Prep Columns
and Bulk Media

"We routinely use Axia packed columns from Phenomenex for peptide purifications. Among various preparative HPLC columns we have used, the Axia packed Luna columns (5µm) stand out. We have been very satisfied with the increased loading capacity and excellent performance."

Guangcheng Jiang
Ferring Research Institute, Inc., USA

The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

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

Axia

Preparative Chromatography Redefined

Axia patented technology is an advanced column packing and hardware design that eliminates media bed collapse as a source of premature failure in chiral and achiral preparative columns.

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.

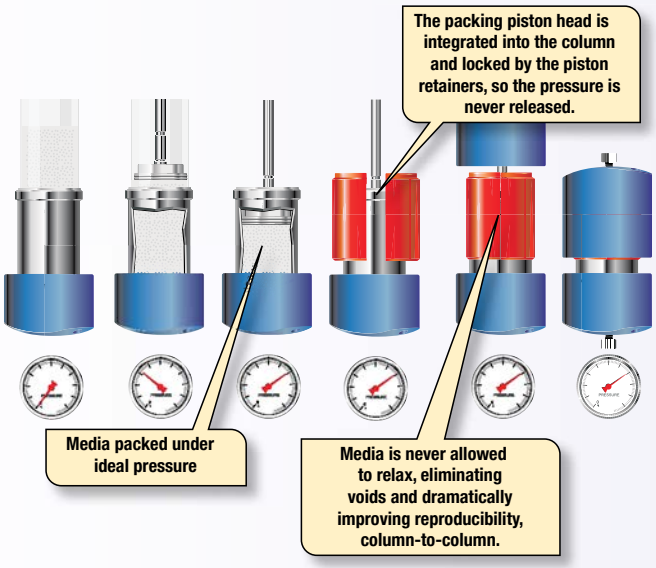
During the Axia packing process, the packing piston is locked in place, eliminating any decompression and then recompression of the media sorbent, thus maintaining media and column bed integrity. This solves common lifetime and performance problems associated with conventional packing processes for preparative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

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 column with comparative data within 45 days for a FULL REFUND. Only applies to 21.2 mm ID columns.

Axia Packing Process Involves:

Compression → Final Column



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**

View loading comparison, see p. 379

Conventional Packing Process Involves:

Compression → Decompression → Recompression → Final Column

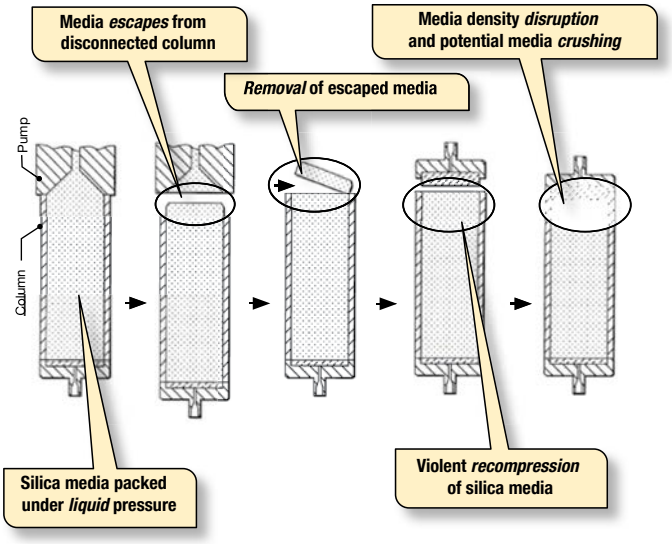


Diagram from Waters Corporation U.S. Patent No. 7,399,410

Axia™ Packed Preparative Columns

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

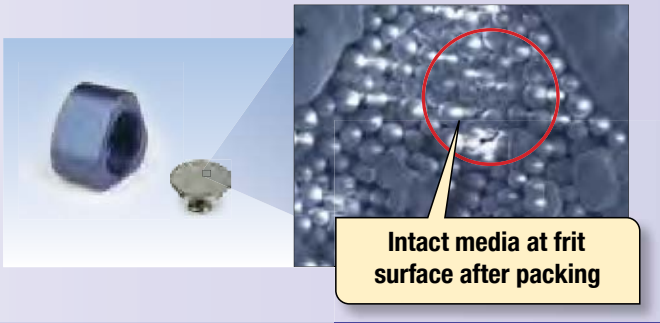
2006 R&D 100 Award Recipient

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.

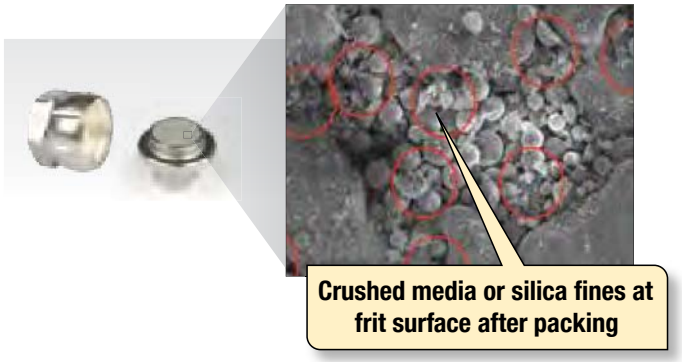
*SEM of Axia inlet frit



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™



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

"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 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

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

The opinions stated herein are solely those of the speaker and not necessarily those of any company or organization.

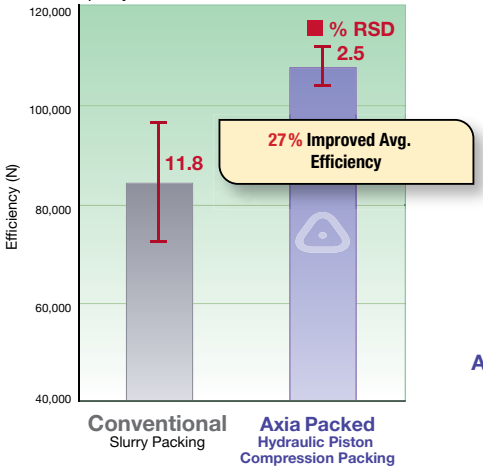
U.S. Patent No. 7, 674, 383

Expect Better Performance. Expect an Excellent Axia Column. Every Time.

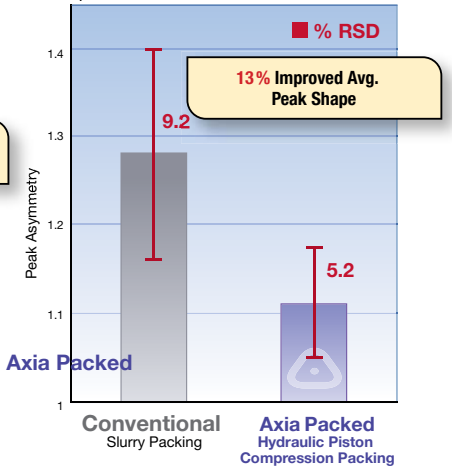
The completely automated packing system offers feedback control and infinite tuning of packing density to specific media characteristics such as mechanical strength and porosity. An optimum higher bed density can be consistently reproduced column-to-column. This directly translates into consistent efficiency and peak asymmetry measurements and decreases the column variability seen in traditionally packed preparative columns.

