AXIA™

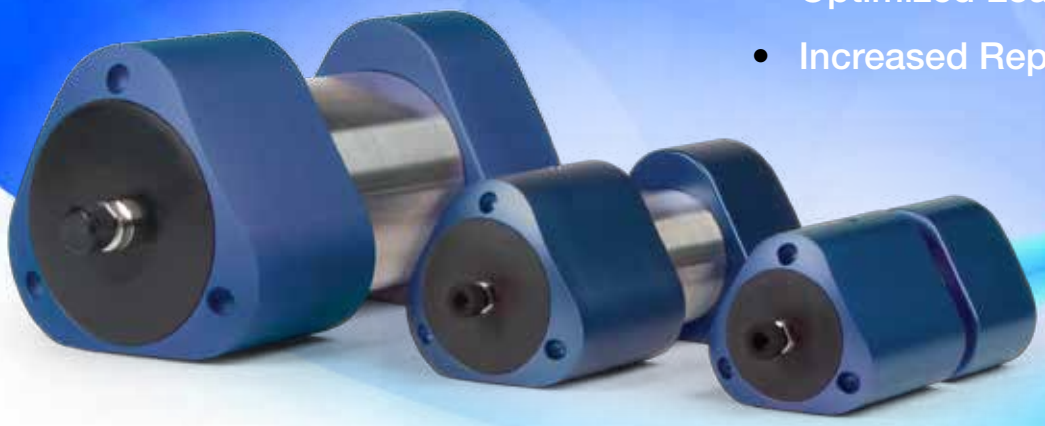
THE ULTIMATE PRE-PACKED PREPARATIVE COLUMN

FOR HPLC AND SFC

GUARANTEED!

Axia PREP LC columns offer:

- Increased Performance
- Groundbreaking Lifetimes
- Optimized Loadability
- Increased Reproducibility



NEW PHASES!

phenomenex®
. . . breaking with tradition℠

The Axia™ Advantage

Available in over 40 unique achiral and chiral selectivities, Axia advanced preparative column packings and column hardware designs offer several advantages. Unlike traditional column packing methods, the Axia packing method offers increased sorbent bed density for increased performance and eliminates media bed collapse as a source of premature column failure in preparative HPLC/SFC columns.

guarantee

If Axia packed columns do not provide at least an equivalent separation as compared to a competing preparative column of the same particle size, same phase, and dimensions, return the product with comparative data within 45 days for a FULL REFUND. Only applies to 21.2 mm ID columns.

Table of Contents

> **I find Axia columns to be very robust and durable. I often use the prep column for much longer than predicted with reproducible peaks. This saves us a significant amount of money.**
>
> *David Wisnoski*
> *GlaxoSmithKline, USA*

Axia™ Technology vs. Traditional "OBD™" Prep Column Packing

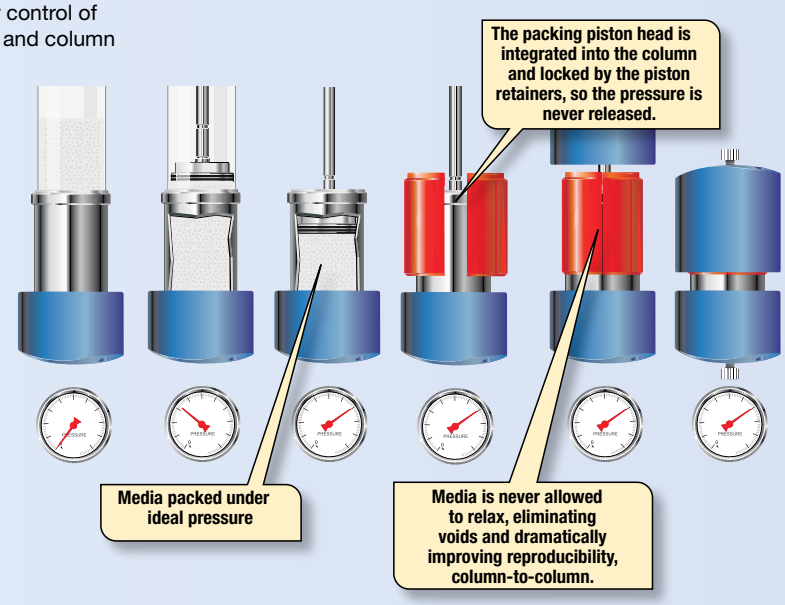
Axia Packing Technology

Axia packed preparative columns involve a single axial compression step unlike conventional packed preparative columns. The ideal column bed density is custom calculated and automated for each specific media and column size. Computer control of the entire process ensures both proper bed density and column uniformity every time.

During the Axia packing process, the packing piston is locked in place, eliminating any decompression and then recompression of the media sorbent, thus maintaining media and column bed integrity. This solves common lifetime and performance problems associated with conventional packing processes for preparative columns.

Axia Packing Process Involves:

Compression → Final Column



U.S. Patent No. 7, 674, 383

Traditional Slurry Packing

Traditional slurry packing processes, like the Waters® OBD (Optimum Bed Density) column packing approach, involve the column being removed from the column packing station once it is packed.

Several potential problems with this packing method are:

- Variability in column performance due to increased number of manual operations required for assembly
- Potential silica media damage during recompression
- Level of process control is based on traditional slurry packing technology

Conventional Packing Process Involves:

Compression → Decompression → Recompression → Final Column

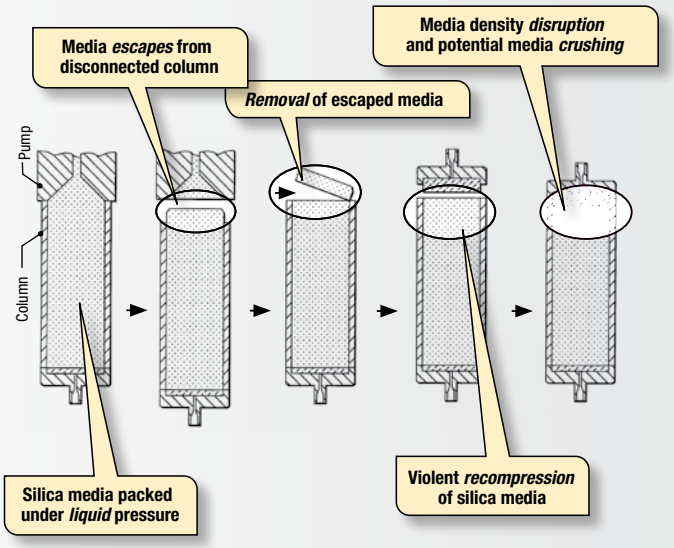


Diagram from Waters Corporation U.S. Patent No. 7,399,410

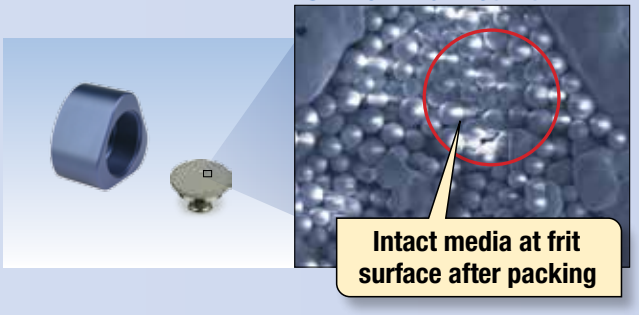
Comparative separations may not be representative of all applications.

Axia™ packed columns produce uniform media bed with intact particles

The highly tuned patented process and hardware eliminates potential decompression ensuring bed stability and optimal packing density.

The media found on the inlet frit of the Axia packed column shows no signs of damage unlike the media found on inlet frit of traditionally packed prep columns.

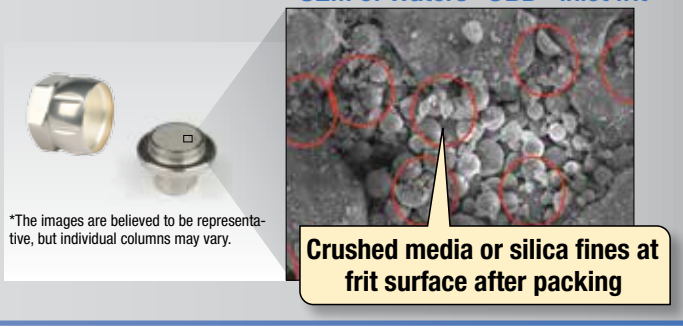
*SEM of Axia inlet frit



Traditional packed preparative columns produce non-uniform media beds with sheared and crushed particles

Decompression and then recompression during packing can damage the media and lead to increased column-to-column variability, flow disturbances, and decreased column lifetimes.

*SEM of Waters® OBD™ inlet frit



*The images are believed to be representative, but individual columns may vary.

> **We are using chromatography media from Phenomenex for GPL/GMP purposes, therefore we audited Phenomenex USA as a manufacturer. From the beginning, we were impressed with Phenomenex and the attitude of their employees. Phenomenex is a unique company in many aspects. Their degree of dedication to customer service, to the organization of the QMS system and last but not least the positive atmosphere in the company is impressive. The outcome of the audit was to our fullest satisfaction.**
>
> *Major Generic Pharma Company, Europe*

View an animated packing process comparison at www.AxiaPrep.com

Phenomenex is not affiliated with Waters Corporation. Comparative separations may not be representative of all applications.

Axia™ Technology Outperforms Traditional Packing Processes!

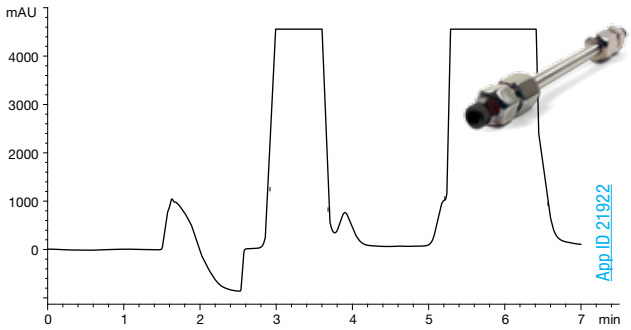
Because of the constant pressure placed on the integrated packing piston, Axia packed columns possess the dynamic capability of maintaining a consistent, homogeneous media bed. This results in superior column performance no matter which media selectivity you choose.

To better understand how much Axia technology improves column performance over traditionally slurry packed preparative columns we scaled-up a 5 µm Lux® Cellulose-1 chiral media analytical column and packed the same media into two different 150 x 21.2 mm I.D. columns. One column was packed using Axia technology and the other prep column was packed using the traditional slurry packing process.

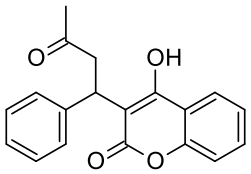
The Axia packing technology had a substantial increase in column efficiency resulting in increased resolution over traditionally packed preparative columns. With increased resolution you are able to increase your sample load enabling you to purify more target compound(s) per purification run. This equates to better throughput and economics.

Warfarin Chiral Purification in Normal Phase Mode

Analytical

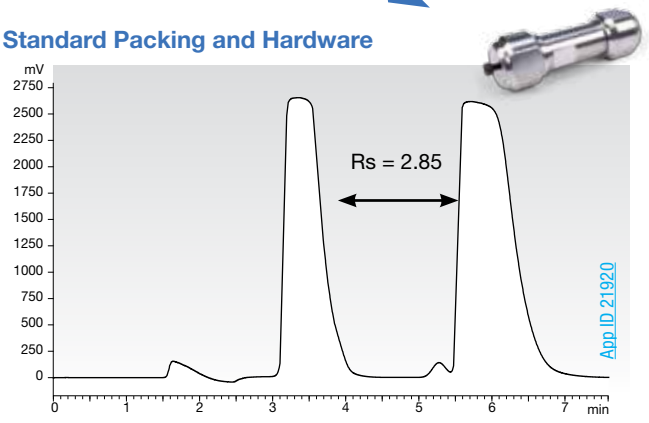


Column: Lux 5 µm Cellulose-1
Dimensions: 150 x 4.6 mm
Mobile Phase: Hexane/Ethanol (75:25)
Flow Rate: 1 mL/ min
Temperature: Ambient
Inj. Volume: 100 µL

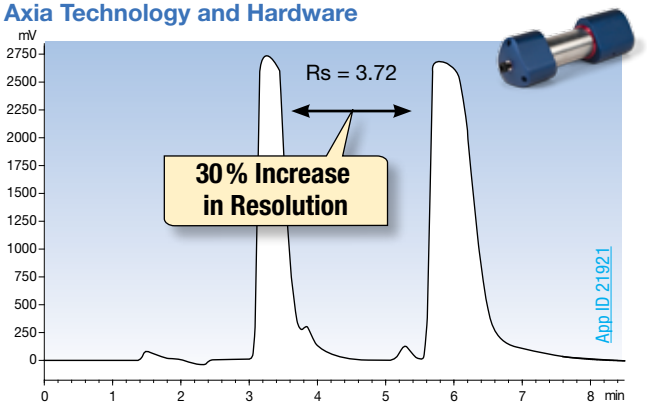


Warfarin

Standard Packing and Hardware



Axia Technology and Hardware



Conditions for both PREP columns:

Media: Lux 5 µm Cellulose-1
Dimensions: 150 x 21.2 mm
Mobile Phase: Hexane / Ethanol (75:25)
Flow Rate: 20 mL/ min
Temperature: Ambient
Inj. Volume: 2 mL

42 % Increase in Efficiency

Column (mm)	Analytical 150 x 4.6	Standard 150 x 21.2	Axia 150 x 21.2
Mass Loaded (mg)	2	40	40
Resolution*	1.5	2.85	3.72
Plates (N)	117	535	**760**

* Resolution calculated with peak width at baseline and center retention time due to the overloaded peaks being off-scale

Tip: For more detailed information on this warfarin application, view application at:

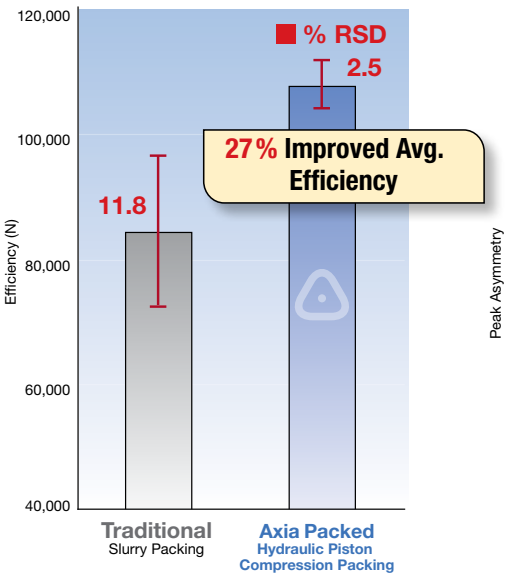
www.phenomenex.com/tn9002

Unmatched Column Reproducibility

The completely automated Axia™ packing system provides feedback control and infinite tuning of packing density for specific media characteristics such as mechanical strength and porosity. An optimum higher bed density can be consistently reproduced column-to-column.

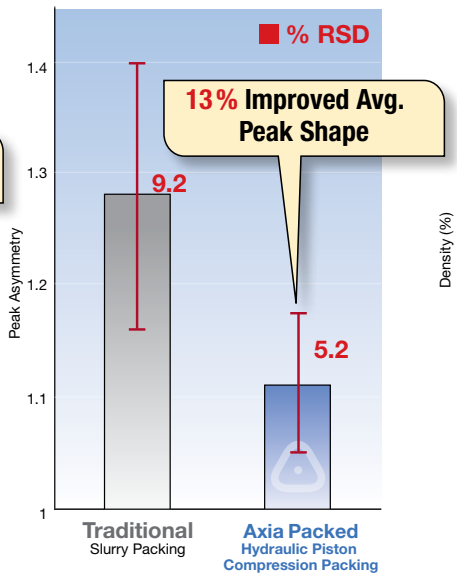
This directly translates into consistent efficiency and peak asymmetry measurements and decreases the column variability seen in traditionally packed preparative columns.

