Phone (302)533-5646
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HPLC
Venusil HPLC Column Family

Venusil HPLC columns are manufactured from the highest purity spherical silica particles on the market. The outstanding properties of the HPLC phases are results of subjecting high quality silica to an innovative surface modification and unique bonding processes. The proprietary nanosurface modification generates a very smooth and even surface reducing the interaction between the silica surface and polar compounds, resulting in symmetric peak shape even for very basic compounds. Based on this technology, a series of unique columns have been developed to meet the tough requirements for the analysis of highly polar compounds. Lot-to-lot reproducibility is ensured by a stable bonding/end-capping process. The uniform, spherical particles have a nominal surface area of 380m2/g, 200 m2/g or 45m2/g, with a controlled pore size of 100Å, 150Å or 300Å, respectively. All columns are packed using a consistent slurry packing process to achieve uniform and stable beds for maximum column efficiency, lifetime and column-to-column reproducibility.

Features:

- Perfect peak symmetry-independent of pH and mobile phase
- Broad pH range (1 – 10.5)
- Compatible with 100% aqueous mobile phase
- Highest surface coverage
- Wide variety of chemistries
- Minimum buffer concentration req'd
- Tightest specification
- Excellent column efficiency
- Great column lifetime

Benefits:

- Flexibility for any application with better sensitivity and greater confidence in results
- Flexibility for method development
- Maximum versatility
- Tolerance of large volume and mass injection
- Broad selection of polarity and maximum versatility
- Better sensitivity for LCMS and extended column life
- Better reproducibility
- Faster separation and reproducibility
- Lower cost and convenience

Performance

Best Peak Symmetry and Efficiency

- The Venusil columns generate symmetric peaks with high efficiency over their entire applicable pH range, outperforming competitors' columns.
- The pH-independent high performance feature of Venusil columns allows scientists to establish rugged methods with flexible choice of pH.

Tightest Specification

- All our columns have tighter specification (see below table) than other brand-name columns. This ensures that all columns have great performance and identical selectivity

Comparison of HPLC Specifications

	Waters Symmetry-C18 4.6×150mm, 5µm	Zorbax XDB-C18 4.6×150mm ,5µm	Venusil XBP C18 (2) 4.6×150mm ,5µm
Spec. on efficiency	N/A	8000	12000
Spec. on tailing factor(toluene)	N/A	0.98-1.25	0.98-1.12
Spec. on tailing factor-amitriptyline	1.8	N/A(typically 1.5-2.0)	1.4
Spec. on selectivity(amitriptyline/acenaphthene)	+/- 10%	N/A	+/- 7%
pH range	2-8	2-9	1.5-9
Specific Surface	300	180	380
Carbon%	16%	12%	19%

Venusil C18 Column Product Line

GS-Tek offers a series of high quality C18 stationary phases to meet a wide range of application needs. These columns contain ultra pure silica subjected to our patented surface deactivation process. By altering the column chemistry, we are able to tune the surface properties of the silica particles and alter selectivity to meet a variety of application needs.

Our columns have very unique properties to meet your special needs.

Venusil XBP-C18 (2): This is phase designed for balanced adsorption to avoid excessive retention of hydrophobic compounds:

- Great peak symmetry for all types of compounds,
- Improved separation of stereo isomers

- Extremely narrow specification during manufacture to offer high column-to-column reproducibility
- Non-excessive retention for hydrophobic peaks (less peak broadening of later eluting compounds compared to other columns)

Venusil ASB C18: This phase is designed for low pH, low bleed (high sensitivity perfect for LC-MS) and strong separation power for polar compounds:

- Extremely low pH stability: pH limit =0.8 at 70℃
- Extremely low bleed offering high sensitivity for LC-MS under acidic conditions
- Compatible with 100% aqueous to 100% organic mobile phases
- Non-endcapped but with low surface acidity/activity compared to other non-endcapped stationary phases

Venusil AQ C18: This phase is designed for polar and semi-polar compounds, to be compatible with 100% water:

- Compatible with 100% aqueous to 100% organic mobile phases
- Applicable to a variety of analytes from very polar to non-polar
- Operates over a wide pH range: 1.0-9.0
- Applicable to a wide range of sample types: plasma, urine, drug formulation, food extraction
- Available in a range of column diameters suitable for LC-MS, conventional analytical, and preparative scale

Venusil XBP-C18: This phase is designed for maximum hydrophobicity and high pH tolerance:

- The highest carbon loading and the most hydrophobic column on the market.
- High pH tolerance
- Not suggested for samples containing highly hydrophobic compounds

Venusil XBP-C18 (L): This phase is designed for larger molecules and highly hydrophobic compounds:

- Larger pore size and lower surface area
- Accelerated elution for highly hydrophobic compounds
- Easier column clean-up for samples containing hydrophobic impurities or samples extracted by non-polar solvents
- Better choice for molecules > 500 Dalton

Properties of Venusil Particles

Stationary Phase	Specific Surface Area (m2/g)	Pore Size (Å)	Carbon Loading	Particle Size Available (μm)	pH Range	Characteristics
Venusil XBP-C18(2)	380	100	19%	3, 5, 10	1.5	Balanced adsorption to avoid excessive retention; a wider range of suitability; perfect peak symmetry for acidic, basic and neutral com-pounds; greater separation power for isomers.
Venusil XBP-C18	380	100	22%	3, 5, 10	1.5	The most hydrophobic adsorption; better high pH tolerance; not suggested for samples which contain highly hydrophobic compounds.
Venusil XBP-C18(L)	200	150	15%	3, 5, 10	1.5	Larger pore size and lower surface area; a better choice for the analysis of large molecule and strong hydrophobic compounds.
Venusil AQ C18	380	100	18%	3, 5, 10	1	Slightly polar C18 and enhanced retention for polar compounds; 100% water compatible; good peak shape for acidic, basic and neutral compounds.
Venusil ASB-C18	200	150	12%	3, 5, 10	0.8	Polar C18; extremely low bleed at low pH; great for LC-MS and peptide separation; stable at pH as low as 0.8 at 70℃.

Venusil XBP C18 (2) Columns

Venusil XBP C18 (2) column packing material is made with ultra pure silica. The silica surface is processed with a patented surface deactivation technology, followed by a unique bonding process that can reduce the carbon content while maintaining a high bonding coverage. The Venusil XBP C18 column does not have excessive retention for highly hydrophobic compounds, and it is great for the separation of acidic, basic, and neutral compounds. Moreover, this column also has superb resolution power for isomers. The perfect peak symmetry offered by this RP column makes it a great first-choice for HPLC method development.

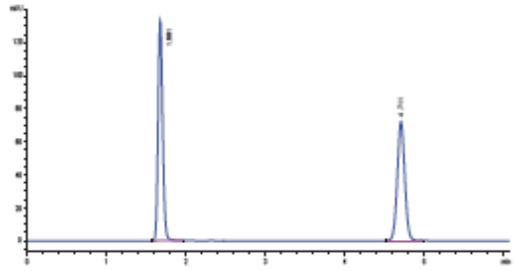
Universal, Highly Inert C18 Columns

- Balanced hydrophobic adsorption which results in a broader suitability
- Stronger separation power for isomers
- Great column-to-column and batch-to-batch reproducibility
- Perfect symmetry for basic, acidic and neutral compounds
- A good replacement for Luna C18 (2) columns!

Technical Parameters

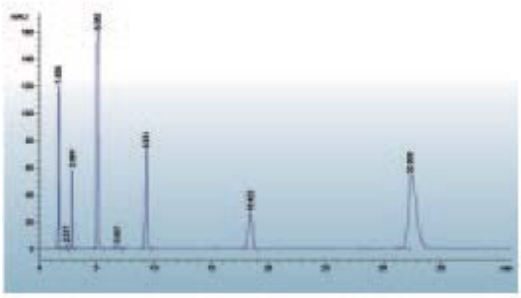
- Metal Impurity < 10ppm
- Particle Size: 5 μm, 3 μm, 10 μm
- Specific Surface: 380m2/g
- Pore Size: 100Å
- Carbon Loading: 19%
- Double End-cap
- pH Range: 1.5-9.0
- Performance: Efficiency ＞ 80,000/m (5 μm)
- TF: 0.98-1.12
- Hydrophobicity Test

Hydrophobicity Test



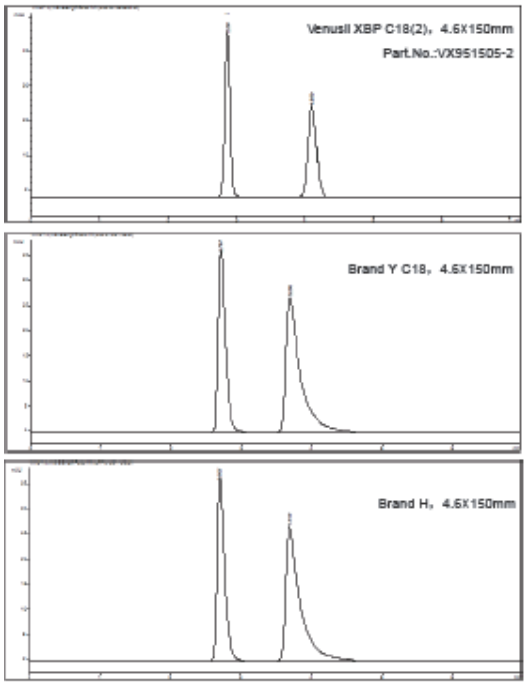
Column: Venusil XBP C18 (2), 4.6 × 150mm, 5 µm
Sample: Uracil, Toluene
Mobile phase: MeOH: 25 mM KH2PO4/K2HPO4 (pH 6.0) = 80 : 20
Detection: UV 254 nm
Flow rate: 1mL/min

Inertness Test

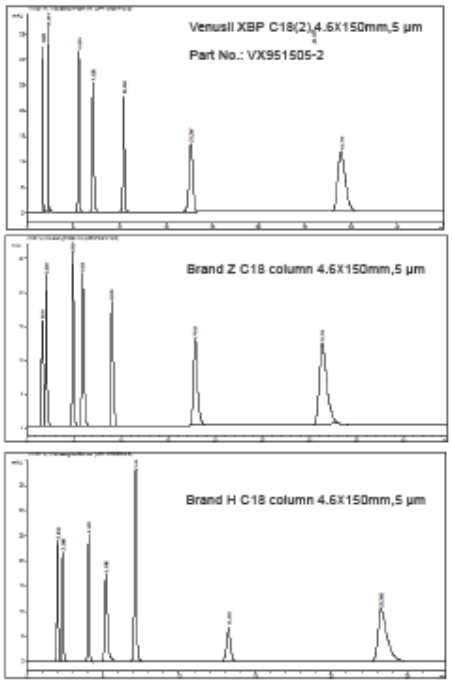


Column: Venusil XBP C18 (2), 4.6 × 150mm, 5 µm
Sample: Amitriptyline
Mobile phase: NaH2PO4/Na2HPO4 （20mM, pH 6.9）:
MeOH = 29 : 71
Detection: UV 254 nm
Flow rate: 1mL/min
Amitriptyline is a strong basic antidepressant. It is recognized as a compound difficult to obtain good peak shape; But the XBP C18（2）column performed outstandingly and gave a great peak symmetry （TF = 1.12）.

