



# The **Only** Columns You Will Ever Need!

Simplify your life with  
Core-Shell Technology



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



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



“ We were thinking about you all along in our creation of Kinetex® Core-Shell Technology! We know your methods are challenging and economic constraints are burdening, but what if you could do more with what you currently have? Our team has pushed the boundaries to develop the amazing Kinetex product line and we did it with you in mind. Now with four scalable particle sizes that cover UHPLC to HPLC to Preparative methods, you truly can get the most out of any of your instrumentation on any method. Don't believe us, take a look at what your colleagues are saying! ”



## EASY TRANSFERABILITY

“ The Kinetex column has worked great for our validated assays. We easily converted our HPLC methods to UPLC® methods using the Kinetex column and have enjoyed being [able] to run fast UPLC® chromatography... ”

Dr. Jeff Layne, PhenoLogix

## SIGNIFICANT COST SAVINGS

“ The 1.7µm Kinetex 100 x 2.1mm column was capable of resolving 16 different chemical entities with a 6 minute run time. This new analytical method will be used to replace 16 older methods thereby facilitating an annualised cost saving for the site of €320,000 (\$ 460,000 USD). ”

Andrew Charles, Pfizer



## IMPROVED RESULTS

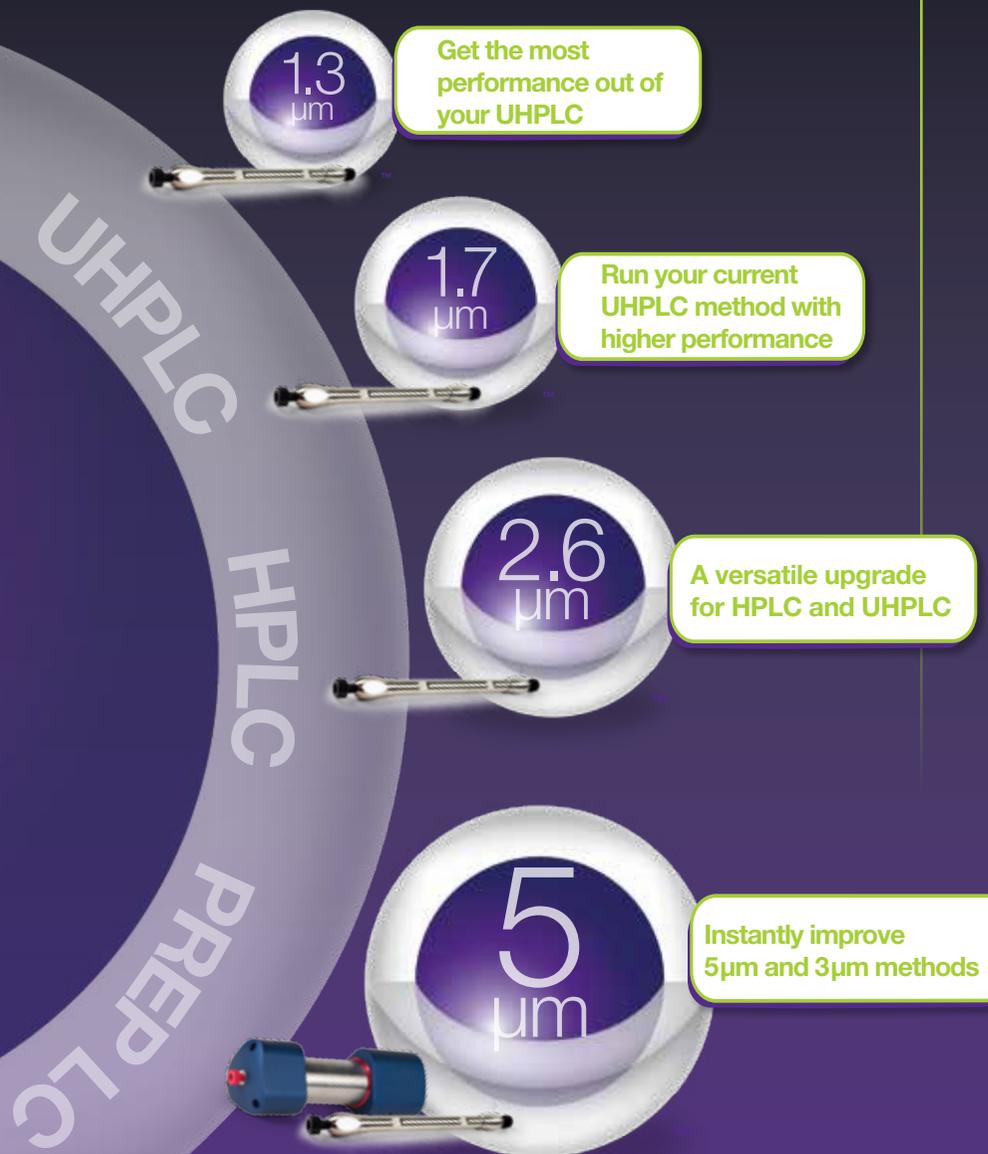
“ I was able to reduce my analysis time from 150 minutes to 60 minutes (including equilibration time) with the use of Kinetex! ”

Erika Schweiger, DSM Nutritional Products

## INCREASED PRODUCTIVITY

“ Simple, efficient, and amazing resolution! Implementation of the Kinetex columns has allowed me to significantly increase production time while reducing solvent usage nearly tenfold... ”

Stacey Garza, Bold Formulators



## Expect more from a Core!

- 6 > Optimized for Performance Gains from UHPLC to HPLC to PREP LC
- 7 > Innovation in Particle Technology
- 8 > High Density, High Efficiency Particle
- 9 > Faster, Better HPLC/UHPLC
- 10-11 > A Superior Core-Shell Particle with More Options
- 12 > Reproducible Batch-to-Batch, Column-to-Column

## Complete Core-Shell Solution from UHPLC to HPLC to PREP LC

Introducing Kinetex® - the current standard in column particle technology that will allow you to get the most out of your UHPLC, HPLC, or PREP LC. You can immediately improve resolution, throughput, and sensitivity as well as reduce solvent consumption.

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

## Better HPLC/UHPLC Performance Starts Now!

- 14 > Selecting the Optimal Core-Shell Particle for Small Molecules
- 15 > Selecting the Optimal Core-Shell Particle for Proteins/Peptides
- 16-21 > Kinetex 5  $\mu\text{m}$ : Better Performance than 5  $\mu\text{m}$  and 3  $\mu\text{m}$  Fully Porous Columns
- 22-27 > Kinetex 2.6  $\mu\text{m}$ : Performance Gains for Both HPLC and UHPLC
- 28-31 > Kinetex 1.7  $\mu\text{m}$  and 1.3  $\mu\text{m}$ : Get More from Your UHPLC System
- 32-33 > Compatibility with HPLC/UHPLC Systems
- 34-35 > Analytical Scalability and Portability, HPLC to UHPLC
- 36-37 > High Performance Column Protection

## Selectivities for All Types of Applications

- 38-39 > Pharmacopeia Column Selection and Optimization
- 41-43 > Achieve the Best Resolution with the Right Selectivity
- 44 > Food Analysis
- 45 > Environmental Analysis
- 46-47 > Clinical Analysis
- 48 > Pharmaceutical Analysis
- 49 > Forensic Analysis
- 50 > Method Development Services
- 52 > Choose the Best Column
- 53-55 > Ordering Information

# Optimized for Performance Gains from UHPLC to HPLC to PREP LC

Continuous improvement in particle technology means greater performance and productivity for all your methods. Traditional fully porous particles leave much to be desired when compared to current core-shell particles. 5  $\mu\text{m}$  and 3  $\mu\text{m}$  fully porous particles give typical HPLC backpressures however, their efficiencies and ability to hold performance drastically decreases at higher flow rates. Newer fully porous sub-2  $\mu\text{m}$  particles offer improved performance, but at the cost of the need for high-pressure capable instrumentation.

Phenomenex has always strived to make sure that you have all the available solutions to get the most out of your current system and method. With Kinetex<sup>®</sup>, this is no different. The 5  $\mu\text{m}$  Kinetex core-shell particle gives 3  $\mu\text{m}$  efficiencies at 5  $\mu\text{m}$  HPLC pressures, the 2.6  $\mu\text{m}$  core-shell particle allows for the potential of sub-2  $\mu\text{m}$  performance on HPLC or UHPLC systems, and the 1.7 and 1.3  $\mu\text{m}$  particles offer incredible efficiency and performance gains on UHPLC systems. **Isn't it time you tried this complete core-shell solution in your lab?**

## Better Performance than Fully Porous Particles

Fully Porous	vs	Kinetex Core-Shell	Average Efficiency Gain with Kinetex*
5 $\mu\text{m}$	vs	5 $\mu\text{m}$	90% Higher
3 $\mu\text{m}$	vs	2.6 $\mu\text{m}$	85% Higher
1.7 $\mu\text{m}$	vs	1.7 $\mu\text{m}$	20% Higher
1.7 $\mu\text{m}$	vs	1.3 $\mu\text{m}$	50% Higher

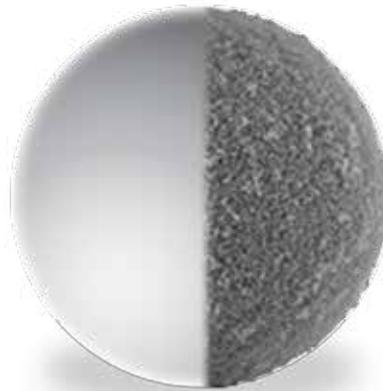
\* May not be representative of all separations.

# Innovation in Particle Technology

Using sol-gel processing techniques that incorporate nano structuring technology, a durable, homogeneous porous shell is grown on a solid silica core. This highly optimized process combined with industry leading column packing technology produces highly reproducible columns that generate extremely high plate counts.

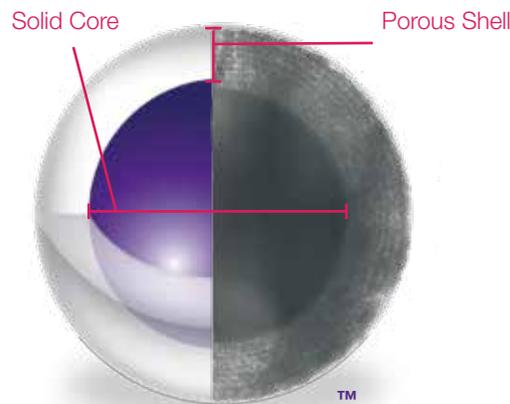
## Traditional Fully Porous Particle

- Less homogenous bed structure leads to performance loss
- Ultra-high performance limited to sub-2 $\mu\text{m}$  particles on UHPLC systems
- Diffusion path limits efficiencies



## Kinetex Core-Shell Particle

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



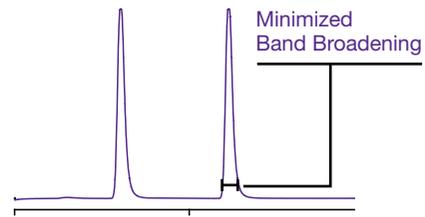
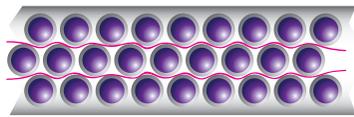
Everyone likes a good story.  
Learn how Kinetex came to be at  
[www.phenomenex.com/kinetex](http://www.phenomenex.com/kinetex)

# High Density, High Efficiency Particle

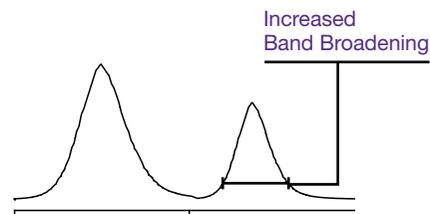
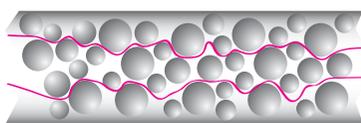
Kinetex® particles are built with a solid high density core that promotes settling into an optimum bed structure. This reduces the band broadening effects of Eddy Diffusion since the interstitial space between the particles is virtually homogeneous and results in ultra-high column efficiency and excellent reproducibility.

## Less Band Broadening with Kinetex Columns

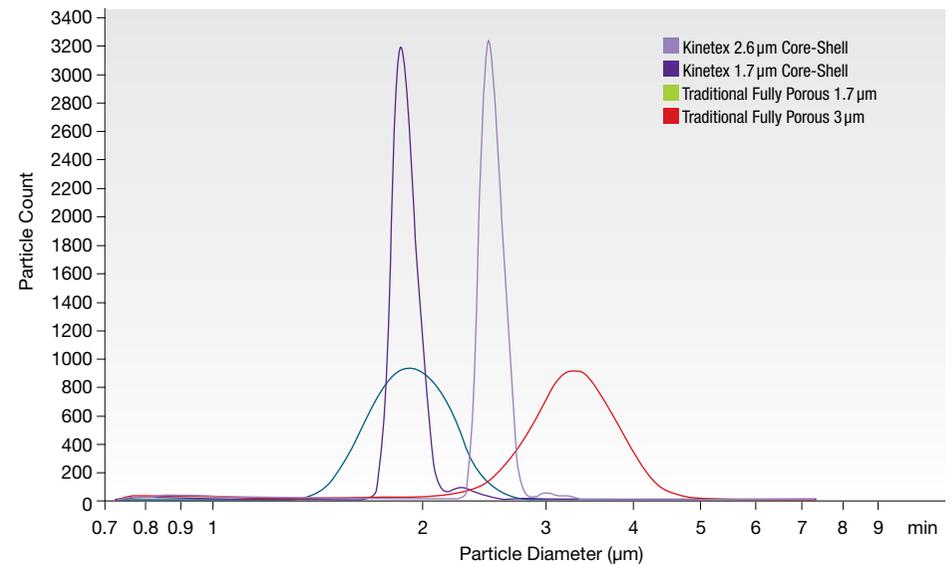
### Core-Shell



### Fully Porous



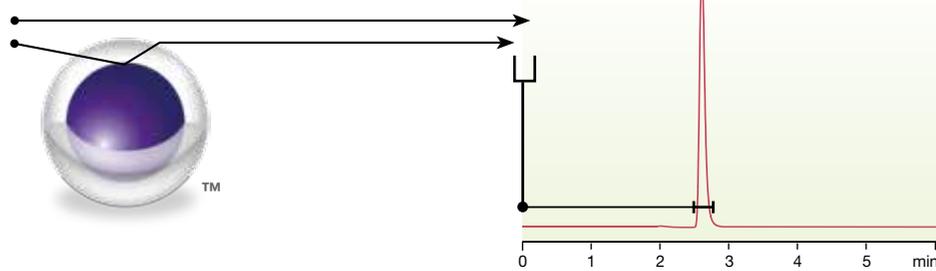
## Uniform Particle Size Distribution



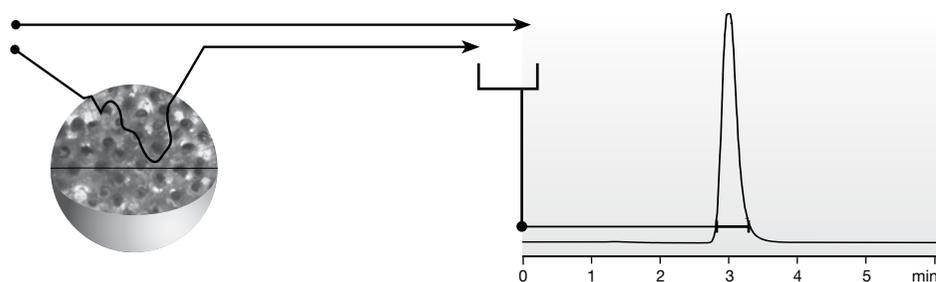
# Faster, Better HPLC/UHPLC

Since the Kinetex particle is not fully porous, analytes spend less time diffusing into and out of the porous layer of each particle as they travel through the column. This shorter diffusion path allows for you to take advantage of faster mass transfer at higher mobile phase velocities and faster chromatography.

## Core-Shell

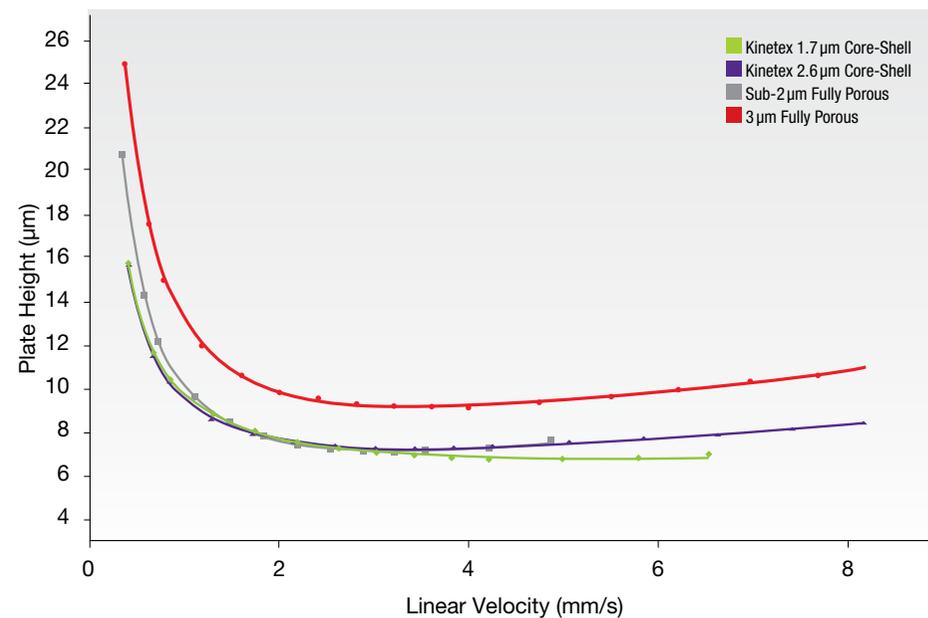


## Fully Porous



## Performance of Kinetex Core-Shell Particles

Compared to Fully Porous Sub-2 $\mu$ m and 3 $\mu$ m Particles



# A Superior Quality Core-Shell Particle with MORE Options



	Phenomenex <b>Kinetex®</b>	Advanced Materials Technology <b>HALO®</b>	Agilent Technologies® <b>Poroshell® 120</b>
<b>5 µm Particle</b>	<b>Phenomenex Kinetex</b>	<b>Advanced Materials Technology HALO</b>	<b>Agilent Technologies Poroshell 120</b>
Total Particle Size	5 µm	5 µm	
Pressure Limit	1000/600 bar*	600 bar	<i>PRODUCT DOES NOT EXIST</i>
Pore Size	100 Å	90 Å	
pH Range	1.5 - 10**	2 - 9	
<b>Sub-3 µm Particle</b>			
Total Particle Size	2.6 µm	2.7 µm	2.7 µm
Pressure Limit	1000/600 bar*	600 bar	600 bar
Pore Size	100 Å	90 Å	120 Å
pH Range	1.5 - 10**	2 - 9	2 - 8
<b>Sub-2 µm Particle</b>			
Total Particle Size	1.7 µm		
Pressure Limit	1000 bar	<i>PRODUCT DOES NOT EXIST</i>	<i>PRODUCT DOES NOT EXIST</i>
Pore Size	100 Å		
pH Range	1.5 - 10**		
<b>Sub-1.5 µm Particle</b>			
Total Particle Size	1.3 µm		
Pressure Limit	1000 bar	<i>PRODUCT DOES NOT EXIST</i>	<i>PRODUCT DOES NOT EXIST</i>
Pore Size	100 Å		
pH Range	1.5 - 10**		

Is that a fully  
porous particle?!



\* 2.1 mm ID Kinetex columns are pressure stable up to 1000 bar.

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

Kinetex HILIC 2.6 and 1.7 µm are pH stable from 2.0 - 7.5 under isocratic and gradient conditions.