Consistent Quality. Column-to-Column. Batch-to-Batch

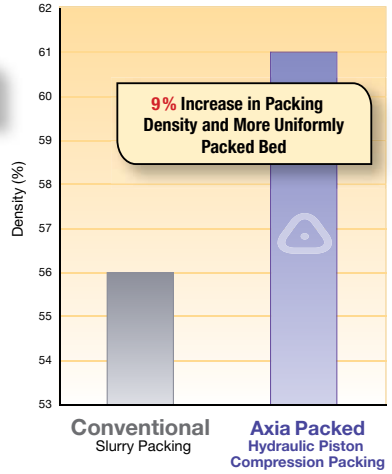
Reproducible Column-to-Column Efficiency
Average Efficiency (N) with Synergi 4 µm Hydro-RP 100 x 21.2 mm



Reproducible Column-to-Column Peak Asymmetry
Average Peak Asymmetry with Gemini 5 µm C18 50 x 21.2 mm

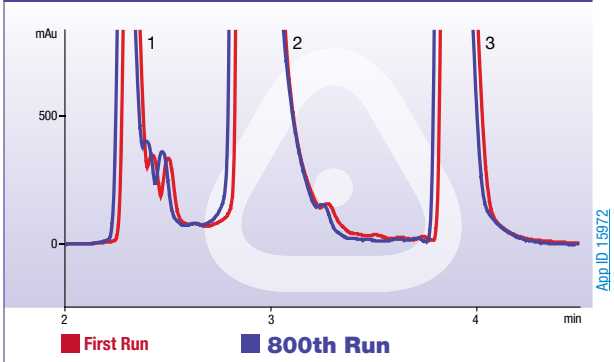


Density Comparison of Packed Beds



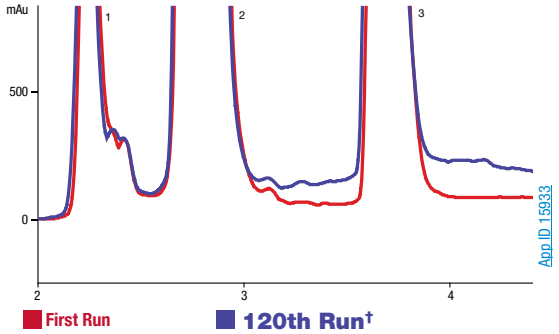
Compare Lifetime

Axia Packed
Luna 5 µm C18(2) Axia Packed



VS.

Competitive Preparative Column
Waters® XTerra® 5 µm Prep MS C18 OBD™



† Six columns tested. Best lifetime chosen for comparison.

Conditions for all except where noted:

Columns: Luna 5 µm C18(2) Axia Packed
Waters® XTerra® 5 µm Prep MS C18 OBD™
Dimension: 50 x 21.2 mm (Luna)
50 x 19 mm (XTerra®)
Mobile Phase: A: 0.5 % TFA in Water B: 0.5 % TFA in Acetonitrile
Gradient: Linear 95:5 (A/B) to 5:95 (A/B) over 7 min, hold 3 min
Injection Volume: 500 µL
Flow Rate: 30 mL/min (Luna)
24 mL/min (XTerra®)‡
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Triprolidine 1.6 mg
2. Methacycline 16 mg
3. Amitriptyline 5.25 mg

‡Same linear velocity

Comparative separations may not be representative of all applications.

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

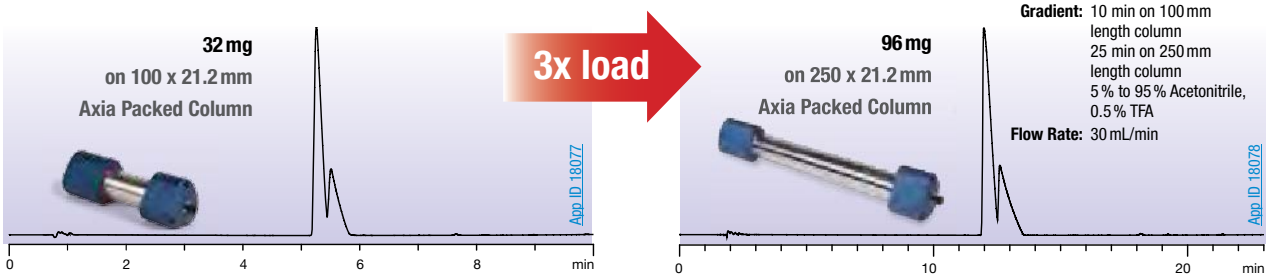
Seamless Scalability: 2 Options to Increase Sample Load

Option 1: Increase Column Length

Increase sample load without increasing your flow rate by using a longer column. With Axia technology, each preparative column is optimized for:

- **Analytical-like efficiency**
- **Long column lifetime**
- **High sample load with high-surface area media such as Kinetex, Aeris, Gemini, Luna, Luna Omega, or Synergi**

As a result, load generally increases as a direct proportion to column length. In this example the sample load tripled by increasing column length.



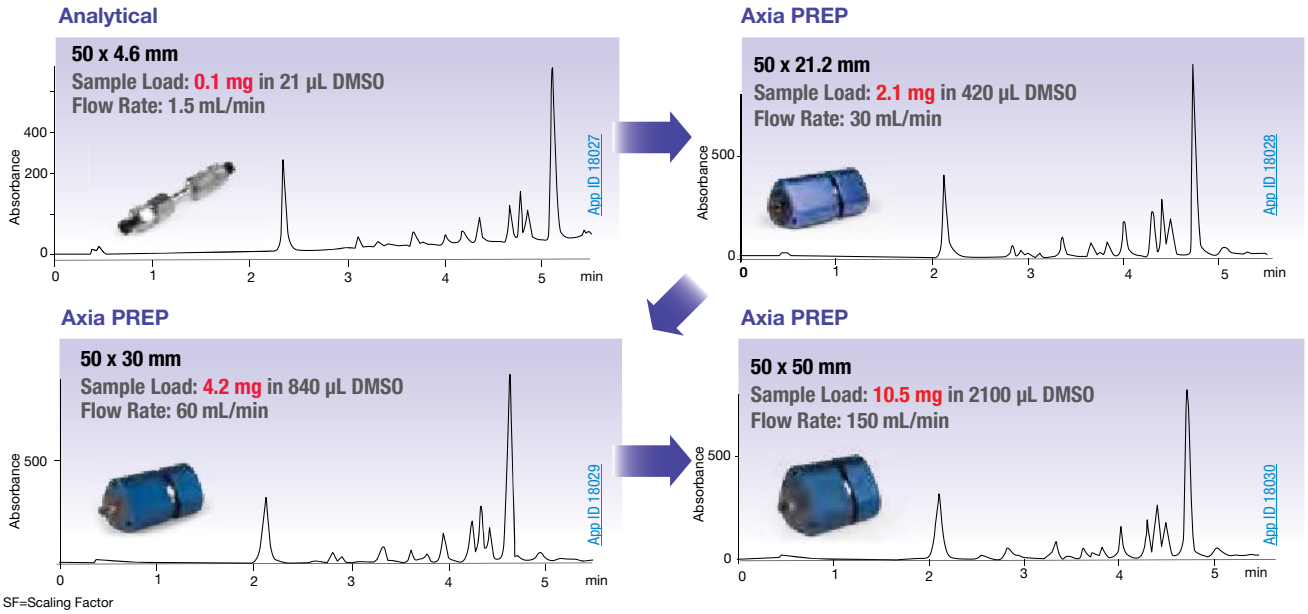
Option 2: Increase Column ID

For maximizing load without increasing the run time, consider scaling up to a larger column ID. Axia packed columns provide the three important benefits you need.

- **Reproducible performance across all column diameters**
- **Increased throughput without sacrificing purity**
- **High efficiency from analytical to preparative**

Conditions for all except where noted:

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
Temperature: Ambient
Injection: As Noted
Detection: UV @ 254 nm
Sample: Suzuki reaction mixture