Extremely Low Metal Effects



Selectivity of Basic Compounds



Mobile Phase: Water :Methanol=65:35
Flow Rate: 1 mL/min
Temperature: 35 ℃
Detection: UV 230 nm
Sample: 2,3-Dihydroxynaphthalene + 2,7 -Dihydroxynaphthalene

Mobile Phase: MeOH: Acetic Acid/ sodium acetate aq. (pH 5.0) =60: 40
Flow Rate: 1 mL/min
Temperature: 30 ℃
Detection: UV 254 nm
Sample: p-Methyl benzoic acid, Pyridine,Phenol, Acetophenone, Amino-dimethyl benzene, Toluene

Venusil XBP C18 (2) Ordering Information

Surface Area: 380m2/g, Pore Size: 100Å

Particle size(μm)	Type	Dimension (mm)	Venusil XBP-C18 (2)
5	Analytical	2.1×30	VX950302-2
	Analytical	2.1×50	VX950502-2
	Analytical	2.1×100	VX951002-2
	Analytical	2.1×150	VX951502-2
	Analytical	4.6×50	VX950505-2
	Analytical	4.6×100	VX951005-2
	Analytical	4.6×150	VX951505-2
	Analytical	4.6×250	VX952505-2
	Guard cartridge	4.6×10 4/pk	VX950105-2

Venusil XBP C18 Columns

Venusil XBP C18 columns have the maximum bonding density therefore the highest hydrophobicity (the lowest polarity). This allows for the least interaction between the analytes and the silanol groups. Venusil XBP columns have extraordinary column stability at high pHs.

Pore size: 100Å, 300 Å; Specific surface: 380 m2/g,45m2/g; Purity > 99.999%;

- Inertness: one of most base-friendly columns.
- Efficiency: excellent at any applicable pH.
- Large volume injection: maintain very high efficiency with very large injection volumes.
- Broad pH range (1.5 – 10.0): low pH, 0.2 % TFA; high pH,0.010 M triethylamine.
- Other Venusil XBP Columns: A complete line of stationary phases include C8, C4, C1, NH2, Phenyl, CN, Silica, SCX, SAX

Venusil XBP C18 Ordering Information

Surface Area: 380m2/g, Pore Size: 100Å

Particle(μm)	Type	Dimension (mm)	Venusil XBP-C18	Venusil XBP-C8	Venusil XBP-C4	Venusil XBP-C1
5	Analytical	2.1×30	VX950302-0	VX850302-0	VX450302-0	VX150302-0
	Analytical	2.1×50	VX950502-0	VX850502-0	VX450502-0	VX150502-0
	Analytical	2.1×100	VX951002-0	VX851002-0	VX451002-0	VX151002-0
	Analytical	2.1×150	VX951502-0	VX851502-0	VX451502-0	VX151502-0
	Analytical	4.6×50	VX950505-0	VX850505-0	VX450505-0	VX150505-0
	Analytical	4.6×100	VX951005-0	VX851005-0	VX451005-0	VX151005-0
	Analytical	4.6×150	VX951505-0	VX851505-0	VX451505-0	VX151505-0
	Analytical	4.6×200	VX952005-0	VX852005-0	VX452005-0	VX152005-0
	Analytical	4.6×250	VX952505-0	VX852505-0	VX452505-0	VX152505-0
	Guard cartridge	4.6×10 4/pk	VX950105-0	VX850105-0	VX450105-0	VX150105-0
3	Fast analysis	2.1×30	VX930302-0	VX830302-0		
	Fast analysis	2.1×50	VX930502-0	VX830502-0		
	Fast analysis	2.1×100	VX931002-0	VX831002-0		
	Fast analysis	2.1×150	VX931502-0	VX831502-0		
	Fast analysis	4.6×50	VX930505-0	VX830505-0		
	Fast analysis	4.6×100	VX931005-0	VX831005-0		
	Fast analysis	4.6×150	VX931505-0	VX831505-0		
	Guard cartridge	4.6×10 4/pk	VX930105-0	VX830105-0		
5	Semi-preparative	10×150	VX951510-0	VX851510-0		
	Semi-preparative	10×250	VX952510-0	VX852510-0		

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Particle(μm)	Type	Dimension (mm)	Venusil XBP-C18	Venusil XBP-C8	Venusil XBP-C4	Venusil XBP-C1
	Preparative	20×50	VX950520-0	VX850520-0		
	Preparative	20×150	VX951520-0	VX851520-0		
	Preparative	20×250	VX952520-0	VX852520-0		
	Preparative	30×100	VX951030-0	VX851030-0		
	Preparative	30×150	VX951530-0	VX851530-0		
	Preparative	30×250	VX952530-0	VX852530-0		
	Guard cartridge	20×10	VX950120-0	VX850120-0		
10	Semi-preparative	10×150	VX901510-0	VX801510-0		
	Semi-preparative	10×250	VX902510-0	VX802510-0		
	Preparative	20×50	VX900520-0	VX800520-0		
	Preparative	20×150	VX901520-0	VX801520-0		
	Preparative	20×250	VX902520-0	VX802520-0		
	Preparative	30×100	VX901030-0	VX801030-0		
	Preparative	30×150	VX901530-0	VX801530-0		
	Preparative	30×250	VX902530-0	VX802530-0		
	Preparative	50×150	VX901550-0	VX801550-0		
	Preparative	50×250	VX902550-0	VX802550-0		
	Guard cartridge	20×10	VX900120-0	VX800120-0		

Surface Area: 380m2/g,Pore Size: 100Å

Particle (μm)	Type	Dimension (mm)	Venusil XBP-NH2	Venusil XBP-Phenyl	Venusil XBP-CN	Venusil Type Silica
5	Analytical	2.1×30	VN850302-0	VX650302-0	VC950302-0	VSi950302-0
	Analytical	2.1×50	VN850502-0	VX650502-0	VC950502-0	VSi950502-0
	Analytical	2.1×100	VN851002-0	VX651002-0	VC951002-0	VSi951002-0
	Analytical	2.1×150	VN851502-0	VX651502-0	VC951502-0	VSi951502-0
	Analytical	4.6×50	VN850505-0	VX650505-0	VC950505-0	VSi950505-0
	Analytical	4.6×100	VN851005-0	VX651005-0	VC951005-0	VSi951005-0
	Analytical	4.6×150	VN851505-0	VX651505-0	VC951505-0	VSi951505-0
	Analytical	4.6×200	VN852005-0	VX652005-0	VC952005-0	VSi952005-0
	Analytical	4.6×250	VN852505-0	VX652505-0	VC952505-0	VSi952505-0
	Guard cartridge	4.6×10 4/pk	VN850105-0	VX650105-0	VC950105-0	VSi950105-0

Surface Area: 45m2/g, Pore Size: 300Å

Particle (μm)	Type	Dimension (mm)	Venusil XBP-C18	Venusil XBP-C8	Venusil XBP-C4	Venusil XBP-C1
5	Analytical	2.1×30	VX950302-T	VX850302-T	VX450302-T	VX150302-T
	Analytical	2.1×50	VX950502-T	VX850502-T	VX450502-T	VX150502-T
	Analytical	2.1×100	VX951002-T	VX851002-T	VX451002-T	VX151002-T
	Analytical	2.1×150	VX951502-T	VX851502-T	VX451502-T	VX151502-T
	Analytical	4.6×50	VX950505-T	VX850505-T	VX450505-T	VX150505-T
	Analytical	4.6×100	VX951005-T	VX851005-T	VX451005-T	VX151005-T
	Analytical	4.6×150	VX951505-T	VX851505-T	VX451505-T	VX151505-T
	Analytical	4.6×200	VX952005-T	VX852005-T	VX452005-T	VX152005-T
	Analytical	4.6×250	VX952505-T	VX852505-T	VX452505-T	VX152505-T
	Guard cartridge	4.6×10 4/pk	VX950105-T	VX850105-T	VX450105-T	VX150105-T
	Semi-preparative	10×150	VX951510-T	VX851510-T		
	Semi-preparative	10×250	VX952510-T	VX852510-T		
	Preparative	20×50	VX950520-T	VX850520-T		
	Preparative	20×150	VX951520-T	VX851520-T		
	Preparative	20×250	VX952520-T	VX852520-T		
	Guard cartridge	20×10	VX950120-T	VX850120-T		

Surface Area: 45m2/g,Pore Size: 300Å

Particle (μm)	Type	Dimension (mm)	Venusil XBP-NH2	Venusil XBP-Phenyl	Venusil XBP-CN	Venusil Type Silica
5	Analytical	2.1×30	VN850302-T	VX650302-T	VC950302-T	VSi950302-T
	Analytical	2.1×50	VN850502-T	VX650502-T	VC950502-T	VSi950502-T
	Analytical	2.1×100	VN851002-T	VX651002-T	VC951002-T	VSi951002-T
	Analytical	2.1×150	VN851502-T	VX651502-T	VC951502-T	VSi951502-T
	Analytical	4.6×50	VN850505-T	VX650505-T	VC950505-T	VSi950505-T
	Analytical	4.6×100	VN851005-T	VX651005-T	VC951005-T	VSi951005-T
	Analytical	4.6×150	VN851505-T	VX651505-T	VC951505-T	VSi951505-T
	Analytical	4.6×200	VN852005-T	VX652005-T	VC952005-T	VSi952005-T
	Analytical	4.6×250	VN852505-T	VX652505-T	VC952505-T	VSi952505-T
	Guard cartridge	4.6×10 4/pk	VN850105-T	VX650105-T	VC950105-T	VSi950105-T

Venusil XBP (L) Series Columns

XBP (L) C18 has an identical bonded phase as XBP C18. However, XBP (L) C18 has relatively low surface area which allows compounds to have shorter retention times. These columns are an excellent alternative to Hypersil BDS-C18, Hypersil BDS-C8; Zorbax XDB-C18, Zorbax XDB-C8 which comparatively could have too much retention.
XBP (L) C18 has relatively larger pore size (150Å) suitable for the separation of large molecules.

