

For Far  
**Greater**  
UHPLC Column Performance



**You Must Have** Kinetex<sup>®</sup> Core-Shell UHPLC Columns

**phenomenex<sup>®</sup>**  
...breaking with tradition<sup>SM</sup>

## The UHPLC Core-Shell Advantage

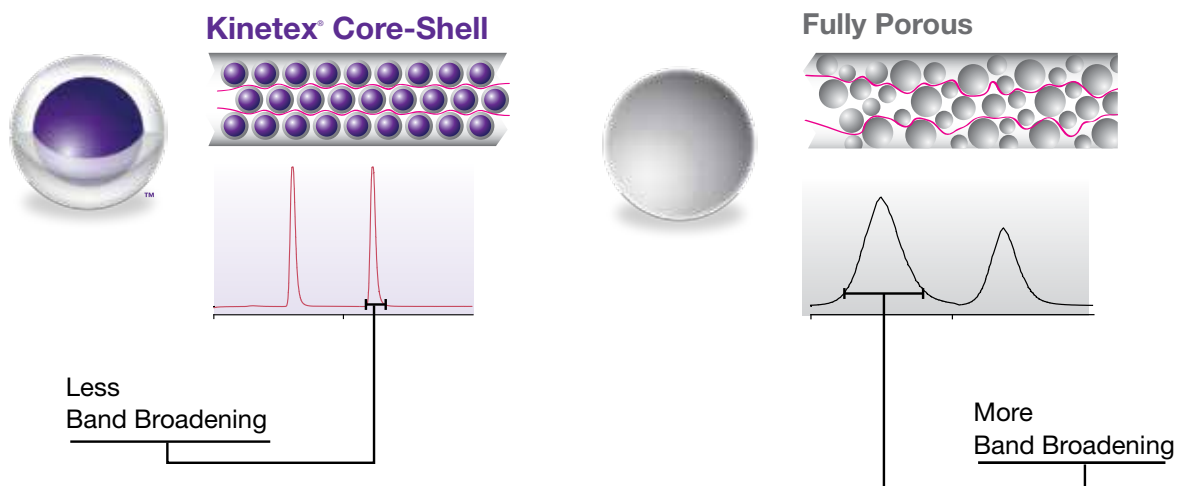


Kinetex® Core-Shell Technology produces increased efficiencies over traditional, fully porous sub-2  $\mu\text{m}$  columns on the market, yielding remarkable chromatographic resolution, higher peak capacities, and greater sensitivity, so labs can get the most out of every UHPLC analysis.

guarantee

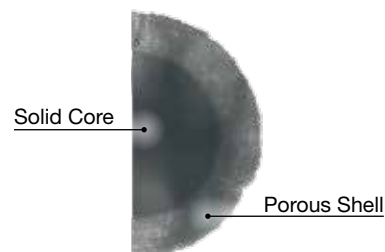
If you are not completely satisfied with Kinetex core-shell columns, send in your comparative data to a similar product within 45 days for a FULL REFUND.

Using sol-gel processing techniques that incorporate nano-structuring technology, a durable, homogeneous porous shell is grown on a solid silica core to create a core-shell particle. This particle morphology results in less band broadening for all four sources of UHPLC band broadening compared to fully porous particles and thus delivers extremely high efficiencies!



## Kinetex Core-Shell

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



## Fully Porous

- Less homogenous bed structure leads to performance loss
- Diffusion path limits efficiencies
- Band broadening due to frictional heating as flow rate increases



# 3 High Performance UHPLC Core-Shell Particles

## Kinetex® 2.6 $\mu\text{m}$

- Sub-2  $\mu\text{m}$  efficiencies at much lower backpressures
- Gives you the opportunity to increase flow rate for increased peak capacities and shorter run times
- Can be used on both UHPLC and HPLC systems



## Kinetex 1.7 $\mu\text{m}$

- 20 % higher performance than traditional 1.7  $\mu\text{m}$  fully porous particle
- First core-shell sub-2  $\mu\text{m}$  on the market



## Kinetex 1.3 $\mu\text{m}$

- Incredible column efficiencies above 400,000 p/m, giving an average of 50 % higher efficiencies than traditional 1.7  $\mu\text{m}$  fully porous particles
- Second core-shell sub-2  $\mu\text{m}$  on the market

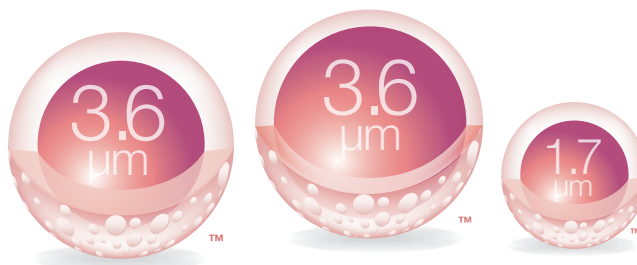


## Other Core-Shell Solutions



## Kinetex 5 $\mu\text{m}$

While not developed specifically for UHPLC systems, the Kinetex 5  $\mu\text{m}$  provides 3  $\mu\text{m}$  or better efficiencies at 5  $\mu\text{m}$  backpressures and is fully scalable to the other 3 Kinetex particle sizes!



## Aeris Columns

Aeris WIDEPORÉ and PEPTIDE columns are excellent tools for UHPLC analysis of proteins and peptides!