SF=Scaling Factor

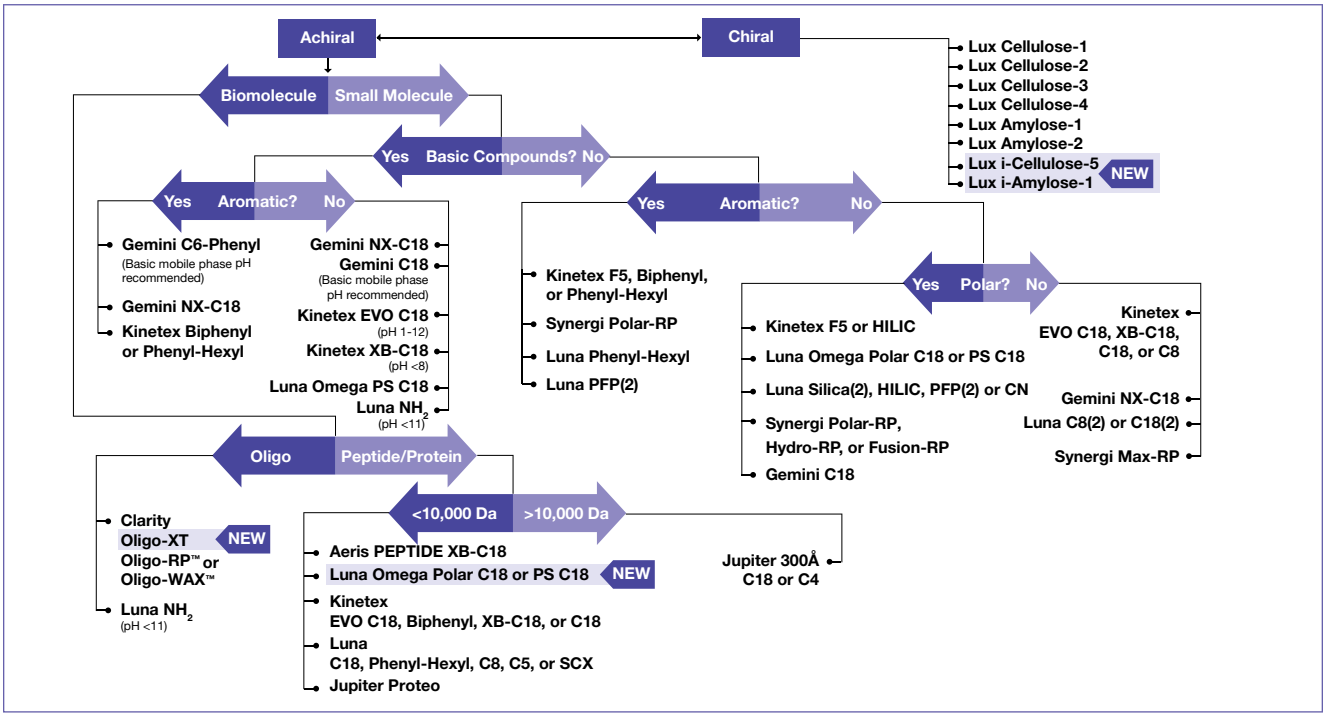
U.S. Patent No. 7, 674, 383

Selectivity Options

Stationary Phase Selectivity

With high surface areas, Phenomenex media—Gemini NX-C18 and Gemini (375 m²/g), Luna (400 m²/g) and Synergi (475 m²/g)—maximize loading capabilities. Use the selection tree below to select the best media for your targeted purification.

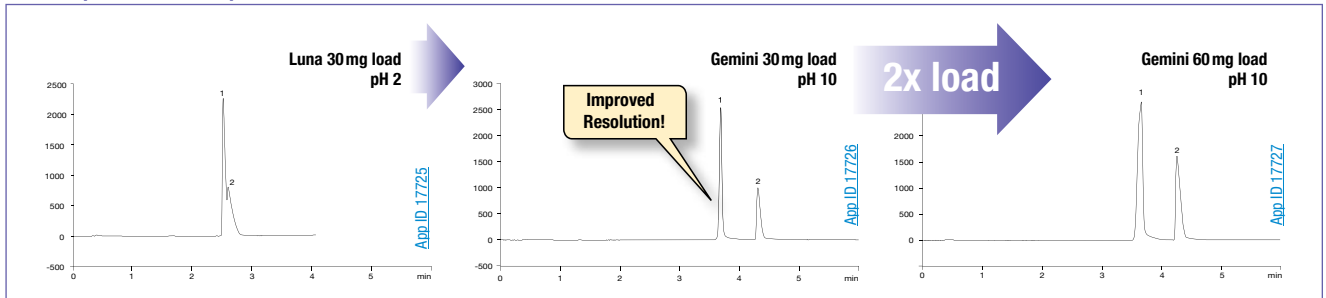
Column Selection Tree



pH Selectivity

In reversed phase chromatography, compounds retain better when neutral. With the advent of pH stable (1-12) media such as Gemini NX-C18, C18, and C6-Phenyl, and Kinetex EVO C18 improving retention and resolution of basic compounds at high pH is now possible without compromising column lifetime. Under these conditions you can easily double or triple the loading compared to your current low pH purifications.

Increase pH for Basic Compounds



Low pH

Column: Luna 5 µm C18(2) Axia Packed
Dimensions: 50 x 21.2 mm
Part No.: 00B-4252-P0-AX
Mobile Phase: A: 0.5% TFA in Water, pH 2.0
B: Acetonitrile
Gradient: 95:5 to 5:95 (A/B) over 4 minutes
Flow Rate: 30 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Propranolol
2. Diphenhydramine

High pH

Column: Gemini 5 µm C18 Axia Packed
Dimensions: 50 x 21.2 mm
Part No.: 00B-4435-P0-AX
Mobile Phase: A: 50 mM Ammonium Bicarbonate, pH 10.0
B: Acetonitrile
Gradient: 95:5 to 5:95 (A/B) over 5 minutes
Flow Rate: 30 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Propranolol
2. Diphenhydramine

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

Chiral Media Packed in Axia Technology

Resolve 92% of Your Enantiomers with Lux Chiral Preparative Columns*

Resolve Your Enantiomers with Seven Distinct Phases:

Lux i-Cellulose-5: **Dichlorinated Cellulose Carbamate Phase** Cellulose tris (3, 5-dichlorophenylcarbamate)

Lux i-Amylose-1: **Immobilized Dimethyl Amylose Chiral Selector** Amylose tris (3, 5-dimethylphenylcarbamate)

Lux Cellulose-1: **Dimethyl Cellulose Chiral Selector** Cellulose tris (3, 5-dimethylphenylcarbamate)

Lux Cellulose-2: **Chlorinated Cellulose Carbamate Phase** Cellulose tris (3-chloro-4-methylphenylcarbamate)

Lux Cellulose-3: **Cellulose Ester Chiral Selector** Cellulose tris (4-methylbenzoate)

Lux Cellulose-4: **Chlorinated Cellulose Carbamate Phase** Cellulose tris (4-chloro-3-methylphenylcarbamate)

Lux Amylose-1: **Dimethyl Amylose Chiral Selector** Amylose tris (3, 5-dimethylphenylcarbamate)

* based on screening 233 compounds on five Lux phases

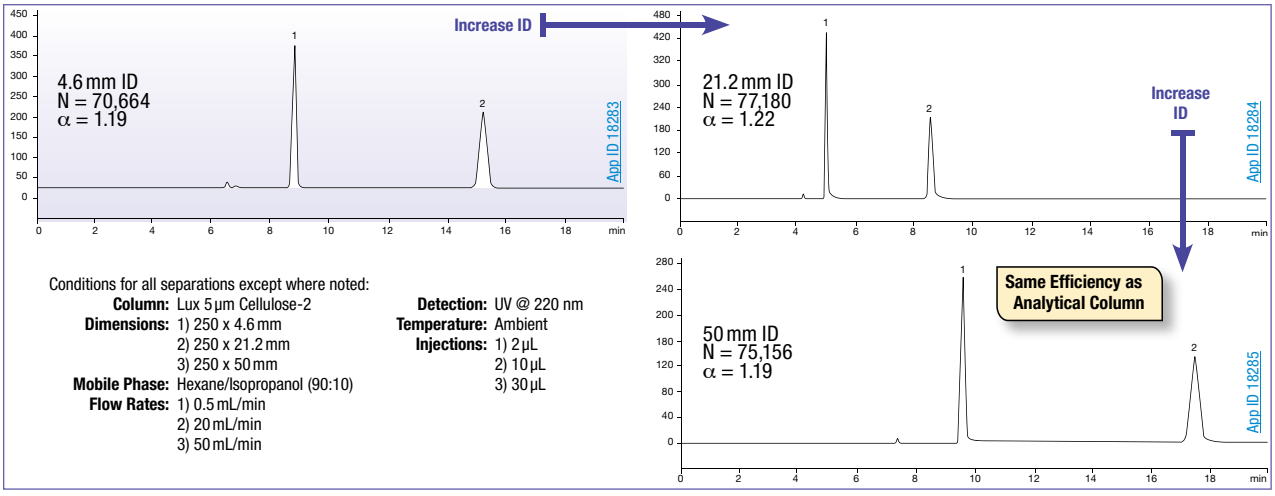
Availability in 3 µm and 5 µm packed columns as well as 20 µm bulk media for process scale purification
All Lux columns are pressure stable up to 300 bar and pH stable 2-9

For more chiral column information, see p.293

Higher Purity Preparative Separations

With award-winning Axia technology, analytical-like efficiency is achieved in a preparative column format.