HALO is a registered trademark of Advanced Materials Technology, Inc. Poroshell is a registered trademark of Agilent Technologies, Inc. Phenomenex is not affiliated with any of the above listed companies. Comparative images may not be representative of all particles.

# A Superior Performing Core-Shell with MORE Options

## From the *Journal of Chromatography A*

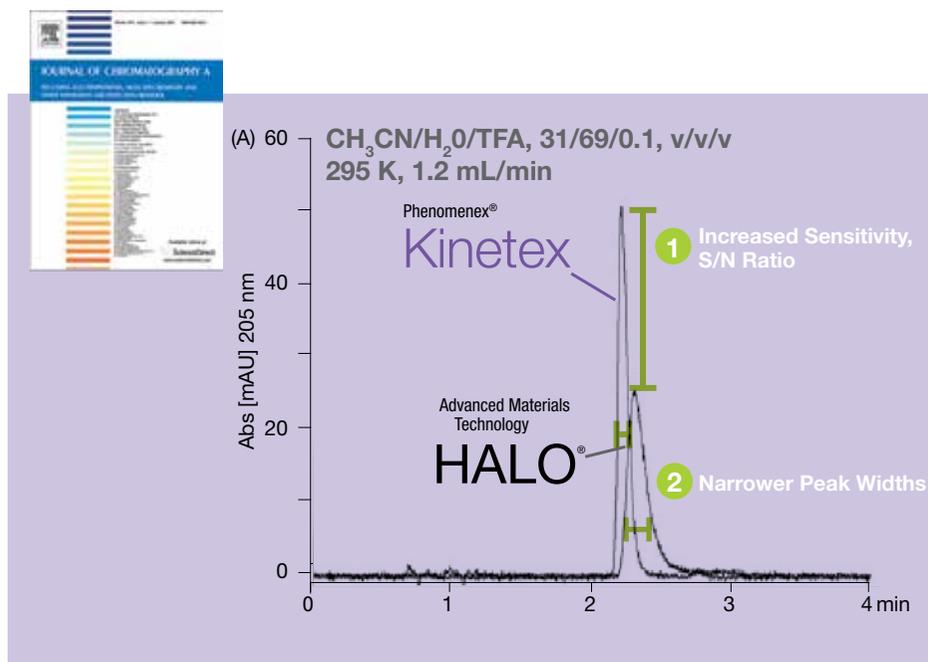
“ Never had such a low reduced HETP value been achieved in column manufacturing technology. ”

F. Gritti et al. / *J. Chromatogr. A* 1217 (2010) 1589-1603

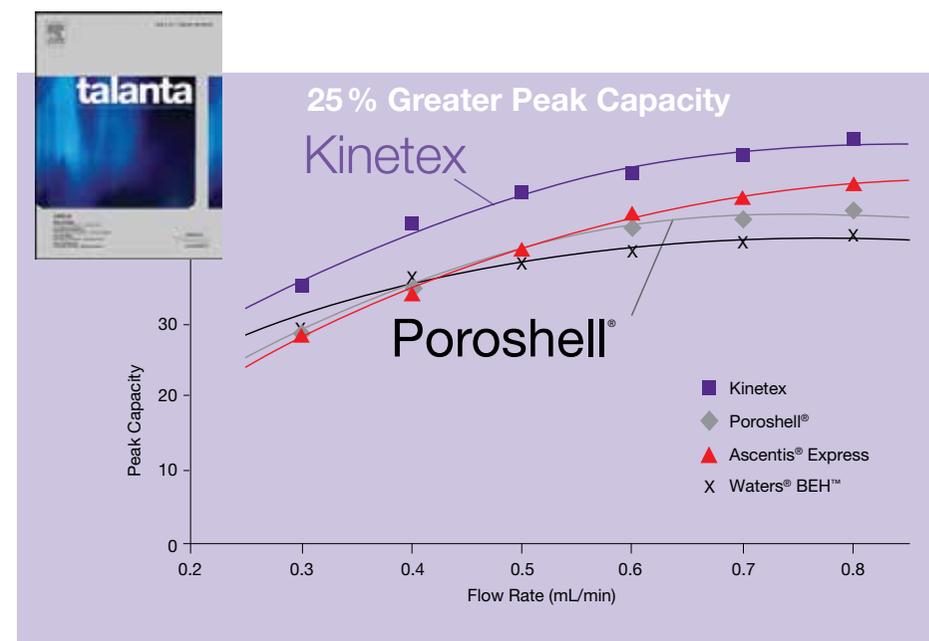
## From *Talanta*

“ The highest peak capacity was obtained with the Kinetex column which is in good agreement with the theory. ”

S. Fekete, J. Fekete / *Talanta* 84 (2011) 416-423



**Comparison between the peak shapes of insulin recorded on the Kinetex and HALO columns.**  
 Reprinted from *Journal of Chromatography A*, Volume 1217, Issue 10, with permission from Elsevier. "Performance of columns packed with the new shell particles, Kinetex-C18," page 1598, copyright 2010. By Fabrice Gritti, Irene Leonardi, David Shock, Paul Stevenson, Andrew Shalliker, and Georges Guiochon.

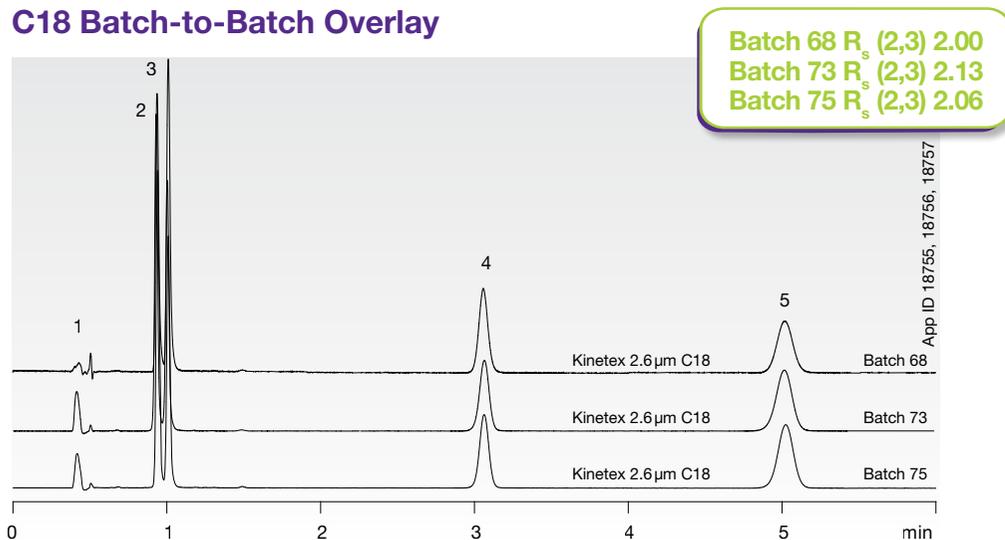


**Peak capacity plots as function of flow rate at 3 min gradient time.**  
 Reprinted from *Talanta*, Volume 84, Issue 2, with permission from Elsevier. "Fast gradient screening of pharmaceuticals with 5 cm long, narrow bore reversed-phase columns packed with sub-3 μm core-shell and sub-2 μm totally porous particles," page 416, copyright 2011. By Szabolcs Fekete and Jenő Fekete.

# Reproducible Batch-to-Batch, Column-to-Column

Every single Kinetex® column and Kinetex batch of media undergoes an incredible battery of quality assurance tests to ensure that you are getting the best column every time. Such tests include particle size distribution (both solid core and shell thickness), surface coverage, carbon load, pore diameter distribution, and many other parameters to ensure exceptional reproducibility.

## C18 Batch-to-Batch Overlay



### Conditions same for all batches:

- Columns:** Kinetex 2.6  $\mu$ m C18
- Dimensions:** 50 x 4.6 mm
- Part No.:** 00B-4462-E0
- Mobile Phase:** Water / Acetonitrile (65:35)
- Flow Rate:** 1.0 mL/min
- Temperature:** Ambient
- Detection:** UV @ 254 nm
- Sample:**
  1. Uracil
  2. Hydroxycortisone
  3. Cortisone
  4. Cortisone acetate
  5. 17-Hydroxyprogesterone

“ Does your current column manufacturer give you the same assurances or results? ”



**\$ 460,000**

Savings for a cleaning  
validation method\*

**2,650%**

Decrease in solvent usage\*

**90%**

Average efficiency increase over  
fully porous 5  $\mu\text{m}$ \*

**5**

Selectivities  
C18, XB-C18, C8,  
Phenyl-Hexyl, and HILIC

**23**

Hours saved converting  
to Kinetex\*

# Shockingly Better Performance

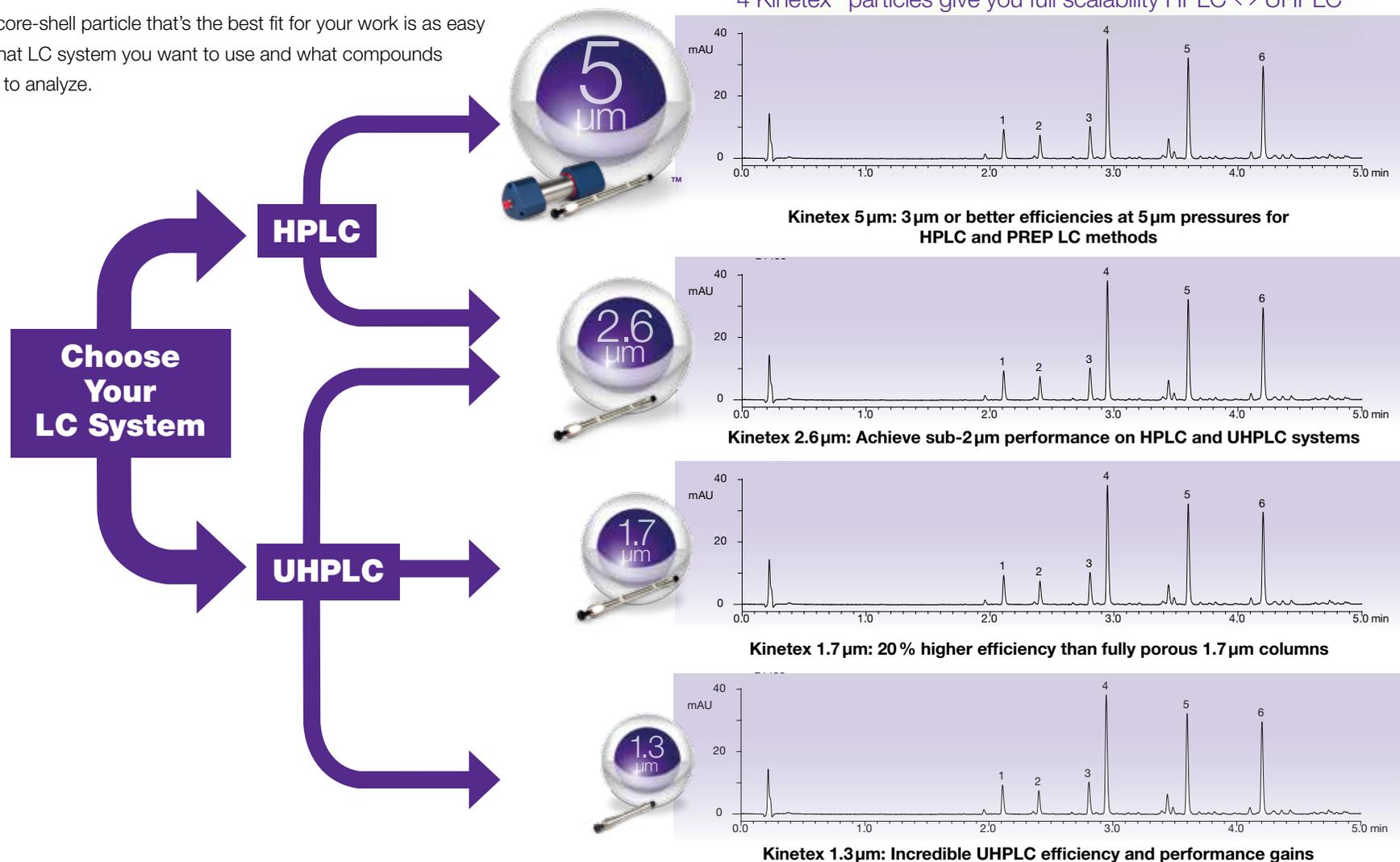
than your current HPLC/UHPLC column. **Guaranteed!**



\*Results may not be representative of all applications. See [www.phenomenex.com/kinetex](http://www.phenomenex.com/kinetex) for details.

# Selecting the Optimal Core-Shell Particle For Small Molecules

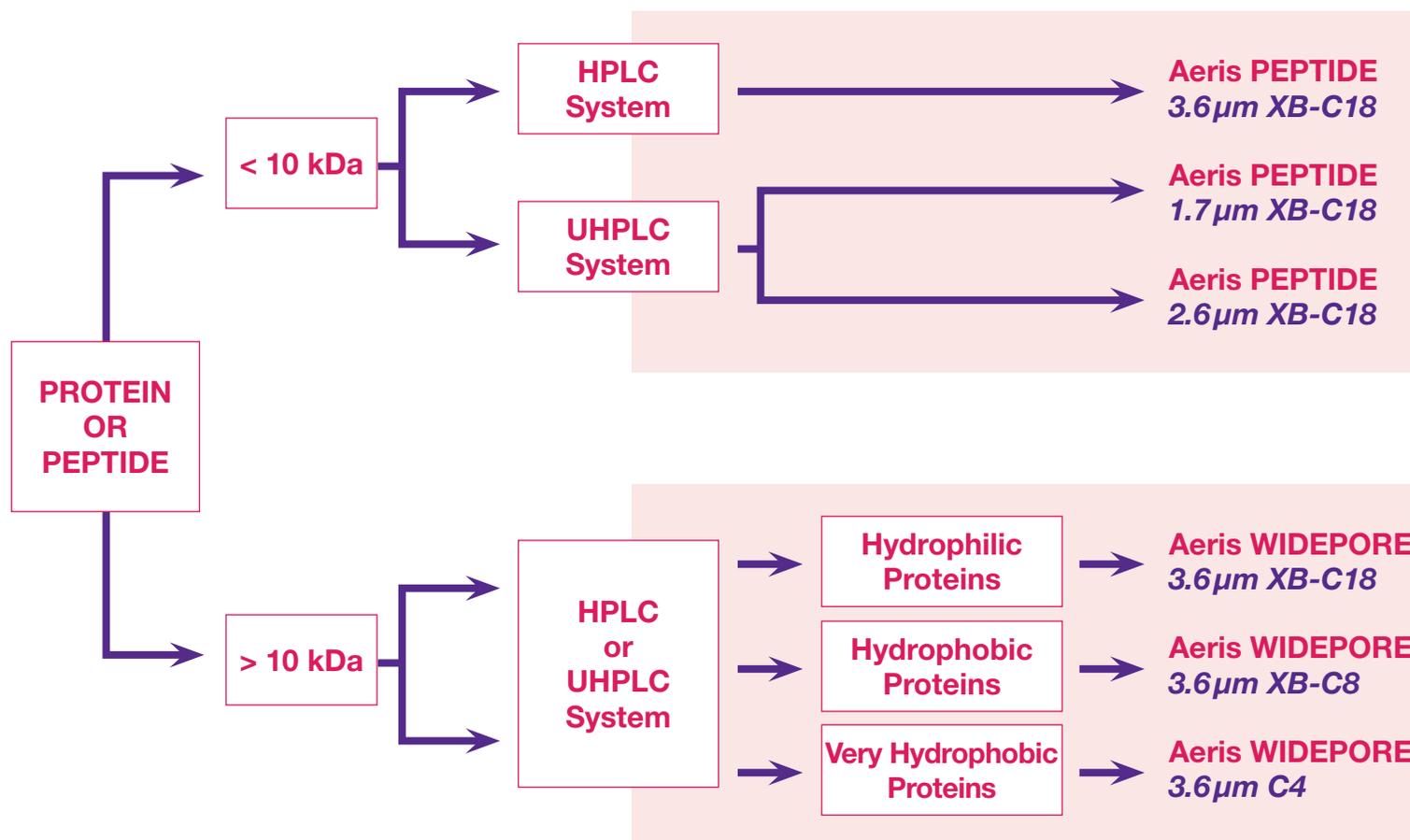
Selecting the core-shell particle that's the best fit for your work is as easy as knowing what LC system you want to use and what compounds you're looking to analyze.



# Selecting the Optimal Core-Shell Particle For Proteins/Peptides

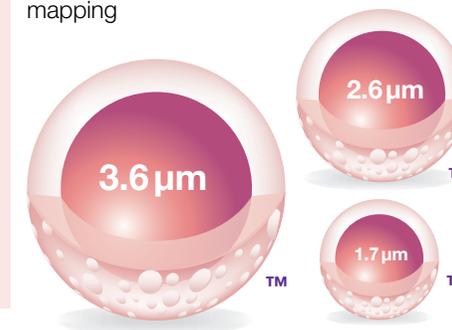
## Working with synthetic RNA/DNA?

Our Core-Shell Clarity® Oligo-MS™ columns were specifically engineered for this type of application. Find more info at: [www.phenomenex.com/clarity](http://www.phenomenex.com/clarity)



## Aeris™ PEPTIDE

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



## Aeris WIDEPORE

Recommended for the separation of intact proteins and polypeptides



Find more Aeris information online at: [www.phenomenex.com/Aeris](http://www.phenomenex.com/Aeris)

## Better Performance than 5 $\mu\text{m}$ and 3 $\mu\text{m}$ Fully Porous Columns with **Kinetex<sup>®</sup> 5 $\mu\text{m}$**

**Isocratic** – Kinetex 5  $\mu\text{m}$  columns have clear efficiency gains over both 5 and 3  $\mu\text{m}$  fully porous columns at 5  $\mu\text{m}$  pressure

**Gradient** – Kinetex 5  $\mu\text{m}$  columns have 3  $\mu\text{m}$  or better peak capacities at 5  $\mu\text{m}$  pressure



### Critical advantages of low HPLC system backpressures with Kinetex 5 $\mu\text{m}$ columns

- Longer column lifetime
- Higher throughput
- Increased system compatibility and method transferability

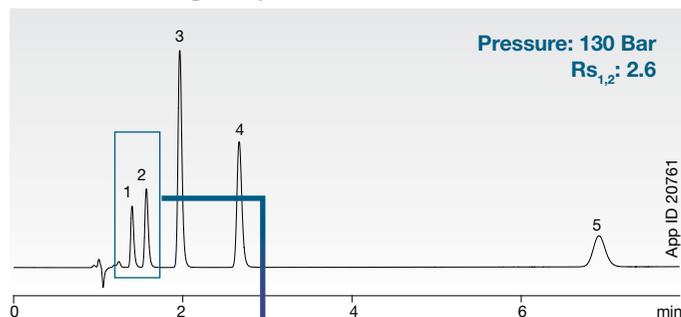


# Instantly Improve 5 µm and 3 µm Methods

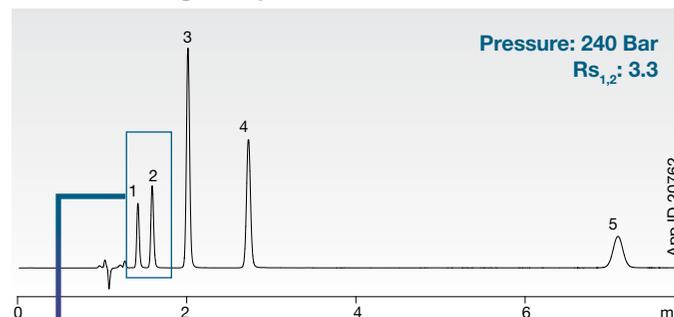
Immediately improve resolution, productivity, and sensitivity of your current 3 µm and 5 µm HPLC methods with **Kinetex 5 µm** core-shell technology. This core-shell particle was specifically developed for use on standard or older model HPLC systems that may have low pressure limitations.