Venusil XBP (L) Series Ordering Information

Surface Area: 200m2/g, Pore Size: 150Å

Particle (μm)	Type	Dimension (mm)	Venusil XBP(L) C18	Venusil XBP(L) C8	Venusil XBP(L) Silica
5	Analytical	2.1×30	VX950302-L	VX850302-L	VSi950302-L
	Analytical	2.1×50	VX950502-L	VX850502-L	VSi950502-L
	Analytical	2.1×100	VX951002-L	VX851002-L	VSi951002-L
	Analytical	2.1×150	VX951502-L	VX851502-L	VSi951502-L
	Analytical	4.6×50	VX950505-L	VX850505-L	VSi950505-L
	Analytical	4.6×100	VX951005-L	VX851005-L	VSi951005-L
	Analytical	4.6×150	VX951505-L	VX851505-L	VSi951505-L
	Analytical	4.6×250	VX952505-L	VX852505-L	VSi952505-L

Venusil AQ-C18 Columns

The Venusil AQ-C18 column is designed for the separation of polar, semi-polar and non-polar compounds at low to medium pH. This column is more polar than XBP-C18, but less polar than ASB-C18. With a special surface treatment, Venusil AQ-C18 is made to be compatible with 100% aqueous mobile phases and it can be used to replace Waters Symmetry, Inertsil C18, Zorbax SB, Atlantis dC18, and other AQ columns. This column has a pH range of 1.5-9.0.

Pore size: 100 Å; Specific surface: 380 m2/g; Purity > 99.999%;

- Inertness: one of most base-friendly columns, excellent peak symmetry of basic compounds.
- Efficiency: The best column for polar compounds at any pH.
- Large volume injection: maintains very high efficiency even if the injection volume is exceptionally large.
- 100% water compatible: very unique for a universal C18 column; much better peak shape, retention, and efficiency than other brand AQ columns.
- Low pH stability (pH=1.5):better stability than most of the popular brand columns (including other brand AQ columns) on the market.

Venusil AQ-C18 Ordering Information

Surface Area: 380m2/g,Pore Size: 100Å

Particle (μm)	Type	Dimension (mm)	Venusil AQ-C18
5	Analytical	2.1×30	VA950302-0
	Analytical	2.1×50	VA950502-0
	Analytical	2.1×100	VA951002-0
	Analytical	2.1×150	VA951502-0
	Analytical	4.6×50	VA950505-0
	Analytical	4.6×100	VA951005-0
	Analytical	4.6×150	VA951505-0
	Analytical	4.6×250	VA952505-0

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Particle (μm)	Type	Dimension (mm)	Venusil AQ-C18
	Guard cartridge	4.6×10 4/pk	VA950105-0
	Fast analysis	2.1×30	VA930302-3
	Fast analysis	2.1×50	VA930502-0
	Fast analysis	2.1×100	VA931002-0
	Fast analysis	2.1×150	VA931502-0
	Fast analysis	4.6×50	VA930505-0
	Fast analysis	4.6×100	VA931005-0
	Fast analysis	4.6×150	VA931505-0
	Guard cartridge	4.6×10 4/pk	VA930105-0
	Semi-preparative	10×150	VA951510-0
	Semi-preparative	10×250	VA952510-0
	Preparative	20×50	VA950520-0
	Preparative	20×150	VA951520-0
	Preparative	20×250	VA952520-0
	Preparative	30×100	VA951030-0
	Preparative	30×150	VA951530-0
	Preparative	30×250	VA952530-0
	Guard cartridge	20×10	VA950120-0

Venusil ASB Columns

The Venusil ASB column is specially designed for the separation of polar compounds from low (extremely stable at pH=1) to medium pH. The stationary phase is end-capped with polar groups and thus has the highest polarity among all Venusil family columns. This column can be used to replace Water Atlantis, Zorbax SB, and other brand AQ columns.

Pore size: 150Å; Specific surface: 200m2/g; Purity ＞ 99.999%

- Low pH stability: great stability even at pH=1
- Peak shape and efficiency: Excellent peak symmetry for basic compounds comparing to other brand polar phase columns
- Polar C18 phase: Very strong separation power for polar compounds
- 100% aqueous compatible: Much better peak shape, retention, and efficiency comparing to other brand "AQ" columns.

Venusil ASB Ordering Information

Surface: 200m2/g,Pore size: 150Å

Particle (μm)	Type	Dimension (mm)	Venusil ASB-C18	Venusil ASB-C8	Venusil ASB-Phenyl
5	Analytical	2.1×30	VS950302-0	VS850302-0	VS650302-0
	Analytical	2.1×50	VS950502-0	VS850502-0	VS650502-0
	Analytical	2.1×100	VS951002-0	VS851002-0	VS651002-0
	Analytical	2.1×150	VS951502-0	VS851502-0	VS651502-0
	Analytical	4.6×50	VS950505-0	VS950505-0	VS650505-0
	Analytical	4.6×100	VS951005-0	VS851005-0	VS651005-0
	Analytical	4.6×150	VS951505-0	VS851505-0	VS651505-0
	Analytical	4.6×250	VS952505-0	VS852505-0	VS652505-0
	Guard cartridge	4.6×10 4/pk	VS950105-0	VS850105-0	VS650105-0
	Semi-preparative	10×150	VS951510-0	VS851510-0	
	Semi-preparative	10×250	VS952510-0	VS852510-0	
	Preparative	20×50	VS950520-0	VS850520-0	
	Preparative	20×150	VS951520-0	VS851520-0	
	Preparative	20×250	VS952520-0	VS852520-0	
	Guard cartridge	20×10	VS950120-0	VS850120-0	

Surface Area: 45m2/g,Pore Size: 300Å

Particle (μm)	Type	Dimension (mm)	Venusil ASB-C18	Venusil ASB-C8
5	Analytical	2.1×30	VS950302-T	VS850302-T
	Analytical	2.1×50	VS950502-T	VS850502-T
	Analytical	2.1×100	VS951002-T	VS851002-T
	Analytical	2.1×150	VS951502-T	VS851502-T

Particle (µm)	Type	Dimension (mm)	Venusil ASB-C18	Venusil ASB-C8
	Analytical	4.6×50	VS950505-T	VS850505-T
	Analytical	4.6×100	VS951005-T	VS851005-T
	Analytical	4.6×150	VS951505-T	VS851505-T
	Analytical	4.6×250	VS952505-T	VS852505-T
	Guard cartridge	4.6×10 4/pk	VS950105-T	VS850105-T

Venusil SCX Columns

SCX HPLC Column is made of spherical silica particles of the highest purity (>99.999%), bonded with aromatic sulfonic acid group. They can be used for the separation of basic, water-soluble compounds and bio-molecules.

Venusil SCX Ordering Information

Surface Area: 200m2/g,Pore Size: 150Å

Particle (µm)	Type	Dimension (mm)	Venusil SCX
5	Analytical	4.6×100	VSc951005-0
	Analytical	4.6×150	VSc951505-0
	Analytical	4.6×250	VSc952505-0
	Guard cartridge	4.6×10 4/pk	VSc950105-0

Surface Area: 50m2/g,Pore Size: 300Å

Particle (µm)	Type	Dimension (mm)	Venusil SCX
5	Analytical	4.6×100	VSc951005-T
	Analytical	4.6×150	VSc951505-T
	Analytical	4.6×250	VSc952505-T
	Guard cartridge	4.6×10 4/pk	VSc950105-T

Venusil SAX Columns

SAX HPLC Column stationary phase is made with high purity spherical silica particles and bonded with quaternary amine groups. The column can be used for the separation of acidic, water-soluble compounds and bio-molecules

Venusil SAX Ordering Information

Surface Area: 200m2/g, Pore Size: 150Å

Particle (µm)	Type	Dimension (mm)	Venusil SAX
5	Analytical	4.6×100	VSa951005-0
	Analytical	4.6×150	VSa951505-0
	Analytical	4.6×250	VSa952505-0
	Guard cartridge	4.6×10 4/pk	VSa950105-0

Surface Area: 50m2/g,Pore Size: 300Å

Particle (µm)	Type	Dimension (mm)	Venusil SAX
5	Analytical	4.6×100	VSa951005-T
	Analytical	4.6×150	VSa951505-T
	Analytical	4.6×250	VSa952505-T
	Guard cartridge	4.6×10 4/pk	VSa950105-T

TIP: The use of non-polar solvents blocks the adsorption sites in the column and may result in peak splitting.

Separation of Bio-molecules

GS-Tek offers a broad line of HPLC columns for Bio-molecules, including reverse phase, normal phase, ion-exchange, HILIC and size exclusion columns. All column packing materials are made of ultra pure silica, bonded with pure silanes to ensure the surface inertness.