High Efficiency trans-Stilbene Oxide from Analytical to Preparative

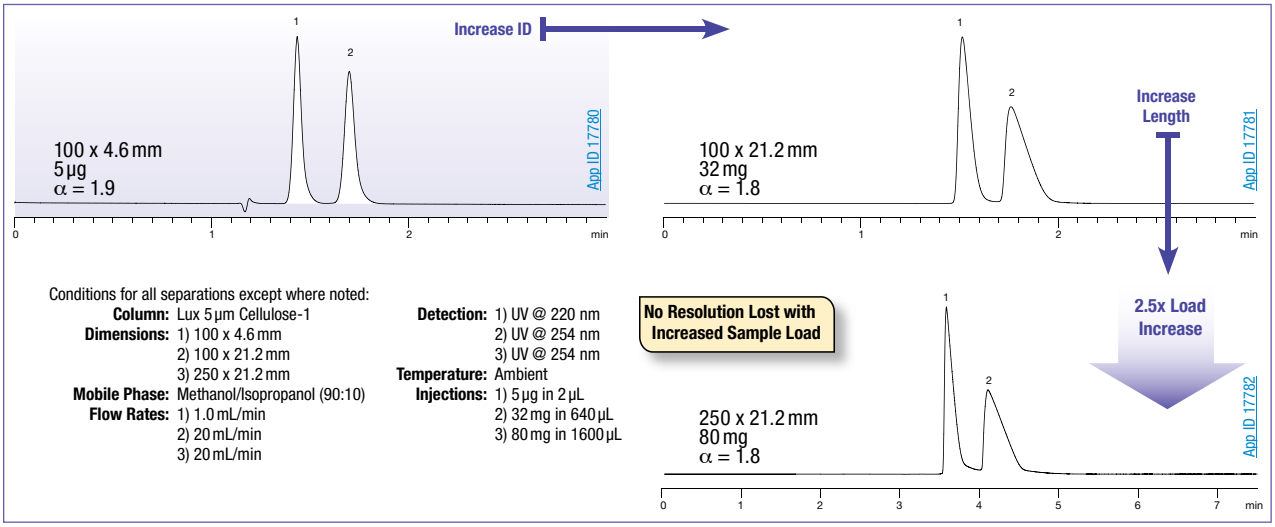


Conditions for all separations except where noted:

Column: Lux 5 µm Cellulose-2
Dimensions: 1) 250 x 4.6 mm
2) 250 x 21.2 mm
3) 250 x 50 mm
Mobile Phase: Hexane/Isopropanol (90:10)
Flow Rates: 1) 0.5 mL/min
2) 20 mL/min
3) 50 mL/min

Detection: UV @ 220 nm
Temperature: Ambient
Injections: 1) 2 µL
2) 10 µL
3) 30 µL

Direct Scale Up of Methocarbamol on Lux Cellulose-1



Conditions for all separations except where noted:

Column: Lux 5 µm Cellulose-1
Dimensions: 1) 100 x 4.6 mm
2) 100 x 21.2 mm
3) 250 x 21.2 mm
Mobile Phase: Methanol/Isopropanol (90:10)
Flow Rates: 1) 1.0 mL/min
2) 20 mL/min
3) 20 mL/min

Detection: 1) UV @ 220 nm
2) UV @ 254 nm
3) UV @ 254 nm
Temperature: Ambient
Injections: 1) 5 µg in 2 µL
2) 32 mg in 640 µL
3) 80 mg in 1600 µL

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

Axia: SFC Approved

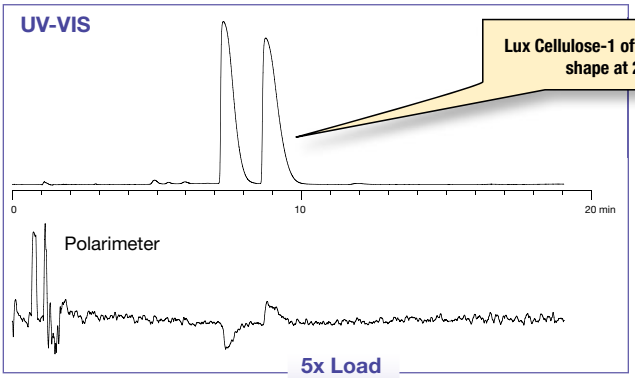
Complete SFC Screening

From analytical to Axia packed preparative achiral columns, Luna, Gemini, Synergi, Kinetex, and Lux chiral columns offer complementary selectivities, high efficiency, and pressure stability up to 300 bar (4300 psi) for SFC separations.

Seamless Scale Up from Laboratory, to Pilot Plant and Production.

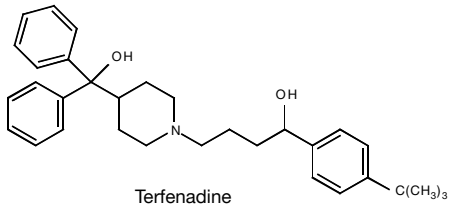
Increase column ID for higher loading and greater purification. Axia packed 21.2 and 30 mm diameter columns provide same purification capability and performance as the 4.6 mm analytical screening columns.

Baseline Separation of Enantiomers



App ID 18865

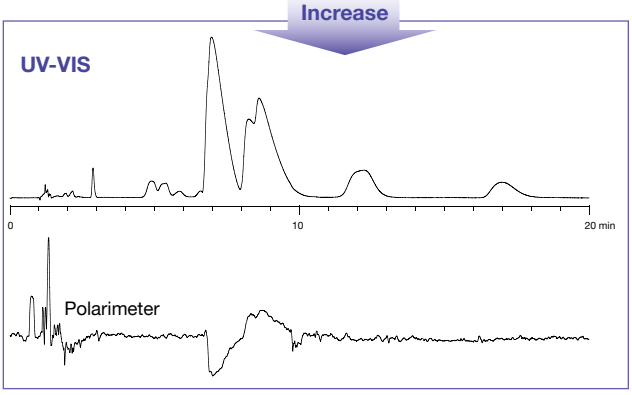
Dimensions: 250 x 4.6 mm
Flow Rate: 2.5 mL/min
Detection: UV @ 220 nm
Load: 300 µg in 10 µL



Terfenadine

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

5x Load Increase

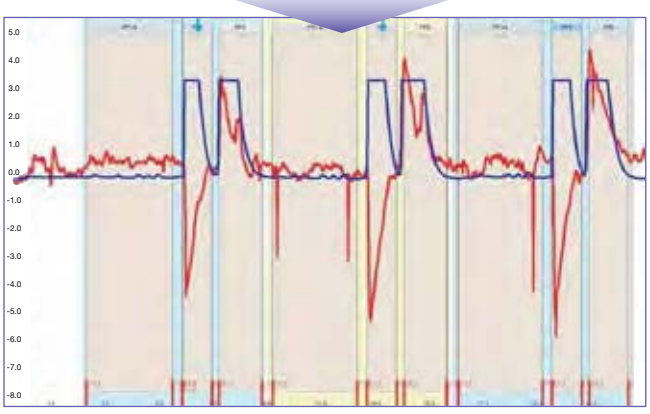


App ID 18866

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

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

70x Load Increase



App ID 18867

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

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

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

7.5 cycles per hr/ 787 mg per hr

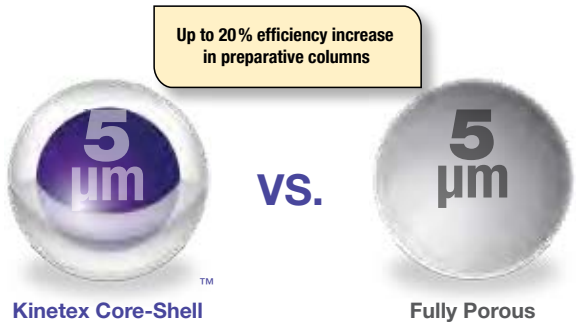
For additional SFC information and applications, see p.362

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

First and Only Core-Shell Material for Preparative Purifications

Kinetex Axia Packed Preparative HPLC Columns

- **Core-shell performance in a preparative format**
- **Easy method scale-up from Kinetex analytical HPLC and UHPLC columns**
- **Reduce solvent consumption with faster purifications**

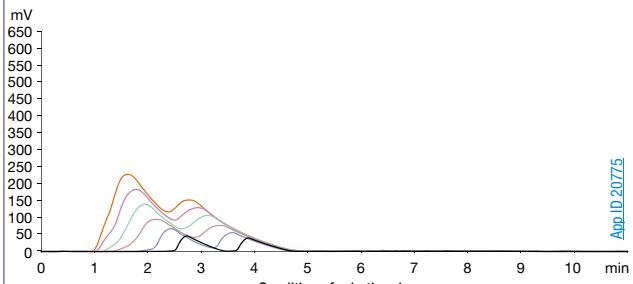


Axia columns packed with Kinetex 5 µm core-shell media provide higher efficiencies and loadability that is as good or better than columns packed with fully porous 5 µm media. Even under very challenging conditions, such as the purification of strong bases using a mobile phase containing formic acid (0.1 %) as the modifier, the Axia packed Kinetex 5 µm media outperforms a fully porous Waters XBridge Prep column.

