

VertiSep™ Integral

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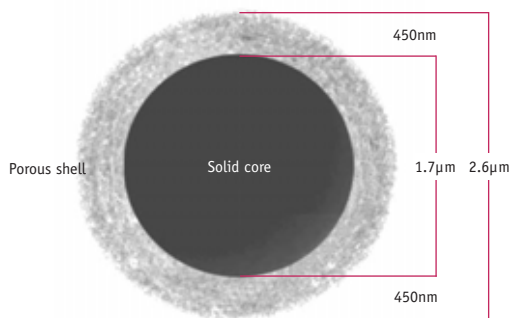
- Ultra-high resolution like sub-2µm columns
- Faster separation like sub-2µm columns
- Lower back pressure than sub-2µm columns
- Compatible with existing HPLC or LC/MS

VertiSep™ Integral columns are made with superficially porous silica microsphere (Core-shell) technology. The packings consist of ultra-pure silica in solid cores and thin outer shells with uniform pores. These offer excellent kinetic properties providing stable, ultra-high resolution and faster than HPLC column with conventional packings.

VertiSep™ Integral columns are 2.6µm in particle size, very narrow particle size distribution and the higher particle density. This provides efficiency of about at least 20,000 in which comparable to sub-2µm columns.

VertiSep™ Integral particles have a solid core of 1.7µm and 450nm thick outer shell respectively. The thin outer porous shell allows rapid solute mass transfer (fast kinetics) so that mobile phase flow rate can be increased to allow for very fast separations without sacrificing resolution like sub-2µm columns.

As only the thin outer shell of core shell particle is porous. This allows less back pressure and rapid solute diffusion in and out of the thin porous shell comparing to totally porous sub-2µm particle. VertiSep™ Integral columns limit at pressure up to at least 5,000psi that are compatible with standard HPLC and LC/MS equipments.

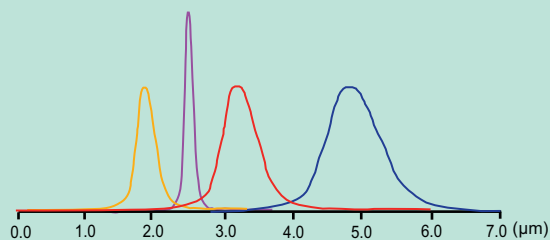


Specifications

Silica	High Purity, Type B
Particle Size (µm)	2.6
Solid Core Size (µm)	1.7
Shell Thickness (nm)	450
Pore Diameter (Å)	100
Surface Area (m ² /g)	130
Pore Volume (cm ³ /g)	0.36
Monodispersivity (D ₉₀ /D ₁₀)	1.20
pH range	1.5-10
Phases	C18, C8, PFP

Comparison of Particle Size Distribution

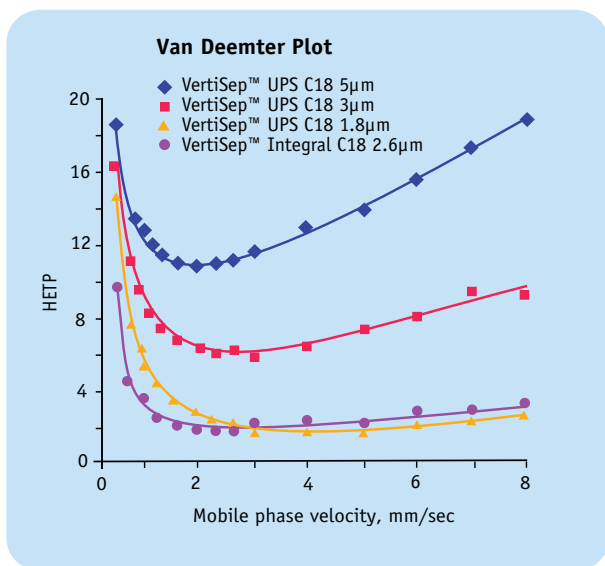
- VertiSep™ UPS 1.8µm (Totally porous)
- VertiSep™ Integral 2.6µm (Core-Shell)
- VertiSep™ UPS 3µm (Totally porous)
- VertiSep™ UPS 5µm (Totally porous)



	D ₁₀	D ₉₀	D ₉₀ /D ₁₀
VertiSep™ UPS 5µm	4.55	6.09	1.34
VertiSep™ UPS 3µm	3.03	4.42	1.46
VertiSep™ UPS 1.8µm	1.6	2.38	1.49
VertiSep™ Integral 2.6µm	2.35	2.82	1.20



