

VertiSep™ BIO

VertiSep™ BIO HPLC Columns

- Full endcapping
- Ultimate Protein and Peptide application column
- Acidic and Alkalic resistance for long lifetime
- 4 Phases: C30, C18, C8, and C4 chemistries
- 3mm, 5mm, 10mm particle sizes



VertiSep™ BIO packings 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 used for extened period of time in acidic mobile phase condition and rinsed for recover with NaOH containing buffer.

There are 4 phases: C30, C18, C8 and C4 and 3 particle sizes: 3µm, 5µm, 10µm particle sizes.

VertiSep™ BIO are manufactured by statistic process control of Silica synthesis, bonding and column packing. The reproducible column packing method control provides exceptional efficiency, symmetry and reproducible capacity factor.

VertiSep™ BIO C30 are ideal for the separation of large molecules such as Proteins and Peptides, especially Isomers in Carotenoid family of long chain molecules. VertiSep™ BIO C30 are a great equivalent to YMC C30 and are interchangeable with them for many applications.

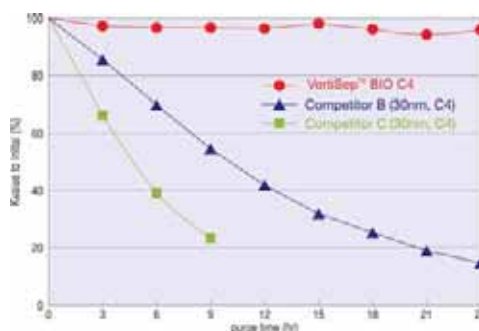
VertiSep™ BIO C18 are ideal for the separation of high molecular weight peptides and oligonucleic acids. VertiSep™ BIO C18 are designed for biopharmaceutical, biochemical and environmental applications and for separation of food compounds as well.

VertiSep™ BIO C8 have moderate hydrophobicity make them useful for separating compounds or samples in cases where separation optimization is difficult to achieve using C18 with relatively high hydrophobicity. VertiSep™ BIO C8 are used to separate many classes of compounds including pharmaceuticals, organic chemicals and biologicals.

VertiSep™ BIO C4 stationary phase surface hydrophobicity is lower than both C18 and C8. VertiSep™ BIO C4 achieve better separation than C18 or C8 for some type of samples. VertiSep™ BIO C4 effectively resolve many classes of proteins and biopolymers.

Packing	Particle Size (mm)	Carbon Load (%)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m ² /g)	End Capped
C30	3,5	20	200	1.1	200	No
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

Comparison of Durability in Acidic Environment



1. Urasil
2. Methyl Benzoate
3. Toluene
4. Naphthalene

Column: VertiSep™ BIO C4 5µm 4.6x250mm

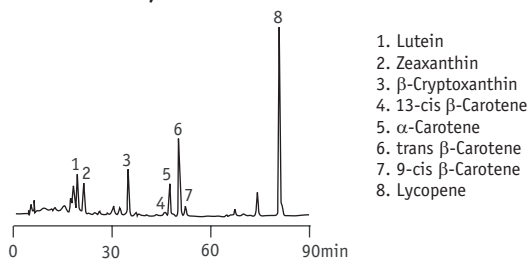
Accelerated Acidic Duration Test Condition

Mobile Phase: CH₃OH:1.0% TFA aq., pH=1.0 (10:90)
 Flow Rate: 1.0mL/min
 Temperature: 70°C
 Purge time: 3h

Chromatographic Test Condition

Mobile Phase: CH₃OH:Water (35:65)
 Flow Rate: 1.0mL/min
 Temperature: 40°C
 Detection: UV214nm

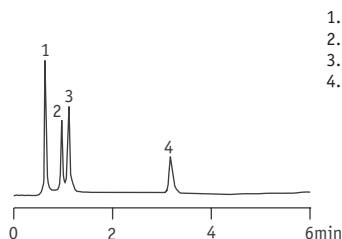
SRM 2383, NIST Food Standard



1. Lutein
2. Zeaxanthin
3. β -Cryptoxanthin
4. 13-cis β -Carotene
5. α -Carotene
6. trans β -Carotene
7. 9-cis β -Carotene
8. Lycopene

