HPLC COLUMNS

VERTICAL™

Brochure # 003

Company Overview

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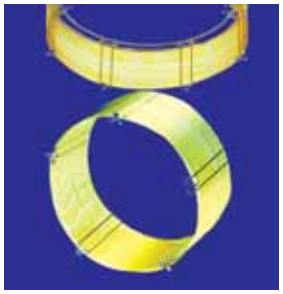
Vertical Chromatography Co.,Ltd. in Bangkok, Thailand was established in 2004 to provide more direct contact with a growing Asia customer.

From the beginning, **Vertical** was developed as an independent site for the manufacturing of chromatography products such as HPLC columns, Capillary column, SPE and Filtration products. Strong technical support and exellent customer relationship contributed to **Vertical** quick growth and the territory was expanded through Asia Pacific.

Vertical serves chemists and biochemists in the field of pharmceuticals, food, drugs, petrochemicals, chemicals, environmental and biotech. We offer a full line of products to meet your chromatography works.

Because of our unique business structure and superior production process, we are able to provide products of the highest quality at very competitive prices. We are also very proud of our full support for customers' applications, and we are willing to customize our products to meet any specific requirement of our customers. All of our products is guaranteed for customers' satisfaction.

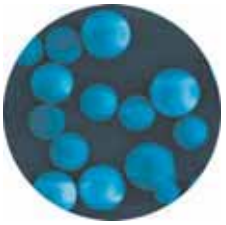




HPLC COLUMNS

Content

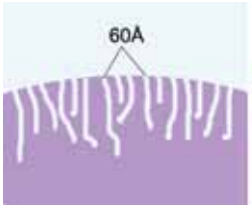
Choosing Packing Materials

Base Materials
Silica-based packings are compatible with a wide range of aqueous and organic solvents. Silica-based column can withstand high pressure. Most silica are stable from pH 2-7.5 but special silica may stable from pH 1-10. Silica provides high resolution or sharp peaks with small molecules. Silica-based column are offen used for separations of low molecular weight analytes.
Cross-linked styrene-divinylbenzene polymer-based packings are compatible with most mobile phase solvents and sample with a pH 1-14. Polymer-based packing have lower efficiencies for a small molecules compared to silica-based due to samller surface area. Polymer-based packing is offen used for ion exchange chromatography.

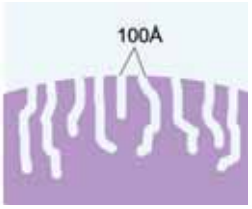

Polymer packing, 10µm


Silica packing, 5µm

Particle Size
Standard particle size is 5 µm. Smaller particle sizes give higher efficiency and higher resolution than larger particle sizes. Larger particle sizes offer faster flow rates and lower back-pressure.



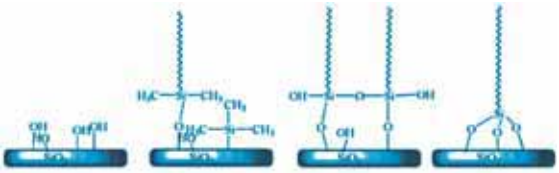
Silica 60Å pore size



Silica 100Å pore size

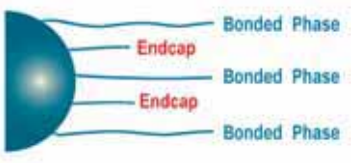
Pore Size
In general, packing materials with a smaller pore size have higher surface areas and higher capacities than packing materials with larger pore sizes. For general purpose reverse phase application, pore size 100-120 is recommended. For higher resolution, pore size 60-80 is recommended. For large molecule such as proteins, pores size 300 is recommended.

Surface Area
A larger surface offers higher capacity and greater resolution. Smaller surface areas equilibrate faster.

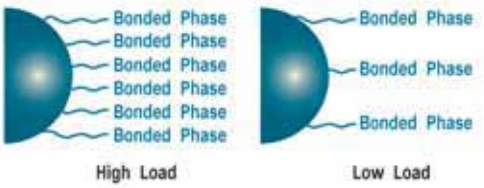

Silica Surface | Monomeric bonding | Polymeric bonding

Phase Type
There are 2 types of bonding, polymeric and monomeric. Polymeric bonding offers better column stability under aggressive mobile phase. Monomeric bonding offers lower back pressure. However, high-purity silica phases are very stable whether monomeric or polymeric bonding.

Endcapping
Free silanol in silica-based reversed-phase packings will interact with polar compounds. Endcapping the bonded phase with C2-C4 will minimizes these interactions. However, non-endcapped phases enhance polar selectivity and stronger retention of polar organic compounds.



Carbon Load
Lower carbon loads are more weakly hydrophobic and reduce retention times. Higher carbon load offer higher capacity and greater resolution.



Choosing Column Formats

Column Length
Shorter columns offer faster run times. Longer columns offer greater resolution. 10-50 mm length is recommended for fast separations, method development. 150mm length is recommended for general separations. 250mm length is recommended for high resolution separations.

Column i.d.
The standard column i.d. is 4.6mm. Narrower columns allow smaller sample sizes, and reduce mobile phase flow rates. Wider columns allow for larger sample sizes and minimize the system's dead volume.

HPLC Column Formats
Vertical offers HPLC columns in several different formats for different applications.
A. Analytical Columns – 50 to 300mm lengths, 4.6mm i.d.
B. Short Columns – 10 or 50mm lengths, 4.6mm i.d
C. Narrow-Bore Columns – 50 to 300mm lengths, 3.0mm i.d
Smaller i.d. significantly reduces solvent usage. Compatible with both APCI and ESI.
D. Capillary and LC/MS Columns – 50 to 300mm lengths, 150µm-2.1mm i.d.s
Small-bore columns compatible with LC/MS instrumentation.
E. Preparative Columns – 50 to 300mm lengths, 7-50mm i.d.s
High volume and mass loading capacity.
F. PEEK Columns – 50 to 300mm lengths, 2.1, 4.6mm i.d.
Complete Bio-compatibilty and IC applications
G. Guard Cartridges – 7.5mm length 2.1, 3.2, 4.6mm i.d.
The Guard System has disposable cartridges for quick and easy replacement.

Choosing Columns

Vertical VertiSep Series

VertiSep

Vertical manufactures our columns to the highest standards of quality and reproducibility with our technical expertise for the best columns, the best applications, and the best technical support.

UPS

VertiSep™ UPS Ultra High Purity Silica – Vertical 's Top series
VertiSep UPS phases are made from Ultra-high purity silica. Eliminate bleed and tailing, and choose from a full selection of phases and formats to optimize your retention and resolution.

AQS

VertiSep™ AQS Reversed-phase columns for use with 100% Aqueous mobile phases
VertiSep AQS phases are compatible with a full range of aqueous mobile phases for excellent retention of highly polar analytes.

HCS

VertiSep™ HCS Highest Carbon loading Reverse-Phase Columns for high resolution applications
VertiSep HCS phases are highest carbon loading, polymeric bonding and endcapping for highest resolution and long column lifetimes

BDS

VertiSep™ BDS Base-Deactivated Silica- the equivalent for Hypersil BDS
VertiSep BDS phase has physical and performance characteristics very similar to those of Hypersil BDS and exellent support for analysis of basic compounds.

BIO

VertiSep™ BIO Special packings for protein and life science applications
VertiSep BIO large-pore phases are ideal for large molecules, a variety of life science and proteomic applications.

GES

VertiSep™ GES General Purpose, economical columns
VertiSep GES phases provide performance and reliability at an exceptional price. easily scale-up from analytical to affordable prep columns. Broad pH stability and high efficiency make it an economical general purpose applications

SUGAR

VertiSep™ SUGAR Special packings for sugar or carbohydrate applications
VertiSep Carbohydrate are polymer-based packing for separation of sugars or carbohydrate.

OA

VertiSep™ OA Special packings for organic acids by ion exclusion chromatography
VertiSep OA are polymer-based packing for separation of weakly ionizable species such as organic acids and alcohols by ion exclusion chromatography.

AMINO

VertiSep™ AMINO Special packings for amino acids by Cation exhange chromatography
VertiSep AMINO are polymer-based packing for high efficiency and high resolution separation of amino acids by cation exchange chromatography. Available for both complex physiological fluids and protein hydrolysate amino acids.

IC

VertiSep™ IC Special packings for ions by ion exchange chromatography
VertiSep IC are polymer-based packing for inorganic or organic anions and cations by ion exchange chromatography followed by suppressed or non-suppressed conductivity detection.

VertiSep Packings Specification

Packing	Base Material	Particle Shape	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped	USP L-Code
VertiSep™ UPS									
C18	Silica	Spherical	3,5	17	100	1.1	450	Yes	L1
C8	Silica	Spherical	3,5	9	100	1.1	450	Yes	L7
Phenyl	Silica	Spherical	3,5	9.5	100	1.1	450	Yes	L11
Cyano	Silica	Spherical	3,5	-	100	1.1	450	No	L10
Silica	Silica	Spherical	3,5	-	100	1.1	450	No	L3
VertiSep™ AQS									
C18	Silica	Spherical	3,5	15	120	1.0	300	Yes	L1
C8	Silica	Spherical	3,5	8	120	1.0	300	Yes	L7
Phenyl	Silica	Spherical	3,5	7	120	1.0	300	Yes	L11
Cyano	Silica	Spherical	3,5	-	120	1.0	300	No	L10
NH2	Silica	Spherical	3,5	-	120	1.0	300	No	L8
Silica	Silica	Spherical	3,5	-	120	1.0	300	No	L3
VertiSep™ HCS									
C18	Silica	Spherical	3,5	23	100	1.0	350	Yes	L1
C8	Silica	Spherical	3,5	13	100	1.0	350	Yes	L7
Phenyl	Silica	Spherical	3,5	8	100	1.0	350	Yes	L11
C4	Silica	Spherical	3,5	6	100	1.0	350	Yes	L26
Cyano	Silica	Spherical	3,5	-	100	1.0	350	Yes	L10
NH2	Silica	Spherical	3,5	-	100	1.0	350	No	L8
Silica	Silica	Spherical	3,5	-	100	1.0	350	No	L3
VertiSep™ BDS									
C18	Silica	Spherical	3,5	11	140	0.6	150	Yes	L1
C8	Silica	Spherical	3,5	6	140	0.6	150	Yes	L7
Phenyl	Silica	Spherical	3,5	5	140	0.6	150	Yes	L11
Cyano	Silica	Spherical	3,5	-	140	0.6	150	Yes	L10
VertiSep™ BIO									
C18	Silica	Spherical	5,10	8	300	0.9	100	Yes	L1
C8	Silica	Spherical	5,10	6	300	0.9	100	Yes	L7
C4	Silica	Spherical	5,10	4	300	0.9	100	Yes	L26
VertiSep™ GES									
C18	Silica	Spherical	3,5	17	120	1.0	300	Yes	L1
C8	Silica	Spherical	3,5	13	120	1.0	300	Yes	L7
Phenyl	Silica	Spherical	3,5	8	120	1.0	300	Yes	L11
C4	Silica	Spherical	3,5	6	120	1.0	300	Yes	L26
Cyano	Silica	Spherical	3,5	-	120	1.0	300	Yes	L10
NH2	Silica	Spherical	3,5	-	120	1.0	300	No	L8
Silica	Silica	Spherical	3,5	-	120	1.0	300	No	L3

VertiSep™ UPS HPLC Columns

- **Ultra-high purity spherical silica offer excellent stability, efficiency and column-to-column reproducibilty**
- **Ultra-high surface area offer ultra high resolution for gradient elution of diffculty separation compounds**
- **High carbon loading C18 offers the high degree of hydrophobicity**
- **Fully endcapped to improve peak shape**
- **Monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes.**

VertiSep™ UPS packing are ultra-high purity silica which contains less amonts of metal ions and sulfate contaminants offer excellent stability, efficiency, column-to-column reproducibility and long lifetime at high and low pH levels and ideal for LC/MS or ELSD application **(Figure 1,2,3,4)**

VertiSep™ UPS packing are ultra-high surface of 450 m^2/g offer greater capacity and higher resolution for gradient elution of difficult separation compounds like basic drugs, organic acids and other polar compounds.

VertiSep™ UPS reverse phase C18 has high carbon loading of 17% offerring the high degree of hydrophobicity.

VertiSep™ UPS reverse phase packings are fully endcapped after bonding to cover unreached silanols and improve peak symmetry for basic analytes.

VertiSep™ UPS packings are monomeric bonding resulting in lower column back pressure and high column efficiency to better resolve chemically similar analytes.

