and increased baseline noise. Also, it has a quenching effect on fluorescence detection and increases the background of UV detectors. Dissolved gases can out-gas in the HPLC system, forming bubbles in check valves, at connections, or in detector flow cells.

In-line vacuum degassing is more effective at removing dissolved gas from mobile phases than sonication or helium sparging. In-line degassers work by withdrawing gas across a gas-permeable membrane encased in a sealed chamber. Traditionally, the membrane has been made of PTFE tubing, but the Degasys Ultimate Degasser uses tubing composed of an amorphous fluoropolymer that is 200 to 300 times more gas permeable than PTFE. This translates into the ability to use shorter tubing for removing dissolved gas. This new material also has better tubular burst strength than PTFE. To prevent cross contamination, each channel on this Degasys unit is individually encased within its own vacuum chamber.

#### Specifications:

<b>Residual Oxygen<sup>1</sup></b>	0.9ppm
<b>Pressure Loss<sup>1</sup></b>	0.24psi (1.65kPa)
<b>Internal Volume</b>	500 $\mu$ L

<sup>1</sup>At a flow rate of 1mL/min.

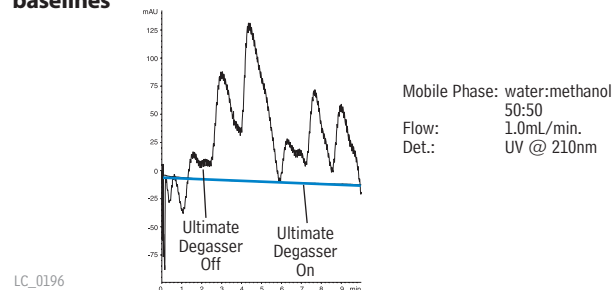
<b>Wetted Parts</b>	Teflon AF, PTFE, ETFE, PPS
<b>Max Flow Rate</b>	7mL/min./channel

Description	qty.	cat.#	price
110V Mobile Phase Degasser (4 Channel, 7mL/min./channel)	ea.	25189	
220V Mobile Phase Degasser (4 Channel, 7mL/min./channel)	ea.	25194	

To prevent system damage, do not use the Degasys system with solutions containing TFA at concentrations greater than 5%.



#### Degasys Ultimate Degasser provides highly stable baselines



### Solvent Debubbler

Bubbles in an HPLC system can cause check valve malfunctions and pump cavitation, seriously affecting pump performance. The debubbler removes bubbles from the fluid stream before it enters the pump.

Special geometry at the base of the housing allows bubbles entrained in the inlet fluid stream to rise and be trapped in the reservoir. The gas/liquid interface is easily visible through the translucent wall of the device. Loosening the airtight cap releases the trapped gas. The debubbler is fitted with a bracket and universal connecting tips.

Description	qty.	cat.#	price
Solvent Debubbler with Bracket	ea.	25014	



### Sonic Debubbler

- Fast.
- Easy to use.
- Less solvent waste; less clean-up.



Just touch the Sonic Debubbler to the inlet line or check valve — sonic vibrations will quickly dislodge or redissolve trapped air bubbles. Reduces downtime or conversion time from one mobile phase to another.

Description	qty.	cat.#	price
Sonic Debubbler (110V)	ea.	20444	
Sonic Debubbler (220V)	ea.	25098	





Bottle not included

**Waste Overflow Indicator for HPLC Systems**

- Avoid messy pooling around mobile phase waste containers.
- Audible alarm instantly alerts user, preventing overflow.
- Compact, battery operated unit.

The Restek Waste Overflow Indicator will help keep your mobile phase waste where it belongs—in the waste container! Compact, battery operated unit fits securely on 4-liter solvent bottles and accommodates two waste streams. An audible alarm is given as the solvent waste container approaches capacity, giving you time to empty or change the container. Another innovative design from Restek!

Description	qty.	cat.#	price
Waste Overflow Indicator for HPLC Systems	kit	26543	
Replacement AA Battery for the Waste Overflow Indicator	ea.	26544	
Replacement AA Batteries for the Waste Overflow Indicator	3-pk.	26545	

**also available**

See **page 342** for Hub-Cap bottle tops, adapters, and filter kits.

**Opti-Cap™ Bottle Top**

The most economical way to helium-sparge and deliver HPLC mobile phases. The Opti-Cap™ top fits all standard GL-45 bottles and has two 1/8-inch holes and one 1/16-inch hole for tubing.

Description	qty.	cat.#	price
Opti-Cap (Cap and PEEK Plug)	ea.	25300	
Opti-Cap Kit			
(Opti-Cap, 3 meters of tubing, sparging filters)	kit	25301	
Opti-Cap Kit with 1L Bottle	kit	25302	
Opti-Cap Kit with 2L Bottle	kit	25303	
<b>Related items and replacement parts</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
Mobile Phase Sparge Filter: 2μm, stainless steel	ea.	25311	
Mobile Phase Inlet Filter: 10μm	ea.	25312	
Teflon Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307	
Teflon Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306	
PEEK Plug, 1/4"-28 threads	3-pk.	25319	
1L Graduated Safety-Coated Bottle – GL-45 threads	ea.	25304	
2L Graduated Safety-Coated Bottle – GL-45 threads	ea.	25305	



**We help novice and veteran chemists alike solve tough analytical problems every day. How can we help you?**

Domestic: [support@restek.com](mailto:support@restek.com)  
International: [intltechsupp@restek.com](mailto:intltechsupp@restek.com)

**Restek's Technical Service Specialists**  
pictured: Al Carusone, Tom Bloom, Jonathan Keim, Al Sensue,  
Mark Badger, Terry Reid, Tim Herring

**Eco-Cap Bottle Top, PTFE**

Fits all standard GL-45 bottles; has two 1/8-inch holes and one 1/16-inch hole for tubing.

Description	qty.	cat.#	price
Eco-Cap Bottle Top, includes 1 Male Luer Plug	ea.	25395	





### Hub-Cap 4 Liter Bottle Tops

Hub-Cap bottle tops are a great way to neatly keep your mobile phase lines where they belong. Use instead of parafilm, aluminum foil, or tape on your mobile phase reservoirs.



Description	qty.	cat.#	price
Hub-Cap (assembly of the bottle cap and plug)	kit	26541	
Hub-Cap Multi-pack	3-pk.	26542	



26538



26540

### Hub-Cap Adapters

Allow the use of the Opti-Cap™ with 4-liter solvent bottles.

Description	qty.	cat.#	price
Hub-Cap Adapter	ea.	26538	
Hub-Cap Adapter Multi-pack	3-pk.	26539	
Hub-Cap Adapter and Opti-Cap	kit	26540	



#### Mobile Phase Additives

Mobile phase additives such as triethylamine, trifluoroacetic acid, and ion-pairing reagents can compete with sample ions, decreasing sensitivity and, in some cases, reducing sample ion intake into the MS. To obtain symmetric peaks and/or sufficient retention, use base deactivated, state-of-the-art Type B silica packings that minimize the need for additives.

### Transfer and filter mobile phase in a single step!



26395



Polypropylene Membrane Filters

### Hub-Cap Filter Kit

Kit includes: bottle adapter, bottle adapter nut, filter inlet cap, grid support, vacuum hose barb, tube compression fitting, 47mm grid, 47mm 0.22µm filter membrane, 47mm 0.45µm filter membrane, 1/4" OD x 1/8" ID ultra chemical resistant, Teflon® FEP lined Tygon® tubing (3'), 6" x 6" box with shrink wrap insert.



Bottle not included.

### Assembles quickly and easily!



Unscrew and lift off top.



Place membrane filter on top of grid.



Reattach top.



Connect vacuum line to side port.

Description	qty.	cat.#	price
Hub-Cap Filter Kit	kit	26395	
<b>Replacement Membrane Filters</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
Polypropylene Membrane Filters, 47mm, 0.45µm	100-pk.	26396	
Polypropylene Membrane Filters, 47mm, 0.22µm	100-pk.	26397	
Nylon Membrane Filters, 47mm, 0.45µm	100-pk.	26398	
Nylon Membrane Filters, 47mm, 0.22µm	100-pk.	26399	





26516

CE

### Sidewinder Column Heater

- Easy to set up!
- Operation range: 5°C above ambient to 85°C,  $\pm 1^\circ\text{C}$ .
- Lightweight, compact design fits in small spaces.
- Column holder can be placed in any orientation.

This unique design completely encloses any HPLC analytical column up to 25cm in length. Two lengths of heater jackets are available: the short column holder accommodates columns up to 10cm in length, while the long column holder holds columns up to 25cm in length. The control module provides optimum heating performance, accuracy to within  $1^\circ\text{C}$ , and stability to within  $0.1^\circ\text{C}$ . The new Sidewinder controller has fast 10Hz sampling for improved responsiveness. Power requirements: 24V control unit for maximum stability; RS232 control allows external programming.

Description	qty.	cat.#	price
Temperature Control Module and Long Column Holder (25cm)	ea.	26516	
Temperature Control Module and Short Column Holder (10cm)	ea.	26517	



26518

CE

### Sidewinder Heater/Cooler Temperature Control Module

- Operation range: 5-55°C,  $\pm 0.2^\circ\text{C}$ .
- Ability to program multiple temperature points.
- Accommodates columns up to 30cm in length and 7.8mm ID.
- Compact design.

The Sidewinder heater/cooler unit has a doubly insulated cover to maintain the programmed temperature to within  $0.2^\circ\text{C}$ . The 24V control unit provides maximum stability and rapid equilibration times; RS232 control allows external programming.

Description	qty.	cat.#	price
Sidewinder Heater/Cooler Temperature Control Module	ea.	26518	

### also available

Looking for a nitrogen generator for your LC/MS?

Restek offers a full line of Parker LC/MS generators. See page 233.



22484

CE

### Mobile Phase Pre-Heater

- Heats mobile phase before it enters a heated column.
- Minimizes temperature changes, to help keep analyte peaks sharp.