## Higher Resolution with No Pressure Increase

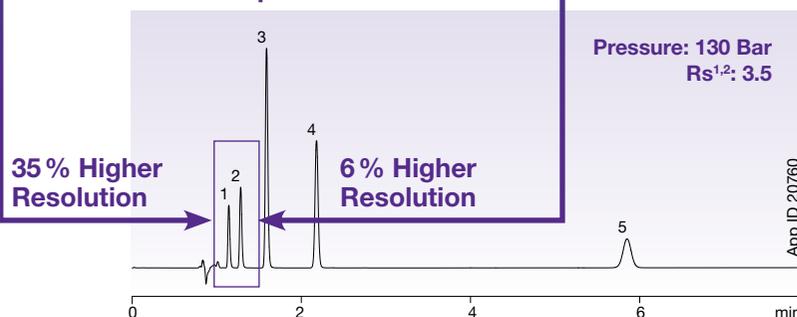
Waters® XBridge® 5 µm C18



Waters XBridge 3.5 µm C18

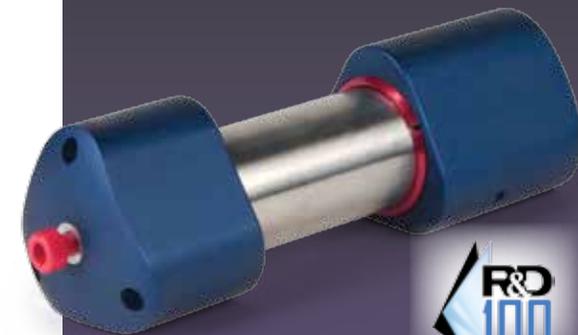


Kinetex 5 µm C18



**Conditions for all columns:**

- Columns:** Kinetex 5 µm C18  
XBridge 5 µm C18  
XBridge 3.5 µm C18
- Dimension:** 150 x 4.6 mm
- Mobile Phase:** Water/Acetonitrile/Phosphoric acid (600:400:2)
- Flow Rate:** 1.5 mL/min
- Temperature:** Ambient
- Detection:** UV @ 235 nm
- Sample:** 1. Impurity A  
2. Impurity B  
3. Acetylsalicylic acid  
4. Salicylic acid  
5. Impurity D



Award Recipient

## First and Only Core-Shell Material for Axia™ Preparative Purifications

The new Axia packed Kinetex 5 µm will provide incredible gains in efficiency and performance for any of your Prep LC methods. Learn more online at:

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

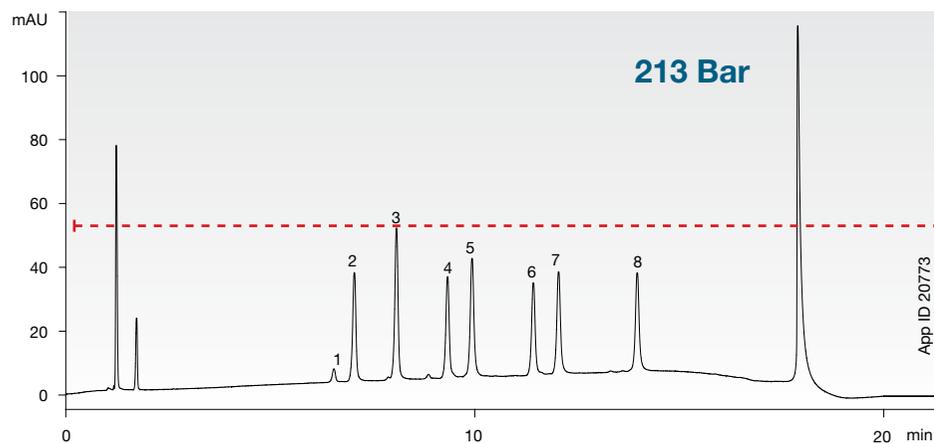
Waters and XBridge are registered trademarks of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Comparative separations may not be representative of all applications.



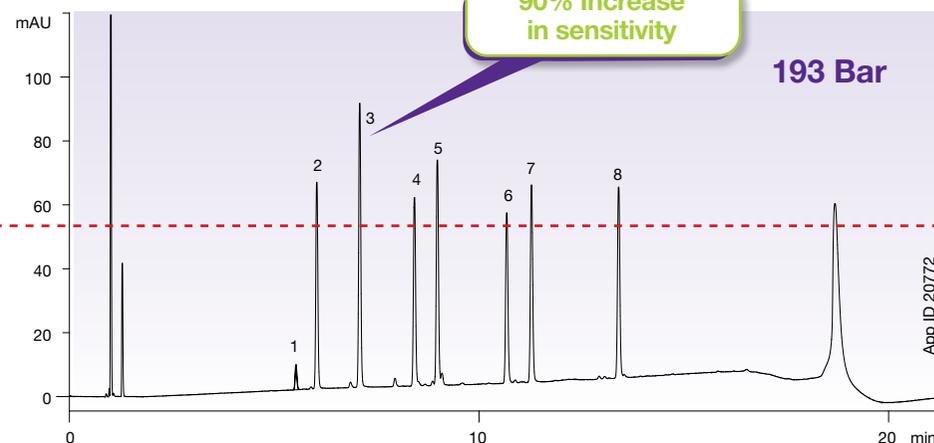
## Enhanced Sensitivity without Pressure Increase

**Kinetex 5 µm** core-shell columns easily provide enhanced sensitivity on any HPLC system without an increase in backpressure.

Macherey Nagel NUCLEOSIL® 5 µm C18



Kinetex® 5 µm C18



**Conditions for both columns:**

**Columns:** Kinetex 5 µm C18  
NUCLEOSIL 5 µm C18

**Dimension:** 150 x 4.6 mm

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

Gradient:	Time (min)	% B
	0	30
	15	95
	16	95
	17	30
	20	30

**Flow Rate:** 1.5 mL/min

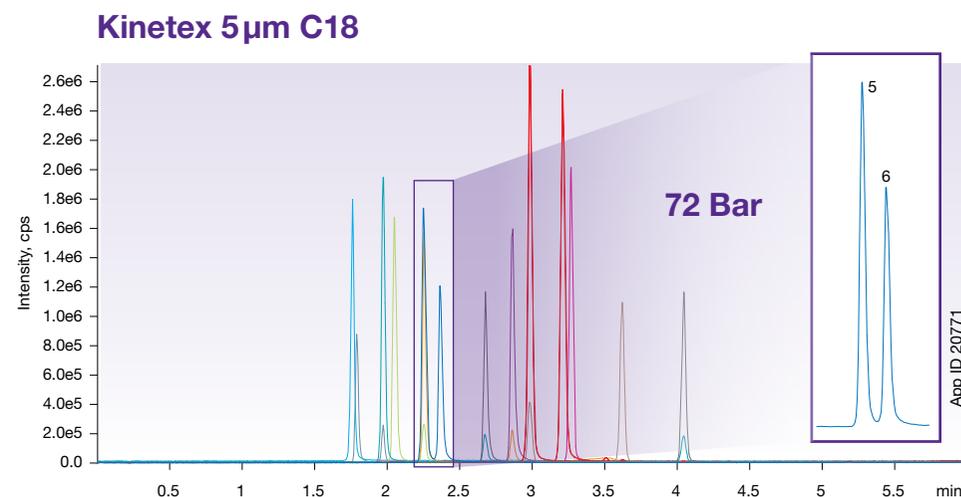
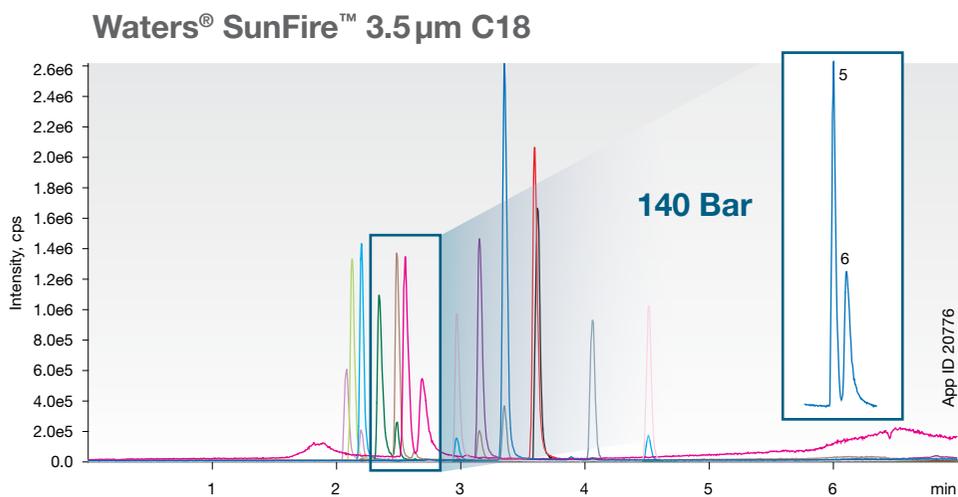
**Temperature:** Ambient

**Detection:** UV @ 205 nm

**Sample:** 1. 6-Gingerol (1) 5. 6-Shogaol  
2. 6-Gingerol (2) 6. 10-Gingerol  
3. Capsaicin 7. 8-Shogaol  
4. 8-Gingerol 8. 10-Shogaol

# Increased Resolution at a Fraction of the Pressure

Alongside LC/UV analyses, the high performance and low pressure of the **Kinetex 5 μm** make it an excellent tool for LC/MS and LC/MS/MS. Pull out isobaric ions with the high efficiency of Kinetex 5 μm, all at low 5 μm backpressures that promote longer column lifetime and less system strain.



**Conditions for both columns:**

**Columns:** Kinetex 5 μm C18  
SunFire 3.5 μm C18

**Dimension:** 50 x 2.1 mm

**Mobile Phase:** A: 30 mM Ammonium formate  
B: Acetonitrile

Gradient: Time (min)	% B
0	5
5	60
5.1	100
6	100
7	5

**Flow Rate:** 0.5 mL/min

**Temperature:** Ambient

**Detection:** MS/MS (API 4000™)

**Sample:**

1. DMIP	8. Harman
2. IQx	9. Norharman
3. IQ	10. PhIP
4. 8-MeIQ	11. AaC
5. 4,8-DiMe-IQx	12. MeAaC
6. 7,8-DiMe-IQx	13. MeIQ
7. Trp-P-2	

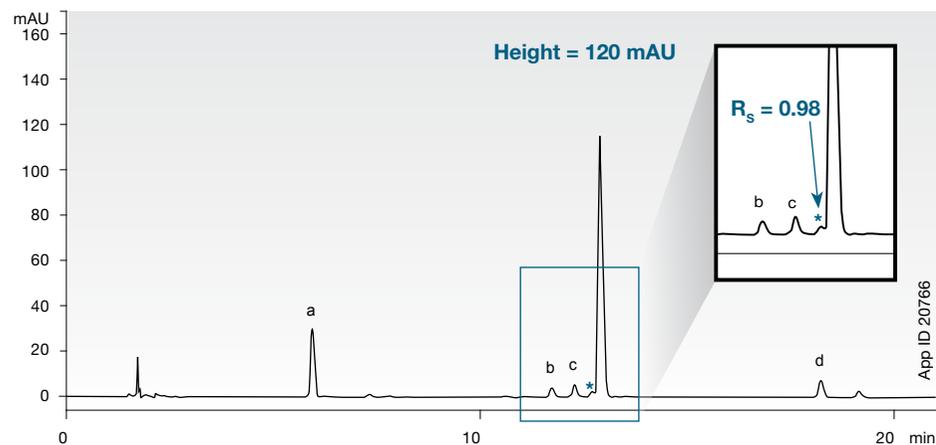
Waters is a registered trademark and SunFire is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Comparative separations may not be representative of all applications.



## Increased Resolution and Sensitivity

By simply dropping in a **Kinetex 5 μm** for this paroxetine stability-indicating assay you get an impressive enhancement in resolution and sensitivity. Now imagine what this column can do for your other 3 and 5 μm methods.

### Agilent® ZORBAX® 5 μm XDB-C18



#### Conditions for both columns

**Column:** Kinetex 5 μm C18  
ZORBAX 5 μm XDB-C18

**Dimensions:** 250 x 4.6 mm

**Mobile Phase:** A: TFA/Water/THF (5:900:100)  
B: TFA/Acetonitrile/THF (5:900:100)

Gradient: Time (min)	% B
0	10
40	80

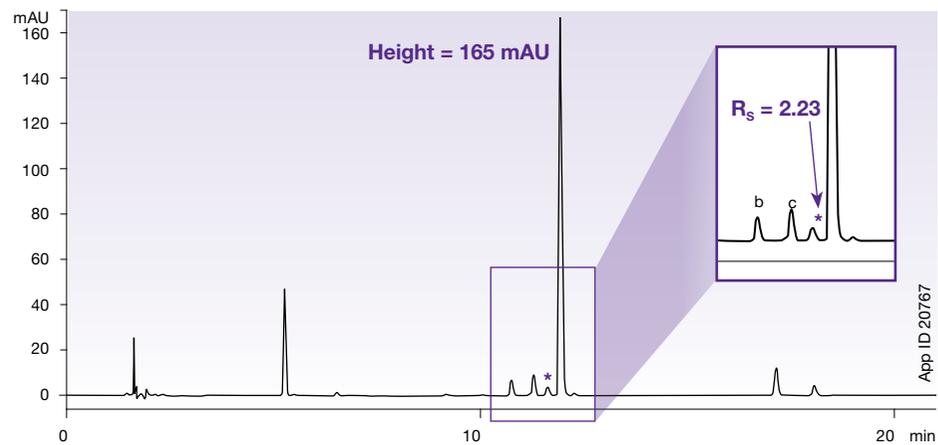
**Flow Rate:** 1.5 mL/min

**Temperature:** 40 °C

**Detection:** UV @ 295 nm

**Sample:** 1. Impurity A  
2. Impurity B  
3. Impurity C  
4. Unidentified  
5. Paroxetine  
6. Impurity D

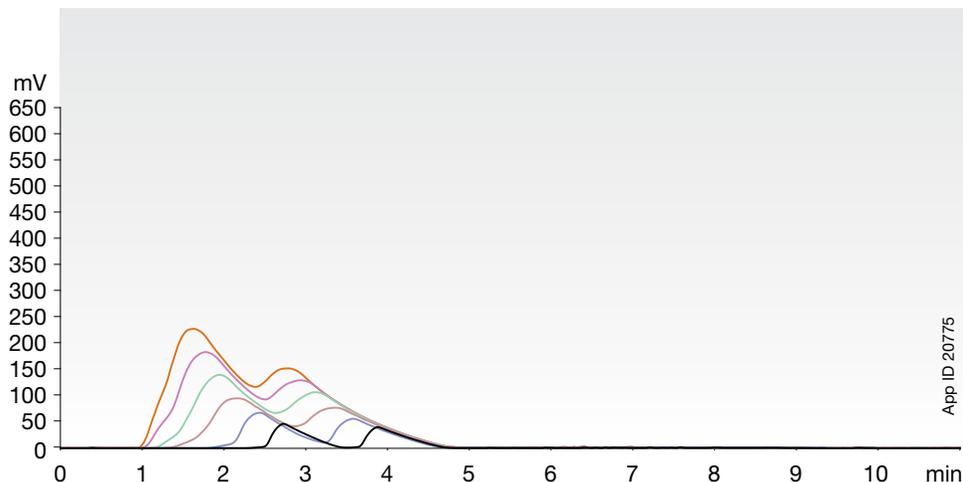
### Kinetex® 5 μm XB-C18



# First and Only Core-Shell Material for Axia™ PREP Purifications

In addition to being completely scalable with the Kinetex 1.3µm, 1.7µm, and 2.6µm particles, the **Kinetex 5µm** column is now available in the revolutionary Axia preparative format. Axia packed Kinetex 5µm columns will provide incredible gains in efficiency and performance for all your reversed phase preparative chromatography methods.

**Waters® XBridge® 5µm C18 Prep OBD™ 50 x 19 mm**



App ID 20775

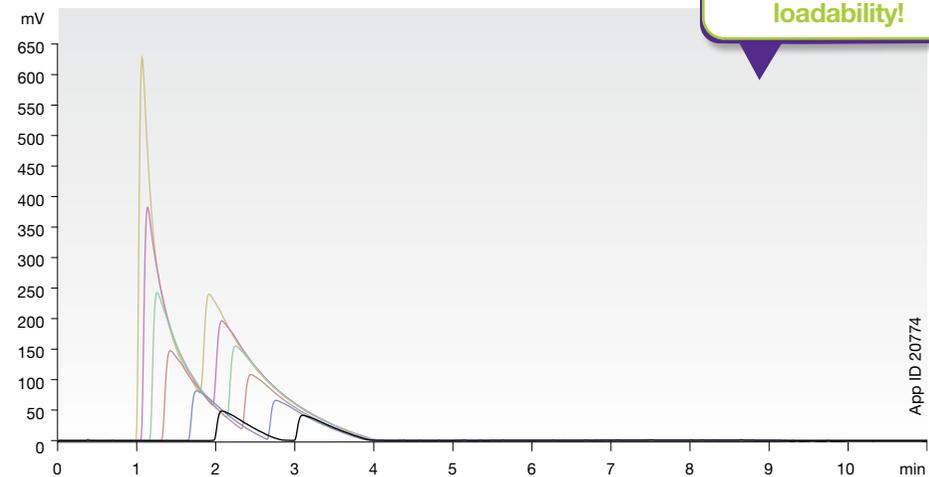
**Conditions for both columns:**

**Columns:** Kinetex 5µm C18 Axia-packed  
XBridge 5µm Prep OBD  
**Dimension:** 50 x 21.2 mm  
50 x 19 mm  
**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

**Flow Rate:** 30 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 254 nm  
**Sample:** 1. Doxepin  
2. Amitriptyline  
**Sample concentration:** 200 mg/mL in DMSO

**Kinetex 5µm C18 Axia 50 x 21.2 mm**



App ID 20774



OBD is a trademark, Waters and XBridge are registered trademarks of Waters Corporation (Milford, MA, USA). Phenomenex is not affiliated with Waters Corporation. Comparative separations may not be representative of all applications.

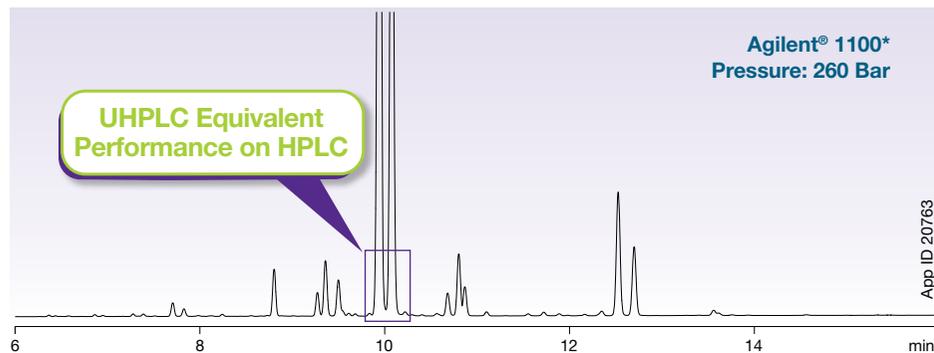


## A Versatile Upgrade for HPLC and UHPLC

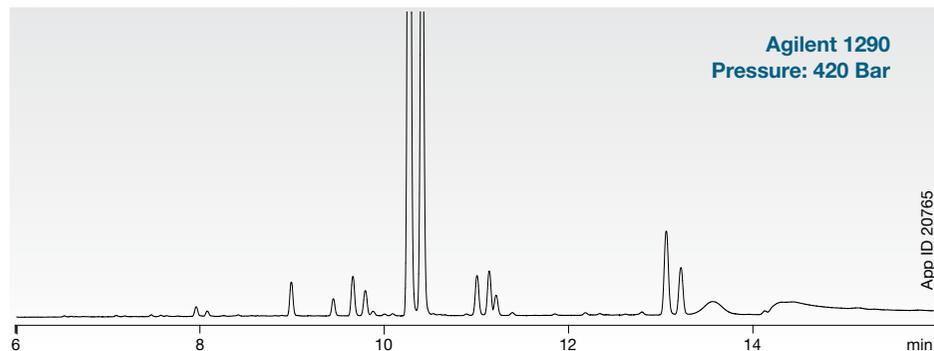
On a low volume HPLC or UHPLC system **Kinetex® 2.6 μm** columns will perform like a fully porous sub-2 μm column, providing up to 3x the efficiency of 5 μm and double the efficiency of 3 μm fully porous media. Dramatically improve the productivity and performance of your existing methods with the use of shorter Kinetex columns, all while decreasing your solvent usage!