Combine this with the added flexibility that the entire Kinetex core-shell line (1.3 µm, 1.7 µm, 2.6 µm and 5 µm) is fully scalable in retention and selectivity, makes transferring high performance HPLC/UHPLC methods to preparative and SFC applications, simple.

Compare Loadability

Waters® XBridge® 5 µm C18 Prep OBD™

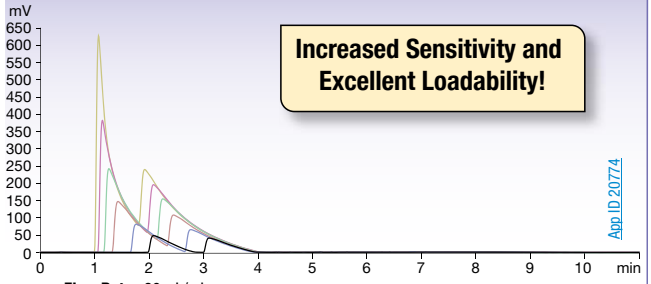


Conditions for both columns:

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

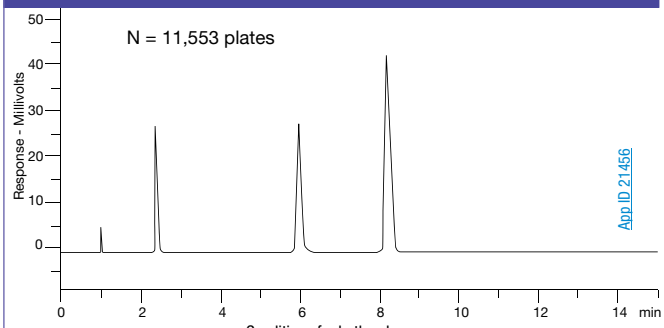
Kinetex® 5 µm C18 Axia Packed



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

Compare Efficiencies

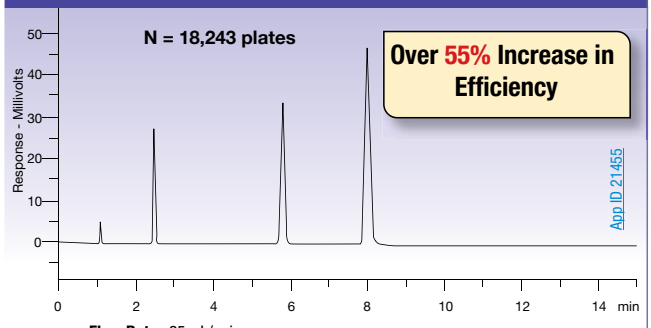
Waters® XBridge® 5 µm C18 Prep OBD™



Conditions for both columns:

Columns: Kinetex 5 µm XB-C18 Axia Packed
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

Kinetex 5 µm XB-C18 Axia Packed



Flow Rate: 25 mL/ min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene

Comparative separations may not be representative of all applications.

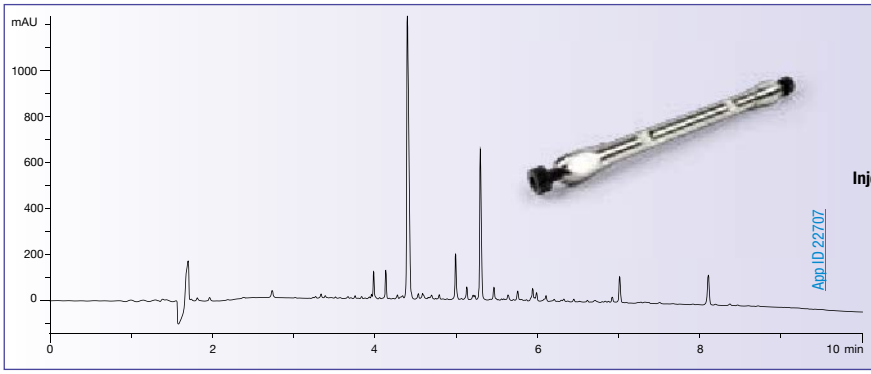
U.S. Patent No. 7, 674, 383

Develop, Purify, and Analyze Peptide Fractions with One Media

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.

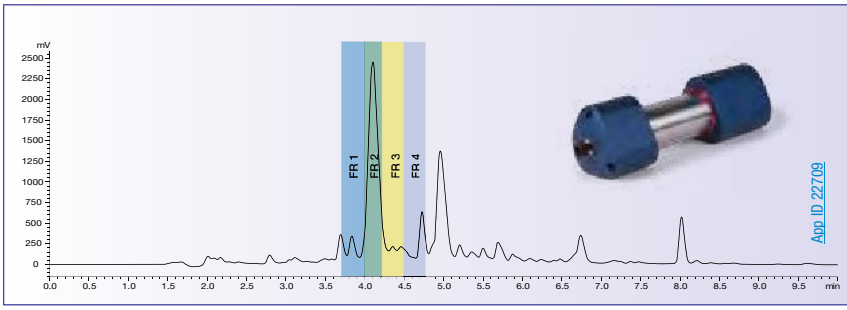
Seamless Scalability from HPLC/UHPLC to PREP

Analytical method — Aeris PEPTIDE 2.6 µm XB-C18



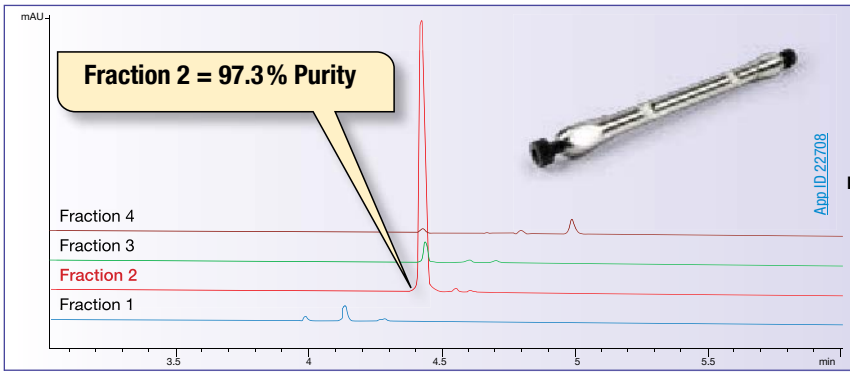
Column: Aeris PEPTIDE 2.6 µm XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4505-E0
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile
Gradient: Linear 85:15 (A/B) to 5:95 (A/B) over 10 minutes
Injection Volume: 10 µL
Flow Rate: 1 mL/ min
Temperature: Ambient
Detection: UV @ 210 nm
Sample: Crude peptide mix

Preparative scale-up and fraction collection — Aeris PEPTIDE 5 µm XB-C18



Column: Aeris PEPTIDE 5 µm XB-C18 Axia Packed
Dimensions: 150 x 21.2 mm
Part No.: 00F-4632-P0-AX
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
Injection Volume: 1 mL
Flow Rate: 20 mL/ min
Temperature: Ambient
Detection: UV @ 210 nm
Sample: Crude peptide mix

Analytical fraction analysis — Aeris PEPTIDE 2.6 µm XB-C18



Column: Aeris PEPTIDE 2.6 µm XB-C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4505-E0
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
Injection Volume: 10 µL
Flow Rate: 1 mL/ min
Temperature: Ambient
Detection: UV @ 210 nm
Sample: Purified fractions

SecurityGuard™ PREP System

(Highly recommended for extending column lifetime)
Protect your Axia Packed column and prolong its lifetime with SecurityGuard, the advanced HPLC guard cartridge system.