VertiSep™ UPS Packing Specifications

Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped
C18	3,5	17	100	1.1	450	Yes
C8	3,5	9	100	1.1	450	Yes
Phenyl	3,5	9.5	100	1.1	450	Yes
Cyano	3,5	-	100	1.1	450	No
Silica	3,5	-	100	1.1	450	No

Figure 1. Comparison of Column-to-Column Reproducibility

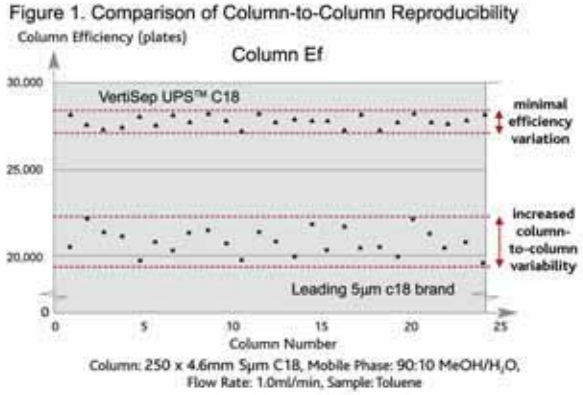


Figure 2. VertiSep UPS™ C18 Acidic Robustness at pH 1.8

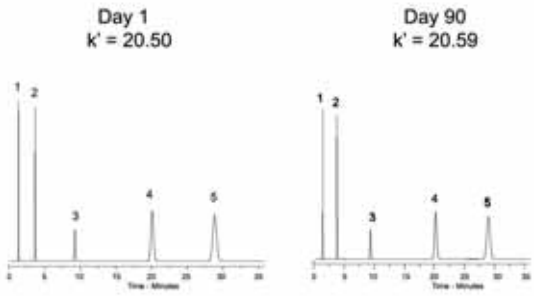


Figure 3. VertiSep UPS™ C18 Basic Robustness at pH 11.0

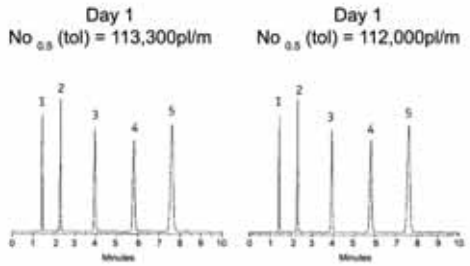
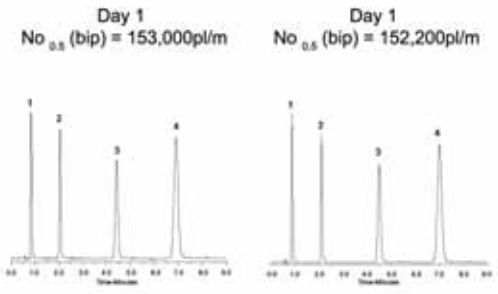


Figure 4. VertiSep UPS™ C18 LC/MS Robustness at pH 10.5



VertiSep™ UPS Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
C18	3	LC/MS	2.1 x 10	03CA-B111	
	3	LC/MS	2.1 x 20	03CA-B611	
	3	LC/MS	2.1 x 50	03CA-B211	
	3	LC/MS	2.1 x 100	03CA-B311	
	3	LC/MS	2.1 x 150	03CA-B411	
	3	LC/MS	3.2 x 100	03CA-J311	
	3	LC/MS	3.2 x 150	03CA-J411	
	3	Analytical	4.6 x 50	03CA-E211	
	3	Analytical	4.6 x 100	03CA-E311	
	3	Analytical	4.6 x 150	03CA-E411	
	5	LC/MS	2.1 x 10	03CA-B121	
	5	LC/MS	2.1 x 20	03CA-B621	
	5	LC/MS	2.1 x 50	03CA-B221	
	5	LC/MS	2.1 x 100	03CA-B321	
	5	LC/MS	2.1 x 150	03CA-B421	
	5	LC/MS	3.2 x 50	03CA-J221	
	5	LC/MS	3.2 x 100	03CA-J321	
	5	LC/MS	3.2 x 150	03CA-J421	
	5	Analytical	4.6 x 50	03CA-E221	
	5	Analytical	4.6 x 100	03CA-E321	
	5	Analytical	4.6 x 150	03CA-E421	
	5	Analytical	4.6 x 250	03CA-E521	
C8	3	LC/MS	2.1 x 10	03CB-B111	
	3	LC/MS	2.1 x 20	03CB-B611	
	3	LC/MS	2.1 x 50	03CB-B211	
	3	LC/MS	2.1 x 100	03CB-B311	
	3	LC/MS	2.1 x 150	03CB-B411	
	3	LC/MS	3.2 x 100	03CB-J311	
	3	LC/MS	3.2 x 150	03CB-J411	
	3	Analytical	4.6 x 50	03CB-E211	
	3	Analytical	4.6 x 100	03CB-E311	
	3	Analytical	4.6 x 150	03CB-E411	
	5	LC/MS	2.1 x 10	03CB-B121	
	5	LC/MS	2.1 x 20	03CB-B621	
	5	LC/MS	2.1 x 50	03CB-B221	
	5	LC/MS	2.1 x 100	03CB-B321	
	5	LC/MS	2.1 x 150	03CB-B421	
	5	LC/MS	3.2 x 100	03CB-J321	
	5	LC/MS	3.2 x 150	03CB-J421	
	5	Analytical	4.6 x 50	03CB-E221	
	5	Analytical	4.6 x 100	03CB-E321	
	5	Analytical	4.6 x 150	03CB-E421	
	5	Analytical	4.6 x 250	03CB-E521	

VertiSep™ UPS

VertiSep™ UPS Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
Phenyl	3	LC/MS	2.1 x 10	03CD-B111	
	3	LC/MS	2.1 x 20	03CD-B611	
	3	LC/MS	2.1 x 50	03CD-B211	
	3	LC/MS	2.1 x 100	03CD-B311	
	3	LC/MS	2.1 x 150	03CD-B411	
	3	LC/MS	3.2 x 100	03CD-J311	
	3	LC/MS	3.2 x 150	03CD-J411	
	3	Analytical	4.6 x 50	03CD-E211	
	3	Analytical	4.6 x 100	03CD-E311	
	3	Analytical	4.6 x 150	03CD-E411	
	5	LC/MS	2.1 x 10	03CD-B121	
	5	LC/MS	2.1 x 20	03CD-B621	
	5	LC/MS	2.1 x 50	03CD-B221	
	5	LC/MS	2.1 x 100	03CD-B321	
	5	LC/MS	2.1 x 150	03CD-B421	
	5	LC/MS	3.2 x 50	03CD-J221	
	5	LC/MS	3.2 x 100	03CD-J321	
	5	LC/MS	3.2 x 150	03CD-J421	
	5	Analytical	4.6 x 50	03CD-E221	
	5	Analytical	4.6 x 100	03CD-E321	
	5	Analytical	4.6 x 150	03CD-E421	
	5	Analytical	4.6 x 250	03CD-E521	
Cyano	3	LC/MS	2.1 x 10	03CE-B111	
	3	LC/MS	2.1 x 20	03CE-B611	
	3	LC/MS	2.1 x 50	03CE-B211	
	3	LC/MS	2.1 x 100	03CE-B311	
	3	LC/MS	2.1 x 150	03CE-B411	
	3	LC/MS	3.2 x 100	03CE-J311	
	3	LC/MS	3.2 x 150	03CE-J411	
	3	Analytical	4.6 x 50	03CE-E211	
	3	Analytical	4.6 x 100	03CE-E311	
	3	Analytical	4.6 x 150	03CE-E411	
	5	LC/MS	2.1 x 10	03CE-B121	
	5	LC/MS	2.1 x 20	03CE-B621	
	5	LC/MS	2.1 x 50	03CE-B221	
	5	LC/MS	2.1 x 100	03CE-B321	
	5	LC/MS	2.1 x 150	03CE-B421	
	5	LC/MS	3.2 x 100	03CE-J321	
	5	LC/MS	3.2 x 150	03CE-J421	
	5	Analytical	4.6 x 50	03CE-E221	
	5	Analytical	4.6 x 100	03CE-E321	
	5	Analytical	4.6 x 150	03CE-E421	
	5	Analytical	4.6 x 250	03CE-E521	

VertiSep™ UPS Columns

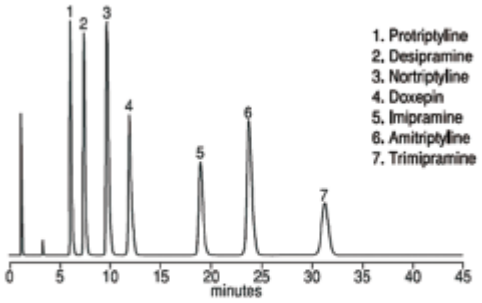
Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
Silica	3	LC/MS	2.1 x 10	03CG-B111	
	3	LC/MS	2.1 x 20	03CG-B611	
	3	LC/MS	2.1 x 50	03CG-B211	
	3	LC/MS	2.1 x 100	03CG-B311	
	3	LC/MS	2.1 x 150	03CG-B411	
	3	LC/MS	3.2 x 100	03CG-J311	
	3	LC/MS	3.2 x 150	03CG-J411	
	3	Analytical	4.6 x 50	03CG-E211	
	3	Analytical	4.6 x 100	03CG-E311	
	3	Analytical	4.6 x 150	03CG-E411	
	5	LC/MS	2.1 x 100	03CG-B321	
	5	LC/MS	2.1 x 150	03CG-B421	
	5	LC/MS	3.2 x 150	03CG-J321	
	5	LC/MS	3.2 x 150	03CG-J421	
	5	Analytical	4.6 x 50	03CG-E221	
	5	Analytical	4.6 x 100	03CG-E321	
	5	Analytical	4.6 x 150	03CG-E421	
	5	Analytical	4.6 x 250	03CG-E521	

VertiSep™ UPS Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
C18	Guard	2.1 x 10	3	03CA-B113	
	Guard	3.2 x 10	3	03CA-J113	
	Guard	4.6 x 10	3	03CA-E113	
C8	Guard	2.1 x 10	3	03CB-B113	
	Guard	3.2 x 10	3	03CB-J113	
	Guard	4.6 x 10	3	03CB-E113	
Phenyl	Guard	2.1 x 10	3	03CD-B113	
	Guard	3.2 x 10	3	03CD-J113	
	Guard	4.6 x 10	3	03CD-E113	
Cyano	Guard	2.1 x 10	3	03CE-B113	
	Guard	3.2 x 10	3	03CE-J113	
	Guard	4.6 x 10	3	03CE-E113	
Silica	Guard	2.1 x 10	3	03CG-B113	
	Guard	3.2 x 10	3	03CG-J113	
	Guard	4.6 x 10	3	03CG-E113	
Guard Holder			1	0300-0001	

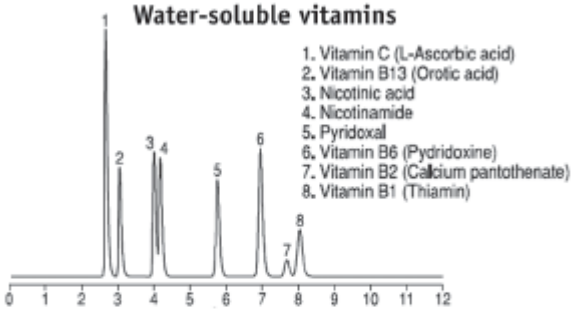
*Guard holder required

Tricyclic antidepressants



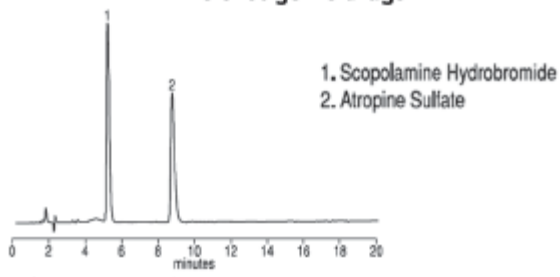
Column : VertiSep UPS C18 5u 4.6x150mm
Mobile Phase: CH_3OH/20mM KH_2PO_4 (pH 7.0)=70/30
Flow Rate: 1.2mL/min
Detector: UV240nm
Temp: 30 ℃

Water-soluble vitamins



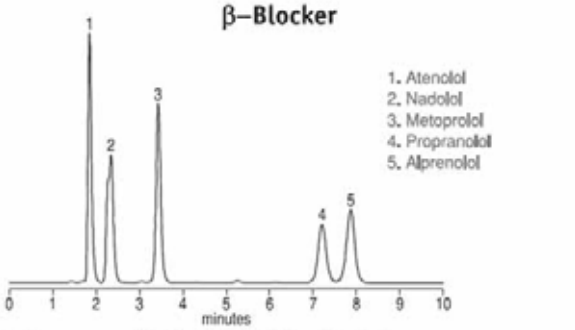
Column : VertiSep UPS C18 5u 4.6x250mm
Mobile Phase: 20mM H_3PO_4 + 5mM Sodium1
-Pentanesulfonate/CH3CN=92/8
Flow Rate: 1.0mL/min
Detector: UV210nm
Temp: 40 ℃

Anticholigenic drugs



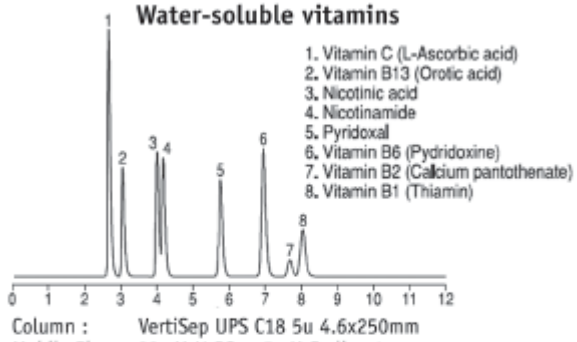
Column : VertiSep UPS C18 5u 4.6x150mm
Mobile Phase: CH_3OH/30mM NaH_2PO_4=15/85
Flow Rate: 1.0mL/min
Detector: UV254nm
Temp: 40 ℃

β–Blocker



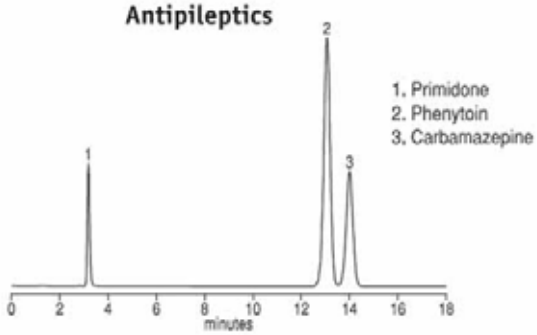
Column : VertiSep UPS C18 5u 4.6x150mm
Mobile Phase: CH_3OH/20mM KH_2PO_4-K_2HPO_4(pH 7.0)=60/40
Flow Rate: 1.0mL/min
Detector: UV220nm
Temp: 40 ℃

Water-soluble vitamins



Column : VertiSep UPS C18 5u 4.6x250mm
Mobile Phase: 20mM H_3PO_4 + 5mM Sodium1
-Pentanesulfonate/CH3CN=92/8
Flow Rate: 1.0mL/min
Detector: UV210nm
Temp: 40 ℃

Antipileptics



Column : VertiSep UPS C18 5u 4.6x150mm
Mobile Phase: CH_3CN/20mM KH_2PO_4-K_2HPO_4 (pH 7.0)=70/30
Flow Rate: 1.0mL/min
Detector: UV220nm
Temp: 30 ℃

VertiSep™ AQS HPLC Columns

- **Ultra-high purity spherical silica offer excellent stability, efficiency and column-to-column reproducibilty**
- **Stable and strong retention in 100% aqueous mobile phase for hydrophilic or polar compounds**
- **High carbon loading C18 offers high degree of hydrophobicity**
- **high surface area offers high resolution for gradient elution of diffculty separation compounds**
- **Fully endcapped to improve peak shape**
- **Monomeric bonding offers low back pressure and high column efficiency to better resolve chemically similar analytes.**

VertiSep™ AQS packing are ultra-high purity silica which contains less amonts of metal ions and sulfate contaminants offer excellent stability, efficiency, column-to-column reproducibility and long lifetime at high and low pH levels and ideal for LC/MS or ELSD application.

