LC Column Comparison

Physical Characteristics Chart

This chart provides an overview of Restek's full offering of HPLC and UHPLC columns, specialty columns, and large molecule columns. Easily compare column silica specifications, applications, chromatography properties, similar phases, and USP codes.

UHPLC Columns

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m^2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Raptor Biphenyl	Y	90	7	1.8 µm: 125	2.0 to 8.0	Ideal for bioanalytical and forensic toxicology testing applications like therapeutic drug monitoring (TDM); drugs of abuse; and metabolite analyses with UHPLC-MS/MS.	Increased retention for dipolar, unsaturated, or conjugated compounds. Enhanced selectivity when used with methanolic mobile phase vs. ACN. Provides increased peak capacity compared to fully porous particles for increased resolution of complex samples.	Ascentis Express Biphenyl (2.7µm), Kinetex Biphenyl	L11
Raptor ARC-18	N	90	7	1.8 µm: 125	1.0 to 8.0	Recommended for high-throughput UHPLC-MS/MS applications with acidic mobile phases. Ideal for large, multiclass analyte lists, including pesticides, vitamins, peptides, and amino acids.	Well-balanced retention profile emphasizing dispersion and hydrophobic interaction. Sterically protected ligand resists acid hydrolysis to withstand harsh, low-pH mobile phases used in UHPLC-MS/MS.	Ascentis Express Peptide ES-C18; Kinetex XB-C18; Poroshell 120 SB-C18; Accucore Vanquish C18+; Accucore XL C18 (1.5 µm)	L1
Raptor C18	Y	90	9	1.8 µm: 125	2.0 to 8.0	The "go-to" phase for a variety of compound types provides excellent data quality for food safety and quality, environmental, bioanalytical, and other applications.	A traditional, end-capped C18 ideal for general-purpose use in reversed-phase chromatography. Increased retention of hydrophobic compounds provides excellent data quality with methanol and ACN mobile phases.	Accucore Vanquish C18+; Accucore XL C18 (1.5 µm); Ascentis Express C18; Cortecs C18; Halo-2 C18; Kinetex C18; Poroshell 120 EC-C18	L1
Raptor FluoroPhenyl	N	90	4	1.8 µm: 125	2.0 to 8.0	Capable of running in reversed phase or HILIC mode for compounds like vitamin D epimers not well resolved on traditional C18 phases. Ideal for charged bases, such as taxane drugs and other amine-containing compounds.	Electron-withdrawing fluorine atoms provide increased retention for charged bases. Reliable and efficient with acidic mobile phases for increasing selectivity and sensitivity in UHPLC-MS/MS analyses running in reversed-phase or HILIC mode.	Accucore PFP, Ascentis Express F5, Halo 2.7 PFP, Kinetex PFP, Nucleoshell PFP, Poroshell PFP	L43
Force C18	Y	100	20	300	2.0 to 8.0	Highly hydrophobic retention with a pH range of between 2.0 to 8.0. Suitable for the analysis of a wide range of compounds.	Traditional end-capped C18 ideal for general-purpose, reversed-phase use. Scalable from 1.8 µm to 3 µm to 5 µm for predictable method transfer from HPLC to UHPLC.	ACQUITY UPLC HSS C18; Develosil C18 (3 µm and 5 µm); Discovery C18; Hypersil Gold C18; Hypersil Gold Vanquish (1.9 µm); Inertsil ODS-2; Kromasil C18; LiChrospher RP-18; Luna C18; Luna Omega C18 (1.6 µm); Symmetry C18; Syncronis C18 (1.7 µm); Titan C18 (1.9 µm); Zorbax Eclipse Plus C18; Zorbax Eclipse XDB-C18; Zorbax RRHD Eclipse Plus C18 (1.8 µm); Zorbax RRHD Eclipse XDB-C18 (1.8 µm)	L1
Force Biphenyl	Y	100	15	300	2.0 to 8.0	Ideal for bioanalytical testing applications like drug and metabolite analyses. Heightened selectivity and retention for compounds that are hard to resolve or elute early on C18 and other phenyl chemistries.	Increased retention for dipolar, unsaturated, or conjugated compounds. Enhanced selectivity when used with methanolic mobile phase vs. ACN. Provides increased sensitivity and selectivity for LC-MS/MS analyses. Scalable from 1.8 µm to 3 µm to 5 µm for predictable method transfer from HPLC to UHPLC.	Unique	L11

