

HPLC Columns

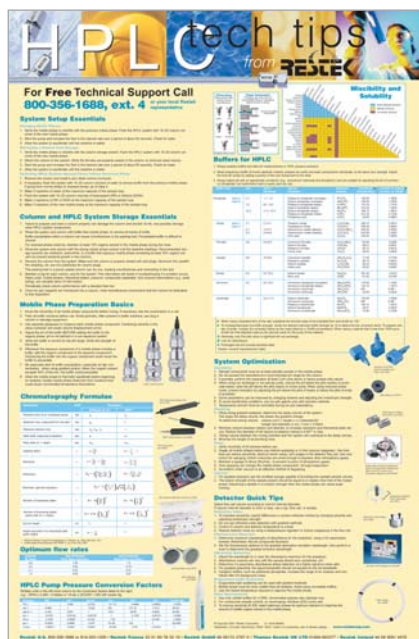
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ordering note

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.

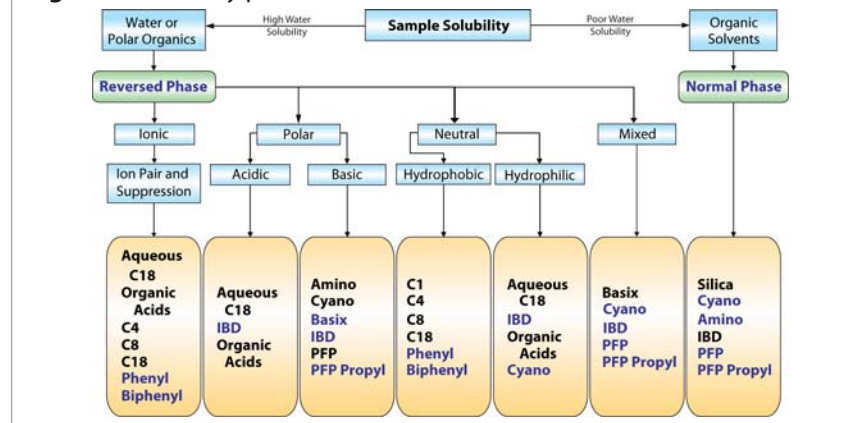
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lit. cat.# 59894A

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).

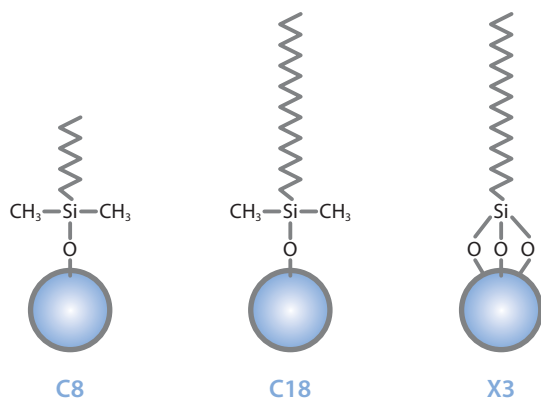
Retention capacity is another important consideration and is influenced by surface area and carbon load (% carbon in the packing material). Allure® columns were designed for maximum retention using a high density of ligands bonded to a large surface area silica. Ultra, Pinnacle® II and Pinnacle® DB columns 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.

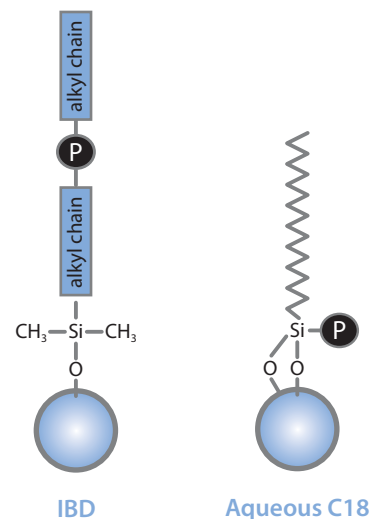
ID (mm)	5µm Particles		3µm Particles	
	Optimum Flow Rate (mL/min.)		Optimum Flow Rate (mL/min.)	
4.6	1.00		1.5	
3.2	0.50		0.73	
2.1	0.20		0.31	
1.0	0.05		0.07	

Figure 2 Stationary phase comparison.



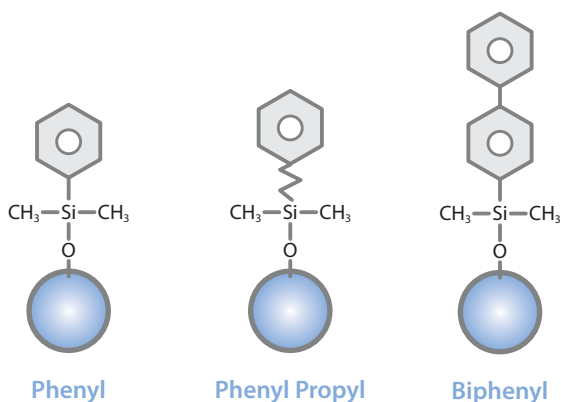
Alkyl phases (e.g. C18)

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



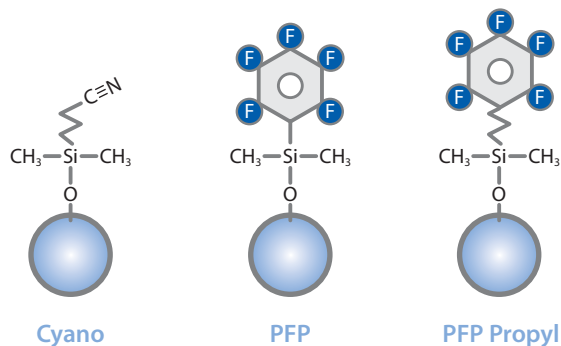
Modified Alkyl Phases

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.