VertiSep™ AQS are stable and strong retention in 100% aqueous mobile phase for hydrophilic or polar compounds such as biomolecules, metabolytes, oligosaccharides, amino acids, small peptides. nucleotides and organic acids.

VertiSep™ AQS packing are high surface of 300 m^2/g offer high capacity and high resolution for fast gradient elution.

VertiSep™ AQS reverse phase C18 are high carbon loading of 15% offerring the high degree of hydrophobicity.

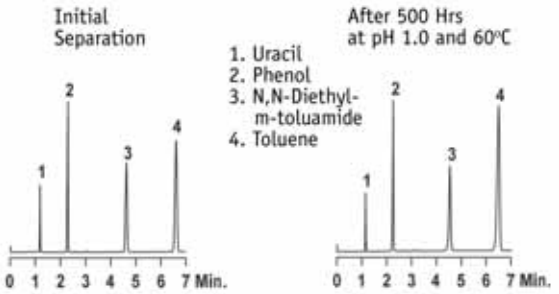
VertiSep™ AQS reverse phase are fully endcapped an show selectivity as conventional C18 phases.

VertiSep™ AQS packings are monomeric bonding resulting in lower column back pressure and high column efficiency to better resolve chemically similar analytes.

VertiSep™ AQS Packing Specifications

Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped
C18	3,5	15	120	1.0	300	Yes
C8	3,5	8	120	1.0	300	Yes
Phenyl	3,5	7	120	1.0	300	Yes
Cyano	3,5	-	120	1.0	300	No
NH2	3,5	-	120	1.0	300	No
Silica	3,5	-	120	1.0	300	No

Stability Test



Column : VertiSep AQS C18 5u 4.6x150mm
Mobile Phase: CH_3CN/H_2O=58/42
Flow Rate: 1.0mL/min
Detector: UV254nm

VertiSep™ AQS Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
C18	3	LC/MS	2.1 x 10	03DA-B111	
	3	LC/MS	2.1 x 20	03DA-B611	
	3	LC/MS	2.1 x 50	03DA-B211	
	3	LC/MS	2.1 x 100	03DA-B311	
	3	LC/MS	2.1 x 150	03DA-B411	
	3	LC/MS	3.2 x 100	03DA-J311	
	3	LC/MS	3.2 x 150	03DA-J411	
	3	Analytical	4.6 x 50	03DA-E211	
	3	Analytical	4.6 x 100	03DA-E311	
	3	Analytical	4.6 x 150	03DA-E411	
	5	LC/MS	2.1 x 10	03DA-B121	
	5	LC/MS	2.1 x 20	03DA-B621	
	5	LC/MS	2.1 x 50	03DA-B221	
	5	LC/MS	2.1 x 100	03DA-B321	
	5	LC/MS	2.1 x 150	03DA-B421	
	5	LC/MS	3.2 x 50	03DA-J221	
	5	LC/MS	3.2 x 100	03DA-J321	
	5	LC/MS	3.2 x 150	03DA-J421	
	5	Analytical	4.6 x 50	03DA-E221	
	5	Analytical	4.6 x 100	03DA-E321	
	5	Analytical	4.6 x 150	03DA-E421	
	5	Analytical	4.6 x 250	03DA-E521	
	5	Prep	30 x 150	03DA-I421	
	5	Prep	30 x 250	03DA-I521	
C8	3	LC/MS	2.1 x 10	03DB-B111	
	3	LC/MS	2.1 x 20	03DB-B611	
	3	LC/MS	2.1 x 50	03DB-B211	
	3	LC/MS	2.1 x 100	03DB-B311	
	3	LC/MS	2.1 x 150	03DB-B411	
	3	LC/MS	3.2 x 100	03DB-J311	
	3	LC/MS	3.2 x 150	03DB-J411	
	3	Analytical	4.6 x 50	03DB-E211	
	3	Analytical	4.6 x 100	03DB-E311	
	3	Analytical	4.6 x 150	03DB-E411	
	5	LC/MS	2.1 x 10	03DB-B121	
	5	LC/MS	2.1 x 20	03DB-B621	
	5	LC/MS	2.1 x 50	03DB-B221	
	5	LC/MS	2.1 x 100	03DB-B321	
	5	LC/MS	2.1 x 150	03DB-B421	
	5	LC/MS	3.2 x 100	03DB-J321	
	5	LC/MS	3.2 x 150	03DB-J421	
	5	Analytical	4.6 x 50	03DB-E221	
	5	Analytical	4.6 x 100	03DB-E321	
	5	Analytical	4.6 x 150	03DB-E421	
	5	Analytical	4.6 x 250	03DB-E521	

VertiSep™ AQS Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
Phenyl	3	LC/MS	2.1 x 10	03DD-B111	
	3	LC/MS	2.1 x 20	03DD-B611	
	3	LC/MS	2.1 x 50	03DD-B211	
	3	LC/MS	2.1 x 100	03DD-B311	
	3	LC/MS	2.1 x 150	03DD-B411	
	3	LC/MS	3.2 x 100	03DD-J311	
	3	LC/MS	3.2 x 150	03DD-J411	
	3	Analytical	4.6 x 50	03DD-E211	
	3	Analytical	4.6 x 100	03DD-E311	
	3	Analytical	4.6 x 150	03DD-E411	
	5	LC/MS	2.1 x 10	03DD-B121	
	5	LC/MS	2.1 x 20	03DD-B621	
	5	LC/MS	2.1 x 50	03DD-B221	
	5	LC/MS	2.1 x 100	03DD-B321	
	5	LC/MS	2.1 x 150	03DD-B421	
	5	LC/MS	3.2 x 50	03DD-J221	
	5	LC/MS	3.2 x 100	03DD-J321	
	5	LC/MS	3.2 x 150	03DD-J421	
	5	Analytical	4.6 x 50	03DD-E221	
	5	Analytical	4.6 x 100	03DD-E321	
	5	Analytical	4.6 x 150	03DD-E421	
	5	Analytical	4.6 x 250	03DD-E521	
Cyano	3	LC/MS	2.1 x 10	03DE-B111	
	3	LC/MS	2.1 x 20	03DE-B611	
	3	LC/MS	2.1 x 50	03DE-B211	
	3	LC/MS	2.1 x 100	03DE-B311	
	3	LC/MS	2.1 x 150	03DE-B411	
	3	LC/MS	3.2 x 100	03DE-J311	
	3	LC/MS	3.2 x 150	03DE-J411	
	3	Analytical	4.6 x 50	03DE-E211	
	3	Analytical	4.6 x 100	03DE-E311	
	3	Analytical	4.6 x 150	03DE-E411	
	5	LC/MS	2.1 x 10	03DE-B121	
	5	LC/MS	2.1 x 20	03DE-B621	
	5	LC/MS	2.1 x 50	03DE-B221	
	5	LC/MS	2.1 x 100	03DE-B321	
	5	LC/MS	2.1 x 150	03DE-B421	
	5	LC/MS	3.2 x 100	03DE-J321	
	5	LC/MS	3.2 x 150	03DE-J421	
	5	Analytical	4.6 x 50	03DE-E221	
	5	Analytical	4.6 x 100	03DE-E321	
	5	Analytical	4.6 x 150	03DE-E421	
	5	Analytical	4.6 x 250	03DE-E521	

VertiSep™ AQS

VertiSep™ AQS Columns

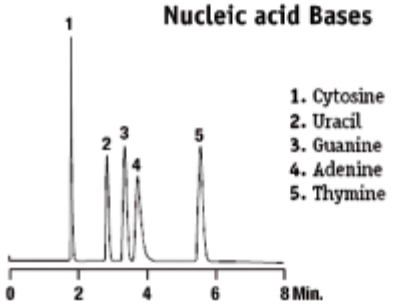
Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
NH2	3	LC/MS	2.1 x 10	03DG-B111	
	3	LC/MS	2.1 x 20	03DG-B611	
	3	LC/MS	2.1 x 50	03DG-B211	
	3	LC/MS	2.1 x 100	03DG-B311	
	3	LC/MS	2.1 x 150	03DG-B411	
	3	LC/MS	3.2 x 100	03DG-J311	
	3	LC/MS	3.2 x 150	03DG-J411	
	3	Analytical	4.6 x 50	03DG-E211	
	3	Analytical	4.6 x 100	03DG-E311	
	3	Analytical	4.6 x 150	03DG-E411	
	5	LC/MS	2.1 x 100	03DG-B321	
	5	LC/MS	2.1 x 150	03DG-B421	
	5	LC/MS	3.2 x 150	03DG-J321	
	5	LC/MS	3.2 x 150	03DG-J421	
	5	Analytical	4.6 x 50	03DG-E221	
	5	Analytical	4.6 x 100	03DG-E321	
	5	Analytical	4.6 x 150	03DG-E421	
	5	Analytical	4.6 x 250	03DG-E521	
Silica	3	LC/MS	2.1 x 10	03DG-B111	
	3	LC/MS	2.1 x 20	03DG-B611	
	3	LC/MS	2.1 x 50	03DG-B211	
	3	LC/MS	2.1 x 100	03DG-B311	
	3	LC/MS	2.1 x 150	03DG-B411	
	3	LC/MS	3.2 x 100	03DG-J311	
	3	LC/MS	3.2 x 150	03DG-J411	
	3	Analytical	4.6 x 50	03DG-E211	
	3	Analytical	4.6 x 100	03DG-E311	
	3	Analytical	4.6 x 150	03DG-E411	
	5	LC/MS	2.1 x 100	03DG-B321	
	5	LC/MS	2.1 x 150	03DG-B421	
	5	LC/MS	3.2 x 150	03DG-J321	
	5	LC/MS	3.2 x 150	03DG-J421	
	5	Analytical	4.6 x 50	03DG-E221	
	5	Analytical	4.6 x 100	03DG-E321	
	5	Analytical	4.6 x 150	03DG-E421	
	5	Analytical	4.6 x 250	03DG-E521	

VertiSep™ AQS Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
C18	Guard	2.1 x 10	3	03DA-B113	
	Guard	3.2 x 10	3	03DA-J113	
	Guard	4.6 x 10	3	03DA-E113	
C8	Guard	2.1 x 10	3	03DB-B113	
	Guard	3.2 x 10	3	03DB-J113	
	Guard	4.6 x 10	3	03DB-E113	
Phenyl	Guard	2.1 x 10	3	03DD-B113	
	Guard	3.2 x 10	3	03DD-J113	
	Guard	4.6 x 10	3	03DD-E113	
Cyano	Guard	2.1 x 10	3	03DE-B113	
	Guard	3.2 x 10	3	03DE-J113	
	Guard	4.6 x 10	3	03DE-E113	
Silica	Guard	2.1 x 10	3	03DG-B113	
	Guard	3.2 x 10	3	03DG-J113	
	Guard	4.6 x 10	3	03DG-E113	
Guard Holder			1	0300-0001	

*Guard holder required

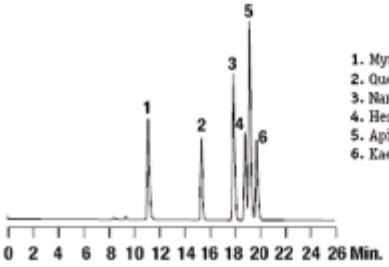
Nucleic acid Bases



1. Cytosine
2. Uracil
3. Guanine
4. Adenine
5. Thymine

Column : VertiSep AQS C18 5u 4.6x150mm
Mobile Phase: ACN/25mM KH_2PO_4 (pH 3.0)=2/98
Flow Rate: 1.0mL/min
Detector: UV254nm
Temp: 30 ℃

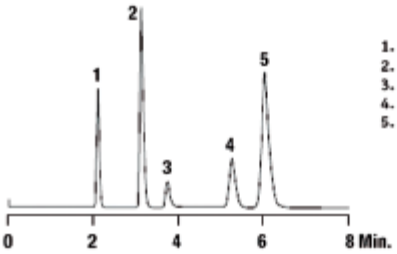
Polyphenolic Flavanoids



1. Myricetin
2. Quercetin
3. Naringenin
4. Hesperetin
5. Apigenin
6. Kaempferol

Column : VertiSep AQS C18 5u 4.6x150mm
Mobile Phase: A: 25mM KH_2PO_4 B: ACN
Gradient: Time/%B : 0/20, 15/40, 25/40
Flow Rate: 1 mL/min
Detector: UV280nm

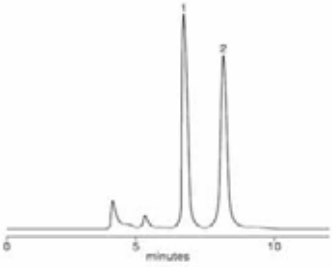
Nucleosides



1. Cytidine
2. Uridine
3. Xanthine
4. Guanosine
5. Adenosine

Column : VertiSep UPS C18 5u 4.6x150mm
Mobile Phase: ACN/25mM KH_2PO_4 (pH 3.0)=4/96
Flow Rate: 1.0mL/min
Detector: UV254nm
Temp: 30 ℃

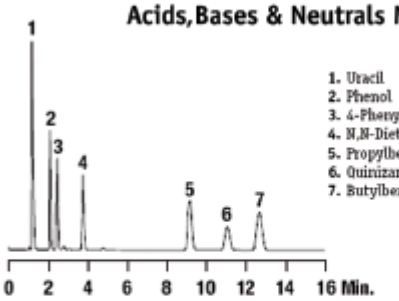
Antioxidants



1. Ascorbic acid
2. GSH

Column : VertiSep AQS C18 5u 4.6x150mm
Mobile Phase: 0.1M Phosphate buffer (pH 3.1)
Flow Rate: 1.0mL/min
Detector: ECD
Temp: ambient

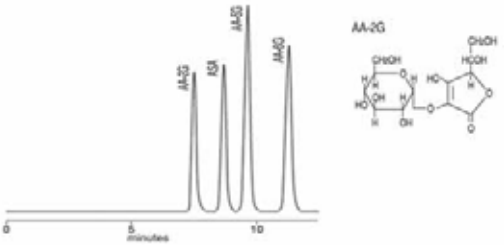
Acids, Bases & Neutrals Mix



1. Uracil
2. Phenol
3. 4-Phenylbutyric acid
4. N,N-Diethyl-m-toluamide
5. Propylbenzene
6. Quinizarin
7. Butylbenzene

Column : VertiSep AQS C18 5u 4.6x150mm
Mobile Phase: ACN/25mM KH_2PO_4 (pH 2.5)=65/35
Flow Rate: 1.0mL/min
Detector: UV254nm
Temp: 30 ℃

Ascorbic acid glycosided



Column : VertiSep AQS C18 5u 4.6x150mm
Mobile Phase: KH_2PO_4-H_3PO_4(pH 3.8)
Flow Rate: 0.7mL/min
Detector: UV240nm
Temp: 40 ℃

VertiSep™ HCS

VertiSep™ HCS HPLC Columns

- **High purity spherical silica offer high stability, efficiency and column-to-column reproducibilty**
- **Highest carbon loading C18 offers highest degree of hydrophobicity for highest resolution of organic compounds that have similar structures**
- **high surface area offers high resolution for gradient elution**
- **Fully endcapped to improve peak symmetry**
- **Polymeric bonding offers high stability and longer column life time**

HPLC COLUMNS

VertiSep™ HCS packing are high purity silica which contains less amonts of metal ions and sulfate contaminants offer high stability, efficiency, column-to-column reproducibility and long lifetime.