[www.phenomenex.com/Aeris](http://www.phenomenex.com/Aeris)

# UHPLC Compatible

## Kinetex® Columns are Compatible with All UHPLC Instruments

Kinetex on Agilent® 1290



Kinetex on JASCO® X-LC



Kinetex on Shimadzu® Nexera®



Kinetex on Waters® ACQUITY® UPLC®



*Need help installing your Kinetex column?*

**[www.phenomenex.com/kinetex/technicalresources](http://www.phenomenex.com/kinetex/technicalresources)**

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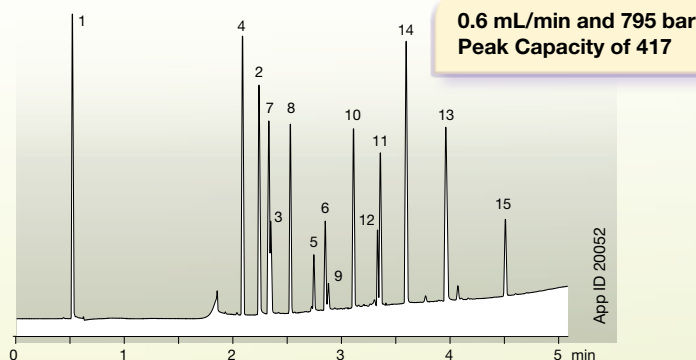


## Beyond Fully Porous Sub-2 µm Performance

With its ability to provide ultra-high performance at a fraction of the pressure, the Kinetex 2.6 µm paves the way for better, faster UHPLC methods.

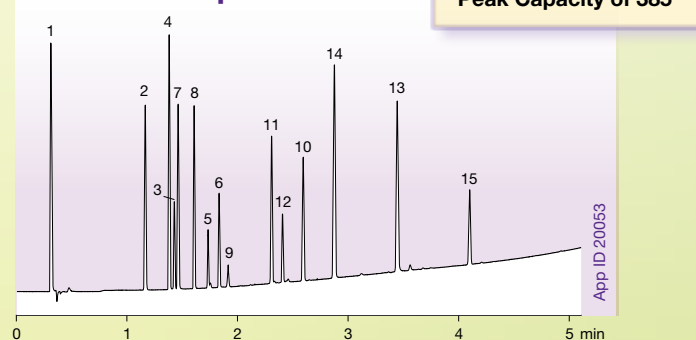
## Where Your UHPLC Performance Stops ...

Waters® ACQUITY® 1.7 µm



## ... Ours Starts ...

**Kinetex 2.6 µm**



Conditions same for all columns except where noted:

Columns: Kinetex 2.6 µm C18

ACQUITY UPLC® BEH™ 1.7 µm C18

Dimensions: 100 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          | 5   |
|          | 0.2        | 5   |
|          | 5          | 95  |
|          | 6          | 95  |
|          | 6.1        | 5   |

Flow Rate: As Noted

Detection: UV @ 254 nm

Backpressure: As Noted

Instrument: Waters® ACQUITY UPLC

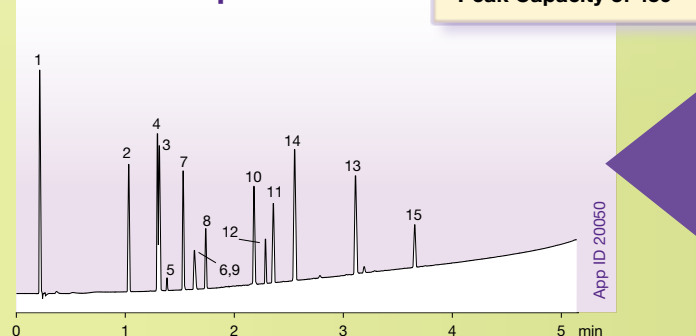
Sample:

1. Pyridine
2. Acetaminophen
3. Pindolol
4. Sulfathiazole
5. Acebutolol
6. Chlorpheniramine
7. Benzyl Alcohol
8. Phenol
9. Triprolidine
10. 3-Methyl, 4-nitrobenzoic acid
11. Nortriptyline
12. Prednisolone
13. Diflunisal
14. 2-Hydroxy, 5-methyl benzaldehyde
15. Hexanophenone



## ... And Keeps Going!

**Kinetex 2.6 µm**



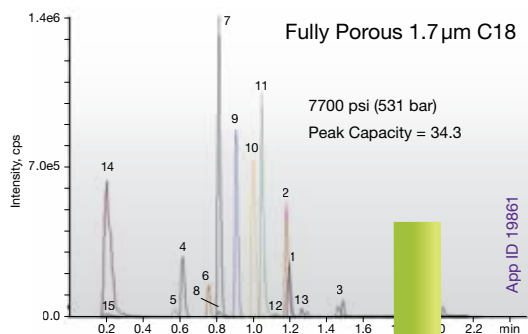
- Faster Analysis
  - Higher Performance
- On Your UHPLC System

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# Kinetex® 2.6 µm

## Do More with Core-Shell!

Start by matching a Kinetex 2.6 µm column to the sub-2 µm you're currently using. Then watch the pressure drop and your options appear. In no time you'll have better peak capacities, sensitivities, and greater column performance.



Conditions are the same for all columns:

Column: Kinetex 2.6 µm C18

Fully Porous 1.7 µm C18

Dimensions: Kinetex: 50 x 2.1 mm, 50 x 2.1 mm, and 100 x 2.1 mm

Fully Porous: 50 x 2.1 mm

Flow Rate: 0.8, 0.8, 1.4, and 0.85 mL/min

Mobile Phase: A: 0.1% Formic acid in Water

B: 0.1% Formic acid in Acetonitrile

Gradient: Time (min) % B

0.00 95

0.25 95

1.80 10

1.90 10

1.91 95

2.50 95

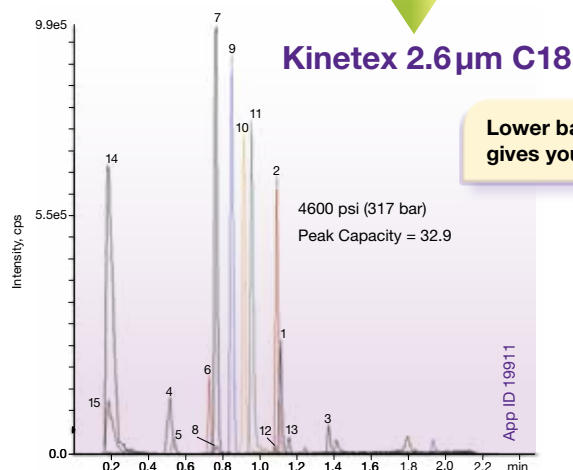
Temperature: 40 °C

Detection: MS

Backpressure: As noted

Analytes:

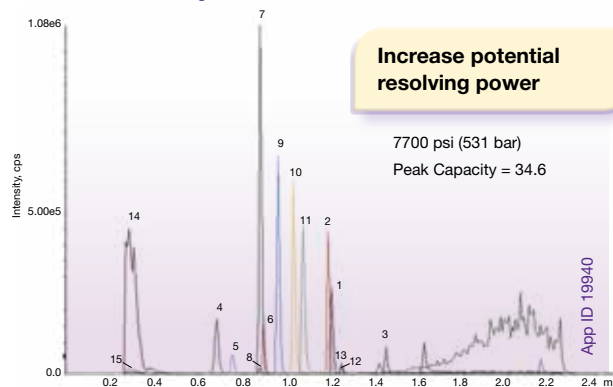
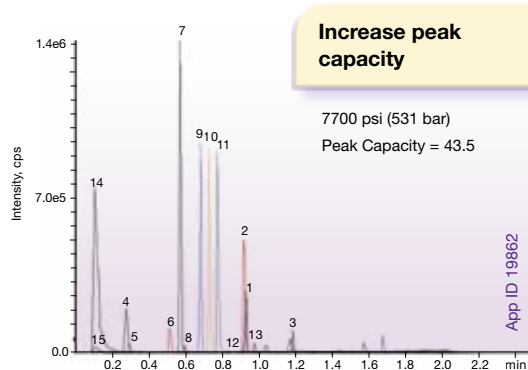
1. Haloperidol
2. Diltiazem
3. Terfenadine
4. Cimetidine
5. Acetaminophen
6. Sulfathiazole
7. Pindolol
8. Quinidine
9. Acebutolol
10. Chlorpheniramine
11. Triprolidine
12. Prednisolone
13. Nortriptyline
14. 2-Hydroxy-5-methyl benzaldehyde
15. Hexanophenone



Lower backpressure  
gives you options

Increase the flow rate  
Kinetex 2.6 µm C18

Increase column length  
Kinetex 2.6 µm C18

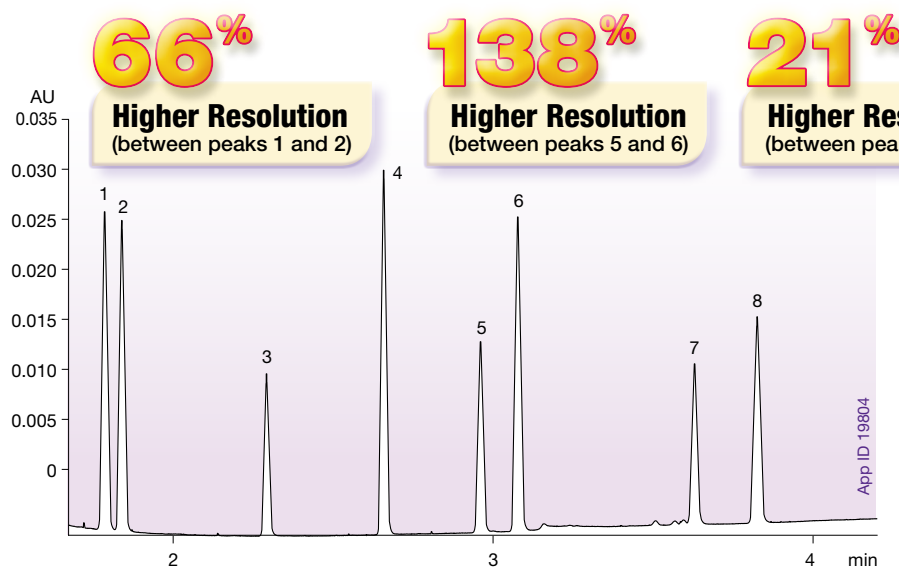






## The First Sub-2 µm Core-Shell Column

Upgrade the efficiency and performance of your current sub-2 µm column with a Kinetex 1.7 µm core-shell column. Extra resolution, higher peak capacities, and greater sensitivity are all within your reach with Kinetex Core-Shell Technology.



### Conditions for both columns:

**Column:** Kinetex 1.7 µm XB-C18  
ACQUITY UPLC® BEH 1.7 µm C18

**Dimensions:** 150 x 2.1 mm

**Mobile Phase:** A: Milli-Q® Water  
B: Acetonitrile

| Gradient | Time (min) | % B |
|----------|------------|-----|
|          | 0          | 30  |
|          | 5          | 100 |

**Flow Rate:** 0.5 mL/min

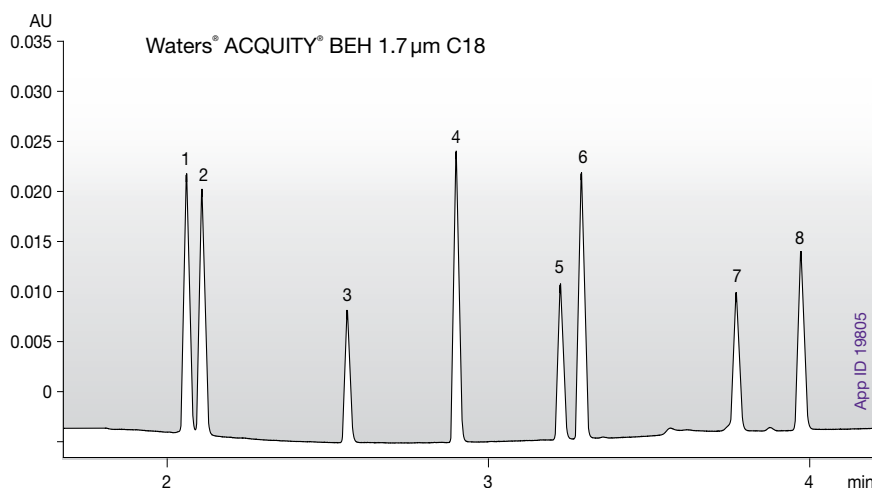
**Temperature:** Ambient

**Detection:** UV @ 210 nm (ambient)

**Backpressure:** 891 bar (Kinetex)  
935 bar (ACQUITY)

**Instrument:** Waters ACQUITY UPLC

**Sample:** 1. Hydrocortisone  
2. Cortisone  
3. Corticosterone  
4. Cortisone-21-Acetate  
5. DHEA (Dehydroepiandrosterone)  
6. 17-Hydroxyprogesterone  
7. Deoxycorticosterone  
8. Progesterone