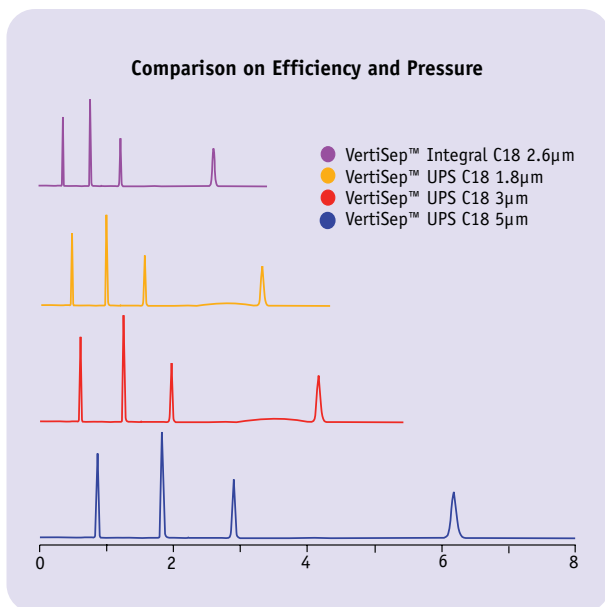
All totally porous particles (1.8µm, 3µm, and 5µm) have an acceptable particle size distribution. However, VertiSep™ Integral core-shell particle has a narrow particle size distribution, which reduces multi-path diffusion and results in high efficiency.



Column : 3.0 x 100mm
 Mobile phase : Acetonitrile/water (60/40)
 Flow rate : 0.5mL/min
 Injection : 3µL
 Temperature : 25 °C
 Detection : UV 254nm
 Analytes : Toluene

The Van Deemter shows that the smaller (2.6µm) particle size of VertiSep™ Integral particles results in significantly higher efficiency for toluene than 5µm and 3µm particle columns. The less increase in plate height with mobile phase velocity increase for the VertiSep™ Integral particles is also in keeping with the smaller particle size and the high kinetic properties of core shell structure.

In comparison with sub-2µm column, VertiSep™ Integral shows very similar efficiency; however, but less backpressures that flow rates can be increased to speed up analysis.



Column Column : 3.0 x 100mm
 Mobile phase : Acetonitrile/water (60/40)
 Flow rate : 0.5mL/min
 Injection : 3µL
 Temperature : 25 °C
 Detection : UV 254nm
 Analytes :

- 1 Uracil
- 2 Phenol
- 3 N,N-Diethyl-m-Toluamide
- 4 Toluene

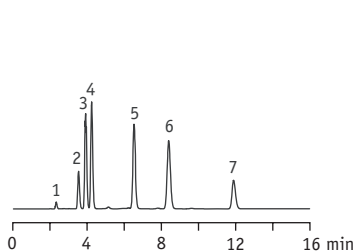
The efficiency on VertiSep™ Integral column is about more than 90% of sub-2µm columns and about 2 times the efficiency of the 3µm columns.

The pressure on VertiSep™ Integral column is below 5,000psi while the pressure on sub-2µm column is above 6,000psi. VertiSep™ Integral columns are compatible with all HPLC systems.

Comparison	Plate (N)	Pressure (psi)
VertiSep™ UPS C18 5µm	6,000	708
VertiSep™ UPS C18 3µm	12,135	2,203
VertiSep™ UPS C18 1.8µm	25,120	6,614
VertiSep™ Integral C18 2.6µm	23,685	4,556

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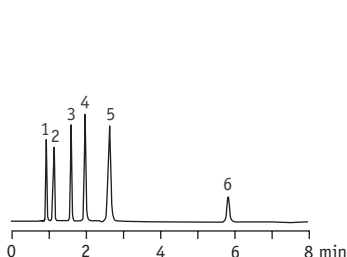
Sudan Dyes



1. Sudan Orange G-a
2. Sudan Orange G-b
3. Sudan Red G
4. Sudan I
5. Sudan II
6. Sudan III
7. Sudan IV

Column: VertiSep™ Integral C18 2.6µm, 4.6x150mm
 Mobile Phase: 0.1% TFA in Water/Acetonitrile : 10/90
 Flow Rate: 1.5 mL/min
 Column Temp: 50 °C
 Detection: UV 480nm

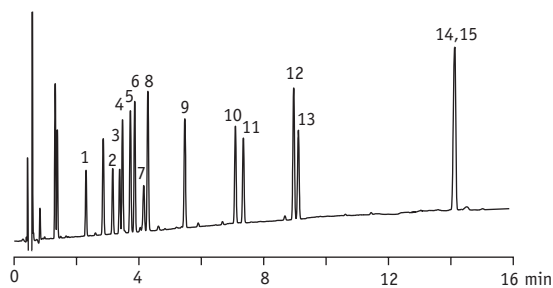
Water Soluble Vitamins



1. Thiamine
2. Ascorbic acid
3. Nicotinic Acid
4. Pyridoxine
5. Niacinamide
6. Pantothenic acid

Column: VertiSep™ Integral C18 2.6µm, 4.6x150mm
 Mobile Phase: 25mM Phosphate buffer pH 3.0/Acetonitrile : (97/3)
 Flow Rate: 1.5 mL/min
 Column Temp: 30 °C
 Detection: UV 212nm