Reproducible Column-to-Column Efficiency



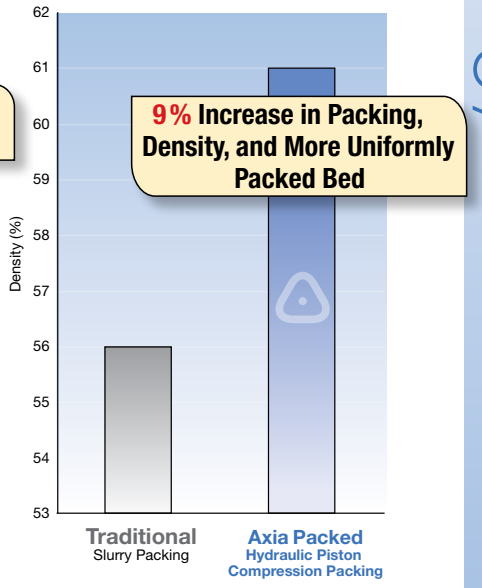
Average Efficiency (N) with Synergi™
4 µm Hydro-RP 100 x 21.2 mm

Reproducible Column-to-Column Peak Asymmetry



Average Peak Asymmetry with Gemini®
5 µm C18 50 x 21.2 mm

Density Comparison of Packed Beds

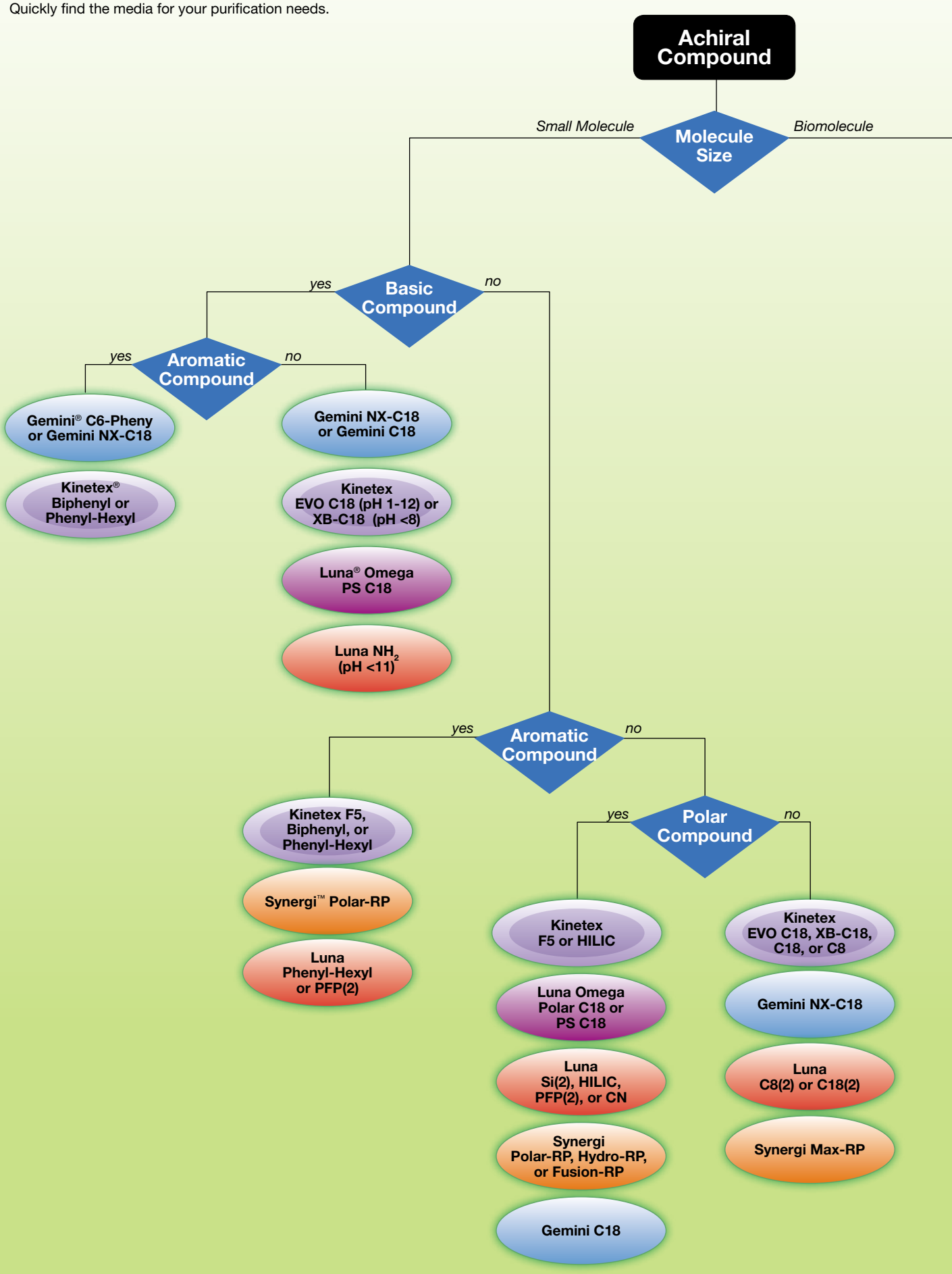


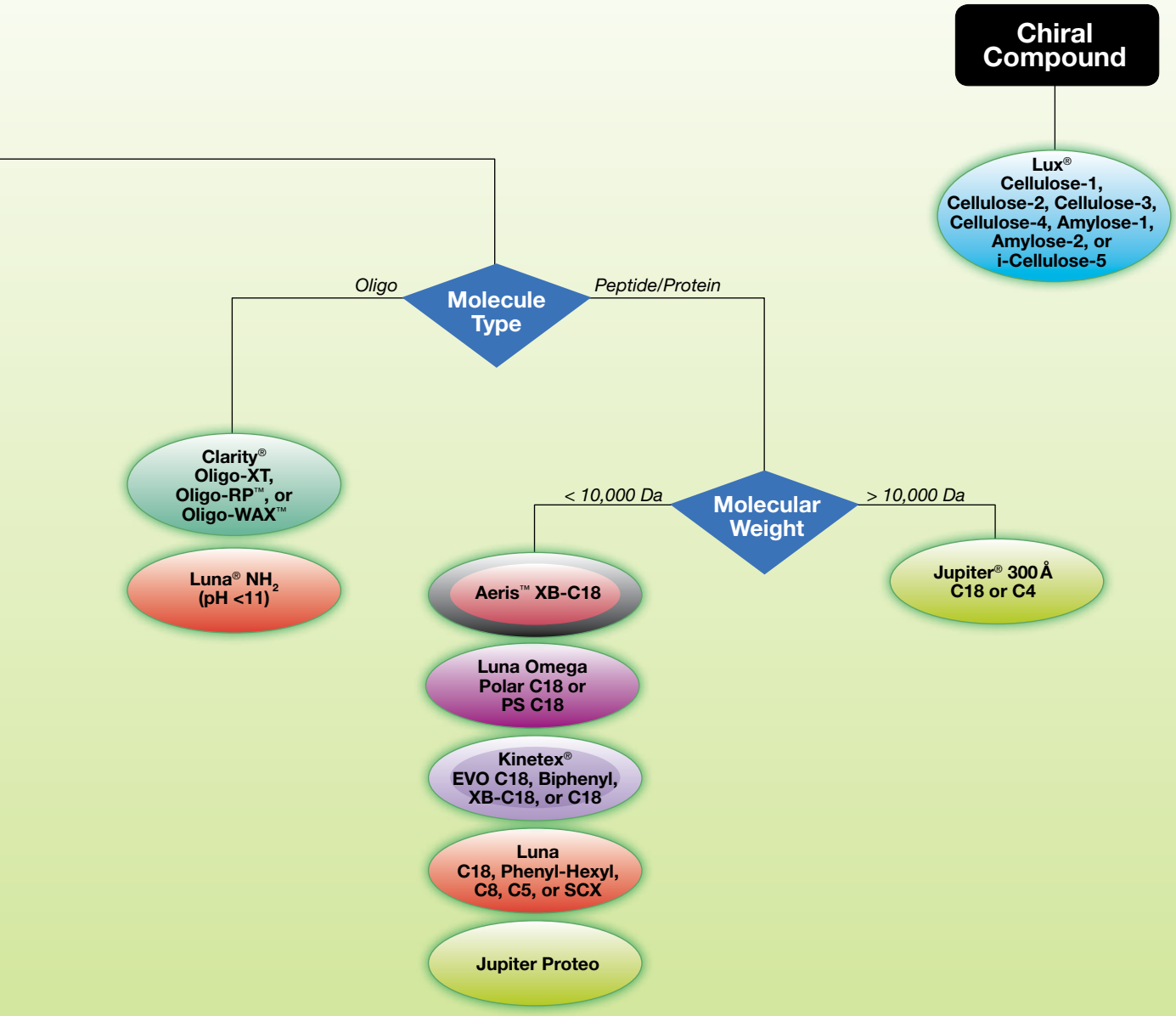
> **Axia columns provide me with first rate quality and engineering. Reliability, reproducibility, and durability are provided with all Axia columns that I use. I can literally purify 2500 samples per column. The time and cost savings are tremendous.**
>
> *Derrick Miyao*
> *—Large Biotech Manufacturer, USA*

> **We have used Phenomenex Axia prep-HPLC columns for several years and they consistently provide excellent separation and reproducibility for a variety of different compounds.**
>
> *Jeremy R. Wolf*
> *ABC Laboratories, USA*

Phase Selection Chart

Quickly find the media for your purification needs.





Kinetex
1st Core-Shell Preparative Column Ever!
Pages 10-13

Luna
Proven Purification Performance
Pages 20-21

Luna Omega
High Efficiency Polar and Non-Polar Purifications
Pages 22-23

Aeris
Core-Shell Peptide Media
Pages 14-15

Gemini®
High pH Separations
Pages 16-17

Synergi™
Unique Chemistries for Complex Mixtures
Pages 18-19

Jupiter
Increase Loadability for Biomolecule Separations
Page 24

Clarity
Purification of Synthetic Oligonucleotides
Page 25

Lux
Polysaccharide Supports with Excellent Enantioselectivity
Pages 26-29

First Core-Shell Preparative HPLC/SFC Column Ever!

Kinetex® Core-Shell Technology produces increased efficiencies over traditional, fully porous columns, yielding remarkable chromatographic resolution, higher peak capacities, and greater sensitivity, so labs can get even more out of their HPLC analyses!

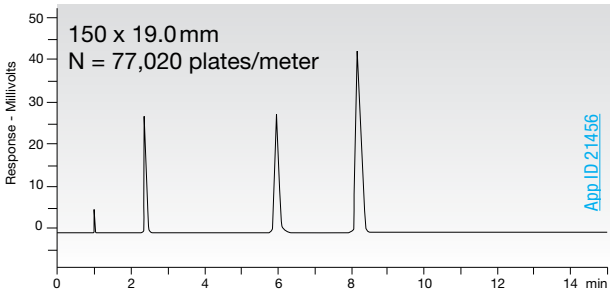
The benefits of Kinetex Core-Shell Technology include:

- Increased efficiencies over traditional fully porous columns
- Seamless scalability from HPLC/UHPLC to Preparative LC
- Kinetex 5 µm provides better performance than traditional fully porous 5 and 3 µm materials

High Column Efficiency

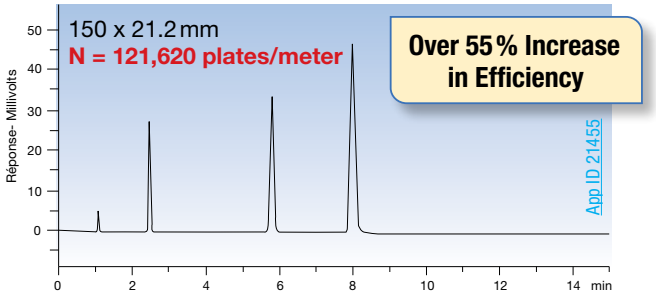
Combining 5 µm Kinetex core-shell and Axia™ technologies can provide the highest separation efficiency of any pre-packed preparative HPLC column.

Waters® XBridge® 5 µm C18 Prep OBD™



Conditions for both columns:
Columns: Kinetex 5 µm XB-C18 Axia Packed
Waters XBridge 5 µm C18 Prep OBD
Dimensions: 150 x 21.2 mm (Kinetex)
150 x 19 mm (XBridge)
Mobile Phase: Water/Acetonitrile (50:50)
Injection Volume: 10 µL
Flow Rate: 25 mL/min

Kinetex 5 µm XB-C18 Axia Packed



Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene

Key: ● Best Suited ◐ Very Good

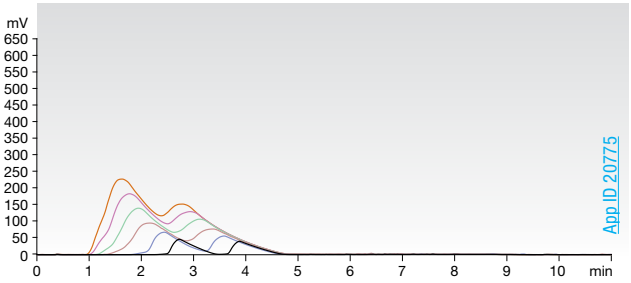
						Applications					Type of Compounds				Loading
Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Small Molecules	Peptides	Proteins	Chiral	Oligonucle-otides	Acids	Polar	Hydro-phobic	Bases	Available Surface Area
Kinetex C18	1.3, 1.7, 2.6, 5	100	200	12	1.5-8.5*	●	●				◐		●	●	◐
Kinetex XB-C18	1.7, 2.6, 3.5, 5	100	200	10	1.5-8.5*	●	●				◐		●	●	◐
Kinetex EVO C18	1.7, 2.6, 5	100	200	11	1-12	●	●				◐	◐	●	●	◐
Kinetex C8	1.7, 2.6, 5	100	200	8	1.5-8.5*	●	●				◐		●	◐	◐
Kinetex Phenyl-Hexyl	1.7, 2.6, 5	100	200	11	1.5-8.5*	●	●				◐	●	◐	◐	◐
Kinetex Biphenyl	1.7, 2.6, 5	100	200	11	1.5-8.5*	●	●				◐	●	◐	●	◐
Kinetex HILIC	1.7, 2.6, 5	100	200	0	2.0-7.5	●	◐				◐	●		◐	◐
Kinetex F5	1.7, 2.6, 5	100	200	9%	1.5-8.5	●	●				●	●	◐	◐	◐

*pH stability under gradient conditions. pH stability is 1.5-10.0 under isocratic conditions.
Comparative separations may not be representative of all applications.

Excellent Loadability!

With narrower peak widths than fully porous columns across every sample load, Axia™ packed Kinetex 5 µm columns give you the capability of increased sample load and higher throughput for vastly improved purification performance and economics.

Waters® XBridge® 5 µm C18 Prep OBD™

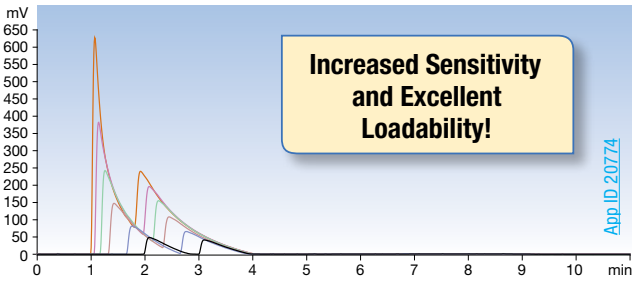


Conditions for both columns:

Columns: Kinetex 5 µm C18 Axia Packed
XBridge 5 µm C18 Prep OBD
Dimensions: 50 x 21.2 mm (Kinetex)
50 x 19 mm (XBridge)
Mobile Phase: A: Water with 0.5 % Formic acid
B: Acetonitrile with 0.5 % Formic acid
Gradient:

Time (min)	% B
0	20
8	50
11	50

Kinetex 5 µm C18 Axia Packed



Flow Rate: 30 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 200 mg/mL in DMSO
1. Doxepin (From1 - 500 mg on-column)
2. Amitriptyline (From1 - 500 mg on-column)

> **Kinetex Axia Preparative columns are fantastic! I currently use two Kinetex 5 µm C18 150 x 21.2 mm columns in parallel for high throughput purifications (<100 mg scale), and Kinetex core-shell media delivers significantly improved peak shape and lower back pressure compared to many of the industry. I can also analyze quickly my purified fractions with the same core-shell phase on my analytical UPLC® system.**
>
> *Chris DeVore*
> *Neurocrine Biosciences, USA*

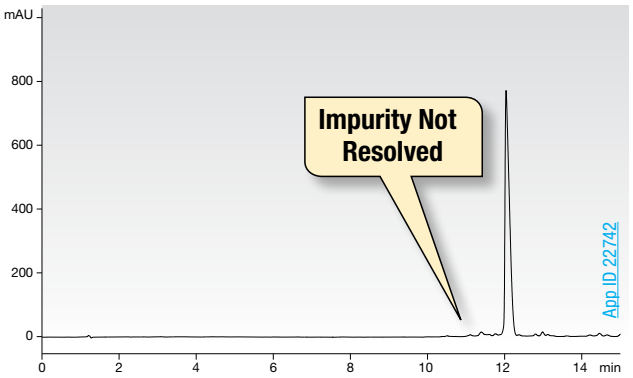
Tip: If you would like to see a loading study performed with the combination of Axia Packing, view application at: www.phenomenex.com/tn1058

Comparative separations may not be representative of all applications.

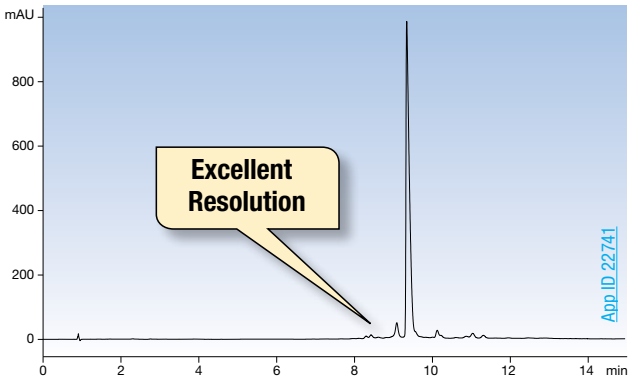
Seamless Scalability from HPLC/UHPLC to PREP

Kinetex® packed with Axia™ technology makes it the first core-shell sorbent commercially available for small-scale preparative applications. Combine this with the fact that the entire Kinetex core-shell line is fully scalable from 1.3 µm to 5 µm, this means that transferring high performance HPLC/UHPLC methods to preparative HPLC and SFC formats is fast and simple.

Waters® XBridge® 5 µm C18 150 x 4.6 mm



Kinetex 5 µm EVO C18 150 x 4.6 mm

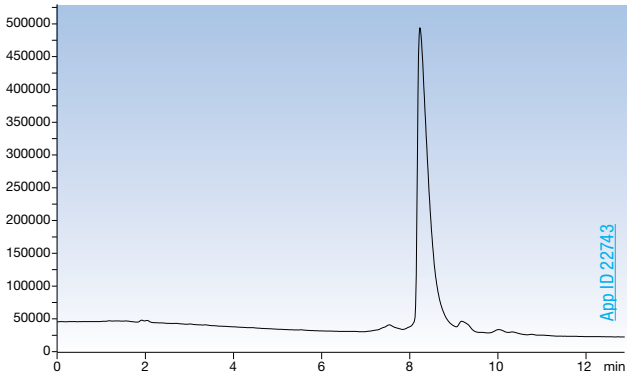


Analytical to PREP Scalability

Conditions for all columns:

Columns: Kinetex 5 µm EVO C18
XBridge 5 µm C18
Dimensions: 150 x 4.6 mm
150 x 21.2 mm (Kinetex AXIA Packed)
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile
Gradient: 20 % to 70 % B over 10 minutes
Flow Rate: 1.5 mL/min
30 mL/min (Kinetex AXIA)
Temperature: Ambient
Detection: UV @ 254 nm
Sample: Proprietary Pharmaceutical Sample

Kinetex 5 µm EVO C18 150 x 21.2 mm AXIA



> **My Axia packed column has a great efficiency for the separation of several classes of natural compounds. Due to its low back pressure and therefore high flow work conditions, time for conditioning the columns is sped up greatly!**
>
> *Sylvian Cretton*
> *-Europe*

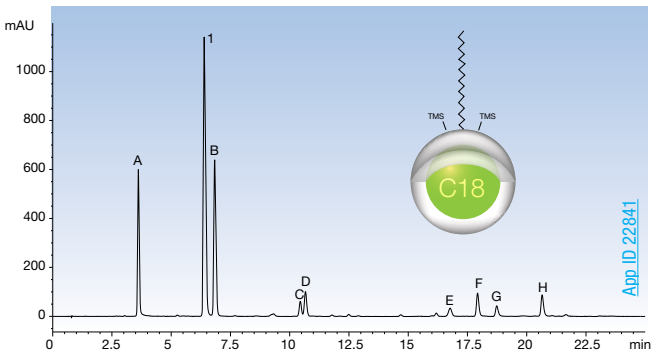
Comparative separations may not be representative of all applications.