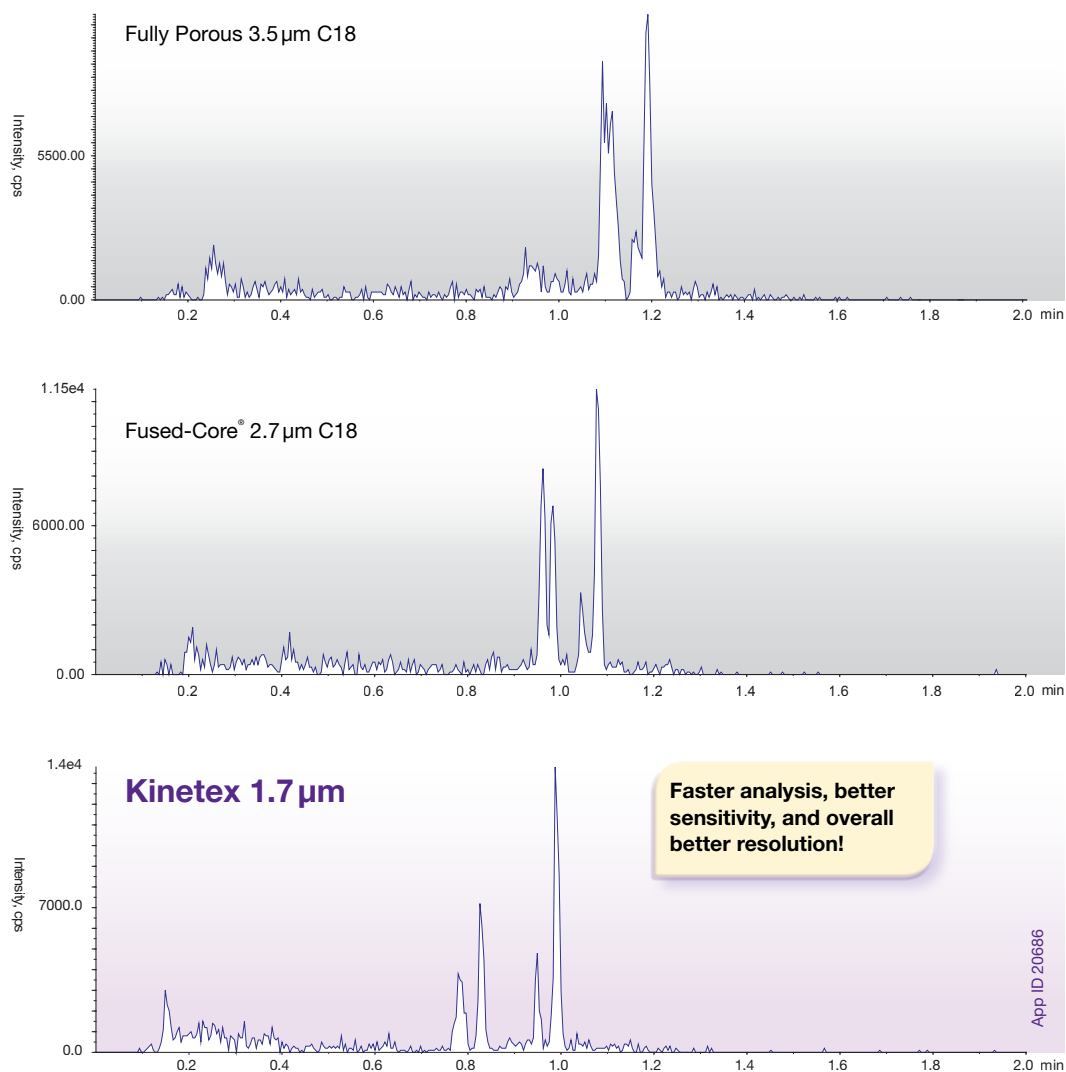
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# Kinetex® 1.7 µm

## Superior Resolving Power

The increased efficiency of the Kinetex 1.7 µm allows you to use shorter columns for faster run times while keeping optimal performance. Now it's time for you to challenge your difficult separations with the superior efficiency and resolving power of a Kinetex 1.7 µm core-shell column.



### Conditions for all columns

**Columns:** Fully porous 3.5 µm C18 (50 x 2.1 mm)  
Fused-Core 2.7 µm C18 (50 x 2.1 mm)  
Kinetex 1.7 µm C18 (30 x 2.1 mm)

**Mobile Phase:** A: 10 mM Ammonium Formate  
B: Acetonitrile

**Gradient:**

| Time (min) | % B |
|------------|-----|
| 0          | 5   |
| 2          | 100 |
| 2.1        | 5   |