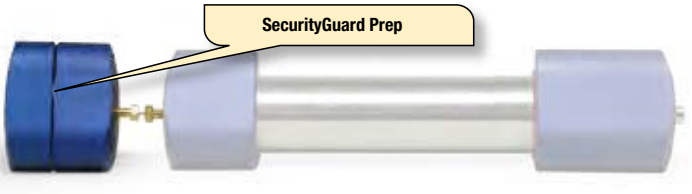
- Get full protection with minimal impact on your chromatographic results.
- Contaminants are retained by an inexpensive, 15 x 21.2 or 15 x 30 mm ID disposable cartridge. See pp. 329-330. For Aeris and Kinetex Core-Shell SecurityGuard PREP cartridges, see p. 330.

For Aeris PEPTIDE 5 µm PREP, see p. 217

Ordering Information

SecurityGuard PREP System

Part No.	Description	Unit
AJ0-8223	SecurityGuard PREP HPLC Guard Cartridge Holder Kit, 21.2 mm ID, includes column coupler	ea
AJ0-8277	SecurityGuard PREP HPLC Guard Cartridge Holder Kit, 30.0 mm ID, includes column coupler	ea



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 column with comparative data within 45 days for a FULL REFUND. Only applies to 21.2 mm ID columns.

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

Axia Packed Columns

Achiral Phases

Ordering Information

Aeris™

Phase	Length	ID	Part No.
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.
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
	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

continued

Gemini®

Phase	Length	ID	Part No.
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.
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

continued

Make your Axia columns last longer with SecurityGuard PREP Holders and Cartridges. See pp.328-330

For additional phases and sizes not displayed, please visit the Phenomenex.com website's individual product pages or contact your Phenomenex technical consultant or local distributor.

For Axia Reducing Adapter, see p. 409
For PREP Column In-Line Filter, see p.18
For SFC Information, see p.362

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 column with comparative data within 45 days for a FULL REFUND. Only applies to 21.2 mm ID columns.

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

Axia Packed Columns *(cont'd)*

Achiral Phases *(cont'd)*

Ordering Information *(cont'd)*

Luna®

Phase	Length	ID	Part No.
5 µm			
C18(2)	50	21.2	00B-4252-P0-AX
	50	30	00B-4252-U0-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
5 µm			
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.
5 µm			
Polar C18	100	21.2	00D-4754-P0-AX
	100	30	00D-4754-U0-AX
	150	21.2	00F-4754-P0-AX
	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
	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

Synergi™

Phase	Length	ID	Part No.
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.
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
	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.
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
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
	250	30	00G-4756-U0-AX
	250	50	00G-4756-V0-AX

continued

Bulk HPLC Media

- **Grams to Multi-Kilogram, Phenomenex can deliver**
- **Over 20 different media available**
- **Long lifetime and excellent reproducibility**

Quick, Direct Scale-up from Analytical Methods

Scaling up is easier when using an HPLC media that provides near identical performance across all particle sizes and with increases in column diameter. Any mobile phase conditions developed on a Luna or Jupiter analytical column can be easily transferred to a 10 µm or 15 µm preparative column with equivalent resolution, selectivity, and proportional mass loading. Lux analytical columns also easily scale to 20 µm preparative columns.

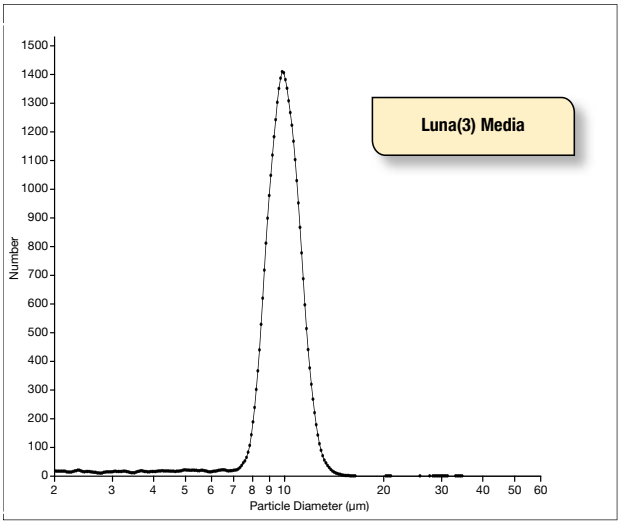
Mechanically Strong Media

- Media free of crushed or cracked silica and silica fines
- Backpressures that remain stable
- Consistent particle size distribution so performance is maintained
- Longer column lifetimes (frits stay unclogged)

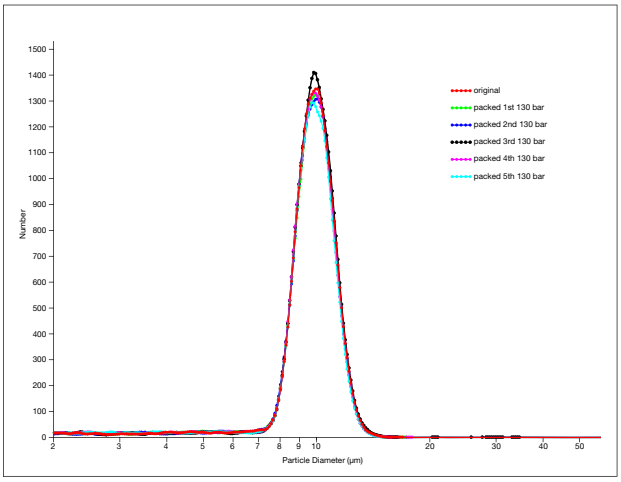
Withstand Multiple Repacking in Dynamic Axial Compression (DAC) Systems

Dynamic Axial Compression (DAC) systems apply high mechanical stress on the packing media. This, along with high flow rates and backpressures can crack or sheer low mechanical strength silica particles, creating silica fines, which will rapidly degrade column efficiency and clog frits. Luna, Jupiter, and Lux media provide exceptional strength over multiple DAC packings without sacrificing performance as well as easily withstanding high mechanical stress.

Lower Backpressure with Narrower Particle Size Distribution



Mechanical Stability Demonstrated by Repeated Packing



Overlay of particle size distributions of Luna C18(3) repeatedly packed at 130 bars in a 5 cm ID DAC system

SFC APPROVED

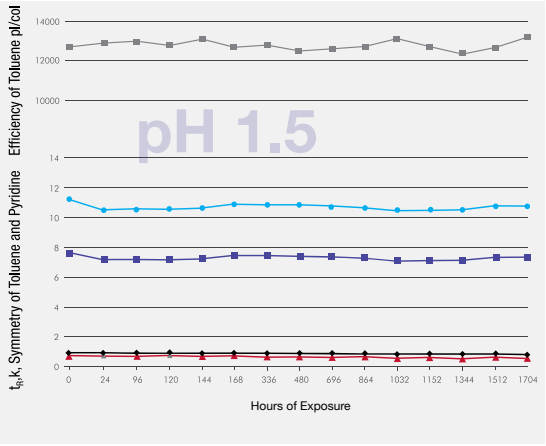
Chemically Stable Media

Chemical stability at pH levels outside the normal constraints of 2-7 is a critical factor in today's process environments for several reasons:

- **Allows greater loading capacity**
- **Allows optimization of sample solubility**
- **pH adjustment to optimize recovery of API**
- **Clean-in-Place (CIP) processes by means of a caustic wash**

Excellent Performance at Low pH

Luna 5µm C18(2) 100 Å, pH Stable (1.5-10)

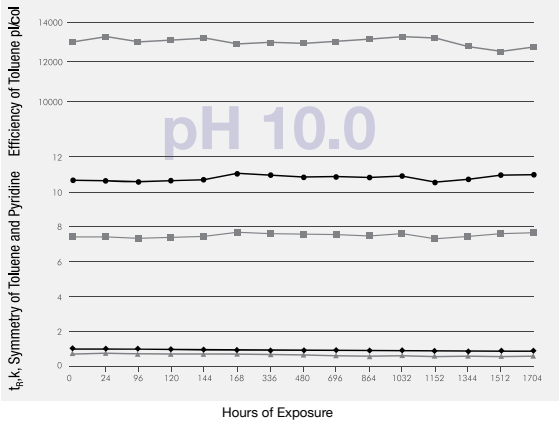


Test Conditions: Column stability tested under highly acidic conditions.
Continuous flush in 0.1 % TFA (pH 1.5) in Water/Acetonitrile, 50:50.

KEY:
Efficiency, Plates for Toluene — t_R of Toluene (min) — k of Toluene
Symmetry of Toluene — Symmetry of Pyridine

Extended Media Lifetime even Under Caustic Washes

Luna 5µm C18(2) 100 Å, pH Stable (1.5-10)



Test Conditions: Column stability tested under highly basic conditions
Continuous flush in 20 mM Na_2HPO_4 (pH 10.0) in Water/Acetonitrile, 50:50.