Description	qty.	cat.#	price
Mobile Phase Pre-heater	ea.	22484	

### Super-Clean Gas Trapping System for LC/MS

- Changing filters is quick and easy.
- Up to 20L of hydrocarbon-free nitrogen per minute.

The Super-Clean Gas Trapping System is the latest technology in cartridge-style gas filtration for purifying nitrogen, and is ideal for use in LC/MS systems. The two-position 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.

Description	qty.	cat.#	price
Super-Clean Gas-Trapping System (2-position base plate, 2 charcoal filters)	ea.	22062	
Replacement Hydrocarbon (Charcoal) Filters	2-pk.	22061	

### it's a fact

A Super-Clean quick-change cartridge system efficiently removes hydrocarbons from nitrogen!





25322



Kits are convenient and economical, compared to ordering individual items!



25097

### PEEK™ Survival Kit for HPLC

The PEEK™ Survival Kit is an invaluable parts kit that contains tubing, fittings, and tools essential for setting up and maintaining your HPLC system: PEEK™ tubing, connectors, and elbows, Teflon® tubing, a tubing cutter and extra blades, a ValvTool wrench, open-end wrenches, and more.

**For start-up and maintenance in all HPLC systems.**

Description	qty.	cat.#	price
PEEK Survival Kit for HPLC	kit	25322	

#### Contents:

Description	qty.	cat.#	price
PEEK Column Connector (beige, round body)	10-pk.	25015	
PEEK Tubing, 1/16" OD x 0.005" ID x 3m (red stripe)	ea.	25065	
PEEK Tubing, 1/16" OD x 0.007" ID x 3m (yellow stripe)	ea.	25066	
PEEK Tubing, 1/16" OD x 0.010" ID x 3m (blue stripe)	ea.	25067	
PEEK Tubing Elbow 90°	5-pk.	25308	
PEEK Tubing Elbow 180°	5-pk.	25309	
Teflon Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306	
Teflon Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307	
Tubing Clip	5-pk.	25310	
ValvTool Wrench	ea.	25321	
Open-End Wrenches (1/4" x 5/16")	2-pk.*	20110	
Clean-Cut Tubing Cutter	ea.	25069	
Replacement Blade for Clean-Cut Cutter	ea.	25070	
PEEK Union Connector 1/16"	2-pk.	25323	
Mobile Phase Spurge Filter: 2µm	ea.	25311	
Inlet Filter: 10µm	ea.	25312	

\*Kit contains 1 wrench, replacement (cat.# 20110) is a 2-pk.

### HPLC PEEK™ Performance Kit

This HPLC PEEK™ Performance Kit is a useful complement to your HPLC system. Includes:

- Hub-Cap Adapter w/Cap (1)
- Tubing Clips (3)
- Clean Cut Tubing Cutter (1)
- PEEK Finger Tight Fittings (5)
- PEEK Column Plugs (5)
- PEEK 90° Tubing Elbows (2)
- PEEK 180° Tubing Elbows (2)
- PEEK Column Connectors (2)



Description	qty.	cat.#	price
HPLC PEEK Performance Kit	kit	26394	

### Stainless Steel Survival Kit for HPLC

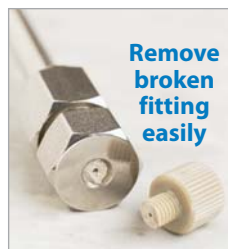
The stainless steel survival kit contains a wide range of tubing, fittings, and tools necessary to set up and maintain your HPLC system: a selection of lengths and IDs of 1/16-inch tubing, plus nuts, ferrules, a ValvTool wrench, and a zero-dead-volume union.

Description	qty.	cat.#	price
Stainless Steel Survival Kit for HPLC	kit	25097	

#### Contents:

Description	color	qty.	cat.#	price
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 5cm	red	3-pk.	25240	
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 10cm	red	3-pk.	25241	
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 20cm	red	3-pk.	25242	
HPLC Capillary Tubing, SS, 1/16" x 0.005" x 30cm	red	3-pk.	25243	
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 5cm	gray	3-pk.	25244	
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 10cm	gray	3-pk.	25245	
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 20cm	gray	3-pk.	25246	
HPLC Capillary Tubing, SS, 1/16" x 0.007" x 30cm	gray	3-pk.	25247	
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 5cm	blue	3-pk.	25248	
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 10cm	blue	3-pk.	25249	
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 20cm	blue	3-pk.	25250	
HPLC Capillary Tubing, SS, 1/16" x 0.010" x 30cm	blue	3-pk.	25251	
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 5cm	yellow	3-pk.	25252	
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 10cm	yellow	3-pk.	25253	
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 20cm	yellow	3-pk.	25254	
HPLC Capillary Tubing, SS, 1/16" x 0.020" x 30cm	yellow	3-pk.	25255	
1/16" Rheodyne Style Nut		10-pk.	25095	
1/16" Rheodyne Style Ferrule		10-pk.	25096	
ValvTool Wrench		ea.	25321	
1/16" Stainless Steel Ferrules		10-pk.	20286	
1/16" Stainless Steel Nuts		10-pk.	20287	
Zero-Dead-Volume Internal Union		ea.	20148	





### PEEK™ Fitting Extractor

Drill into the broken fitting, then screw the extractor into the fitting and remove it easily. Eliminates the need for heat or other techniques that could damage your column.



Description	qty.	cat.#	price
PEEK Fitting Extractor	ea.	25325	



### PEEK™ Union Connector

Allows you to quickly and reliably connect two pieces of 1/16-inch tubing. 0.3mm union bore. End fittings included.

Description	qty.	cat.#	price
PEEK Union Connector 1/16"	2-pk.	25323	



20147

### 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.

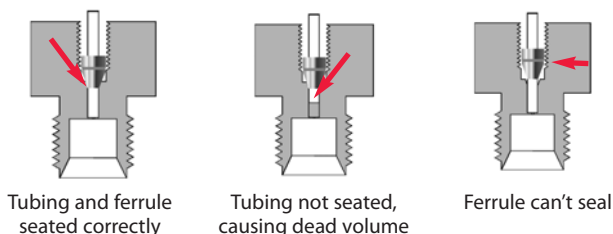
Description	Union Bore	Valco #	qty.	cat.#	price
Internal Union	0.15mm	ZU1XC	ea.	20147	
Internal Union	0.25mm	ZU1C	ea.	20148	
Internal Union	0.75mm	ZU1	ea.	20149	
Internal Union	1/16"	ZU1T	ea.	20150	

### Improving Column Connections

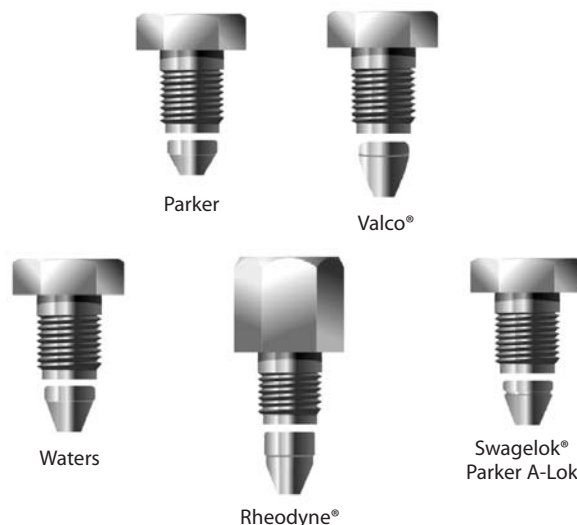
A good connection is necessary for trouble-free chromatography. Connecting incompatible fittings from different manufacturers can result in leaks, poor peak shape, and increased void volume (Figure 1). Each type of end-fitting has a unique seat depth or style. Generally, Restek, Valco®, Parker, and Upchurch Scientific® fittings are interchangeable; whereas Waters, SSI, Rheodyne®, and Gasukura fittings are not (Figure 2).

Our wrenchless universal 10-32 PEEK™ column connector (cat.# 25015, page 347) can be used with any style of end fitting, and all 1/16-inch tubing. It is reusable and will adjust to any seat, depth, or style.

**Figure 1** Incompatible fittings create problems.



**Figure 2** Fitting styles differ among various manufacturers.





Use the flat side of the Piston Seal Insertion Tool to seat a Waters face seal.



### HPLC Piston Seal Insertion Tool

Simplify pump maintenance: use one end to remove your old seal, then simply slip your new seal on the other end and push it flush into position. The tool cannot mar the surrounding metal surface of the pump housing.



Remove a seal



Seat a seal



Description	qty.	cat.#	price
HPLC Piston Seal Insertion Tool	ea.	21356	



PEEK™  
Secure-Fit Fitting



Stainless Steel  
Secure-Fit Fitting

### Secure-Fit Fittings

A good connection between HPLC components is necessary for trouble-free chromatography. Secure-Fit connectors from Restek and Selerity Technologies ensure a consistent, leak-free seal—and they eliminate excess dead volume! An internal spring mechanism holds the capillary tubing at the proper depth in the female fitting. This seal is maintained while you finger-tighten the nut. These fittings are available in stainless steel or PEEK™, and in a variety of tubing lengths and internal diameters.

#### Secure-Fit Fittings—Single Connectors

Length	Stainless Steel			PEEK			price
	0.005" ID	0.007" ID	0.010" ID	0.005" ID	0.007" ID	0.010" ID	
6cm	25181	25185	25190	25230	25234	25217	
10cm	25182	25186	25191	25231	25235	25218	
20cm	25183	25187	25192	25232	25236	25219	
30cm	25184	25188	25193	25233	25237	25220	
50cm	26510	26511	26512	—	—	—	

#### Secure-Fit Fittings—Two Connectors

Length	Stainless Steel			PEEK			price
	0.005" ID	0.007" ID	0.010" ID	0.005" ID	0.007" ID	0.010" ID	
10cm	25208	25211	25214	25221	25224	25227	
20cm	25209	25212	25215	25222	25225	25228	
30cm	25210	25213	25216	25223	25226	25229	
50cm	26513	26514	26515	—	—	—	

also available

HPLC Syringes  
See pages 285-289.