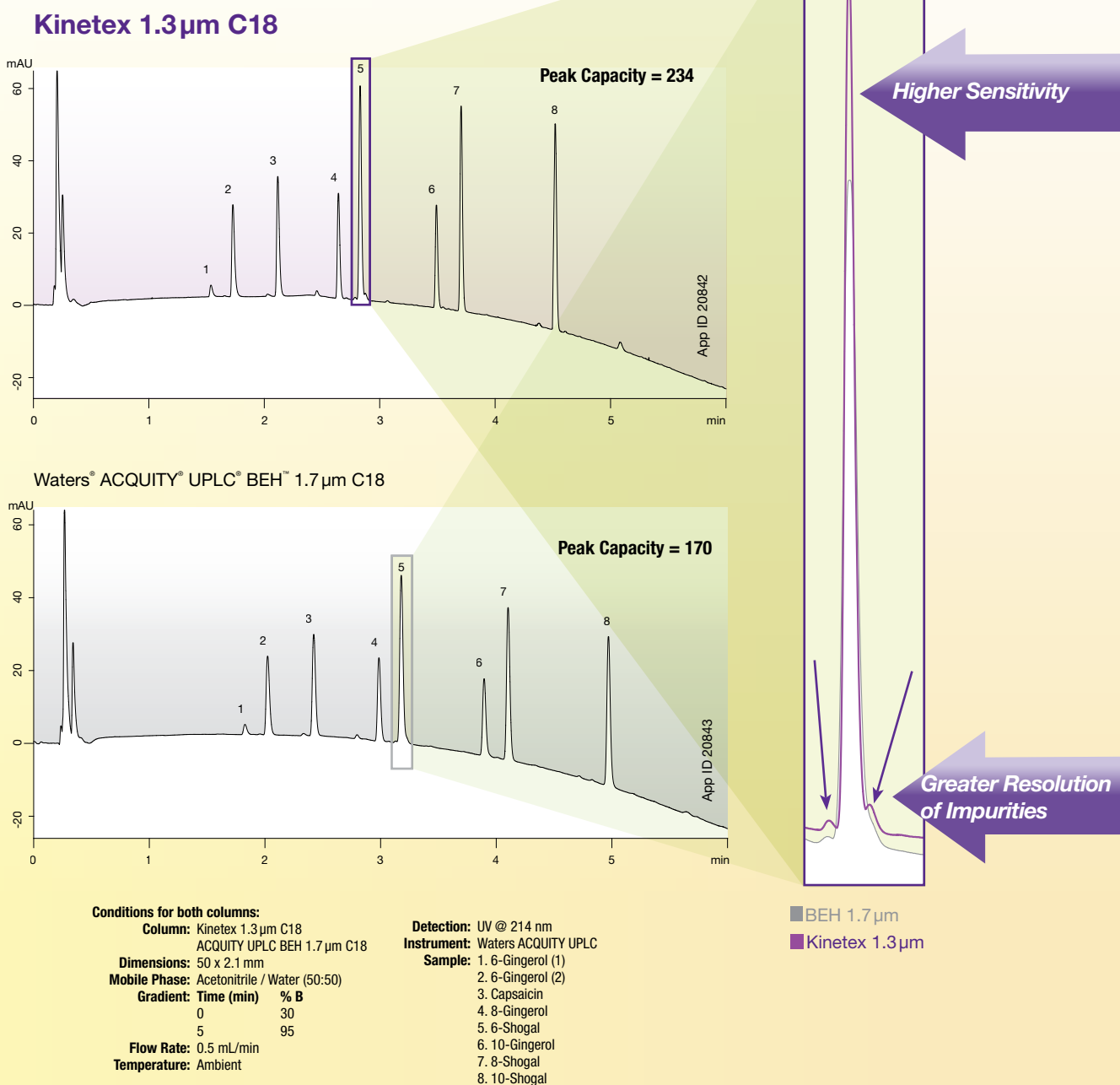
**Flow Rate:** 0.7 mL/min  
**Temperature:** 22°C  
**Detection:** MS/MS (AB SCIEX API 4000™)  
**Sample:** 1. Lorazepam glucuronide

Fused-Core is a registered trademark of Advanced Materials Technology, Inc. Phenomenex is in no way affiliated with Advanced Materials Technology, Inc. Comparative separations may not be representative of all applications.



## The New Standard for UHPLC

Bring your UHPLC analysis to the next level with the incredibly powerful Kinetex 1.3 µm.



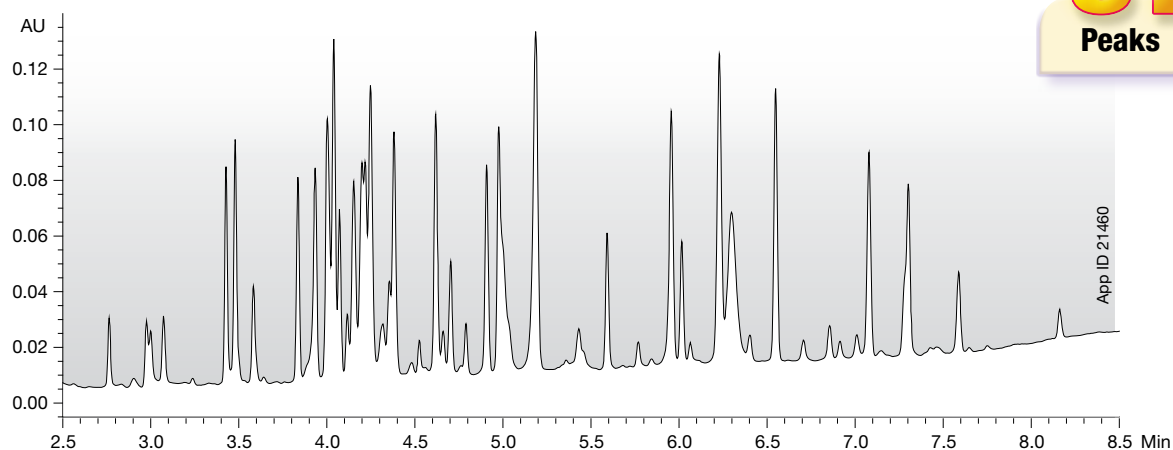
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# Kinetex® 1.3µm

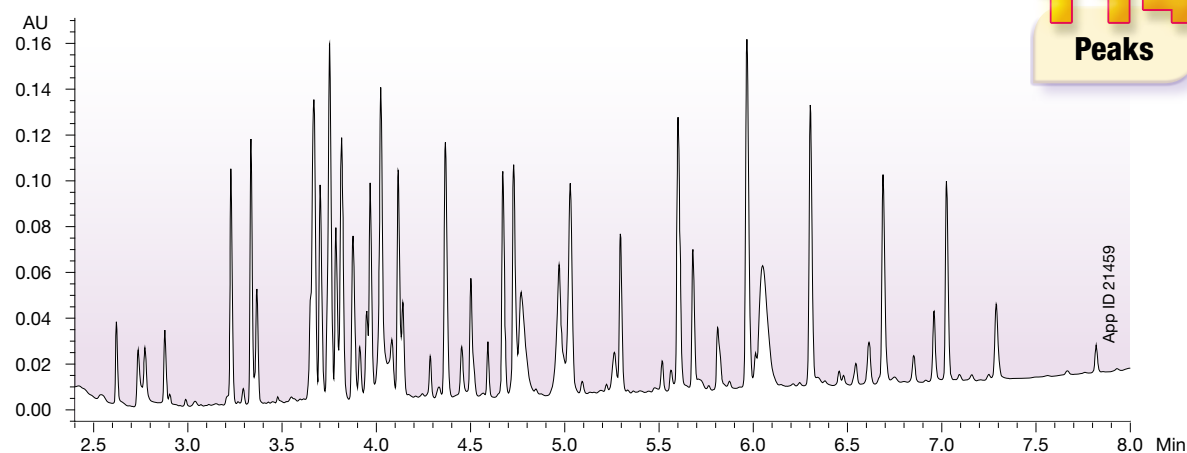
## More Peaks and More Sensitivity, in Less Time