General consideration for the column selection:

- Small peptide: C18, C8, C4; 100Å or 150 Å
- Large peptide and proteins: C8, C4, 300 Å; ion-exchange; HILIC; size exclusion
- Mono- and oligo-saccharides: ion-exchange; NH2; HILIC
- Polysaccharides: ion-exchange; size exclusion
- Oligo-nuclei: ion-exchange; reverse phase
- Nuclei acids: ion-exchange; size exclusion

Reverse Phase Columns for Small Molecules

Ordering Information by Type of Stationary Phases

Analytical Columns, Particle Size: 5µm

Dimension (mm)	Venusil XBP Phenyl	Venusil XBP C4	Venusil XBP C1	Venusil XBP CN
	100Å, 380	100Å, 380	100Å, 380	100Å, 380
	M2/g, C%=12	m2/g, C%=7	m2/g; C%= 3	m2/g, C%=7
2.1×20	VX650202-0	VX450202-0	VX150202-0	VC950202-0
2.1×30	VX650302-0	VX450302-0	VX150302-0	VC950302-0
2.1×50	VX650502-0	VX450502-0	VX150502-0	VC950502-0
2.1×100	VX651002-0	VX451002-0	VX151002-0	VC951002-0
2.1×150	VX651502-0	VX451502-0	VX151502-0	VC951502-0
3.0x30	VX650303-0	VX450303-0	VX150303-0	VC950303-0
3.0x50	VX650503-0	VX450503-0	VX150503-0	VC950503-0
3.0x100	VX651003-0	VX451003-0	VX151003-0	VC951003-0
3.0x150	VX651503-0	VX451503-0	VX151503-0	VC951503-0
4.6×50	VX650505-0	VX450505-0	VX150505-0	VC950505-0
4.6×100	VX651005-0	VX451005-0	VX151005-0	VC951005-0
4.6×150	VX651505-0	VX451505-0	VX151505-0	VC951505-0
4.6×200	VX652005-0	VX452005-0	VX152005-0	VC952005-0
4.6×250	VX652505-0	VX452505-0	VX152505-0	VC952505-0
4.6×10	VX650105-0	VX450105-0	VX150105-0	VC950105-0
ID: 2.1, 3.0, 4.6	CH-100	CH-100	CH-100	CH-100

Column Type	Dimension (mm)	Particle Size (µm)	Venusil XBP C18 (2)	Venusil XBP C18 (L)
			ultra surface inertness and reproducibility; balanced retention; 100Å, 380 m2/g, C%=19	same as XBP C18 with larger pore size; 150Å, 200 m2/g; C%=15
Analytical	2.1×30	5	VX950302-2	VX950302-L
Analytical	2.1×50	5	VX950502-2	VX950502-L
Analytical	2.1×100	5	VX951002-2	VX951002-L
Analytical	2.1×150	5	VX951502-2	VX951502-L
Analytical	3.0x30	5	VX950303-2	VX950303-L
Analytical	3.0x50	5	VX950503-2	VX950503-L
Analytical	3.0x100	5	VX951003-2	VX951003-L
Analytical	3.0x150	5	VX951503-2	VX951503-L
Analytical	4.6×50	5	VX950505-2	VX950505-L
Analytical	4.6×100	5	VX951005-2	VX951005-L
Analytical	4.6×150	5	VX951505-2	VX951505-L
Analytical	4.6×200	5	VX952005-2	VX952005-L
Analytical	4.6×250	5	VX952505-2	VX952505-L
Guard Cartridge	4.6×10, 4/pk	5	VX950105-2	VX950105-L
Cartridge Holder	20x10		CH-200	CH-200

Dimension (mm)	Particle Size (µm)	Venusil ASB C18	Venusil ASB C8	Venusil AQ C18	Venusil XBP-C18	Venusil XBP-C8
		extreme low pH tolerance (0.8-7.5), low bleed; 150 Å, 200m2/g; C%=12	C8 for low pH and low bleed; 150 Å, 200m2/g, C%=7	for high aqueous applications; compatible with 100% water; 100Å, 380 m2/g, C%=18	highest hydrophobicity; 100Å, 380m2/g, C%=22	general RP; 100Å, 380 m2/g; C%= 14
2.1×30	5	VS950302-0	VS850302-0	VA950302-0	VX950302-0	VX850302-0
2.1×50	5	VS950502-0	VS850502-0	VA950502-0	VX950502-0	VX850502-0
2.1×100	5	VS951002-0	VS851002-0	VA951002-0	VX951002-0	VX851002-0
2.1×150	5	VS951502-0	VS851502-0	VA951502-0	VX951502-0	VX851502-0
3.0x30	5	VS950303-0	VS850303-0	VA950303-0	VX950303-0	VX850303-0
3.0x50	5	VS950503-0	VS850503-0	VA950503-0	VX950503-0	VX850503-0
3.0x100	5	VS951003-0	VS851003-0	VA951003-0	VX951003-0	VX851003-0
3.0x150	5	VS951503-0	VS851503-0	VA951503-0	VX951503-0	VX851503-0
4.6×50	5	VS950505-0	VS850505-0	VA950505-0	VX950505-0	VX850505-0
4.6×100	5	VS951005-0	VS851005-0	VA951005-0	VX951005-0	VX851005-0
4.6×150	5	VS951505-0	VS851505-0	VA951505-0	VX951505-0	VX851505-0
4.6×200	5	VS952005-0	VS852005-0	VA952005-0	VX952005-0	VX852005-0
4.6×250	5	VS952505-0	VS852505-0	VA952505-0	VX952505-0	VX852505-0
G 4.6×10, 4/pk	5	VS950105-0	VS850105-0	VA950105-0	VX950105-0	VX850105-0
2.1×20	3	VS930202-0	VS830202-0	VA930202-0	VX930202-0	VX830202-0
2.1×30	3	VS930302-0	VS830302-0	VA930302-0	VX930302-0	VX830302-0
2.1×50	3	VS930502-0	VS830502-0	VA930502-0	VX930502-0	VX830502-0
2.1×100	3	VS931002-0	VS831002-0	VA931002-0	VX931002-0	VX831002-0
2.1×150	3	VS931502-0	VS831502-0	VA931502-0	VX931502-0	VX831502-0
3.0x30	3	VS930303-0	VS830303-0	VA930303-0	VX930303-0	VX830303-0
3.0x50	3	VS930503-0	VS830503-0	VA930503-0	VX930503-0	VX830503-0
3.0x100	3	VS931003-0	VS831003-0	VA931003-0	VX931003-0	VX831003-0
3.0x150	3	VS931503-0	VS831503-0	VA931503-0	VX931503-0	VX831503-0
G 3.0×10	3	VS930103-0	VS830103-0	VA930103-0	VX930103-0	VX830103-0
4.6×50	3	VS930505-0	VS830502-0	VA930505-0	VX930505-0	VX830502-0
4.6×100	3	VS931005-0	VS831002-0	VA930505-0	VX931005-0	VX831002-0
4.6×150	3	VS931505-0	VS831505-0	VA931505-0	VX931505-0	VX831505-0
G4.6×10	3	VS930105-0	VS830105-0	VA930105-0	VX930105-0	VX830105-0
GCH 2.1, 3.0, 4.6		CH-100		CH-100	CH-100	CH-100
10×150	5	VS951510-0		VA951510-0	VX951510-0	VX851510-0
10×250	5	VS952510-0		VA952510-0	VX952510-0	VX852510-0
20×50	5	VS950520-0		VA950520-0	VX950520-0	VX850520-0
20×150	5	VS951520-0		VA951520-0	VX951520-0	VX851520-0
20×250	5	VS952520-0		VA952520-0	VX952520-0	VX852520-0
30×100	5	VS951030-0		VA951030-0	VX951030-0	VX851030-0
30×150	5	VS951530-0		VA951530-0	VX951530-0	VX851530-0
30×250	5	VS952530-0		VA952530-0	VX952530-0	VX852530-0
G 20×10	5	VS950120-0		VA950120-0	VX950120-0	VX850120-0
10×150	10	VS901510-0			VX901510-0	VX801510-0
10×250	10	VS902510-0			VX902510-0	VX802510-0
20×50	10	VS900520-0			VX900520-0	VX800520-0
20×150	10	VS901520-0			VX901520-0	VX801520-0
20×250	10	VS902520-0			VX902520-0	VX802520-0
30×100	10	VS901030-0			VX901030-0	VX801030-0
30×150	10	VS901530-0			VX901530-0	VX801530-0
30×250	10	VS902530-0			VX902530-0	VX802530-0
50×150	10	VS901550-0			VX901550-0	VX801550-0
50×250	10	VS902550-0			VX902550-0	VX802550-0
G 20×10	10	VS90120-0			VX900120-0	VX800120-0
GCH 20x10		CH-200	CH-200	CH-200	CH-200	CH-200

G=Guard Cartridge; GCH= Guard Cartridge Holder

Reverse Phase Columns for Large Molecules

Particle Size: 5µm; Pore Size: 300Å; Surface Area: 45 m2/g

Column Type	Dimension (mm)	Venusil XBP Phenyl	Venusil XBP C4	Venusil XBP C1	Venusil XBP CN
Analytical	2.1×30	VX650302-T	VX450302-T	VX150302-T	VC950302-T
Analytical	2.1×50	VX650502-T	VX450502-T	VX150502-T	VC950502-T
Analytical	2.1×100	VX651002-T	VX451002-T	VX151002-T	VC951002-T
Analytical	2.1×150	VX651502-T	VX451502-T	VX151502-T	VC951502-T
Analytical	3.0x30	VX650303-T	VX450303-T	VX150303-T	VC950303-T
Analytical	3.0x50	VX650503-T	VX450503-T	VX150503-T	VC950503-T
Analytical	3.0x100	VX651003-T	VX451003-T	VX151003-T	VC951003-T
Analytical	3.0x150	VX651503-T	VX451503-T	VX151503-T	VC951503-T
Analytical	4.6×50	VX650505-T	VX450505-T	VX150505-T	VC950505-T
Analytical	4.6×100	VX651005-T	VX451005-T	VX151005-T	VC951005-T
Analytical	4.6×150	VX651505-T	VX451505-T	VX151505-T	VC951505-T
Analytical	4.6×200	VX652005-T	VX452005-T	VX152005-T	VC952005-T
Analytical	4.6×250	VX652505-T	VX452505-T	VX152505-T	VC952505-T
Guard Cartridge	4.6×10, 4/pk	VX650105-T	VX450105-T	VX150105-T	VC950105-T
Cartridge Holder	2.1, 3.0, 4.6	CH-100	CH-100	CH-100	CH-100
Semi-prep	10×150	VX651510-T	VX451510-T	VX151510-T	VC951510-T
Semi-prep	10×250	VX652510-T	VX452510-T	VX152510-T	VC952510-T
Semi-prep	20×50	VX650520-T	VX450520-T	VX150520-T	VC950520-T
Semi-prep	20×150	VX651520-T	VX451520-T	VX151520-T	VC951520-T
Semi-prep	20×250	VX652520-T	VX452520-T	VX152520-T	VC952520-T
Guard Cartridge	20×10	VX650120-T	VX450120-T	VX150120-T	VC950120-T
Cartridge Holder	20×10	CH-200	CH-200	CH-200	CH-200

