Core-Shell HPLC / UHPLC Columns for Proteins and Peptides

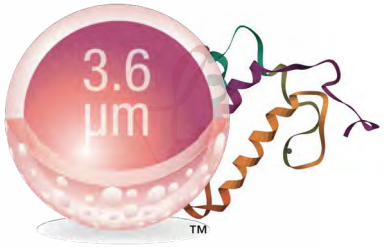
Find newer methods in our Biozen Portfolio
See pp. 210-230

Ultra-High Resolution and Performance

Introducing Aeris, a specialized line of reversed phase core-shell HPLC / UHPLC columns, built exclusively for the ultra-high performance separation and analysis of proteins and peptides.

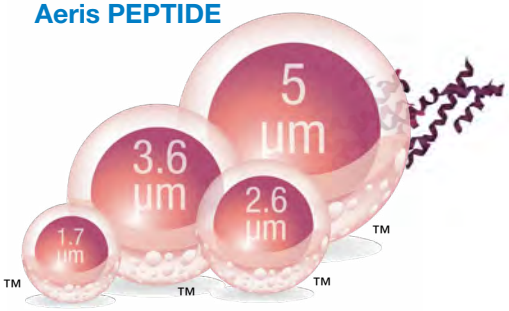
These columns can provide improved resolving power, selectivity, throughput, sensitivity, column lifetime, and method flexibility compared to other fully porous and core-shell columns typically used for bioseparations.

Aeris WIDEPORE



Large pore optimized for intact proteins and polypeptides

Aeris PEPTIDE



Small pore optimized for peptides and for peptide mapping

The precise architecture of Aeris core-shell particles provides dramatic leaps in performance in two important ways:

1. The thin, porous layer, or "shell", decreases the diffusion path length, thus reducing the time it takes for biomolecules to adsorb/desorb into and out of the particle.

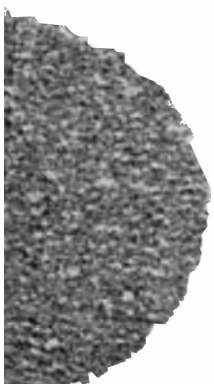
2. Expert manufacturing combined with tight packing specifications and high particle density reduces losses in efficiency and performance due to band broadening.

Aeris Core-Shell Particle

- **High particle density helps create optimal bed structure which reduces band broadening effects of Eddy Diffusion**
- **Ultra-high performance on HPLC and UHPLC systems alike**
- **Reduced diffusion path improves efficiency**

Fully Porous Particle

- **Less homogenuous bed structure leads to performance loss**
- **Ultra-high performance limited to sub-2µm particles on UHPLC systems**
- **Diffusion path limits efficiencies**



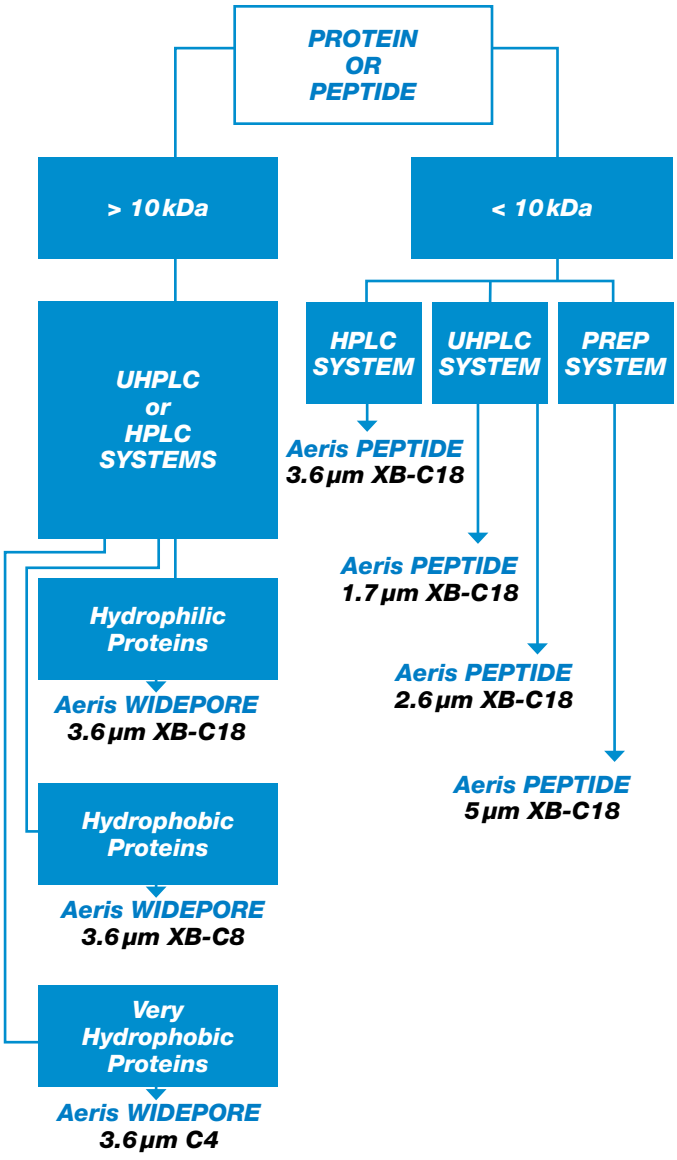
The result is:

- **3.6µm core-shell particles that can perform like sub-2µm columns on both HPLC and UHPLC systems at a fraction of the pressure**
- **5µm core-shell particles allow scale up to preparative dimensions**
- **1.7µm and 2.6µm core-shell particles that can provide higher peak capacities compared to fully porous sub-2µm columns on UHPLC systems**

To see our entire BioSeparations column and accessory portfolio, visit:
www.phenomenex.com/biopharm

Selecting the Optimal Aeris Column for Your Applications

Aeris core-shell columns are designed for the separation of complex protein and peptide mixtures. Chromatographers can easily narrow down the column(s) that has a high probability of success for their separation by selecting from a variety of phase, pore size, and particle size options.



Aeris PEPTIDE

Recommended for the separation of low molecular weight peptides and for peptide mapping.

- **XB-C18 chemistry best suited for resolving peptides**
- **1.7µm, 2.6µm, and 3.6µm particles for method development flexibility between HPLC and UHPLC systems**
- **5µm particle for peptide purification**
- **Small pore optimized for peptide diffusion**

For increased resolving power, use a longer column, preferably a 250mm (or 150mm for the Aeris 1.7µm XB-C18). Due to the lower backpressure of Aeris 3.6µm, one can easily run 250mm columns on both HPLC and UHPLC systems, AND one can couple multiple 250mm columns together and run them inline for even better results. For maximum UHPLC resolution, the 150mm length Aeris 1.7µm or 250mm length Aeris 2.6µm columns are excellent choices.

Aeris WIDEPORE

Recommended for the separation of intact proteins and polypeptides.

- **XB-C18, XB-C8, and C4 phases for alternate selectivities**
- **3.6µm particle for system flexibility**
- **Large pore optimized for fast protein adsorption/ desorption**

Because of the reduced hydrophobicity compared to fully porous 300Å columns, one should start gradients with reduced organic concentrations compared to other columns to improve peak shape of polar proteins and peptides. Shallower gradients compared to other fully porous columns may be appropriate.

Material Characteristics

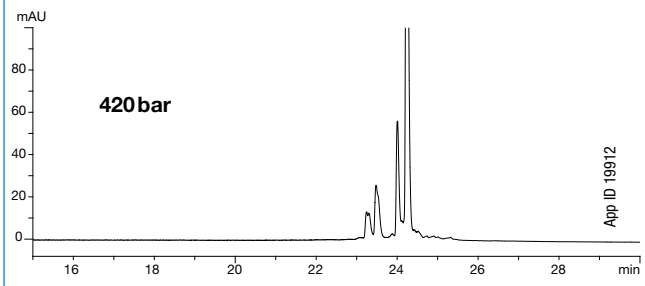
Packing Material	Total Particle Size (µm)	Porous Shell (µm)	Core Size (µm)	pH Stability	Temp Stability °C	Pressure Stability bar
Aeris WIDEPORE	3.6	0.2	3.2	1.5 - 9	90	600
Aeris PEPTIDE	1.7	0.22	1.25	1.5 - 9	90	1000
Aeris PEPTIDE	2.6	0.35	1.9	1.5 - 9	90	1000
Aeris PEPTIDE	3.6	0.5	2.6	1.5 - 9	90	600
Aeris PEPTIDE	5	0.6	3.8	1.5 - 9	90	600