Column: VertiSep™ BIO C30 5 μ m 4.6x250mm
 Mobile Phase: A: MeOH:MTBE:H₂O (81:15:4)
 B: MeOH:MTBE:H₂O (6:90:4)
 Gradient: Time:%B: 0:0, 90:100
 Flow Rate: 1.0mL/min
 Detection: UV450nm

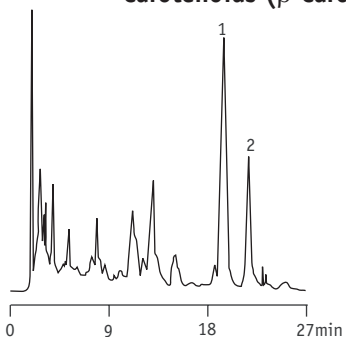
Carotenoids



1. Lutein
2. Alpha-carotene
3. Beta-carotene
4. Lycopene

Column: VertiSep™ BIO C30 3 μ m 4.6x50mm
 Mobile Phase: A: MeOH
 B: 5.5% MeOH with 5% THF
 Gradient: Time:%B: 0:0, 3.5:100
 Flow Rate: 1.0mL/min
 Detection: UV450nm

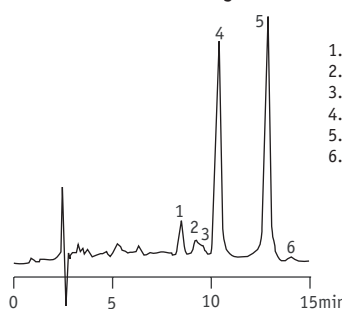
Carotenoids (β -Carotene)



1. all-trans
2. 9-cis

Column: VertiSep™ BIO C30 5 μ m 4.6x250mm
 Mobile Phase: MeOH:TBME (80:20)
 Flow Rate: 1.0mL/min
 Detection: UV450nm

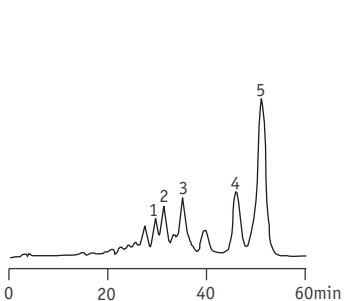
Carotene Isomers From Commercially Available Capsules



1. 15-cis β -Carotene
2. 13-cis β^2 -Carotene
3. 13'-cis β -Carotene
4. α -Carotene
5. β -Carotene
6. α -Carotene

Column: VertiSep™ BIO C30 5 μ m 4.6x250mm
 Mobile Phase: EtOH:MeOH:THF (75:20:5)
 Flow Rate: 1.0mL/min
 Detection: UV450nm

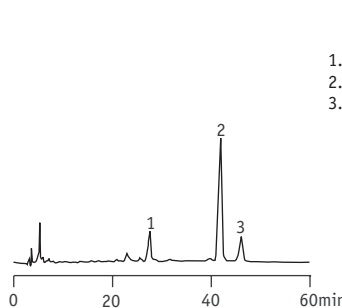
Carotenes Found In Algae



1. 15-cis β -Carotene
2. 13-cis β -Carotene
3. trans α -Carotene
4. trans β -Carotene
5. 9-cis β -Carotene

Column: VertiSep™ BIO C30 5 μ m 4.6x250mm
 Mobile Phase: MeOH:TBME (80:20)
 Flow Rate: 2.0mL/min
 Detection: UV450nm

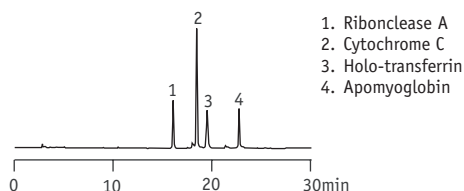
Carotenoids of cassava



1. 13-cis β -Carotene
2. trans β -Carotene
3. 9-cis β -Carotene

Column: VertiSep™ BIO C30 5 μ m 4.6x250mm
 Mobile Phase: MeOH:Methyl-*tert*-butyl ether (80:20)
 Flow Rate: 0.8mL/min
 Detection: UV450nm