Reverse Phase Columns for Large Molecules

Particle Size: 5µm; Pore Size: 300Å; Surface Area: 45 m2/g

Type	Dimension (mm)	Venusil ASB C18	Venusil ASB C8	Venusil XBP C18	Venusil XBP C8
		extreme low pH tolerance (0.8-7.5), low bleed	C8 for low pH and low bleed	highest hydrophobicity	General RP
Analytical	2.1×30	VS950302-T	VS850302-T	VX950302-T	VX850302-T
Analytical	2.1×50	VS950502-T	VS850502-T	VX950502-T	VX850502-T
Analytical	2.1×100	VS951002-T	VS851002-T	VX951002-T	VX851002-T
Analytical	2.1×150	VS951502-T	VS851502-T	VX951502-T	VX851502-T
Analytical	3.0x30	VS950303-T	VS850303-T	VX950303-T	VX850303-T
Analytical	3.0x50	VS950503-T	VS850503-T	VX950503-T	VX850503-T
Analytical	3.0x100	VS951003-T	VS851003-T	VX951003-T	VX851003-T
Analytical	3.0x150	VS951503-T	VS851503-T	VX951503-T	VX851503-T
Analytical	4.6×50	VS950505-T	VS850505-T	VX950505-T	VX850505-T
Analytical	4.6×100	VS951005-T	VS851005-T	VX951005-T	VX851005-T
Analytical	4.6×150	VS951505-T	VS851505-T	VX951505-T	VX851505-T
Analytical	4.6×200	VS952005-T	VS852005-T	VX952005-T	VX852005-T
Analytical	4.6×250	VS952505-T	VS852505-T	VX952505-T	VX852505-T
Guard Cartridge	4.6×10, 4/pk	VS950105-T	VS850105-T	VX950105-T	VX850105-T
Cartridge Holder	ID: 2.1, 3.0, 4.6	CH-100	CH-100	CH-100	CH-100
Semi-Prep	10×150	VS951510-T	VS851510-T	VX951510-T	VX851510-T
Semi-Prep	10×250	VS952510-T	VS852510-T	VX952510-T	VX852510-T
Semi-Prep	20×50	VS950520-T	VS850520-T	VX950520-T	VX850520-T
Semi-Prep	20×150	VS951520-T	VS851520-T	VX951520-T	VX851520-T
Semi-Prep	20×250	VS952520-T	VS852520-T	VX952520-T	VX852520-T
Guard Cartridge	20×10	VS950120-T	VS850120-T	VX950120-T	VX850120-T
Cartridge Holder	20×10	CH-200	CH-200	CH-200	CH-200

Normal Phase Columns for Small Molecules

Particle Size: 5µm

Type	Dimension (mm)	Particle Size (µm)	Unisol Amide (HILIC)	Venusil Silica (HILIC II)	Venusil XBP-NH2(HILIC III)	Venusil XBP-Diol	Venusil XBP CN
			unique selectivity; 100Å, 410 m2/g,	ultra pure ; 100Å, 380m2/g,	ultra pure: 100 Å,380m2/g;	ultra pure: 100Å, 380 m2/g	ultra pure:100Å,380 m2/g
Analytical	2.1×30	5	VH950302-0	VSi950302-0	VN850302-0	VC950302-0	VD950302-0
Analytical	2.1×50	5	VH950502-0	VSi950502-0	VN850502-0	VC950502-0	VD950502-0
Analytical	2.1×100	5	VH951002-0	VSi951002-0	VN851002-0	VC951002-0	VD951002-0
Analytical	2.1×150	5	VH951502-0	VSi951502-0	VN851502-0	VC951502-0	VD951502-0
Analytical	3.0x30	5	VH950303-0	VSi950303-0	VN850303-0	VC950303-0	VD950303-0
Analytical	3.0x50	5	VH950503-0	VSi950503-0	VN850503-0	VC950503-0	VD950503-0
Analytical	3.0x100	5	VH951003-0	VSi951003-0	VN851003-0	VC951003-0	VD951003-0
Analytical	3.0x150	5	VH951503-0	VSi951503-0	VN851503-0	VC951503-0	VD951503-0
Analytical	4.6×50	5	VH950505-0	VSi950505-0	VN850505-0	VC950505-0	VD950505-0
Analytical	4.6×100	5	VH951005-0	VSi951005-0	VN851005-0	VC951005-0	VD951005-0
Analytical	4.6×150	5	VH951505-0	VSi951505-0	VN851505-0	VC951505-0	VD951505-0
Analytical	4.6×200	5	VH952005-0	VSi952005-0	VN852005-0	VC952005-0	VD952005-0
Analytical	4.6×250	5	VH952505-0	VSi952505-0	VN852505-0	VC952505-0	VD952505-0
Guard cartridge	4.6×10 , 4/ pk	5	VH950105-0	VSi950105-0	VN850105-0	VC950105-0	VD950105-0
GCH	2.1,3.0,4.6		CH-100	CH-100	CH-100	CH-100	CH-100
Semi-preparative	10×150	5	VH951510-0	VSi951510-0	VN851510-0		VC951510-0
Semi-preparative	10×250	5	VH952510-0	VSi952510-0	VN852510-0		VC952510-0
Preparative	20×50	5	VH950520-0	VSi950520-0	VN850520-0		VC950520-0
Preparative	20×150	5	VH951520-0	VSi951520-0	VN851520-0		VC951520-0
Preparative	20×250	5	VH952520-0	VSi952520-0	VN852520-0		VC952520-0
Preparative	30×100	5	VH951030-0	VSi951030-0	VN851030-0		VC951030-0
Preparative	30×150	5	VH951530-0	VSi951530-0	VN851530-0		VC951530-0
Preparative	30×250	5	VH952530-0	VSi952530-0	VN852530-0		VC952530-0
Guard Cartridge	20×10		VH950220-0	VSi950220-0	VN850220-0		VC950220-0
Semi-preparative	10×150	10	VH901510-0	VSi901510-0	VN801510-0		VC901510-0
Semi-preparative	10×250	10	VH902510-0	VSi902510-0	VN802510-0		VC902510-0
Preparative	20×50	10	VH900520-0	VSi900520-0	VN800520-0		VC900520-0
Preparative	20×150	10	VH901520-0	VSi901520-0	VN801520-0		VC901520-0
Preparative	20×250	10	VH902520-0	VSi902520-0	VN802520-0		VC902520-0
Preparative	30×100	10	VH901030-0	VSi901030-0	VN801030-0		VC901030-0
Preparative	30×150	10	VH901530-0	VSi901530-0	VN801530-0		VC901530-0
Preparative	30×250	10	VH902530-0	VSi902530-0	VN802530-0		VC902530-0
Preparative	50×150	10	VH901550-0	VSi901550-0	VN801550-0		VC901550-0
Preparative	50×250	10	VH902550-0	VSi902550-0	VN802550-0		VC902550-0
Guard Cartridge	20×10	10	VH900120-0	VSi900120-0	VN800120-0		VC900120-0
GCH	2.1,3.0,4.6		CH-200	CH-200	CH-200		CH-200

GCH=Guard Cartridge Holder

Ion-exchange Columns

Surface Area: 200m2/g,Pore Size: 150Å

Type	Dimension (mm)	Particle Size (µm)	Venusil SAX	Venusil SCX
Analytical	4.6×100	5	VSa951005-0	VSc951005-0
Analytical	4.6×150	5	VSa951505-0	VSc951505-0

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Fax (302)737-4547

Type	Dimension (mm)	Particle Size (µm)	Venusil SAX	Venusil SCX
Analytical	4.6×250	5	VSa952505-0	VSc952505-0
Guard cartridge	4.6×10 4/pk	5	VSa950105-0	VSc950105-0

Surface Area: 50m2/g,Pore Size: 300Å

Type	Dimension (mm)	Particle Size (µm)	Venusil SAX	Venusil SCX
Analytical	4.6×100	5	VSa951005-T	VSc951005-T
Analytical	4.6×150	5	VSa951505-T	VSc951505-T
Analytical	4.6×250	5	VSa952505-T	VSc952505-T
Guard cartridge	4.6×10 4/pk	5	VSa950105-T	VSc950105-T