### Sub-2 μm Performance with Kinetex 2.6 μm on HPLC and UHPLC Systems

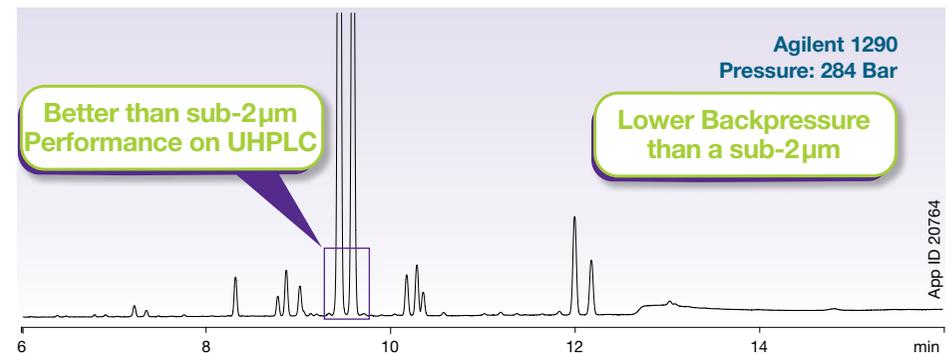
#### Kinetex 2.6 μm C18



#### Agilent® ZORBAX® 1.8 μm SB-C18



#### Kinetex 2.6 μm C18



#### Conditions for all columns same except where noted:

**Columns:** Kinetex 2.6 μm C18 (Agilent 1100\*)  
Kinetex 2.6 μm C18 (Agilent 1290)  
ZORBAX 1.8 μm SB-C18 (Agilent 1290)

**Dimension:** 100 x 4.6 mm

**Mobile Phase:** A: Water with 0.1% TFA  
B: Acetonitrile with 0.1% TFA

Gradient Time (min)	% B
0	10
20	70

**Flow Rate:** 1.2 mL/min

**Temperature:** Ambient

**Detection:** UV @ 210 nm

**Sample:** Mupirocin degradants

\* Agilent 1100 was optimized with the Core-Shell Performance Enhancement Kit A00-8892.

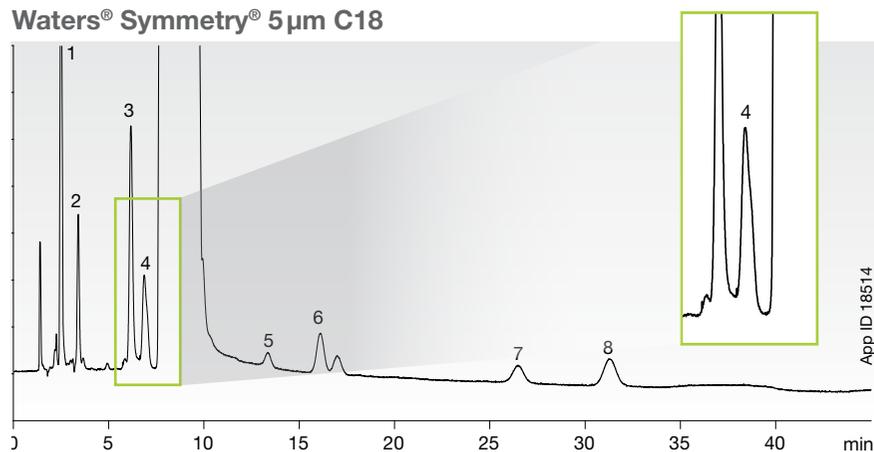
Agilent and ZORBAX are registered trademarks of Agilent Technologies, Inc. Phenomenex is not affiliated with Agilent Technologies. Comparative separations may not be representative of all applications.

# Replace 3 $\mu\text{m}$ and 5 $\mu\text{m}$ Columns. For Improved Speed, Resolution, and Sensitivity

Generating much lower backpressure (< 400 bar) at optimal linear velocities, you can now achieve 2-3x's the column efficiencies of traditional fully porous 3  $\mu\text{m}$  and 5  $\mu\text{m}$  columns on any LC instrument.

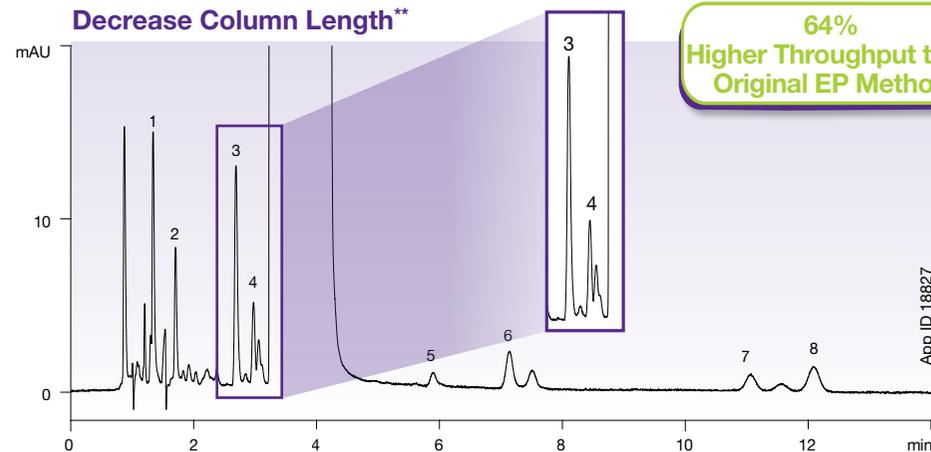
## \*Ph. Eur. Specified 5 $\mu\text{m}$ C18 Column

Waters® Symmetry® 5  $\mu\text{m}$  C18



**Dimensions:** 150 x 3.9 mm  
**Mobile Phase:** 12.5 mM Phosphoric acid in Water, pH 3.0 + 2.0 g Sodium octanesulfonate + 0.8 g Tetrabutyl ammonium hydrogen sulfate / Methanol / THF (80:18:2)  
**Flow Rate:** 0.6 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 226 nm  
**Sample:** Atenolol Related Substance  
 1. Impurity B                      5. Impurities D and E  
 2. Impurity A                      6. Impurity F  
 3. Impurity J                      7. Impurity G  
 4. Impurity I                      8. Impurity H

Decrease Column Length\*\*



**Column:** Kinetex 2.6  $\mu\text{m}$  C18  
**Dimensions:** 100 x 4.6 mm  
**Part No.:** 00D-4462-E0  
**Mobile Phase:** 12.5 mM Phosphoric acid in Water, pH 3.0 + 2.0 g Sodium octanesulfonate + 0.8 g Tetrabutyl ammonium hydrogen sulfate / Methanol / THF (80:18:2)  
**Flow Rate:** 0.9 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 226 nm  
**Sample:** Atenolol Related Substance  
 1. Impurity B                      5. Impurities D and E  
 2. Impurity A                      6. Impurity F  
 3. Impurity J                      7. Impurity G  
 4. Impurity I                      8. Impurity H

\* European Pharmacopeia (Ph. Eur.)  
 Waters and Symmetry are registered trademarks of Waters Corporation. Phenomenex is not affiliated with Waters Corporation.  
 Comparative separations may not be representative of all applications.

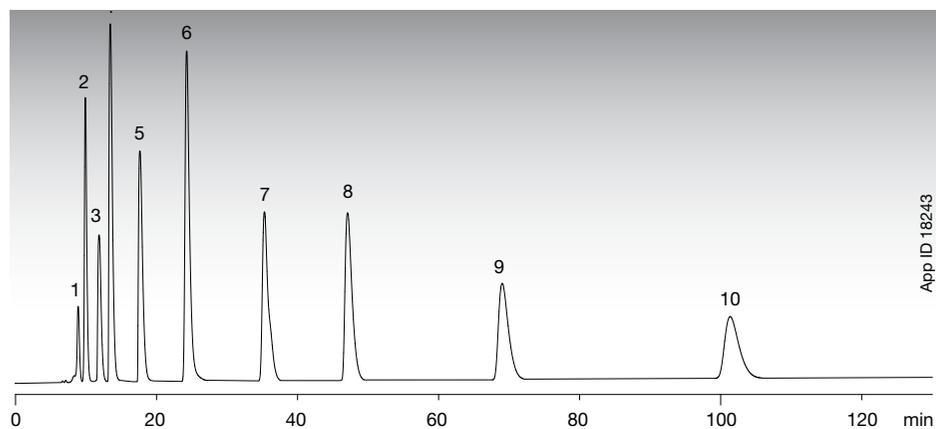
\* Decrease in column particle within allowable Ph. Eur. and USP pharma particles size change (+/- 50%)  
 \*\* Decrease in column length within allowable Ph. Eur. and USP column length change (+/- 70%)



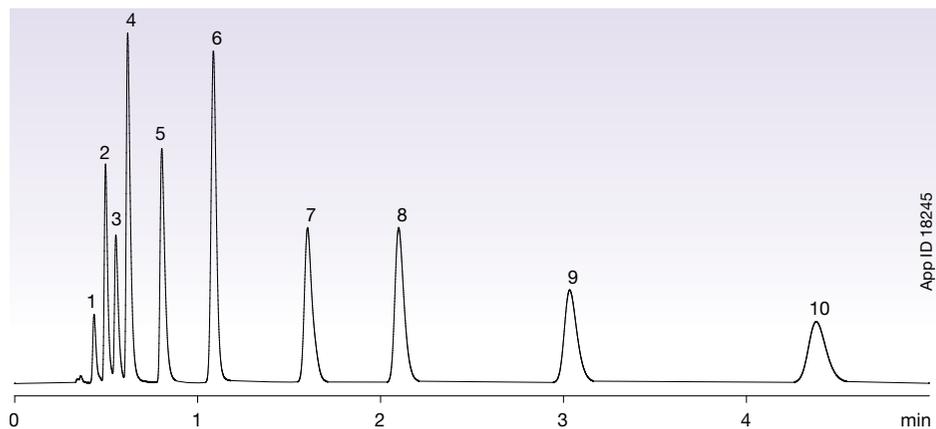
## Improve Performance, Save Solvent

When chromatographic column performance improves you can decrease your analysis time and also decrease your overall solvent consumption without compromising your separations. Use Kinetex® Core-Shell Technology to dramatically decrease the solvent consumption in your laboratory and increase sample throughput.

### Example Method Consumption



### Less Solvent Consumption with Kinetex Column



110 mL  
solvent per run!



**Column:** Traditional 5 μm C18  
**Dimensions:** 250 x 4.6 mm  
**Flow Rate:** 1.0 mL/min

< 4 mL  
solvent per run!



**Column:** Kinetex 2.6 μm C18  
**Dimensions:** 50 x 2.1 mm  
**Flow Rate:** 1.0 mL/min

#### Conditions for both columns:

**Mobile Phase:** A: 20 mM Potassium phosphate pH 7  
B: Methanol / Acetonitrile (50:50)  
A/B (48:52)

**Temperature:** 40 °C

**Detection:** UV @ 254 nm

**Sample:**

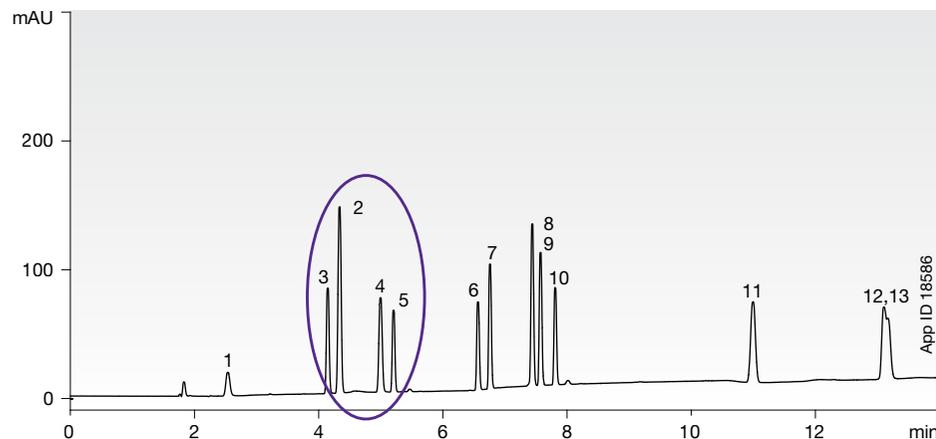
1. Tianeptine	6. Amoxapine
2. Desmethyldoxepin	7. Doxepin
3. Protriptyline	8. Nortriptyline
4. Desipramine	9. Amitriptyline
5. Imipramine	10. Clomipramine

Comparative separations may not be representative of all applications.

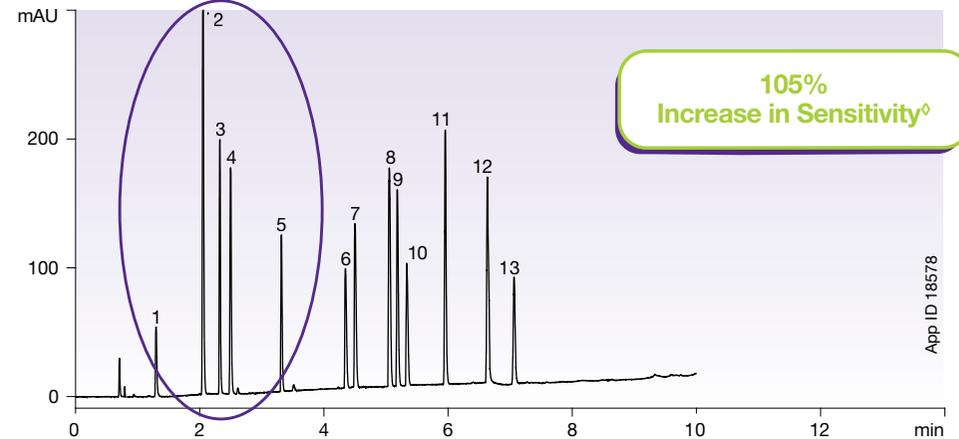
# Increased Sensitivity

The combination of the uniform particle shape, narrow particle size distribution, and the significantly shorter diffusion path results in much higher column efficiencies and increased chromatographic resolution. The increased efficiencies provide an immediate benefit in sensitivity since higher chromatographic efficiencies translate into significantly narrower and taller peaks, making it easier to detect low level impurities.

### GL Sciences Inertsil® 5µm ODS-3 250 x 4.6 mm



### Kinetex 2.6µm C18 150 x 4.6 mm



Conditions same for both columns except where noted:

**Columns:** Kinetex 2.6µm C18 100 Å  
Inertsil 5µm ODS-3 100 Å

**Dimensions:** Kinetex: 150 x 4.6 mm  
Inertsil: 250 x 4.6 mm

**Mobile Phase:** A: 0.1% Phosphoric acid in Water  
B: 0.1% Phosphoric acid in Acetonitrile

**Gradient:** 5% to 95% B in 9 min (150 x 4.6 mm)  
5% to 95% B in 15 min (250 x 4.6 mm)

**Flow Rate:** 1.8 mL/min  
**Temperature:** 50 °C

**Detection:** UV @ 215 nm (22 °C)

**Sample:** 1. Procainamide  
2. Acetaminophen  
3. Folic acid  
4. Sulfathiazole  
5. Acetabotolol  
6. Dextromethorphan  
7. Diphenhydramine  
8. Propafenone  
9. Amitriptyline  
10. Fluoxetine  
11. Naproxen  
12. Diflunisal  
13. Indomethacin

° Signal-to-noise ratio of peak 2

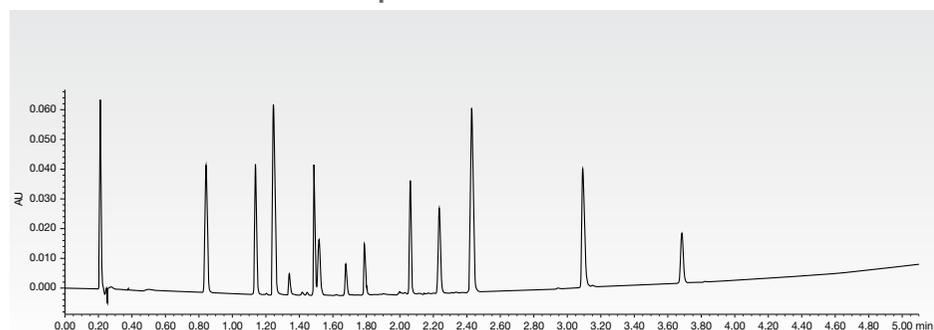
Inertsil is a registered trademark of GL Sciences Inc. Phenomenex is in no way affiliated with GL Sciences Inc. Comparative separations may not be representative of all applications.



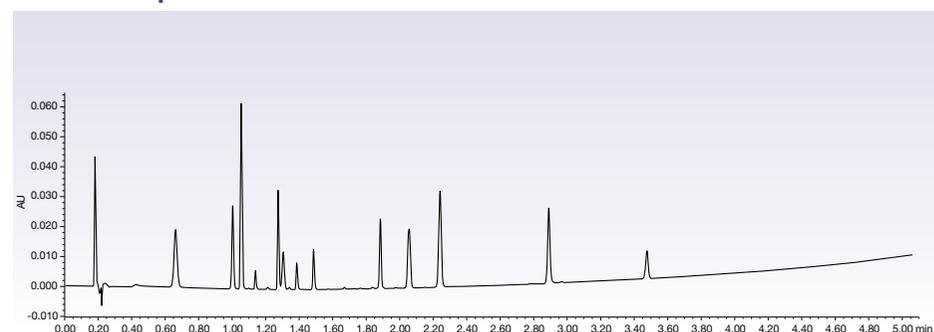
## Higher Peak Capacities than Traditional Sub-2 $\mu$ m Columns

With higher peak capacities than traditional sub-2 $\mu$ m fully porous columns, **Kinetex® 2.6 $\mu$ m** columns give you the ability to use different size columns depending on your ultimate needs.