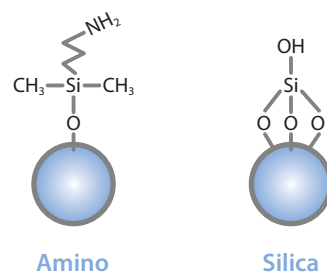
Phenyl & Biphenyl phases

Phenyl stationary phases interact with compounds containing aromatic groups or unsaturated bonds through π - π 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.



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 column	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 column	—	305
Specifically designed to resolve complex mixtures of polycyclic aromatic hydrocarbons.	unique column	—	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 column	—	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 column	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 column	L1	311
Highly retentive, highly selective phase, developed specifically for the analysis of aldehydes and ketones as DNPH derivatives.	unique column	—	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 column	—	312
High purity, highly retentive phase for aromatic and unsaturated compounds.	unique column	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

L1	Octadecyl silane chemically bonded to porous silica or ceramic microparticles, 1.7 to 10 μ m 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>
L3	Porous silica particles, 5 to 10 μ m 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>
L7	Octylsilane chemically bonded to totally porous silica particles, 1.7 to 10 μ m in diameter. <i>Pinnacle DB C8 (p. 301), Pinnacle II C8 (p. 307), Ultra C8 (p. 314), Viva C8 (p. 321)</i>
L8	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 3 to 10 μ m in diameter. <i>Pinnacle II Amino (p. 308), Ultra Amino (p. 318)</i>
L10	Nitrile groups chemically bonded to porous silica particles, 3 to 10 μ m in diameter. <i>Pinnacle DB Cyano (p. 302), Pinnacle II Cyano (p. 307), Allure Basix (p. 310), Ultra Cyano (p. 317)</i>
L11	Phenyl groups chemically bonded to porous silica particles, 1.7 to 10 μ m 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>
L13	Trimethylsilane chemically bonded to porous silica particles, 3 to 10 μ m in diameter. <i>Ultra C1 (p. 316)</i>
L26	Butyl silane chemically bonded to totally porous silica particles, 3 to 10 μ m in diameter. <i>Ultra C4 (p.316), Viva C4 (p.322)</i>
L43	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10 μ m 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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Silica manufactured by Restek. Greatest large-pore surface ratio in the market.

Similar Phases

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

Platinum Phenyl, Supelcosil Phenyl, Betasil Phenyl

Platinum Amino, Develosil NH2

Fluophase PFP, Fluosep-RP Phenyl, Curosil PFP

—

unique **column**

unique **column**

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

The chart provides a comprehensive overview of Restek's HPLC columns, categorized by stationary phase (e.g., C18, C8, C4, Cyano, Phenyl, Amino, PFP) and silica type (e.g., BioBasic, Synchropak, Jupiter). It includes columns for USP codes and page numbers, matching the table above. The chart also features a flowchart for stationary phase selection and images of HPLC columns.

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

RESTEK Chromatography Products

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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

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

1.9µm Pinnacle® DB UHPLC Columns

Physical Characteristics:

particle size: $1.9\mu\text{m}$
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
Pinnacle DB C18 $1.9\mu\text{m}$ Columns		
30mm	9414232	
50mm	9414252	
100mm	9414212	
Pinnacle DB Silica $1.9\mu\text{m}$ Columns		
30mm	9410232	
50mm	9410252	
100mm	9410212	
Pinnacle DB PFP Propyl $1.9\mu\text{m}$ Columns		
30mm	9419232	
50mm	9419252	
100mm	9419212	
Pinnacle DB Biphenyl $1.9\mu\text{m}$ Columns		
30mm	9409232	
50mm	9409252	
100mm	9409212	
Pinnacle DB Aqueous C18 $1.9\mu\text{m}$ Columns		
30mm	9418232	
50mm	9418252	
100mm	9418212	
NEW!	Pinnacle DB IBD $1.9\mu\text{m}$ Columns	
	30mm	9425232
	50mm	9425252
	100mm	9425212
Pinnacle DB Cyano $1.9\mu\text{m}$ Columns		
	30mm	9416232
	50mm	9416252
	100mm	9416212
NEW!	Pinnacle DB C8 $1.9\mu\text{m}$ Columns	
	30mm	9413232
	50mm	9413252
	100mm	9413212
NEW!	Pinnacle DB PAH $1.9\mu\text{m}$ Columns	
	30mm	9470232
	50mm	9470252
	100mm	9470212
NEW!	Pinnacle DB X3 C18 $1.9\mu\text{m}$ Columns	
	30mm	9424232
	50mm	9424252
	100mm	9424212