Tip: For more information on the power of Kinetex core-shell scalability, view application at: www.phenomenex.com/tn1135

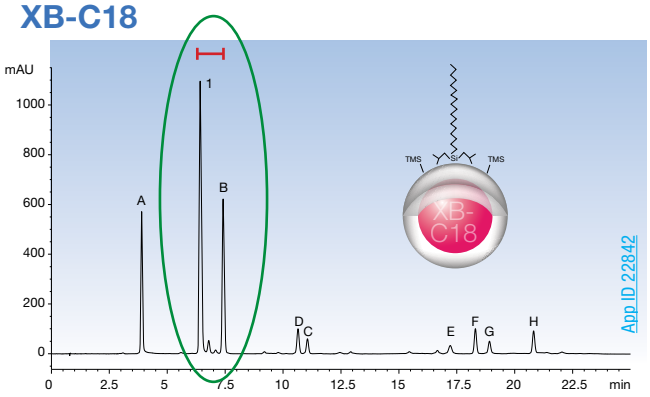
A Broad Spectrum of Column Selectivities

Kinetex® core-shell columns are available in a wide range of stationary phases, allowing you to optimize your separation for maximum resolution and loadability across HPLC, UHPLC, and preparative HPLC and SFC applications.

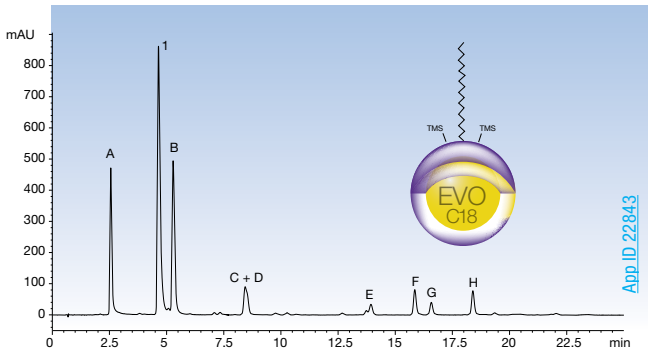
C18



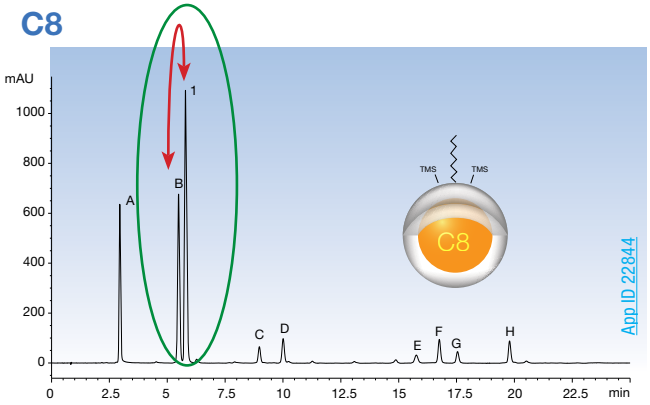
XB-C18



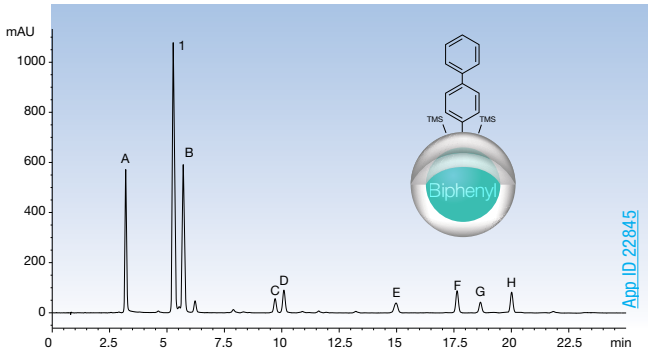
EVO C18



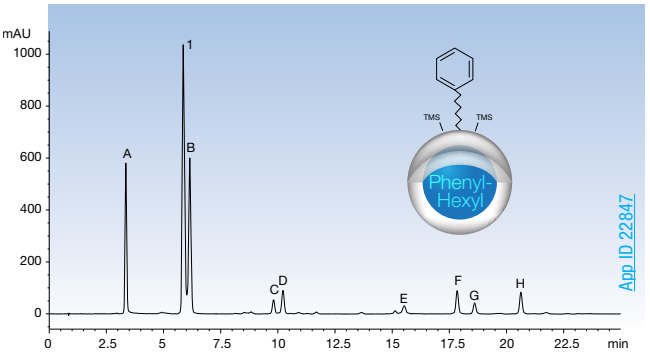
C8



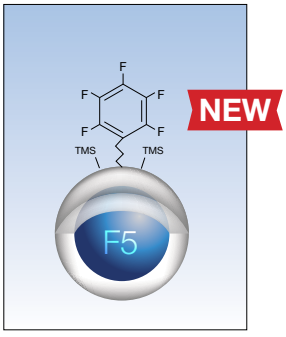
Biphenyl



Phenyl-Hexyl



Kinetex 5 µm F5



Conditions for all columns:

Columns: Kinetex 5 µm C18
Kinetex 5 µm XB-C18
Kinetex 5 µm EVO C18
Kinetex 5 µm C8
Kinetex 5 µm Biphenyl
Kinetex 5 µm Phenyl-Hexyl
Dimensions: 100 x 4.6 mm
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile

Gradient:	**Time (min)**	**% B**
	0	5
	20	20
	22	20
	22.5	5
	25	5

Flow Rate: 1.5 mL/min
Temperature: 22 °C
Detection: UV @ 330 nm
Sample: 1. Chlorogenic Acid
Others: Antioxidants from green coffee

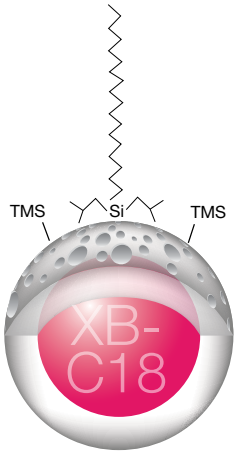
Tip: For more information on Chlorogenic Acids from Green Coffee by HPLC, view application at: www.phenomenex.com/tn1134

Ordering information on page 34

Increased Performance for Peptide Purifications

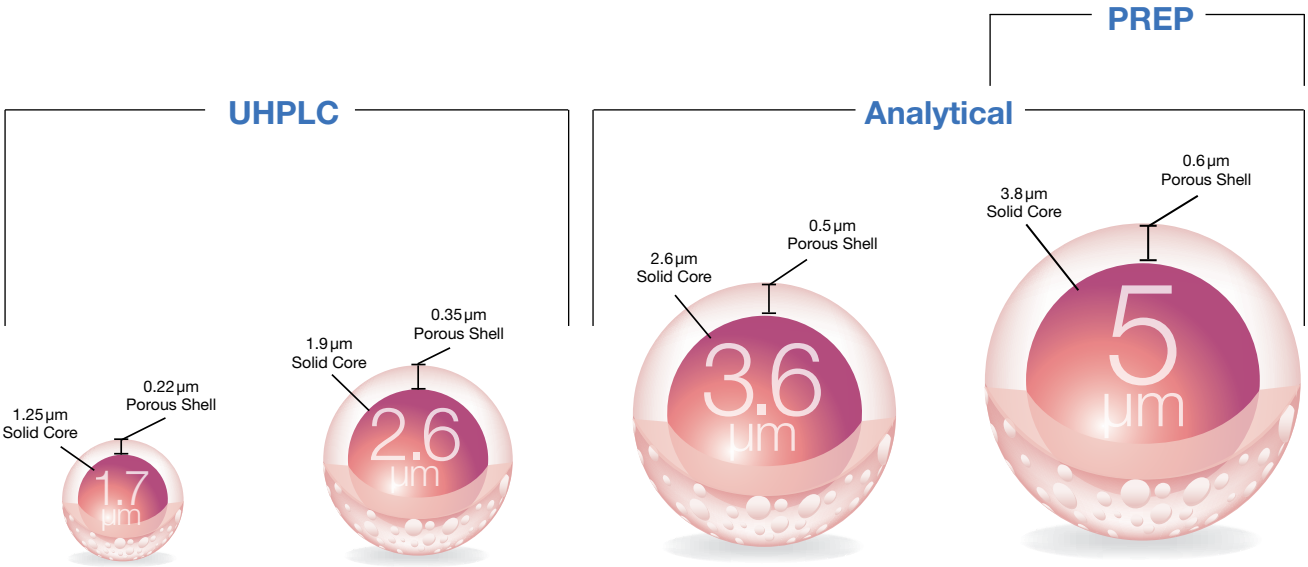
Based on core-shell particle technology, Aeris™ PEPTIDE media is designed with small pores (100 Å), an inert XB-C18 surface chemistry, and multiple particle sizes to meet the selectivity, resolution and loading demands of chemists working with synthetic peptides. The benefits of Aeris PEPTIDE columns include:

- Optimized media for peptide purifications
- Multiple particle size options for method development flexibility and peptide impurity analysis
- Seamless scalability from HPLC/UHPLC to preparative HPLC



XB-C18 chemistry best suited for resolving peptides

Multiple Particle Sizes For Added Versatility



Key: ● Best Suited ◐ Very Good

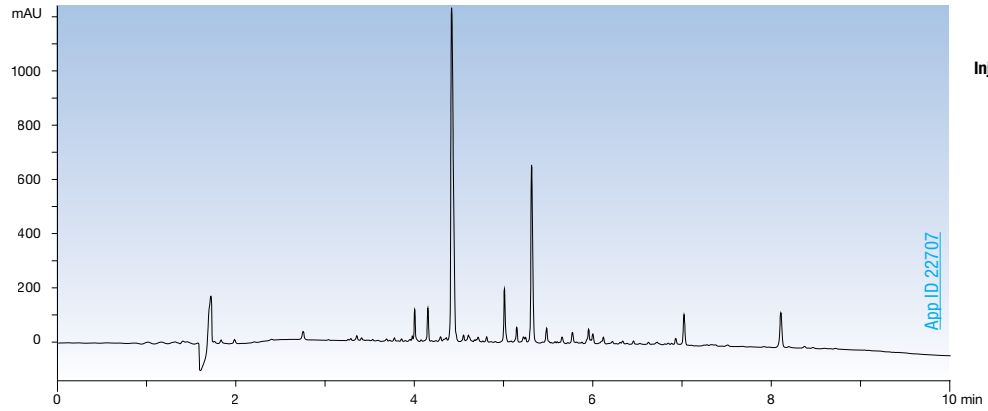
Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Applications: Small Molecules	Applications: Peptides	Applications: Proteins	Applications: Chiral	Applications: Oligonucleotides	Type of Compounds: Acids	Type of Compounds: Polar	Type of Compounds: Hydrophobic	Type of Compounds: Bases	Loading: Available Surface Area
Aeris PEPTIDE	1.7, 2.6, 3.6, 5	100	200	12	1.5-9.0	●	●				◐		●	◐	◐

Develop, Purify, and Analyze Peptide Fractions with One Media

AERIS™ Bio Core-Shell Technology

Aeris PEPTIDE is fully scalable in retention and selectivity with its 4 unique particle sizes (1.7 µm, 2.6 µm, 3.6 µm, and 5 µm) for easy transfer from HPLC and UHPLC methods to preparative applications.

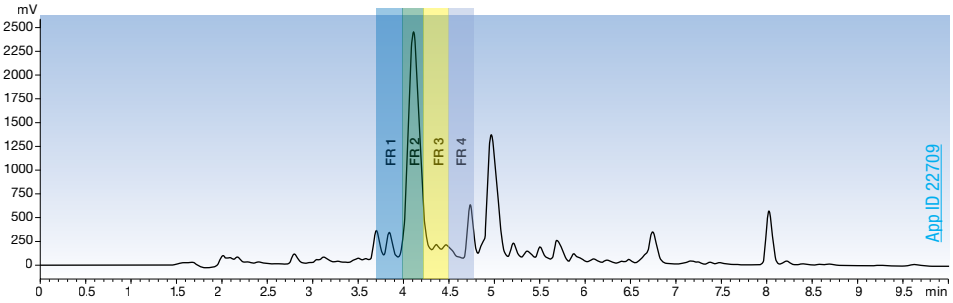
Aeris PEPTIDE 2.6 µm XB-C18



Analytical method

Column: Aeris PEPTIDE 2.6 µm XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4505-E0
Injection Volume: 10 µL
Flow Rate: 1 mL/ min
Sample: Crude peptide mix

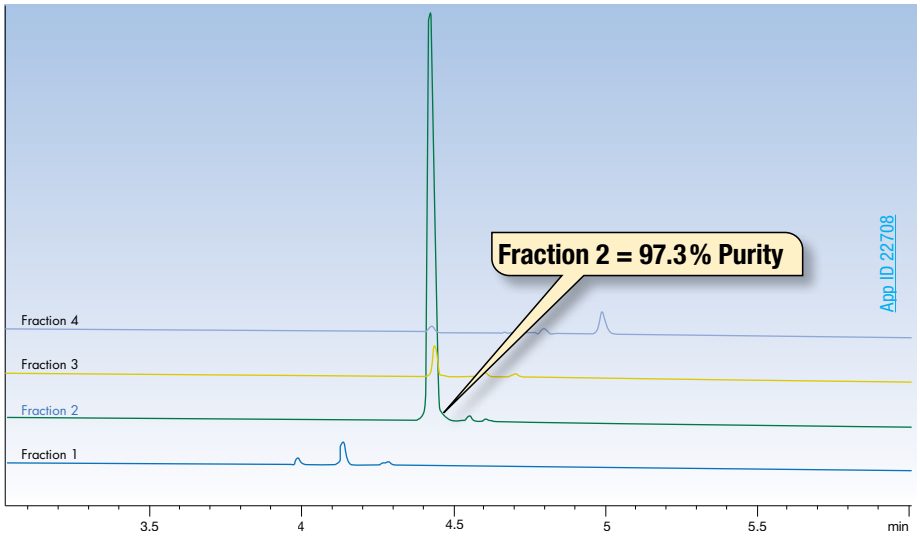
Aeris PEPTIDE 5 µm XB-C18



Preparative scale-up and fraction collection

Column: Aeris PEPTIDE 5 µm XB-C18 Axia Packed
Dimensions: 150 x 21.2 mm
Part No.: 00F-4632-P0-AX
Injection Volume: 1 mL
Flow Rate: 20 mL/ min
Sample: Crude peptide mix

Aeris PEPTIDE 2.6 µm XB-C18



Analytical fraction analysis

Column: Aeris PEPTIDE 2.6 µm XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4505-E0
Injection Volume: 10 µL
Flow Rate: 1 mL/ min
Sample: Purified Fractions

Conditions for all separations (except as noted):
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile
Gradient: Linear 85:15 (A/B) to 5:95 (A/B) over 10 minutes
Temperature: Ambient
Detection: UV @ 210 nm

Ordering information on page 34

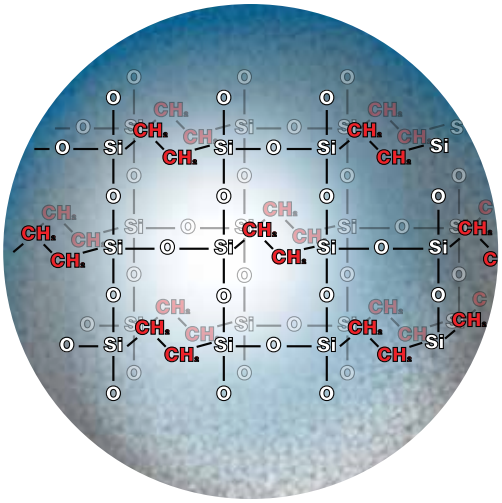
Setting the Standard for pH Method Development

Gemini pH Flexible LC

Gemini features a pH stability from 1-12, making it optimal for high alkaline washes and high pH purifications of basic drugs.

Optimized parameters include:

- Innovative surface layer for increased pH stability
- High-surface area for increased loading
- Silica smoothness for stable packing beds
- Bonding density for excellent reproducibility



Second-Generation TWIN-NX™ Technology

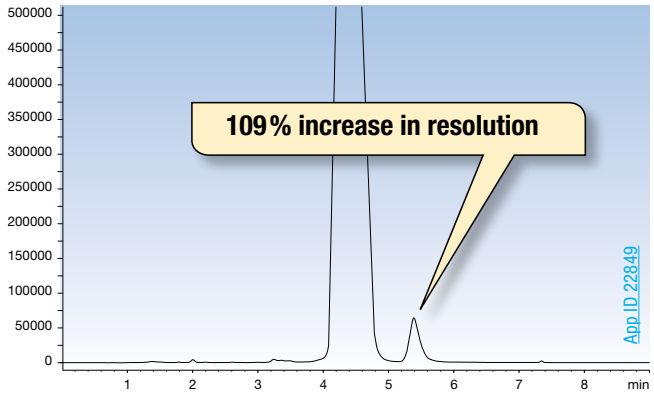
Gemini NX-C18

TWIN-NX technology uses an improved, patented organo-silica grafting process which incorporates highly stabilizing ethane cross-linking. These organic groups are evenly incorporated into the grafted layers on the silica surface while maintaining a pure silica core. This not only provides resistance to high pH attack, but also maintains the high efficiency and mechanical strength of a silica particle.