**PEEK™ Tubing Elbows**

Tubing Elbows (90° and 180°) are ideal for routing 1/16-inch PEEK™ tubing through your system. Simply snap the tubing into the elbow. Prevent pinching of PEEK™ tubing which can cause high pressure.

Description	qty.	cat.#	price
PEEK Tubing Elbow 90°	5-pk.	25308	
PEEK Tubing Elbow 180°	5-pk.	25309	



20188

**Tubing Dressing Tool**

Opens stainless steel tubing bore and removes burrs. For 1/16-inch OD tubing or 1/8-inch OD tubing.

Description	qty.	cat.#	price
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	



25069

**Clean-Cut Tubing Cutter**

- Burr-free, perpendicular cuts that will not distort the tubing OD or close the ID.
- Use on PEEK™, Teflon®, Tefzel®, other polymeric tubing.

Description	qty.	cat.#	price
Clean-Cut Tubing Cutter	ea.	25069	
Replacement Blade for Clean-Cut Cutter	ea.	25070	

For stainless steel tubing cutters, see page 248 or visit [www.restek.com](http://www.restek.com).

**Universal 10-32 PEEK™ Column Connectors and Plugs**

Universal PEEK™ Connectors allow easy installation of all 1/16-inch tubing, including stainless steel. See "Improving Column Connections" data on page 345.

Description	qty.	cat.#	price
PEEK Column Connector (beige, round body)	10-pk.	25015	
PEEK Column Plug (black)	10-pk.	25016	
PEEK Fingertight Fittings (blue, flat-sided)	10-pk.	25324	



25095

25096

**Rheodyne® Style Nut and Ferrule**

Replacement long nut for connecting stainless steel tubing to a Rheodyne® 6-port valve or other Rheodyne® part.

Description	qty.	cat.#	price
1/16" Rheodyne Style Nut	10-pk.	25095	
1/16" Rheodyne Style Ferrule	10-pk.	25096	



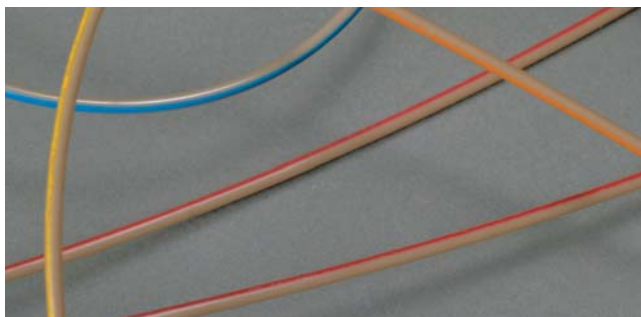
25321

**ValvTool Wrench**

The ValvTool is a time-saving device that provides easy access to many hard-to-reach Rheodyne® or Valco® valves. For 1/4-inch nuts.

Description	qty.	cat.#	price
ValvTool Wrench	ea.	25321	





### Inert PEEK™ Tubing

- Replaces stainless steel, titanium, Teflon® or Tefzel® tubing.
- Less oxygen permeable and more temperature resistant (to 250°C) than Teflon® or Tefzel® tubing.
- Use with PEEK™ fingertight or flangeless fittings.
- Use to 7,000psi (48,263kPa).

Description	Color Code	qty.	cat.#	price
PEEK Tubing, 1/16" OD x 0.0025" ID x 1m	pink dash stripe	3-pk.	25320	
PEEK Tubing, 1/16" OD x 0.005" ID x 3m	red stripe	ea.	25065	
PEEK Tubing, 1/16" OD x 0.007" ID x 3m	yellow stripe	ea.	25066	
PEEK Tubing, 1/16" OD x 0.010" ID x 3m	blue stripe	ea.	25067	
PEEK Tubing, 1/16" OD x 0.020" ID x 3m	orange stripe	ea.	25068	



### HPLC Stainless Steel Capillary Tubing

- 316 grade stainless steel.
- Precise pre-cut lengths.
- Smooth surface finish.
- Ultra clean.

Whether you need to replace system tubing as part of your troubleshooting or want to reduce the dwell volume of your system as you move to narrower columns, Restek has the quality tubing in the lengths and IDs you need. Each ID is color-coded so it is easy to identify and replace correctly.

		0.005" ID (red)		0.007" ID (gray)		0.010" ID (blue)		0.020" ID (yellow)	
Length	qty.	cat.#	price	cat.#	price	cat.#	price	cat.#	price
1/16" OD Tubing									
5cm	3-pk.	25240		25244		25248		25252	
10cm	3-pk.	25241		25245		25249		25253	
20cm	3-pk.	25242		25246		25250		25254	
30cm	3-pk.	25243		25247		25251		25255	



### Teflon® Tubing

- Ideal for mobile phase inlet lines.
- Chemically inert.
- Use to 500psi (3,447kPa) and 80°C.

Description	qty.	cat.#	price
Teflon Tubing, 1/8" OD x 0.063" ID x 3m (1.6mm ID)	3m	25306	
Teflon Tubing, 1/8" OD x 0.094" ID x 3m (2.4mm ID)	3m	25307	



### Tubing Clip

Securely holds 1/16-inch or 1/8-inch tubing in beaker, flask, or bottle up to 4mm thick.

Description	qty.	cat.#	price
Tubing Clip	5-pk.	25310	





25328



25326



25342

### QuickSplit Post-Column Flow Splitters

Fluid resistor technology eliminates adjustments to capillary tubing for optimizing split ratio. Wide range of interchangeable resistors available.

### Fixed Flow Splitters for HPLC & LC/MS

- Split ratio not affected by changes in viscosity or pressure.
- High operating pressure limit: 10,000psi (68,948kPa).
- Low dead volume—negligible effect on analyte bandwidth.
- Total flow: 0.1–5.0mL/min.

### Adjustable Flow Splitter

- Adjustable metering valve gives convenient control of split ratio.
- Split ratio not affected by changes in viscosity or pressure.
- High operating pressure limit: 5,000psi (34,474kPa).
- Low dead volume—negligible effect on analyte bandwidth.
- Total flow: 0.1–5.0mL/min.

Description	Split Ratio	qty.	cat.#	price
Binary Fixed Flow Splitter	100:01:00	ea.	25326	
	50:01:00	ea.	25327	
	20:01	ea.	25328	
	10:01	ea.	25329	
	5:01	ea.	25330	
Replacement Fixed Flow Splitter Resistor Set	100:01:00	ea.	25331	
	50:01:00	ea.	25332	
	20:01	ea.	25333	
	10:01	ea.	25334	
	5:01	ea.	25335	
Adjustable Flow Splitter	5:1 to 100:1	ea.	25336	
	1:1 to 20:1	ea.	25337	
	50:1 to 1000:1	ea.	26416	
Replacement Adjustable Flow Splitter Resistor Set	5:1 to 100:1	ea.	25338	
	1:1 to 20:1	ea.	25339	

### HPLC Mixers

- Reduced baseline noise.
- Increased sensitivity.
- Improved gradient accuracy, for more reproducible results.
- Increased reaction efficiency in post-column derivatization.

An efficient cross-flow shearing mechanism and interchangeable cartridges produce vortex shear mixing over a wide range of flows. Stainless steel or PEEK™.

### HyperShear Static In-Line Mixers

Description	Stainless Steel			PEEK		
	qty.	cat.#	price	qty.	cat.#	price
1μL In-Line Mixer	ea.	26409		ea.	26410	
25μL In-Line Mixer	ea.	26411		ea.	26412	
50μL In-Line Mixer	ea.	25341		ea.	26413	
150μL In-Line Mixer	ea.	25342		ea.	26414	
250μL In-Line Mixer	ea.	25343		ea.	26415	



25138

### Ternary Tee Mixer

Description	qty.	cat.#	price
25μL Ternary Tee Mixer	ea.	25138	

### also available

We are pleased to offer HPLC accessory items from Analytical Scientific Instruments (ASI). ASI specializes in HPLC system components and parts that often exceed the original equipment manufacturer's performance. See **page 337**.





25340

**FlatLine Pulse Damper**

- Rupture-proof, no diaphragm—minimal risk of failure or leaks.
- Clean flush-out design—no sample carryover.
- Low internal volume—negligible effect on analyte bandwidth.

The ASI FlatLine Pulse Damper combines performance and reliability in a simple, easy-to-use housing. Standard 10-32 inlet and outlet ports allow quick connection into virtually any HPLC system. Solid core technology provides reliable long-term operation without the down time associated with ruptured or leaking membrane dampers. 600–700 $\mu$ L internal volume at ambient pressure.

Description	qty.	cat.#	price
FlatLine Pulse Damper	ea.	25340	



25238

**MicroPulse Pulse Dampers**

- Compact unit (2.5" x 1.5") can be placed almost anywhere.
- Small, 150 $\mu$ L dead volume at atmospheric pressure.
- PEEK™ unit can withstand pressures to 5,000psi (34,474kPa).
- 316 Stainless steel unit can withstand pressures to 6,000psi (41,369kPa).

Improves system baseline stability while increasing the total system volume by only 150 $\mu$ L. The MicroPulse pulse damper is ideal for applications where minimizing the total system volume is critical. Stainless steel and PEEK™ options for a wide range of applications.

Description	qty.	cat.#	price
MicroPulse Pulse Damper, Stainless Steel	ea.	25238	
MicroPulse Pulse Damper, PEEK	ea.	25239	



25013

**LO-Pulse Pulse Damper**

The LO-Pulse Pulse Damper is a patented, wide-dynamic-range 316 stainless steel device that smooths pulsations and maintains constant flow at system pressures up to 6,000psi (41,369kPa). The flow path volume is only 0.9mL and the path is efficiently swept, eliminating solvent memory effects when changing mobile phases.