VertiSep™ HCS reverse phase C18 are highest carbon loading of 23% offerring the highest degree of hydrophobicity for highest resolution of organic compounds that have similar structures such as polynuclear aromatic hydrocarbons, benzidines, vitamins D2,D3, PTH amino acids.

VertiSep™ HCS are high surface of 350 m^2/g offer high capacity and high resolution for gradient elution.

VertiSep™ HCS reverse phase are fully endcapped an show selectivity as conventional C18 phases.

VertiSep™ HCS are polymeric bonding resulting high stability and longer column life time.

VertiSep™ HCS Packing Specifications

Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped
C18	3,5	23	100	1.0	350	Yes
C8	3,5	13	100	1.0	350	Yes
Phenyl	3,5	8	100	1.0	350	Yes
C4	3,5	6	100	1.0	350	Yes
Cyano	3,5	-	100	1.0	350	Yes
NH2	3,5	-	100	1.0	350	No
Silica	3,5	-	100	1.0	350	No

VertiSep™ HCS Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
C18	3	LC/MS	2.1 x 10	03BA-B111	
	3	LC/MS	2.1 x 20	03BA-B611	
	3	LC/MS	2.1 x 50	03BA-B211	
	3	LC/MS	2.1 x 100	03BA-B311	
	3	LC/MS	2.1 x 150	03BA-B411	
	3	LC/MS	3.2 x 100	03BA-J311	
	3	LC/MS	3.2 x 150	03BA-J411	
	3	Analytical	4.6 x 50	03BA-E211	
	3	Analytical	4.6 x 100	03BA-E311	
	3	Analytical	4.6 x 150	03BA-E411	
	5	LC/MS	2.1 x 10	03BA-B121	
	5	LC/MS	2.1 x 20	03BA-B621	
	5	LC/MS	2.1 x 50	03BA-B221	
	5	LC/MS	2.1 x 100	03BA-B321	
	5	LC/MS	2.1 x 150	03BA-B421	
	5	LC/MS	3.2 x 50	03BA-J221	
	5	LC/MS	3.2 x 100	03BA-J321	
	5	LC/MS	3.2 x 150	03BA-J421	
	5	Analytical	4.6 x 50	03BA-E221	
	5	Analytical	4.6 x 100	03BA-E321	
	5	Analytical	4.6 x 150	03BA-E421	
	5	Analytical	4.6 x 250	03BA-E521	
C8	3	LC/MS	2.1 x 10	03BB-B111	
	3	LC/MS	2.1 x 20	03BB-B611	
	3	LC/MS	2.1 x 50	03BB-B211	
	3	LC/MS	2.1 x 100	03BB-B311	
	3	LC/MS	2.1 x 150	03BB-B411	
	3	LC/MS	3.2 x 100	03BB-J311	
	3	LC/MS	3.2 x 150	03BB-J411	
	3	Analytical	4.6 x 50	03BB-E211	
	3	Analytical	4.6 x 100	03BB-E311	
	3	Analytical	4.6 x 150	03BB-E411	
	5	LC/MS	2.1 x 10	03BB-B121	
	5	LC/MS	2.1 x 20	03BB-B621	
	5	LC/MS	2.1 x 50	03BB-B221	
	5	LC/MS	2.1 x 100	03BB-B321	
	5	LC/MS	2.1 x 150	03BB-B421	
	5	LC/MS	3.2 x 100	03BB-J321	
	5	LC/MS	3.2 x 150	03BB-J421	
	5	Analytical	4.6 x 50	03BB-E221	
	5	Analytical	4.6 x 100	03BB-E321	
	5	Analytical	4.6 x 150	03BB-E421	
	5	Analytical	4.6 x 250	03BB-E521	

VertiSep™ HCS Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
Phenyl	3	LC/MS	2.1 x 10	03BD-B111	
	3	LC/MS	2.1 x 20	03BD-B611	
	3	LC/MS	2.1 x 50	03BD-B211	
	3	LC/MS	2.1 x 100	03BD-B311	
	3	LC/MS	2.1 x 150	03BD-B411	
	3	LC/MS	3.2 x 100	03BD-J311	
	3	LC/MS	3.2 x 150	03BD-J411	
	3	Analytical	4.6 x 50	03BD-E211	
	3	Analytical	4.6 x 100	03BD-E311	
	3	Analytical	4.6 x 150	03BD-E411	
	5	LC/MS	2.1 x 10	03BD-B121	
	5	LC/MS	2.1 x 20	03BD-B621	
	5	LC/MS	2.1 x 50	03BD-B221	
	5	LC/MS	2.1 x 100	03BD-B321	
	5	LC/MS	2.1 x 150	03BD-B421	
	5	LC/MS	3.2 x 50	03BD-J221	
	5	LC/MS	3.2 x 100	03BD-J321	
	5	LC/MS	3.2 x 150	03BD-J421	
	5	Analytical	4.6 x 50	03BD-E221	
	5	Analytical	4.6 x 100	03BD-E321	
	5	Analytical	4.6 x 150	03BD-E421	
	5	Analytical	4.6 x 250	03BD-E521	
Cyano	3	LC/MS	2.1 x 10	03BE-B111	
	3	LC/MS	2.1 x 20	03BE-B611	
	3	LC/MS	2.1 x 50	03BE-B211	
	3	LC/MS	2.1 x 100	03BE-B311	
	3	LC/MS	2.1 x 150	03DE-B411	
	3	LC/MS	3.2 x 100	03BE-J311	
	3	LC/MS	3.2 x 150	03BE-J411	
	3	Analytical	4.6 x 50	03BE-E211	
	3	Analytical	4.6 x 100	03BE-E311	
	3	Analytical	4.6 x 150	03BE-E411	
	5	LC/MS	2.1 x 10	03BE-B121	
	5	LC/MS	2.1 x 20	03BE-B621	
	5	LC/MS	2.1 x 50	03BE-B221	
	5	LC/MS	2.1 x 100	03BE-B321	
	5	LC/MS	2.1 x 150	03BE-B421	
	5	LC/MS	3.2 x 100	03BE-J321	
	5	LC/MS	3.2 x 150	03BE-J421	
	5	Analytical	4.6 x 50	03BE-E221	
	5	Analytical	4.6 x 100	03BE-E321	
	5	Analytical	4.6 x 150	03BE-E421	
	5	Analytical	4.6 x 250	03BE-E521	

VertiSep™ HCS

VertiSep™ HCS Columns

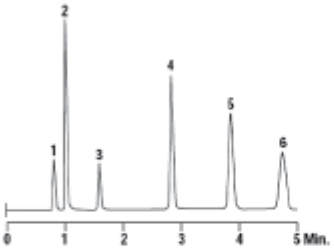
Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
NH2	3	LC/MS	2.1 x 10	03BG-B111	
	3	LC/MS	2.1 x 20	03BG-B611	
	3	LC/MS	2.1 x 50	03BG-B211	
	3	LC/MS	2.1 x 100	03BG-B311	
	3	LC/MS	2.1 x 150	03BG-B411	
	3	LC/MS	3.2 x 100	03BG-J311	
	3	LC/MS	3.2 x 150	03BG-J411	
	3	Analytical	4.6 x 50	03BG-E211	
	3	Analytical	4.6 x 100	03BG-E311	
	3	Analytical	4.6 x 150	03BG-E411	
	5	LC/MS	2.1 x 100	03BG-B321	
	5	LC/MS	2.1 x 150	03BG-B421	
	5	LC/MS	3.2 x 150	03BG-J321	
	5	LC/MS	3.2 x 150	03BG-J421	
	5	Analytical	4.6 x 50	03BG-E221	
	5	Analytical	4.6 x 100	03BG-E321	
	5	Analytical	4.6 x 150	03BG-E421	
	5	Analytical	4.6 x 250	03BG-E521	
Silica	3	LC/MS	2.1 x 10	03BG-B111	
	3	LC/MS	2.1 x 20	03BG-B611	
	3	LC/MS	2.1 x 50	03BG-B211	
	3	LC/MS	2.1 x 100	03BG-B311	
	3	LC/MS	2.1 x 150	03BG-B411	
	3	LC/MS	3.2 x 100	03BG-J311	
	3	LC/MS	3.2 x 150	03BG-J411	
	3	Analytical	4.6 x 50	03BG-E211	
	3	Analytical	4.6 x 100	03BG-E311	
	3	Analytical	4.6 x 150	03BG-E411	
	5	LC/MS	2.1 x 100	03BG-B321	
	5	LC/MS	2.1 x 150	03BG-B421	
	5	LC/MS	3.2 x 150	03BG-J321	
	5	LC/MS	3.2 x 150	03BG-J421	
	5	Analytical	4.6 x 50	03BG-E221	
	5	Analytical	4.6 x 100	03BG-E321	
	5	Analytical	4.6 x 150	03BG-E421	
	5	Analytical	4.6 x 250	03BG-E521	

VertiSep™ HCS Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
C18	Guard	2.1 x 10	3	03BA-B113	
	Guard	3.2 x 10	3	03BA-J113	
	Guard	4.6 x 10	3	03BA-E113	
C8	Guard	2.1 x 10	3	03BB-B113	
	Guard	3.2 x 10	3	03BB-J113	
	Guard	4.6 x 10	3	03BB-E113	
Phenyl	Guard	2.1 x 10	3	03BD-B113	
	Guard	3.2 x 10	3	03BD-J113	
	Guard	4.6 x 10	3	03BD-E113	
Cyano	Guard	2.1 x 10	3	03BE-B113	
	Guard	3.2 x 10	3	03BE-J113	
	Guard	4.6 x 10	3	03BE-E113	
Silica	Guard	2.1 x 10	3	03BG-B113	
	Guard	3.2 x 10	3	03BG-J113	
	Guard	4.6 x 10	3	03BG-E113	
Guard Holder			1	0300-0001	

*Guard holder required

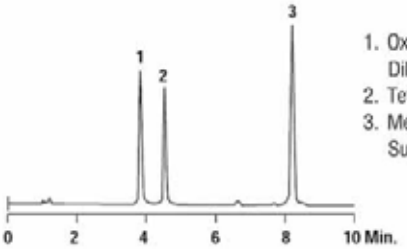
Acids, Base, and Neutrals



1. Uracil
2. Pyridine
3. phenol
4. N,N-Dimethylaniline
5. 4-Butylbenzoic Acid
6. Toluene

Column : VertiSep HCS C18, 3µm, 100x4.6mm
Mobile Phase: 50mM KH_2PO_4, pH3.0:CH_3CN (40:60)
Flow Rate: 1.0mL/min
Detector: UV at 254nm

Antibacterials



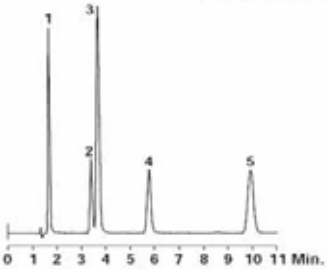
1. Oxytetracycline Dihydrate
2. Tetracycline HCL
3. Meclocycline Sulfosalicylate Salt

Column: VertiSep HCS C18, 3µm, 100 x 4.6mm
Mobile Phase: A: 50 mM KH_2PO_4, pH 3.0 B: CH_3CN
Gradient

Time:	0	10
%B:	15	40

Flowrate: 1.0mL/min
Detector: UV at 254nm

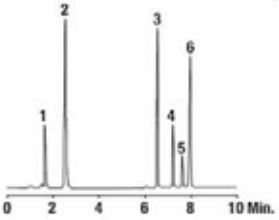
Aromatic Acids



1. 4-Hydroxy-3-methoxy-mandelic Acid
2. Homovanillic Acid
3. Vanillic Acid
4. Salicylic Acid
5. Benzoic Acid

Column: VertiSep HCS C18, 5µm, 150 x 4.6mm
Mobile Phase: 50mM KH_2PO_4, pH 3.2:CH_3OH (60:40)
Flowrate: 1.0mL/min
Detector: UV at 254nm

Analgesics



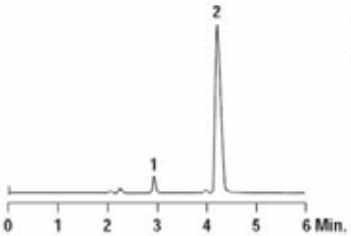
1. Aspirin
2. Acetaminophen
3. Naproxen
4. Fenprofen
5. Ibuprofen
6. Diclofenac

Column: VertiSep HCS C8, 5mm, 150 x 4.6mm
Mobile Phase: A: 50mM KH_2PO_4 pH3.3 B: Methanol C: Acetonitrile
Gradient:

Time:	0	2	5
%B:	10	10	30
%C:	10	10	25

Flowrate: 2.0mL/min
Detector: UV at 280nm

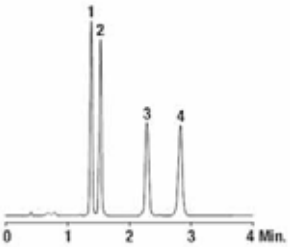
Aspartame



1. Degradant
2. Aspartame

Column: VertiSep HCS C18, 3µm, 150 x 4.6mm
Mobile Phase: 50mM KH_2PO_4, pH 2.75:CH_3OH (80:20)
Flowrate: 1.0mL/min
Detector: UV at 220nm

MDA & MDMA Analogs



1. 2,3-MDA
2. 3,4-MDA
3. 2,3-MDMA
4. 3,4-MDMA

Column: VertiSep HCS Silica, 3µm, 100 x 4.6mm
Mobile Phase: Acetonitrile:1.0% Ammonium Hydroxide (75:25)
Flowrate: 2.0mL/min
Detector: UV at 280nm

VertiSep™ BDS HPLC Columns

- **Highly base deactivation for basic compounds**
- **Superior peak shape with high efficiency for analysis of neutral and acidic compounds**
- **Available with C18, C8, Phenyl and Cyano phase**
- **Fully endcapped to improve peak shape**
- **Monomeric bonding offer low back pressure and faster separation**
- **Excellent lot-to-lot and column-to-column reproducibility**
- **Equivalent to Hypersil BDS**

VertiSep™ BDS are highly base deactivation for basic compounds while offer superior effeciency for neutral and acidic compounds.