Physical Characteristics Chart

UHPLC Columns *(continued)*

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m^2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Force FluoroPhenyl	N	100	10	300	2.0 to 8.0	Reversed-phase or HILIC applications for a variety of compounds. Ideal for charged bases and other amine-containing compounds like xanthines and nitrofurans.	Electron-withdrawing fluorine atoms provide increased retention for charged bases. Reliable and efficient with acidic mobile phases for increasing selectivity and sensitivity in LC-MS/MS analyses running in reversed-phase or HILIC mode. Scalable from 1.8 µm to 3 µm to 5 µm for predictable method transfer from HPLC to UHPLC.	ACQUITY UPLC HSS PFP; Discovery HS F5; Hypersil Gold PFP; Hypersil Gold Vanquish PFP (1.9 µm); Luna PFP(2); Pursuit PFP; Titan PFP (1.9 µm)	L43
Pinnacle DB C18	Y	140	11	150	2.5 to 8.0	Hydrophobic C18 phase suitable for analyses of a wide range of compounds from acidic through slightly basic.	Highly base-deactivated spherical silica manufactured by Restek Monomeric C18 bonding.	Spherisorb ODS, Zorbax ODS	L1
Pinnacle DB Aqueous C18	N	140	6	150	2.5 to 8.0	Ideal for applications that require highly aqueous mobile phases, such as organic acids and water-soluble vitamins.	Highly selective phase for polar analytes. Compatible with highly aqueous (up to 100%) mobile phases. Silica manufactured by Restek.	AQUA C18, Aquasil C18, Hypersil Gold AQ, YMC ODS-AQ	L1
Pinnacle DB Biphenyl	Y	140	8	150	2.5 to 8.0	Excellent choice for the analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.	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	L11
Pinnacle DB IBD	N	140	Proprietary	150	2.5 to 8.0	A polar group assists in deactivating surface silanols and contributes to unique separation selectivities for acids, bases, zwitterions, and other polar compounds.	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	L68
Pinnacle DB PFP Propyl	Y	140	6	150	2.5 to 8.0	Exhibits excellent peak shapes for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.	Highly base-deactivated spherical silica manufactured by Restek. Unique pentafluorophenyl phase with a propyl spacer.	Discovery HS F5	L43
Pinnacle DB Silica	N/A	140	N/A	150	2.5 to 8.0	Normal phase mode of separation.	Highly base-deactivated spherical silica manufactured by Restek.	Zorbax Silica	L3
Pinnacle DB PAH	N	140	Proprietary	150	2.5 to 8.0	Ideal for polycyclic aromatic hydrocarbons.	Specifically designed to resolve complex mixtures of polycyclic aromatic hydrocarbons.	Unique	—