Maximize Resolving Power with Unique Wide-Pore 3.6 µm Core-Shell Particle

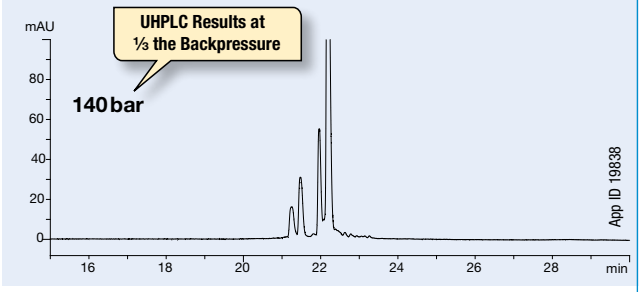
3.6 µm core-shell technology combined with inert surface chemistries and tight packing specifications results in Aeris WIDEPORE columns delivering exceptional resolving power at significantly lower backpressures. Chromatographers now have the ability to generate higher quality data than typically produced by columns packed with fully porous particles for every protein analysis – on HPLC or UHPLC systems.

Performance Equivalent to Sub-2 µm Particle at Low Backpressure

Waters® ACQUITY® BEH300 1.7 µm C4



Aeris WIDEPORE 3.6 µm C4



Conditions for both columns:

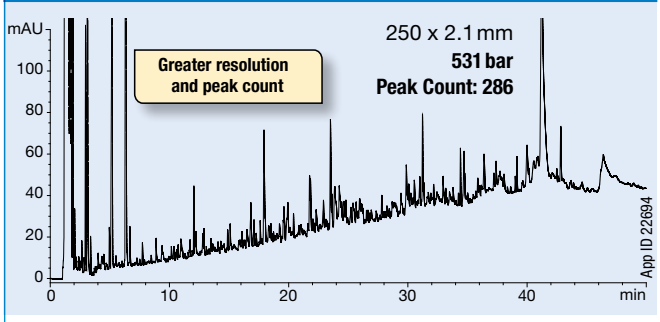
Column: ACQUITY® BEH300 1.7 µm C4
Aeris WIDEPORE 3.6 µm C4
Dimensions: 150 x 2.1 mm
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient: A/B (97:3) to A/B (35:65) over 45 min
Flow Rate: 0.3 mL/min
Temperature: 40 °C
Injection Volume: 10 µL
Instrument: Agilent® 1200
Detection: UV @ 214 nm (ambient)
Sample: Human Epidermal Growth Factor (EGF)

Ultra-High Resolving Power on UHPLC Systems with Aeris PEPTIDE 2.6 µm Columns of 250 mm Length

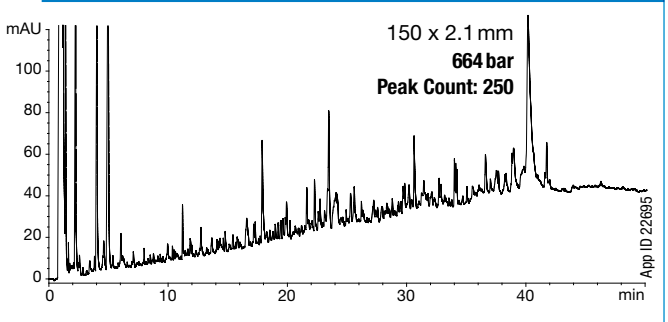
The Aeris PEPTIDE 2.6 µm core-shell particle was designed with one purpose in mind: to enhance the separation and maximize the peak count of complex peptide maps on UHPLC systems. Because the 2.6 µm core-shell particle reduces backpressure on UHPLC systems while maintaining similar efficiencies to sub-2 µm fully porous particles, longer columns can be used to further maximize the separation power while still being well within the backpressure constraints of the instrumentation.

Increase UHPLC Performance with Aeris PEPTIDE 2.6 µm Columns

Aeris PEPTIDE 2.6 µm XB-C18



Waters® ACQUITY® BEH130 1.7 µm C18



Conditions for both columns:

Column: Aeris PEPTIDE 2.6 µm XB-C18
ACQUITY® BEH130 1.7 µm C18
Dimensions: as noted
Mobile Phase: A: 20 mM Ammonium formate, pH 3.2 in 2 % Acetonitrile
B: 20 mM Ammonium formate, pH 3.2 in 90 % Acetonitrile