VertiSep™ BDS has four stable reverse phase packings C18, C8, Phenyl and Cyano that well suited for pharmaceutical and other biological compounds

VertiSep™ UPS are fully endcapped after bonding to cover unreached silanols and imporve peak symmetry for basic analytes.

VertiSep™ BDS are monomeric bonding resulting in lower column back pressure and faster separation.

VertiSep™ BDS are produced under high quality control and individually tested to ensure reproducible performance.

VertiSep™ BDS columns are equivalent to Hypersil BDS at a lower cost.

VertiSep™ BDS Packing Specifications

Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped
C18	3,5	11	140	0.6	150	Yes
C8	3,5	6	140	0.6	150	Yes
Phenyl	3,5	5	140	0.6	150	Yes
Cyano	3,5	-	140	0.6	150	Yes

VertiSep™ BDS Columns

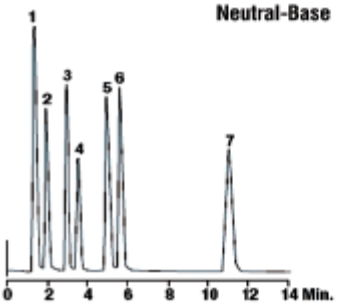
Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
C18	3	Analytical	4.6 x 100	03FA-E311	
	3	Analytical	4.6 x 150	03FA-E411	
	5	Analytical	4.6 x 150	03FA-E421	
	5	Analytical	4.6 x 250	03FA-E521	
C8	3	Analytical	4.6 x 100	03FB-E311	
	3	Analytical	4.6 x 150	03FB-E411	
	5	Analytical	4.6 x 150	03FB-E421	
	5	Analytical	4.6 x 250	03FB-E521	
Phenyl	3	Analytical	4.6 x 100	03FD-E311	
	3	Analytical	4.6 x 150	03FD-E411	
	5	Analytical	4.6 x 150	03FD-E421	
	5	Analytical	4.6 x 250	03FD-E521	
Cyano	3	Analytical	4.6 x 100	03FE-E311	
	3	Analytical	4.6 x 150	03FE-E411	
	5	Analytical	4.6 x 150	03FE-E421	
	5	Analytical	4.6 x 250	03FE-E521	

VertiSep™ BDS Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
C18	Guard	4.6 x 10	3	03FA-E123	
C8	Guard	4.6 x 10	3	03FB-E123	
Phenyl	Guard	4.6 x 10	3	03FB-E123	
Cyano	Guard	4.6 x 10	3	03FE-E123	
Guard Holder			1	0300-0001	

*Guard holder required

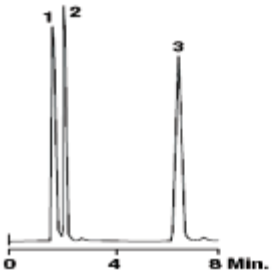
Neutral-Base Mix



1. Uracil
2. Aniline
3. 2-Nitroaniline
4. 2,4-Dinitroaniline
5. 3,5-Xylenol
6. Anisole
7. Toluene

Column: VertiSep BDS C18, 5µm, 150 x 4.6mm
Mobile Phase: Methanol:0.05M KH_2PO_4, pH3.5 (65:35)
Flowrate: 1.0mL/min
Detector: UV at 254nm

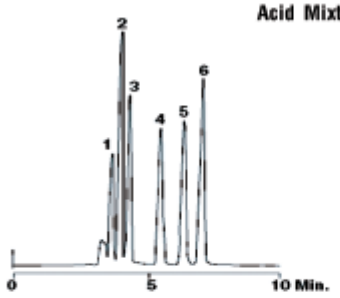
Vitamins



1. Thiamine (B1)
2. Niacinamide (B3)
3. Riboflavin (B2)

Column: VertiSep BDS C18, 5µm, 150 x 4.6mm
Mobile Phase: Methanol:0.05M KH_2PO_4, pH3.5 (30:70)
Flowrate: 1.0mL/min
Detector: UV at 254nm

Acid Mixture



1. Glutamic Acid
2. Glycolic Acid
3. Malic Acid
4. Citric Acid
5. Succinic Acid
6. Fumaric Acid

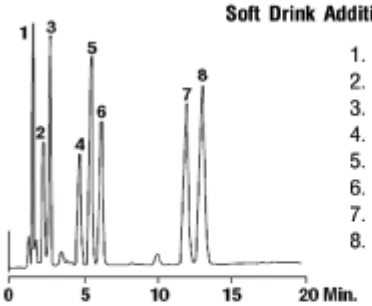
Column: VertiSep BDS C18, 5µm, 250 x 4.6mm
Mobile Phase: 0.2M H_3PO_4:Methanol (90:10)
Flowrate: 0.8mL/min
Detector: UV at 254nm

Naproxen

1. naproxen

Column:	**VertiSep BDS C18**
Dimensions:	150 x 4.6mm
Mobile Phase:	A: 90% 20 mmolar KH2PO4 buffer, pH 3.0 B: 10% acetonitrile
Flow:	1.0mL/min
Temp.:	27°C
Det.:	UV @ 254nm

Soft Drink Additives



1. L-Ascorbic Acid
2. Saccharin
3. Caffeine
4. Sodium Salicylate
5. Vanillin
6. Aspartame
7. Sorbic Acid
8. Benzoic Acid

Column: VertiSep BDS C18, 5µm, 150 x 4.6mm
Mobile Phase: Methanol:1% Acetic Acid (30:70)
Flowrate: 1.0mL/min
Detector: UV at 254nm

Paracetamol

1. Paracetamol

Column: VertiSep BDS C18, 5µm, 150 x 4.6mm
Mobile Phase: Acetonitrile:0.05M KH_2PO_4, pH4.5 (30:70)
Flowrate: 1.0mL/min
Detector: UV at 254nm

VertiSep™ BIO HPLC Columns

- **300Å ultra high purity silica**
- **Full endcapping**
- **Ultimate protein and peptide application column**
- **Acidic and alkalic resistance for long life time**
- **3 Phases: C18, C8, and C4 chemistries**
- **5µm, 10µm particle sizes**

VertiSep™ BIO are ultra-high purity spherical silica, full endcapping providing separation or purification of high molecular weight compounds like protein and peptide.

Because of the significant improvement of acidic and alkalic resistance, it can be use for extened period of time in acidic mobile phase condition and rinsed for recover with NaOH containing buffer.

There are 3 phases: C18, C8 and C4 and 2 particle size: 5µm, 10µm particle sizes

VertiSep™ BIO Packing Specifications

Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped
C18	5,10	8	300	0.9	100	Yes
C8	5,10	6	300	0.9	100	Yes
C4	5,10	4	300	0.9	100	Yes

VertiSep™ BIO Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
C18	5	Analytical	4.6 x 150	03HA-E421	
	5	Analytical	4.6 x 250	03HA-E521	
	10	Analytical	10 x 100	03HA-H331	
	10	Prep	10 x 250	03HA-H531	
	10	Prep	22 x 100	03HA-I331	
	10	Prep	22 x 250	03HA-I531	
C8	5	Analytical	4.6 x 150	03HB-E421	
	5	Analytical	4.6 x 250	03HB-E521	
	10	Analytical	10 x 100	03HB-H331	
	10	Prep	10 x 250	03HB-H531	
	10	Prep	22 x 100	03HB-I331	
	10	Prep	22 x 250	03HB-I531	
C4	5	Analytical	4.6 x 150	03HC-E421	
	5	Analytical	4.6 x 250	03HC-E521	
	10	Analytical	10 x 100	03HC-H331	
	10	Prep	10 x 250	03HC-H531	
	10	Prep	22 x 100	03HC-I331	
	10	Prep	22 x 250	03HA-I531	

VertiSep™ BIO Gaurd Cartridge*

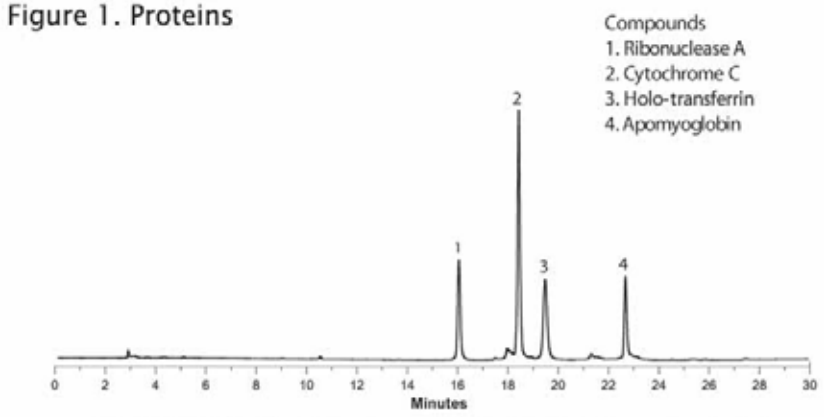
Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
C18	Guard	4.6 x 10	3	03HA-E123	
C8	Guard	4.6 x 10	3	03HB-E123	
C4	Guard	4.6 x 10	3	03HC-E123	
Guard Holder			1	0300-0001	

*Guard holder required

Most chromatographers prefer inert stationary phases for the reversed-phase HPLC of ionic compounds because they minimize the negative effect of silanols on the separation. This results in improved peak shape and reproducibility when separating compounds that contain polar functional groups, especially amines.

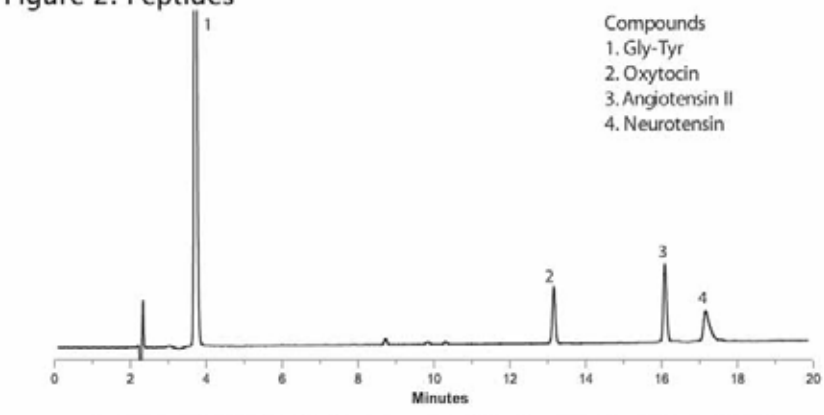
A new generation of ultra-inert stationary phases, with extremely low silanol activity, has made it possible to achieve even better peak shape and reproducibility when separating these types of compounds. Scientists working with small molecules have been rapidly adopting this new technology and the recent introduction of wide-pore (300Å) ultra-inert phases makes the benefits of this technology available to those wanting to separate peptides and proteins by reversed-phase HPLC (see Figures 1 and 2).

Figure 1. Proteins



Column:VertiSep BIO C18, 250 x 4.6mm, Flow Rate: 1.0ml/min, Temperature: Ambient
Mobile Phase: A. 0.1% TFA in H_2O B. 0.1% TFA in MeCN 5% to 70% B in 30 mins, Detection: UV, 280nm

Figure 2. Peptides



Column:VertiSep BIO C18, 250 x 4.6mm, Flow Rate: 1.0ml/min, Temperature: Ambient
Mobile Phase: A. 0.1% TFA in H_2O B. 0.1% TFA in MeCN 10% to 40% B in 25 mins, Detection: UV, 220nm

VertiSep™ GES HPLC Columns

- **High purity silica offer high stability, efficiency, reproducibilty**
- **Moderate pore size and surface area are perfect for general purpose**
- **High carbon loading C18 offers high degree of hydrophobicity for high resolution of organic compounds that have similar structures**
- **Fully endcapped to improve peak symmetry**
- **Polymeric bonding offers high stability and longer column life time**

VertiSep™ GES are high purity silica which contains less amonts of metal ions and sulfate contaminants offer high stability, efficiency, column-to-column reproducibility.

VertiSep™ GES are moderate pore size and surface area proving general purpose separations of variety of compounds.

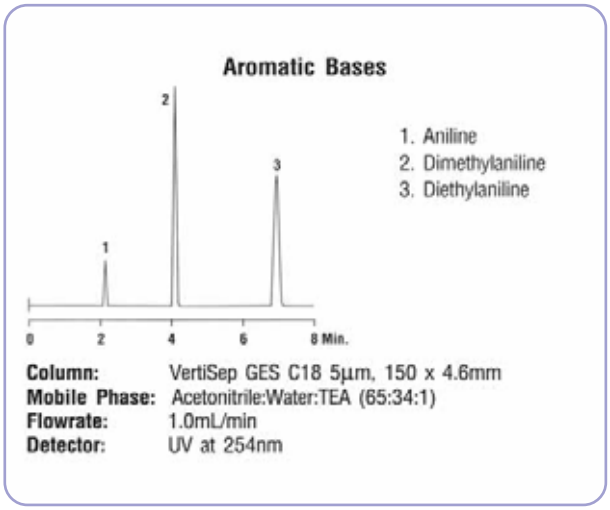
VertiSep™ GES reverse phase C18 are high carbon loading of 17% offerring the high degree of hydrophobicity for high resolution of organic compounds that have similar structures such as polynuclear aromatic hydrocarbons, benzidines, vitamins D2,D3, PTH amino acids.

VertiSep™ HCS reverse phase are fully endcapped an show selectivity as conventional C18 phases.

