Physical Characteristics of HPLC Columns; USP Descriptions

HPLC COLUMNS

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Restek HPLC Column	End Cap?	Pore Size (Å)	Carbon load (%)	Applications	Chromatographic Properties	Similar Phases	USP Code	Page #
Ultra PFP	Y	100	7	Ideal for taxol and precursors, or halogenated compounds, amines, esters, or ketones.	A pentafluorophenyl phase. Unique selectivity by interaction with functional groups of organohalogens or other basic analytes.	Fluophase® PFP, Fluosep®-RP Phenyl, Curosil® PFP	L43	326
Ultra Silica	—	100	—	Ideal for normal phase applications.	High purity, high surface area.	—	L3	327
Ultra Carbamate	—	100	—	Rapid analysis of carbamates.	Proprietary stationary phase can process up to twice as many samples per hour, compared to a conventional C18 phase.	Unique	—	327
Ultra Quat	—	100	—	Proprietary phase for the analysis of paraquat and diquat and other quaternary amines.	High purity silica.	Unique	—	328
Kromasil® C18	Y	100	20	A good all-purpose C18 phase for a wide range of water-soluble compounds.	High purity phase with excellent peak shape for a wide range of compounds. Good general pupose reversed phase column.	Discovery® C18, Symmetry® C18, Hypersil® Gold C18, Luna® C18, Zorbax® C18, LiChrospher RP®-18, Inertsil® ODS-2, Develosil® C18	L1	332
Kromasil® C8	Y	100	12	Selectivity similar to Kromasil® C18, but less hydrophobic retention.	High purity, reversed phase packing for a wide range of compounds.	Luna® C8, Symmetry® C8, Hypersil® Gold C8	L7	333
Kromasil® C4	Y	100	8	Selectivity similar to Kromasil® C18, but less hydrophobic retention.	High purity, reversed phase packing for a wide range of compounds. Less retentive than C18 and C8.	Supelcosil™ Butyl (C4), Delta-Pak™ C4	L26	332
Kromasil® C1	Y	100	—	Alternate selectivity to alkyl phases, especially for polar analytes.	High purity, reversed phase packing for a wide range of compounds. Less retentive than C18, C8, and C4.	Spherisorb® C1	L13	333
Kromasil® Phenyl	Y	100	14	Ideal for aromatic compounds, PAHs, and purines/pyrimidines.	High purity, base deactivated reversed phase packing. Alternate selectivity to alkyl phases.	Platinum™ Phenyl, Supelcosil™ Phenyl, Betasil® Phenyl	L11	333
Kromasil® Amino	Y	100	1.7% nitrogen	Excellent choice for carbohydrate analysis.	High purity, base deactivated reversed phase packing. Alternate selectivity to alkyl phases.	Platinum™ Amino, Develosil® NH2	L8	333
Kromasil® Silica	—	100	—	Good choice for normal phase applications.	High purity, base deactivated packing.	—	L3	333
Viva Wide Pore C18	Y	300	9	Proteins and other higher molecular weight compounds.	Silica manufactured by Restek.	BioBasic® 18, Symmetry® 300 C18, Jupiter® 300 C18, Zorbax® 300 OSB C18, Synchropak® C18, 208 TP C18	L1	329
Viva Wide Pore C8	Y	300	5	Proteins and other higher molecular weight compounds. Less retentive than C18 phase.	Silica manufactured by Restek.	BioBasic® 8, Zorbax® 300 OSB C8, Synchropak® C8, 208 TP C8	L7	329
Viva Wide Pore C4	Y	300	3.5	Proteins and other higher molecular weight compounds. Less retentive than C18 and C8 phases.	Silica manufactured by Restek.	BioBasic® 4, Symmetry® 300 C4, Jupiter® 300 C4, Synchropak® C4, 208 TP C4	L26	330
Viva Wide Pore Biphenyl	Y	300	6.7	Exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays.	Silica manufactured by Restek.	Unique	L11	330
Viva Wide Pore PFP Propyl	Y	300	5	Exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.	Silica manufactured by Restek.	Unique	L43	330
Viva Wide Pore Silica	—	300	—	Normal phase applications for highly retained high molecular weight compounds.	Silica manufactured by Restek.	—	L3	331
pHidelity® C18	—	140	—	Hydrophobic C18 phase suitable for analyzing a wide range of compounds; enhanced stability under basic and acidic conditions.	Excellent stability under extreme pH conditions. True C18 selectivity in a silica-based stationary phase.	Unique	—	308

pH ranges and temperature limits: see product listings on pages listed here.
Column lifetime will be shorter when operating at pH and/or temperature extremes.

US Pharmacopoeia Cross Reference

L1	Octadecyl silane chemically bonded to porous silica or ceramic microparticles, 1.7 to 10µm in diameter, or a monolithic rod. *Pinnacle™ DB C18 (p. 310), Pinnacle™ DB Aqueous C18 (p. 313), Pinnacle™ II C18 (p. 314), Allure® C18 (p. 318), Allure® Aqueous C18 (p. 319), Ultra C18 (p. 322), Ultra Aqueous C18 (p. 323), Viva C18 (p. 329), Kromasil® C18 (p. 332)*
L3	Porous silica particles, 5 to 10µm in diameter. *Pinnacle™ DB Silica (p. 313), Pinnacle™ II Silica (p. 317), Allure® Silica (p. 321), Ultra Silica (p. 327), Viva Silica (p. 331), Kromasil® Silica (p. 333)*
L7	Octylsilane chemically bonded to totally porous silica particles, 1.7 to 10µm in diameter. *Pinnacle™ DB C8 (p. 310), Pinnacle™ II C8 (p. 315), Ultra C8 (p. 322), Viva C8 (p. 329), Kromasil® C8 (p. 333)*
L8	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 3 to 10µm in diameter. *Pinnacle™ II Amino (p. 316), Ultra Amino (p. 326), Kromasil® Amino (p. 333)*
L10	Nitrile groups chemically bonded to porous silica particles, 3 to 10µm in diameter. *Pinnacle™ DB Cyano (p. 311), Pinnacle™ II Cyano (p. 315), Allure® Basix (p. 318), Ultra Cyano (p. 325)*
L11	Phenyl groups chemically bonded to porous silica particles, 1.7 to 10µm in diameter. *Pinnacle™ DB Phenyl (p. 311), Pinnacle™ DB Biphenyl (p. 312), Pinnacle™ II Phenyl (p. 316), Pinnacle™ II Biphenyl (p. 317), Allure® Biphenyl (p. 320), Ultra Phenyl (p. 325), Viva Biphenyl (p. 330), Kromasil® Phenyl (p. 333)*
L13	Trimethylsilane chemically bonded to porous silica particles, 3 to 10µm in diameter. *Ultra C1 (p. 324), Kromasil® C1 (p. 333)*
L26	Butyl silane chemically bonded to totally porous silica particles, 3 to 10µm in diameter. *Ultra C4 (p.324), Viva C4 (p.330), Kromasil® C4 (p.332)*
L43	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10µm in diameter. *Pinnacle™ DB PFP Propyl (p. 312), Allure® PFP Propyl (p. 319), Ultra PFP (p. 326), Viva PFP Propyl (p. 330)*

tech tip

Managing High Backpressure

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

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

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

free literature

HPLC Column Selection Guide

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

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

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