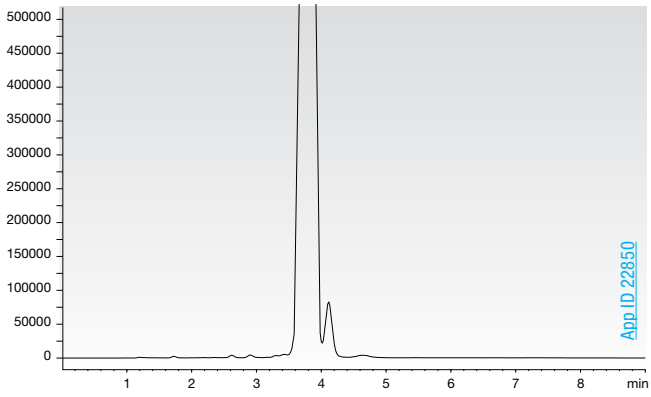
*This bonding technology is also available in Core-Shell media.
See Kinetex® EVO on page 12.

Dramatically improve sample resolution, productivity and performance of any preparative column media with Axia™ column hardware and packing technology. Axia packed prep columns offer the opportunity for longer lifetime, higher loading and increased throughput.

Gemini 5µm NX-C18 Axia Packed



Waters® XBridge® 5µm C18 Prep OBD™



Conditions for both columns:

Column: Gemini 5µm NX-C18
Waters 5µm XBridge
Dimensions: 150 x 21.2mm (Gemini)
150 x 19mm (XBridge)
Mobile Phase: A: 20mM Ammonium bicarbonate pH 10.0
B: Acetonitrile

Gradient: Time (min)	% B
0.1	50
5.1	95
6	95
6.5	50
8.9	50

Flow Rate: 25mL/min
Temperature: 22°C
Detection: UV @ 268nm
Sample: 1. Reserpine
2. Unknown

Key: ● Best Suited ◐ Very Good

						Applications					Type of Compounds				Loading
						Small Molecules	Peptides	Proteins	Chiral	Oligonucle-otides	Acids	Polar	Hydro-phobic	Bases	Available Surface Area
Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range										
Gemini C18	3, 5, 10	110	375	14	1-12	●	●				●	◐	●	●	●
Gemini C6-Phenyl	3, 5	110	375	12	1-12	●	●				◐		●	◐	●
Gemini NX-C18	3, 5, 10	110	375	14	1-12	●	●				●		●	●	●

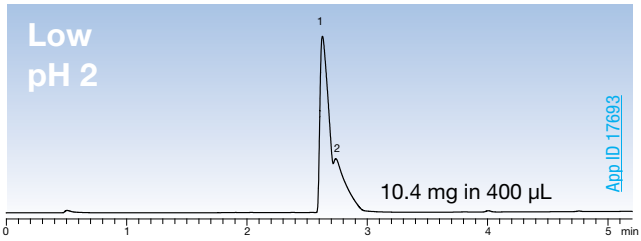
Comparative separations may not be representative of all applications.

Flexibility in pH Adjustments Allows for Increased Purification Performance

Separating basic compounds at higher pH levels produces dramatic changes when compared to low pH conditions. At pH 10.5, the basic compounds become neutralized and are more hydrophobic. The retention for the uncharged basic compounds increases providing an increase in separation along with superior peak shapes.

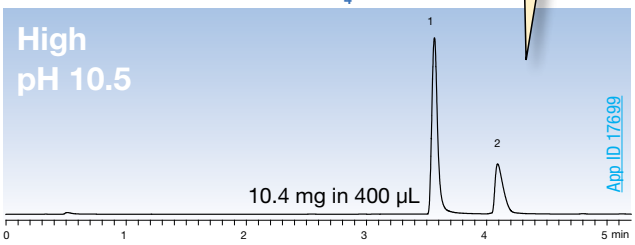
Excellent resolution at high pH

Gemini® NX-C18 with 0.5% TFA



Column: Gemini NX-C18 5 µm
Dimensions: 50 x 21.2 mm
Mobile Phase: A: 0.5% TFA in Water
B: Acetonitrile
Gradient: 5% B to 95% B in 5 min
Flow Rate: 30 mL/min
Detection: UV @ 254 nm
Sample: 1. Diphenhydramine
2. Propranolol

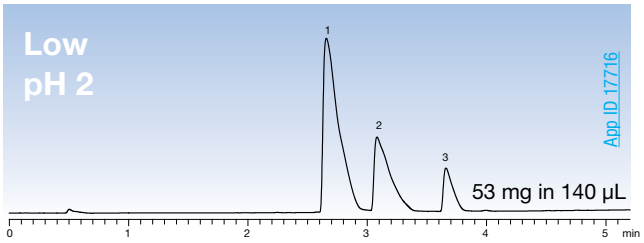
Gemini NX-C18 with 0.2% NH_4OH



Column: Gemini NX-C18 5 µm
Dimensions: 50 x 21.2 mm
Mobile Phase: A: 0.2% NH_4OH in Water
B: Acetonitrile
Gradient: 5% B to 95% B in 5 min
Flow Rate: 30 mL/min
Detection: UV @ 254 nm
Sample: 1. Diphenhydramine
2. Propranolol

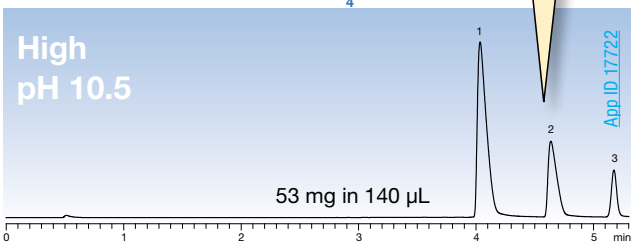
Separation shape improvement provides opportunity for increased loading

Gemini NX-C18 with 0.5% TFA



Column: Gemini NX-C18 5 µm
Dimensions: 50 x 21.2 mm
Mobile Phase: A: 0.5% TFA in Water
B: Acetonitrile
Gradient: 5% B to 95% B in 5 min
Flow Rate: 30 mL/min
Detection: UV @ 254 nm
Sample: 1. Diphenhydramine
2. Oxybutynin
3. Terfenadine

Gemini NX-C18 with 0.2% NH_4OH



Column: Gemini NX-C18 5 µm
Dimensions: 50 x 21.2 mm
Mobile Phase: A: 0.2% NH_4OH in Water
B: Acetonitrile
Gradient: 5% B to 95% B in 5 min
Flow Rate: 30 mL/min
Detection: UV @ 254 nm
Sample: 1. Diphenhydramine
2. Oxybutynin
3. Terfenadine

Our Phenomenex Gemini and Luna® Axia™ packed columns are the work-horses in our lab. These columns exhibit outstanding performance for challenging separations while also handling a high workload for standard separations. Longevity has also been excellent with some columns lasting 2 years or more. Dependability is so important in my line of work and these columns never disappoint!!

-Major Pharmaceutical Company, USA

Ordering information on page 34

Tip: If you want longer Gemini NX-C18 Axia packed column lifetimes, view a lifetime study application at: www.phenomenex.com/tn1138

Increased Loading with Unique Selectivities

synergi™
Full Range Selectivity LC Columns

Synergi is available in four unique phases, each offering dramatic differences in:

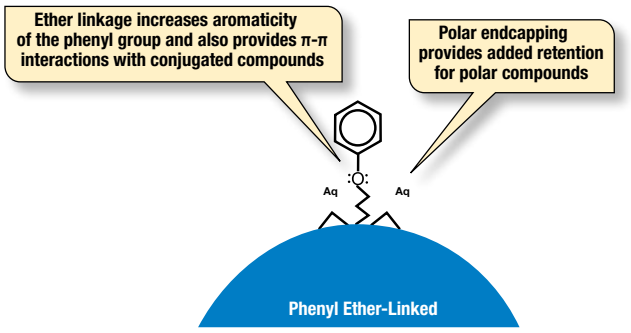
- Selectivity
- Retention time
- Resolution

The unique selectivity profiles found within the Synergi product line offer complementary selectivity to the standard C18, C8, or silica phases traditionally employed in preparative HPLC.

Synergi Polar-RP

For Polar and Aromatic Mixtures

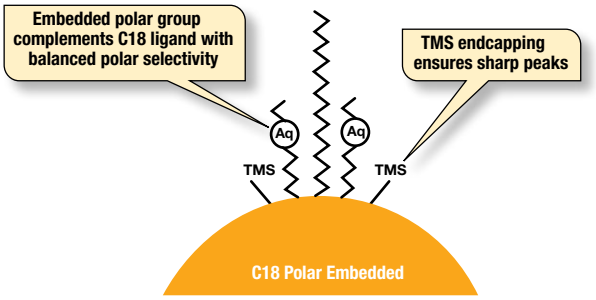
(100 % Aqueous Stable)



Synergi Fusion-RP

Balanced Non-polar and Polar Performance

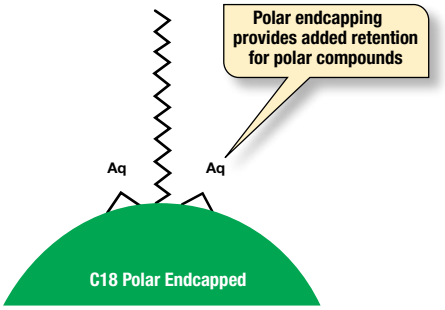
(100 % Aqueous Stable)



Synergi Hydro-RP

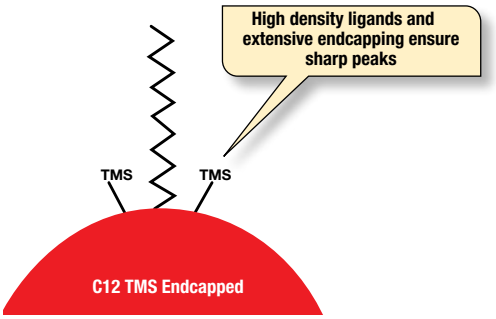
Strong Non-polar and Polar Retention

(100 % Aqueous Stable)



Synergi Max-RP

Excellent for Basic Compounds at Neutral pH



Key: ● Best Suited ◐ Very Good

Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Applications: Small Molecules	Applications: Peptides	Applications: Proteins	Applications: Chiral	Applications: Oligonucleotides	Type of Compounds: Acids	Type of Compounds: Polar	Type of Compounds: Hydrophobic	Type of Compounds: Bases	Loading: Available Surface Area
Synergi Fusion-RP	4, 10	80	475	12	1.5-9.0*	●	●				◐	●	●	◐	●
Synergi Max-RP	4, 10	80	475	17	1.5-9.0*	●	●				◐		●	◐	●
Synergi Hydro-RP	4, 10	80	475	19	1.5-7.5	●	●				◐	●	●	◐	●
Synergi Polar-RP	4, 10	80	475	11	1.5-7	●	●				◐	●		◐	●

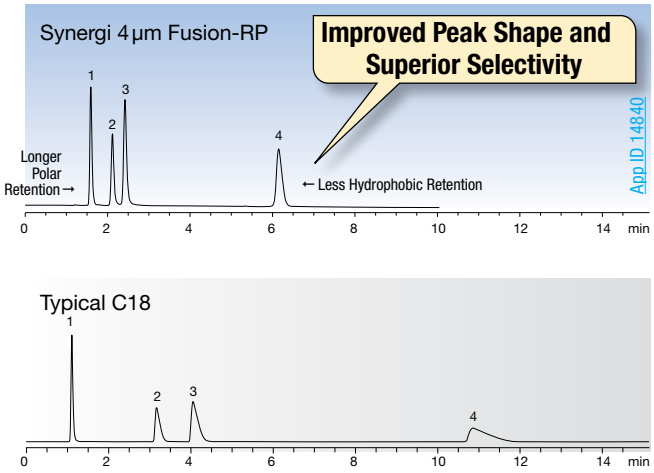
*pH stability under gradient conditions. pH stability is 1.5-10.0 under isocratic conditions.

Selectivity Like No Other

Offering a balanced combination of hydrophobic and polar selectivity, Synergi™ Fusion-RP separates compounds exhibiting moderately polar and hydrophobic characteristics.

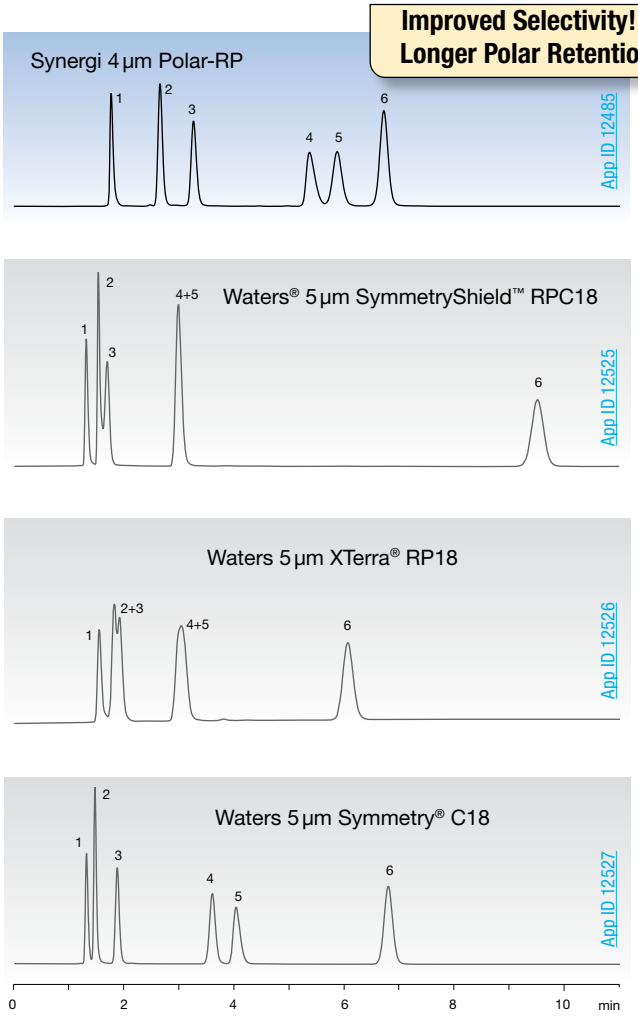
The slightest variations in compound polarity and aromaticity are exploited by Synergi Polar-RP to achieve the greatest separation between polar and/or aromatic compounds.

Hydrophobic basic compounds



Conditions for all columns:
Columns: Synergi 4 µm Fusion-RP
Typical C18
Dimensions: 150 x 4.6 mm
Mobile Phase: 20 mM Potassium Phosphate, pH 2.5 / Acetonitrile (75:25)
Flow Rate: 1.0 mL/ min
Detection: UV @ 210 nm
Sample: 1. Maleic acid
2. Chlorpheniramine
3. Triprolidine
4. Diphenhydramine

Increased resolution of polar compounds with Synergi Polar-RP compared to traditional C18 phases



Conditions for all columns:
Columns: Synergi 4 µm Polar-RP
Waters 5 µm SymmetryShield™ RPC18
Waters 5 µm Symmetry® C18
Waters 5 µm XTerra® RP18
Dimensions: 150 x 4.6 mm
Mobile Phase: 20 mM Potassium phosphate pH 3 / Methanol (50:50)
Flow Rate: 1.0 mL/ min
Detection: UV @ 230 nm
Temperature: Ambient
Injection: 2 µL
Sample: 1. Metaproterenol (0.4 µg)
2. Pindolol (0.6 µg)
3. Metoprolol (0.15 µg)
4. Alprenolol (0.3 µg)
5. Propranolol (0.04 µg)
6. Ethylparaben (0.4 µg)

> **We regularly use RP stationary phases from Phenomenex for our separation problems. Especially Synergi Polar-RP which was found to often show the desired selectivity, distinguishing this phase from other RP phases.**
>
> *CARBOGEN AMCIS, Switzerland*

Comparative separations may not be representative of all applications.

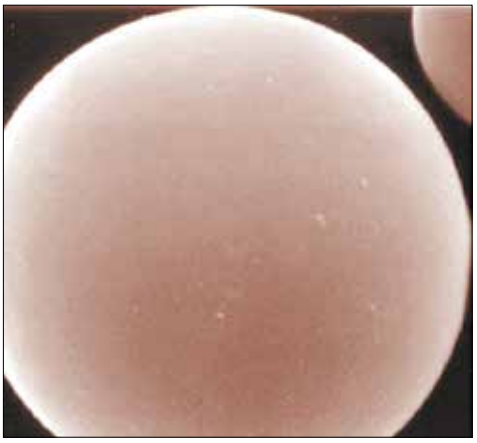
Ordering information on page 35

Media for One of the World's Leading PREP HPLC Columns

Luna® high surface area (400 m^2/g) silica packing materials provide optimized parameters specifically designed for the purification of small molecules and peptides. This media allows high loading with excellent lifetimes.