The LO-Pulse pulse damper also is available in a space-saving, economical kit that includes hardware for mounting the pulse damper on a bracket, or for installing feet on it for bench-top use.

Description	qty.	cat.#	price
Model LP-21 LO-Pulse Pulse Damper	ea.	25012	
Pulse Damper Kit	kit	25013	

**Backpressure Regulators**

Backpressure regulators can improve detector performance by preventing bubble formation in the detector flow cell. They also are useful in post-column reaction lines and between detectors and fraction collectors in preparatory work. Regulators are superior to more specific alternative solutions, like small-bore tubing, in which pressure varies with flow rate.

Our end-of-line and flow-through backpressure regulators are adjustable to assure constant backpressure over a wide range of mobile-phase viscosities and flow rates. The end-of-line model is available with 1/4-28 plastic flange-type fittings or high-pressure 1/16-inch compression fittings; this design adjusts from 15 to 60psi (103 to 414kPa). The flow-through design has 1/16-inch compression fittings and is adjustable from 7 to 75psi (48 to 517kPa).

Description	qty.	cat.#	price
Backpressure Regulator:			
end-of-line, 1/16-inch OD tubing, flanged	ea.	25017	
Backpressure Regulator: end-of-line, high-pressure seat	ea.	25018	
Backpressure Regulator:			
flow-through, 5 $\mu$ L internal volume	ea.	25020	





### HPLC Column Tubing

Restek tubing is manufactured from fine, chromatographic-grade 316 stainless steel. It is corrosion resistant, ultrasonically cleaned and passivated. We polish the tubing and promise a burr-free cut. You can use this tubing immediately—there is no need for additional treatment.

Length	2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price
<b>1/4" OD Tubing</b>						
30mm	25100		25106		25112	
50mm	25101		25107		25113	
100mm	25102		25108		25114	
150mm	25103		25109		25115	
200mm	25104		25110		25116	
250mm	25105		25111		25117	



Packing particle size	Use this pore size:
3–4 $\mu$ m	0.5 $\mu$ m
5–20 $\mu$ m	2.0 $\mu$ m

### 1/4-Inch HPLC Frits

We manufacture our frits from fine, chromatographic-grade 316 stainless steel, and we offer sizes to fit most column and pore sizes. To choose the correct frit, check its pore size compatibility with the particle size of the packing in the column (see chart above). If the packing has a smaller particle size than the pore size of the frit, the packing can clog the frit.

ID	Pore Size	qty.	cat.#	price
4.6mm	2.0 $\mu$ m	10-pk.	25071	
4.6mm	0.5 $\mu$ m	10-pk.	25072	
3.2mm	2.0 $\mu$ m	10-pk.	25073	
3.2mm	0.5 $\mu$ m	10-pk.	25074	
2.1mm	2.0 $\mu$ m	10-pk.	25075	
2.1mm	0.5 $\mu$ m	10-pk.	25076	



### Column End-Fittings

1/4-inch end-fittings are compatible with Valco® and Parker fittings.

Description	qty.	cat.#	price
Column End-Fitting for 4.6mm Column	ea.	25077	
Column End-Fitting Flat Bottom	ea.	25078	



### Empty Chromatography Columns

- 316 stainless steel tubing complete with end-fittings, frits, nuts, and ferrules.
- Preassembled prior to shipment, unless otherwise requested.
- Internal 1/16-inch seats are compatible with Valco® and Parker fittings.

Length	2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price
<b>1/4" OD Tubing</b>						
30mm	25118		25124		25130	
50mm	25119		25125		25131	
100mm	25120		25126		25132	
150mm	25121		25127		25133	
200mm	25122		25128		25134	
250mm	25123		25129		25135	



**Restek Pack in a Box Kit**

Restek's Pack in a Box Kit is a complete column-packing system. Everything you need to pack your own analytical HPLC columns is included: pump, 20mL reservoir, column hardware (two, 150 x 4.6mm), and system control software (computer not included). Detailed packing instructions and a DVD video also are included. The packing pump is electric, so no pressurized air is required. AC input requirement: 85-265 VAC. 10,000psi maximum pressure.

Description	qty.	cat.#	price
Pack in a Box Kit	kit	26408	

**HPLC Organizers\***

LCLocker HPLC Organizer



Deluxe BenchBooster Organizer



Mini pHPerch Storage Unit



TopLoader BalanceBank Storage Unit



HPLC 30-Column Storage Cabinet



Book Holders



Open Supply Bins, 13-bin unit



Glove Box Dispensers

Description	dimensions	qty.	cat.#	price
LCLocker	24 x 12 x 6"	ea.	25149	
BenchBooster	24 x 7 x 12"	ea.	25150	
Mini pHPerch	13 x 12 x 6"	ea.	25147	
TopLoader	12 x 12 x 7"	ea.	25148	
30 Column Cabinet	17 <sup>7</sup> / <sub>8</sub> x 15 x 2 <sup>7</sup> / <sub>8</sub> "	ea.	25159	
Book Holder, Small	0.75" ID	ea.	25151	
Book Holder, Large	1.5" ID	ea.	25152	
Open Supply Bin, 4-bin Unit	24 x 12 x 10"	ea.	25153	
Open Supply Bin, 5-bin Unit	12 x 16 x 10.5"	ea.	25154	
Open Supply Bin, 13-bin Unit	12 x 7.5 x 12"	ea.	25155	
Glove Box Dispenser, Single	5 <sup>7</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25156	
Glove Box Dispenser, Double	10 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25157	
Glove Box Dispenser, Triple	15 <sup>3</sup> / <sub>8</sub> x 11 <sup>1</sup> / <sub>2</sub> x 4 <sup>1</sup> / <sub>2</sub> "	ea.	25158	

\*Please note: Accessories and supplies in photographs are not included.



## HPLC Pump Pressure Conversion Table

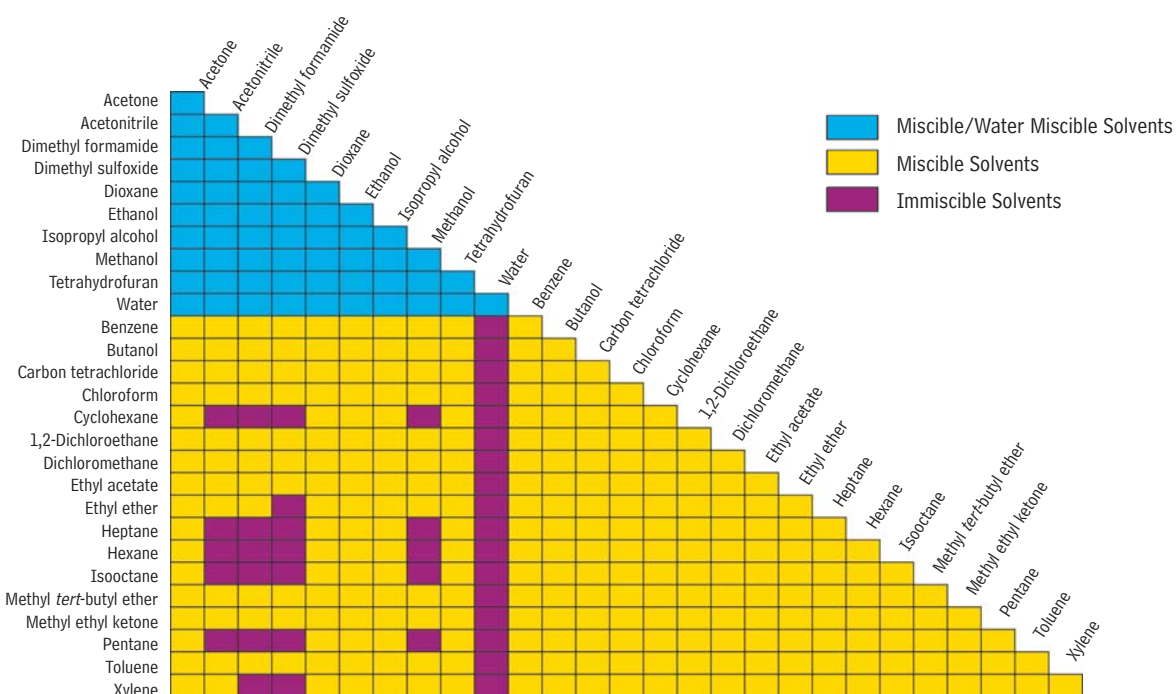
Pressure	psi	atm	kg/cm <sup>2</sup>	torr	kPa	bar	inches Hg
1 psi =	1	0.068	0.0703	51.713	6.8948	0.06895	2.0359
1 atm =	14.696	1	1.0332	760	101.32	1.0133	29.921
1 kg/cm <sup>2</sup> =	14.223	0.967	1	735.5	98.06	0.9806	28.958
1 torr =	0.0193	0.00132	0.00136	1	0.1330	0.00133	0.0394
1 kPa =	0.1450	0.00987	0.0102	7.52	1	0.0100	0.2962
1 bar =	14.5038	0.9869	1.0197	751.88	100	1	29.5300
1 in Hg =	0.49612	0.0334	0.0345	25.400	3.376	0.03376	1

Multiply units in the left-most column by the conversion factors listed in the columns to the right.