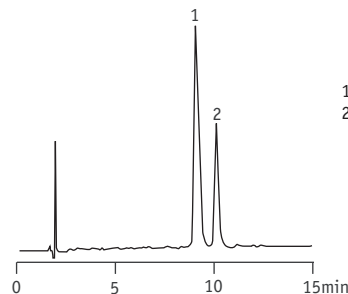
Proteins



1. Ribonclease A
2. Cytochrome C
3. Holo-transferrin
4. Apomyoglobin

Column: VertiSep™ BIO C18 4.6x250mm
 Mobile Phase: A: 0.1% TFA in H₂O
 B: 0.1% TFA in MeCN
 Gradient: Time:%B: 0/5, 30/70
 Flow Rate: 1.0mL/min
 Detection: UV280nm

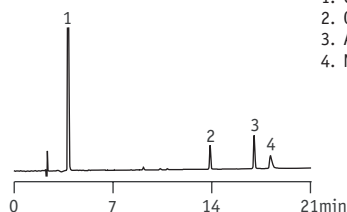
Bradykinins



1. des-Pro²-bradykinin
2. Bradykinin

Column: VertiSep™ BIO C18 4.6x150mm
 Mobile Phase: A: 0.15% TFA in Water
 B: 0.13% TFA in Acetonitrile
 Gradient: Time:%B: 0:15, 15:25
 Flow Rate: 1mL/min
 Detection: UV205nm

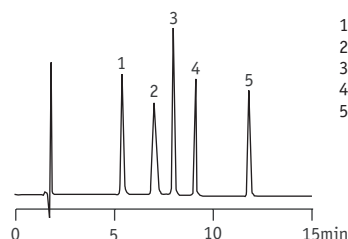
Peptides



1. Gly-Tyr
2. Oxytocin
3. Angiotensin II
4. Neurotensin

Column: VertiSep™ BIO C18 4.6x250mm
 Mobile Phase: A: 0.1% TFA in H₂O
 B: 0.1% TFA in MeCN
 Gradient: Time:%B: 0:10, 25:40
 Flow Rate: 1.0mL/min
 Detection: UV220nm

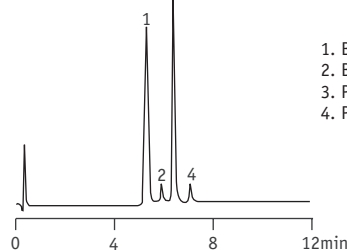
Bioactive Peptides



1. Methionine Enkephalin
2. Bradykinin
3. Leucine Enkephalin
4. Physalaemin
5. Substance P

Column: VertiSep™ BIO C18 4.6x150mm
 Mobile Phase: A: 0.1% TFA in Water
 B: 0.085% TFA in Acetonitrile:Water (95:5)
 Gradient: Time:%B: 0:20, 20:50
 Flow Rate: 1.0mL/min
 Detection: UV220nm

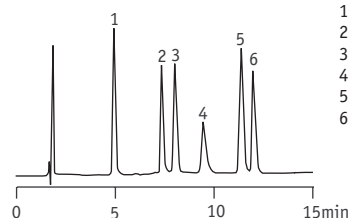
Insulins



1. Bovine Insulin
2. Bovine Insulin Impurity
3. Porcine Insulin
4. Porcine Insulin Impurity

Column: VertiSep™ BIO C18 5µm 4.6x150mm
 Mobile Phase: A: 0.13% TFA in Water
 B: 0.10% TFA in Acetonitrile
 Gradient: Time:%B: 0:28, 12:38
 Flow Rate: 1.0mL/min
 Detection: UV220nm

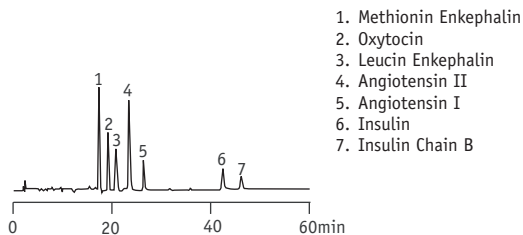
Peptide Mix



1. Methionine Enkephalin
2. Leucine Enkephalin
3. Angiotensin II
4. Neurotensin
5. Angiotensin I
6. Substance P

Column: VertiSep™ BIO C18 5µm 4.6x250mm
 Mobile Phase: A: 0.1% TFA in Water
 B: 0.08% TFA in Acetonitrile
 Gradient: Time:%B: 0:20, 20:40
 Flow Rate: 1.0mL/min
 Detection: UV220nm