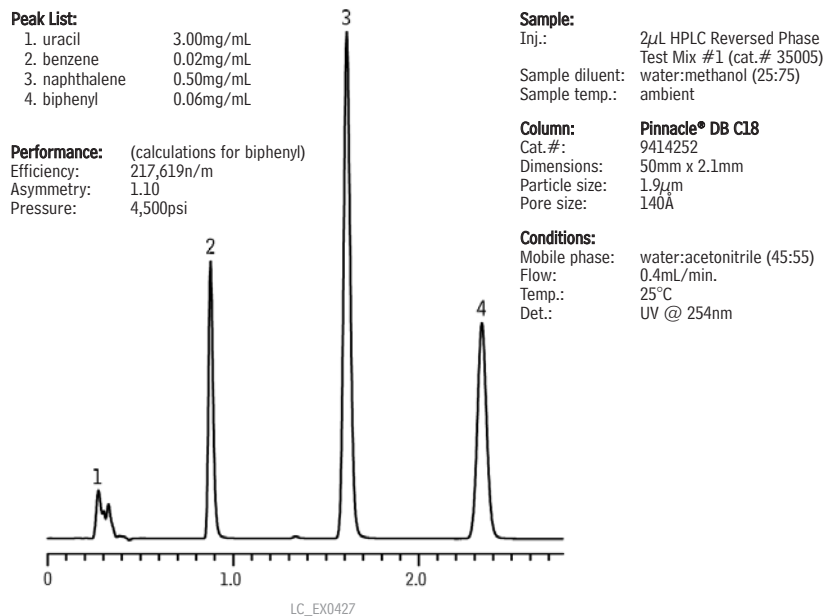
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Optimize Selectivity & Efficiency in UHPLC Separations

Download your free copy from www.restek.com.

Applications Note
lit. cat.# 580202

Figure 1 Excellent peak symmetry and efficiency on a 1.9µm 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

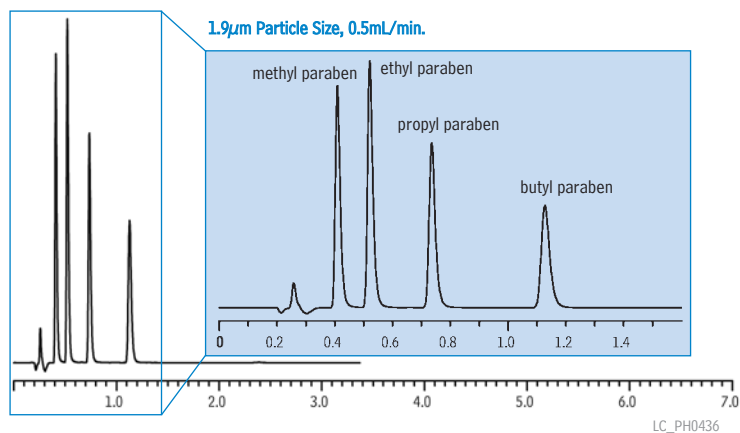
Online: www.restek.com—24-hours a day

Outside the U.S.

Contact your Restek representative:

Refer to our list on pages 4-5 or visit our website at www.restek.com

Figure 2 Parabens on a 1.9µm Pinnacle® DB C18 column.

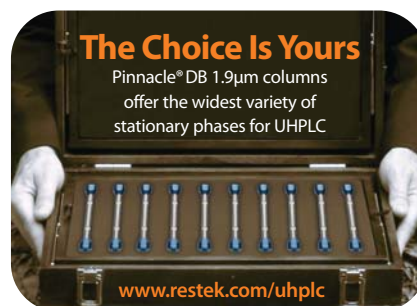


Peak List:
1. methyl paraben
2. ethyl paraben
3. propyl paraben
4. butyl paraben

Column: Pinnacle® DB C18
Cat.#: 9414252
Dimensions: 50mm x 2.1mm
Particle size: 1.9µm
Pore size: 140Å

Sample:
Inj.: 2µL
Conc.: ~ 100µg/mL each component
Sample diluent: mobile phase

Conditions:
Mobile phase: 0.1% acetic acid: acetonitrile (50:50)
isocratic
Flow: 0.5mL/min.
Temp.: ambient
Det.: UV @ 254nm





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

Viva C18:

particle size: 3 μ m, 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
Allure Basix 3μm Capillary Columns		
50mm	916135B	
150mm	916136B	
Allure Biphenyl 3μm Capillary Columns		
50mm	916635B	
150mm	916636B	
Allure PFP Propyl 3μm Capillary Columns		
50mm	916935B	
150mm	916936B	
Ultra Aqueous C18 3μm Capillary Columns		
50mm	917835B	
150mm	917836B	
Ultra C18 3μm Capillary Columns		
50mm	917435B	
150mm	917436B	
Viva C18 3μm Capillary Columns		
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 endcap: yes
pore size: 140Å pH range: 2.5 to 10
carbon load: 11% temperature limit: 80°C



Chromatographic Properties:

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

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
1.9µm Columns								
30mm			9414232					
50mm			9414252					
100mm			9414212					
3µm Columns								
30mm	9414331		9414332		9414333		9414335	
50mm	9414351		9414352		9414353		9414355	
100mm	9414311		9414312		9414313		9414315	
5µm Columns								
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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Parabens	511
Vanilla Bean Extract	515
Xanthines	532

looking for more chromatograms?