Waters® ACQUITY® BEH™ 1.7 $\mu$ m C18



Kinetex 2.6 $\mu$ m C18



**Conditions for both columns:**

**Dimension:** 50 x 21.2 mm

**Mobile Phase:** A: Water with 0.1% Formic acid  
B: Acetonitrile with 0.1% Formic acid

**Gradient:** 5% to 95% B in 5 min

**Flow Rate:** 0.6 mL/min

**Temperature:** 22 °C

**Detection:** UV @ 254 nm

**Sample:**

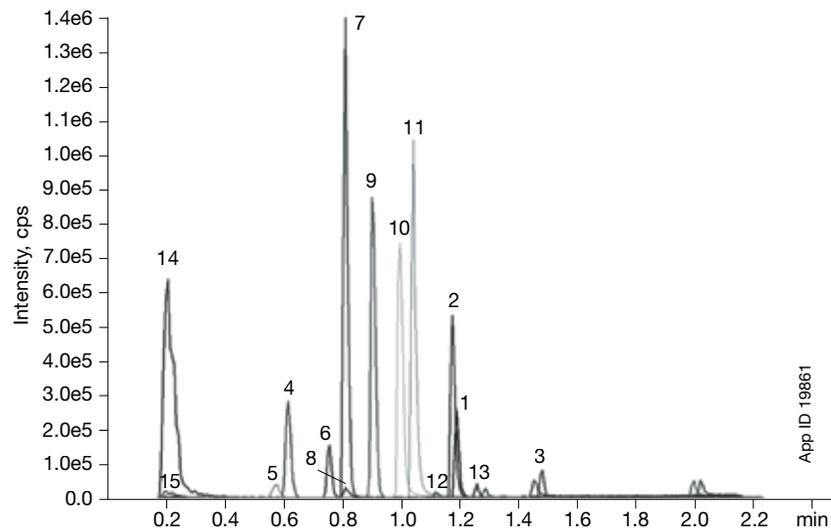
1. Pyridine	8. Chlorpheniramine
2. Acetaminophen	9. Triprolidine
3. Sulfathiazole	10. Prednisolone
4. Pindolol + Quinidine	11. 3-Methyl, 4-nitrobenzoic Acid
5. Benzyl Alcohol	12. Nortriptyline
6. Phenol	13. 2-Hydroxy, 5-methyl benzaldehyde
7. Acebutolol	14. Diflunisal
	15. Hexanophenone

Waters and ACQUITY are registered trademarks and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation.  
Comparative separations may not be representative of all applications.

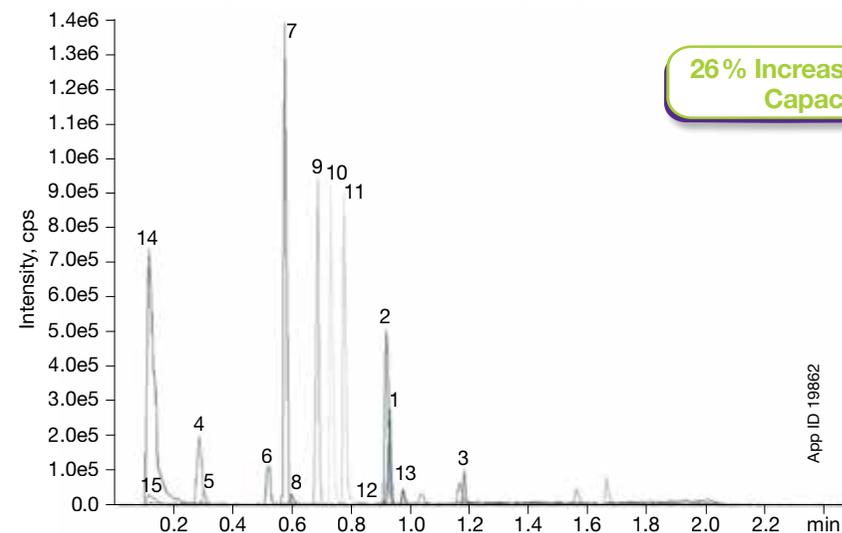
# Kinetex 2.6 μm Advantage On Your UHPLC System

Increased peak capacity is achieved with **Kinetex 2.6 μm** when compared to sub-2 μm columns at the same pressure. Take full advantage of your UHPLC system with Kinetex 2.6 μm columns.

**Traditional 1.7 μm C18**  
Peak Capacity: 34.4 @ 7700 psi (531 bar)\*



**Kinetex 2.6 μm C18**  
Peak Capacity: 43.5 @ 7700 psi (531 bar)\*



**26% Increase in Peak Capacity\***

**Conditions for both columns:**

**Dimensions:** 50 x 2.1 mm  
**Mobile Phase:** A: 0.1% Formic acid in Acetonitrile  
 B: 0.1% Formic acid (aq)  
**Gradient:**

Time (min)	% B
0.00	95
0.25	95
1.80	10
1.90	10
1.91	95
2.50	95

**Sample:**

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

**Temperature:** 40 °C  
**Detection:** MS  
**Instrument:** \*\*Waters ACQUITY® Binary UPLC®  
 \*\*API 5000™ QQQ  
**Flow Rate:** Kinetex: 1.4 mL/min  
 Traditional: 0.8 mL/min

**It Doesn't Stop Here!**  
 34% increase in peak capacity and a 3.5 x's increase in sensitivity was achieved! Download technical note TN-1104 at [www.phenomenex.com/kinetex](http://www.phenomenex.com/kinetex) (technical resource/technical library) to learn how.

Data generated by Quotient Bioresearch, U.K.  
 \*\*ACQUITY and UPLC are registered trademarks of Waters Corporation. API 5000 is a trademark of AB SCIEX.  
 Phenomenex is not affiliated with Waters Corporation.  
 \*Comparative separations may not be representative of all applications.

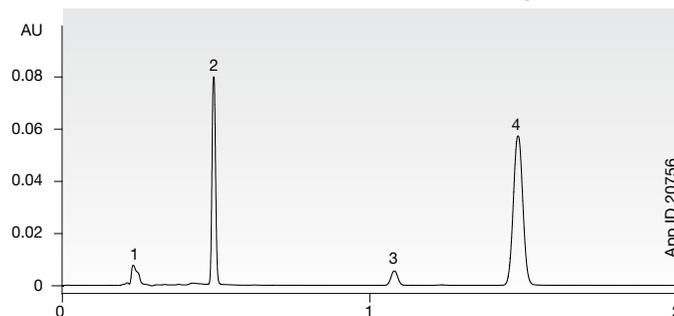


## Get the Most Performance Out of Your UHPLC System

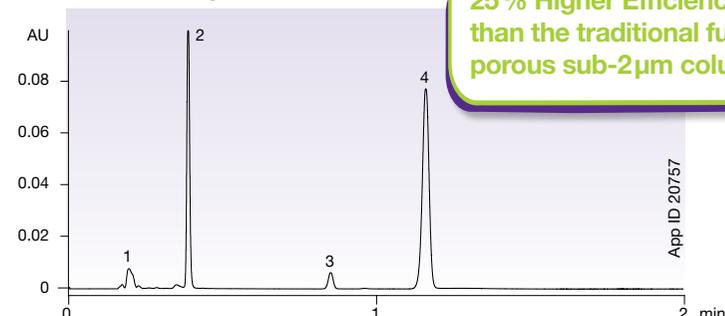
**Kinetex® 1.3 and 1.7 μm** Core-Shell Technology produces increased efficiencies over traditional sub-2-μm columns on the market, yielding remarkable chromatographic resolution, higher peak capacities, and greater sensitivity, so you can get the most out of every UHPLC analysis.

### Incredible Efficiency Gains

Waters® ACQUITY® UPLC® BEH™ 1.7 μm C18

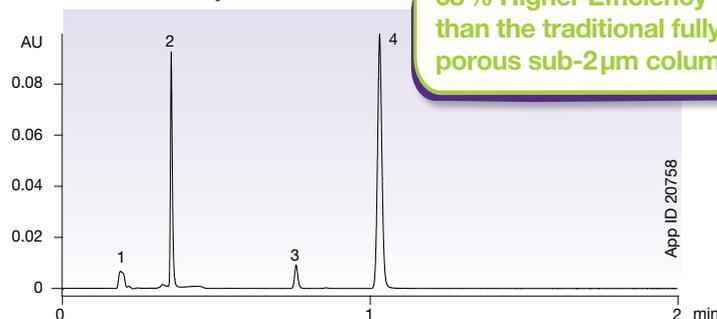


Kinetex 1.7 μm C18



25% Higher Efficiency than the traditional fully porous sub-2 μm column

Kinetex 1.3 μm C18



68% Higher Efficiency than the traditional fully porous sub-2 μm column

#### Conditions for all columns:

**Columns:** Kinetex 1.7 μm C18  
Kinetex 1.3 μm C18  
ACQUITY UPLC BEH 1.7 μm C18

**Dimension:** 50 x 2.1 mm  
**Mobile Phase:** Acetonitrile / Water (50:50)  
**Flow Rate:** 0.5 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 254 nm  
**Instrument:** Waters® ACQUITY® UPLC®  
**Sample:** 1. Acetophenone  
2. Benzene  
3. Toluene  
4. Naphthalene

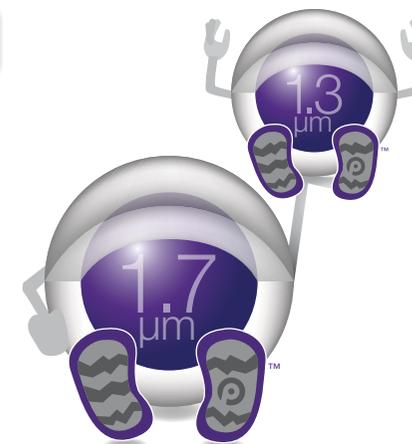
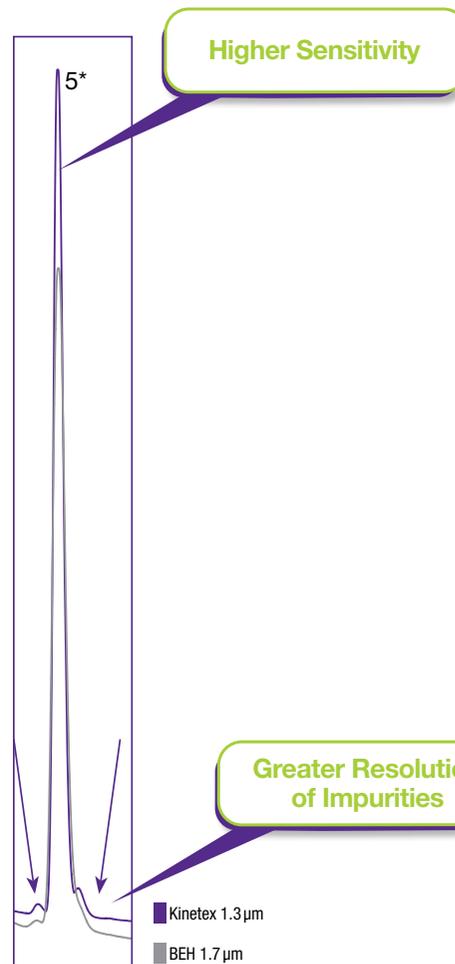
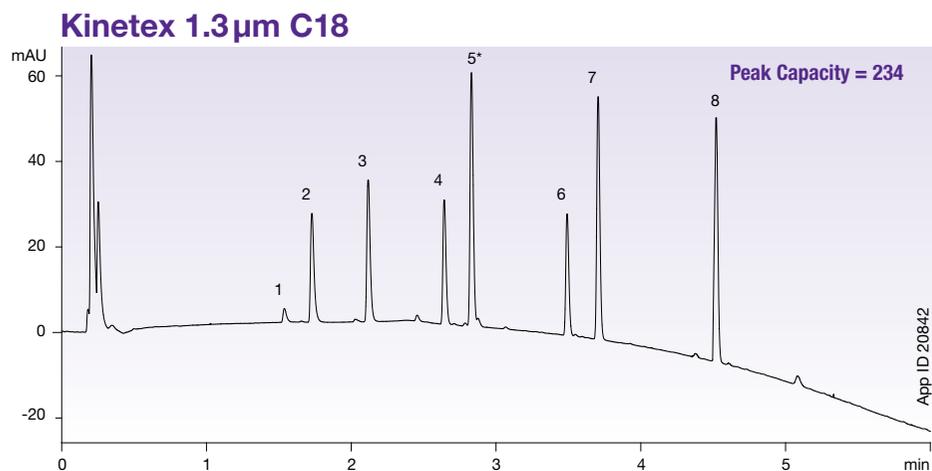
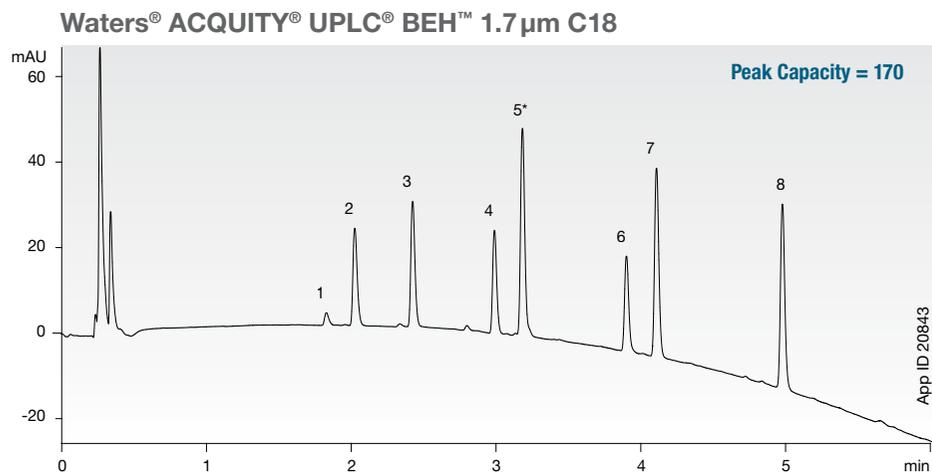
Easy Installation on UHPLC Systems

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



Efficiency calculated from peak 4 in each chromatogram. Waters, ACQUITY, and UPLC are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is not affiliated with Waters Corporation. Comparative separations may not be representative of all applications.

# Better Sensitivity, Resolution, and Peak Capacity



**Conditions for both columns:**  
**Column:** Kinetex 1.3 μm C18  
 ACQUITY UPLC BEH 1.7 μm C18  
**Dimensions:** 50 x 2.1 mm  
**Mobile Phase:** Acetonitrile / Water (50:50)  
**Gradient:**

Time (min)	% B
0	30
5	95

**Flow Rate:** 0.5 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 214 nm  
**Instrument:** Waters ACQUITY UPLC  
**Sample:**

- 6-Gingerol (1)
- 6-Gingerol (2)
- Capsaicin
- 8-Gingerol
- 6-Shogal
- 10-Gingerol
- 8-Shogal
- 10-Shogal

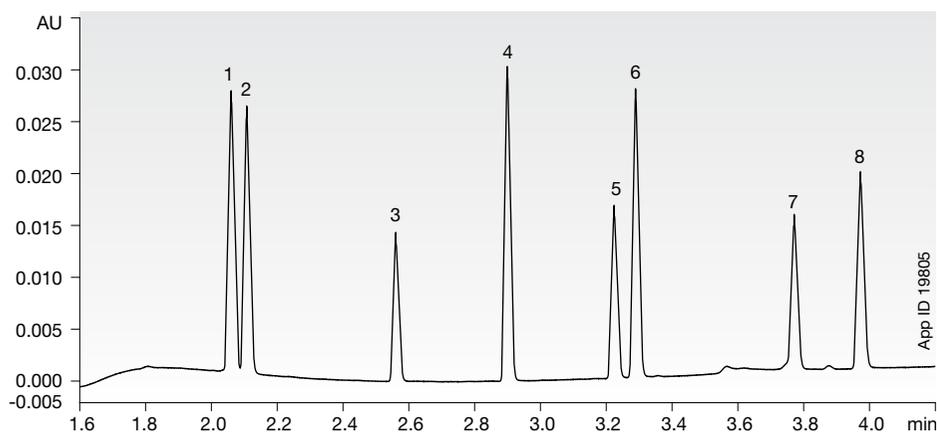
Waters, ACQUITY, and UPLC are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Phenomenex is in no way affiliated with Waters Corporation. Comparative separations may not be representative of all applications.

# Kinetex® 1.7 µm for Higher Resolution

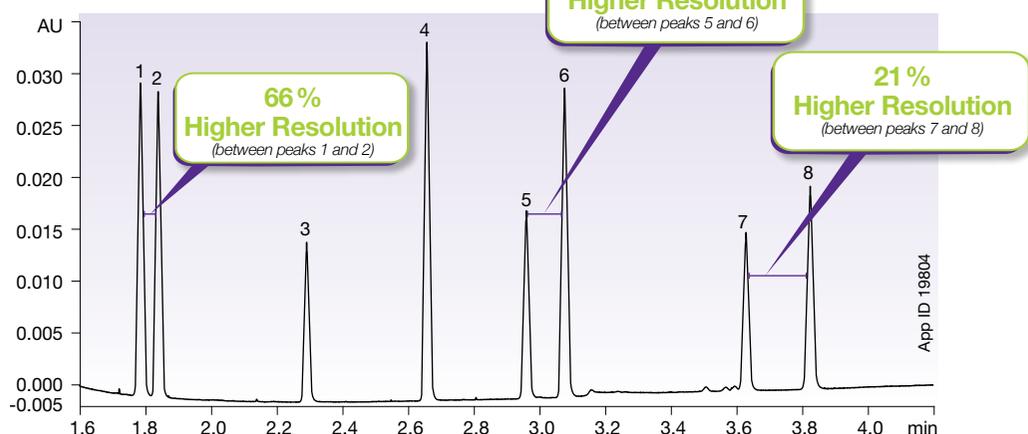


Do everything you can to make sure you are achieving the resolution needed by using a powerful Kinetex Core-Shell sub-2 µm column.

## Waters® ACQUITY® BEH™ 1.7 µm



## Phenomenex® Kinetex 1.7 µm



### 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:** 981 bar (Kinetex)  
935 bar (ACQUITY)

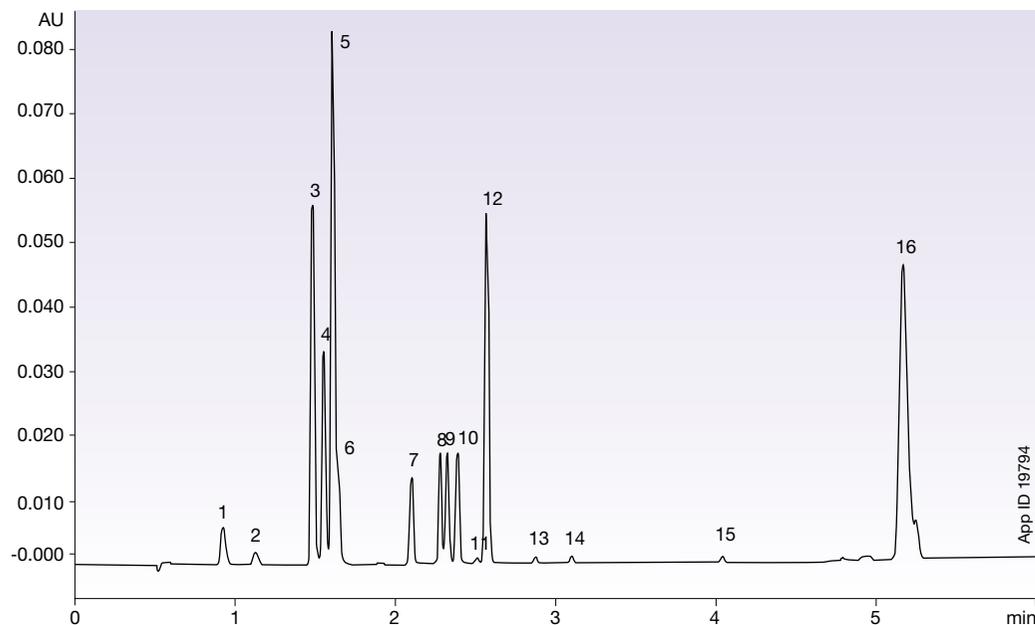
**Instrument:** Waters ACQUITY UPLC

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

Column	Resolution between Hydrocortisone and Cortisone	Resolution between DHEA (Dehydroepiandrosterone) and 17-Hydroxyprogesterone	Resolution between Deoxycorticosterone and Progesterone
Kinetex 1.7 µm XB-C18 150 x 2.1 mm	2.5 (66% increase)	5.0 (138% increase)	7.4 (21% increase)
ACQUITY® 1.7 µm BEH™ C18 150 x 2.1 mm	1.5	2.1	6.1

Waters, ACQUITY, and UPLC are registered trademarks, and BEH Technology is a trademark of Waters Corporation. Milli-Q is a registered trademark of Merck KGaA, Darmstadt, Germany. Phenomenex is not affiliated with Waters Corporation or Merck KGaA. Comparative separations may not be representative of all applications.