e.g., 10 psi x 0.068 = 0.68atm

10 bar x 29.5300 = 295.300 inches Hg

## Solvent Miscibility and Solubility

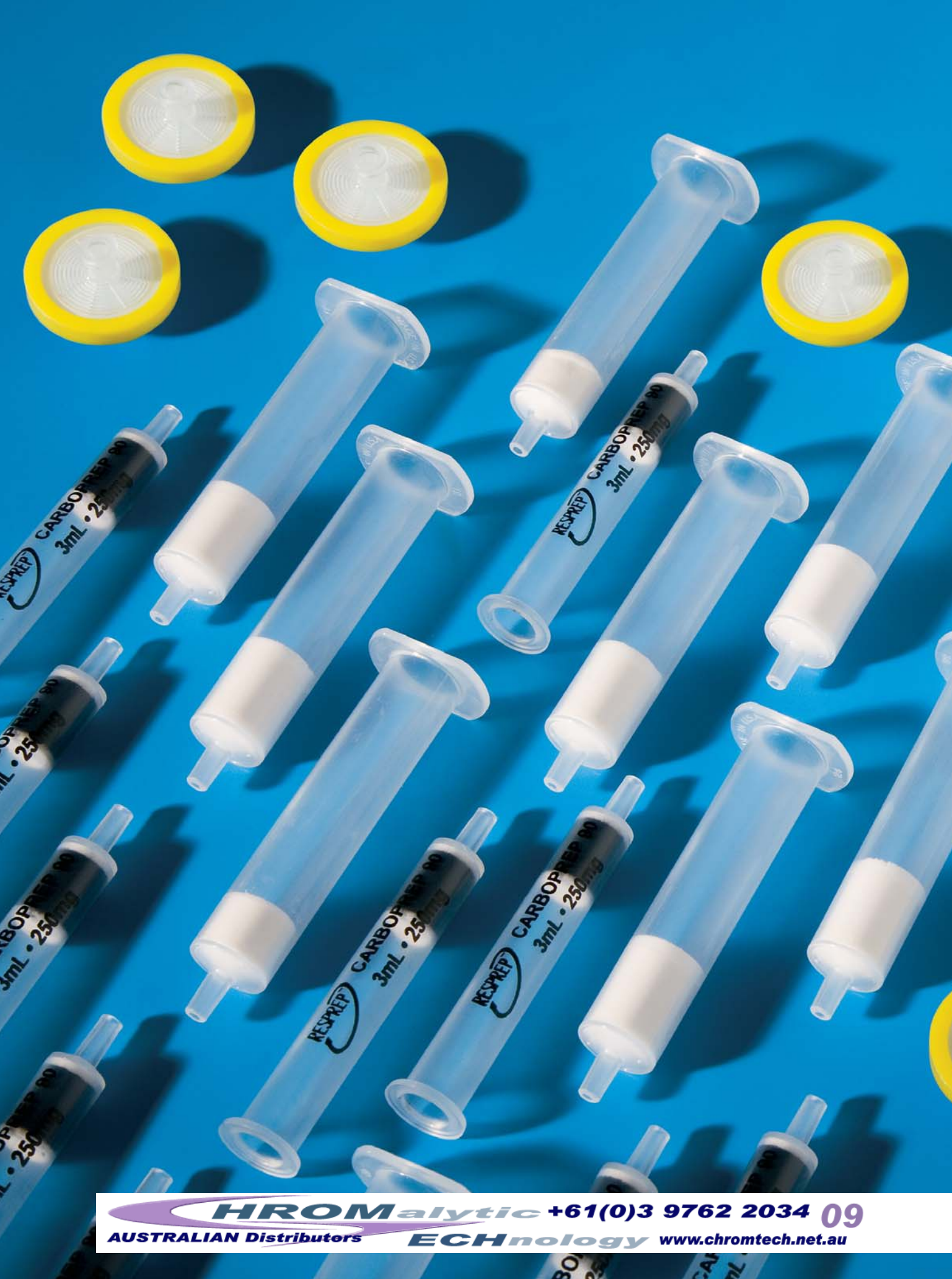


also **available**

HPLC Syringes

See pages 285-289.









# Sample Preparation

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All cartridges are manufactured using high density polypropylene and have polyethylene frits unless otherwise noted.



### Resprep™ SPE Cartridges: Normal Phase

Hydrophilic (polar) adsorbents used to extract hydrophilic analytes from nonpolar matrices, such as organic solvents (e.g., polar contaminants from sample extracts).

	3mL/500mg (50-pk.)	6mL/500mg (30-pk.)	6mL/1000mg (30-pk.)	6mL/1000mg (100-pk.)	15mL/2g (100-pk.)
Florisol (EPA SW 846 methods and CLP protocols)	24031 24032*	— 26086**	— 24034 26085**	26205 —	26228 —
Silica (EPA SW 846 methods)	24035 24036*	— —	24038 —	— —	— —

\*Teflon frits

\*\*Glass tubes with Teflon frits

NEW!

### Resprep™ SPE Cartridges: Ion Exchange Phases

Ionized phases bonded to silica-based adsorbents used to extract positively- or negatively-charged analytes from aqueous matrices (e.g., tricyclic antidepressants from plasma).

	1mL/100mg (100-pk.)	3mL/200mg (50-pk.)	3mL/500mg (50-pk.)	6mL/500mg (30-pk.)	6mL/1000mg (30-pk.)
SAX, quaternary amine	26054	—	26055	—	—
SCX, propyl	26056	—	26057	—	—
SCX, benzyl	—	26058	—	26059	26060
WAX, NH <sub>2</sub> , primary amine	26050	26051	26052	26053	—
WCX, COOH, carboxylic acid	26061	—	26062	—	—

Strong Anion Exchange (SAX); Strong Cation Exchange (SCX); Weak Anion Exchange (WAX); Weak Cation Exchange (WCX)

### Resprep™ SPE Cartridges: Bonded Reversed Phases

Hydrophobic (nonpolar) silica-based adsorbents, used to extract hydrophobic analytes from polar matrices, such as water (e.g., pesticides from water).

	1mL/100mg (100-pk.)	3mL/200mg (50-pk.)	3mL/500mg (50-pk.)	6mL/500mg (30-pk.)	6mL/1000mg (30-pk.)	20mL/5g (20-pk.)	60mL/10g (16-pk.)
C18 (high load, endcapped)	26030	26031	24050	24052	24051	26034	26035
C8 (high load, endcapped)	26036	26037	26038	26039	26040	—	—
Cyclohexyl (endcapped)	—	—	—	—	26043	—	—

### Resprep™ SPE Cartridges: Polymeric DVB Adsorbents

Polymeric adsorbents are used to extract a wide range of polar aromatic and unsaturated analytes from aqueous matrices and can tolerate a wider pH range than silica based adsorbents.



	6mL/500mg (50-pk.)
DVB (Teflon frits)	25989

**FREE**  
Sample Packs  
Available!

Free sample packs of SPE cartridges are available by adding -248 to the catalog number when you call to place your order.



**CarboPrep™ SPE Cartridges**

- Improved recovery of sulfonylurea herbicides, phenols, carbamates, and triazine herbicides, compared to C18 and C8 cartridges.
- Wide range of selectivity for both analytes and their metabolites or degradation products.
- Rapid sampling flow rates; uncompromised recoveries.
- Maximum capacity for contaminant cleanup.
- Controlled manufacturing improves cleanliness and ensures reproducible performance.

CarboPrep™ cartridges are manufactured from chromatographic-grade, nonporous, graphitized carbon. Our manufacturing process minimizes variability and improves recovery and cleanup procedures. We offer two types of carbons: CarboPrep™ 90 has a surface area of approximately 90m<sup>2</sup>/g, CarboPrep™ 200 has a surface area of 200m<sup>2</sup>/g. Both have higher capacity than silica-based packings for a variety of compounds.

CarboPrep™ cartridges can be used for both sample extraction of organic compounds and extract cleanup of matrix interferences.

SPE Cartridge	Tube Volume, Bed Weight	qty.	cat#	price
CarboPrep 90	3mL, 250mg	50-pk.	26091	
CarboPrep 90	6mL, 500mg	30-pk.	26092	
CarboPrep 200	3mL, 250mg	50-pk.	26088	
CarboPrep 200	6mL, 500mg	30-pk.	26087	

**CarboPrep™ Reversing SPE Cartridges**

- High adsorbent capacity (surface area ~200m<sup>2</sup>/g) for large volume sampling.
- Chromatographic grade graphitized carbon provides consistent and quantitative recoveries of a wide variety of semivolatiles, pesticides and herbicides.
- 500mg bed weight (100mg and 900mg bed weights available on request).

Reversing cartridge design allows convenient inverted elution of strongly retained analytes using minimum solvent volumes. Ideal design for extraction of pesticides in water.<sup>1</sup>

SPE Cartridge	Bed Weight	qty.	cat#	price
CarboPrep 200 Reversing Cartridge	500mg	30-pk.	26206	

<sup>1</sup>Crescenzi, C.; DiCorcia, A.; Guerriero, E.; and Saperi, R. Development of a Multiresidue Method for Analyzing Pesticide Traces in Water Based on Solid-Phase Extraction and Electrospray Liquid Chromatography Mass Spectrometry, *Environmental Science & Technology* vol.31, no. 2 (1997) 479-488.

for **more** info

For cartridge components, see **page 363**.



**please note**

If you need a custom SPE cartridge, contact our Technical Service chemists or your Restek representative.

**Closed End SPE Cartridge: Activated Sodium Sulfate**

- High quality anhydrous sodium sulfate.
- Approximately 1 gram prepackaged in a convenient capped cartridge with both male and female luer ends for easy connection to a variety of devices or equipment.
- The adsorbent is fully activated and ready to use for removal of excess water from small volumes of organic solvent solutions, prior to many types of analysis.
- Capped cartridges will remain active for long periods of storage in the lab.

SPE Cartridge	Bed Weight	qty.	cat#	price
Activated Sodium Sulfate	1000mg	50-pk.	26207	





## SAMPLE PREPARATION

### SPE Cartridges

#### Method Specific SPE Cartridges

These cartridges have been specifically designed to provide consistent and reproducible results for the method or application stated.