Visit www.restek.com.

Pinnacle® DB C8 Columns (USP L7)

Physical Characteristics:

particle size: 1.9µm, 3µm, or 5µm, spherical endcap: yes
pore size: 140Å pH range: 2.5 to 10
carbon load: 6% temperature limit: 80°C



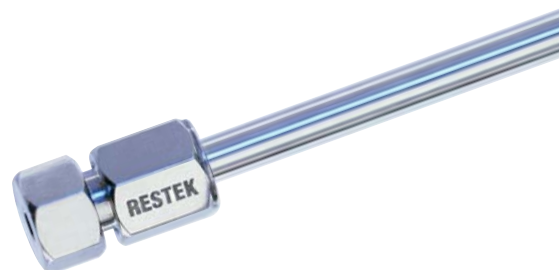
Chromatographic Properties:

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

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
1.9µm Columns								
30mm			9413232					
50mm			9413252					
100mm			9413212					
3µm Columns								
30mm	9413331		9413332		9413333		9413335	
50mm	9413351		9413352		9413353		9413355	
100mm	9413311		9413312		9413313		9413315	
5µm Columns								
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.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
1.9µm Columns								
30mm			9416232					
50mm			9416252					
100mm			9416212					
5µm Columns								
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.



Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
5µm Columns								
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 endcap: yes
pore size: 140Å pH range: 2.5 to 7.5
carbon load: 6% 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
1.9µm Columns								
30mm			9419232					
50mm			9419252					
100mm			9419212					
3µm Columns								
30mm	9419331		9419332		9419333		9419335	
50mm	9419351		9419352		9419353		9419355	
100mm	9419311		9419312		9419313		9419315	
150mm	9419361		9419362		9419363		9419365	
5µm Columns								
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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Benzodiazepines	497

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 endcap: yes
pore size: 140Å pH range: 2.5 to 7.5
carbon load: 8% 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
1.9µm Columns								
30mm			9409232					
50mm			9409252					
100mm			9409212					
3µm Columns								
30mm	9409331		9409332		9409333		9409335	
50mm	9409351		9409352		9409353		9409355	
100mm	9409311		9409312		9409313		9409315	
150mm	9409361		9409362		9409363		9409365	
5µm Columns								
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	



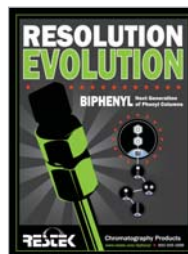
.....	Page #
Antibiotics	525
Steroids	530

free literature

Resolution Evolution: Biphenyl-Next Generation of Phenyl Columns

Download your free copy from 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
1.9µm Columns								
30mm			9418232					
50mm			9418252					
100mm			9418212					
3µm Columns								
30mm	9418331		9418332		9418333		9418335	
50mm	9418351		9418352		9418353		9418355	
100mm	9418311		9418312		9418313		9418315	
150mm	9418361		9418362		9418363		9418365	
5µm Columns								
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
1.9µm Columns								
30mm			9410232					
50mm			9410252					
100mm			9410212					
3µm Columns								
30mm	9410331		9410332		9410333		9410335	
50mm	9410351		9410352		9410353		9410355	
100mm	9410311		9410312		9410313		9410315	
150mm	9410361		9410362		9410363		9410365	
5µm Columns								
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
pore size: 140Å

endcap: yes
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
1.9µm Columns		
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
pore size: 140Å

endcap: yes
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
1.9µm Columns		
30mm	9470232	
50mm	9470252	
100mm	9470212	

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Polycyclic Aromatic Hydrocarbons508, 509

Pinnacle® DB IBD 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:

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
1.9µm Columns		
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:

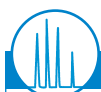
particle size: 3µm or 5µm, spherical
pore size: 110Å
carbon load: 13%

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.