# Significant Cost Savings with Kinetex 1.7 $\mu\text{m}$



**Column:** Kinetex 1.7  $\mu\text{m}$  C18  
**Dimensions:** 100 x 2.1 mm  
**Part No.:** 00D-4475-AN  
**Mobile Phase:** A: 5 mM Ammonium formate pH 3.25 / Acetonitrile (95:5)  
 B: 5 mM Ammonium formate pH 3.25 / Acetonitrile (10:90)  
**Gradient:**

Time (min)	% B
0.0	30
1.5	50
3.0	56.3
5.0	95
6.0	95
6.1	30

**Flow Rate:** 0.4 mL/min  
**Temperature:** 50 °C  
**Detection:** PDA 210-300 nm, extracted channel 280 nm  
**Instrument:** Waters® ACQUITY® equipped with PDA

**Sample:**

1. Antidepressant drug (containing an HCl salt)
2. Hormone therapy #1 (containing a salt)
3. SERM drug (containing basic functional group)
4. CNS drug (containing basic functional group)
5. PPI drug (containing basic functional group)
6. CNS drug (containing basic functional group)
7. CNS drug (containing basic functional group)
8. Hormone therapy #2 (neutral)
9. Oral contraceptive hormone #1 (neutral)
10. Hormone therapy #3 (neutral)
11. Oral contraceptive hormone #2 (neutral)
12. Hormone therapy #4 (neutral)
13. Oral contraceptive hormone (neutral)
14. Hormone therapy #5 (neutral)
15. Hormone therapy #6 (acetate salt of 14)
16. Immunosuppressant drug (macromolecule, containing basic functional group)

“ It has been shown that the 1.7  $\mu\text{m}$  Kinetex 100 x 2.1 mm column was capable of resolving 16 different chemical entities with a 6 minute run time. This new analytical method will be used to replace 16 older methods thereby facilitating an annualised cost saving for the site of €320,000 ”

A. Charles, et. al., Pfizer Grange Castle, Grange Castle Business Park, Clondalkin, Dublin Republic of Ireland

# Kinetex® Columns are Compatible with All HPLC Instruments

Watch our quick and easy  
column installation videos at:

[http://www.phenomenex.com/  
Kinetex/TechnicalResources](http://www.phenomenex.com/Kinetex/TechnicalResources)

Verify that you are getting the  
highest performance with your new  
Kinetex column @  
[www.phenomenex.com/kinetexverify](http://www.phenomenex.com/kinetexverify)

The screenshot displays the Phenomenex website's Kinetex product page. At the top, the Phenomenex logo is visible, along with navigation links for 'products', 'our company', and 'technical resources'. A search bar and user account options are also present. The main banner features the headline 'Shocking Better Performance Than Your Current LC Column!' and the Kinetex logo. Below the banner, there are navigation tabs for 'Buy Column Selection', 'Core Shell Technology', 'Technical Resources', 'Application Search', 'Ask Our Guy', 'Care Club', and 'Order Now'. The central content area is titled 'Verify Your Kinetex Core-Shell Column Performance' and includes a paragraph explaining the benefits of core-shell technology. A '3 Simple Steps' section follows, detailing the process: 1. Run Performance Test, 2. Enter Performance Results, and 3. Review Performance Summary. Each step is accompanied by an icon and a brief description. At the bottom of the page, there are three columns for 'What's New', 'Technical Resources', and 'Product Videos', each with a 'Check Now' button. The footer contains a 'Sitemap' and 'Contact Us' link, social media icons, and a copyright notice for 2013 Phenomenex, Inc.

# Kinetex Columns are Compatible with All UHPLC Instruments

No matter which UHPLC system you have in your lab, it is easy to harness the power of Kinetex Core-Shell Technology.

**Agilent® 1290**



**Shimadzu® Nexera®**



**JASCO® X-LC**

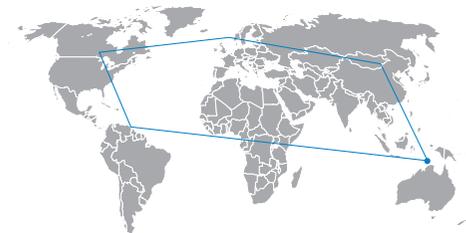


**Waters® ACQUITY® UPLC®**



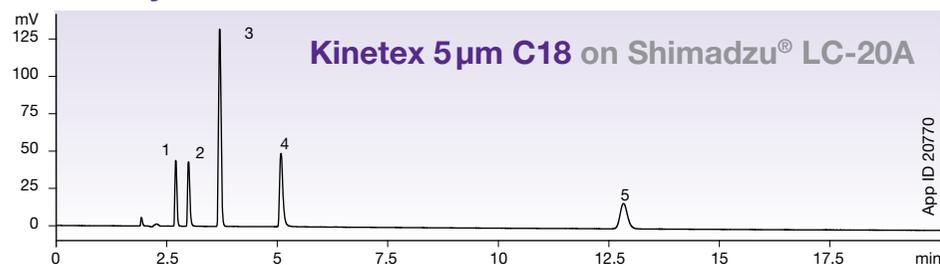
Waters, ACQUITY and UPLC are registered trademarks of Waters Corporation. Agilent is a registered trademark of Agilent Technologies, Inc. Shimadzu and Nexera are registered trademarks of Shimadzu Corporation. JASCO is a registered trademark of JASCO Corporation. Phenomenex is not affiliated with Agilent, JASCO, or Waters.

# Analytical Scalability and Portability, HPLC to UHPLC

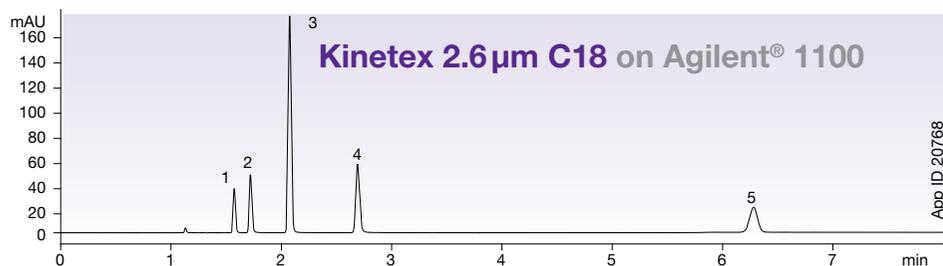


With **Kinetex® 5µm, 2.6µm, 1.7µm, and 1.3µm** Core-Shell Technology, you are no longer restricted from developing high performance LC methods on any system and transferring them anywhere. These four scalable Kinetex particle sizes offer you the ability to develop and transfer your method effortlessly from system to system.

## Portability



**Columns:** Kinetex 5µm C18  
**Dimension:** 250 x 4.6 mm  
**Part No.:** 00G-4601-E0



**Columns:** Kinetex 2.6µm C18  
**Dimension:** 150 x 4.6 mm  
**Part No.:** 00F-4462-E0

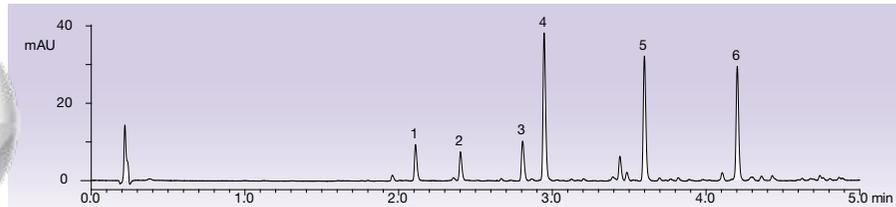
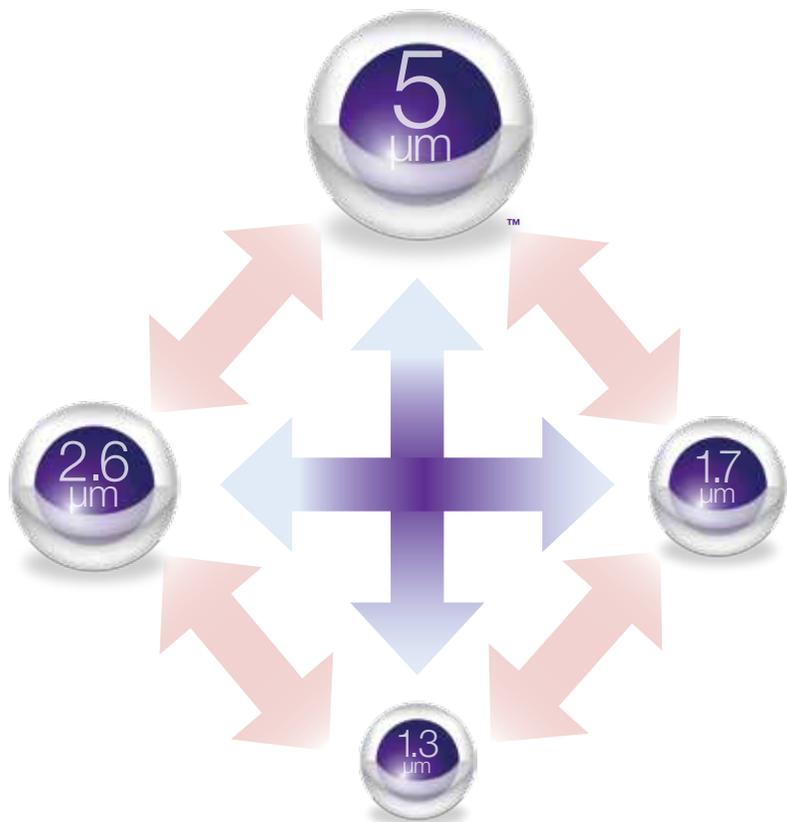


**Columns:** Kinetex 1.7µm C18  
**Dimension:** 50 x 3.0 mm  
**Part No.:** 00B-4475-Y0  
**Mobile Phase:** 680:320:2

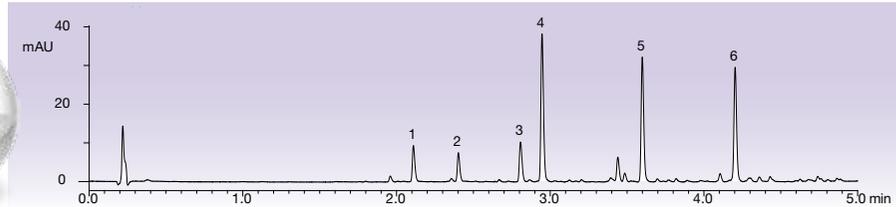
**Conditions are same except as noted:**  
**Mobile Phase:** Water/Acetonitrile/Phosphoric acid (600:400:2)  
**Flow Rate:** 1 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 237 nm  
**Sample:** 1. Impurity A  
 2. Impurity B  
 3. Impurity C  
 4. Acetylsalicylic acid  
 5. Impurity D

Agilent is a registered trademark of Agilent Technologies, Inc. Shimadzu is a registered trademark of Shimadzu Corporation. Phenomenex is not affiliated with Agilent Technologies. Comparative separations may not be representative of all applications.

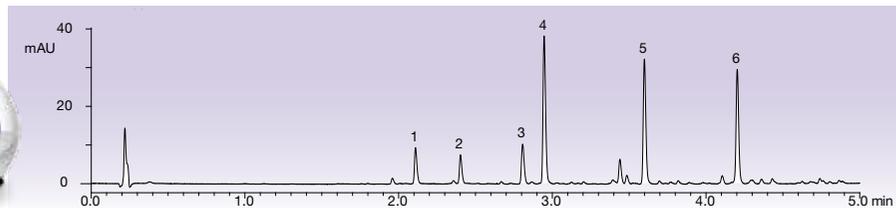
# 4 Kinetex Particles Give You Full Scalability from HPLC ↔ UHPLC



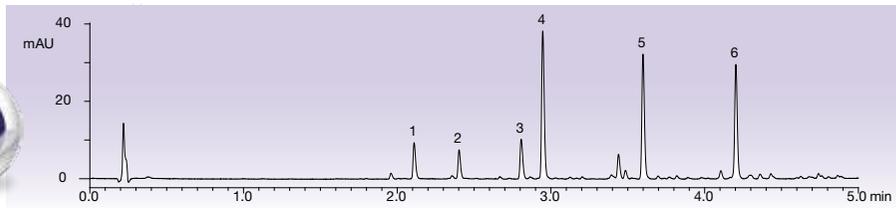
**Kinetex 5 μm: 3 μm or better efficiencies at 5 μm pressures for HPLC and PREP LC methods**



**Kinetex 2.6 μm: Achieve sub-2 μm performance on HPLC and UHPLC systems**



**Kinetex 1.7 μm: 20% higher efficiency than fully porous 1.7 μm columns**



**Kinetex 1.3 μm: Incredible UHPLC efficiency and performance gains**

\*Gingerols analyzed on 50x2.1 mm columns

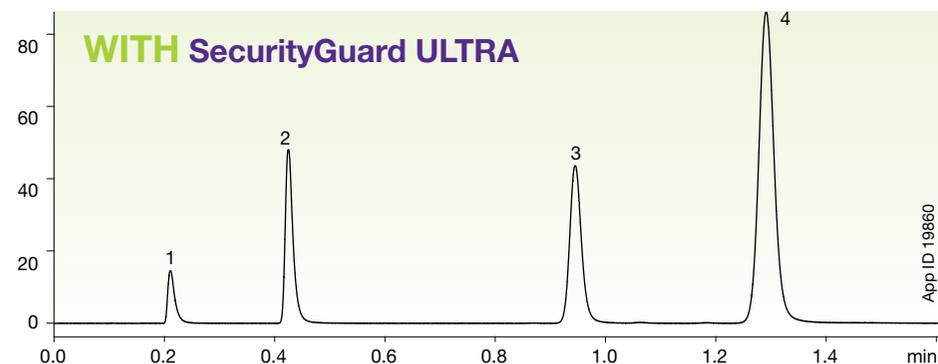
# SecurityGuard™ ULTRA

## UHPLC Column Protection System for Any Sub-2µm or Kinetex® Column

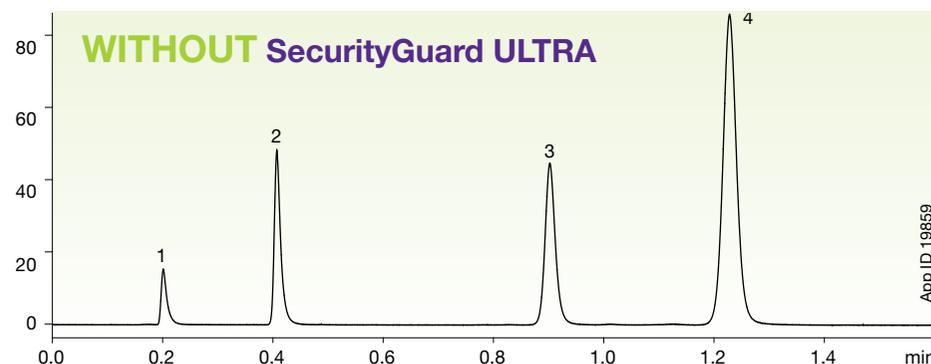
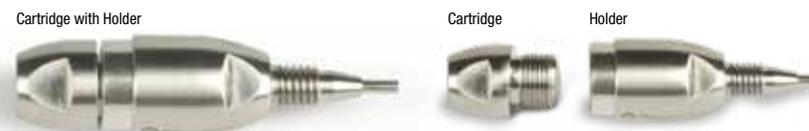
### Protects with No Loss of Column Performance!

With SecurityGuard ULTRA, contaminants and microparticulates are trapped within the guard cartridge instead of in your expensive UHPLC column. The extremely low dead volume (<0.3 µL) of this unique guard design minimizes sample peak dispersion to maintain column performance without altering your chromatography results.

### Kinetex 1.7 µm column with and without the SecurityGuard ULTRA cartridge system



- Increases column lifetime of virtually all manufacturers' UHPLC columns
- Offers more reproducible chromatography
- For pressures up to 20,000 psi



#### Conditions for both columns:

**Column:** Kinetex 1.7 µm XB-C18  
**Dimensions:** 50 x 2.1 mm  
**Guard Cartridge:** SecurityGuard ULTRA C18 (ODS) 2.1 mm ID  
 Part No.: AJ0-8768  
**Mobile Phase:** Acetonitrile / Water (50:50)  
**Flow Rate:** 0.5 mL/min  
**Detection:** UV @ 254 nm

**Sample:** 1. Uracil  
 2. Acetophenone  
 3. Toluene  
 4. Naphthalene

Parameters	With SecurityGuard ULTRA	Without SecurityGuard ULTRA	Difference
<b>Selectivity</b>	1.36	1.35	-0.99%
<b>Efficiency (Plates/Meter)</b>	237,220	246,080	-3.60%
<b>Backpressure</b>	360	348	3.45%

For more details on the test methodology and results, contact Phenomenex.  
 See pp. 53 and 55 for SecurityGuard ULTRA ordering information.

# SecurityGuard™ ULTRA Guard Cartridge System for Your Ultra-High Performance Columns

## Protect Your Investment

When contaminants and particulates build up at the head of your column, system backpressures can increase dramatically. By simply replacing the SecurityGuard ULTRA cartridge, instead of your column, you are able to regain normal operating conditions and reclaim original column performance.

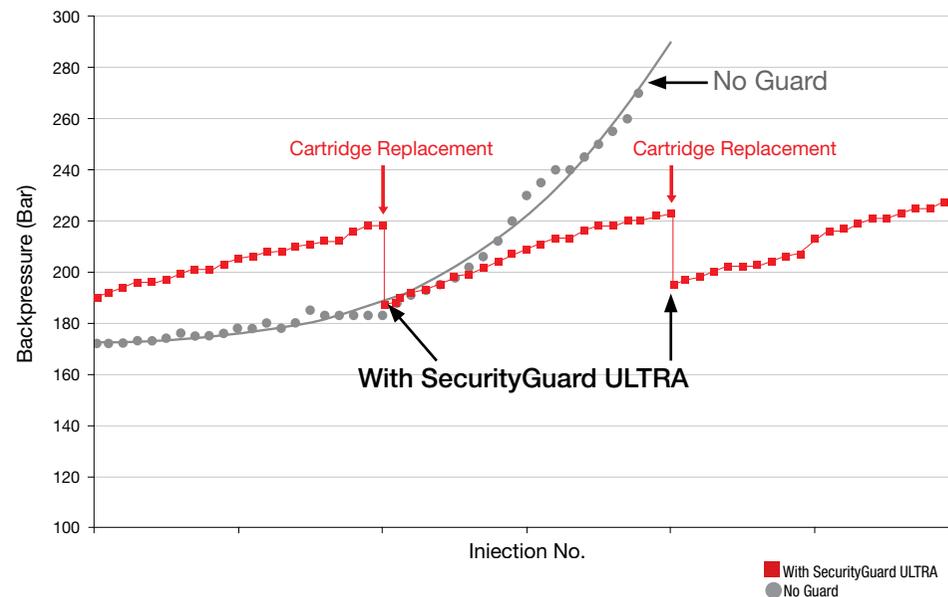
- Extends column lifetimes
- Virtually no change in chromatography
- Easy to use on virtually all manufacturers' UHPLC columns

Cartridge with Holder



Cartridge

Holder



Accelerated lifetime test using endogenous biological matrix on Kinetex 2.6µm C18 50 x 4.6 mm ID

# USP and Ph. Eur. Kinetex® Column Selection

With 4 particle sizes and multiple selectivities, the Kinetex core-shell product line offers an incredible range of options for pharmacopeia methods both old and new!