Normal Phase Columns for Large Molecules

Ultra Pure Silica; Pore Size:300 Å; Surface Area:45m2/g

Type	Dimension (mm)	Particle Size (µm)	Venusil XBP NH2	Venusil XBP Diol	Venusil XBP CN	Unisol Amide (HILIC)	Venusil XBP Silica
Analytical	2.1×30	5	VN850302-T	VD950302-T	VC950302-T	VH950302-T	VSi950302-T
Analytical	2.1×50	5	VN850502-T	VD950502-T	VC950502-T	VH950502-T	VSi950502-T
Analytical	2.1×100	5	VN851002-T	VD951002-T	VC951002-T	VH951002-T	VSi951002-T
Analytical	2.1×150	5	VN851502-T	VD951502-T	VC951502-T	VH951502-T	VSi951502-T
Analytical	3.0x30	5	VN850303-T	VD950303-T	VC950303-T	VH950303-T	VSi950303-T
Analytical	3.0x50	5	VN850503-T	VD950503-T	VC950503-T	VH950503-T	VSi950503-T
Analytical	3.0x100	5	VN851003-T	VD951003-T	VC951003-T	VH951003-T	VSi951003-T
Analytical	3.0x150	5	VN851503-T	VD951503-T	VC951503-T	VH951503-T	VSi951503-T
Analytical	4.6×50	5	VN850505-T	VD950505-T	VC950505-T	VH950505-T	VSi950505-T
Analytical	4.6×100	5	VN851005-T	VD951005-T	VC951005-T	VH951005-T	VSi951005-T
Analytical	4.6×150	5	VN851505-T	VD951505-T	VC951505-T	VH951505-T	VSi951505-T
Analytical	4.6×200	5	VN852005-T	VD952005-T	VC952005-T	VH952005-T	VSi952005-T
Analytical	4.6×250	5	VN852505-T	VD952505-T	VC952505-T	VH952505-T	VSi952505-T
Guard Cartridge	4.6×10, 4/pk	5	VN850105-T	VD950105-T	VC950105-T	VH950105-T	VSi950105-T
GCH	ID: 2.1, 3.0, 4.6		CH-100	CH-100	CH-100	CH-100	CH-100
Semi-preparative	10×150	5	VN851510-T		VC951510-T		VSi951510-T
Semi-preparative	10×250	5	VN852510-T		VC952510-T		VSi952510-T
Preparative	20×50	5	VN850520-T		VC950520-T		VSi950520-T
Preparative	20×150	5	VN851520-T		VC951520-T		VSi951520-T
Preparative	20×250	5	VN852520-T		VC952520-T		VSi952520-T
Preparative	30×100	5	VN851030-T		VC951030-T		VSi951030-T
Preparative	30×150	5	VN851530-T		VC951530-T		VSi951530-T
Preparative	30×250	5	VN852530-T		VC952530-T		VSi952530-T
Guard Cartridge	20×10	5	VN850120-T		VC950120-T		VSi950120-T
GCH	20x10		CH-200		CH-200		CH-200

GCH=Guard cartridge Holder

Polymer Phase Columns

RPC-Analytical Prepacked Columns

Matrix	Dimension (mm)	Particle Size (µm)
AKF-RP-M-154607	4.6×150	7
AKF-RP-M-154610	4.6×150	10
AKF-RP-M-154620	4.6×150	20
AKF-RP-H-254605	4.6×250	5
AKF-RP-H-254607	4.6×250	7
AKF-RP-H-254610	4.6×250	10
AKF-RP-H-254620	4.6×250	20

RPC-Preparative Prepacked Columns

Matrix	Dimension (mm)	Particle Size (μm)
AKF-RP-M-052007	20×50	5
AKF-RP-M-102007	20×100	5
AKF-RP-M-251007	10×250	7
AKF-RP-M-252007	20×250	7
AKF-RP-M-151010	10×150	10
AKF-RP-M-152010	20×150	10
AKF-RP-H-151010	10×150	10
AKF-RP-H-152010	20×150	10
AKF-RP-M-251010	10×250	10
AKF-RP-M-252010	20×250	10
AKF-RP-H-251010	10×250	10
AKF-RP-H-252010	20×250	10
AKF-RP-H-152020	20×150	20
AKF-RP-H-252020	20×250	20
AKF-RP-H-105020	50×100	20
AKF-RP-H-255020	50×250	20
AKF-RP-H-2510020	100×250	20

HPLC Applications

Analyte by Industry	Recommended Column Description	Mobile phase
Pharmaceutical-Antibiotics		
Antibiotics: Sulbactam Sodium +Cefoperazone Sodium	Venusil C18, 4.6mm x 250mm x 5um	5mmol/L TABOH (pH5.0 w/ H3PO4: ACN 70:30
Antibiotics: Meleumycin	Venusil C8, 4.6mm x 150mm x 5um	0.2mol/L ammonium formate (pH7.3 w/ TEA):CAN 62:38
Benzylpenicillin Sodium	Venusil AQ-C18, 4.6mm x 150mm x 5um	0.1mol/L potassium dihydrogen phosphate (pH2.5):acetonitrile=70:30
Amoxicillin Sodium	Venusil AQ-C18, 4.6mm x 150mm x 5um	0.05mol/L phosphas buffer (pH5.0):acetonitrile=97.5:2.5
Cefotaxime Sodium	Venusil AQ-C18, 4.6mm x 150mm x 5um	Phosphate buffer (0.4mM KH2PO4+8mMK2HPO4): MeOH=89:11
Cefalexine	Venusil AQ-C18, 4.6mm x 150mm x 5um	Water/MeOH/3.86% sodium acetate solution/4% acetic acid solution = 742:240:15:3
Cefadroxil	Venusil AQ-C18, 4.6mm x 150mm x 5um	0.05mol/L phosphate buffer（pH 3.4）:ACN = 92:8
Cefaclor	Venusil AQ-C18, 4.6mm x 150mm x 5um	Water/MeOH/3.86% sodium acetate solution/4% acetic acid solution = 742:240:15:3
Meleumycin	Venusil XBP-C8, 4.6mm x 150mm x 5um	Ammonium formate（0.2mol/L adjust to pH 7.3 with TEA）:ACN=62:38
Synthetic Antimicrobial Agents		
Norfloxacin	Venusil XBP C18, 4.6mm x 250mm x 5um	H3PO4 (0.025 mol/L，adjust to pH 3.0 with TEA):ACN = 87:13
Ofloxacin	Venusil XBP C18, 4.6mm x 250mm x 5um	NH4AC/ KClO4 (40mM , pH 2.0):ACN=85:15
Ciprofloxacin Lactate	Venusil XBP C18, 4.6mm x 150mm x 5um	citric acid buffer (0.05 mol/L, adjust to pH 3.5 with TFA):ACN=82:28
Gatifloxacin HCl	Venusil XBP C18(L), 4.6mm x 150mm x 5um	1%TEA（pH 4.5）:ACN=87:13
Fluconazole	Venusil XBP C18, 4.6mm x 150mm x 5um	KH2PO4 buffer(adjust to pH7.0 with NaOH):MeOH = 55:45
Steroid Hormones		
Ethinylestradiol	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH:Water = 70:30
Triamcinolone Acetonide	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH:Water = 21:19
Hydrocortisone	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH:Water = 70:30
Dexamethasone	Venusil XBP C18, 4.6 x 150mm x 5um	Citric acid buffer (0.05 mol/L, adjust to pH 3.5 with TFA):ACN=82:28
Levonorgestrel	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH:Water = 70:30
Prednisone	Venusil AQ-C18, 4.6mm x 150mm x 5um	Water :THF :MeOH = 668:250:62
Clobetasol Propionate	Venusil AQ-C18, 4.6mm x 150mm x 5um	Phosphate buffer（0.05 mol/L ,pH 2.5）/ACN/MeOH = 425:475:100
Fluocinonide	Venusil XBP C18 4.6×150mm x5 μ m	MeOH :ACN :Water=60:10:30
Alkaloids		
Ganciclovir	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH::water = 5:95

Analyte by Industry	Recommended Column Description	Mobile phase
Nimodipine	Venusil XBP-C18, 4.6mm x 150mm x 5um	MeOH::water = 5:95
Matrine	Venusil XBP-NH2 4.6mm x 250mm x 5um	ACN:Ethanol:3% H3PO4 aq. = 80:10:10
Kakkonein	Venusil XBP-C18, 4.6mm x 150mm x 5um	MeOH:0.1% citric acid=25:75
Omeprazole	Venusil C8, 4.6mm x 150mm x 5um	0.01mol/L phosphate buffer (pH7.6):acenotrile=75:25
Terfenadine	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH:0.1mol/L phosphate buffer=80:20
Arilin related substance	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH:water=20:80
Analysis of Aconite, Mesonitine, Hypaconitine	Venusil XBP C18 (2), 4.6mm x 250mm x 5um	ACN:2% acetic acid adjusted pH 6.5 w/ triethylamine=15:85
Agricultural		
Haloxyfop-P-methyl	Venusil XBP C18, 4.6mm x 150mm x 5um	ACN:Water=70:30
Fluazifop-p-butyl	Venusil XBP C18, 4.6mm x 150mm x 5um	ACN:Water=70:30
1,2-Dibenzoyl-1-tert-butylhydrazine	Venusil XBP C18, 4.6mm x 150mm x 5um	Water:MeOH =25:75
Others		
Glipizide	Venusil AQ-C18, 4.6mm x 150mm x 5um	phosphate Buffer（0.1 mol/L ,pH6.0）:MeOH=55:45
Terfenadine	Venusil AQ-C18, 4.6mm x 150mm x 5um	MeOH: H3PO4/Triethylamine(0.1mol/L) = 80:20
organic acids in Fermentation Broth	Venusil AQ-C18, 4.6mm x 150mm x 5um	0.02M NH4AC Aq.:MeOH=95:5
Catechins in Tea Extract	Venusil AQ-C18, 4.6mm x 250mm x 5um	0.02%H3PO4: MeOH=81:19
Saccharin Sodium in Milk Powder	Venusil AQ-C18, 4.6mm x 250mm x 5um	MeOH:CH3COONH4 (0.02 M) =5:95
DHA in the Health Food	Venusil AQ-C18, 4.6mm x 250mm x 5um	MeOH:Water =80:20
Melamine in Feed	Venusil ASB C184.6mm x 250mm x 5um	10mM Citric acid+10mM Perfluorooctane sulfonate(pH 3.0) :ACN=85:15
Tetrodotoxin（TTX）	Venusil ASB C18 4.6mm x 250mm x 5um	0.02% H3PO4:MeOH=40:60
Baicalin	Venusil ASB C18, 4.6mm x 150mm x 5um	MeOH : 1% acetic acid =50:50
Tartrazine in Food	Venusil AQ-C18, 4.6mm x 250mm x 5um	A: Ammonium acetate buffer（pH 4.0）;B: MeOH

TIP: For long term storage of HPLC column, it is recommended treatment with acetonitrile. Before treating with acetonitrile make sure that the buffers present in the column are washed out completely, because buffers present are potentially soluble in acetonitrile that results in blockage of the capillaries and the column.

Column Performance Regeneration & Care

Due to interactions between the stationary phase and sample components, HPLC columns may occasionally require cleaning or regeneration. The following conditions apply to silica-based columns. Flow rates should be 1/5 - 1/2 of the typical flow rate.