	Page #
Allicin	510
Capsaicinoids	513
Morphine Sulfate	520
Phenolic Antioxidants	510, 513

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
3µm Columns										
30mm	9214331		9214332		9214333		—	—	9214335	
50mm	9214351		9214352		9214353		—	—	9214355	
100mm	9214311		9214312		9214313		—	—	9214315	
5µm Columns										
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

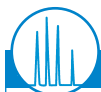
endcap: fully endcapped
pH range: 2.5 to 10
temperature limit: 80°C



Chromatographic Properties:

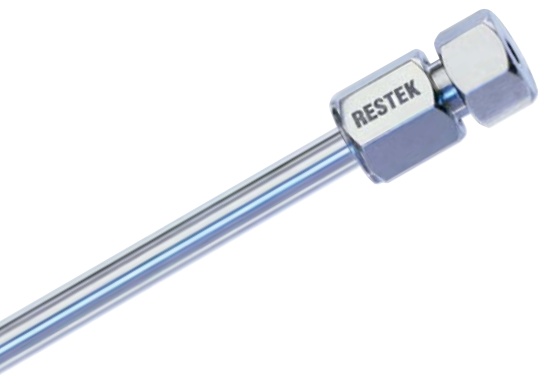
Developed specifically for challenging analyses of polycyclic aromatic hydrocarbons. The Pinnacle® II PAH stationary phase incorporates a proprietary C18 bonding that enables unique shape selectivity to resolve to baseline all 16 PAHs listed in US EPA Method 610. Every lot of Pinnacle® II PAH bonded 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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PAHs	508

Length	2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price
4µm Columns						
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
3µm Columns										
30mm	9213331		9213332		9213333		—	—	9213335	
50mm	9213351		9213352		9213353		—	—	9213355	
100mm	9213311		9213312		9213313		—	—	9213315	
5µm Columns										
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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Parabens	511

looking for more
chromatograms?

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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
3µm Columns								
30mm	9216331		9216332		9216333		9216335	
50mm	9216351		9216352		9216353		9216355	
100mm	9216311		9216312		9216313		9216315	
5µm Columns								
30mm	9216531		9216532		9216533		9216535	
50mm	9216551		9216552		9216553		9216555	
100mm	9216511		9216512		9216513		9216515	
150mm	9216561		9216562		9216563		9216565	
200mm	9216521		9216522		9216523		9216525	
250mm	9216571		9216572		9216573		9216575	



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Corticosteroids	528
Piperine	513

ordering note

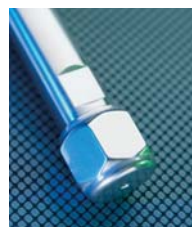
To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

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.



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.



	Page #
Parabens	.511
Sorbic & Benzoic Acids	.513

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

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Pinnacle® II Amino Columns (USP L8)

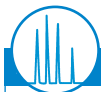
Physical Characteristics:

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.



	Page #
Lactulose Concentrate	.532
Maple Syrup	.515
Sugars	.515

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	cat.#	price	cat.#	price	cat.#	price	cat.#	price
3µm Columns								
30mm	9217331		9217332		9217333		9217335	
50mm	9217351		9217352		9217353		9217355	
100mm	9217311		9217312		9217313		9217315	
5µm Columns								
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	

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	



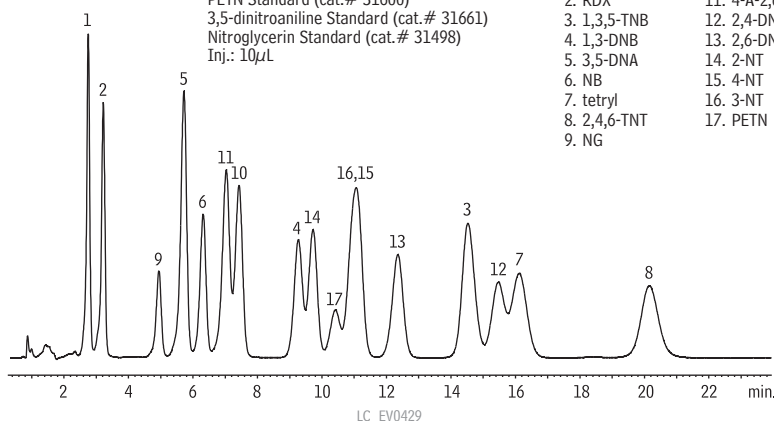
Explosives	Page #
Explosives	501

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

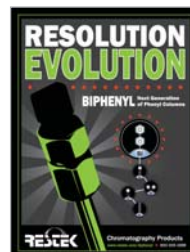
Column: Pinnacle® II Biphenyl
Cat.#: 9209565-700
Dimensions: 150mm x 4.6mm
Particle size: 5µm
Pore size: 110Å
Conditions: Mobile phase: water:methanol (45:55 v/v)
Flow: 1.2mL/min.
Temp.: 30°C
Det.: UV detection @ 210nm

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

- 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 | |



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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.

Length	1.0mm ID		2.1mm ID		3.2mm ID		4.6mm ID	
	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
5µm Columns								
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
5µm Columns								
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
5µm Columns								
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
5µm Columns								
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.



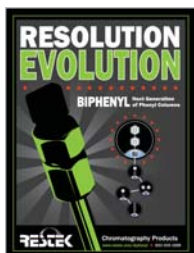
also
available

Prep Columns
See page 324.

Bulk Packing Materials
See page 326.



	Page #
Antibiotics	526
Cannabinoids	496
Corticosteroids	529
NSAIDs	531
Steroids	529



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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
5µm Columns								
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.



	Page #
Carboxylic Acids	514
Fruit Juice Acids	514, 515

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

Note: Other dimensions available on request.

ordering note

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

Nominal additional charge

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

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

For guard cartridges for these columns, see page 329.



