Preparative Chromatography Meets UHPLC

The Power of Kinetex Core-Shell Technology with the Performance of Piston Packed Prep Columns

- Ultra-High Efficiencies
- Ultra-Long Lifetimes
- NO Added Pressure
NOW COMBINED to give you unmatched purification performance for both HPLC and SFC applications.

KINETEX Core-Shell Technology

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

Preparative Column Packing Technology

An advanced preparative column packing and hardware design, Axia incorporates patented Hydraulic Piston Compression technology that offers increased sorbent bed density and eliminates media bed collapse as a source of premature column failure in preparative HPLC columns.

Unlike traditional column packing methods, the Axia packing method is completely automated and monitored by multiple sensors to allow for measurement and recording of all process parameters for every column. The result is a vastly improved packing process that offers the following benefits:

- Extended column lifetimes
- Improved reproducibility: Column-to-Column and Batch-to-Batch
- Efficiencies and peak symmetries on par with analytical separations
- Increased column stability under high flow rates
**Higher Efficiency!**

Start with sharper peaks by taking advantage of the high efficiencies of Kinetex™ 5 µm Axia™ preparative columns.

**Waters® XBridge™ 5µm C18 Prep OBD™**

150 x 19.0 mm  
N = 11,553 plates

**Kinetex 5µm Xb-C18 Axia Packed**

150 x 21.2 mm  
N = 18,243 plates

**Conditions for both columns:**
- **Columns:** Kinetex 5 µm 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

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

Waters® XBridge™ 5 µm C18 Prep OBD™

App ID 21456

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Phenomenex is in no way affiliated with Waters Corp. 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 5µm C18 Prep OBD**

**Kinetex 5µm C18 Axia Packed**

**Increased Sensitivity and Excellent Loadability!**

**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  
  11 100

**Flow Rate:** 30 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 254 nm  
**Sample:**
1. Doxepin (From 1 - 500 mg on-column)
2. Amitriptyline (From 1 - 500 mg on-column)
Axia™ Technology Vs. Traditional Prep Column Packing

Waters® “OBD” Patented Prep Column Packing Process:

In traditional slurry packing processes, like the Waters® OBD™ (Optional Bed Density) Prep column packing approach, pressure on the packed bed is released when the column is removed from the column packing station to allow attachment of the endfitting.

This conventional packing process involves:

**Compression ➔ Decompression ➔ Recompression**

Several 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
- Limited level of process control is based on traditional slurry packing technology

Our Vastly Improved Patented Packing Process:

In contrast to the multi-step process required in conventional slurry packing, Axia packed preparative columns are packed using a single axial compression step. 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 recompression of the packed bed. This improves media integrity and column bed stability, and solves the primary lifetime and performance problems associated with conventional slurry packed preparative columns.
Traditional Prep Packing
Decompression and then recompression during packing can damage the media and lead to increased column-to-column variability, flow disturbances, and decreased column lifetimes.

Axia Packing Technology
Highly tuned patented process and hardware eliminates potential decompression and ensures media stability and optimal bed density.

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

View an animated packing process comparison [www.AxiaPrep.com](http://www.AxiaPrep.com)

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 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.

![Efficiency Comparison](image)

<table>
<thead>
<tr>
<th>Column-to-Column Efficiency</th>
<th>Column-to-Column Peak Asymmetry</th>
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<tbody>
<tr>
<td>Traditional Slurry Packing</td>
<td>Average Efficiency (N) with Synergi™</td>
</tr>
<tr>
<td>Axia™ Packed Hydraulic Piston Compression Packing</td>
<td>Average Peak Asymmetry with Gemini™</td>
</tr>
<tr>
<td>4 µm Hydro-RP 100 x 21.2 mm</td>
<td>5 µm C18 50 x 21.2 mm</td>
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<thead>
<tr>
<th>% RSD</th>
<th>27% Improved Avg. Efficiency</th>
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<tr>
<td>11.8</td>
<td>2.5</td>
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<table>
<thead>
<tr>
<th>Peak Asymmetry</th>
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<tbody>
<tr>
<td>Traditional Slurry Packing</td>
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<thead>
<tr>
<th>% RSD</th>
<th>13% Improved Avg. Peak Shape</th>
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<tr>
<td>9.2</td>
<td>5.2</td>
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<tr>
<th>Density Comparison of Packed Beds</th>
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<tbody>
<tr>
<td>Traditional Slurry Packing</td>
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<table>
<thead>
<tr>
<th>% RSD</th>
<th>9% Increase in Packing, density and More Uniformly Packed Bed</th>
</tr>
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<tbody>
<tr>
<td>53</td>
<td>54</td>
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Seamless Scalability from HPLC/UHPLC to PREP

The recent addition of the Kinetex™ 5 µm in the Axia packed format (21.2 mm ID) makes it the first core-shell sorbent commercially available for small-scale preparative applications. 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.