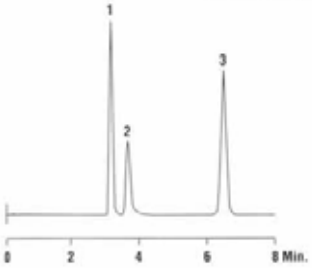
VertiSep™ HCS are polymeric bonding resulting high stability and longer column life time.

VertiSep™ GES Packing Specifications

Packing	Particle Size (µm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (ml/g)	Surface Area (m^2/g)	End Capped
C18	3,5	17	120	1.0	300	Yes
C8	3,5	13	120	1.0	300	Yes
Phenyl	3,5	8	120	1.0	300	Yes
C4	3,5	6	120	1.0	300	Yes
Cyano	3,5	-	120	1.0	300	Yes
NH2	3,5	-	120	1.0	300	No
Silica	3,5	-	120	1.0	300	No



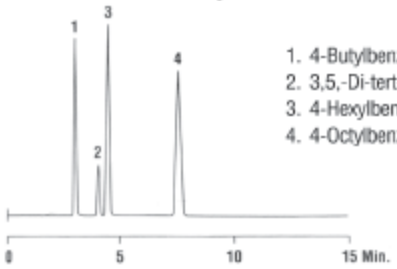
Aromatic Acids



1. Homovanillic Acid
2. Benzoic Acid
3. Salicylic Acid

Column: VertiSep GES C18 5µm, 150 x 4.6mm
Mobile Phase: 0.05M KH_2PO_4, pH3.2:Methanol (60:40)
Flowrate: 1.0mL/min
Detector: UV at 254nm

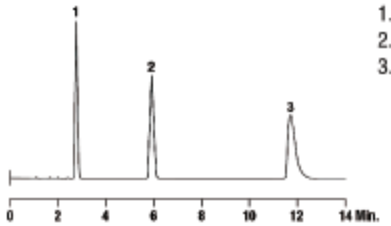
Alkyl Benzoic Acids



1. 4-Butylbenzoic Acid
2. 3,5,-Di-tert-Butylbenzoic Acid
3. 4-Hexylbenzoic Acid
4. 4-Octylbenzoic Acid

Column: VertiSep GES C18 5µm, 150 x 4.6mm
Mobile Phase: Acetonitrile:Water:Acetic Acid (65:34:1)
Flowrate: 1.0mL/min
Detector: UV at 254nm

Steroids



1. Hydrocortisone
2. Testosterone
3. Progesterone

Column: VertiSep GES C18 5µm, 150 x 4.6mm
Mobile Phase: Methanol:Water (70:30)
Flowrate: 1.0mL/min
Detector: UV at 254nm

VertiSep™ GES Columns

Packing	Particle Size (µm)	Formats	I.D. Length (mm)	Part No.	Price
C18	3	Analytical	4.6 x 100	03AA-E311	
	3	Analytical	4.6 x 150	03AA-E411	
	5	Analytical	4.6 x 150	03AA-E421	
	5	Analytical	4.6 x 250	03AA-E521	
C8	3	Analytical	4.6 x 100	03AB-E311	
	3	Analytical	4.6 x 150	03AB-E411	
	5	Analytical	4.6 x 150	03AB-E421	
	5	Analytical	4.6 x 250	03AB-E521	
Phenyl	3	Analytical	4.6 x 100	03AD-E311	
	3	Analytical	4.6 x 150	03AD-E411	
	5	Analytical	4.6 x 150	03AD-E421	
	5	Analytical	4.6 x 250	03AD-E521	
Cyano	3	Analytical	4.6 x 100	03AE-E311	
	3	Analytical	4.6 x 150	03AE-E411	
	5	Analytical	4.6 x 150	03AE-E421	
	5	Analytical	4.6 x 250	03AE-E521	
NH2	3	Analytical	4.6 x 100	03AF-E311	
	3	Analytical	4.6 x 150	03AF-E411	
	5	Analytical	4.6 x 150	03AF-E421	
	5	Analytical	4.6 x 250	03AF-E521	
Silica	3	Analytical	4.6 x 100	03AG-E311	
	3	Analytical	4.6 x 150	03AG-E411	
	5	Analytical	4.6 x 150	03AG-E421	
	5	Analytical	4.6 x 250	03AG-E521	
SAX	5	Analytical	4.6 x 250	03AH-E521	
SCX	5	Analytical	4.6 x 250	03AI-E521	

VertiSep™ GES Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
C18	Guard	4.6 x 10	3	03AA-E123	
C8	Guard	4.6 x 10	3	03AB-E123	
Phenyl	Guard	4.6 x 10	3	03AB-E123	
Cyano	Guard	4.6 x 10	3	03AE-E123	
NH2	Guard	4.6 x 10	3	03AF-E123	
Silica	Guard	4.6 x 10	3	03AG-E123	
SCX	Guard	4.6 x 10	3	03AH-E123	
SAX	Guard	4.6 x 10	3	03AI-E123	
Guard Holder			1	0300-0001	

*Guard holder required

VertiSep™ SUGAR

VertiSep™ SUGAR HPLC Columns

- **Polymeric base**
- **High efficiency**
- **High resolution**
- **Reproducibility lot-to-lot and column-to-column**
- **Rugged**
- **Available in variety of applications**

VertiSep™ SUGAR columns employ a technique called ligand-exchange chromatography for the separation of monosaccharides, disaccharides and oligosaccharides up to 15 glucose units long.

Ligand exchange resins are highly sulfonated cation exchange resins that have group 1, 2 or transition series metals loaded on. The sulfonic acid groups on the resin tightly hold the metal ions via an ionic attraction so that it is not released during analysis or through the life of the column. It is this metal ion that provides the positive charge that interacts with the negative charge on the sugar.

During analysis, the carbohydrates are introduced onto the column. The sugars are attracted to the metals via an ionic interaction thus they become weakly bound to the metal ion on the resin.Water will also have a weak ionic interaction with the metals on the column, so the water will exchange with the sugars on the metal sites.This ionic adsorption and desorption occurs for the sugars through the column. Since the ionic charge is different for every sugar, separation of the sugars occurs. Selectivity is easily controlled by resin type, metal selected, and other factors such as temperature and mobile phase.

Column	Application	Form	Particle Size (µm)	Typical Mobile Phase	Recom'd Rate Flow (mL/min)	Recom'd Temp (°C)
VertiSep™ SUGAR 411	oligosaccharides up to DP10, corn syrup, molasses	sodium	20	water	0.4	75
VertiSep™ SUGAR 611	oligosaccharides up to DP5	sodium	10	water	0.5	90
VertiSep™ SUGAR 611OH	mono and oligosaccharides w/ PAD detection	sodium	10	NaOH	0.5	90
VertiSep™ SUGAR 620	high fructose corn syrup, mono-, di-,trisaccharides and sugar alcohols	calcium	10	water	0.5	90
VertiSep™ SUGAR 682	mono and disaccharides, sucrose, maltose lactose	lead	7	water	0.4	80
VertiSep™ SUGAR 820	simple sugars, sugar alcohols	calcium	8	water	0.5	90
VertiSep™ SUGAR 87C	mono and disaccharides	calcium	9	water	0.6	85
VertiSep™ SUGAR 42Ag	oligosaccharides up to DP11	silver	20	water	0.4	75
VertiSep™ SUGAR 87K	beet sugar, cane sugar, corn syrup, molasses	potassium	8	water	0.6	85
VertiSep™ SUGAR 87N	beet sugars, mono and oligosaccharides	sodium	8	water	0.6	85
VertiSep™ SUGAR 87P	pentose, hexose,	lead	8	water	0.8	85
VertiSep™ SUGAR L19	USP L-19 for separation of sorbitol and mannitol	calcium	9	water	0.2	30
VertiSep™ SUGAR 87MM	mono, di, and trisaccharides, and sugar alcohols	calcium/sodium	8	water	0.5	85

VertiSep™ SUGAR Columns

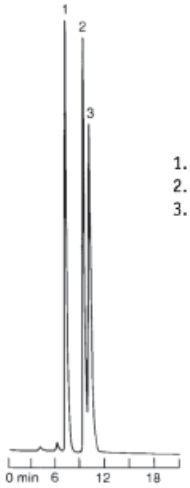
Packing	I.D. Length (mm)	Part No.	Price
411	7.8 x 300	99-9850	
611	6.5 x 300	99-9751	
611OH	6.5 x 150	99-7752	
620	6.5 x 300	99-9753	
682	7.8 x 300	99-9854	
820	7.8 x 300	99-9855	
87C	7.8 x 300	99-9860	
42Ag	7.8 x 300	99-9851	
87K	7.8 x 300	99-9862	
87N	7.8 x 300	99-9863	
87P	7.8 x 300	99-9864	
L19	4.0 x 250	99-8453	
87MM	7.8 x 300	99-9865	

VertiSep™ SUGAR Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
411	Guard	7.8 x 20	2	99-1351	
611	Guard	7.8 x 20	2	99-1351	
611OH	Guard	7.8 x 20	2	99-1352	
620	Guard	6.5 x 20	2	99-1353	
682	Guard	7.8 x 20	2	99-1354	
820	Guard	7.8 x 20	2	99-1355	
87C	Guard	7.8 x 20	2	99-1360	
42Ag	Guard	7.8 x 20	2	99-1366	
87K	Guard	7.8 x 20	2	99-1362	
87N	Guard	7.8 x 20	2	99-1363	
87P	Guard	7.8 x 20	2	99-1364	
L19	Guard	7.8 x 20	2	99-1355	
87MM	Guard	7.8 x 20	2	99-1365	
Guard Holder			1	99-1300	

*Guard holder required

Carobohydrates with PAD

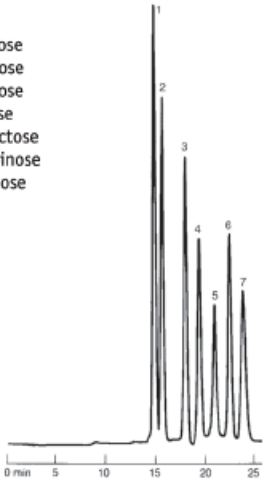


1. Sucrose (250 ppm)
2. Glucose (250 ppm)
3. Arabinose (250ppm)

Column : VertiSep SUGAR 6110H
Mobile Phase: 0.015N NaOH
Flow Rate: 0.6mL/min
Detector: PAD
Temp: 85 ℃

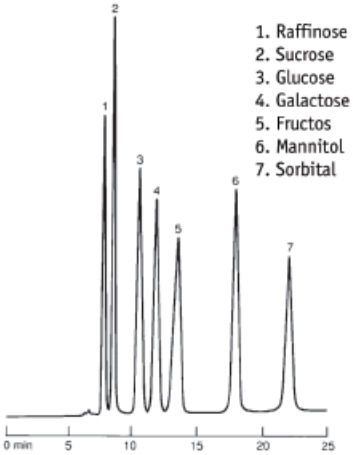
Mono- and Disaccharides

1. Sucrose
2. Maltose
3. Glucose
4. Xylose
5. Galactose
6. Arabinose
7.Mannose



Column : VertiSep SUGAR 682
Mobile Phase: H_2O
Flow Rate: 0.4mL/min
Detector: Ref
Temp: 80 ℃

Carbohydrate Standards



1. Raffinose
2. Sucrose
3. Glucose
4. Galactose
5. Fructos
6. Mannitol
7. Sorbital

Column : VertiSep SUGAR 820
Mobile Phase: Water
Flow Rate: 0.5mL/min
Detector: DRI
Temp: 90 ℃

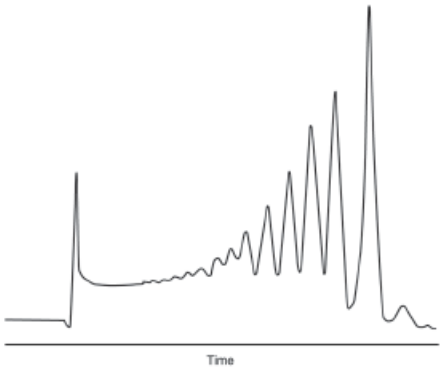
Mannitol and Sorbiltal for USP L-19

1. Mannitol
2. Sorbital

Column : VertiSep SUGAR 820 L-19
Mobile Phase: Water
Flow Rate: 0.2mL/min
Detector: DRI
Temp: 30 ℃

Sugar COREGEL-42Ag Column

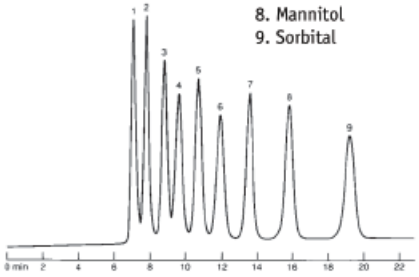
Corn Syrup



Column : VertiSep SUGAR Coregel-42Ag
Mobile Phase: H_2O
Flow Rate: 0.4mL/min
Detector: RI
Temp: 75 °C

Sugar and Sugar Alcohol

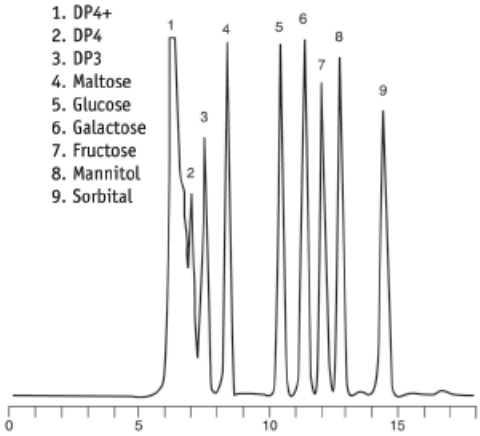
1. Raffinose
2. Sucrose
3. LActolose
4. Glucose
5. Galactose
6. Fructose
7. Ribital
8. Mannitol
9. Sorbital



Column : VertiSep SUGAR 87C
Mobile Phase: Water
Flow Rate: 0.6mL/min
Detector: DRI
Temp: 85 °C

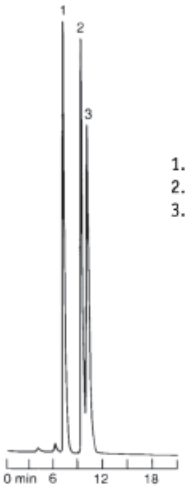
Sugar COREGEL-87MM Column

1. DP4+
2. DP4
3. DP3
4. Maltose
5. Glucose
6. Galactose
7. Fructose
8. Mannitol
9. Sorbital



Column : VertiSep SUGAR Coregel-87MM
Mobile Phase: H_2O
Flow Rate: 0.6mL/min
Detector: RI
Temp: 85 °C

Carobohydrates with PAD



1. Sucrose (250 ppm)
2. Glucose (250 ppm)
3. Arabinose (250ppm)

Column : VertiSep SUGAR 611OH
Mobile Phase: 0.015N NaOH
Flow Rate: 0.6mL/min
Detector: PAD
Temp: 85 °C

VertiSep™ OA HPLC Columns

- **Polymeric base**
- **High efficiency**
- **High resolution**
- **Reproducibility lot-to-lot and column-to-column**
- **Rugged**
- **Available in variety of applications**

Ion exclusion is the preferred method for the separation of weakly ionizable species such as organic acids and alcohols. Transgenomic provides a broad range of columns that provide varying efficiencies and selectivities for the separation of weak acids by ion exclusion.