Allure® Silica Columns (USP L3)

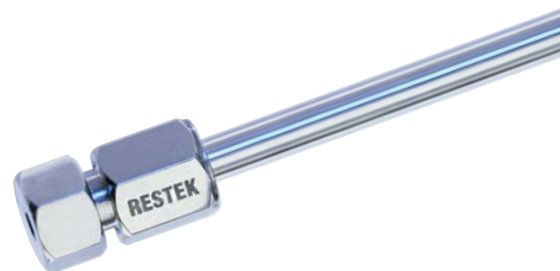
Physical Characteristics:

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
5µm Columns								
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
5µm Columns with Trident Integral Inlet Fittings				
200mm		9159523-700		9159525-700



.....Page #
Carbonyls500

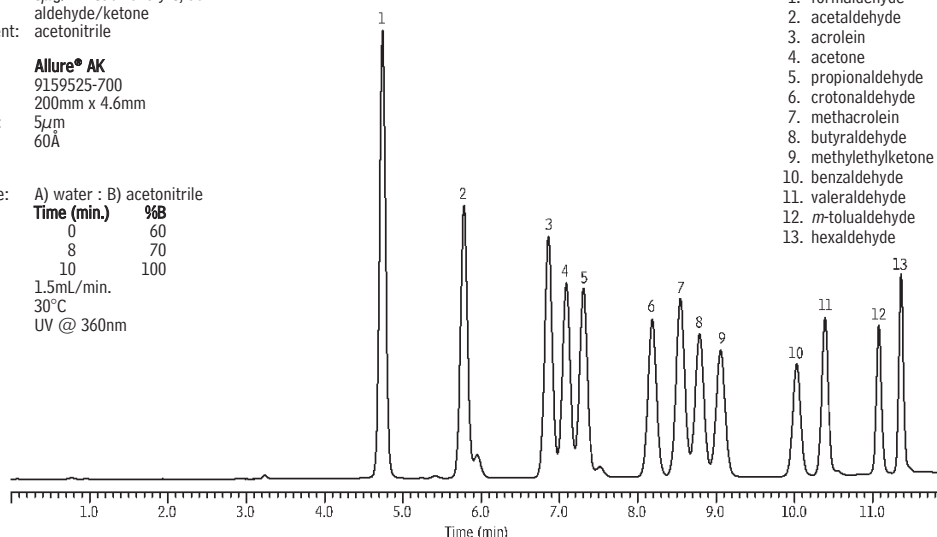
Carbonyls by CARB Method 1004 on an Allure® AK column.

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. methylethylketone	9.06
10. benzaldehyde	10.03
11. valeraldehyde	10.39
12. m-tolualdehyde	11.08
13. hexaldehyde	11.36

LC_EV0393



	Page #
Acetaminophen, Narcotic Analgesics	.519
Aldehydes, Ketones	.500
Beclomethasone	.523
Corticosteroids	.529
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
pore size: 100Å
carbon load: 20%

endcap: fully endcapped
pH range: 2.5 to 7.5
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.

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
3µm Columns										
30mm	9174331		9174332		9174333		—	—	9174335	
50mm	9174351		9174352		9174353		—	—	9174355	
100mm	9174311		9174312		9174313		—	—	9174315	
5µm Columns										
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
pore size: 100Å
carbon load: 12%

endcap: fully endcapped
pH range: 2.5 to 7.5
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.

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
3µm Columns										
30mm	9103331		9103332		9103333		—	—	9103335	
50mm	9103351		9103352		9103353		—	—	9103355	
100mm	9103311		9103312		9103313		—	—	9103315	
5µm Columns										
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
3µm Columns								
30mm	9178331		9178332		9178333		9178335	
50mm	9178351		9178352		9178353		9178355	
100mm	9178311		9178312		9178313		9178315	
5µm Columns								
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
3µm Columns								
30mm	9175331		9175332		9175333		9175335	
50mm	9175351		9175352		9175353		9175355	
100mm	9175311		9175312		9175313		9175315	
5µm Columns								
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
3µm Columns								
30mm	9102331		9102332		9102333		9102335	
50mm	9102351		9102352		9102353		9102355	
100mm	9102311		9102312		9102313		9102315	
5µm Columns								
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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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
3µm Columns								
30mm	9101331		9101332		9101333		9101335	
50mm	9101351		9101352		9101353		9101355	
100mm	9101311		9101312		9101313		9101315	
5µm Columns								
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
3µm Columns								
30mm	9106331		9106332		9106333		9106335	
50mm	9106351		9106352		9106353		9106355	
100mm	9106311		9106312		9106313		9106315	
5µm Columns								
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	



Antiarrhythmics520

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
3µm Columns								
30mm	9105331		9105332		9105333		9105335	
50mm	9105351		9105352		9105353		9105355	
100mm	9105311		9105312		9105313		9105315	
5µm Columns								
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	

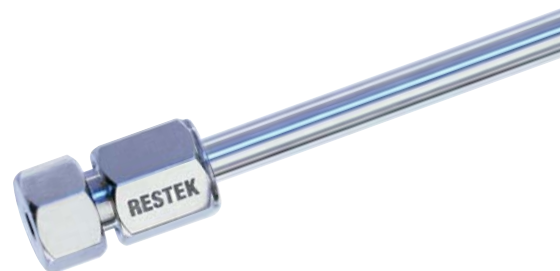


Guaifenesin, Codeine533

also available

HPLC Syringes

See pages 285-289.