With typically 50 % more efficiency than a fully porous 1.7 µm particle, the Kinetex 1.3 µm lets you **SEE MORE!**

Waters® ACQUITY® BEH 1.7 µm C18



Kinetex 1.3µm C18



Conditions for all columns same except where noted:

Column: Waters ACQUITY UPLC® BEH 1.7 µm C18

Kinetex 1.3µm C18

Dimensions: 50 x 2.1 mm

Mobile Phase: A: 0.1 % TFA in Water

B: 0.1 % TFA in Acetonitrile

| Gradient: Time (min) | % B |
|----------------------|-----|
| 0                    | 5   |
| 1.0                  | 5   |
| 11.0                 | 95  |
| 11.5                 | 95  |
| 11.6                 | 5   |

Flow Rate: 0.5 mL/min

Temperature: 30 °C

Detection: UV @ 210 nm (ambient)

Instrument: Waters ACQUITY UPLC

Sample: Trypsin digested BSA

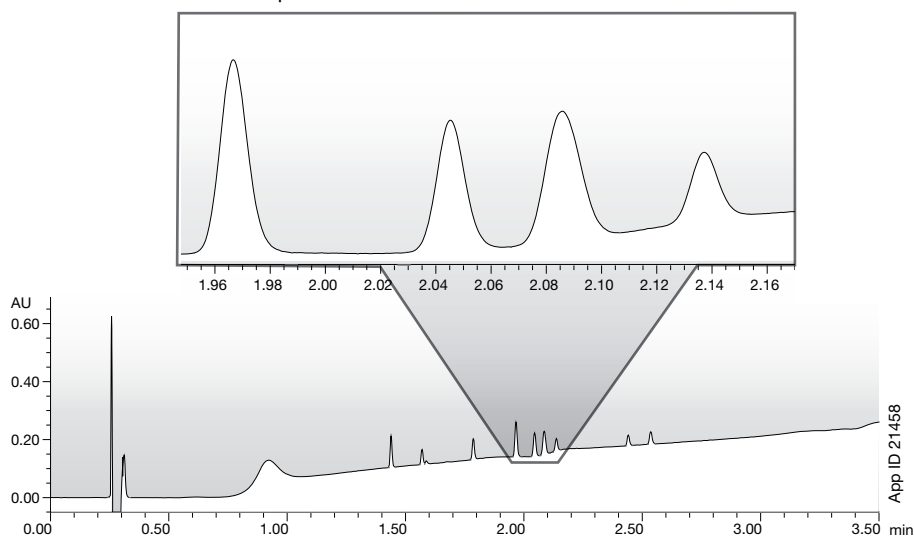
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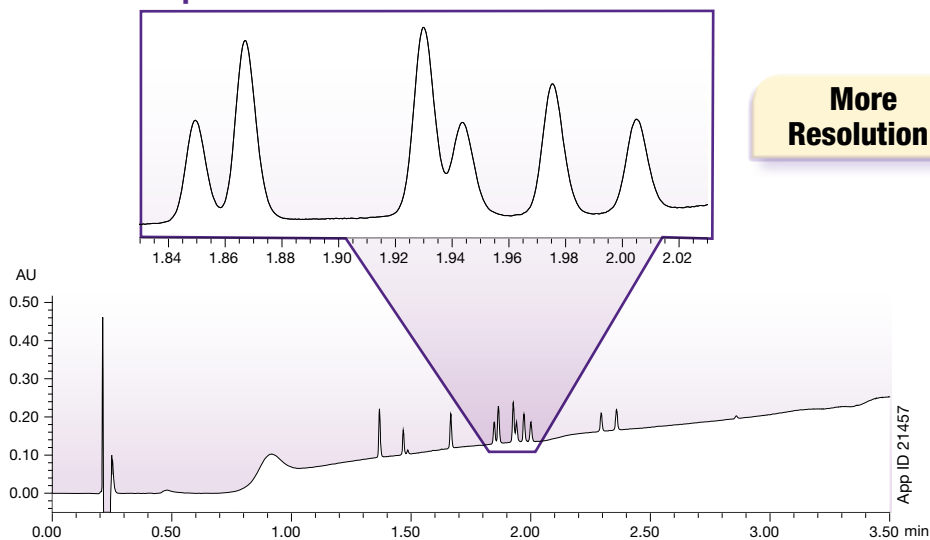
## More Resolution!

Kinetex 1.3 µm Core-Shell Technology will show you what you're missing with conventional sub-2 µm fully porous columns.