Optimized loading parameters include:

- Silica smoothness for stable packed beds
- Optimum pore size/distribution provide outstanding performance
- High pore volume offers increased surface area
- Fine tuned bonding density for excellent reproducibility
- Greater loading capacity with an extended pH range of 1.5 to 10.0*



> **We routinely use Axia™ packed columns from Phenomenex for peptide purifications. Among various preparative HPLC columns we have used, the Axia packed Luna columns (5 µm) stand out. We have been very satisfied with the increased loading capacity and excellent performance.**
>
> *Guangcheng Jiang*
> *Ferring Research Institute, Inc., USA*

Key: ● Best Suited ◐ Very Good

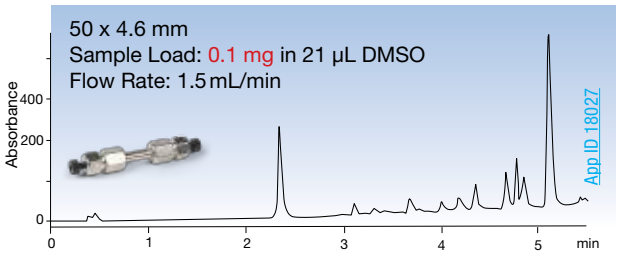
						Applications					Type of Compounds				Loading
Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Small Molecules	Peptides	Proteins	Chiral	Oligonucle-otides	Acids	Polar	Hydro-phobic	Bases	Available Surface Area
Luna C18(2)	3, 5, 10, 10-*PREP*, 15	100	400	17.5	1.5-9.0*	●	●				◐		●	◐	●
Luna C8(2)	3, 5, 10, 10-*PREP*, 15	100	400	13.5	1.5-9.0*	●	●				◐		●	◐	●
Luna C5	5, 10	100	440	12.5	1.5-9.0*	●	●				◐		●	◐	●
Luna Phenyl-Hexyl	3, 5, 10, 10-*PREP*, 15	100	400	17.5	1.5-9.0*	●	●				◐	◐	●	◐	●
Luna Silica(2)	3, 5, 10, 10-*PREP*, 15	100	400	-	-	●					◐	◐		◐	●
Luna CN	3, 5, 10	100	400	7	1.5-7.0	●					◐	◐		◐	●
Luna NH_2	3, 5, 10	100	400	9.5	1.5-11.0	●					◐	◐		◐	●
Luna SCX	5, 10	100	400		2-7	●						●		●	●
Luna HILIC	3, 5	200	200	5.7	1.5-8.0	●	◐				◐	●		◐	●
Luna PFP(2)	5, 10	100	400	11.5	1.5-8.0	●						●		◐	●

*pH stability under gradient conditions. pH stability is 1.5-10.0 under isocratic conditions.

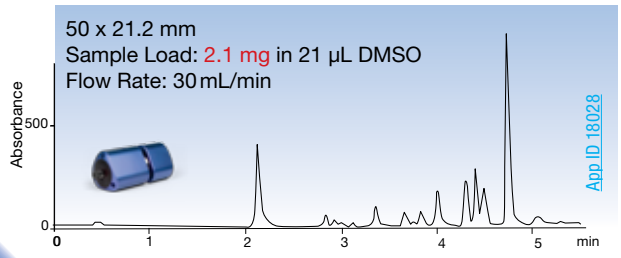
Simple Scale-Up

Axia™ column technology provides the same high efficiency chromatographic performance for preparative scale columns (21.2, 30, and 50 mm ID) as obtained in 4.6 mm ID analytical columns. This improvement in preparative column performance across all lengths and internal diameters makes it easier to select the appropriate column size to achieve the desired purity and yield without having to compromise on performance.

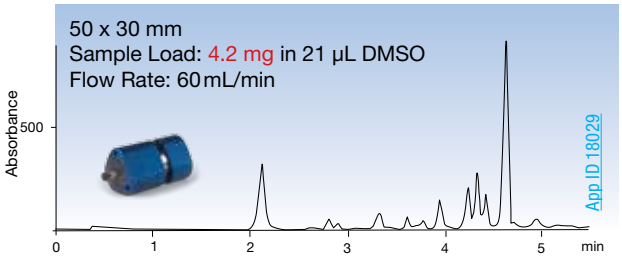
Analytical



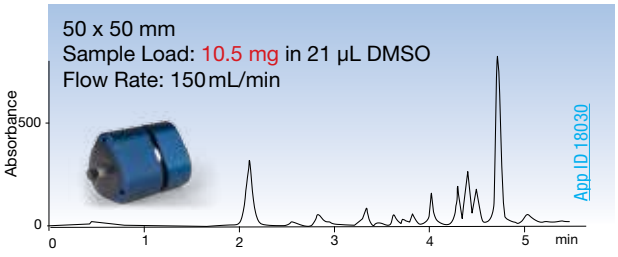
Axia PREP



Axia PREP



Axia PREP



Columns: Luna 5 µm C18(2)
Dimensions: As Noted
Mobile Phase: A: 0.5 % TFA in Water
B: 0.5 % TFA in Acetonitrile
Gradient: A/B (95:5) to A/B (5:95) in 5 minutes

Flow Rate: As Noted
Detection: UV @ 254 nm
Temperature: Ambient
Injection: See chromatograms
Sample: Suzuki Reaction Mixture

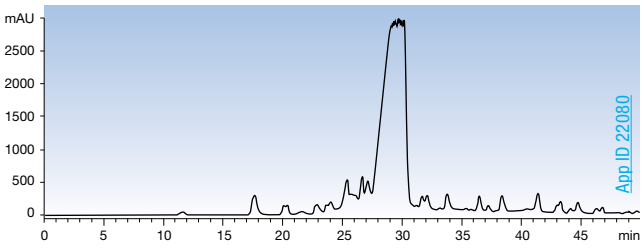
Proven Media for Peptide Purifications

An optimal compromise between throughput, recovery, and yield. Perform high loading (0.74 g on column) and achieve high purity (>98 %) in a single purification run.

Preparative Purification of Bivalirudin

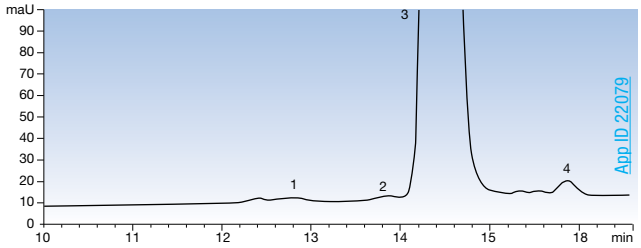
(20 amino acid peptide also known as Angiomax®)

Purification Elution Profile at 1.5 % Specific Load



Column: Luna 10 µm-*PREP* C8(2)
Dimensions: 250 x 21.2 mm
Part No.: 00G-4323-P0-AX
Mobile Phase: A: 100 mM Ammonium acetate pH 4.7 in Water
B: Acetonitrile
Gradient: 10 to 50 % B in 40 min; hold at 80 % B for 5 min; re-equilibration at 10 % B for 10 min
Flow Rate: 21 mL/min
Temperature: Ambient
Detection: UV @ 280 nm
Injection Volume: 105 mL
Sample Concentration: 7 mg/mL in water
Sample: Crude Bivalirudin in Water

Purity Confirmation of Combined Fractions



11 Combined fractions 27.8 – 29.8 min; Recovery 80.5 % with purity ≥ 98.5 %

Peak No.	Time (min)	Area	Area %
1	12.74	73.7	0.35
2	**13.83**	**40.6**	**0.19**
3	**14.37**	**21118.7**	**98.53**
4	15.858	200.5	0.93

Column: Luna 5 µm C8(2)
Dimensions: 250 x 4.6 mm
Part No.: 00G-4249-E0
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile
Gradient: 20 % to 50 % B in 30 min

Flow Rate: 1 mL/min
Temperature: 25 °C
Detection: UV @ 220 nm
Injection Volume: 2 µL
Sample: Combined Fractions

Ordering information on page 35

Luna® Omega NEW

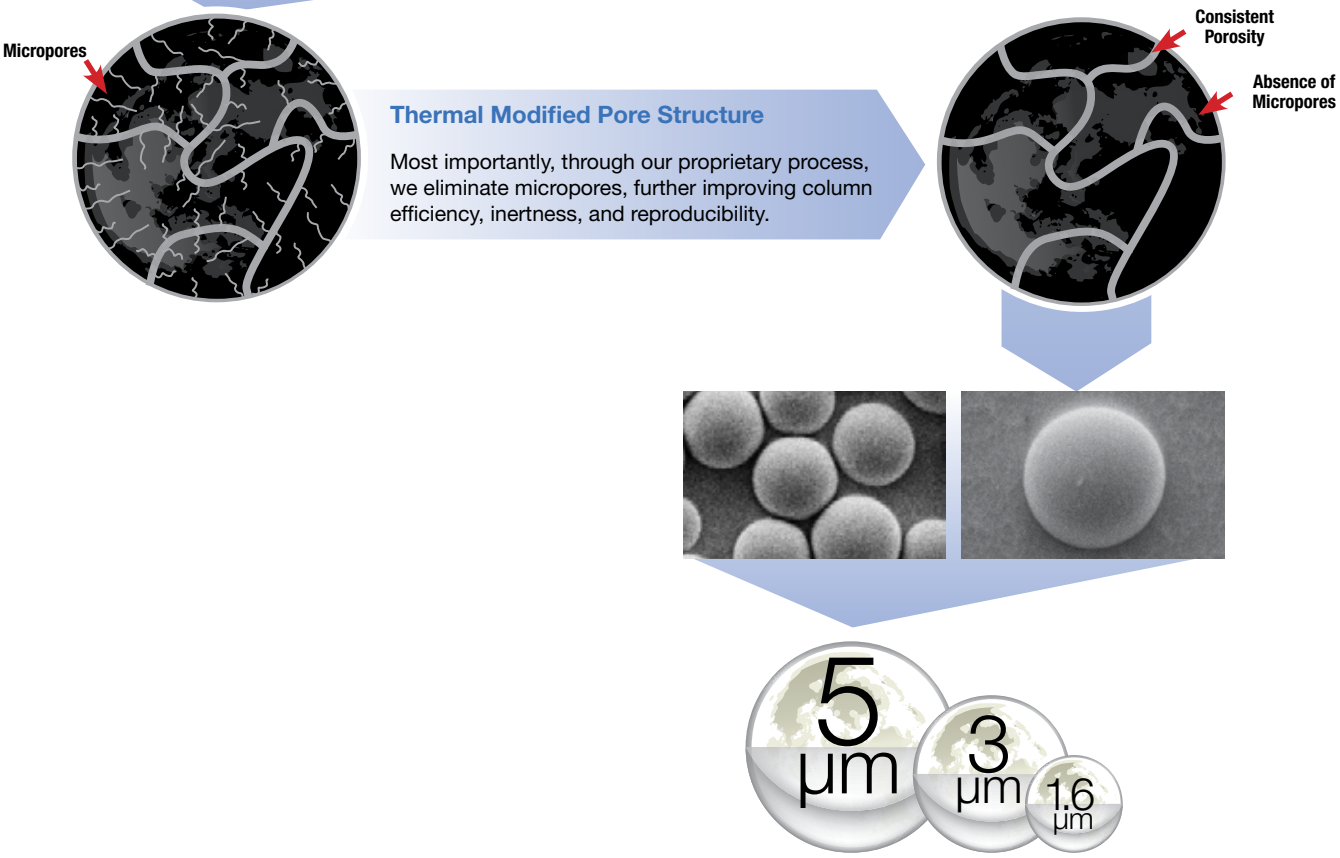
Cutting Edge Fully Porous Silica Particle

Luna is one of the most recognized HPLC brands on the market, delivering high efficiency, ruggedness, reproducibility, and dependability for a wide range of analyses. The new Luna Omega builds upon this legacy with an innovative yet rugged silica particle architecture, designed and manufactured by Phenomenex based on more than 20 years of applied knowledge, invention, and customer experience.

Novel Design and Manufacturing Process

Within the novel manufacturing process of Luna Omega silica, we implement a proprietary processing technique to gain greater particle inertness, a stronger particle morphology, and more consistent porosity.





Key: ● Best Suited ◐ Very Good

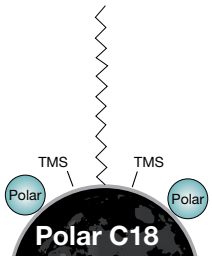
	Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Applications: Small Molecules	Applications: Peptides	Applications: Proteins	Applications: Chiral	Applications: Oligonucleotides	Type of Compounds: Acids	Type of Compounds: Polar	Type of Compounds: Hydrophobic	Type of Compounds: Bases	Loading: Available Surface Area
NEW	Luna Omega Polar C18	1.6, 3, 5	100	260	9 %	1.5-8.5*	●	●				◐	●	●	●	◐
NEW	Luna Omega PS C18	1.6, 3, 5	100	260	9 %	1.5-8.5*	●	●				●	●	●	●	◐

*pH stability under gradient conditions. pH stability is 1.5-10 under isocratic conditions.

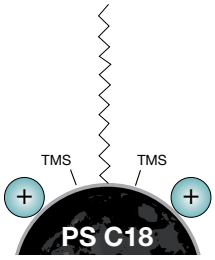
UHPLC to HPLC to PREP Scalability

With direct selectivity scalability from Luna Omega 1.6 µm to 5 µm you can fluidly transfer methods from UHPLC platforms to HPLC and preparative instrumentation. Additionally, you can easily go in reverse and use a Luna Omega 1.6 µm to analyze fractions taken from a Luna Omega 5 µm preparative column.

Luna Omega Phase Selection

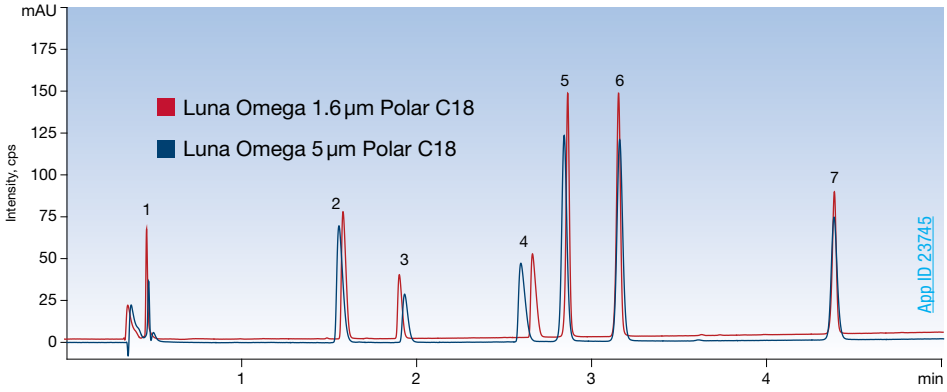


100 % aqueous stability and enhanced selectivity/retention for polar analytes without diminishing useful non-polar retention. The C18 ligand provides general hydrophobic interactions while a polar modified particle surface provides enhanced polar compound retention.



Unique, 100 % aqueous stable mixed-mode phase that provides both polar and non-polar retention. The surface contains a positive charged ligand which aids in the retention of acidic compounds through ionic interactions, while the C18 ligand promotes general reversed phase retention. The positively charged surface also improves basic compound peaks shape through ionic repulsion.

Direct Scalability 1.6 µm to 5 µm



Conditions for all columns:

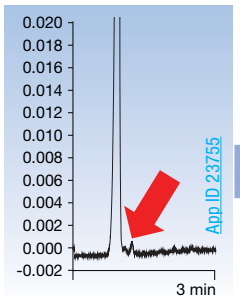
Columns: Luna Omega 1.6 µm Polar C18
Luna Omega 5 µm Polar C18
Dimension: 50 x 2.1 mm
Mobile Phase: A: Water with 0.1 % Formic Acid
B: Acetonitrile with 0.1 % Formic Acid
Gradient:

Time (min)	% B
0	5
5	95

Flow Rate: 0.4 mL/min
Temperature: 30 °C
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Pindolol
3. Chlorpheniramine
4. Nortriptyline
5. 3-Methyl-4-nitrobenzoic acid
6. 5-Methyl salicylaldehyde
7. Hexanophenone

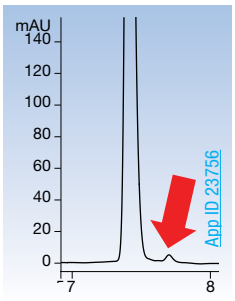
UHPLC to HPLC to PREP

UHPLC Scout



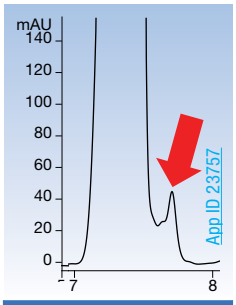
Dimension: 50 x 2.1 mm
Flow Rate: 0.2 mL/min

Optimized HPLC



Dimension: 150 x 4.6 mm
Flow Rate: 1.5 mL/min

Preparative Purification



Dimension: 150 x 21.2 mm
Flow Rate: 30 mL/min

Conditions for all columns (as noted):

Columns: Luna Omega 5 µm PS C18
Mobile Phase: A: Water with 0.1 % TFA
B: Acetonitrile with 0.1 % TFA
Gradient:

Time (min)	% B
0	10
15	90

Temperature: 22 °C
Detection: UV @ 254 nm
Sample: 1. Impurity
2. Proprietary API
3. Impurity

Analyze Prep Fractions via UHPLC

Ordering information on page 35

Media for Biomolecules

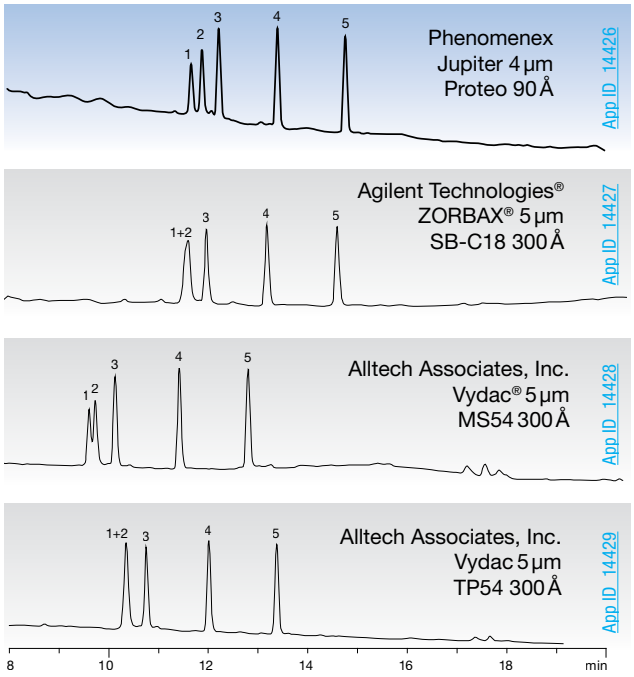
The Jupiter HPLC column portfolio, including Jupiter 300 and Jupiter Proteo, offers optimized reversed phase solutions for peptide and protein purification. Identify, purify, and analyze almost any protein with Jupiter columns.