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
3µm Columns								
30mm	9107331		9107332		9107333		9107335	
50mm	9107351		9107352		9107353		9107355	
100mm	9107311		9107312		9107313		9107315	
5µm Columns								
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	



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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
3µm Columns								
30mm	9176331		9176332		9176333		9176335	
50mm	9176351		9176352		9176353		9176355	
100mm	9176311		9176312		9176313		9176315	
5µm Columns								
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
3µm Columns								
30mm	9100331		9100332		9100333		9100335	
50mm	9100351		9100352		9100353		9100355	
100mm	9100311		9100312		9100313		9100315	
5µm Columns								
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
3µm Columns										
50mm	9177351		9177352		9177353		9177354		9177355	
100mm	9177311		9177312		9177313		—	—	9177315	
5µm Columns										
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.

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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**.

restek **exclusive!**



Paraquat, Diquat505

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



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Simple, Sensitive HPLC/UV Analysis for Paraquat and Diquat

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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

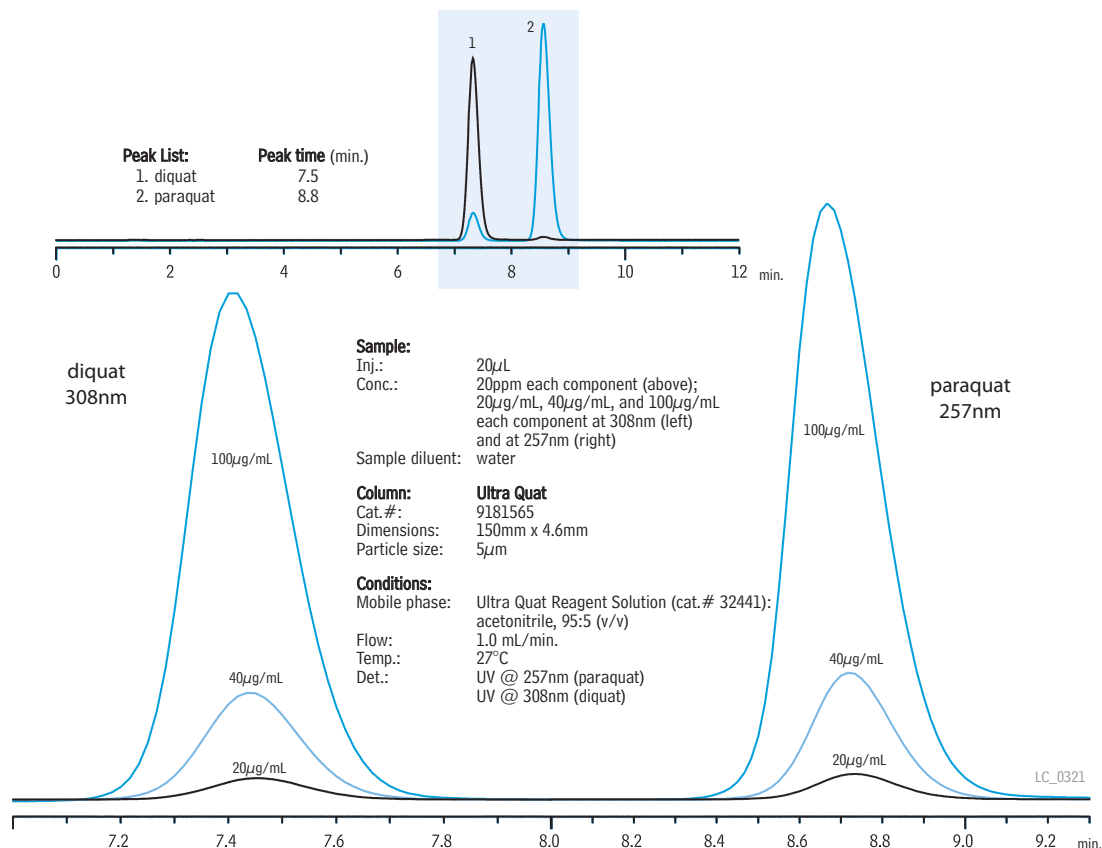
Use with Ultra Quat HPLC column.
Dilute to 1 liter water, per instructions.

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.

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.

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
3µm Columns								
30mm	9514331		9514332		9514333		9514335	
50mm	9514351		9514352		9514353		9514355	
100mm	9514311		9514312		9514313		9514315	
150mm	9514361		9514362		9514363		9514365	
5µm Columns								
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	



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Oxytocin	495
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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
5µm Columns								
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

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

also available

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

ordering note

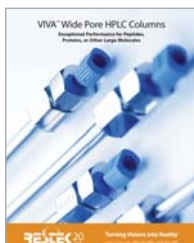
To order a 2.1mm, 3.2mm, or 4.6mm ID column with a Trident Integral Inlet Fitting, add "-700" to the catalog number for the column.