The packings employed with ion exclusion are totally sulfonated polystyrene divinylbenze (PS/DVB) copolymers. By totally sulfonating the polymer, the bead behaves as though it were a negatively charged sphere. This charged sphere is referred to as a Donnan membrane. Species that have a negative charge are repelled from the negatively charged membrane, while uncharged species are allowed to enter the sphere and adsorb onto the beads.The mobile phases employed with ion exclusion are low concentration acids, such as 5mM sulfuric acid.

VertiSep™ OA

Packing	I.D. Length (mm)	Part No.	Price
ION-300	7.8 x 300	99-9850	
107H	7.8 x 300	99-9866	
ORH-801	6.5 x 300	99-9754	
WA-1	7.8 x 300	99-9810	
ION-310	6.5 x 150	99-7752	
ARH-601	6.5 x 100	99-5753	
64H	7.8 x 300	99-9860	

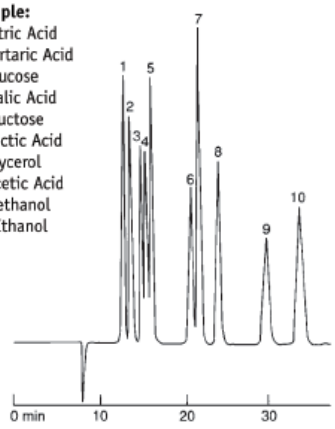
VertiSep™ ORGANIC ACID AcGaurd Cartridge*

Packing	I.D. Length (mm)	Part No.	Price
ION-300	4.6 x 10	99-2364	
107H	4.6 x 10	99-2366	
ORH-801	4.6 x 10	99-2364	
WA-1	4.6 x 10	99-1310	
ION-310	4.6 x 10	99-2364	
ARH-601	4.6 x 10	99-2363	
64H	4.6 x 10	99-2370	
Guard Holder		99-1300	

*Guard holder required

Standard Mixture of Sugars and Acids

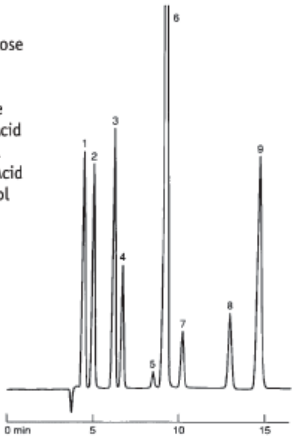
Sample:
1.Citric Acid
2.Tartaric Acid
3.Glucose
4.Malic Acid
5.Fructose
6.Lactic Acid
7.Glycerol
8.Acetic Acid
9.Methanol
10.Ethanol



Conditions:
Column: VertiSep ORGANIC ACID ION-300
Eluent: 0.0085 NH_2SO_4
Flow rate: 0.4 mL/min
Temperature: 70°C
Detection: DRI

Fermentation Broth

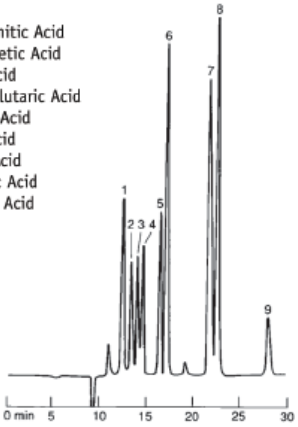
Sample:
1.Maltotriose
2.Maltose
3.Glucose
4.Fructose
5.Lactic Acid
6.Glycerol
7.Acetic Acid
8.Methanol
9.Ethanol



Conditions:
Column: VertiSep ORGANIC ACID ORH-801
Eluent: 0.0025 NH_2SO_4
Flow rate: 0.6 mL/min
Temperature: 65°C
Detection: RI
Injection: 20 µL

Krebs Tricarboxylic Acid Cycle Intermediates

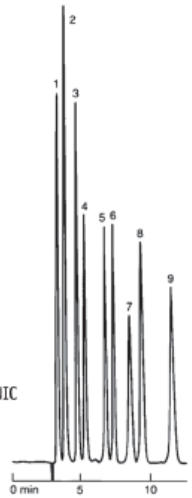
Sample:
1.Cis-Aconitic Acid
2.Oxaloacetic Acid
3.Citric Acid
4.α-ketoglutaric Acid
5.Pyruvic Acid
6.Malic Acid
7.Lactic Acid
8.Succinic Acid
9.Fumaric Acid



Conditions:
Column: VertiSep ORGANIC ACID ION-300
Eluent: 0.01 NH_2SO_4
Flow rate: 0.4 mL/min
Temperature: 42°C
Detection: DRI

Separation of Organic Acids

Sample:
1.Oxalic
2.cis-aconitic
3.Tartaric
4.Malic
5.Lactic
6.Formic
7.Fumaric
8.Propionic
9.Butyric



Conditions:
Column: VertiSep ORGANIC ACID ORH-801
Eluent: 0.01 N H2SO4
Flow rate: 0.8 mL/min
Temperature: 35°C
Detection: DRI
Injection: 20 µL

VertiSep™ AMINO

VertiSep™ AMINO HPLC Columns

- **Polymeric base**
- **High efficiency**
- **High resolution**
- **Reproducibility lot-to-lot and column-to-column**
- **Rugged**
- **Available in variety of applications**

Ion-exchange chromatography is a popular technique for the analysis of amino acids because both retention times and quantification are highly reproducible regardless of the sample matrix. This unique matrix insensitivity is important when comparing results from different patients or batches of protein hydrolysate.

Amino acids are zwitterions; at low pH, they are positively - charged and are bound to the resin by their attraction to the negatively charged ion-exchange sites. Almost all the contaminants, i.e. matrix, are eluted at the void.The amino acids are then selectively eluted by increasing the pH and salt concentration with different buffers.With few exceptions, the order of elution follows the isoelectric point of the amino acids, i.e. acidic amino acids first, then neutral and basic. Because the separation and the ensuing post-column reaction of amino acids are devoid of contaminants, amino acid analyses via ion-exchange chromatography are highly reproducible.

VertiSep™ AMINO

Packing	I.D. Length (mm)	Part No.	Price
Lithium	4.0 x 100	99-6311	
Sodium	4.0 x 120	99-6312	
	4.0 x 200	99-6310	
Sodium AA-911	4.6 x 250	99-8553	
Sodium AA-511	4.6 x 150	99-7554	
	4.6 x 120	99-6554	

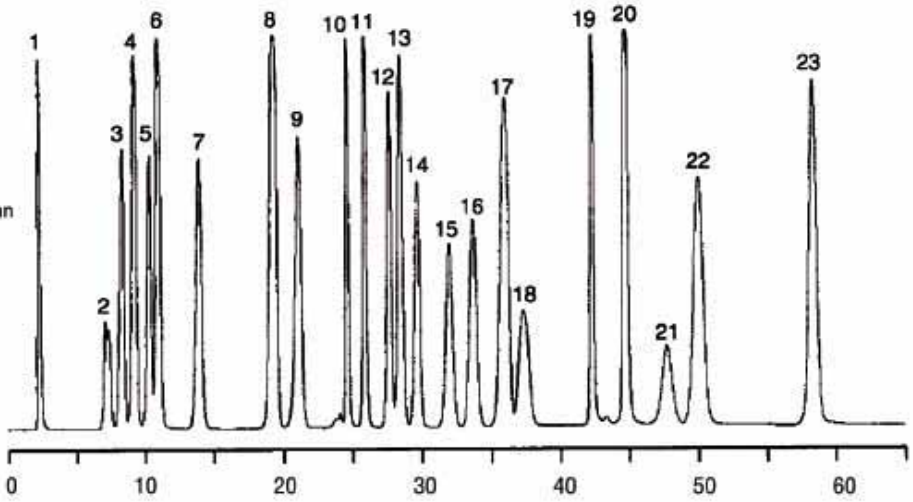
VertiSep™ AMINO Gaurd Cartridge*

Packing	I.D. Length (mm)	Part No.	Price
Lithium	4.6 x 10	99-1311	
Sodium	4.6 x 10	99-1312	
GC-911	4.6 x 10	99-1353	
GC-511	4.6 x 10	99-1354	
Guard Holder		99-1300	

*Guard holder required

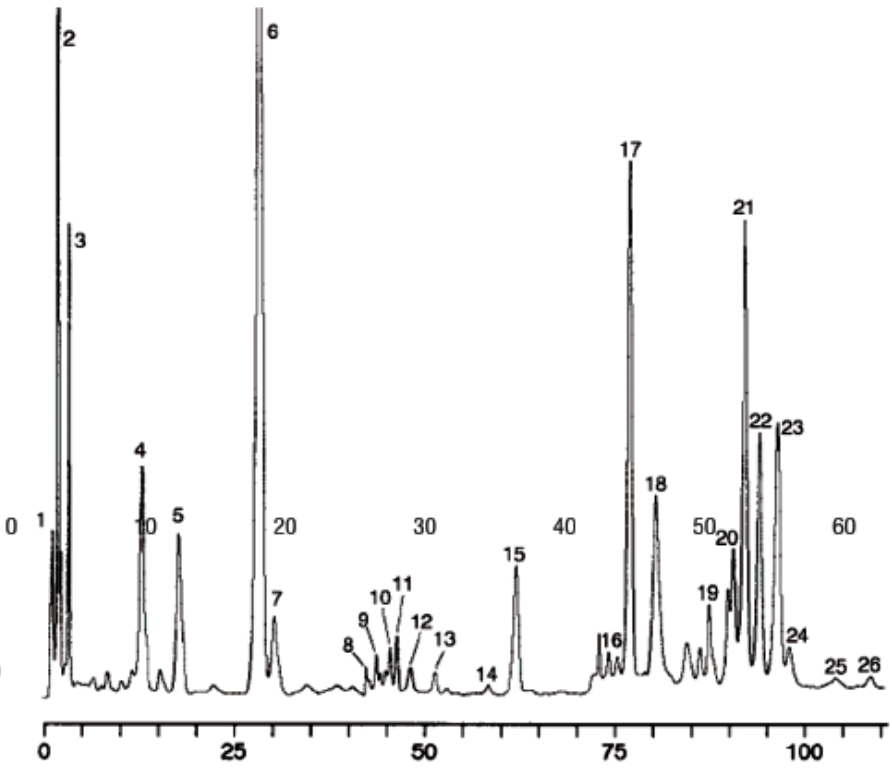
Sample:
1.L-Cysteic Acid
2.Methionine Sulfoxide
3.L-Aspartic Acid
4.Methionine Sulfone

Conditions:
Column:VertiSep Sodium Column
Flow rate: 0.233 mL/min
Temperature: 48-70-77°C
Pressure: 655 PSIG
Detection: Fluorescence
Injection: 20 µL



Sample:
1. PER
2. TAU
3. PETN
4. THR
5. GLU
6. GLY
7. ALA
8. Met
9. CYST
10. ILE
11. LEU
12. TYR
13. PHE
14. BALA
15. BABA
16. TRP
17. EIN
18. NH3
19. ORN
20. LYS
21 ME-HIS
22. HIS
23 ME-HIS
24. ANS
25. CARN
26. ARG

Conditions:
Column: VertiSep Lithium Column
Flow rate: 0.333 mL/min
Temperature: 32.5-63-80°C
Pressure: 1200 PSIG
Detection: Fluorescence
Injection: 20 µL



VertiSep™ IC HPLC Columns

- **Polymeric base**
- **High efficiency**
- **High resolution**
- **Reproducibility lot-to-lot and column-to-column**
- **Rugged**
- **Available in variety of applications**

Vertisep™ IC Ion Chromatography (IC) is the separation of inorganic and organic ionic species by ion exchange chromatography followed by suppressed conductivity detection. The technique was pioneered by Dow Chemical Company in 1974 and has grown in popularity since.

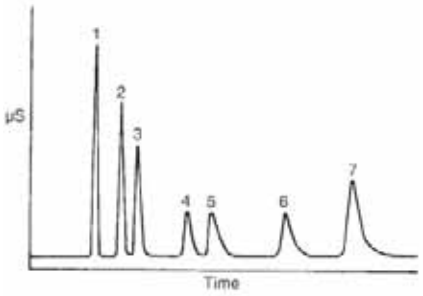
Vertisep™ IC The species analyzed by IC include both anions and cations. The separation of anions is accomplished via anion exchange chromatography. The separations of cations are accomplished via cation exchange chromatography. Transgenomic provides a broad range of columns for the separation of both anions and cations.

Vertisep™ IC The resins used for anion and cation exchange chromatography in IC employ a functionalized, macroporous polystyrene/divinyl benzene copolymer. Resins functionalized with quaternary alkyl or alkynol ammonium groups are used with hydroxide or carbonatebased eluents for anion exchange IC. Resins functionalized with sulfonic acid or carboxylic acid groups are used with acidic eluents for cation exchange IC.