KEY:
Efficiency, Plates for Toluene — t_R of Toluene (min) — k of Toluene
Symmetry of Toluene — Symmetry of Pyridine

Controlled Manufacturing Process

We engineer and manufacture all of our media with your needs as a guideline. Our state-of-the-art facility gives us the capability to provide some of the most consistent media available on the market. With very high loadability, excellent mechanical strength, extended chemical stability, and batch-to-batch reproducibility, it is no wonder why more and more people turn to Phenomenex media every day.

Certificates

The development, production, and marketing of Phenomenex Bulk Media follow ISO 9001 guidelines.

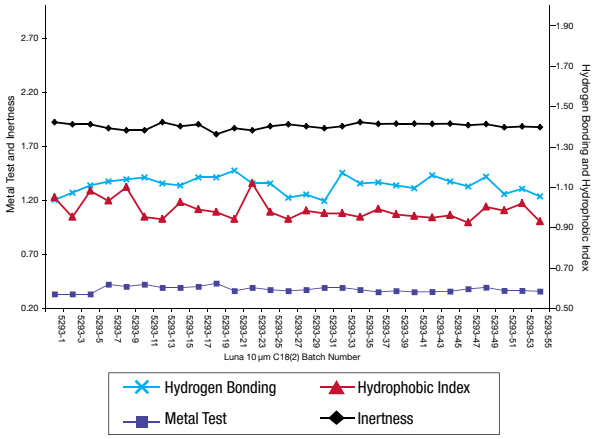
Product Quality

ISO 9001

BSE/TSE Certificate

Batch-to-Batch Reproducibility

With over 20 years of proven reproducibility, you can be confident in your choice to develop methods on Luna. The following graph shows consistency in both inertness and hydrophobicity across 40 batches of Luna 10 µm C18(2).



Exceptional Chemical Stability for Low Leachates

The dense bonded phase density of Luna and Synergi provide revolutionary pH 1.5–10 stability†, with Gemini offering an extended pH range of 1.0-12.0. The wide pH range of these media provides flexibility in method development allowing for improvements in resolution and greater mass loading of basic compounds (pK_a > 9) at high pH.

†Please see Sorbent Characteristics chart pp. 433-434 for exact pH limits of each phase.

PREP LC Columns and Bulk HPLC Media

- **Maintain or increase yield with less media**
- **Dramatically reduce cost of PREP/Process-LC purifications**
- **Withstand multiple axial compression packings with high mechanical strength media**

Maintain or Increase Yield with Less Media

Higher silica surface area equals greater mass loading. With 400 m^2/g surface area, Luna has one of the highest surface areas among popular PREP LC media. Even greater mass loading is possible with the 475 m^2/g surface area of Synergi 80 Å media. Both Synergi and Luna are unique in that they offer high mass loading with low-density, rugged silica; requiring less media to pack a given volume. Thus while less media is needed to pack a given dimension compared to other common prep sorbents, mass loading remains high with peak resolution and purity maintained. Especially for early eluting target compounds, Luna has been shown to provide greater mass loading compared to some common prep media. This allows for increased loading on less media, and more yield per run.

Choose the Correct Media for your Application

Bonded Phase	Sorbent	Pore Size (Å)	Surface Area (m^2/g)	pH Stability	Particle Size (µm) ("bulk" indicates bulk media available)	Density	Applications
Achiral Media							
Si (Silica)	Luna Silica(3)	100	400	2.0 – 7.5	*10-PREP* (bulk)	0.47	Small Organic Molecules, Steroids, Nutraceuticals, Fat Soluble Vitamins, Tocopherols
	Luna Silica(2)	100	400	2.0 – 7.5	10 µm (bulk) 10-*PREP* (bulk) 15 µm (bulk) 20 µm (bulk)	0.45	Small Organic Molecules, Steroids, Nutraceuticals, Fat Soluble Vitamins, Tocopherols
C18	Luna C18(3)	100	400	1.5 – 10	10-*PREP* (bulk)	0.60	Pharmaceuticals, Peptides, Nutraceuticals, Agrochemical, Vitamins, Basic Compounds, General Reversed Phase Applications
	Luna C18(2)	100	400	1.5 – 10	10 µm (bulk) 10-*PREP* (bulk) 15 µm (bulk)	0.58	Pharmaceuticals, Peptides, Nutraceuticals, Agrochemical, Vitamins, Basic Compounds, General Reversed Phase Applications
	Synergi Hydro-RP *C18 with Polar Endcapping*	80	475	1.5 – 7.5	10 µm (bulk)	0.55	Very Polar Compounds, Pharmaceuticals, Vitamins, Antibiotics
	Jupiter 300 C18	300	170	1.5 – 10	10 µm (bulk), 15 µm (bulk)	0.44	Hydrophilic Proteins, Oligonucleotides (>30 mer)
C12	Synergi Max-RP	80	475	1.5 – 10	10 µm (bulk)	0.55	Pharmaceuticals, Nutraceuticals, Agrochemical, Vitamins, Amino Acids, Basic Compounds, General Reversed Phase Applications
C8	Luna C8(3)	100	400	1.5 – 10	10-*PREP* (bulk)	0.60	Pharmaceuticals, Peptides, Estrogens, Basic Compounds, General Reversed Phase Applications
	Luna C8(2)	100	400	1.5 – 10	10 µm (bulk) 10-*PREP* (bulk) 15 µm (bulk)	0.56	Pharmaceuticals, Peptides, Estrogens, Basic Compounds, General Reversed Phase Applications
C4	Luna C4(2)	100	400	1.5 – 10	10-*PREP* (bulk)	0.54	Hydrophobic Compounds, Peptides, Small Proteins
	Jupiter 300 C4	300	170	1.5 – 10	10 µm (bulk), 15 µm (bulk)	0.38	Hydrophobic Proteins
Phenyl	Luna Phenyl-Hexyl	100	440	1.5 – 10	10 µm (bulk) 10-*PREP* (bulk) 15 µm (bulk)	0.58	Polar and Aromatic Compounds, Peptides, Antibiotics, Lipids, Phenols, Sweeteners
	Luna Polar-RP	100	400	1.5 – 7.0	10-*PREP* (bulk)	0.55	Polar and Aromatic Compounds, Hydrophilic Peptides, Antibiotics, Phenols, Sweeteners
	Synergi Polar-RP *(Ether-Linked Phenyl)*	80	475	1.5 – 7.0	10 µm (bulk)	0.55	Polar and Aromatic Compounds, Hydrophilic Peptides, Antibiotics, Phenols, Sweeteners
CN (Cyano)	Luna CN	100	400	1.5 – 7.0	10 µm (bulk)	0.55	Polar Compounds, Pharmaceuticals, Hydrophilic Peptides, Esters, Steroids, Phthalates, Compounds with COOH, CO, NH_2, NHR_2 or NR_2 groups
NH_2 (Amino)	Luna NH_2	100	400	1.5 – 11	10 µm (bulk)	0.57	Sugars, Sugar Alcohols, Anionic Compounds, Steroids, Vitamins, Nucleosides, Oligonucleotides
Chiral Media							
cellulose tris(3,5-dimethylphenyl carbamate)	Lux Cellulose-1	1000	—	2 – 9	10, 20 µm	0.62	Enhanced enantioselectivity for aromatic, conjugated and other chiral compounds
cellulose tris(3-chloro-4-methyl phenylcarbamate)	Lux Cellulose-2	1000	—	2 – 9	10, 20 µm	0.62	Enhanced enantioselectivity for aromatic, conjugated and other chiral compounds
cellulose tris(4-methyl-benzoate)	Lux Cellulose-3	1000	—	2 – 9	10, 20 µm	0.62	Enhanced enantioselectivity for aromatic, conjugated and other chiral compounds
cellulose tris(4-chloro-3-methyl phenylcarbamate)	Lux Cellulose-4	1000	—	2 – 9	10, 20 µm	0.62	Enhanced enantioselectivity for aromatic, conjugated and other chiral compounds

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Scout Columns

Achiral Columns

Ordering Information

Luna (100 Å)