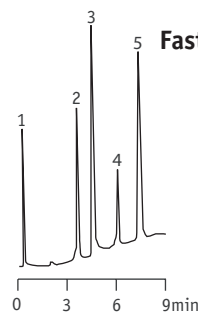
Proteins



1. Methionin Enkephalin
2. Oxytocin
3. Leucin Enkephalin
4. Angiotensin II
5. Angiotensin I
6. Insulin
7. Insulin Chain B

Column: VertiSep™ BIO C8 5µm 4.6x250mm
 Mobile Phase: A: 0.05% Formic Acid
 (0.05% Formic Acid in Solvent B)
 B: ACN:Water (90:10)
 Gradient: Time:%B: 0:10, 60:40
 Flow Rate: 1.0mL/min
 Detection: UV280nm

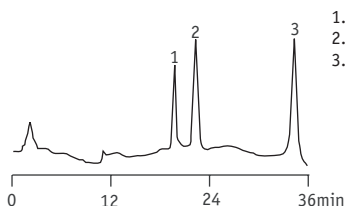
Fast protein analysis



1. Ribonuclease A
2. Insulin
3. Lysozyme
4. BSA

Column: VertiSep™ BIO C8 5µm 4.6x50mm
 Mobile Phase: A: Trifluoroacetic acid:Water (0.1:99.9)
 B: Trifluoroacetic acid:Water:Acetonitrile
 (0.1:4.9:95)
 Gradient: Time:%B: 0:25, 10:65
 Flow Rate: 2.5mL/min
 Detection: UV220nm

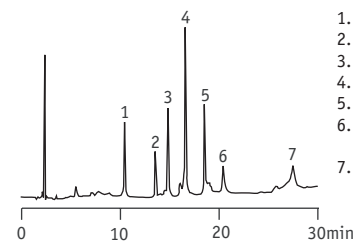
Basic Protein



1. RNA polymerase
2. Chymotrypsinogen
3. Lysozyme

Column: VertiSep™ BIO C8 5µm 4.6x100mm
 Mobile Phase: A: 0.02 M tris, pH 7.0
 B: 0.02 M tris in 0.5 M sodium acetate, pH 7.0
 Gradient: Time:%B: 0:0, 30:100
 Flow Rate: 1.0mL/min
 Detection: UV254nm

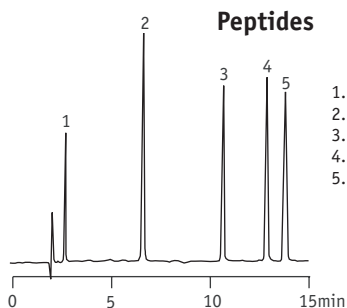
Polypeptides



1. Ribonuclease
2. Insulin
3. Cytochrome
4. Lysozyme
5. BSA
6. Trypsin Inhibitor from Soybean
7. Ovalbumin

Column: VertiSep™ BIO C8 5µm 4.6x150mm
 Mobile Phase: A: 0.1% TFA
 B: MeCN:0.1% TFA (90:10)
 Gradient: Time:%B: 0:20, 25:60
 Flow Rate: 1.0mL/min
 Detection: UV280nm

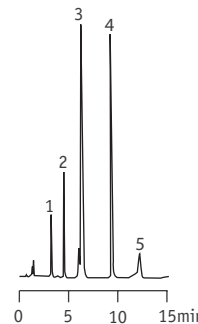
Peptides



1. GLY-TYR
2. VAL-TYR-VAL
3. Methionine Enkephalin
4. Leucine Enkephalin
5. Angiotensin II

Column: VertiSep™ BIO C8 5µm 4.6x150mm
 Mobile Phase: A: 0.15% TFA in H₂O
 B: 0.13% TFA in ACN
 Gradient: Time:%B: 0:10, 15:30
 Flow Rate: 1.0mL/min
 Detection: UV220nm

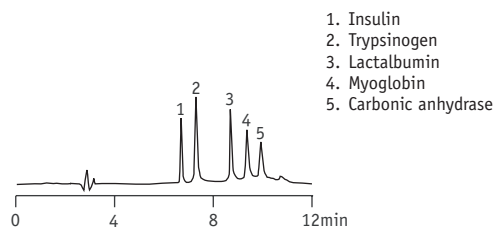
Proteins



1. Ribonuclease A
2. Insulin
3. Lysozyme
4. Myoglobin
5. Ovalbumin

Column: VertiSep™ BIO C8 5µm 4.6x250mm
 Mobile Phase: A: 0.1% TFA in H₂O
 B: 0.1% TFA in ACN
 Gradient: Time:%B: 0:25, 30:100
 Flow Rate: 1.5mL/min
 Detection: UV254 nm