Analytical method — Kinetex 2.6 µm XB-C18

![Analytical method graph]

**Column:** Kinetex 2.6 µm XB-C18
**Dimensions:** 150 x 4.6 mm
**Part No.:** 00F-4496-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 — Kinetex 5 µm XB-C18

![Preparative method graph]

**Column:** Kinetex 5 µm XB-C18 Axia Packed
**Dimensions:** 150 x 21.2 mm
**Part No.:** 00F-4305-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

Tip:
For more information on the power of Kinetex core-shell scalability, request technical note TN-1135 at:
www.phenomenex.com/Kinetex/AxiaRequest
A Broad Spectrum of Column Selectives

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.

- **Endcapped C18 phase**
  - Increased retention for polar basic compounds

- **Protective isobutyl side chains**
  - Increased retention of polar acidic compounds

- **Phenyl-Hexyl**
  - Greater retention and separation of aromatic hydrocarbons

- **Pentafluorophenyl phase**
  - Unique aromatic and polar selectivity

**Conditions for all columns:**
- **Column:**
  - Kinetex 2.6 µm C18
  - Kinetex 2.6 µm XB-C18
  - Kinetex 2.6 µm Phenyl-Hexyl
  - Kinetex 2.6 µm PFP

- **Dimensions:** 50 x 2.1 mm
- **Mobile Phase:**
  - A: 0.1% Formic acid in Water
  - B: 0.1% Formic acid in Acetonitrile

- **Gradient:**
  - Time (min) % B
  - 0.0 5
  - 0.2 5
  - 4.2 95
  - 4.21 5
  - 5.5 5

- **Flow Rate:** 0.8 mL/min
- **Temperature:** 30 ºC
- **Detection:** UV @ 254 nm (ambient)
- **Sample**:
  1. Pyridine
  2. Acetaminophen
  3. Pindolol
  4. Quinidine
  5. Sulfathiazole
  6. Acebutolol
  7. Benzyl alcohol
  8. Chlorpheniramine
  9. Phenol
  10. Triprolidine
  11. Nortriptyline
  12. Prednisolone
  13. 3-Methyl-
  4-nitrobenzoic acid
  14. 2-Hydroxy-
  5-methylbenzaldehyde
  15. Diflunisal
  16. Hexanophenone

Comparative separations may not be representative of all applications. Columns are pH stable from 1.5-10 under isocratic conditions. Columns are pH stable 1.5-8.5 under gradient conditions.
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.

1. **Column Screening**
   - Normal Phase
   - Reversed Phase
   - Polar Organic
   - SFC
   - Chiral

2. **Method Optimization Services**
   - Fast Turnaround
   - Easy Method Transfer
   - Continued Support

3. **Preparative and Process Scale-Up**
   - Media Screening
   - Small Scale Purification
   - DAC Packing Assistance

**A New Era of Technical Support Services, Let Us Do the Work for You**

Get started today and let us exceed your expectations.

[www.phenomenex.com/phenologix](http://www.phenomenex.com/phenologix)
Use the SecurityGuard™ PREP column protection system!

- Extend preparative column lifetime by as much as 5x
- Protect column from samples that precipitate out of solution
- Protect column from contaminants
- Stable and leak-free up to 60 mL/min

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.

Forced Degradation Lifetime Study

Axia packed column with SecurityGuard PREP cartridge after initial injection

Conditions
- 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

Axia packed column with SecurityGuard PREP cartridge after multiple injections

Injection 240

Time to change the PREP cartridge

Axia packed column after removing SecurityGuard column protection system

Injection 241

Original column performance maintained by using SecurityGuard PREP
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.
Kinetex™ Analytical Columns

SecurityGuard™ Analytical Columns

Ordering Information

SecurityGuard™ Column Protection

Protect your Kinetex and Axia Packed preparative columns from the damaging effects of mobile phase and sample chemical contaminants with SecurityGuard ULTRA and SecurityGuard PREP.

- Dramatically extends column lifetime and performance
- Virtually no change in chromatography
- Simple to use

*SecurityGuard ULTRA cartridges require holder, Part No. AJ0-9000
**SecurityGuard PREP cartridges require holder, Part No. AJ0-6223

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Axia is patented by Phenomenex. U.S. Patent No. 7,674,383

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