Column	Column	Application
AN300	Dionex AS4A	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, By E.P.A. Method 300.0(a)
AN1	Dionex AS9-HC	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight, Organic acids in medium to high ionic strength matrices Cr(III), Cr(VI) as CrO_3^-, CrO_4^{2-}
ANSC	Dionex AS4A-SC	Polyvalent Phosphates,Arsentate, Sulfite Selenate, Arsenite, Selenite, F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight, Organic acids
AN1SC	Dionex AS9-HC	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight, Organic acids in medium to high ionic strength matrices
AN2	Dionex AS14	Arsenate, Sulfite, Selenate, Arsenite, Selenite F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, Low molecular weight Organic acids
AN300B	Dionex AS9	F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}, ClO_2^-, ClO_3^-, BrO_3^- Li^+, Na^+, K^+, Rb^+, Cs^+,Mg^{2+}, Ca^{2+}, NH^{4+}, Cu^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+},
CN2	Dionex CS15	Cd^{2+}, Pb^{2+}, Mn^{2+}, Fe^{2+}, Fe^{2+}

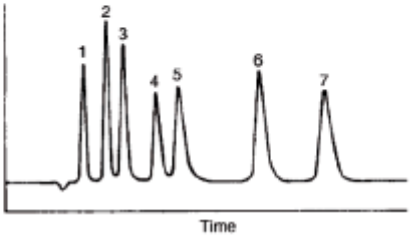
Sample:
1.Fluoride
2.Chloride
3.Nitrite
4.Bromide
5.Nitrate
6.Phosphate
7.Sulfate

Conditions
Column: Vertisep IC ANSC
Eluent: 1.8mM Sodium Carbonate,
1.7mM Sodium Bicarbonate
Flow rate: 1.2 mL/min
Detection: suppressed conductivity



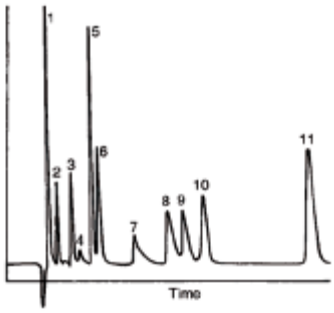
Sample
1. Fluoride
2. Chloride
3. Nitrite
4. Bromide
5. Nitrate
6. Phosphate
7. Sulfate

Column: VertiSep IC AN300
Eluent: 1.7mM Sodium Carbonate,
1.8mM Sodium Bicarbonate
Flow rate: 2.0 mL/min
Detection: suppressed conductivity



Sample:
1. Fluoride
2. Chlorite
3. Bromate
4. Dichloroacetate
5. Chloride
6. Nitrite
7. Chlorate
8. Nitrate
9. Bromide
10. Phosphate
11. Sulfate

Column: VertiSep IC AN300
Eluent: 3.5mM Sodium Carbonate
Flow rate: 1.0 mL/min
Detection: Conductivity



VertiSep™ IC

Packing	I.D. Length (mm)	Part No.	Price
AN2	4.6 x 250	99-8515	
AN1	4.6 x 250	99-8511	
AN1-SC	4.6 x 250	99-8514	
AN300	5.5 x 150	99-7613	
AN300B	4.6 x 250	99-8516	
ANSC	4.6 x 250	99-8512	
ION-120	4.6 x 120	99-6550	
CN2	3.2 x 100	99-5250	
CN2 FA	4.5 x 50	99-3550	

VertiSep™ IC Gaurd Cartridge*

Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
AN2	Guard	3.0 x 10	2	99-0015	
AN1	Guard	3.0 x 10	2	99-0010	
AN1-SC	Guard	3.0 x 10	2	99-0014	
AN300	Guard	3.0 x 10	2	99-0010	
AN300B	Guard	3.0 x 10	2	99-0016	
ANSC	Guard	3.0 x 10	2	99-0012	
ION-120	Guard	3.0 x 10	2	99-0090	
CN2	Guard	3.0 x 10	2	99-1350	
CN2 FA	Guard	3.0 x 10	2	99-1350	
Guard Holder			1	99-1300	

*Guard holder required

VertiSep™ PRP HPLC Columns

- **pH stable from 0 – 14**
- **temperature stable**
- **very rugged, long lasting materials**
- **very tight particle size range (± 0.5 µm) for high efficiency**
- **very high efficiency for polymeric resins**
- **both alkylated and non alkylated PS/DVB available**
- **all resins available in both analytical and bulk for scalability**

Vertisep™ PRP Reversed phase is commonly referred to as adsorption chromatography. Reversed phase works by taking advantage of the hydrophobic interactions between molecules and a hydrophobic stationary phase.

Vertisep™ PRP in reversed phase, molecules are adsorbed onto a hydrophobic stationary phase.Then, the molecules are desorbed by changing the hydrophobic character of the mobile phase such that the molecules will selectively partition into the mobile phase and elute from the column.

Vertisep™ PRP Traditionally, silica-based packings have been the most commonly used sorbants. However, as samples become more challenging, as with biological samples, supports are required that have broader pH ranges, are more rugged, and can be cleaned.Transgenomic provides a family of products all based on polystyrenedivinylbenzene sorbants that utilize our patented alkylation technology.

VertiSep™ PRP Columns

Packing	I.D. Length (mm)	Part No.	Price
PRX-1	2.1 x 50	99-3014	
	4.6 x 150	99-7514	
	4.6 x 250	99-8514	
ACT-1 C18	2.1 x 50	99-3150	
	2.1 x 150	99-7150	
	4.6 x 250	99-7550	
	4.6 x 50	99-3550	
Poly-RP	4.6 x 150	99-7551	

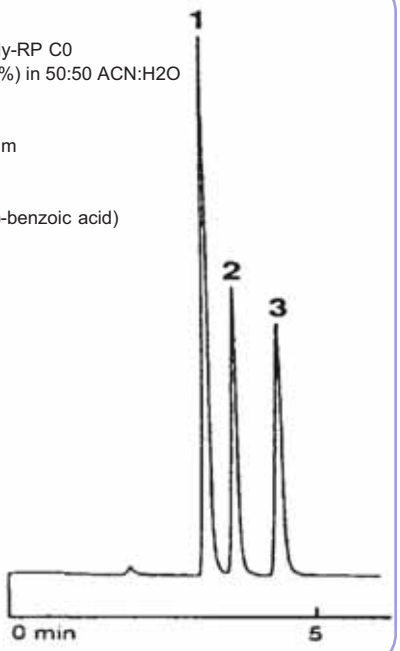
VertiSep™ PRP Gaurd Cartridge*

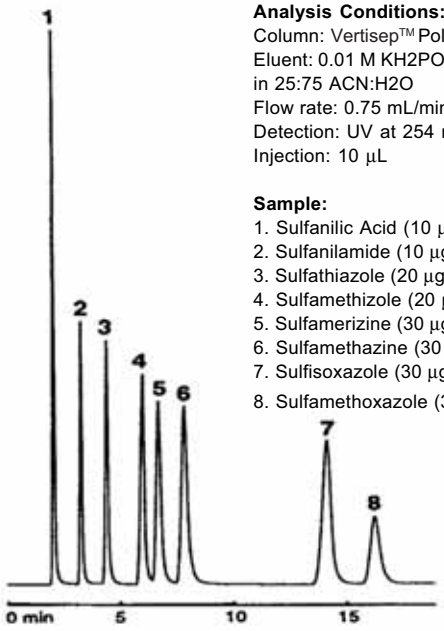
Packing	Formats	I.D. Length (mm)	QTY	Part No.	Price
PRX-1	Guard	4.0 x 24	2	99-1314	
ACT-1 C18	Guard	4.0 x 24	2	99-2360	
Poly-RP	Guard	4.0 x 24	2	99-2361	
Guard Holder			1	99-1300	

*Guard holder required

Analysis Conditions:
Column: Vertisep™ Poly-RP C0
Eluent: 1% H3PO4 (28%) in 50:50 ACN:H2O
Flow rate: 0.75 mL/min
Temperature: Ambient
Detection: UV at 254 nm

Sample:
1.Aspirin (2-(acetyloxy)-benzoic acid)
2.Benzoic Acid
3.Salicylic Acid



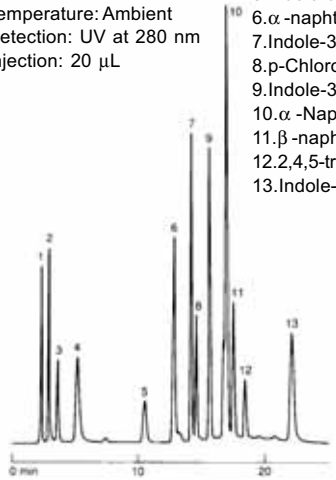


Analysis Conditions:
Column: Vertisep™ Poly-RP C0
Eluent: 0.01 M KH2PO4
in 25:75 ACN:H2O
Flow rate: 0.75 mL/min
Detection: UV at 254 nm
Injection: 10 µL

Sample:
1. Sulfanilic Acid (10 µg/mL)
2. Sulfanilamide (10 µg/mL)
3. Sulfathiazole (20 µg/mL)
4. Sulfamethizole (20 µg/mL)
5. Sulfamerizine (30 µg/mL)
6. Sulfamethazine (30 µg/mL)
7. Sulfisoxazole (30 µg/mL)
8. Sulfamethoxazole (30 µg/mL)

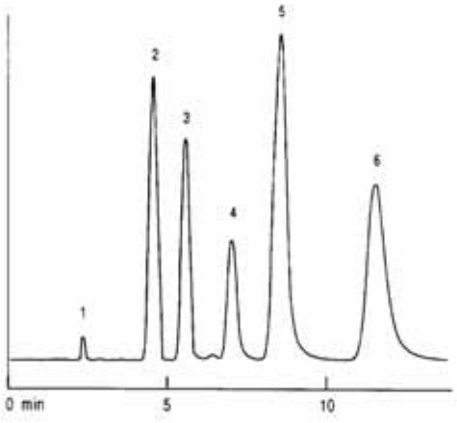
Analysis Conditions:
Column: Vertisep™ Poly-RP C0
Eluent: 30:70 ACB:1% acetic acid, B: 100% ACN
Gradient: 100% A for 4 min, 100% A to 50% A in 8 min, hold for 4 min
Flow rate: 0.6 mL/min
Temperature: Ambient
Detection: UV at 280 nm
Injection: 20 µL

Sample:
1.Maleic Acid Hydrazide
2.Kinetin
3.6-benzylaminopurine riboside
4.Colchicine
5.Indole-3-Acetic-Acid
6.α-naphthaleneactamide
7.Indole-3-Propanoic Acid
8.p-Chlorophenoxy-Acetic Acid
9.Indole-3-Butyric Acid
10.α-Naphthaleneacetic Acid
11.β-naphthalene-Acetic Acid
12.2,4,5-trichlorophenoxyacetic Acid
13.Indole-3-Acetic Ethyl Ester



Analysis Conditions:
Column: Vertisep™ Poly-RP C0
Eluent: 60:40 ACN:H2O
Flow rate: 0.75 mL/min
Temperature: Ambient
Pressure: 107 Bar
Detection: UV at 254 nm

Sample:
1.Aminotriazole
2.Simazine
3.Atrazine
4.Propazine
5.Ametryne
6.Prometryne



Sales Terms and Conditions

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Website: www.vertichrom.com

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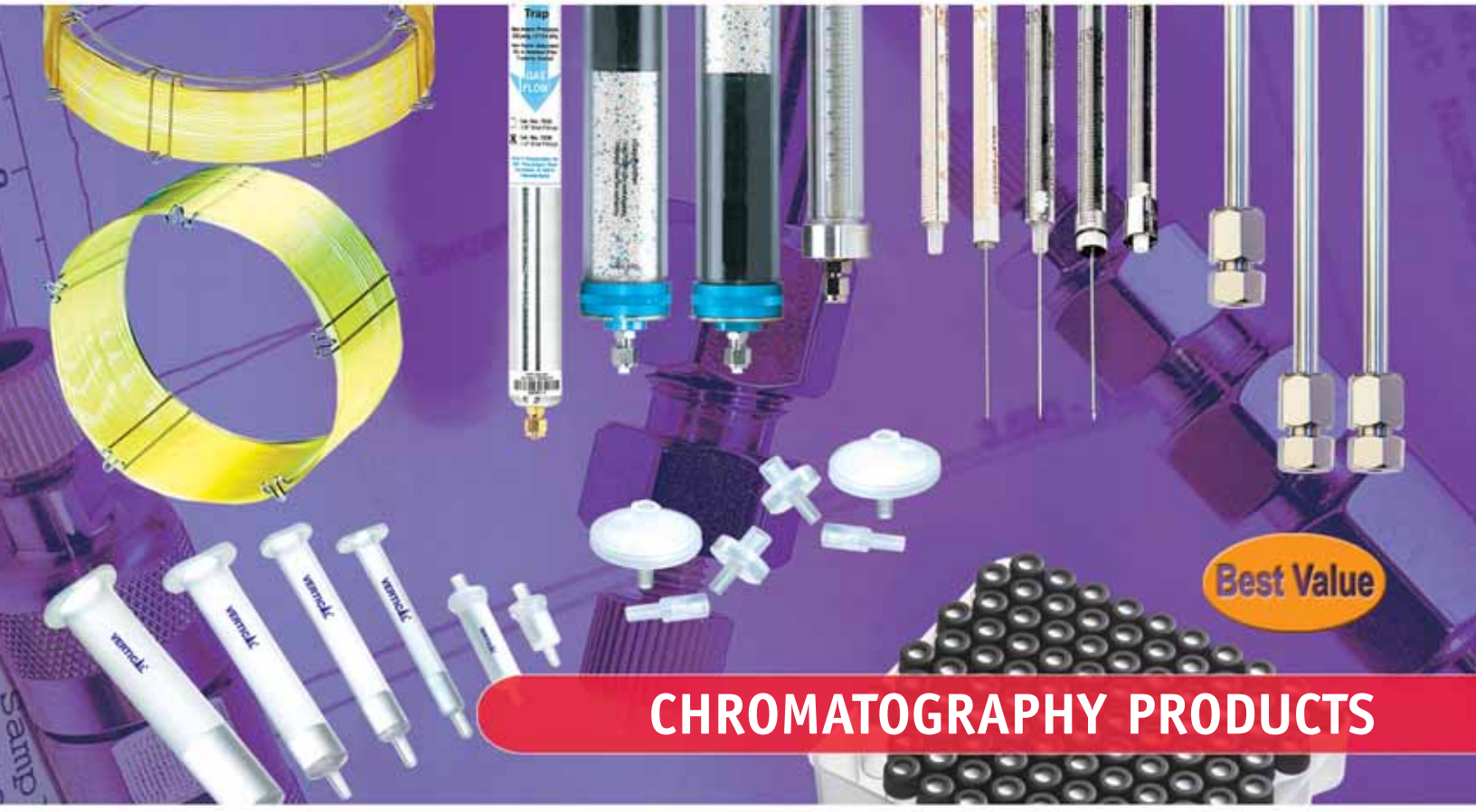

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