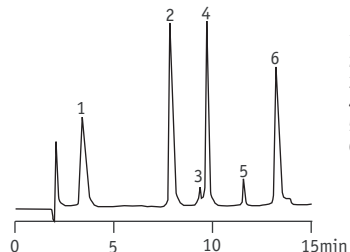
Proteins



1. Insulin
2. Trypsinogen
3. Lactalbumin
4. Myoglobin
5. Carbonic anhydrase

Column: VertiSep™ BIO C4 5µm 4.6x250mm
 Mobile Phase: A: 0.01% TFA in H₂O
 B: 0.01% TFA in ACN
 Gradient: Time:%B: 0:25, 20:95
 Flow Rate: 1.0mL/min
 Detection: UV214nm

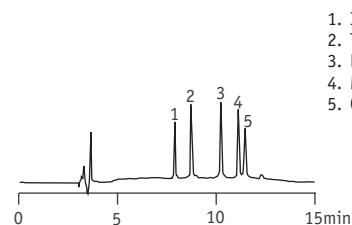
Proteins Mix



1. Ribonuclease A
2. Cytochrome C
3. Lysozyme Impurity
4. Lysozyme
5. Myoglobin Impurity
6. Myoglobin

Column: VertiSep™ BIO C4 5µm 4.6x150mm
 Mobile Phase: A: 0.15% TFA
 B: 0.13% TFA in ACN:H₂O (95:5)
 Gradient: Time:%B: 0:30, 15:60
 Flow Rate: 1.0mL/min
 Detection: UV220nm

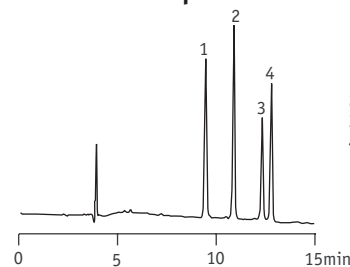
Proteins



1. Insulin
2. Trypsinogen
3. Lactalbumin
4. Myoglobin
5. Carbonic anhydrase

Column: VertiSep™ BIO C4 5µm 4.6x250mm
 Mobile Phase: A: 0.1% TFA in H₂O
 B: 0.1% TFA in ACN
 Gradient: Time:%B: 0:25, 20:95
 Flow Rate: 1.0mL/min
 Detection: UV214nm

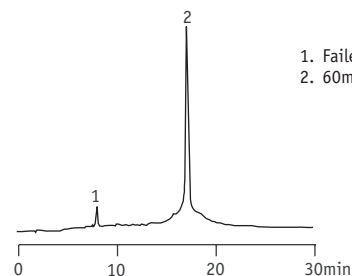
Peptide Hormones



1. [Arg₈]-Vasotocin
2. [Arg₈]-VasoPressin
3. Isotocin
4. Oxytocin

Column: VertiSep™ BIO C4 5µm 4.6x250mm
 Mobile Phase: A: 0.1% TFA in H₂O
 B: 0.1% TFA in ACN:H₂O (90:10)
 Gradient: Time:%B: 0:10, 8:26, 14:30
 Flow Rate: 1.0mL/min
 Detection: UV214nm

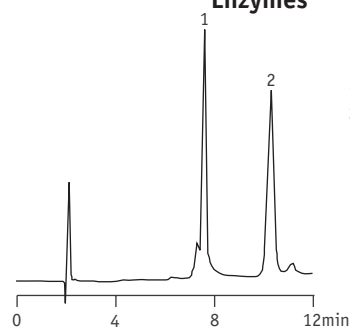
60mer Oligonucleotide Separation



1. Failed sequence contaminant
2. 60mer Oligonucleotide

Column: VertiSep™ BIO C4 5µm 4.6x250mm
 Mobile Phase: A: 100mM TEAA in H₂O, pH 7.0
 B: 100mM TEAA in ACN, pH7.0
 Gradient: Time:%B: 0:4, 30:15
 Flow Rate: 1.0mL/min
 Detection: UV260nm