Jupiter Proteo 90 Å

- For separation of proteins and peptides < 10,000 MW
- C12 bonded onto an ultra-high surface area (475 m^2/g) silica for increased peak capacity and resolution of peptide separations
- Direct scale-up from analytical to preparative and bulk materials

Resolve Peptides with Similar Hydrophobicity

Jupiter Proteo is able to fully resolve peptides that differ in hydrophobicity by one methyl group.



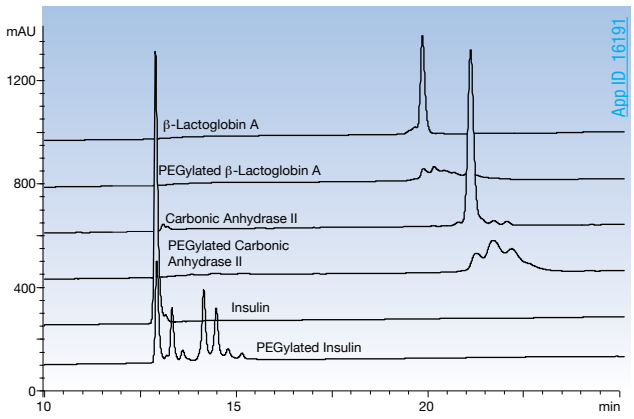
Columns: Phenomenex Jupiter 4 µm Proteo 90 A
Agilent Technologies ZORBAX 5 µm SB-C18 300 Å
Alltech Associates, Inc. Vydac 5 µm MS54 300 Å
Alltech Associates, Inc. Vydac 5 µm TP54 300 Å
Dimensions: 250 x 4.6 mm
Mobile Phase: A: 0.1 % TFA in Water
B: 0.085 % TFA in Acetonitrile
Gradient: A/B (95:5) to A/B (55:45) in 20 minutes
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 214 nm
Sample: 1. NH_2-Arg-Gly-Gly-Ala-Gly-Gly-Leu-Gly-Leu-Gly-Lys-Amide
2. Ac-Arg-Gly-Gly-Gly-Gly-Gly-Leu-Gly-Leu-Gly-Lys-Amide
3. Ac-Arg-Gly-Ala-Gly-Gly-Gly-Leu-Gly-Leu-Gly-Lys-Amide
4. Ac-Arg-Gly-Val-Gly-Gly-Gly-Leu-Gly-Leu-Gly-Lys-Amide
5. Ac-Arg-Gly-Val-Val-Gly-Gly-Leu-Gly-Leu-Gly-Lys-Amide

Jupiter 300 Å

- For separation of proteins > 10,000 MW
- Available with C18 and C4 bonded phases
- 1.5 – 10 pH stability for method ruggedness and easy protein removal
- Direct scale up to preparative and bulk materials

Compare PEGylated vs. Native Forms of Proteins

Reversed phase separation of PEGylated and native proteins on a Jupiter 300 C4 column. Note the good resolution of multiple PEGylated forms for all proteins tested.



Columns: Jupiter 300 5 µm C4 300 A
Dimensions: 150 x 4.6 mm
Part No.: 00F-4167-E0
Mobile Phase: A: 2 % Acetonitrile / 0.1 % TFA in Water
B: 70 % Acetonitrile /20 % IPA / 0.08 % TFA in Water
Gradient: A/B (85:15) to A/B (30:70) in 25 min
Flow Rate: 1 mL/min
Temperature: 45 °C
Detection: UV @ 214 nm
Sample: PEGylated and Native Proteins

> **We purchased the Jupiter 300 C18 300 Å column a few months ago and have been quite impressed with its performance. The Jupiter 300 column provides better separation of the proteins. As for reproducibility, the control profiles have not changed since day one of its use.**
>
> *Major Biotech Company, Europe*

Key: ● Best Suited ◐ Very Good

Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Applications: Small Molecules	Applications: Peptides	Applications: Proteins	Applications: Chiral	Applications: Oligonucleotides	Type of Compounds: Neutrals: Acids	Type of Compounds: Neutrals: Polar	Type of Compounds: Neutrals: Hydrophobic	Type of Compounds: Bases	Loading: Available Surface Area
Jupiter C18	5, 10, 15	300	170	13.3	1.5-10.0			●			◐		●	◐	●
Jupiter C4	5, 10, 15	300	170	5	1.5-10.0			●			◐		●	◐	●
Jupiter Proteo	4, 10	90	475	15	1.5-10.0	●	●				◐		●	◐	●

Comparative separations may not be representative of all applications.

Purification of Synthetic Oligonucleotides

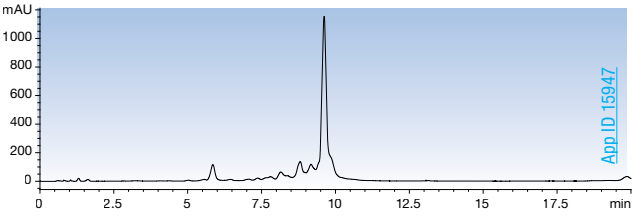
Clarity Oligo-RP™

Unique media specifically designed for reversed phase purification of oligonucleotides with balanced hydrophobicity and polar selectivity. The media is based on composite particle TWIN™ technology that provides improved selectivity and efficiency for oligonucleotides when compared to competing hybrid, polymer, and silica media.

RP-HPLC Preparative Purification

- Easily separate N-1 failure sequences from target oligo with >90 % purities
- Purify oligos up to 60 nt in length
- Trityl-off purification of DNA, RNA, thioates, and modified/ labeled oligonucleotides
- 3 µm, 5 µm, 10 µm particles for seamless scaling

Preparative 20 nt DNA Oligo-RP Purification



Column: Clarity 3 µm Oligo-RP C18
Dimensions: 50 x 10 mm
Part No.: 00B-4441-N0
Mobile Phase: A: 50 mM TEAA pH 7.5/ 5 % Acetonitrile
B: Methanol
Gradient: 10 % to 60 % B in 20 minutes
Flow Rate: 5 mL /min
Detection: UV @ 260 nm
Sample: 20nt DNA

Clarity Oligo-XT NEW

Clarity Oligo-XT, C18 columns have been designed to provide rugged high performance for the LC/MS characterization of synthetic DNA and RNA samples, alongside purification of these targeted oligos. With high efficiency levels from the novel core-shell particle design, this new media provides the necessary separation power to accurately resolve closely related oligo sequences.

- Novel core-shell particle technology with rugged pH stability from 1-12
- 5 µm particles provide extremely low pressure HPLC and Preparative purification solutions
- Seamless scalability between all three particle sizes (1.7 µm, 2.6 µm and 5 µm)

Clarity Oligo-WAX™

Clarity Oligo-WAX is a crosslinked weak anion-exchange media designed for successful ion-exchange purification of synthetic DNA/RNA. Oligo-WAX is an advantageous combination of purity, capacity, mechanical strength, cost, and efficiency.

- Excellent efficiency column results in > 90 % purities due to good fractionation of closely eluting compounds
- High loading capacity due to very high density ligand
- Increase productivity by running at higher flow rates and pressures

> **We have used the Axia™ prep columns and have not had problems with them. I have never had to adjust for retention gaps. This speaks directly to the quality of Phenomenex's phases and the quality of their PREP columns.**
>
> *-Major Biotech Company, USA*

Key: ● Best Suited ◐ Very Good

						Applications					Type of Compounds				Loading
											Neutrals				
Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Small Molecules	Peptides	Proteins	Chiral	Oligonucleotides	Acids	Polar	Hydrophobic	Bases	Available Surface Area
Oligo-RP	3, 5, 10	110	375	14	1-12					●	◐		●	◐	●
Oligo-Wax	10	360	150	-	1-11					●	●				◐
NEW Oligo-XT	1.7, 2.6, 5	100	200	11	1-12					●	◐		●	●	◐

Complete Chiral Solutions

Lux Chiral LC Columns

Achieving optimal chiral separation is easier than ever with seven unique Lux polysaccharide stationary phases to screen. Choose a phase, then transfer the method to lab scale, process, pilot, and commercial scale.

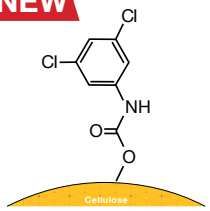
Lux chiral preparative columns simplify the separation process:

- Unique and traditional phases that increase the success rate of the chiral screen
- Consistent particle size distribution so performance is maintained
- Mechanically strong media for increased stability
- Available in multiple particle sizes for direct scale up (3 µm and 5 µm packed columns for screening and small scale purifications; 10 µm and 20 µm bulk media for process scale purifications)

Resolve Your Enantiomers with Seven Unique Phases

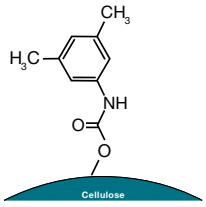
The Lux family of bulk cellulose and amylose chiral selectors provides a variety of complementary selectivities.

NEW



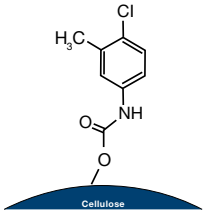
Lux i-Cellulose-5

Cellulose tris(3,5-dichlorophenylcarbamate)
Guaranteed Alternative to CHIRALPAK® IC and IC-3



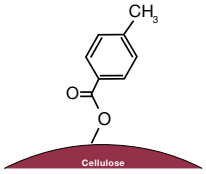
Lux Cellulose-1

Cellulose tris(3,5-dimethylphenylcarbamate)
Guaranteed Alternative to CHIRALCEL® OD®, OD-H®, OD-3, OD-RH®, and OD-3R



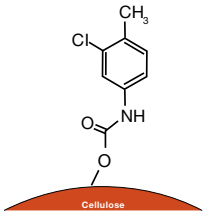
Lux Cellulose-2

Cellulose tris(3-chloro-4-methylphenylcarbamate)
Guaranteed Alternative to CHIRALCEL OZ, OZ-H®, OZ-3, OZ-RH, and OZ-3R



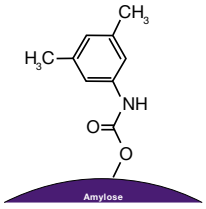
Lux Cellulose-3

Cellulose tris(4-methylbenzoate)
Guaranteed Alternative to CHIRALCEL OJ® , OJ-H®, OJ-3, OJ-RH®, and OJ-3R



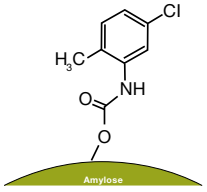
Lux Cellulose-4

Cellulose tris(4-chloro-3-methylphenylcarbamate)
Guaranteed Alternative to CHIRALCEL OX-H, OX-3, OX-RH, and OX-3R



Lux Amylose-1

Amylose tris(3,5-dimethylphenylcarbamate)
Guaranteed Alternative to CHIRALPAK AD®, AD-H®, AD-3, AD-RH®, and AD-3R



Lux Amylose-2

Amylose tris(5-chloro-2-methylphenylcarbamate)
Guaranteed Alternative to CHIRALPAK AY®, AY-H®, AY-3, AY-RH, and AY-3R

Key: ● Best Suited ◐ Very Good

							Chiral Applications					Type of Chiral Compounds				Loading
	Packing Material	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Range	Small Molecules	Peptides	Proteins	Chiral	Oligonucleotides	Acids	Polar	Hydrophobic	Bases	Available Surface Area
NEW	Lux i-Cellulose-5	3, 5	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●
	Lux Cellulose-1	3, 5, 10, 20	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●
	Lux Cellulose-2	3, 5, 10, 20	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●
	Lux Cellulose-3	3, 5, 10, 20	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●
	Lux Cellulose-4	3, 5, 10, 20	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●
	Lux Amylose-1	3, 5	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●
	Lux Amylose-2	3, 5	1,000	-	-	2-9	●			●		◐	◐	◐	◐	●

Column Screening for Optimal Chiral Resolution

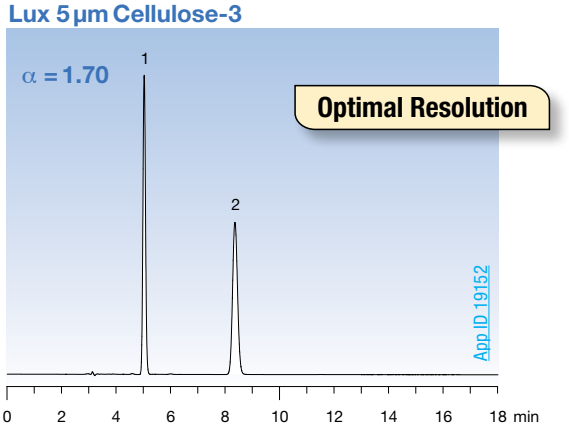
Being able to utilize differences in selectivity in each of the seven Lux® columns can help develop methods more efficiently by offering broad and complementary chiral recognition abilities.

In the example below, a simple screen determined which column gave the best separation.

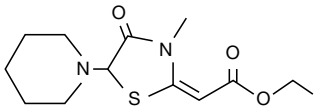
Etozolin

Based on a five phase screen under reversed phase conditions, the optimal chiral stationary phase for resolving Etozolin is Lux Cellulose-3.

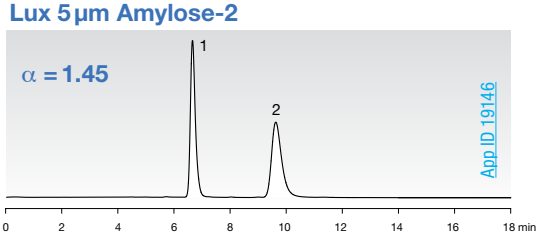
Lux 5 µm Cellulose-3



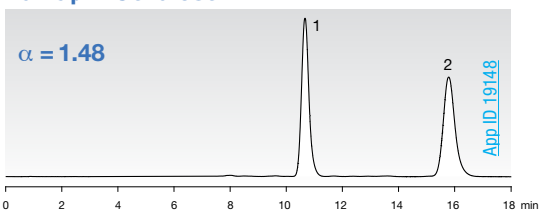
Conditions for all columns:
Column: As noted
Dimension: 250 x 4.6 mm
Mobile Phase: Acetonitrile / 20 mM Ammonium bicarbonate with 0.1 % Diethylamine (60:40)
Flow Rate: 1 mL/min
Temperature: Ambient
Detection: UV @ 220 nm



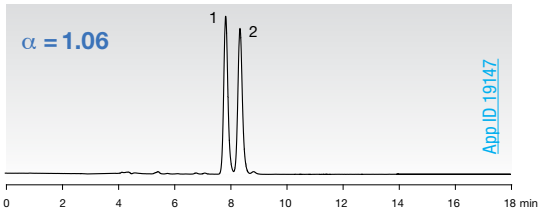
Lux 5 µm Amylose-2



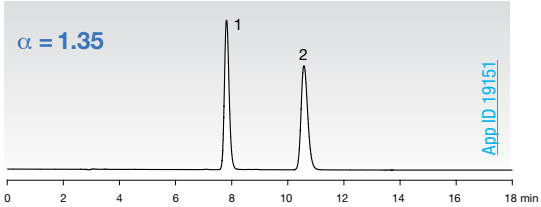
Lux 5 µm Cellulose-2



Lux 5 µm Cellulose-1

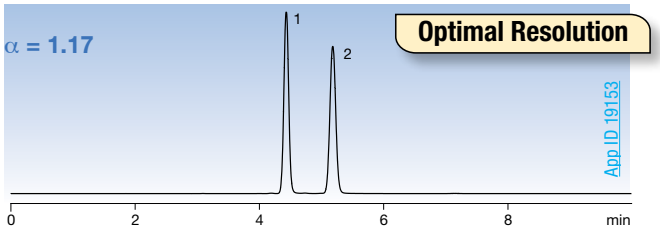


Lux 3 µm Cellulose-4

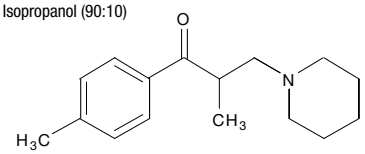


Innovative chiral selector will succeed where others fail

Lux 5 µm Cellulose-4

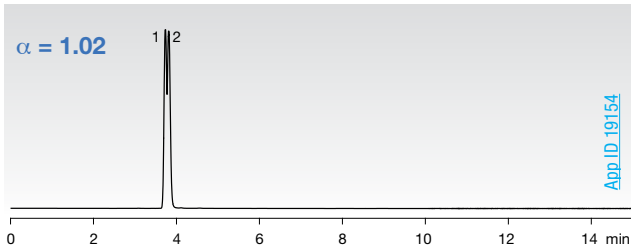


Conditions for all columns:
Dimensions: 250 x 4.6 mm
Mobile Phase: 0.1 % Diethylamine in Hexane / 0.1 % Diethylamine in Isopropanol (90:10)
Flow Rate: 1 mL/min
Detection: UV @ 220 nm
Temperature: Ambient

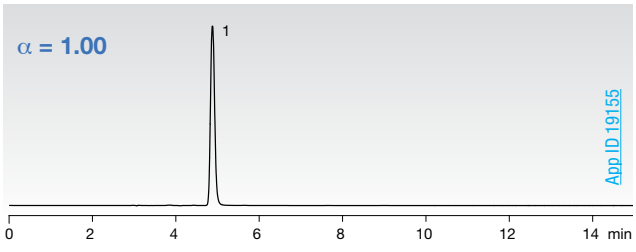


Tolperisone

CHIRALCEL® 5 µm OD-H®



CHIRALPAK® 5 µm AD®-H

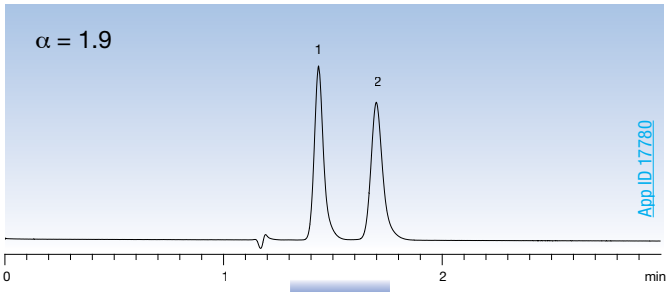


Columns used for comparison were manufactured by DAICEL Corporation.
Phenomenex is in no way affiliated with DAICEL Corporation. Comparative separations may not be representative of all applications.