Physical Characteristics Chart

HPLC Columns

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m^2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Roc C18	Y	100	20	300	2.5 to 8.0	General-purpose HPLC column for a variety of compounds from acidic to slightly basic. Ideal for high-volume workflows using USP or other compendial type methods.	A very retentive, high-purity ODS phase that exhibits excellent peak shape for a wide range of compounds.	Hypersil Gold C18, Luna C18, Reliant C18, Symmetry C18, Zorbax Eclipse C18, Zorbax Eclipse XDB C18	L1
Roc C8	Y	100	12	300	2.5 to 8.0	General-purpose HPLC column for a variety of compounds from acidic to slightly basic. Ideal for high-volume workflows using USP or other compendial-type methods.	The shorter alkyl chain results in less hydrophobic retention and improved basic peak shape over a traditional C18.	Eclipse Plus C8, Hypersil Gold C8, Luna C8, Symmetry C8, Zorbax Eclipse XDB C8	L7
Roc Phenyl-Hexyl	Y	100	15	300	2.5 to 8.0	General-purpose HPLC column ideal for high-volume workflows using USP or other compendial-type methods. Recommended for aromatic analytes and complex samples.	A phenyl ring attached to a 6-carbon chain provides alternate selectivity to straight-chain hydrocarbon phases. Analyte interaction profile includes both dispersion and aromatic polarizability.	Eclipse Plus Phenyl-Hexyl, Hypersil Gold Phenyl, Luna Phenyl-Hexyl, Zorbax Eclipse XDB-Phenyl	L11
Roc Cyano	Y	100	8	300	2.5 to 8.0	Recommended for assays where alternate selectivity or confirmation to a C8 or C18 is desired. Also, an excellent choice for protonated bases. Ideal for high-volume workflows using USP or other compendial-type methods.	Cyanopropyl silane that can be used in normal phase, reversed-phase, or HILIC modes.	Hypersil Cyano, Luna CN, XSelect CN, Zorbax Eclipse XDB-CN	L10
Roc Silica	N/A	100	N/A	300	2.5 to 8.0	Small, nonpolar compounds in normal phase mode, polar compounds, such as water-soluble vitamins, steroids, and organic acids, in HILIC mode.	Base-deactivated for normal phase or HILIC separations.	Hypersil Gold Silica, Luna Silica, Pursuit XRs-Si	L3
Raptor Biphenyl	Y	90	7 (2.7 µm) 5 (5 µm)	2.7 µm: 130, 5 µm: 100	2.0 to 8.0	Ideal for bioanalytical testing applications like drug and metabolite analyses. Heightened selectivity and retention for compounds that are hard to resolve or elute early on C18 and other phenyl chemistries.	Increased retention for dipolar, unsaturated, or conjugated solutes. Enhanced selectivity when used with methanolic mobile phase. Ideal for increasing sensitivity and selectivity in LC-MS analyses.	Ascentis Express; Express Biphenyl; AMT; Halo Biphenyl (2.7 µm); Kinetex Biphenyl; Thermal Accucore Biphenyl (2.6 µm)	L11
Raptor ARC-18	N	90	7 (2.7 µm) 5 (5 µm)	2.7 µm: 130, 5 µm: 100	1.0 to 8.0	Ideal for high-throughput LC-MS/MS applications with minimal sample preparation. Well-balanced retention profile for better detection and integration of large, multiclass analyte lists.	Well-balanced retention profile. Sterically protected and acid-resistant to withstand harsh, low-pH mobile phases. Ideal for use with sensitive detectors like mass spec.	Accucore XL C18, Ascentis Express Peptide ES-C18, Kinetex XB-C18, Poroshell 120 SB-C18	L1
Raptor C18	Y	90	7 (2.7 µm) 5 (5 µm)	2.7 µm: 130, 5 µm: 100	2.0 to 8.0	A traditional, end-capped C18 ideal for general-purpose use in reversed-phase chromatography. pH range (2–8) provides excellent data quality for many applications, matrices, and compounds.	Compatible with moderately acidic to neutral mobile phases (pH 2–8). Excellent data quality in food, environmental, bioanalytical, and other applications.	Accucore C18, Accucore RP-MS, ACE UltraCore Super C18, Ascentis Express C18, Cortecs C18, Halo 2.7 C18, Kinetex C18, Nucleoshell RP 18, Poroshell EC-C18, Sunshell C18	L1
Raptor C8	Y	90	4.6	130	2.0 to 8.0	Recommended when less retention for nonpolar analytes compared to C18 is needed.	Conventional monomeric octylsilane column offering a shorter alkyl chain to provide less hydrophobic retention and improved basic peak shape over a traditional C18 phase.	Agilent InfinityLab Poroshell, 120 SB-C8, Phenomenex Kinetex C8, Thermo Fisher Scientific Accucore C8, Waters CORTECS C8	L7
Raptor FluoroPhenyl	N	90	4 (2.7 µm) 3 (5 µm)	2.7 µm: 130, 5 µm: 100	2.0 to 8.0	HILIC applications and compounds like vitamin D epimers not well resolved on traditional C18 phases. Ideal for charged bases, such as taxane drugs and other amine-containing compounds.	Electron-withdrawing fluorine atoms provide increased retention for charged bases. Reliable and efficient with acidic mobile phases for increasing selectivity and sensitivity in LCMS/MS analyses.	Accucore PFP, Ascentis Express F5, Halo 2.7 PFP, Kinetex PFP, Nucleoshell PFP, Poroshell PFP	L43