Enzymes



1. α-Chymotrypsinogen
2. Carbonic Anhydrase

Column: VertiSep™ BIO C4 5µm 4.6x150mm
 Mobile Phase: A: 0.15% TFA in H₂O
 B: 0.13% TFA in ACN
 Gradient: Time:%B: 0:40, 15:55
 Flow Rate: 1.0mL/min
 Detection: UV220nm

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C30	3	Ultra-Fast	2.1 x 50	1	03HQ-B211
	3	LC/MS	2.1 x 100	1	03HQ-B311
	3	LC/MS	2.1 x 150	1	03HQ-B411
	3	Ultra-Fast	3.2 x 50	1	03HQ-C211
	3	LC/MS	3.2 x 100	1	03HQ-C311
	3	LC/MS	3.2 x 150	1	03HQ-C411
	3	Hi-Speed	4.6 x 50	1	03HQ-E211
	3	Analytical	4.6 x 100	1	03HQ-E311
	3	Analytical	4.6 x 150	1	03HQ-E411
	5	Ultra-Fast	2.1 x 50	1	03HQ-B221
	5	LC/MS	2.1 x 100	1	03HQ-B321
	5	LC/MS	2.1 x 150	1	03HQ-B421
	5	LC/MS	2.1 x 250	1	03HQ-B521
	5	Ultra-Fast	3.2 x 50	1	03HQ-C221
	5	LC/MS	3.2 x 100	1	03HQ-C321
	5	LC/MS	3.2 x 150	1	03HQ-C421
	5	LC/MS	3.2 x 250	1	03HQ-C521
	5	Hi-Speed	4.6 x 50	1	03HQ-E221
	5	Analytical	4.6 x 100	1	03HQ-E321
	5	Analytical	4.6 x 150	1	03HQ-E421
	5	Analytical	4.6 x 250	1	03HQ-E521

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C18	5	LC/MS	2.1 x 100	1	03HA-B321
	5	LC/MS	2.1 x 150	1	03HA-B421
	5	LC/MS	3.2 x 150	1	03HA-C421
	5	Analytical	4.6 x 100	1	03HA-E321
	5	Analytical	4.6 x 150	1	03HA-E421
	5	Analytical	4.6 x 250	1	03HA-E521
	5	Prep	10.0 x 150	1	03HA-H421
	5	Prep	10.0 x 250	1	03HA-H521
	5	Prep	22.0 x 150	1	03HA-I421
	5	Prep	22.0 x 250	1	03HA-I521
	10	Analytical	4.6 x 100	1	03HA-E331
	10	Analytical	4.6 x 150	1	03HA-E431
	10	Analytical	4.6 x 250	1	03HA-E531
	10	Prep	10.0 x 100	1	03HA-H331
	10	Prep	10.0 x 150	1	03HA-H431
	10	Prep	10.0 x 250	1	03HA-H531
	10	Prep	21.2 x 100	1	03HA-I331
	10	Prep	21.2 x 150	1	03HA-I431
	10	Prep	21.2 x 250	1	03HA-I531
	10	Prep	30.0 x 150	1	03HA-J431
	10	Prep	30.0 x 250	1	03HA-J531
	10	Prep	50.0 x 150	1	03HA-K431
	10	Prep	50.0 x 250	1	03HA-K531



VertiSep™ BIO

HPLC Columns

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C8	5	LC/MS	2.1 x 100	1	03HB-B321
	5	LC/MS	2.1 x 150	1	03HB-B421
	5	LC/MS	3.2 x 150	1	03HB-C421
	5	Analytical	4.6 x 100	1	03HB-E321
	5	Analytical	4.6 x 150	1	03HB-E421
	5	Analytical	4.6 x 250	1	03HB-E521
	5	Prep	10.0 x 150	1	03HB-H421
	5	Prep	10.0 x 250	1	03HB-H521
	5	Prep	22.0 x 150	1	03HB-I421
	5	Prep	22.0 x 250	1	03HB-I521
	10	Analytical	4.6 x 100	1	03HB-E331
	10	Analytical	4.6 x 150	1	03HB-E431
	10	Analytical	4.6 x 250	1	03HB-E531
	10	Prep	10.0 x 100	1	03HB-H331
	10	Prep	10.0 x 150	1	03HB-H431
	10	Prep	10.0 x 250	1	03HB-H531
	10	Prep	21.2 x 100	1	03HB-I331
	10	Prep	21.2 x 150	1	03HB-I431
	10	Prep	21.2 x 250	1	03HB-I531
	10	Prep	30.0 x 150	1	03HB-J431
	10	Prep	30.0 x 250	1	03HB-J531
	10	Prep	50.0 x 150	1	03HB-K431
	10	Prep	50.0 x 250	1	03HB-K531

Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO					
C4	5	LC/MS	2.1 x 100	1	03HC-B321
	5	LC/MS	2.1 x 150	1	03HC-B421
	5	LC/MS	3.2 x 150	1	03HC-C421
	5	Analytical	4.6 x 100	1	03HC-E321
	5	Analytical	4.6 x 150	1	03HC-E421
	5	Analytical	4.6 x 250	1	03HC-E521
	5	Prep	10.0 x 150	1	03HC-H421
	5	Prep	10.0 x 250	1	03HC-H521
	5	Prep	22.0 x 150	1	03HC-I421
	5	Prep	22.0 x 250	1	03HC-I521
	10	Analytical	4.6 x 100	1	03HC-E331
	10	Analytical	4.6 x 150	1	03HC-E431
	10	Analytical	4.6 x 250	1	03HC-E531
	10	Prep	10.0 x 100	1	03HC-H331
	10	Prep	10.0 x 150	1	03HC-H431
	10	Prep	10.0 x 250	1	03HC-H531
	10	Prep	21.2 x 100	1	03HC-I331
	10	Prep	21.2 x 150	1	03HC-I431
	10	Prep	21.2 x 250	1	03HC-I531
	10	Prep	30.0 x 150	1	03HC-J431
	10	Prep	30.0 x 250	1	03HC-J531
	10	Prep	50.0 x 150	1	03HC-K431
	10	Prep	50.0 x 250	1	03HC-K531





Ordering Information					
Phase	Particle Size (µm)	Formats	I.D. Length (mm)	QTY	Part No.
VertiSep™ BIO Guard Cartridges*					
C30	3	Guard	2.1 x 10	2	03HQ-B113
	3	Guard	3.2 x 10	2	03HQ-C113
	3	Guard	4.6 x 10	2	03HQ-E113
	5	Guard	2.1 x 10	2	03HQ-B123
	5	Guard	3.2 x 10	2	03HQ-C123
C18	5	Guard	4.6 x 10	2	03HQ-E123
	5	Guard	2.1 x 10	2	03HA-B123
	5	Guard	3.2 x 10	2	03HA-C123
	5	Guard	4.6 x 10	2	03HA-E123
	5	Guard	10.0 x 10	2	03HA-H123
	5	Guard	21.2 x 10	2	03HA-I123
	10	Guard	4.6 x 10	2	03HA-E133
C8	10	Guard	10.0 x 10	2	03HA-H133
	10	Guard	21.2 x 10	2	03HA-I133
	5	Guard	2.1 x 10	2	03HB-B123
	5	Guard	3.2 x 10	2	03HB-C123
	5	Guard	4.6 x 10	2	03HB-E123
	5	Guard	10.0 x 10	2	03HB-H123
	5	Guard	21.2 x 10	2	03HB-I123
C4	10	Guard	4.6 x 10	2	03HB-E133
	10	Guard	10.0 x 10	2	03HB-H133
	10	Guard	21.2 x 10	2	03HB-I133
	5	Guard	2.1 x 10	2	03HC-B123
	5	Guard	3.2 x 10	2	03HC-C123
	5	Guard	4.6 x 10	2	03HC-E123
	5	Guard	10.0 x 10	2	03HC-H123
	5	Guard	21.2 x 10	2	03HC-I123
	10	Guard	4.6 x 10	2	03HC-E133
	10	Guard	10.0 x 10	2	03HC-H133
	10	Guard	21.2 x 10	2	03HC-I133

*Guard holder required

Ordering Information		
Description	QTY	Part No.
Guard Holder with Coupler		
For column I.D. 2.1-7.8 mm	1	0300-0001
For column I.D. 10 mm	1	0300-0002
For column I.D. 21.2 mm	1	0300-0003