Phases	250 x 4.6	250 x 10
10 µm-*PREP*		
C18(3)	00G-4616-E0	00G-4616-N0
C18(2)	00G-4324-E0	—
C8(3)	00G-4623-E0	00G-4623-N0
C8(2)	00G-4323-E0	00G-4323-N0
C4(2)	00G-4460-E0	00G-4460-N0
Phenyl-Hexyl	00G-4325-E0	00G-4325-N0
Polar-RP	00G-4757-E0	00G-4757-N0
Silica(3)	00G-4617-E0	00G-4617-N0
Silica(2)	00G-4322-E0	00G-4322-N0
10 µm		
CN	00G-4300-E0	—
NH_2	00G-4379-E0	00G-4379-N0
15 µm		—
C18(2)	00G-4273-E0	00G-4273-N0
C8(2)	00G-4272-E0	00G-4272-N0
Phenyl-Hexyl	00G-4286-E0	00G-4286-N0
Silica(2)	00G-4271-E0	—
20 µm		—
Silica(2)	00G-4437-E0	—

Jupiter (300 Å and 90 Å)

Phases	250 x 4.6	250 x 10
15 µm		
300 Å C18	00G-4057-E0	00G-4057-N0
300 Å C4	00G-4169-E0	00G-4169-N0

Synergi (80 Å)

Phases	250 x 4.6	250 x 10
10 µm		
Fusion-RP	00G-4425-E0	00G-4425-N0
Max-RP	00G-4350-E0	00G-4350-N0
Hydro-RP	00G-4376-E0	00G-4376-N0
Polar-RP	00G-4351-E0	00G-4351-N0

Chiral Columns

Ordering Information

Lux (1000 Å)

Phases	250 x 4.6	250 x 10
10 µm		
Cellulose-1	00G-4501-E0	00G-4501-N0
Cellulose-2	00G-4502-E0	00G-4502-N0
Cellulose-3	00G-4624-E0	—
Cellulose-4	00G-4625-E0	—
20 µm		
Cellulose-1	00G-4473-E0	00G-4473-N0
Cellulose-2	00G-4464-E0	00G-4464-N0
Cellulose-3	00G-4504-E0	00G-4504-N0
Cellulose-4	00G-4503-E0	00G-4503-N0

Additional scout columns available. Contact us for 3 µm, 4 µm, 5 µm, and 10 µm media scout columns.

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Bulk HPLC Media

Achiral Media

Ordering Information

Luna (100 Å)

Phases	100 g	1 kg	5 kg	10 kg
10 µm-*PREP*				
C18(3)	04G-4616	04K-4616	04L-4616	04M-4616
C18(2)	04G-4324	04K-4324	04L-4324	04M-4324
C8(3)	04G-4623	04K-4623	04L-4623	04M-4623
C8(2)	04G-4323	04K-4323	04L-4323	04M-4323
C4(2)	04G-4460	04K-4460	04L-4460	04M-4460
Phenyl-Hexyl	04G-4325	04K-4325	04L-4325	04M-4325
Polar-RP	04G-4757	04K-4757	04L-4757	04M-4757
Silica(3)	04G-4617	04K-4617	04L-4617	04M-4617
Silica(2)	04G-4322	04K-4322	04L-4322	04M-4322
10 µm				—
CN	04G-4300	04K-4300	04L-4300	—
NH_2	04G-4379	04K-4379	—	—
15 µm				
C18(2)	04G-4273	04K-4273	04L-4273	04M-4273
C8(2)	04G-4272	04K-4272	04L-4272	04M-4272
Phenyl-Hexyl	04G-4286	04K-4286	04L-4286	04M-4286
Silica(2)	04G-4271	04K-4271	04L-4271	04M-4271
20 µm				
Silica(2)	04G-4437	04K-4437	04L-4437	04M-4437

Jupiter (300 Å and 90 Å)

Phases	100 g	1 kg	5 kg	10 kg
15 µm				
300 Å C18	04G-4057	04K-4057	04L-4057	04M-4057
300 Å C4	04G-4169	04K-4169	04L-4169	04M-4169

Synergi (80 Å)

Phases	100 g	1 kg
10 µm		
Fusion-RP	04G-4425	04K-4425
Max-RP	04G-4350	04K-4350
Hydro-RP	04G-4376	04K-4376
Polar-RP	04G-4351	04K-4351

For Sepra bulk sorbents, see p.388

Chiral Media

Ordering Information

Lux (1000 Å)

Phases	10 g	100 g	1 kg	5 kg	10 kg
10 µm					
Cellulose-1	04D-4501	04G-4501	04K-4501	04L-4501	04M-4501
Cellulose-2	04D-4502	04G-4502	04K-4502	04L-4502	04M-4502
Cellulose-3	04D-4624	04G-4624	04K-4624	—	—
Cellulose-4	04D-4625	04G-4625	04K-4625	—	—
20 µm					
Cellulose-1	04D-4473	04G-4473	04K-4473	04L-4473	04M-4473
Cellulose-2	04D-4464	04G-4464	04K-4464	04L-4464	04M-4464
Cellulose-3	04D-4504	04G-4504	04K-4504	04L-4504	04M-4504
Cellulose-4	04D-4503	04G-4503	04K-4503	04L-4503	04M-4503

Contact your Phenomenex technical consultant or local distributor for additional bulk packings and quantities not listed.

guarantee

If Sepra Bulk products do not perform as well or better than your current SPE product of similar phase, mass and size, return the product with comparative data within 45 days for a FULL REFUND.

Sepra™ Bulk Sorbents

- **Provides reproducible recoveries from capture to purification**
- **Removes contaminants and eliminates matrix effects**
- **Offers controlled selectivity for target analytes**
- **Results in high-throughput sample purification**

Phenomenex offers a wide mix of bulk media including an array of large particle media for today's chemists who need effective capture and concentrating resins.

Sepra media offers purification of proteins, peptides, nucleic acids, antibodies, tryptic digests, nucleotides, viruses, and small molecular weight pharmaceuticals in a low pressure environment. It is an excellent economical alternative to high pressure RPC while still offering high resolution and loading capacity.

Capture and Concentrate Resins

Media Base Material	Brand	Phase	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	pH Stability	Ordering Information Sepra Bulk Sorbents Phase	100 g	1 kg
Silica	**Sepra**									
		C18-E	50	65	500	17	2-9	C18-E	04G-4348	04K-4348
		C18-T	50	135	300	15	2-9	C18-T	04G-4405	04K-4405
		C8	50	65	500	10	2-9	C8	04G-4406	—
		Phenyl	50	65	500	10	2-9	Phenyl	04G-4407	—
		CN	50	65	500	10	2-9	CN	04G-4409	—
		NH_2	50	65	500	5	2-9	NH_2	04G-4408	04K-4408
		Florisil®	170 (60/100 mesh)	80	300	0	2-9	Florisil®	04G-4411	04K-4411
		SCX	50	65	500	9	2-9	SCX	04G-4413	04K-4413
		SAX	50	65	500	6	2-9	SAX	04G-4414	04K-4414
		WCX	55	70	500	8	2-9	WCX	04G-S027	—
		Silica	50	65	500	0	2-9	Silica	04G-4410	04K-4410
		EPH	200	70	Proprietary	0	2-7.5	EPH	04G-4508	—
Small Pore Polymer	**Sepra ZT**									
		ZT	30	85	800	–	1-14	ZT	04G-4426	—
		ZT-SCX	30	85	800	–	1-14	ZT-SCX	04G-4466	—
		ZT-WCX	30	85	800	–	1-14	ZT-WCX	04G-4478	—
		ZT-SAX	30	85	800	–	1-14	ZT-SAX	04G-4485	—
		ZT-WAX	30	85	800	–	1-14	ZT-WAX	04G-4463	—
Large Pore Polymer	**Sepra ZTL**									
		ZTL	115	330	500	–	1-14	ZTL	04G-4470	—
		ZTL-SCX	115	330	500	–	1-14	ZTL-SCX	—	04K-4467
		ZTL-WCX	115	330	500	–	1-14	ZTL-WCX	Inquire	Inquire
		ZTL-SAX	115	330	500	–	1-14	ZTL-SAX	Inquire	Inquire
		ZTL-WAX	115	330	500	–	1-14	ZTL-WAX	04G-4494	—
Styrenedivinylbenzene Polymer	**Sepra SDB-L**									
		SDB-L	95	255	500	–	1-14	SDB-L	04G-4412	04K-4412

Interested in MSPD for your analysis? Please contact us for technique and accessory information.

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