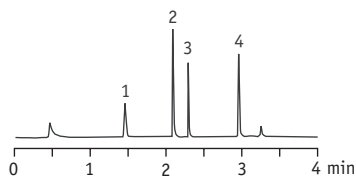
Preservatives in cosmetics



1. Benzyl alcohol
2. Phenoxyethanol
3. Sorbic acid
4. Benzoic acid
5. Methyl paraben
6. p-Anisic acid
7. Dehydroacetic acid
8. Salicylic acid
9. Ethyl paraben
10. Isopropyl paraben
11. Propyl paraben
12. Isobutyl paraben
13. Butyl paraben
14. Triclosan
15. Triclocarban

Column: VertiSep™ Integral C18 2.6µm, 4.6x100mm
 Mobile Phase: 0.1% TFA in Water/Acetonitrile : 85/15
 Flow Rate: 1.5 mL/min
 Column Temp: 30 °C
 Detection: UV 214nm

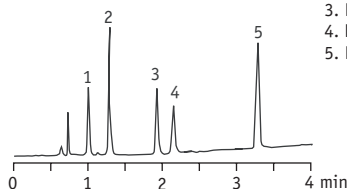
Soft Drinks Additives



1. Acesulfame K
2. Caffeine
3. Aspartame
4. Benzoic acid

Column: VertiSep™ Integral C18 2.6µm, 4.6x100mm
 Mobile Phase: A: 0.1% Phosphoric acid in Water
 B: 0.1% Phosphoric acid in Acetonitrile
 Gradient: Time/%B: 0/5, 2.5/40
 Flow Rate: 1.6 mL/min
 Column Temp: 40 °C
 Detection: UV 215nm

Catechins



1. Epigallocatechin
2. Catechin
3. Epicatechin
4. Epigallocatechin gallate
5. Epicatechin gallate

Column: VertiSep™ Integral C18 2.6µm, 4.6x100mm
 Mobile Phase: 0.1% Phosphoric acid/Acetonitrile : (98/2)
 Flow Rate: 1.3 mL/min
 Column Temp: 30 °C
 Detection: UV 250nm

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HPLC Columns

Ordering Information				
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ Integral Columns				
C18	2.6	2.1 x 30	1	034A-B0B1
		2.1 x 50	1	034A-B2B1
		2.1 x 75	1	034A-B8B1
		2.1 x 100	1	034A-B3B1
		2.1 x 150	1	034A-B4B1
		3.0 x 30	1	034A-C0B1
		3.0 x 50	1	034A-C2B1
		3.0 x 75	1	034A-C8B1
		3.0 x 100	1	034A-C3B1
		3.0 x 150	1	034A-C4B1
		4.6 x 30	1	034A-E0B1
		4.6 x 50	1	034A-E2B1
		4.6 x 75	1	034A-E8B1
		4.6 x 100	1	034A-E3B1
		4.6 x 150	1	034A-E4B1
C8	2.6	2.1 x 30	1	034B-B0B1
		2.1 x 50	1	034B-B2B1
		2.1 x 75	1	034B-B8B1
		2.1 x 100	1	034B-B3B1
		2.1 x 150	1	034B-B4B1
		3.0 x 30	1	034B-C0B1
		3.0 x 50	1	034B-C2B1
		3.0 x 75	1	034B-C8B1
		3.0 x 100	1	034B-C3B1
		3.0 x 150	1	034B-C4B1
		4.6 x 30	1	034B-E0B1
		4.6 x 50	1	034B-E2B1
		4.6 x 75	1	034B-E8B1
		4.6 x 100	1	034B-E3B1
		4.6 x 150	1	034B-E4B1
PFP	2.6	2.1 x 30	1	0345-B0B1
		2.1 x 50	1	0345-B2B1
		2.1 x 75	1	0345-B8B1
		2.1 x 100	1	0345-B3B1
		2.1 x 150	1	0345-B4B1
		3.0 x 30	1	0345-C0B1
		3.0 x 50	1	0345-C2B1
		3.0 x 75	1	0345-C8B1
		3.0 x 100	1	0345-C3B1
		3.0 x 150	1	0345-C4B1
		4.6 x 30	1	0345-E0B1
		4.6 x 50	1	0345-E2B1
		4.6 x 75	1	0345-E8B1
		4.6 x 100	1	0345-E3B1
		4.6 x 150	1	0345-E4B1



Ordering Information				
Phase	Particle Size (µm)	I.D. Length (mm)	QTY	Part No.
VertiSep™ Integral Guard Cartridge*				
C18	2.6	2.1 x 10	2	034A-B1B3
		3.0 x 10	2	034A-C1B3
		4.6 x 10	2	034A-E1B3
C8	2.6	2.1 x 10	2	034B-B1B3
		3.0 x 10	2	034B-C1B3
		4.6 x 10	2	034B-E1B3
PFP	2.6	2.1 x 10	2	0345-B1B3
		3.0 x 10	2	0345-C1B3
		4.6 x 10	2	0345-E1B3

*Guard holder required

Ordering Information		
Description	QTY	Part No.
Accessories required		
Guard holder	1	0300-0001
In-Line Filter 2µm**	1	05AB-2021
PEEK Tubing, 1/16"OD, 0.12mmID**	5'	05AD-1031

**Required when use a small internal volumes HPLC column (< 50mm Length or < 3mm ID)