To estimate the column volume, use the following equation:

V=pr2 / L

V = column volume in mL
r = column radius in cm
L = column length in cm

PHASE TYPE	RECOMMENDED ACTIONS
UNBONDED SILICA COLUMNS (SILICA)	Rinse with 10 column volumes each of: Hexane, Methylene, Chloride, Isopropanol, Methylene Chloride. Mobile phase: Flush column with 30mL 2.5% 2,2-dimethoxy- propane and 2.5% glacial acetic acid in hexane
REVERSED PHASE COLUMNS (C18, C8, C4, C2, C1, PHENYL, CN, NH2)	Rinse with 10 column volumes of: 95% Water/5% Acetonitrile (for buffer removal) followed by 95% Acetonitrile/5% Water mobile phase
REVERSED PHASE PROTEIN/PEPTIDE COLUMNS (C18, C8, C5, C4, PHENYL)	Rinse with 20 column volumes of mobile phase with buffer removed run gradient (2x): A) 0.1% Aqueous TFA in Water B) 0.1% TFA in Acetonitrile/Isopropanol (1:2) 25% B 100% B for 30 minutes Equilibrate with 10 column volumes of mobile phase.
BONDED NORMAL PHASE COLUMNS (CN, NH2, DIOL)	Rinse with 10 column vol umes each of : Chloroform,Isopropanol, Methylene chloride, mobile phase. Exception: Recommended for cleaning Luna Amino when used in reversed phase mode: 1. Wash with at least 30 column volumes of Sodium Hydroxide (pH 11.0) 2. Flush with at least 30 column volumes of Water (HPLC grade) 3. Re-equilibrate to Mobile phase conditions.
GFC/SEC COLUMNS FOR PROTEINS	(300 x 7.8mm size columns) Rinse with 5 column volumes of: 0.1M Phosphate buffer pH 3.0. For strongly retained proteins: Run 100% Water to 100% Acetonitrile to 100% Water over 60 minutes or wash with 5 column volumes of SDS or 6M Guanidine Thiocyanate or 10% DMSO
ION-EXCHANGE COLUMNS (SAX, SCX, NH2, DEAE)	Rinse with 10 column volumes of: 500mM Phosphate buffer pH 7 10% Acetic acid (Aq) 5 Column Volumes of Water 10 Column Volumes of Phosphate buffer pH 7 5 Column Volumes of Water 10 Column Volumes of Methanol 10 Column Volumes of Water For protein removal Follow the above procedure with this exception: Substitute 10 column volumes of Methanol with 10 column volumes of 5M Urea or 5M Guanidine Thiocyanate

Column Care

- Inject only well-prepared (filtration, liquid/liquid extraction, SPE) clean samples
- Minimize pressure surge; avoid mechanical and thermo shock.
- Use guard columns or on-line filtration.
- Flush columns frequently using an appropriate program
- Remove unstable and strongly retained components of no-interest from samples
- Use low pH (1-6) mobile phase if possible.
- Use organic buffer when operating at medium to high pH (6-10)
- Avoid elevated temperature unless it is necessary
- Add 200 ppm sodium azide in aqueous mobile phase to suppress the growth of the bacteria
- Wash out all buffer salts and store the columns in high organic solution for overnight or long time storage
- Hydrophobic Interaction Chromatography Columns

Matrix	Dimension (mm)	Particle Size (µm)
AKF-PHEMM-154607	4.6×150	7
AKF-PHEMM-154610	4.6×150	10
AKF-PHEMM-154620	4.6×150	20
AKF-PHEMH-254607	4.6×250	7
AKF-PHEMH-254610	4.6×250	10
AKF-PHEMH-254620	4.6×250	20
AKF-PHEMH-036410	6.4×30	10
AKF-C4-MM-154607	4.6×150	7
AKF-C4-MM-154610	4.6×150	10
AKF-C4-MM-154620	4.6×150	20
AKF-C4-MH-254607	4.6×250	7
AKF-C4-MH-254610	4.6×250	10
AKF-C4-MH-254620	4.6×250	20
AKF-C4-MH-036410	6.4×30	10
AKF-C8-MM-154607	4.6×150	7
AKF-C8-MM-154610	4.6×150	10
AKF-C8-MM-154620	4.6×150	20
AKF-C8-MH-254607	4.6×250	7
AKF-C8-MH-254610	4.6×250	10
AKF-C8-MH-254620	4.6×250	20
AKF-C8-MH-036410	6.4×30	10
AKF-ETHMM-154607	4.6×150	7
AKF-ETHMM-154610	4.6×150	10

Matrix	Dimension (mm)	Particle Size (µm)
AKF-ETHMM-154620	4.6×150	20
AKF-ETHMH-254607	4.6×250	7
AKF-ETHMH-254610	4.6×250	10
AKF-ETHMH-254620	4.6×250	20
AKF-ETHMH-036410	6.4×30	10

Ion Exchange Chromatography Columns (strong cation)

Matrix	Dimension (mm)	Particle Size (µm)
AKF-CISLM-050207	2.0×50	5
AKF-CISLM-150207	2.0×150	5
AKF-CISLM-154607	4.6×150	7
AKF-CISLM-154610	4.6×150	10
AKF-CISLM-154620	4.6×150	20
AKF-CISLH-154607	4.6×150	7
AKF-CISLH-154610	4.6×150	10
AKF-CISLH-154620	4.6×150	20
AKF-CISLM-254610	4.6×250	10
AKF-CISLH-254610	4.6×250	10
AKF-CISLH-251010	10×250	10
AKF-CISLH-101010	10×100	10

Ion Exchange Chromatography Columns (Weak Cation)

Matrix	Dimension (mm)	Particle Size (µm)
AKF-CLV-050207	2.0×50	5
AKF-CLV-150207	2.0×150	5
AKF-CLV-154607	4.6×150	7
AKF-CLV-154610	4.6×150	10
AKF-CLV-154620	4.6×150	20
AKF-CHV-154607	4.6×150	7
AKF-CHV-154610	4.6×150	10
AKF-CHV-154620	4.6×150	20
AKF-CLV-254610	4.6×250	10
AKF-CHV-254610	4.6×250	10
AKF-CHV-251010	10×250	10
AKF-CHV-101010	10×100	10

Ion Exchange Chromatography Columns (Strong Anion)

Matrix	Dimension (mm)	Particle Size (µm)
AKF-QLV-050207	2.0×50	5
AKF-QLV-150207	2.0×150	5
AKF-QLV-154607	4.6×150	7
AKF-QLV-154610	4.6×150	10
AKF-QLV-154620	4.6×150	20
AKF-QHV-154607	4.6×150	7
AKF-QHV-154610	4.6×150	10
AKF-QHV-154620	4.6×150	20
AKF-QLV-254610	4.6×250	10
AKF-QHV-254610	4.6×250	10
AKF-QHV-251010	10×250	10
AKF-QHV-101010	10×100	10

TIP: Always use HPLC grade solvents to prolong column lifetime.

Ion Exchange Chromatography Columns (Weak Anion)

Matrix	Dimension (mm)	Particle Size (μm)
AKF-DEAL-050207	2.0×50	5
AKF-DEAL-150207	2.0×150	5
AKF-DEAL-154607	4.6×150	7
AKF-DEAL-154610	4.6×150	10
AKF-DEAL-154620	4.6×150	20
AKF-DEAH-154607	4.6×150	7
AKF-DEAH-154610	4.6×150	10
AKF-DEAH-154620	4.6×150	20
AKF-DEAL-254610	4.6×250	10
AKF-DEAH-254610	4.6×250	10
AKF-DEAH-251010	10×250	10
AKF-DEAH-101010	10×100	10

TIP: Before using HPLC, pay attention to the product information and the required pH range. If you are not familiar, typical pH stability while working with silica based HPLC columns are stable within 2 to 6 range.

HPLC Column Selection

Column Selection Parameters

Stationary Phases

- Reverse Phase [C18 (XBP, AQ, ASB), C8 (XBP, ASB), C4 , Phenyl]: most HPLC analytical and preparative separations; use shorter chain if the retention is too high on C18 columns ; use shorter chain (C8, C4) for proteins and larger peptides.
- Normal Phase [Silica, Amino, SAX, SCX]: for those not applicable on reverse phase; polysaccharides (amino), ion-exchange chromatography, some preparative needs.
- Bi-mode [Cyano, Venusil HILIC]: can be used in both reverse and normal phase modes, alternative selectivity to hydrocarbon-based reverse phases, inert and better reproducibility than silica columns.

Particle Size

- 3 μm: fast analysis, high throughput analytical applications, micro/nano HPLC
- 5 μm: analytical and semi-preparative separation
- 10 μm: preparative separation

Pore Size

- Narrow pore (100-150 Å): MW <3000
- Large pore (300-500 Å): 3000< MW <50000
- Mega pore (1000 Å): MW >50000

Column Length

- Short (30 mm, 50 mm): high throughput analysis and purification, pre-separation
- Regular (100 mm, 150 mm, 250 mm): more complex sample, larger injection volume

Column Diameter

- Capillary (0.5 mm, 1.0 mm): LC-MS, micro-HPLC, very small sample volume
- Analytical (2.1 mm, 4.6 mm, 10 mm): standard HPLC, analytical and mini-prep
- Preparative (21 mm, 30 mm, 50 mm): preparative HPLC

Basic Considerations in Choosing HPLC Columns

Analyte

- **Molecular Weight** – small molecule (<3000), narrow pore; medium molecule(3000- 50000), large pore; large molecule(>50000), mega pore.
- **Solubility in aqueous solutions** – very hydrophilic, use AQ-C18, ASB-C18 or Venusil HILIC; very hydrophobic, use shorter chain phases (C8, C4, Phenyl, CN); in between, use AQ-C18, ASP-C18, XPB-C18 or Phenyl .
- **Difference between the compounds to be separated** – by polarity, use AQ C18, ASB-C18, cyano, HILIC; by shape or regio-isomer, use XBP-C18, phenyl.