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.



free literature

Viva Wide Pore HPLC Columns

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Flyer
lit. cat.# 59939

Viva C4 Columns (USP L26)

Physical Characteristics:

particle size: 5 μ m, 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
5μm Columns								
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

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

Viva Biphenyl Columns (USP L11)

Physical Characteristics:

particle size: 5 μ m
pore size: 300Å
carbon load: 6.7%

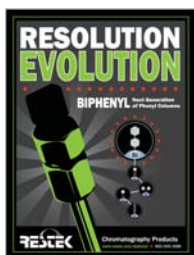
endcap: yes
pH range: 2.5 to 7.5
temperature limit: 80°C

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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
5μm Columns								
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

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Flyer
lit. cat.# GNFL1096

Viva PFP Propyl Columns (USP L43)

Physical Characteristics:

particle size: 5 μ m, 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
5μm Columns								
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: 5 μ m, 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
5μm Columns								
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 3 μ m 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	

3 μ m 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	



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
3µm Pinnacle II Bulk Packing Materials						
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
5µm Pinnacle II Bulk Packing Materials						
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
5µm Pinnacle DB Bulk Packing Materials						
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
5µm Ultra Bulk Packing Materials						
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
Silica Bulk Materials						
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

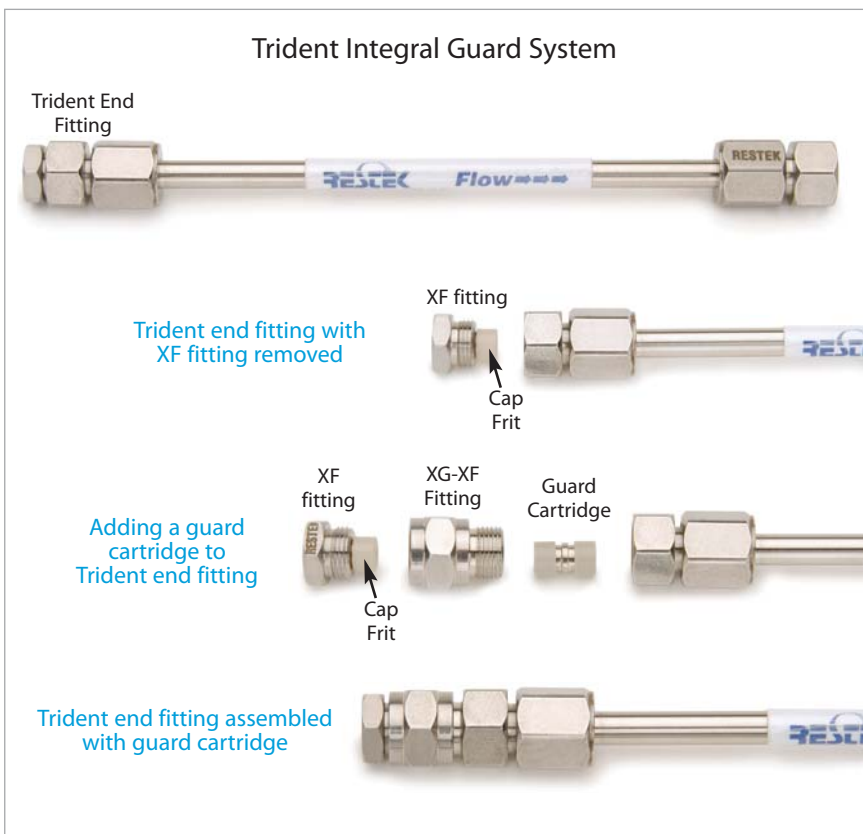
Fax: 814-353-1309—24-hours a day

Online: www.restek.com—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

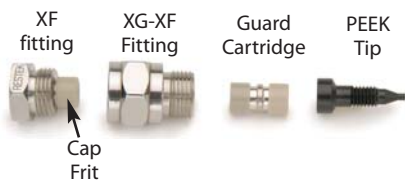
Description	qty.	cat.#	price
XG-XF Fitting for 10mm Guard Cartridge	ea.	25026	
XG-XF Fitting for 20mm Guard Cartridge	ea.	25062	
Replacement XF Filter Fitting	ea.	25024	
Replacement Cap Frits: 4mm, 2.0µm	5-pk.	25022	
Replacement Cap Frits: 4mm, 0.5µm	5-pk.	25023	
Replacement Cap Frits: 2mm, 2.0µm	5-pk.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





Trident Direct 10mm guard cartridge holder with filter

Components



Assembled



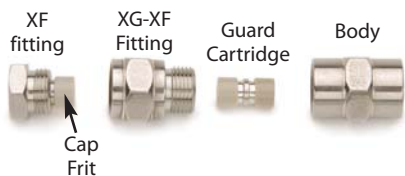
Installed onto column



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



Restek's Learning Network

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