Waters® ACQUITY® BEH 1.7 µm C18



## Kinetex 1.3 µm C18



**More Resolution!**

Conditions for all columns same except where noted:

**Column:** Waters ACQUITY UPLC® BEH 1.7 µm C18  
Kinetex 1.3 µm C18  
**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 5  
3.0 95  
3.5 95  
3.6 5  
**Flow Rate:** 0.5 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 254 nm  
**Instrument:** Waters ACQUITY UPLC

**Sample:** 1. Estriol  
2. Hydrocortisone  
3. Corticosterone  
4. Cortisone acetate  
5. 17-beta-estradiol  
6. 17-alpha-estradiol  
7. 21-OH-progesterone  
8. 17-alpha-ethynylestradiol  
9. Estrone  
10. Deoxycorticosterone acetate  
11. Progesterone

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# UHPLC Column Protection

R&D 100 Award  
Recipient



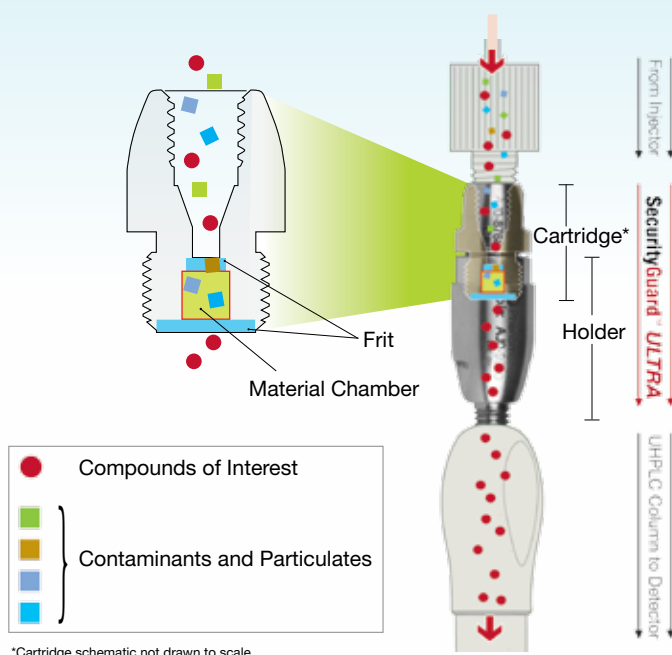
## Protect any UHPLC column

Protect your column, including Kinetex core-shell columns, from damaging contaminants and microparticulates with the SecurityGuard™ ULTRA guard cartridge system!

- Simple to use
- Extend column lifetime
- Pressure rated to 20,000 psi (1,378 bar)
- Fits virtually all manufacturers' columns 2.1 to 4.6 mm ID



SecurityGuard ULTRA Guard Cartridge System (Cartridge connected to Holder)

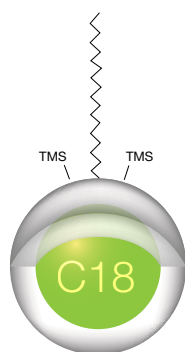


See it in action:

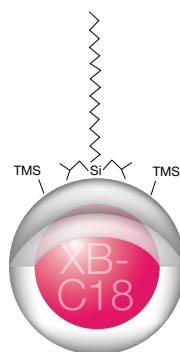
[www.phenomenex.com/SecurityGuardULTRA](http://www.phenomenex.com/SecurityGuardULTRA)

# Six selectivities. Take your pick.

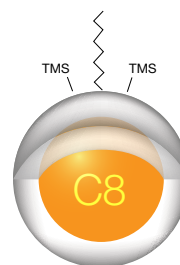
Choose from a wide range of phases for greater flexibility in UHPLC method development. Kinetex® columns come in a variety of stationary phases to cover a full spectrum of applications ranging from acids and bases, to isomers and extremely polar compounds.



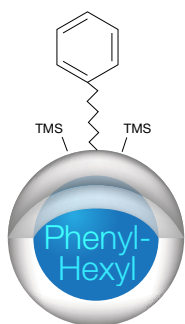
**Endcapped C18 phase**  
Increased retention for **polar basic compounds**



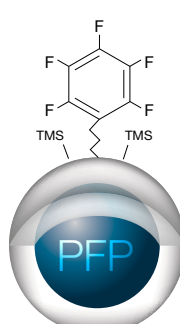
**Protective isobutyl side chains**  
Increased retention of **polar acidic compounds**



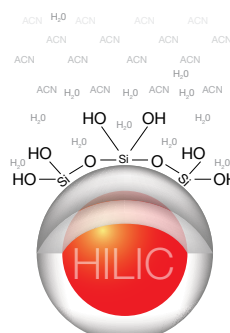
**Endcapped C8 phase**  
Less hydrophobic than a C18 phase



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



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



**Unbonded silica phase**  
Increased retention of **polar compounds**

## Material Characteristics

| Packing Material     | Pore Size (Å) | Effective Surface Area (m <sup>2</sup> /g) | Effective Carbon Load % | USP Classification | pH Stability* | Pressure Stability |
|----------------------|---------------|--------------------------------------------|-------------------------|--------------------|---------------|--------------------|
| Kinetex C18          | 100           | 200                                        | 12                      | L1                 | 1.5 - 8.5*    | 1000 bar**         |
| Kinetex XB-C18       | 100           | 200                                        | 10                      | L1                 | 1.5 - 8.5*    | 1000 bar**         |
| Kinetex C8           | 100           | 200                                        | 8                       | L7                 | 1.5 - 8.5*    | 1000 bar**         |
| Kinetex PFP          | 100           | 200                                        | 9                       | L43                | 1.5 - 8.5*    | 1000 bar**         |
| Kinetex HILIC        | 100           | 200                                        | —                       | L3                 | 2.0 - 7.5     | 1000 bar**         |
| Kinetex Phenyl-Hexyl | 100           | 200                                        | 11                      | L11                | 1.5 - 8.5*    | 1000 bar**         |

\*Columns are pH stable from 1.5-10 under isocratic conditions. Columns are pH stable 1.5-8.5 under gradient conditions.

\*\*Kinetex 2.6 µm columns of 3.0 and 4.6 mm ID are pressure rated to 600 bar.