USP Classification & Description	Phase	Particle Sizes
L1 Octadecyl silane chemically bonded to porous or non-porous silica or ceramic microparticles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm, 2.6 µm, 5 µm 1.7 µm, 2.6 µm, 5 µm
L3 Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Kinetex HILIC	1.7 µm, 2.6 µm
L7 Octyl silane chemically bonded to totally or superficially porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Kinetex C8	1.7 µm, 2.6 µm, 5 µm
L11 Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	Kinetex Phenyl-Hexyl	1.7 µm, 2.6 µm, 5 µm

◇ Available particle sizes that may be used if within the allowable USP adjustments.



Ph. Eur. Number & Description**	Phase	Particle Sizes
1160200 Silica gel for chromatography, alkyl bonded for use with highly aqueous mobile phases.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm, 2.6 µm, 5 µm 1.7 µm, 2.6 µm*, 5 µm
1176900 Silica gel for chromatography, alkyl bonded for use with highly aqueous mobile phases, endcapped.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm*, 2.6 µm, 5 µm 1.7 µm*, 2.6 µm*, 5 µm
1140000 Silica gel for chromatography, di-isobutyloctadecylsilyl.	Kinetex XB-C18	1.7 µm*, 2.6 µm*, 5 µm
1077500 Silica gel for chromatography, octadecylsilyl.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm*, 2.6 µm*, 5 µm 1.7 µm*, 2.6 µm*, 5 µm
1110100 Silica gel for chromatography, octadecylsilyl R1 ultrapure silica (<20 ppm metals), pore size and C-load are indicated in the method.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm*, 2.6 µm*, 5 µm
1077600 Silica gel for chromatography, octadecylsilyl, base-deactivated pretreated before the bonding by careful washing and hydrolyzing most of the superficial siloxane bridges to minimize the interaction with basic components.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm*, 2.6 µm*, 5 µm 1.7 µm*, 2.6 µm*, 5 µm
1115400 Silica gel for chromatography, octadecylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm*, 2.6 µm*, 5 µm
1162600 Silica gel for chromatography, octadecylsilyl, endcapped, base-deactivated R1; pretreated before the bonding by careful washing and hydrolyzing most of the superficial siloxane bridges. To further minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	Kinetex C18 Kinetex XB-C18	1.3 µm*, 1.7 µm*, 2.6 µm*, 5 µm
1077700 Silica gel for chromatography, octylsilyl.	Kinetex C8	1.7 µm*, 2.6 µm*, 5 µm

Ph. Eur. Number & Description**	Phase	Particle Sizes
1077701 Silica gel for chromatography, octylsilyl R1. Bonding of octylsilyl and methyl groups (double bonded phase).	Kinetex C8	1.7 µm*, 2.6 µm*, 5 µm
1131600 Silica gel for chromatography, octylsilyl, base-deactivated pretreated before the bonding by careful washing and hydrolyzing most of the superficial siloxane bridges to minimize the interaction with basic components.	Kinetex C8	1.7 µm*, 2.6 µm*, 5 µm
1119600 Silica gel for chromatography, octylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	Kinetex C8	1.7 µm*, 2.6 µm*, 5 µm
1148800 Silica gel for chromatography, octylsilyl, endcapped, base-deactivated pretreated before the bonding by careful washing and hydrolyzing most of the superficial siloxane bridges to minimize the interaction with basic components. To further minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanols.	Kinetex C8	1.7 µm*, 2.6 µm*, 5 µm
1153900 Silica gel for chromatography, phenylhexylsilyl.	Kinetex Phenyl-Hexyl	1.7 µm*, 2.6 µm*, 5 µm
1170600 Silica gel for chromatography, phenylhexylsilyl, endcapped. 3 µm; To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	Kinetex Phenyl-Hexyl	1.7 µm*, 2.6 µm*, 5 µm*
1110200 Silica gel for chromatography, phenylsilyl.	Kinetex Phenyl-Hexyl	1.7 µm*, 2.6 µm*, 5 µm
1154900 Silica gel for chromatography, phenylsilyl, endcapped. To minimize any interaction with basic compounds it's carefully endcapped to cover most of the remaining silanol groups.	Kinetex Phenyl-Hexyl	1.7 µm*, 2.6 µm*, 5 µm

\* Available particle sizes that may be used if within allowable Ph. Eur. adjustments

\*\*According to European Pharmacopeia (Ph. Eur.) Chapter 4.1.1.

# Easy Pharmacopeia Method Optimization

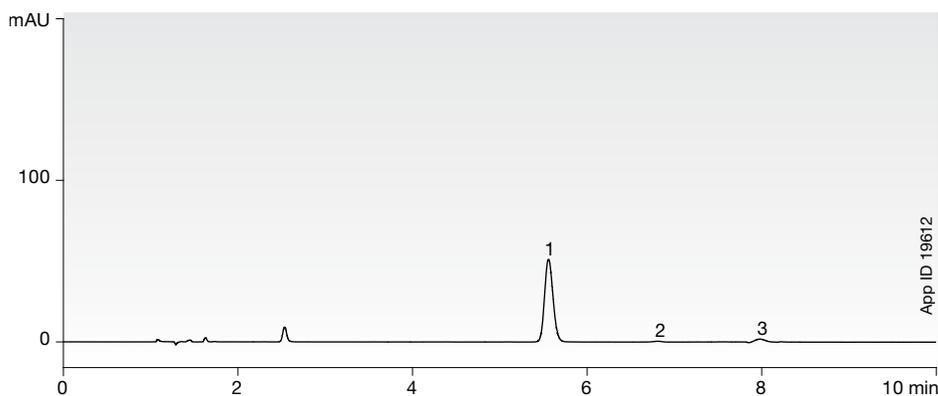
Some of the greatest laboratory cost savings can be realized when an older method is optimized to increase throughput and decrease solvent consumption. With the increased efficiency of Kinetex core-shell technology, Ph. Eur. or USP methods can yield dramatic performance improvements while staying within the allowable adjustments.

## USP Monograph for the Assay of Ibuprofen

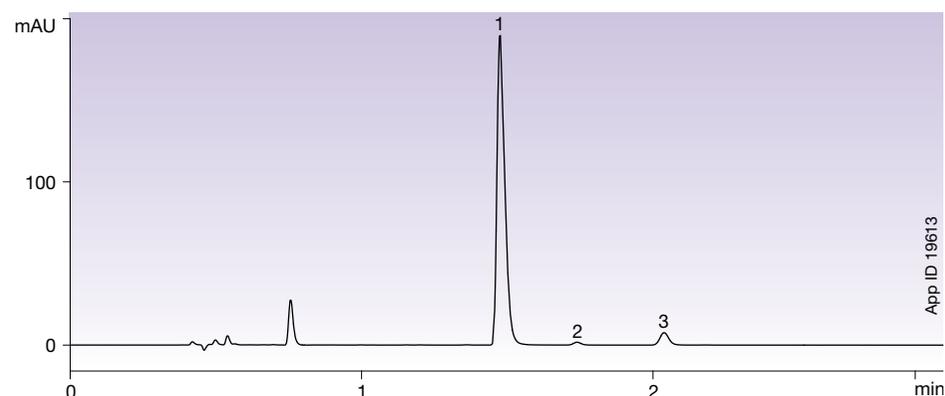
The monograph specifies using a 250 x 4.6 mm column packed with 5  $\mu$ m media containing a C18 bonded phase under the isocratic conditions shown below. Using a Kinetex 2.6  $\mu$ m 100 x 4.6 mm column, you can stay within the allowable adjustments specified in USP General Chapter <621>, and still maintain the system suitability of resolution between peaks of no less than 2.5 and a tailing factor for all peaks of no more than 2.5.



**Traditional 5  $\mu$ m C18**



**Kinetex 2.6  $\mu$ m XB-C18**

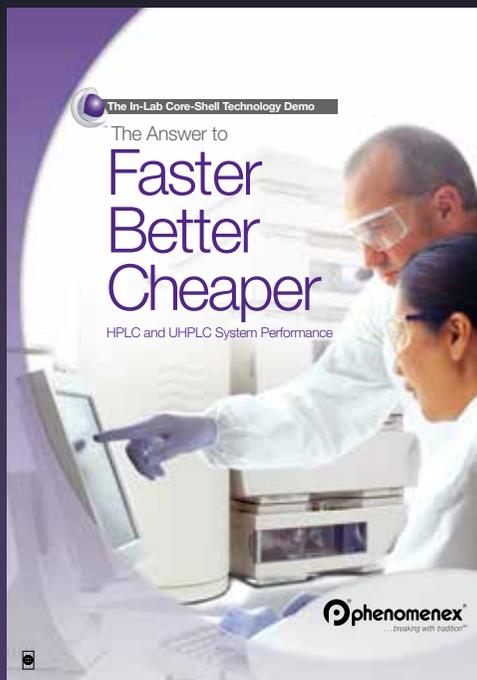


**Conditions for both columns:**

**Column:** Kinetex 2.6  $\mu$ m XB-C18, 100 x 4.6 mm  
 Traditional 5  $\mu$ m C18, 250 x 4.6 mm  
**Mobile Phase:** Acetonitrile/Water with 4 g Chloroacetic acid adjusted to pH 3.0 with Ammonium hydroxide (60:40)  
**Flow Rate:** 2.0 mL/min

**Temperature:** 30 °C  
**Detection:** UV @ 254 nm  
**Sample:** 1. Ibuprofen  
 2. Valerophenone  
 3. Ibuprofen related compound C

Comparative separations may not be representative of all applications.



Request a **FREE** on-site demonstration or seminar to see first hand the power of Kinetex Core-Shell Technology:

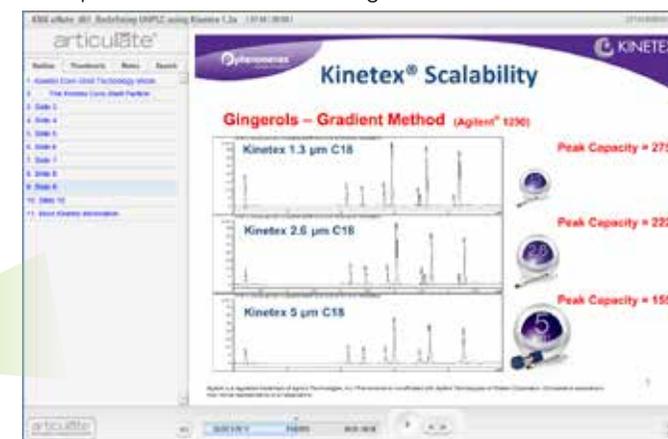
[www.phenomenex.com/kinetexdeminar](http://www.phenomenex.com/kinetexdeminar)

## We're here to help!

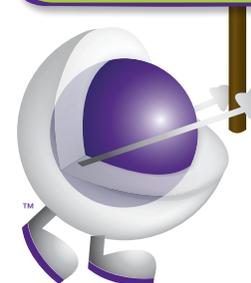
We know that sometimes you don't have the time to pick up the phone, but that doesn't mean we can't answer your questions. Introducing our Kinetex digital tutorial series, where one of our scientists gives first-hand experience and knowledge regarding HPLC/UHPLC topics that are important to you.



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

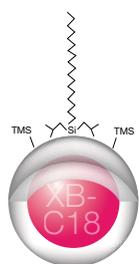


Have an idea for a new digital tutorial or is there a particular topic you are really interested in? Tell us today at:  
[www.phenomenex.com/wearelistening](http://www.phenomenex.com/wearelistening)

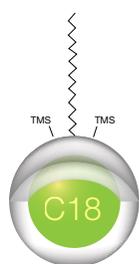


# Achieve the Best Resolution with the Right Selectivity

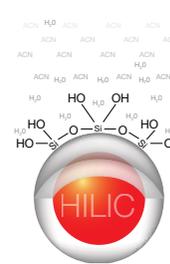
Combining the high efficiency of Kinetex Core-Shell Technology with an excellent range of surface chemistries gives you the best opportunity for increased resolution.



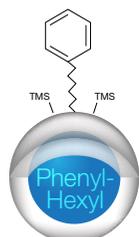
This unique C18 phase yields increased hydrogen bonding with hydrophobic selectivity, resulting in improved peak shape for basic compounds and increased retention of acidic compounds



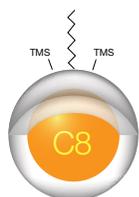
Balanced C18 phase that provides the highest degree of hydrophobic selectivity relative to the other Kinetex phases



Used under HILIC running conditions, this phase provides the highest polar selectivity for retention and separation of hydrophilic compounds



Aromatic and moderate hydrophobic selectivity result in the great retention and separation of aromatic hydrocarbons



Moderate hydrophobic and steric selectivity is offered, bringing ultra-high performance to USP L7 and other octyl silane methods

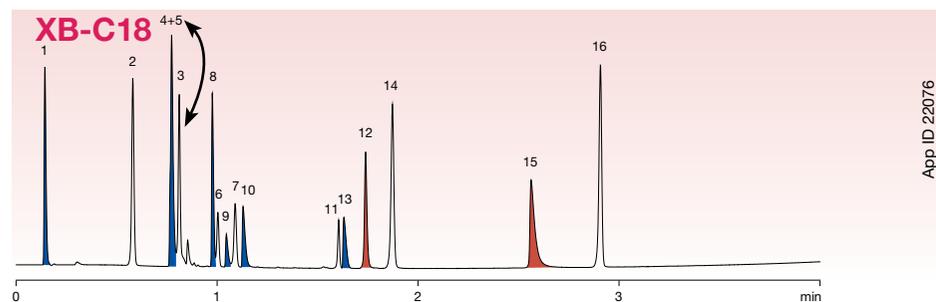


Meet the team and see them in action at [www.phenomenex.com/kinetex](http://www.phenomenex.com/kinetex)

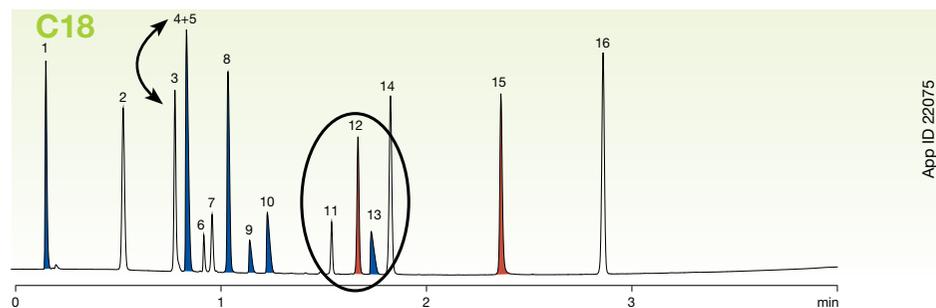
# Complementary Selectivities

With complementary reversed phases selectivities you can screen for optimal resolution of complex sample mixtures. Manipulate acidic and basic compound elution by simply switching between column chemistries.

## Change your peak elution profile



App ID 22076



App ID 22075

### Conditions for both columns:

**Column:** Kinetex® 2.6 µm XB-C18  
Kinetex 2.6 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
	0.0	5
	0.2	5
	4.2	95
	4.21	5
	5.5	5

**Flow Rate:** 0.8 mL/min

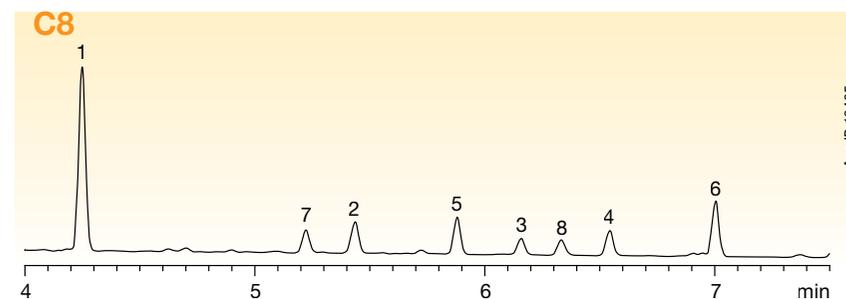
**Temperature:** 30 °C

**Detection:** UV @ 254 nm (ambient)

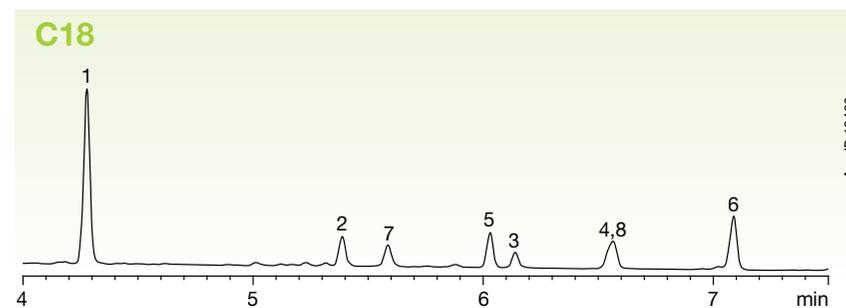
Sample	1. Pyridine	2. Acetaminophen	3. Pindolol	4. Quinidine	5. Sulfathiazole	6. Acetubutolol	7. Benzyl alcohol	8. Chlorpheniramine	9. Phenol	10. Triprolidine	11. Nortriptyline	12. Prednisolone	13. 3-Methyl-4-nitrobenzoic acid	14. 2-Hydroxy-5-methylbenzaldehyde	15. Diflunisal	16. Hexanophenone
--------	-------------	------------------	-------------	--------------	------------------	-----------------	-------------------	---------------------	-----------	------------------	-------------------	------------------	----------------------------------	------------------------------------	----------------	-------------------

Comparative separations may not be representative of all applications.

## Increase resolution between compounds



App ID 19465



App ID 19466

### Conditions for both columns:

**Column:** Kinetex 2.6 µm C8  
Kinetex 2.6 µm C18

**Dimensions:** 100 x 4.6 mm

**Mobile Phase:** A: 0.1% Phosphoric acid in Water  
B: 0.1% Phosphoric acid in Acetonitrile

Gradient	Time (min)	% B	Time (min)	% B
	0	30	9	95
	4	50	10	30
	7.5	70		

**Flow Rate:** 1.5 mL/min

**Temperature:** 25 °C

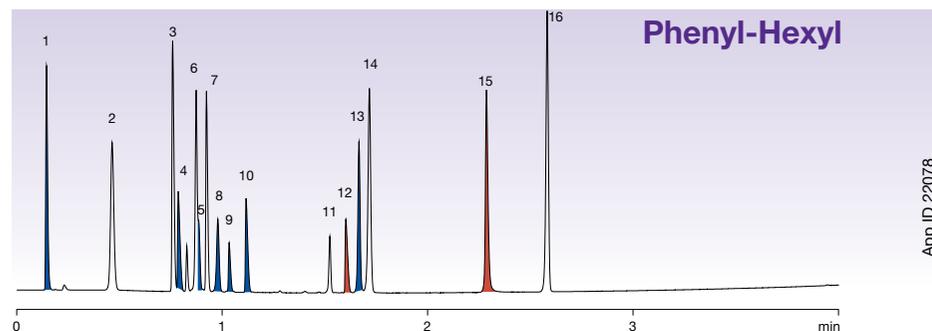
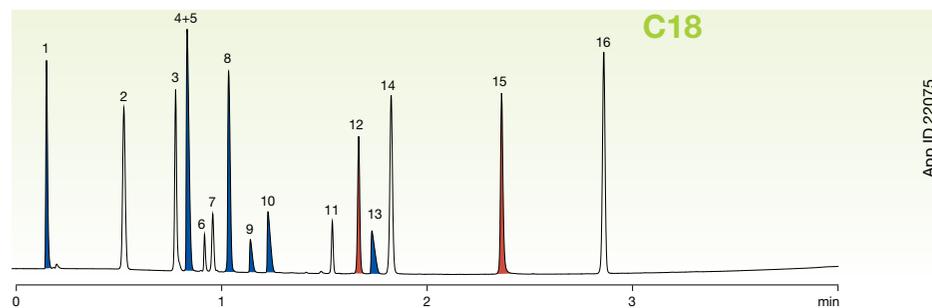
**Detection:** UV @ 230 nm

Sample	1. Naproxen	2. Fenoprofen	3. Ibuprofen	4. Phenylbutazone	5. Indomethacin	6. Meclofenamic acid	7. Matrix impurity	8. Matrix impurity
--------	-------------	---------------	--------------	-------------------	-----------------	----------------------	--------------------	--------------------

# Orthogonal Chemistries

Whether you are looking for a confirmation column or an orthogonal selectivity, both the Kinetex Phenyl-Hexyl and HILIC stationary phases offer excellent solutions for you.