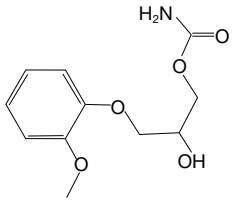
Load More with an Increase in Column Length

Axia™ column technology allows separations to scale up directly based on column length. With the 100 mm length column a 32 mg/load separation was achieved and an increased sample load of 80 mg/load was achieved on the longer 250 mm length column. As expected when increasing the load, the peak width and tailing increased but there was no loss of resolution.

Conditions for all columns:
Columns: Lux® 5 µm Cellulose-1
Dimensions: as noted
Mobile Phase: Methanol / Isopropanol (90:10)
Flow Rate: as noted
Detection: as noted
Sample: Dissolved in mobile phase as noted

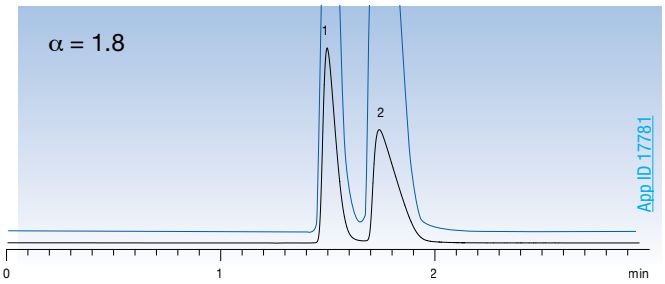


Dimensions: 100 x 4.6 mm
Flow Rate: 1 mL/min
Detection: UV @ 220 nm
Sample: 5 µg in 2 µL



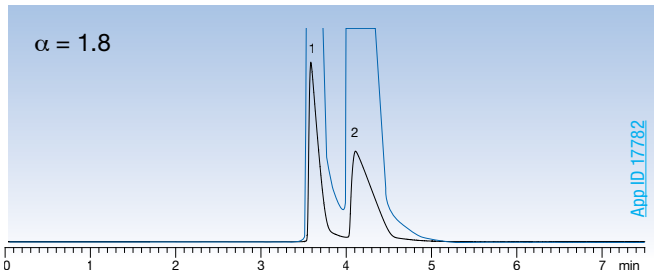
Methocarbamol

No resolution loss with increased sample load



Dimensions: 100 x 21.2 mm
Flow Rate: 20 mL/min
Detection: UV @ 220 nm and 254 nm
Sample: 32 mg in 640 µL

2.5 x Load Increase



Dimensions: 250 x 21.2 mm
Flow Rate: 20 mL/min
Detection: UV @ 220 nm and 254 nm
Sample: 80 mg in 1600 µL

Lux Axia preparative columns are wonderful! I regularly use Lux chiral stationary phases Cellulose-2 and Cellulose-4 and less frequently, the Lux Amylose-2. In our community of chiral analysis/ purification scientists, there are some who use the CC4 column instead of the *equivalent* Lux Cellulose-4. On several occasions we've seen separation and good peak shape on the Lux Cellulose-4 that was completely missing from the CC4. Customer support and delivery times are always within a few days.

Julia G. Christie
GlaxoSmithKline, USA

Easy SFC Scale-up

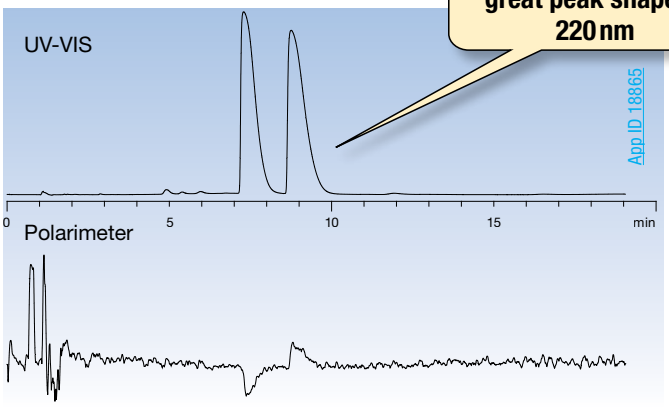
SFC Purfication of Terfenadine

SFC APPROVED

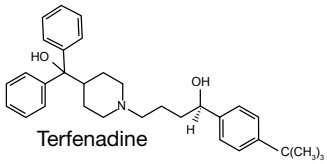
Analytical and Axia™ packed columns have been extensively tested on various SFC systems and all column ID's and lengths are SFC compatible.

Baseline Separation of Enantiomers

Lux® Cellulose-1 offers great peak shape at 220 nm



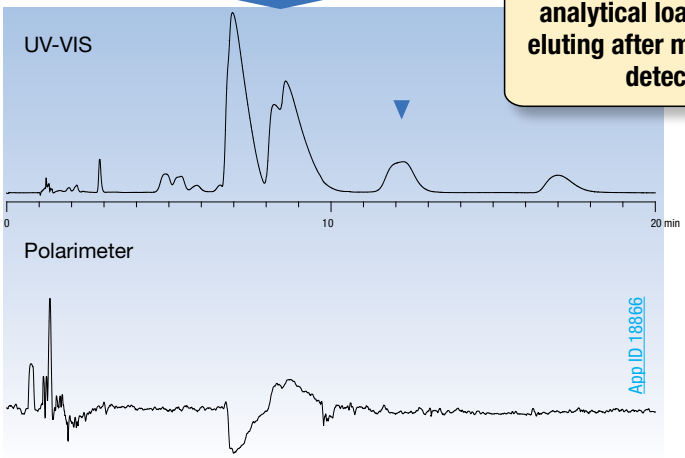
Dimensions: 250 x 4.6 mm
Flow Rate: 2.5 mL/min
Detection: UV @ 220 nm
Load: 300 µg in 10 µL



Terfenadine

5x Load Increase

Overloading study with increased analytical load showing impurities eluting after major enantiomers only detected at 254 nm



Dimensions: 250 x 4.6 mm
Flow Rate: 2.5 mL/min
Detection: UV @ 254 nm
Load: 1.5 mg in 50 µL

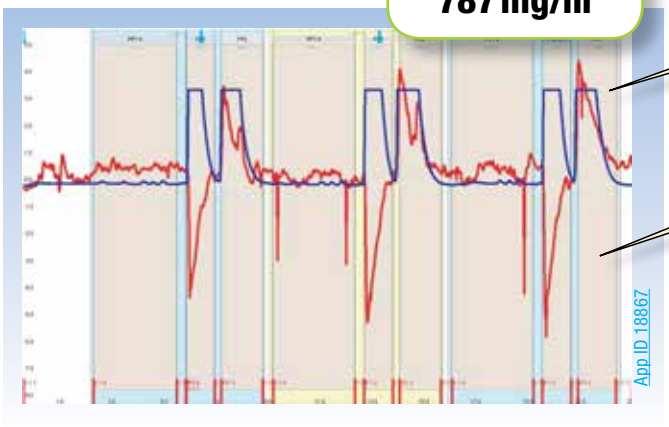
Conditions for all columns:
Columns: Lux 5 µm Cellulose-1
Mobile Phase: Methanol with 0.1 % DEA/ Carbon Dioxide (25:75)
Column Temperature: 35 °C
Polarimeter: ALP-PDR-Chiral
Sample: Terfenadine with ethanol dissolution solvent

70x Load Increase

7.5 cycles/hr
787 mg/hr

High loading capacity media along with stacking injections allow for increased yields and productivity

Closer stacked injections can not be used due to the impurities eluting after the major enantiomers



Dimensions: 250 x 21.2 mm
Flow Rate: 50 mL/min
Detection: UV @ 220 nm
Load: 105 mg in 3.5 mL

Tip: For SFC column screening, use Lux 150 x 3.0 mm ID columns.

Ordering information on page 35

A New Era of Technical Support Services

Let Us Do the Work for You

PhenoLogix, our in-house application support lab, saves you time and money by screening multiple scout columns and solvent strategies for new purification methods or revalidating your current methods. We work together to make you successful by minimizing your process purification development time and optimizing your purification method.

Chiral Screening

- Normal Phase
- Reversed Phase
- Polar Organic
- SFC

Method Optimization Services

- Fast Turnaround
- Easy Method Transfer
- Continued Support

Preparative and Process Scale-Up

- Media Screening
- Small Scale Purification
- DAC Packing Assistance

phenoLogix℠
Your Method. Our Scientists.

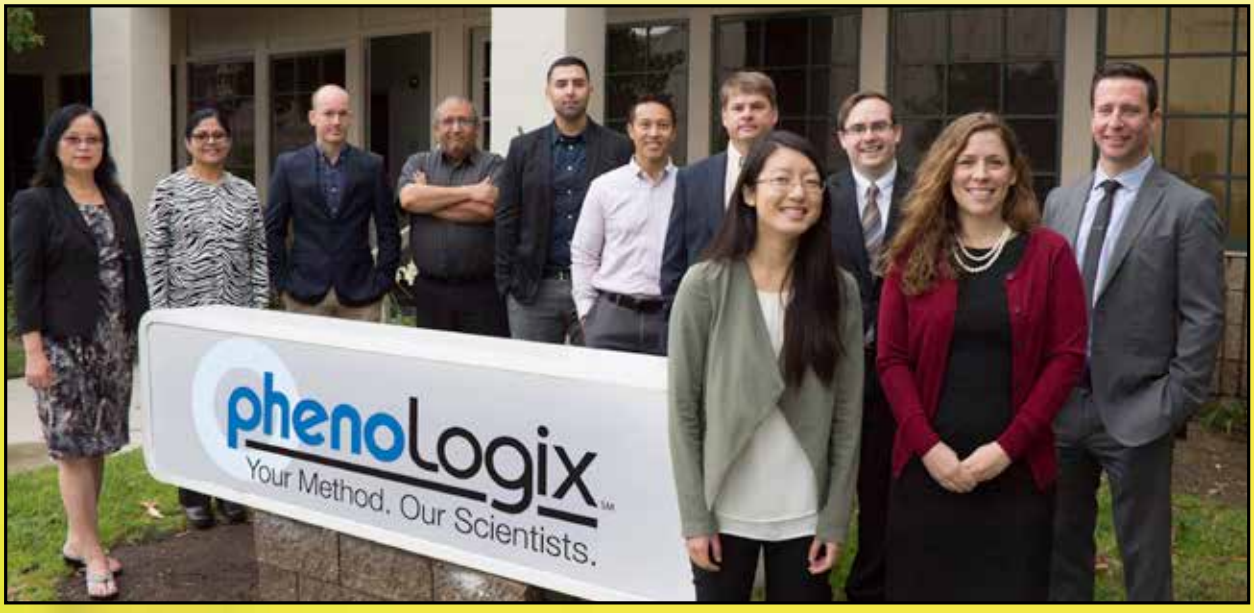
Your Method, Our Scientists

Quality Products, Advanced Performance, Complete Support

For more information or to begin a project today, please contact your local Phenomenex representative or email us at **phenologix@phenomenex.com**

You can also visit us online:

www.phenomenex.com/phenologix



> **Our scientists at American Peptide have taken advantage of Phenomenex's column packing services, application development, and project-specific consultation services for some of our most challenging separations.**
>
> *American Peptide Company, USA*

PREP HPLC/SFC Column Protection

SecurityGuard™ PREP

- Extends preparative column lifetime by as much as 5 times
- Protects columns from samples that precipitate out of solution
- Protects columns from contaminants
- Stable and leak-free up to 60 mL/min within specified pressure ratings

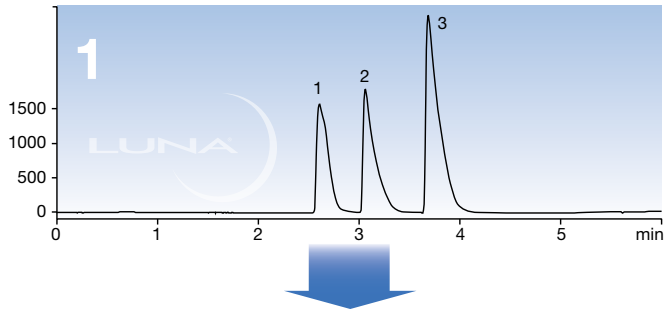
The SecurityGuard PREP system was designed to effectively and inexpensively protect your valuable prep columns from the damaging effects of mobile phase and sample chemical contaminants and particulates, without altering your chromatographic results.

Lower Your Cost Per Injection!

SecurityGuard isn't only about column protection, it's about lowering your cost per injection! When you increase the number of injections from a single preparative column you're lowering your overall cost per injection. With SecurityGuard PREP, the inexpensive cartridge was ruined while the integrity of the prep column was maintained and its performance restored.

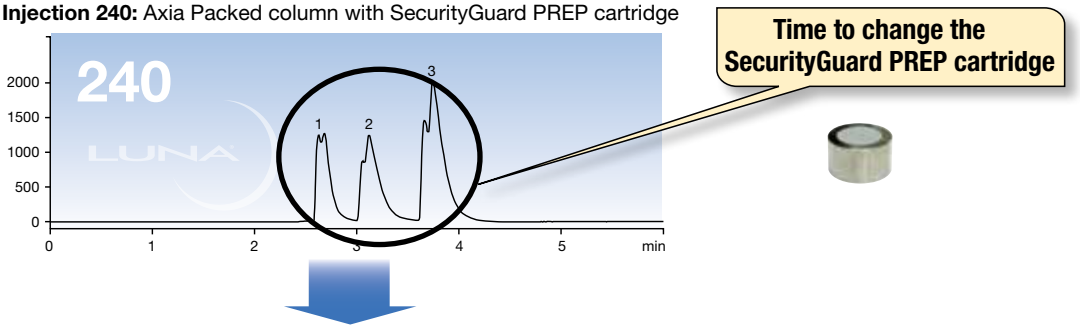
Forced Degradation Study

Injection 1: Axia™ Packed column with SecurityGuard PREP cartridge

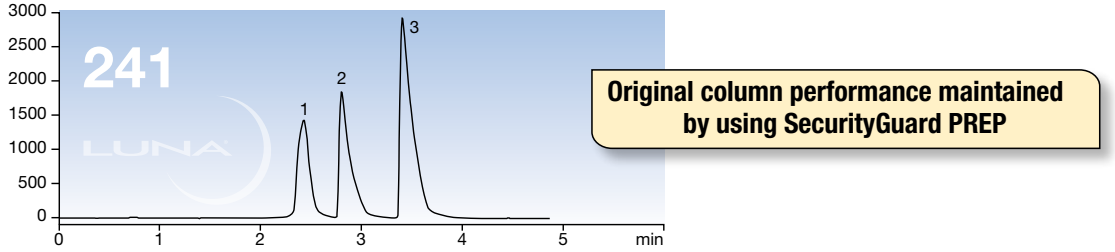


Column: Luna® 10 µm C18(2) Axia Packed
Dimension: 50 x 21.2 mm
Part No.: 00B-4253-P0-AX
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Water / Acetonitrile (25:75)
Gradient: Linear 93:7 (A/B) to 100 % B over 5 minutes
Injection Volume: 420 µL
Flow Rate: 60 mL/min
Temperature: Ambient
Detection: UV @ 270 nm
Sample: 1. Nadolol
2. Metoprolol
3. Propranolol

Injection 240: Axia Packed column with SecurityGuard PREP cartridge



Injection 241: Axia Packed column after removing SecurityGuard column protection system