# Kinetex Ordering Information



## 1.3 µm Minibore Column (mm)

| Phases | 50 x 2.1    |
|--------|-------------|
| C18    | 00B-4515-AN |

| 1.7 µm Minibore Columns (mm) |             |             |             |             | SecurityGuard™<br>ULTRA Cartridges <sup>‡</sup> |
|------------------------------|-------------|-------------|-------------|-------------|-------------------------------------------------|
| Phases                       | 30 x 2.1    | 50 x 2.1    | 100 x 2.1   | 150 x 2.1   | 3/pk                                            |
| XB-C18                       | 00A-4498-AN | 00B-4498-AN | 00D-4498-AN | 00F-4498-AN | AJO-8782                                        |
| C18                          | 00A-4475-AN | 00B-4475-AN | 00D-4475-AN | 00F-4475-AN | AJO-8782                                        |
| C8                           | 00A-4499-AN | 00B-4499-AN | 00D-4499-AN | 00F-4499-AN | AJO-8784                                        |
| PFP                          | 00A-4476-AN | 00B-4476-AN | 00D-4476-AN | 00F-4476-AN | AJO-8787                                        |
| HILIC                        | 00A-4474-AN | 00B-4474-AN | 00D-4474-AN | —           | AJO-8786                                        |
| Phenyl-Hexyl                 | —           | 00B-4500-AN | 00D-4500-AN | 00F-4500-AN | AJO-8788                                        |

for 2.1 mm ID



R&D 100  
Award Recipient

| 1.7 µm MidBore™ Columns (mm) |             |             |             | SecurityGuard™<br>ULTRA Cartridges <sup>‡</sup> |
|------------------------------|-------------|-------------|-------------|-------------------------------------------------|
| Phases                       | 30 x 3.0    | 50 x 3.0    | 100 x 3.0   | 3/pk                                            |
| XB-C18                       | 00A-4498-YO | 00B-4498-YO | 00D-4498-YO | AJO-8775                                        |
| C18                          | —           | 00B-4475-YO | 00D-4475-YO | AJO-8775                                        |
| C8                           | 00A-4499-YO | 00B-4499-YO | 00D-4499-YO | AJO-8777                                        |
| PFP                          | —           | 00B-4476-YO | 00D-4476-YO | AJO-8780                                        |
| HILIC                        | —           | 00B-4474-YO | —           | AJO-8779                                        |
| Phenyl-Hexyl                 | —           | —           | —           | AJO-8781                                        |

for 3.0 mm ID



| 2.6 µm Minibore Columns (mm) |             |             |             |             |             | SecurityGuard™<br>ULTRA Cartridges <sup>‡</sup> |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------------------------------------------|
| Phases                       | 30 x 2.1    | 50 x 2.1    | 75 x 2.1    | 100 x 2.1   | 150 x 2.1   | 3/pk                                            |
| XB-C18                       | 00A-4496-AN | 00B-4496-AN | 00C-4496-AN | 00D-4496-AN | 00F-4496-AN | AJO-8782                                        |
| C18                          | 00A-4462-AN | 00B-4462-AN | 00C-4462-AN | 00D-4462-AN | 00F-4462-AN | AJO-8782                                        |
| C8                           | 00A-4497-AN | 00B-4497-AN | 00C-4497-AN | 00D-4497-AN | 00F-4497-AN | AJO-8784                                        |
| PFP                          | 00A-4477-AN | 00B-4477-AN | 00C-4477-AN | 00D-4477-AN | 00F-4477-AN | AJO-8787                                        |
| HILIC                        | 00A-4461-AN | 00B-4461-AN | 00C-4461-AN | 00D-4461-AN | 00F-4461-AN | AJO-8786                                        |
| Phenyl-Hexyl                 | 00A-4495-AN | 00B-4495-AN | 00C-4495-AN | 00D-4495-AN | 00F-4495-AN | AJO-8788                                        |

for 2.1 mm ID

| 2.6 µm MidBore Columns (mm) |             |             |             |             |             | SecurityGuard™<br>ULTRA Cartridges <sup>‡</sup> |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------------------------------------------|
| Phases                      | 30 x 3.0    | 50 x 3.0    | 75 x 3.0    | 100 x 3.0   | 150 x 3.0   | 3/pk                                            |
| XB-C18                      | 00A-4496-YO | 00B-4496-YO | 00C-4496-YO | 00D-4496-YO | 00F-4496-YO | AJO-8775                                        |
| C18                         | 00A-4462-YO | 00B-4462-YO | 00C-4462-YO | 00D-4462-YO | 00F-4462-YO | AJO-8775                                        |
| C8                          | 00A-4497-YO | 00B-4497-YO | 00C-4497-YO | 00D-4497-YO | 00F-4497-YO | AJO-8777                                        |
| PFP                         | 00A-4477-YO | 00B-4477-YO | 00C-4477-YO | 00D-4477-YO | 00F-4477-YO | AJO-8780                                        |
| HILIC                       | 00A-4461-YO | —           | —           | —           | 00F-4461-YO | AJO-8779                                        |
| Phenyl-Hexyl                | —           | —           | —           | 00D-4495-YO | 00F-4495-YO | AJO-8781                                        |

for 3.0 mm ID

| 2.6 µm Analytical Columns (mm) |             |             |             |             |             | SecurityGuard™<br>ULTRA Cartridges <sup>‡</sup> |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------------------------------------------|
| Phases                         | 30 x 4.6    | 50 x 4.6    | 75 x 4.6    | 100 x 4.6   | 150 x 4.6   | 3/pk                                            |
| XB-C18                         | —           | 00B-4496-E0 | 00C-4496-E0 | 00D-4496-E0 | 00F-4496-E0 | AJO-8768                                        |
| C18                            | 00A-4462-E0 | 00B-4462-E0 | 00C-4462-E0 | 00D-4462-E0 | 00F-4462-E0 | AJO-8768                                        |
| C8                             | —           | 00B-4497-E0 | 00C-4497-E0 | 00D-4497-E0 | 00F-4497-E0 | AJO-8770                                        |
| PFP                            | 00A-4477-E0 | 00B-4477-E0 | 00C-4477-E0 | 00D-4477-E0 | 00F-4477-E0 | AJO-8773                                        |
| HILIC                          | —           | 00B-4461-E0 | 00C-4461-E0 | 00D-4461-E0 | 00F-4461-E0 | AJO-8772                                        |
| Phenyl-Hexyl                   | —           | 00B-4495-E0 | 00C-4495-E0 | 00D-4495-E0 | 00F-4495-E0 | AJO-8774                                        |

for 4.6 mm ID

<sup>‡</sup>SecurityGuard ULTRA cartridges require holder, Part No. AJO-9000.

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