Gradient:	**Time (min)**	**% B**
	0	3
	2	3
	49	50
	54	95

Flow Rate: 0.4 mL/min
Temperature: 40 °C
Detection: UV @ 240 nm (ambient)
Sample: IgG1 (Ascites Fluid) R+A Tryptic Digest

Ordering Information

Aeris PEPTIDE 1.7 µm Minibore Columns (mm)				SecurityGuard™ ULTRA Cartridges*
Phase	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
XB-C18	00B-4506-AN	00D-4506-AN	00F-4506-AN	AJ0-8948
				for 2.1 mm ID

Aeris PEPTIDE 2.6 µm Minibore Columns (mm)					SecurityGuard ULTRA Cartridges*
Phase	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1	3/pk
XB-C18	00B-4505-AN	00D-4505-AN	00F-4505-AN	00G-4505-AN	AJ0-8948
					for 2.1 mm ID

Aeris PEPTIDE 2.6 µm MidBore™ and Analytical Columns (mm)				SecurityGuard ULTRA Cartridges*	
Phase	150 x 3.0	150 x 4.6	250 x 4.6	3/pk	3/pk
XB-C18	00F-4505-Y0	00F-4505-E0	00G-4505-E0	AJ0-8947	AJ0-8946
				for 3.0 mm ID	for 4.6 mm ID

Aeris PEPTIDE 3.6 µm Minibore Columns (mm)					SecurityGuard ULTRA Cartridges*
Phase	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1	3/pk
XB-C18	00B-4507-AN	00D-4507-AN	00F-4507-AN	00G-4507-AN	AJ0-8948
					for 2.1 mm ID

Aeris PEPTIDE 3.6 µm Analytical Columns (mm)					SecurityGuard ULTRA Cartridges*
Phase	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
XB-C18	00B-4507-E0	00D-4507-E0	00F-4507-E0	00G-4507-E0	AJ0-8946
					for 4.6 mm ID

Aeris PEPTIDE 5 µm Analytical Scout and Semi-Prep Columns (mm)					SecurityGuard ULTRA Cartridges*	SecurityGuard SemiPrep Cartridges**
Phase	150 x 4.6	250 x 4.6	150 x 10.0	250 x 10.0	3/pk	10 x 10 /3pk
XB-C18	00F-4632-E0	00G-4632-E0	00F-4632-N0	00G-4632-N0	AJ0-8946	AJ0-9317
					for 4.6 mm ID	for 10 mm ID

Aeris PEPTIDE 5 µm Axia™ Packed Preparative Columns (mm)			SecurityGuard PREP Cartridges†
Phase	150 x 21.2	250 x 21.2	15 x 21.2 /ea
XB-C18	00F-4632-P0-AX	00G-4632-P0-AX	AJ0-9318
			for 21.2 mm ID

Aeris WIDEPORE 3.6 µm Minibore Columns (mm)					SecurityGuard™ ULTRA Cartridges*
Phases	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1	3/pk
XB-C18	00B-4482-AN	00D-4482-AN	00F-4482-AN	00G-4482-AN	AJ0-8783
XB-C8	00B-4481-AN	00D-4481-AN	00F-4481-AN	00G-4481-AN	AJ0-8785
C4	00B-4486-AN	00D-4486-AN	00F-4486-AN	00G-4486-AN	AJ0-8899
					for 2.1 mm ID

SecurityGuard ULTRA
Holder with cartridge

Aeris WIDEPORE 3.6 µm Analytical Columns (mm)				SecurityGuard ULTRA Cartridges*
Phases	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
XB-C18	00D-4482-E0	00F-4482-E0	00G-4482-E0	AJ0-8769
XB-C8	00D-4481-E0	00F-4481-E0	00G-4481-E0	AJ0-8771
C4	00D-4486-E0	00F-4486-E0	00G-4486-E0	AJ0-8901
				for 4.6 mm ID

*SecurityGuard ULTRA Cartridges require holder, Part No.: AJ0-9000
**SemiPREP SecurityGuard Cartridges require holder, Part No.: AJ0-9281
†PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8223

For HPLC Column Performance Check Standards, see pp. 424-425

Increase lab safety with HPLC / UHPLC solvent protection, see SecurityCAP™ products on pp. 417-418
For UHPLC system connections, see SecurityLINK™ UHPLC fingertight fitting system on pp. 336-337
For more about SecurityGuard ULTRA, see p. 335
For Core-Shell Performance Enhancement Kit, see p. 421