Physical Characteristics Chart

HPLC Columns *(continued)*

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m^2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Raptor HILIC-Si	N/A	90	N/A	130	1.0 to 8.0	Ideal for small polar compounds, especially nitrogen-containing, which are protonated under high organic conditions. Recommended for the analysis of paraquat and diquat.	Retention of small polar molecules without ion-pairing reagents.	Accucore HILIC, Ascentis Express HILIC, Cortecs HILIC, Halo HILIC, Kinetex HILIC, Poroshell 120 HILIC	L3
Raptor Polar X	Proprietary	90	Proprietary	130	2.0 to 8.0	Recommended for LC-MS/MS analysis of polar compounds. Ideal for analyzing glyphosate and other polar contaminants in the QuPPe method, underivatized amino acids, and ultra-short chain PFAS.	Excellent resolution and separation of a wide variety of polar compounds. Combines HILIC and ion-exchange retention mechanisms together in a single ligand. Broadly applicable for polar compound analysis spanning different industries and methods.	Unique	N/A
Ultra C1	N/A	100	5	300	2.5 to 8.0	Alternative selectivity to Ultra C18 or C8 columns, especially for polar analytes. Shortest chain alkyl phase available for reversed-phase separations.	Exceptionally stable C1 packing resists hydrolysis even under acidic mobile phase conditions. Least retentive reversed-phase hydrocarbon packing.	Spherisorb C1	L13
Ultra C4	Y	100	9	300	2.5 to 8.0	Ideal for peptides and small proteins.	Exceptionally stable C4 packing with high bonding coverage and silanol base deactivation. Exhibits shorter retention than C18 or C8 phases.	Delta-Pak C4, Supelcosil Butyl (C4)	L26
Ultra C8	Y	100	12	300	2.5 to 8.0	Selectivity and peak shape similar to Ultra C18 but less hydrophobic retention.	Very retentive, high-purity, base-deactivated reversed-phase packing that exhibits excellent peak shape for a wide range of compounds.	Eclipse Plus C8, Hypersil Gold C8, Luna C8, Symmetry C8, Zorbax Eclipse XDB C8	L7
Ultra C18	Y	100	20	300	2.5 to 8.0	Ideal for anilines, barbiturates, carbonyls, fat-soluble vitamins, fatty acids, glycerides, phthalates, PTH amino acids, steroids, other acids.	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.	Develosil C18, Discovery C18, Eclipse Plus C-18, Hypersil Gold C18, Inertsil ODS-2, Kromasil C18, LiChrospher RP-18, Luna C18, Symmetry C18, Zorbax Eclipse XDB-CB	L1
Ultra Aqueous C18	N	100	15	300	2.5 to 8.0	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.	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
Ultra Biphenyl	Y	100	15	300	2.5 to 8.0	An excellent choice for the analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.	A unique reversed-phase material that exhibits both increased retention and selectivity for aromatic and/or unsaturated compounds compared to conventional alkyl and phenyl phases.	Unique	L11
Ultra Aromax	Y	100	17	300	2.5 to 8.0	A very suitable choice for analysis of steroids, tetracyclines, drug metabolites, and other compounds that contain some degree of unsaturation.	A unique reversed-phase material that exhibits superior retention and selectivity for aromatic and/or unsaturated compounds compared to conventional alkyl and phenyl phases. This column is a great alternative to our Biphenyl phase when increased retention is required.	Unique	L11
Ultra IBD	N	100	12	300	2.5 to 8.0	A polar group assists in deactivating surface silanols and contributes to unique separation selectivities for acids, bases, zwitterions, and other polar compounds.	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.	Discovery ABZ & ABZ+, Prism, Symmetry Shield	L68
Ultra PFP Propyl	Y	100	11	300	2.5 to 8.0	Highly retentive for basic analytes. An excellent phase for separating nucleosides, nucleotides, purines, pyrimidines, and halogenated compounds.	A pentafluorophenyl phase with a propyl spacer.	Discovery HS F5; Luna PFP(2); Pursuit PFP	L43

Physical Characteristics Chart

HPLC Columns *(continued)*

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m^2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Ultra Cyano	Y	100	8	300	2.5 to 8.0	Excellent for basic pharmaceuticals; steroids (normal or reversed-phase conditions); or other basic compounds.	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.	Develosil Cyano, Hypersil Gold CN, Luna CN, Platinum CN, Zorbax Eclipse XDB-CN	L10
Ultra Amino	N	100	2	300	2.5 to 8.0	Superior general-purpose amino phase. Ideal for carbohydrates.	Recommended for normal phase analyses of mono- and disaccharides and other similar compounds. Can also serve as a weak anion exchanger with aqueous buffers.	Develosil NH2, Platinum Amino	L8
Ultra Silica	N/A	100	N/A	300	2.5 to 8.0	Ideal for normal phase applications.	High-purity, high surface area.	—	L3
Pinnacle DB C8	Y	140	6	150	2.5 to 8.0	Applications similar to Pinnacle DB C18 but with less hydrophobic retention. Less retention can be useful for shortening analysis time if resolution is adequate.	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.	Spherisorb C8, Zorbax C8	L7
Pinnacle DB Cyano	Y	140	4	150	2.5 to 8.0	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.	Highly base-deactivated spherical silica manufactured by Restek Cyano bonding.	Spherisorb Cyano, Zorbax CN	L10