Mobile Phase

- **Solution solvent:** 97-100% aqueous solution, AQ-C18 or ASB-C18; normal phase mode with aqueous mobile phase, Venusil HILIC
- **pH:** pH < 2, C18 phases; pH > 9, XBP-C18; pH= 2-9, most phases; (check the pH range for each column before use!)
- **Salt concentration:** high salt concentration >0.1 M (should be avoided if possible), XBP-C18, SCX, SAX.

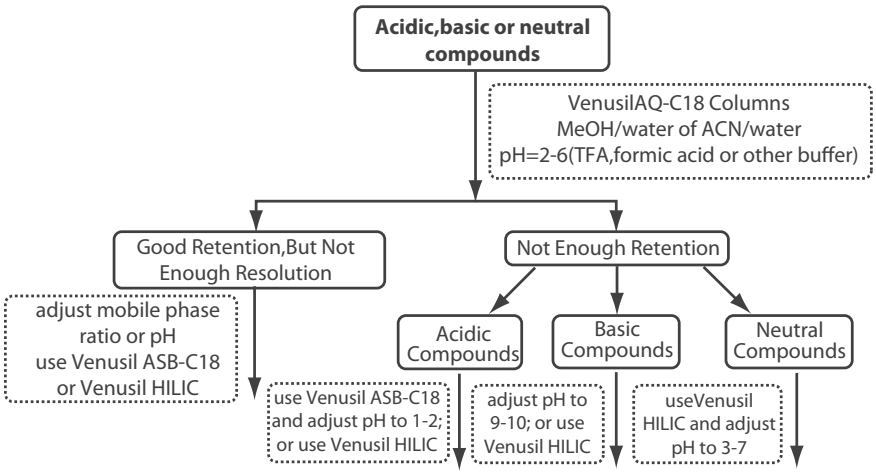
Sample

- Analyte mass/concentration: high mass load, larger diameter column (>10 for preparative).
- Sample volume: small volume, small diameter; large volume, large diameter and length.
- Sample complexity: simple separation, short column; complex separation, long column.

Instrument and Application

- Traditional HPLC analysis: 3µm, 5µm; 4.6 x 100 mm, 4.6 x 150 mm, 4.6 x 250 mm
- High throughput analysis: 3µm, 5µm; 2.1 x 30 mm, 2.1 x 50 mm, 4.6 x 50 mm.
- LC-MS application: 3µm, 5µm; 1.0 x 30 mm, 1.0 x 50 mm, 2.1 x 30 mm, 2.1 x 50 mm, 2.1 x 100 mm.
- Micro HPLC: 3µm, 5µm; 0.5 x 30 mm, 0.5 x 50 mm, 0.5 x 100 mm.
- Preparative HPLC: 5µm, 10µm; 21 x 50 mm, 21 x 150 mm, 21 x 250 mm, 30 x 150 mm, 30 x 250 mm, 50 x 250 mm.

Column Selection Diagram



Cross-reference for GS-Tek Venusil Series Columns

	XBP C18	XBP C18 (2)	XBP C8	XBP(L) C18	XBP(L) C8	ASB C18	ASB C8	AQ C18	HILIC
Agilent									
SB-C18						R			
SB-C8							R		
XDB-C18				R					
XDB-C8					R				
SB-Aq								R	
Waters									
Sunfire-C18	R	R							
Sunfire C8			R						
Atlantis-C18 (AQ)								E	
Atlantis-HILIC									R

	XBP C18	XBP C18 (2)	XBP C8	XBP(L) C18	XBP(L) C8	ASB C18	ASB C8	AQ C18	HILIC
Phenomenex									
Luna-C18	E								
Luna-C8			E						
Luna-C18 (2)		E							
Supelco									
Discovery-C18				E					
Discovery-C8					E				
Asentics-C18	E								
Asentics-C8			E						
GL Science									
Insertsil ODS-3								R	

Comparison of Particle Characteristics of Typical HPLC Stationary Phases

Stationary Phase	Particle um	Pore(A)	Surface(m2/g)	C%	End Capping	High Purity Silica
Venusil XBP-C18 (2)	5	100	380	19	double	Yes
Venusil XBP-C18	5	100	380	22	double	yes
Venusil AQ-C18	5	100	380	18	yes	yes
Venusil ASB-C18	5	150	200	11	no	yse
Venusil XBP-C18(L)	5	150	200	14	double	yes
ZORBAX SB-C18	5	80	180	10	no	yes
ZORBAX XDB-C18	5	80	180	12	yes	yes
Waters SunFire C18	5	100	340	16	yes	yes
Waters Symmetry C18	5	100	335	19	yes	yes
Waters XTerra MS C18	5	125	—	15.5	yes	—
Hypersil BDS C18	5	130	170	11	yes	no
Hypersil ODS	5	120	170	10	yes	no
Inertsil ODS	5	100	350	14	yes	no
Inertsil ODS3	5	100	450	15	yes	yes
Kromasil C18	5	100	340	19	yes	special
Supelco Discovery C18	5	180	200	12	yes	yes
Luna C18(2)	5	100	400	17.5	yes	yes

USP Column Selection Guide

USP	Specifications	Column	Particle Shape
L01	Octadecyl silane bonded to porous silica or ceramic microparticles, 3 to 10µm in diameter.	Venusil C18	Spherical
L02	Octadecyl silane chemically bonded to silica gel of a controlled surface porosity that has been bonded to a solid spherical core, 30 to 50µm in diameter	Please call	
L03	Porous silica microparticles, 5 to 10 µm in diameter	Venusil silica	Spherical
L04	Silica gel of controlled surface porosity bonded to a solid spherical core, 30 to 50µm in diameter.	Please call	
L05	Alumina of controlled surface porosity bonded to a solid spherical core, 30 to 50 µm in diameter.	Please call	
L06	Strong cation-exchange packing: sulfonated fluorocarbon polymer coated on a solid spherical core, 30 to 50 µm in diameter.	Please call	
L07	Octylsilane bonded to totally porous microsilica particles, 3 to 10 µm in diameter.	Venusil C8	Spherical
L08	An essentially monomolecular layer of aminopropyl-silane chemically bonded to totally porous silica gel support, 10 µm in diameter.	Venusil NH2	Spherical
L09	10 µm irregular totally porous silica gel having a chemically bonded, strongly acidic cation-exchange coating.	Please call	Irregular
L10	Nitrile groups chemically bonded to porous silica microparticles, 3 to 10 µm in diameter.	Venusil CN	Spherical
L11	Phenyl groups chemically bonded to porous silica micro-particles, 3 to 10 µm in diameter.	Venusil Phenyl	Spherical
L12	Strong anion-exchange packing made by chemically bonding a quaternary amine to a solid silica spherical core, 30 to 50 µm in diameter	Please call	
L13	Trimethylsilane chemically bonded to porous silica microparticles, 3 to 10 µm in diameter.	Please call	Spherical
L14	Silica gel, 10 µm in diameter, having a chemically bonded, strongly basic quaternary ammonium anion-exchange coating.	Please call	Spherical
L15	Hexyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.	Please call	
L16	Dimethyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.	Please call	Spherical

USP	Specifications	Column	Particle Shape
L17	Strong cation exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 7 to 11 µm in diameter.	AKF CISLH columns	Spherical
L18	Amino and cyano groups chemically bonded to porous silica particles, 5 to 10 µm in diameter.	Please call	Irregular
L19	Strong cation exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, 9 µm in diameter.	AKF CISLM columns	Spherical
L20	Dihydroxypropane groups chemically bonded to	Please call	Spherical
L21	A rigid, spherical styrene-divinylbenzene copolymer, 5 to 10 µm in diameter.	AKF RP columns	Spherical
L22	A cation exchange resin made of porous polystyrene gel with sulfonic acid groups, about 10 µm in size.	AKF CISLH columns	Spherical
L23	An ion exchange resin made of porous polymethacrylate or polyacrylate gel with quaternary ammonium groups, about 10 µm in size.	Please call	Spherical
L24	A semi-rigid hydrophilic gel consisting of vinyl polymers with numerous hydroxyl groups on the matrix surface, 32 to 63 µm in diameter.	Please call	
L25	Packing having the capacity to separate compounds with a MW range from 100 to 5000 daltons (as determined by polyethylene oxide), applied to neutral	Please call	Spherical
L26	Butyl silane chemically bonded to totally porous silica particles, 5 to 10 µm in diameter.	Venusil C4	Spherical
L27	Porous silica particles, 30 to 50 µm in diameter.	Please call	
L28	A multifunctional support, which consists of a high purity, 100 Å spherical silica substrate that has been bonded with anionic (amine) functionality.	Please call	
L29	Gamma alumina, reversed phase, low carbon percentage by weight, alumina-based polybutadiene spherical particles, 5 µm diameter w/a pore diameter of 80 Å	Please call	
L30	Ethyl silane chemically bonded to a totally porous silica particle, 3 to 10 µm in diameter.	Please call	Irregular
L31	A strong anion-exchange resin-quaternary amine bonded on latex particles attached to a core of 8.5 µm macroporous particles having a pore size of 2000 Å.	Please call	
L32	A chiral ligand-exchange packing- L-proline copper complex covanlently bonded to irregularly shaped silica particles, 5 to 10 µm in diameter.	Please call	Spherical
L33	Packing having the capacity to separate proteins of 4,000 to 400,000 daltons. It is spherical, silicabased and processed to provide pH stability.	Please call	Spherical
L34	Strong cation exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, 9 µm in diameter.	Please call	Spherical
L35	A zirconium-stabilized spherical silica packing with a hydrophilic (diol-type) molecular monolayer bonded phase having a pore size of 150 Å.	Please call	Spherical
L36	L-Phenylglycine-3,5-dinitrobenzoyl on 5 µm aminopropyl silica	Nucleosil Chiral-3	Spherical
L37	Polymethacrylate gel for proteins 2000~40,000 MW	Please call	Spherical
L38	Methacrylate-based SEC column for water-solubles	Please call	Spherical
L39	Hydrophilic polyhydroxymethacrylate gel of totally porous spherical resin	Please call	Spherical
L40	Cellulose tris-3,5 dimethylphenylcarbamate coated	Please call	