Description	Applications	Tube Volume, Bed Weight	qty.	cat.#	price
Massachusetts EPH	Extraction of hexane-extractable petroleum hydrocarbons from soil and waste samples. Specially treated to reduce contaminants and increase capacity. Silica packing.	20mL, 5g	20-pk.	26065	
EPA Method 521	For use in EPA Method 521: Nitrosamines in Drinking Water. This method calls for large volume injection and CI/MS/MS. Activated charcoal packing for NDMA.	6mL, 2g	30-pk.	26032	
EPA Method 548.1	Extraction of endotoxin from aqueous samples. Weak anion exchange resin (BioRex 5) packing.	6mL	30-pk.	26063	
Ultra Quat SPE	For use in HPLC analysis of paraquat/diquat, as an alternative to EPA 549.2. For an HPLC column developed specifically for this application, see page 320.	6mL, 500mg	30-pk.	25499	
EPA Method 552.1	Extraction of haloacetic acids from aqueous samples. Strong anion exchange resin (Ag 1x8) packing.	1mL	100-pk.	26064	
EPA Method 8321 (AH SPE)	For use in HPLC analysis of phenoxy acid herbicides.	6mL, 500mg	30-pk.	26029	
Organo Tin	High-capacity clean-up of butyl and phenyl tin compounds from soil, water, and biota. Mixed bed.	60mL	16-pk.	24049	
Drug Prep I	Suitable for acidic, basic, and neutral drugs. Mixed-mode hydrophobic and ion exchange sites provide selective, reproducible extraction of biological samples containing therapeutic or illegal drugs.	3mL, 200mg 10mL, 200mg	50-pk. 50-pk.	26044 26045	
Drug Prep II	Extraction of THCA from biological samples. Copolymeric anion exchange sites provide selective, reproducible extraction of THCA from urine.	3mL, 200mg 10mL, 200mg	50-pk. 50-pk.	26046 26047	
GHB	Extraction of $\gamma$ -hydroxybutyric acid from biological samples. Provides reproducible extraction of GHB from urine, blood, or tissue without conversion to GBL ( $\gamma$ -butyrolactone).	10mL, 200mg	50-pk.	26208	
RDX	Extraction of explosive compounds (similar to EPA Method 8095 and 8330 list) from water samples.	6mL, 500mg	30-pk.	26093	



26194



26195



26128

#### Pesticide Residue Cleanup SPE Cartridges

- Convenient, multiple adsorbent beds in a single cartridge.
- For use in multiple-residue pesticide analysis, to remove matrix interferences.

SPE Cartridge	qty.	cat#	price
6mL Combo SPE Cartridge, Packed with 500mg CarboPrep 90/500mg Aminopropyl, Polyethylene Frits	30-pk.	26193	
6mL Combo SPE Cartridge, Packed with 500mg CarboPrep 90/500mg PSA, Polyethylene Frits	30-pk.	26194	
6mL SPE Cartridge, Packed with 500mg PSA, Polyethylene Frits	30-pk.	26195	
6mL Combo SPE Cartridge, Packed with 200mg CarboPrep 200 and 400mg PSA, Teflon Frits	30-pk.	26127	
6mL Combo SPE Cartridge, Packed with 250mg CarboPrep 200 and 500mg PSA, Teflon Frits	30-pk.	26128	
6mL Combo SPE Cartridge, Packed with 500mg CarboPrep 200 and 500mg PSA, Teflon Frits	30-pk.	26129	



## Catch the Buzz

Sign up for Restek's e-newsletter, *The Buzz*  
[www.restek.com/buzz](http://www.restek.com/buzz)



## QuEChERS SPE Tubes for Extraction and Clean-Up of Pesticide Residue Samples from Food Products

- Fast, simple sample extraction and cleanup using dSPE.
- Fourfold increases in sample throughput.
- Fourfold decreases in material cost.
- Convenient, ready to use centrifuge tubes with ultra pure, preweighed adsorbent mixes.

Quick, Easy, Cheap, Effective, Rugged, and Safe, the QuEChERS ("catchers") method, developed by the USDA Eastern Regional Research Center<sup>1</sup>, has become very popular for extraction and clean-up of pesticide residue samples. Our products are available in three centrifuge tube sizes to meet the needs of both extraction and cleanup of a wide variety of sample matrices following various methods.

The researchers developed a simple two-step procedure. First, the homogenized samples are extracted and partitioned, using an organic solvent and salt solution. Then, the supernatant is further extracted and cleaned, using a dispersive SPE technique. Multiple adsorbents are placed in a centrifuge tube, along with the 1mL of organic solvent and the extracted residues partitioned from step 1. The contents are thoroughly mixed, then centrifuged, producing a clean extract ready for a variety of GC or HPLC analytical techniques.<sup>2</sup> Validation and proficiency data for the QuEChERS method are available for a wide variety of pesticides in several common food matrices at [www.quechers.com](http://www.quechers.com)

Description	Material	Methods	qty.	cat#	price
<b>50mL Centrifuge Tubes for Sample Extraction</b>					
Resprep Q110	4g MgSO <sub>4</sub> , 1g NaCl, 1g trisodium citrate dihydrate, .5g disodium hydrogencitrate sesquihydrate	Mini-Multiresidue, European prEN-15662	50-pk.	26213	
Resprep Q150	6g MgSO <sub>4</sub> , 1.5g NaOAc	AOAC 2007.1	50-pk.	26214	
Empty 50mL Centrifuge Tube	—	Mini-Multiresidue, European prEN-15662, AOAC 2007.1	25-pk.	26227	

### 2mL Micro-Centrifuge Tubes for dSPE (clean-up of 1mL extract)

Resprep Q210	150mg MgSO <sub>4</sub> , 25mg PSA	Mini-Multiresidue, European prEN-15662	100-pk.	26215	
Resprep Q211	150mg MgSO <sub>4</sub> , 25mg PSA, 25mg C18	Mini-Multiresidue	100-pk.	26216	
Resprep Q212	150mg MgSO <sub>4</sub> , 25mg PSA, 2.5mg GCB	Mini-Multiresidue, European prEN-15662	100-pk.	26217	
Resprep Q213	150mg MgSO <sub>4</sub> , 25mg PSA, 7.5mg GCB	Mini-Multiresidue, European prEN-15662	100-pk.	26218	
Resprep Q250	150mg MgSO <sub>4</sub> , 50mg PSA	AOAC 2007.1	100-pk.	26124	
Resprep Q251	150mg MgSO <sub>4</sub> , 50mg PSA, 50mg C18	AOAC 2007.1	100-pk.	26125	
Resprep Q253	150mg MgSO <sub>4</sub> , 50mg PSA, 50mg GCB	—	100-pk.	26123	
Resprep Q252	150mg MgSO <sub>4</sub> , 50mg PSA, 50mg C18, 50mg GCB	AOAC 2007.1	100-pk.	26219	

### 15mL Centrifuge Tubes for dSPE (clean-up of 6mL extract)

Resprep Q350	1200mg MgSO <sub>4</sub> , 400mg PSA	AOAC 2007.1	50-pk.	26220	
Resprep Q351	1200mg MgSO <sub>4</sub> , 400mg PSA, 400mg C18	AOAC 2007.1	50-pk.	26221	
Resprep Q352	1200mg MgSO <sub>4</sub> , 400mg PSA, 400mg C18, 400mg GCB	AOAC 2007.1	50-pk.	26222	
Resprep Q370	900mg MgSO <sub>4</sub> , 150mg PSA	European prEN-15662	50-pk.	26223	
Resprep Q371	900mg MgSO <sub>4</sub> , 150mg PSA, 15mg GCB	European prEN-15662	50-pk.	26224	
Resprep Q372	900mg MgSO <sub>4</sub> , 150mg PSA, 45mg GCB	European prEN-15662	50-pk.	26225	
Resprep Q373	900mg MgSO <sub>4</sub> , 150mg PSA, 150mg C18	—	50-pk.	26226	
Resprep Q374	900mg MgSO <sub>4</sub> , 300mg PSA, 150mg GCB	—	50-pk.	26126	

PSA—primary and secondary amine exchange material  
GCB—graphitized carbon black

#### Reference (not available from Restek)

1. Anastassiades, M., S.J. Lehotay, D. Stajnbaher, F.J. Schenck, "Fast and Easy Multiresidue Method Employing Acetonitrile Extraction/Partitioning and "Dispersive Solid-Phase Extraction" for the Determination of Pesticide Residues in Produce", *J AOAC International*, 2003, vol 86 no 22, pp 412-431.
2. Schenck, F.J., SPE Cleanup and the Analysis of PPB Levels of Pesticides in Fruits and Vegetables. Florida Pesticide Residue Workshop, 2002.



Visit [www.restek.com/quechers](http://www.restek.com/quechers) for free literature and resources on QuEChERS.

## did you know?

Multiple sorbents are used to extract different types of interferences.

MgSO <sub>4</sub>	removes excess water
PSA	removes sugars, fatty acids, organic acids, and anthocyanine pigments
C18	removes nonpolar interferences
GCB	removes pigments, sterols, and nonpolar interferences



## also available

Custom adsorbent mix combinations available upon request.



Free sample packs of QuEChERS SPE Tubes are available by adding -248 to the catalog number when you call to place your order.





### Sodium Sulfate

- Ideal for removing water from sample extracts.
- Requires activation before use.
- Packaged in recloseable 5kg buckets.

Anhydrous sodium sulfate is the most common drying agent used to remove moisture from sample extracts. We package our 60 mesh material in recloseable buckets.

Description	qty.	cat.#	price
Sodium Sulfate	5kg	26204	



Al Carusone, Technical Service

## Technical Service

Do you have a technical question? Restek's Technical Service group has answers! Drawing from our extensive libraries of technical information and many years of collective chromatography experience, the experts in Technical Service can help you from set-up to method development.

### Contact us:

For quick answers to commonly asked questions any time of the day, visit [www.restek.com/answers](http://www.restek.com/answers) or contact us directly:

#### In the U.S.

Phone: 1-800-356-1688, ext. 4  
Fax: 814-353-1568  
e-mail: [support@restek.com](mailto:support@restek.com)

#### Outside the U.S.

Contact your Restek representative.

### Florisil® PR

- Pesticide residue grade.
- Each lot certified to meet AOAC method requirements.
- Packaged in glass containers.

Florisil® PR is commonly used to remove polar interferences from pesticide residues. This bulk material is ideal for labs packing their own chromatography columns for pesticide residue extractions.