Physical Characteristics Chart

Specialty Columns

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Raptor EtG/EtS	—	90	Proprietary	130	2.0 to 8.0	Application-specific column for the analysis of ethanol metabolites ethyl glucuronide (EtG) and ethyl sulfate (EtS) in urine.	Reproducible retention of EtG and EtS resolved from matrix interferences.	Unique	—
Allure Acrylamide	No	60	Proprietary	450	2.5 to 8.0	Application-specific column for the analysis of acrylamide in food and drinking water.	A very high surface area particle combined with a proprietary bonded phase to offer unique retention for small polar molecules like acrylamide.	Unique	—
Allure Silica	N/A	60	N/A	450	2.5 to 8.0	Highly retentive phase for normal phase separation. Recommended for MOSH/MOAH analysis.	Highly retentive phase for normal phase separation of polar analytes. Very high surface area.	LiChrospher Si-60 (irregularly shaped particle), Maxsil Si (irregularly shaped particle)	L3
Allure AK	Y	60	Proprietary	450	2.5 to 8.0	Ideal for the analysis of aldehydes and ketones as DNPH derivatives.	Highly retentive, highly selective phase, developed specifically for the analysis of aldehydes and ketones as DNPH derivatives.	Unique	—
Allure Organic Acids	N	60	Proprietary	450	2.5 to 8.0	Excellent resolution of challenging organic acids.	Single 30 cm column performs equally to two C18 columns in series. (AOAC Method 986.13)	Unique	—
Pinnacle II PAH	N	110	Proprietary	180	2.5 to 8.0	Maximum resolution of polycyclic aromatic hydrocarbons.	Proprietary stationary phase; resolves 16 PAHs in US EPA Method 610. Silica manufactured by Restek.	Unique	—
Ultra Carbamate	—	100	Proprietary	300	2.5 to 8.0	Rapid analysis of carbamates.	Proprietary stationary phase can process up to twice as many samples per hour, compared to a conventional C18 phase.	Unique	—
Ultra Quat	—	100	Proprietary	300	2.5 to 8.0	Proprietary phase for the analysis of quaternary amines.	High-purity silica.	Unique	—

Physical Characteristics Chart

Large Molecule Columns

Restek Column	End Cap	Pore Size (Å)	Carbon Load (%)	Surface Area (m2/g)	pH Range	Applications	Chromatographic Properties	Similar Phases	USP Code
Viva C4	Y	300	3.5	100	2.5 to 8.0	Proteins and other higher molecular weight compounds. Less retentive than C18 and C8 phases.	Silica manufactured by Restek with a narrow distribution around the 300Å mean pore size for more surface interaction and analyte retention.	208 TP C4, BioBasic 4, Jupiter 300 C4, Symmetry 300 C4, SynChropak C4	L26
Viva C8	Y	300	5	100	2.5 to 8.0	Proteins and other higher molecular weight compounds. Less retentive than C18 phase.	Silica manufactured by Restek with a narrow distribution around the 300Å mean pore size for more surface interaction and analyte retention.	208 TP C8, BioBasic 8, SynChropak C8, Zorbax 300 OSB C8	L7
Viva C18	Y	300	9	100	2.5 to 8.0	Proteins and other higher molecular weight compounds.	Silica manufactured by Restek with a narrow distribution around the 300Å mean pore size for more surface interaction and analyte retention.	208 TP C18, BioBasic 18, Jupiter 300 C18, Symmetry 300 C18, SynChropak C18, Zorbax 300 OSB C18	L1
Viva Biphenyl	Y	300	7	100	2.5 to 8.0	Exhibits excellent peak shape for a wide range of compounds; ideal for large molecule and biomolecule assays.	Silica manufactured by Restek with a narrow distribution around the 300Å mean pore size for more surface interaction and analyte retention.	Unique	L11
Viva PFP Propyl	Y	300	5	100	2.5 to 8.0	Exhibits excellent peak shape for a wide range of compounds, including nucleosides, nucleotides, and halogenated compounds.	Silica manufactured by Restek with a narrow distribution around the 300Å mean pore size for more surface interaction and analyte retention.	Unique	L43
Viva Silica	N/A	300	N/A	100	2.5 to 8.0	Normal phase applications for highly retained high molecular weight compounds.	Silica manufactured by Restek with a narrow distribution around the 300Å mean pore size for more surface interaction and analyte retention.	Unique	L3

Questions? Contact us or your local Restek representative (www.restek.com/contact-us).

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