Ordering Information

SecurityGuard PREP

Preparative LC Column Protection

SecurityGuard PREP

Material	Description	pH Stability	Semi-Prep	Preparative (HPLC or SFC)	
			If your column ID (mm) is:		
			9.0-16.0	18.0-29.0	30.0-49.0
			Use cartridges (mm):		
			10.0 x 10.0	15.0 x 21.2	15.0 x 30.0
Cartridges for General Purpose/Pharmaceutical			/ 3 pk	/ ea	/ ea
C18	(ODS, Octadecyl)	1.5 - 10	AJ0-7221	AJ0-7839	AJ0-8301
C12	(Dodecyl)	1.5 - 10	AJ0-7275	AJ0-7842	AJ0-8304
C8	(MOS, Octyl)	1.5 - 10	AJ0-7222	AJ0-7840	AJ0-8302
C5	(Pentyl)	1.5 - 10	AJ0-7372	—	—
Silica	—	—	AJ0-7223	AJ0-7229	AJ0-8312
HILIC	(HILIC)	1.5 - 8	AJ0-8902	—	—
NH_2	(Amino, Aminopropyl)	1.5 - 11	AJ0-7364	AJ0-8162	AJ0-8309
CN	(Cyano, Cyanopropyl)	2 - 7.5	AJ0-7313	AJ0-8220	AJ0-8311
Phenyl	(Phenylhexyl)	1.5 - 10	AJ0-7314	AJ0-7841	AJ0-8303
PFP(2)	(Pentafluorophenyl)	1.5 - 8	AJ0-8376	AJ0-8377	AJ0-8378
SCX	(SA, Strong Cation Exchanger)	2.5 - 7.5	—	AJ0-8595	AJ0-8596
SAX	(SB, Strong Anion Exchanger)	2.5 - 7.5	AJ0-7370	—	—
RP-1	(Reversed Phase - Polymer)	0 - 14	AJ0-7368	AJ0-8358	—
Polar-RP	(Ether-linked Phenyl)	1.5 - 7	AJ0-7276	AJ0-7845	AJ0-8307
Fusion-RP	(C18 Polar Embedded)	1.5 - 10	AJ0-7558	AJ0-7844	AJ0-8306
AQ C18	(Polar Endcapped C18)	1.5 - 7.5	AJ0-7512	AJ0-7843	AJ0-8305
Gemini® NX-C18	(C18 TWIN-NX™ Technology)	1 - 12	AJ0-8369	AJ0-8370	AJ0-8371
Gemini C18	(C18 TWIN™ Technology)	1 - 12	AJ0-7598	AJ0-7846	AJ0-8308
Gemini C6-Phenyl	(C6-Phenyl TWIN Technology)	1 - 12	AJ0-9156	AJ0-9157	AJ0-9158
Luna® Omega Polar C18	(Polar Function C18)	1.5 - 10	—	AJ0-7603	AJ0-7604
Luna Omega PS C18	(Mixed Mode C18)	1.5 - 10	—	AJ0-7608	AJ0-7609
Cartridges for Core-Shell PREP Columns			/ 3 pk	/ ea	/ ea
For core-shell media columns, such as Kinetex® and Aeris™ (Phenomenex).					
EVO C18	(ODS, Octadecyl)	1 - 12	AJ0-9306	AJ0-9304	AJ0-9305
C18	(ODS, Octadecyl)	1.5 - 8.5	AJ0-9278	AJ0-9145	AJ0-9204
C8	(MOS, Octyl)	1.5 - 8.5	—	AJ0-9205	AJ0-9217
PFP	(Pentafluorophenyl)	1.5 - 9	—	AJ0-9146	AJ0-9299
Phenyl-Hexyl	(Phenylhexyl)	1.5 - 8.5	—	AJ0-9147	AJ0-9216
Biphenyl	(Biphenyl)	1.5 - 8.5	AJ0-9280	AJ0-9272	AJ0-9273
HILIC	(HILIC)	2 - 7.5	—	AJ0-9277	—
C18-Peptide	(ODS, Octadecyl)	1.5 - 9	AJ0-9317	AJ0-9318	AJ0-9319
F5	(Pentafluorophenyl)	1.5 - 8.5	AJ0-9323	AJ0-9324	AJ0-9325
Cartridges for Protein and Polypeptide Reversed Phase			/ 3 pk	/ ea	/ ea
For use with silica columns for separation of proteins and peptides, such as Jupiter® (Phenomenex); Vydac® 218TP, 214TP (Alltech Associates, Inc.); SynChropak® 300 C18, C4 (Eprogen, Inc.); Nucleosil® 300Å C18, C4 (Macherey-Nagel); Hypersil® 300Å (Thermo Hypersil-Keystone), and other widepore or 300Å brands.					
Widepore C18	(ODS, Octadecyl)	1.5 - 10	AJ0-7224	AJ0-7230	AJ0-8313
Widepore C5	(Pentyl)	1.5 - 10	AJ0-7371	—	—
Widepore C4	(Butyl)	1.5 - 10	AJ0-7225	AJ0-7231	AJ0-8314
Cartridges for Synthetic DNA / RNA Analysis			/ 3 pk	/ ea	/ ea
For use with columns like Clarity® (Phenomenex)					
Oligo-RP™	(C18 TWIN Technology)	1 - 12	AJ0-8136	AJ0-8210	—
Oligo-WAX™	(WA, Weak Anion Exchanger)	1.5 - 11	AJ0-8325	AJ0-8639	—
Oligo-XT	(ODS, Octadecyl)	1 - 12	AJ0-9516	AJ0-9517	AJ0-9518
Cartridges for Silica GFC			—	/ ea	—
(Aqueous SEC) For use with silica GFC columns, such as Yarra™ and BioSep™ (Phenomenex); ZORBAX® GF-Series (Agilent Technologies); Bio-Sil® (Bio-Rad®).					
GFC-2000	–	2 - 7.5	—	AJ0-8588	—
GFC-3000	–	2 - 7.5	—	AJ0-8589	—
GFC-4000	–	2 - 7.5	—	AJ0-8590	—
Cartridges for Chiral			/ 3 pk	/ ea	/ ea
For use with chiral columns, such as Lux® Cellulose-1, -2, -3, -4, i-Cellulose-5, and Amylose-1,-2 (Phenomenex); CHIRALCEL® OD-H®, CHIRALCEL® OJ-H®, and CHIRALPAK® AD®-H (DAICEL Corporation).					
Lux i-Cellulose-5	Cellulose tris(3,5-dichlorophenylcarbamate)	2 - 9	—	AJ0-8634	AJ0-8635
Lux Cellulose-1	Cellulose tris(3,5-dimethylphenylcarbamate)	2 - 9	AJ0-8404	AJ0-8405	AJ0-8406
Lux Cellulose-2	Cellulose tris(3-chloro-4-methylphenylcarbamate)	2 - 9	AJ0-8399	AJ0-8400	AJ0-8401
Lux Cellulose-3	Cellulose tris(4-methylbenzoate)	2 - 9	AJ0-8623	AJ0-8624	AJ0-8625
Lux Cellulose-4	Cellulose tris(4-chloro-3-methylphenylcarbamate)	2 - 9	AJ0-8628	AJ0-8629	AJ0-8630
Lux Amylose-1	Amylose tris(3,5-dimethylphenylcarbamate)	2 - 9	AJ0-9344	AJ0-9338	AJ0-9339
Lux Amylose-2	Amylose tris(5-chloro-2-methylphenylcarbamate)	2 - 9	AJ0-8472	AJ0-8473	AJ0-8474
HPLC Guard Cartridge Holders*			/ holder	/kit	/kit
Reuseable Holder			AJ0-9281	AJ0-8223	AJ0-8277
					
SFC Guard Cartridge Holders*			/ holder	/kit	/kit
Reuseable Holder			AJ0-9281	AJ0-8617	AJ0-8618

* Includes column coupler

guarantee

If SecurityGuard PREP cartridge protection system does not perform as well or better than your current guard cartridge system of similar phase and dimensions, return the product with the comparative data within 45 days for a FULL REFUND.

Ordering Information

Achiral Phases

Aeris™

Phase	Length	ID	Part No.	Price
5 µm				
PEPTIDE XB-C18	150	21.2	00F-4632-P0-AX	
	250	21.2	00G-4632-P0-AX	

Kinetex®

Phase	Length	ID	Part No.	Price
5 µm				
XB-C18	50	21.2	00B-4605-P0-AX	
	50	30	00B-4605-U0-AX	
	100	21.2	00D-4605-P0-AX	
	100	30	00D-4605-U0-AX	
	150	21.2	00F-4605-P0-AX	
	150	30	00F-4605-U0-AX	
	250	21.2	00G-4605-P0-AX	
	250	30	00G-4605-U0-AX	
EVO C18	50	21.2	00B-4633-P0-AX	
	50	30	00B-4633-U0-AX	
	100	21.2	00D-4633-P0-AX	
	100	30	00D-4633-U0-AX	
	150	21.2	00F-4633-P0-AX	
	150	30	00F-4633-U0-AX	
	250	21.2	00G-4633-P0-AX	
	250	30	00G-4633-U0-AX	
Biphenyl	100	21.2	00D-4627-P0-AX	
	100	50	00D-4627-V0-AX	
	150	21.2	00F-4627-P0-AX	
	150	30	00F-4627-U0-AX	
	250	21.2	00G-4627-P0-AX	
HILIC	100	21.2	00D-4606-P0-AX	
	150	21.2	00F-4606-P0-AX	
	250	21.2	00G-4606-P0-AX	
C18	50	21.2	00B-4601-P0-AX	
	50	30	00B-4601-U0-AX	
	100	21.2	00D-4601-P0-AX	
	100	30	00D-4601-U0-AX	
	150	21.2	00F-4601-P0-AX	
	150	30	00F-4601-U0-AX	
	250	21.2	00G-4601-P0-AX	
	250	30	00G-4601-U0-AX	
C8	50	21.2	00B-4608-P0-AX	
	50	30	00B-4608-U0-AX	
	100	21.2	00D-4608-P0-AX	
	100	30	00D-4608-U0-AX	
	150	21.2	00F-4608-P0-AX	
	150	30	00F-4608-U0-AX	
	250	21.2	00G-4608-P0-AX	
	250	30	00G-4608-U0-AX	
Phenyl-Hexyl	50	21.2	00B-4603-P0-AX	
	50	30	00B-4603-U0-AX	
	100	21.2	00D-4603-P0-AX	
	100	30	00D-4603-U0-AX	
	150	21.2	00F-4603-P0-AX	
	150	30	00F-4603-U0-AX	
	250	21.2	00G-4603-P0-AX	
	250	30	00G-4603-U0-AX	
F5	50	30	00B-4724-U0-AX	
	100	30	00D-4724-U0-AX	
NEW	150	21.2	00F-4724-P0-AX	
	150	30	00F-4724-U0-AX	
	250	21.2	00G-4724-P0-AX	
	150	30	00F-4603-U0-AX	

Gemini®

Phase	Length	ID	Part No.	Price
5 µm				
NX-C18	50	21.2	00B-4454-P0-AX	
	50	30	00B-4454-U0-AX	
	75	30	00C-4454-U0-AX	
	100	21.2	00D-4454-P0-AX	
	100	30	00D-4454-U0-AX	
	150	21.2	00F-4454-P0-AX	
	150	30	00F-4454-U0-AX	
	250	21.2	00G-4454-P0-AX	
	250	30	00G-4454-U0-AX	
C18	50	21.2	00B-4435-P0-AX	
	50	30	00B-4435-U0-AX	
	100	21.2	00D-4435-P0-AX	
	100	30	00D-4435-U0-AX	
	150	21.2	00F-4435-P0-AX	
	150	30	00F-4435-U0-AX	
	250	21.2	00G-4435-P0-AX	
	250	30	00G-4435-U0-AX	
C6-Phenyl	100	21.2	00D-4444-P0-AX	
	150	21.2	00F-4444-P0-AX	
	250	21.2	00G-4444-P0-AX	
10 µm				
NX-C18	50	21.2	00B-4455-P0-AX	
	100	21.2	00D-4455-P0-AX	
	100	30	00D-4455-U0-AX	
	100	50	00D-4455-V0-AX	
	150	21.2	00F-4455-P0-AX	
	150	30	00F-4455-U0-AX	
	150	50	00F-4455-V0-AX	
	250	21.2	00G-4455-P0-AX	
	250	30	00G-4455-U0-AX	
	250	50	00G-4455-V0-AX	
C18	100	21.2	00D-4436-P0-AX	
	100	30	00D-4436-U0-AX	
	150	21.2	00F-4436-P0-AX	
	150	30	00F-4436-U0-AX	
	150	50	00F-4436-V0-AX	
	250	21.2	00G-4436-P0-AX	
	250	30	00G-4436-U0-AX	
	250	50	00G-4436-V0-AX	

Jupiter®

Phase	Length	ID	Part No.	Price
4 µm				
Proteo	250	30	00G-4396-U0-AX	
10 µm				
Proteo	100	21.2	00D-4397-P0-AX	
	250	21.2	00G-4397-P0-AX	
	250	30	00G-4397-U0-AX	
C18 300 Å	250	30	00G-4055-U0-AX	
C4 300 Å	250	21.2	00G-4168-P0-AX	

For additional sizes not displayed, please contact your Phenomenex technical consultant or local distributor.

guarantee

If Axia™ packed columns do not provide at least an equivalent separation as compared to a competing preparative column of the same particle size, same phase, and dimensions, return the product with comparative data within 45 days for a FULL REFUND. Only applies to 21.2 mm ID columns.

Luna®

Phase	Length	ID	Part No.	Price
5 µm				
C18(2)	50	21.2	00B-4252-P0-AX	
	50	30	00B-4252-U0-AX	
	75	21.2	00C-4252-P0-AX	
	75	30	00C-4252-U0-AX	
	100	21.2	00D-4252-P0-AX	
	100	30	00D-4252-U0-AX	
	150	21.2	00F-4252-P0-AX	
	150	30	00F-4252-U0-AX	
	250	21.2	00G-4252-P0-AX	
	250	30	00G-4252-U0-AX	
C8(2)	75	30	00C-4249-U0-AX	
	100	30	00D-4249-U0-AX	
	150	21.2	00F-4249-P0-AX	
	250	21.2	00G-4249-P0-AX	
CN	250	21.2	00G-4255-P0-AX	
Phenyl-Hexyl	150	21.2	00F-4257-P0-AX	
NH_2	150	21.2	00F-4378-P0-AX	
	250	21.2	00G-4378-P0-AX	
HILIC	100	21.2	00D-4450-P0-AX	
	150	21.2	00F-4450-P0-AX	
	250	21.2	00G-4450-P0-AX	
	250	30	00G-4450-U0-AX	
PFP(2)	100	21.2	00D-4448-P0-AX	
	100	30	00D-4448-U0-AX	
	150	21.2	00F-4448-P0-AX	
	250	21.2	00G-4448-P0-AX	
	250	30	00G-4448-U0-AX	
Silica (2)	100	21.2	00D-4274-P0-AX	
	150	21.2	00F-4274-P0-AX	
	250	21.2	00G-4274-P0-AX	
	250	30	00G-4274-U0-AX	
10 µm				
C18(2)	50	21.2	00B-4253-P0-AX	
	100	21.2	00D-4253-P0-AX	
	150	21.2	00F-4253-P0-AX	
	150	30	00F-4253-U0-AX	
	250	21.2	00G-4253-P0-AX	
	250	30	00G-4253-U0-AX	
	250	50	00G-4253-V0-AX	
C8(2)	250	21.2	00G-4250-P0-AX	
	250	50	00G-4250-V0-AX	
Silica (2)	250	21.2	00G-4091-P0-AX	
15 µm				
C18(2)	250	50	00G-4273-V0-AX	
C8(2)	250	50	00G-4272-V0-AX	

Luna Omega

Phase	Length	ID	Part No.	Price
5 µm				
Polar C18	100	21.2	00D-4754-P0-AX	
	100	30	00D-4754-U0-AX	
	150	21.2	00F-4754-P0-AX	
NEW	150	30	00F-4754-U0-AX	
	250	21.2	00G-4754-P0-AX	
	250	30	00G-4754-U0-AX	
	250	50	00G-4754-V0-AX	
PS C18	50	21.2	00B-4753-P0-AX	
	50	30	00B-4753-U0-AX	
	100	21.2	00D-4753-P0-AX	
	100	30	00D-4753-U0-AX	
NEW	150	21.2	00F-4753-P0-AX	
	150	30	00F-4753-U0-AX	
	250	21.2	00G-4753-P0-AX	
	250	30	00G-4753-U0-AX	
	250	50	00G-4753-V0-AX	

Tip:

Protect your Axia™ Prep Columns with SecurityGuard™.

See page 33 for ordering information

Synergi™

Phase	Length	ID	Part No.	Price
4 µm				
Fusion-RP	100	21.2	00D-4424-P0-AX	
	150	21.2	00F-4424-P0-AX	
	250	21.2	00G-4424-P0-AX	
Hydro-RP	50	21.2	00B-4375-P0-AX	
	150	21.2	00F-4375-P0-AX	
	250	21.2	00G-4375-P0-AX	
Max-RP	150	21.2	00F-4337-P0-AX	
	250	21.2	00G-4337-P0-AX	
Polar-RP	50	21.2	00B-4336-P0-AX	
	100	21.2	00D-4336-P0-AX	
	100	30	00D-4336-U0-AX	
	150	21.2	00F-4336-P0-AX	
	150	30	00F-4336-U0-AX	
	250	21.2	00G-4336-P0-AX	
10 µm				
Fusion-RP	150	21.2	00F-4425-P0-AX	
	250	21.2	00G-4425-P0-AX	
Hydro-RP	150	21.2	00F-4376-P0-AX	
	250	21.2	00G-4376-P0-AX	
Polar-RP	250	21.2	00G-4351-P0-AX	

Clarity®

Phase	Length	ID	Part No.	Price
5 µm				
Oligo-RP™	100	21.2	00D-4442-P0-AX	
	100	30	00D-4442-U0-AX	
	250	21.2	00G-4442-P0-AX	
Oligo-XT	100	21.2	00D-4745-P0-AX	
	150	21.2	00F-4745-P0-AX	
NEW	150	30	00F-4745-U0-AX	
	250	21.2	00G-4745-P0-AX	
10 µm				
Oligo-RP	150	21.2	00F-4445-P0-AX	
	150	30	00F-4445-U0-AX	
	250	21.2	00G-4445-P0-AX	
Oligo-WAX™	250	21.2	00G-4451-P0-AX	

Chiral Phases

Lux®

Phase	Length	ID	Part No.	Price
5 µm				
Amylose-1	150	21.2	00F-4732-P0-AX	
	250	21.2	00G-4732-P0-AX	
	250	30	00G-4732-U0-AX	
	250	50	00G-4732-V0-AX	
Amylose-2	150	21.2	00F-4472-P0-AX	
	250	21.2	00G-4472-P0-AX	
	250	30	00G-4472-U0-AX	
Cellulose-1	150	21.2	00F-4459-P0-AX	
	250	21.2	00G-4459-P0-AX	
	250	30	00G-4459-U0-AX	
	250	50	00G-4459-V0-AX	
Cellulose-2	150	21.2	00F-4457-P0-AX	
	250	21.2	00G-4457-P0-AX	
	250	30	00G-4457-U0-AX	
	250	50	00G-4457-V0-AX	
Cellulose-3	150	21.2	00F-4493-P0-AX	
	250	21.2	00G-4493-P0-AX	
	250	30	00G-4493-U0-AX	
	250	50	00G-4493-V0-AX	
Cellulose-4	150	21.2	00F-4491-P0-AX	
	250	21.2	00G-4491-P0-AX	
	250	30	00G-4491-U0-AX	
	250	50	00G-4491-V0-AX	
i-Cellulose-5	150	21.2	00F-4756-P0-AX	
	250	21.2	00G-4756-P0-AX	
NEW	250	30	00G-4756-U0-AX	
	250	50	00G-4756-V0-AX	

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