Description	qty.	cat.#	price
Florisil PR, 60/100 mesh	500gms	26135	

### Granulated Activated Copper

- Convenient form for removing sulfur from environmental extracts.
- Acidified and activated—ready for use.

Activated copper effectively removes elemental sulfur from environmental extracts. Our acid-washed and activated material can be used right out of the package. The 30 mesh granular material eliminates the potential for fine copper particles in filtered extracts.

Description	qty.	cat.#	price
Granulated Activated Copper, 30 mesh	1kg	26136	

### Ottawa Sand

- Sample medium for matrix spikes and laboratory control blanks.
- Packaged in convenient 5kg buckets.

Ottawa sand is listed in several US EPA methods as the specified medium for matrix spike and laboratory control blanks.

Description	qty.	cat.#	price
Ottawa Sand	5kg	26137	

### Diatomaceous Earth

- Improves extraction efficiency.
- Adsorbs moisture from samples.

Diatomaceous earth is used as a filter aid to improve extraction efficiency of densely packed soils, such as clays. By mixing the sample with diatomaceous earth, recoveries can be improved and excess moisture can be absorbed. We package our 30/40 mesh material in a convenient 1kg quantity.

Description	Similar to Dionex part #	qty.	cat.#	price
Diatomaceous Earth, 30/40 mesh	062819	1kg	26033	



### Resprep™-C18 and Resprep™-C8 SPE Disks

- Glass fiber disks embedded with C18 or C8 bonded silica.
- Extract semivolatile organic compounds.
- Deep-pore design reduces clogging and allows faster flow rates.
- Meet requirements for EPA Methods 525.1, 506, 550.1, and 549.1.
- Lower cost than Teflon® disks.

Description	qty.	cat.#	price
Resprep-C8 47mm SPE Disks	24-pk.	24048	
Resprep-C18 47mm SPE Disks	20-pk.	24004	
Resprep-C18 90mm SPE Disks	12-pk.	25988	

### Resprep™ Oil & Grease SPE Disks

- 47mm glass fiber disks embedded with specialty bonded silica.
- Meet requirements for EPA Method 1664.\*
- Reduce emulsion formation and amount of solvent required by previous EPA methods.
- No chlorofluorocarbons needed.

Description	qty.	cat.#	price
Resprep Oil & Grease SPE Disks	20-pk.	26022	

\*A sodium sulfate drying tube and a 0.45µm PTFE syringe filter (cat.# 26145, page 363) also may be used.

### Resprep™ SPE Flow Filters

- Designed specifically to improve flow when filtering oil and grease samples.
- Use with Resprep™ Diskcover-47 reservoir, or any 47mm glass sample reservoir.

Description	qty.	cat.#	price
Resprep SPE Flow Filters	20-pk.	26024	

### Resprep™ Resin SPE Disks

- 47mm glass fiber disks embedded with styrene/DVB resin.
- For chlorinated, benzidine-containing, or nitrogen-containing pesticides.
- Meet requirements of EPA Methods 515.2 and 553.

Description	qty.	cat.#	price
Resprep Resin SPE Disks	20-pk.	26023	



Resprep™ disks & flow filters extract analytes of interest at high flow rates, and significantly reduce clogging.

also **available**

For an alternative membrane filtration system, see page 339.

## Parts for Diskcover-47 Extraction System

### Diskcover-47 Extraction Disk Holder

- Compatible with most vacuum manifold systems that accept 1/8-inch male luer fittings.
- Sample can be automatically introduced via 1/8-inch Teflon® tubing or from the optional Diskcover-47 reservoir.

Description	qty.	cat.#	price
Diskcover-47 Extraction Disk Holder	ea.	24020	
Diskcover-47 Extraction Disk Holder	6-pk.	24021	
Teflon Tube Luer Adaptors (1/8" OD)	6-pk.	24017	
Teflon Sample Tubing (2ft./0.6m, 1/8" OD)	6-pk.	24025	

### Diskcover-47 Reservoir\*

The Diskcover-47 open-top reservoir allows you to pour up to 125mL of sample directly onto the filter disk holder. It easily installs on top of the Diskcover-47 extraction disk holder.

Description	qty.	cat.#	price
Diskcover-47 Reservoir	ea.	24029	
Diskcover-47 Reservoir	6-pk.	24030	
Teflon O-Ring**	ea.	24027	
Teflon O-Ring**	6-pk.	24028	

\*Must be used with the Diskcover-47 extraction disk holder.

\*\*Order when using PTFE extraction filters.



24029

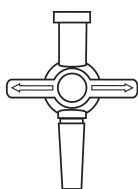




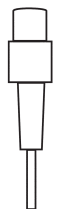
26077

**Resprep™ 12- or 24-Port SPE Manifolds**

- Use with any standard male luer-end SPE cartridges.
- Inert, Teflon® sample guides reduce cross-contamination and carryover.
- Flexible sample collection rack will accommodate a variety of receiving vessels.
- Quick vacuum-release valve for better system control.
- Individual vacuum control for each cartridge—improves reproducibility.

**Resprep™ Manifold Replacement Parts**Valve  
26083Valve  
Attachment  
26130

Manifold Lid

Needle  
Attachment  
26131Sample  
Guide  
26084**Description**

Complete Resprep 12-Port SPE Manifold (includes glass basin with built-in vacuum regulator, polypropylene lid with 12 individual control valves, 12-position collection rack, 12 Teflon sample guides, and waste container)  
Complete Resprep 24-Port SPE Manifold (includes glass basin with built-in vacuum regulator, polypropylene lid with 24 individual control valves, 24-position collection rack, and 24 Teflon sample guides)

qty.	cat.#	price
kit	26077	
kit	26080	

**Resprep™ Manifold Replacement Parts****Description**

Replacement Waste Container, 12-port

qty.	cat.#	price
ea.	24014	

**Collection Rack**

Collection Rack, 12-port

ea.	26079	
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Collection Rack, 24-port

ea.	26082	
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**Manifold Lid**

Replacement Manifold Lid, 12-port (sample guides not included)

ea.	26078	
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Replacement Manifold Lid, 24-port (sample guides not included)

ea.	26081	
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**Manifold Lid Replacement Parts**

Valves, 12 or 24-port

2-pk.	26083	
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Valve Attachment

48-pk.	26130	
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Needle Attachment

48-pk.	26131	
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Sample Guides, 12 or 24-port

12-pk.	26084	
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\*Not included in 24-port manifold (cat.# 26080 or 26082).

**Oil-Free Vacuum/Pressure Station for 12-Port Resprep™ SPE Systems**

Allows switching from pressure to vacuum in a matter of seconds. Quiet, oil-free unit won't contaminate the extraction system or your samples. Provides 20" Hg (68kPa) vacuum or 18psi (124kPa) pressure.

**Description**

Oil-Free Vacuum/Pressure Station, 115VAC, 60Hz, US

qty.	cat.#	price
ea.	24002	

Oil-Free Vacuum/Pressure Station, 230VAC, 50Hz, Europe

ea.	24003	
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Vacuum Tubing (10ft./3m, 1/4" ID)

ea.	24016	
-----	-------	--

Not recommended for use with 24-port manifold.



### Syringe Filters with Luer Lock Inlet

- Variety of filter types, porosities, and diameters.
- Color coded for easy identification.
- Polypropylene housing.
- Reusable storage container.
- Quantity break pricing, for greater savings.

Excellent syringe filters—  
great prices!

Price per 100-pack

Size	Porosity	Color	qty.	cat.#	1-4 packs	5-9 packs	10 or more packs
<b>Cellulose Acetate</b>							
13mm	0.22µm	green	100-pk.	26156	/pk.	/pk.	/pk.
13mm	0.45µm	blue	100-pk.	26155	/pk.	/pk.	/pk.
25mm	0.22µm	green	100-pk.	26158	/pk.	/pk.	/pk.
25mm	0.45µm	blue	100-pk.	26157	/pk.	/pk.	/pk.
<b>Nylon</b>							
13mm	0.22µm	yellow	100-pk.	26146	/pk.	/pk.	/pk.
13mm	0.45µm	pink	100-pk.	26147	/pk.	/pk.	/pk.
25mm	0.22µm	yellow	100-pk.	26148	/pk.	/pk.	/pk.
25mm	0.45µm	pink	100-pk.	26149	/pk.	/pk.	/pk.
<b>PTFE (polytetrafluoroethylene)</b>							
13mm	0.22µm	purple	100-pk.	26142	/pk.	/pk.	/pk.
13mm	0.45µm	orange	100-pk.	26143	/pk.	/pk.	/pk.
25mm	0.22µm	purple	100-pk.	26144	/pk.	/pk.	/pk.
25mm	0.45µm	orange	100-pk.	26145	/pk.	/pk.	/pk.
<b>PVDF (polyvinylidene difluoride)</b>							
13mm	0.22µm	brown	100-pk.	26150	/pk.	/pk.	/pk.
13mm	0.45µm	red	100-pk.	26151	/pk.	/pk.	/pk.
25mm	0.22µm	brown	100-pk.	26152	/pk.	/pk.	/pk.
25mm	0.45µm	red	100-pk.	26153	/pk.	/pk.	/pk.

Cellulose Acetate, Nylon, PVDF - hydrophilic applications

PTFE - hydrophobic applications, resistant to acids and bases, used mostly with nonaqueous samples

### Resprep™ SPE Tube Parts & Accessories

<b>Empty Tubes (polypropylene)</b>		<b>Volume</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
		1mL	50-pk.	26010	
		3mL	50-pk.	26011	
		6mL	50-pk.	26012	
		15mL	50-pk.	26013	
		sample reservoir, 25mL	12-pk.	26014	
		sample reservoir, 70mL	12-pk.	26015	
<b>Frits (polyethylene), 20µm</b>		<b>Fits Tube Volume, Diameter</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
		1mL, 6mm	100-pk.	26016	
		3mL, 9mm	100-pk.	26017	
		6mL, 1.2cm	100-pk.	26018	
		15mL, 1.6cm	100-pk.	26019	
		25mL, 2.0cm*	100-pk.	26020	
		70mL, 2.6cm**	100-pk.	26021	
<b>Tube Caps</b>		<b>Fits Tube Volume</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
		1mL	12-pk.	26001	
		3mL	12-pk.	26002	
		6mL	12-pk.	26003	
		15mL	12-pk.	26004	
		25mL*	12-pk.	26005	
		70mL**	12-pk.	26006	
<b>Female Luer End Caps</b>		<b>Fits Tube Volume</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
		universal	12-pk.	26000	
<b>Connectors</b>		<b>Fits Tube Volume</b>	<b>qty.</b>	<b>cat.#</b>	<b>price</b>
		1, 3, 6mL	12-pk.	26007	
		25mL*	12-pk.	26008	
		70mL**	12-pk.	26009	

\*For 20mL packed tubes.

\*\*For 60mL packed tubes.

did you **know**?

You can elute an SPE tube manually with our connectors and NORM-JECT® syringes (see page 289).



**free**  
literature

For a helpful membrane selection guide, download **lit. cat.# GNFF1072** from [www.restek.com](http://www.restek.com).



Free sample packs of syringe filters are available by adding -248 to the catalog number when you call to place your order.







26166



26180



Accelerated solvent extraction has become a common technique for fast and reliable extraction of organic materials from solid matrices, using EPA SW-846 Method 3545, Pressurized Fluid Extraction (PFE). Restek offers a wide range of replacement parts to keep your extraction system running smoothly. All parts are economically priced to save you money and are designed to meet or exceed the performance of the original manufacturer's parts.

For handy tools designed for use with ASE® systems, see page 367. For diatomaceous earth and sodium sulfate, see page 360.

## Replacement Parts for ASE® 200 Systems, Manufacturer's Design

### Extraction Cell Parts for ASE® 200 Systems

- Choose original equipment-equivalent stainless steel, or Siltek® deactivation for improved inertness.
- Inner surfaces polished, for easier cleaning.
- Caps include frit, washer, PTFE O-ring, and threaded insert.

Description	Similar to Dionex part #	qty.	Stainless Steel		Siltek Treated	
			cat.#	price	cat.#	price
Extraction Cell Body for ASE 200, 1mL	054973	ea.	26110		ea.	26111
Extraction Cell Body for ASE 200, 5mL	054974	ea.	26112		ea.	26113
Extraction Cell Body for ASE 200, 11mL	048820	ea.	26114		ea.	26115
Extraction Cell Body for ASE 200, 22mL	048821	ea.	26098		ea.	26099
Extraction Cell Body for ASE 200, 33mL	048822	ea.	26116		ea.	26117
Replacement Extraction Cell End Caps for ASE 200	049450	2-pk.	26096		2-pk.	26097
Cap Inserts for ASE 200		2-pk.	26166			
Replacement Frits for ASE 200	049453	10-pk.	26100		10-pk.	26101

Description	Similar to Dionex part #	qty.	Stainless Steel		Siltek Treated	
			cat.#	price	cat.#	price
Snap Rings for Caps for ASE 200	049456	10-pk.	26184			
Funnel for ASE 200	056958	ea.	26180			
PTFE O-Rings for ASE 200 & ASE 300 Caps	049457	100-pk.	26187			
Viton O-Rings for ASE 200 & ASE 300 Caps	056325	50-pk.	26188			

### PEEK™ Washers for ASE® 200 Systems

- Meet original equipment manufacturer's performance.
- Available in 4 quantities.

Description	Similar to Dionex part #	qty.	cat.#	price
PEEK Washers for ASE 200	049454	12-pk.	25256	
		48-pk.	25257	
		250-pk.	26120	
		1,000-pk.	26229	

**NEW!**

### 20mm Filters for ASE® 200 Extraction Cells

- Cellulose or glass fiber construction.
- Cellulose filters available in economical 1,000-packs.

Description	Similar to Dionex part #	qty.	cat.#	price
Cellulose Filters for ASE 200	049458	100-pk.	26118	
Cellulose Filters for ASE 200	049458	1,000-pk.	26190	
Glass Fiber Filters for ASE 200	047017	100-pk.	26119	



### 60mL Sample Collection Vials for ASE® 200 Systems

- Cleaned, assembled, and ready to use.
- Clear or amber glass.
- Caps and Teflon®-lined septa included.

Description	Similar to Dionex part #	qty.	cat.#	price
60mL Collection Vials, Clear Glass, for ASE 200	048784	72-pk.	26121	
60mL Collection Vials, Amber Glass, for ASE 200	048781	72-pk.	26122	
Replacement Septa for 20, 40 & 60mL Vials and 250mL Bottles (24mm Teflon-lined 0.125" silicone septa)	—	100-pk.	24694	



### Autoseal Tip Assembly for ASE® 200 Systems

- Meets original equipment manufacturer's performance.
- Choose original equipment-equivalent stainless steel, or Siltek® deactivation for improved inertness and extended lifetime.

Description	Similar to Dionex part #	Stainless Steel			Siltek Treated		
		qty.	cat.#	price	qty.	cat.#	price
Autoseal Tip Assembly for ASE 200 Systems	048811	ea.	26162		ea.	26161	



### Valves for ASE® 100/200/300 Systems

- Fits ASE® 100, 200, 300 systems.
- Meets original equipment manufacturer's performance.

Description	Similar to Dionex part #	qty.	cat.#	price
Pressure Relief Valve for ASE 100/200/300 Systems	048889	ea.	26159	
Static Valve for ASE 100/200/300 Systems	048778	ea.	26160	







## Replacement Parts for ASE® 300/100 Systems, Manufacturer's Design

For handy tools designed for use with ASE® systems, see page 367. For diatomaceous earth and sodium sulfate, see page 360.

### Extraction Cell Parts for ASE® 300/100 Systems

- Choose original equipment-equivalent stainless steel, or Siltek® deactivation for improved inertness.
- Inner surfaces polished, for easier cleaning.
- Caps include frit, washer, PTFE O-ring, and threaded insert.

Description	Similar to		Stainless Steel		Siltek Treated		
	Dionex part #	qty.	cat. #	price	qty.	cat. #	price
Extraction Cell Body for ASE 100, 10mL	059793	ea.	26172		ea.	26173	
Extraction Cell Body for ASE 300/100, 34mL	056646	ea.	26176		ea.	26177	
Extraction Cell Body for ASE 300/100, 66mL	056696	ea.	26178		ea.	26179	
Extraction Cell Body for ASE 300/100, 100mL	056693	ea.	26132		ea.	26133	
Replacement Extraction Cell End Caps for ASE 300	056921	2-pk.	26170		2-pk.	26171	
Cap Inserts for ASE 300		2-pk.	26167				
Replacement Frits for ASE 300/100		6-pk.	26174		6-pk.	26175	

Description	Similar to		Stainless Steel		Siltek Treated		
	Dionex part #	qty.	cat. #	price	qty.	cat. #	price
Snap Rings for Caps for ASE 300/100	056778	12-pk.	26134				
Funnel for ASE 300/100	056699	ea.	26169				
PTFE O-Rings for ASE 200 & ASE 300 Caps	049457	100-pk.	26187				
Viton O-Rings for ASE 200 & ASE 300 Caps	056325	50-pk.	26188				

### PEEK™ Washers for ASE® 300/100 Systems

- Meet original equipment manufacturer's performance.
- Available in 2 quantities.

Description	Similar to Dionex part #	12-pk.	48-pk.
PEEK Washers for ASE 300/100	061687	25393	25394

### 30mm Filters for ASE® 300/100 Extraction Cells

- Cellulose or glass fiber construction.

Description	Similar to Dionex part #	qty.	cat. #	price
Cellulose Filters for ASE 300/100	056780	100-pk.	26168	
Glass Filters for ASE 300/100	056781	100-pk.	26189	



### 250mL Sample Collection Bottles for ASE® 300/100 Systems

- Cleaned, assembled, and ready to use.
- Clear glass.
- Caps and Teflon®-lined septa included.

Description	Similar to Dionex part #	qty.	cat. #	price
250mL Collection Bottles, Clear Glass, for ASE 300/100	056284	12-pk.	26191	
Replacement Septa for 20, 40 & 60mL Vials and 250mL Bottles (24mm Teflon-lined 0.125" silicone septa)	—	100-pk.	24694	





## Resprep™ Tools for ASE® Systems

- Specialized tools that simplify routine chores.
- Use with ASE® 100, ASE® 200, or ASE® 300 systems.

### 2-in-1 Filter/O-Ring Insertion Tool Kit for ASE® 100/200/300

Inserting a Filter (ASE® 100/200/300 systems)

Using Filter Insertion Attachments on Resprep™ Tool Handle.



Screw the appropriate size attachment onto the end of the Resprep™ Tool Handle.



Place a filter at the top of the extraction cell.



Push the filter to the bottom of the extraction cell.



26181

Inserting an O-Ring (ASE® 100/200/300 systems)

Using Resprep™ Tool Handle.



Place the O-ring over the tip of the tool.



Insert the tool into the center hole of the extraction cell cap.



Press the tool firmly inside the cap until the O-ring snaps into place.



26182



26183

Description	qty.	cat.#	price
2-in-1 Filter/O-Ring Insertion Tool Kit for ASE 100/200/300 (includes Resprep Tool Handle and Filter Insertion Attachments)	kit	26181	
Resprep Tool Handle for ASE 100/200/300	ea.	26182	
Filter Insertion Attachments for ASE 100/200/300 (1mL, 5mL, 11mL, 33mL)	4-piece set	26183	

### Retaining Ring Pliers for ASE® 100/200/300 Systems

- Can be used for internal or external retaining rings.
- Works to remove retaining ring in all ASE® cell caps.

Description	qty.	cat.#	price
Retaining Ring Pliers for ASE 100/200/300 Systems	ea.	26185	



26185