## Pharmaceutical Screen



**Conditions for both columns:**

**Column:** Kinetex 2.6 µm C18  
Kinetex 2.6 µm Phenyl-Hexyl

**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 °C

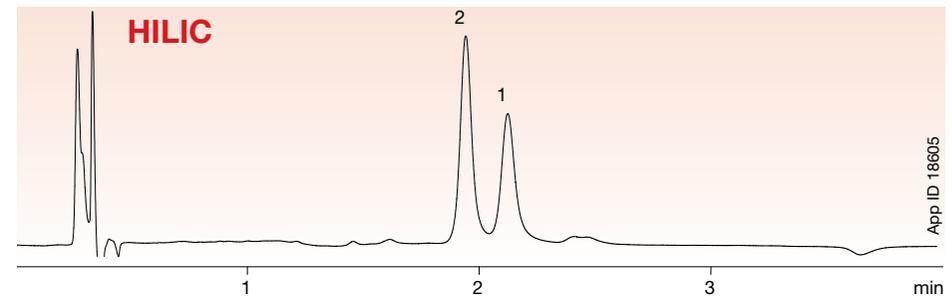
**Detection:** UV @ 254 nm (ambient)

**Sample:**

1. Pyridine	10. Triprolidine
2. Acetaminophen	11. Prednisolone
3. Sulfathiazole	12. 3-Methyl-4-nitrobenzoic acid
4. Pindolol	13. Nortriptyline
5. Quinidine	14. 2-Hydroxy-5-methylbenzaldehyde
6. Benzyl alcohol	15. Diflunisal
7. Phenol	16. Hexanophenone
8. Acebutolol	
9. Chlorpheniramine	

Comparative separations may not be representative of all applications.

## Norepinephrine and Epinephrine



**Conditions for both columns:**

**Columns:** Kinetex 2.6 µm HILIC  
Kinetex 2.6 µm C18

**Dimensions:** 50 x 2.1 mm

**Mobile Phase (HILIC):** Acetonitrile / 100 mM Ammonium formate pH 3.2 (92:8)

**Mobile Phase (C18):** 5 mM Ammonium formate pH 3.2 / Methanol (97:3)

**Flow Rate:** 0.4 mL/min

**Temperature:** 30 °C

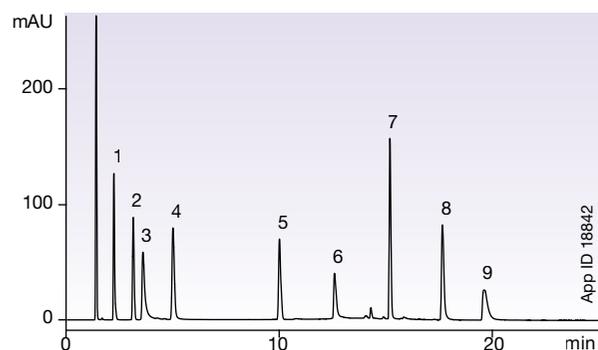
**Detection:** UV @ 210 nm (ambient)

**Sample:** 1. Norepinephrine  
2. Epinephrine

# Wide Applicability Across Many Industries For Food Analysis

With complementary C18 and Phenyl phases you can screen for optimal resolution of complex sample mixtures. Manipulate acidic and basic compound elution by simply switching between the two column chemistries.

## Water Soluble Vitamins

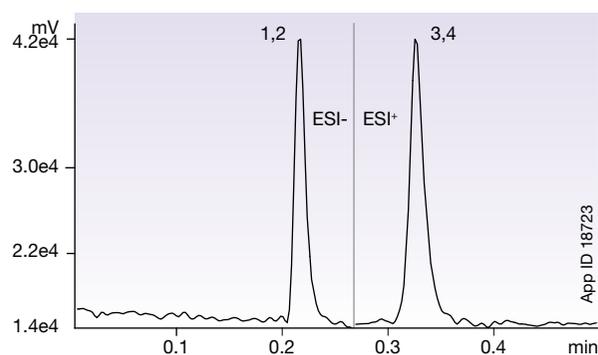


**Column:** Kinetex® 2.6 µm HILIC  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** 00F-4461-E0  
**Mobile Phase:** A: Acetonitrile  
 B: 100 mM Ammonium formate, pH 3.2  
 C: Water

Gradient Time (min)	% A	% B	% C
0	90	10	0
5	90	10	0
20	50	10	40

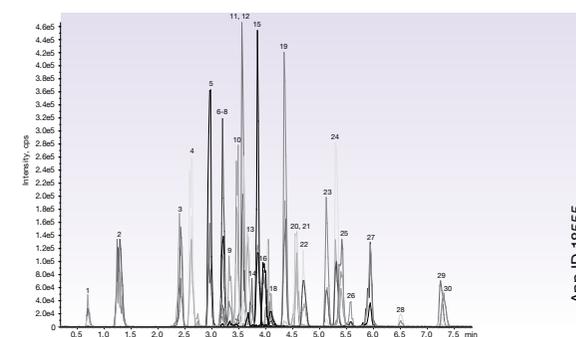
**Flow Rate:** 1 mL/min  
**Temperature:** Ambient  
**Detection:** UV @ 260 nm  
**Sample:** 1. Nicotinamide  
 2. PABA  
 3. Pyridoxine  
 4. Riboflavin  
 5. Nicotinic Acid  
 6. Ascorbic Acid  
 7. Folic Acid  
 8. Vitamin B12  
 9. Thiamine

## Melamine and Cyanuric Acid



**Column:** Kinetex 2.6 µm HILIC  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** 00B-4461-AN  
**Mobile Phase:** Acetonitrile / 100 mM Ammonium acetate, pH 5.8 (90:10)  
**Flow Rate:** 1.0 mL/min  
**Temperature:** 25 °C  
**Detection:** API 3000™ MS  
**Backpressure:** 190 bar  
**Instrument:** Waters® ACQUITY® UPLC® MS/MS  
**Sample :** 1. Cyanuric acid 128-85.0 (quant ion), 128.0-42.0 (qualifier ion)  
 2. Cyanuric acid-13C3 ISTD 131.1-87.0  
 3. Melamine 127.1-85 (quant ion), 127.1-68 (qualifier ion)  
 4. Melamine-13C3.15N3 ISTD 133.2-89.1

## Antibiotic Screen

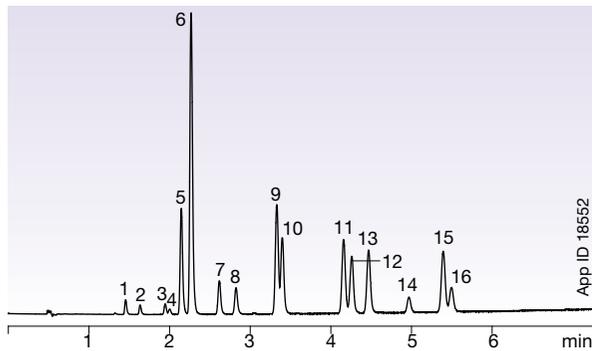


**Column:** Kinetex 2.6 µm C18  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** 00B-4462-AN  
**Mobile Phase:** A: 0.1 % Formic Acid in Water  
 B: 0.1 % Formic Acid in Methanol  
**Inj. Volume:** 10 µL  
**Flow Rate:** 0.5 mL/min  
**Temperature:** 40 °C  
**Detection:** Mass spectrometer (MS)  
**Sample :** 1. Sulfanilamide  
 2. Amoxicillin  
 3. Lincomycin  
 4. Sulfadiazine  
 5. Sulfathiazole  
 6. Ampicillin  
 7. Thiamphenicol  
 8. Sulfamerazine  
 9. Tetracycline  
 10. Ciprofloxacin  
 11. Enrofloxacin  
 12. Danofloxacin  
 13. Sulfamethazine  
 14. Sarafloxacin  
 15. Sulfamethoxyipyridazine  
 16. Florfenicol  
 17. Spiramycin  
 18. Chlorotetracycline  
 19. Sulfadoxine  
 20. Clindamycin  
 21. Tilicosin  
 22. Chloramphenicol  
 23. Sulfadimethoxine  
 24. Sulfaquinoxaline  
 25. Erythromycin  
 26. Tylosin  
 27. Josamycin  
 28. Penicillin G  
 29. Cloxacillin  
 30. Flunixin

API 3000 is a trademark of AB SCIEX.  
 Waters, ACQUITY, and UPLC are registered trademarks of Waters Corporation.  
 Phenomenex is not affiliated with Waters Corporation.  
 Comparative separations may not be representative of all applications.

# Wide Applicability Across Many Industries For Environmental Analysis

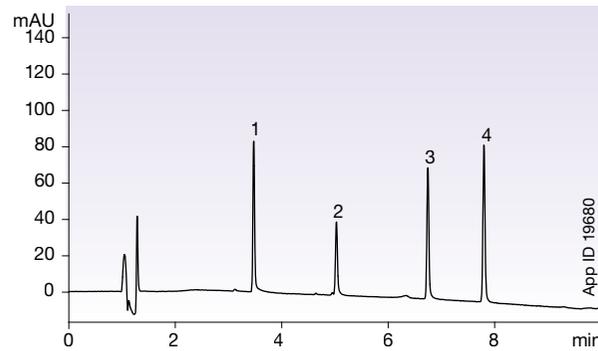
## Polyaromatic Hydrocarbons (PAHs): EPA Method 610



**Column:** Kinetex 2.6 μm C18  
**Dimensions:** 100 x 4.6 mm  
**Part No.:** OOD-4462-E0  
**Mobile Phase:** A: Water  
 B: Acetonitrile  
**Gradient:** (30:70) A/B to (0:100) A/B over 10 min  
**Flow Rate:** 1.5 mL/min  
**Temperature:** 30 °C  
**Detection:** UV @ 254 nm  
**Sample:**

1. Naphthalene	9. Chrysene
2. Acenaphthylene	10. Benz[a]anthracene
3. Fluorene	11. Benzo[b]fluoranthene
4. Acenaphthene	12. Benzo[k]fluoranthene
5. Phenanthrene	13. Benzo[a]pyrene
6. Anthracene	14. Dibenzo[a,h]anthracene
7. Fluoranthene	15. Indeno[1,2,3-cd]pyrene
8. Pyrene	16. Benzo[g,h,i]perylene

## Estrone, Estradiol, and Estrinol from Water



**Column:** Kinetex 2.6 μm XB-C18  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** OOF-4496-E0  
**Mobile Phase:** A: 6.9 mM Ammonium acetate pH 4.0 with 25% Acetonitrile  
 B: Acetonitrile  
**Gradient:**

<b>Time (min)</b>	<b>% B</b>
0	0
10	65

**Flow Rate:** 1.2 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 230 nm  
**Sample:**

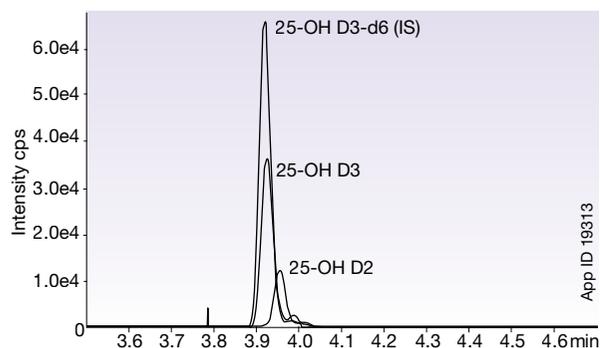
- Estrinol
- Ethyl Paraben (ISS)
- 17β Estradiol
- Estrone



Access hundreds of  
Kinetex applications at  
[www.phenomenex.com/kinetex](http://www.phenomenex.com/kinetex)

# Wide Applicability Across Many Industries For Clinical Analysis

## 25-OH Vitamin D2 and D3 from Serum



**Column:** Kinetex® 2.6 µm C18  
**Dimensions:** 50 x 4.6 mm  
**Part No.:** 00B-4462-E0  
**Mobile Phase:** A: 0.05% Formic acid  
 B: 5 mM Ammonium acetate + 0.1% Formic acid in Methanol

Gradient	Time (sec)	% B
	0	8
	5	8
	205	100
	290	100
	360	8

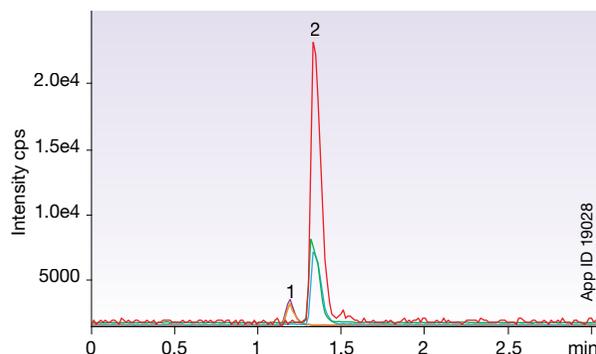
**Flow Rate:** 1 mL/min

**Temperature:** 35 °C

**Detection:** MS (ambient)

**Sample :** 1. 25-hydroxyvitamin D3 (25-OH D3)  
 2. 25-hydroxyvitamin D3-d6 (25-OH D3-d6)  
 3. 25-hydroxyvitamin D2 (25-OH D2)

## Ethyl Sulfate and Ethyl Glucuronide



**Column:** Kinetex 2.6 µm C18  
**Dimensions:** 100 x 2.1 mm  
**Part No.:** 00D-4462-AN  
**Mobile Phase:** A: 5 mM Ammonium formate  
 B: Methanol

Gradient	Time (min)	% B
	0	5
	3	10
	4	95
	4.01	5

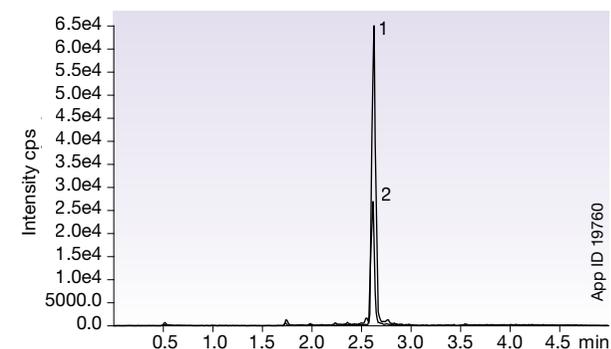
**Flow Rate:** 0.2 mL/min

**Temperature:** 25 °C

**Detection:** MS (ambient)

**Sample :** 1. Ethyl Glucuronide (EtG) + IS (EtG-d5)  
 2. Ethyl Sulfate (EtS) + IS (EtS-d5)

## Testosterone from Male Plasma



**Column:** Kinetex 1.7 µm C18  
**Dimensions:** 30 x 2.1 mm  
**Part No.:** 00A-4475-AN  
**Mobile Phase:** A: 0.1% Formic acid + 1 mM Ammonium Formate in Water  
 B: 0.1% Formic acid + 1 mM Ammonium Formate in Acetonitrile

Gradient	Time (min)	% B
	0	10
	2.5	90
	3.5	90
	3.6	10

**Flow Rate:** 0.4 mL/min

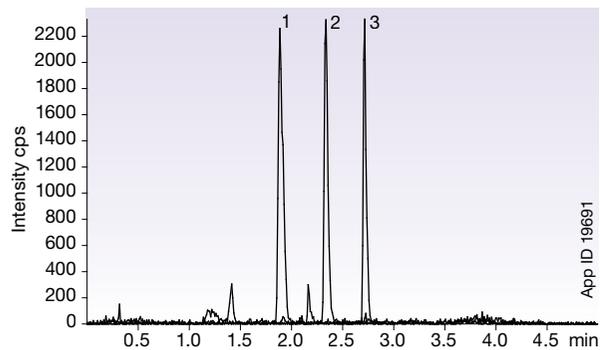
**Temperature:** 55 °C

**Detection:** MS (ambient)

**Sample :** 1. Testosterone  
 2. Testosterone-d3

# Wide Applicability Across Many Industries For Clinical Analysis

## Digoxin and Digitoxin in Plasma



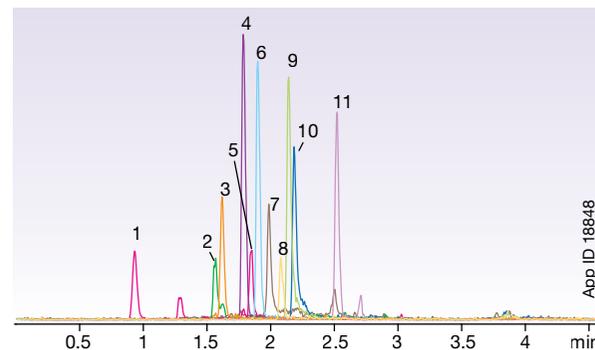
**Column:** Kinetex 2.6 μm C18  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** 00B-4497-AN  
**Mobile Phase:** A: 10 mM Ammonium acetate  
 B: 10 mM Ammonium acetate in Methanol

Gradient:	Time (min)	% B
	0	50
	2.5	100
	2.51	50
	5	50

**Flow Rate:** 0.4 mL/min  
**Temperature:** 30 °C  
**Detection:** MS @ 350 °C

**Sample:** Concentration 0.25 mg/mL each  
 1. Digoxin  
 2. Oleandrin (IS)  
 3. Digitoxin

## Steroids



**Column:** Kinetex 2.6 μm C18  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** 00B-4462-AN  
**Mobile Phase:** A: 0.1 % Formic acid in Water  
 B: 0.1 % Formic acid in Acetonitrile

Gradient:	Time (min)	% B	Time (min)	% B
	0	20	2.8	95
	2.5	80	2.81	20
	2.51	95	4.6	20

**Flow Rate:** 450 μL/min  
**Temperature:** 25 °C

**Detection:** MS (ambient)

**Sample:** 1. Triamcinolone  
 2. Prednisolone  
 3. Cortisone  
 4. Betamethasone  
 5. Corticosterone  
 6. Triamcinolone acetonide  
 7. 11-α-Hydroxyprogesterone  
 8. Cortisone acetate  
 9. Testosterone  
 10. 11-Ketoprogesterone  
 11. Betamethasone 17-valerate

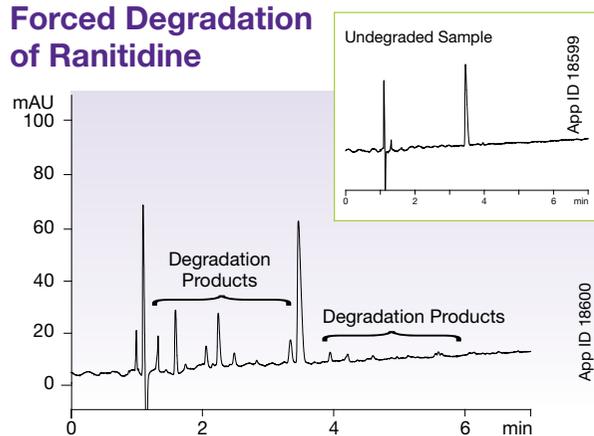


**Preview your current method  
 enhanced with Kinetex Core-Shell  
 Technology**

[www.phenomenex.com/tools/kinetexcalculator](http://www.phenomenex.com/tools/kinetexcalculator)

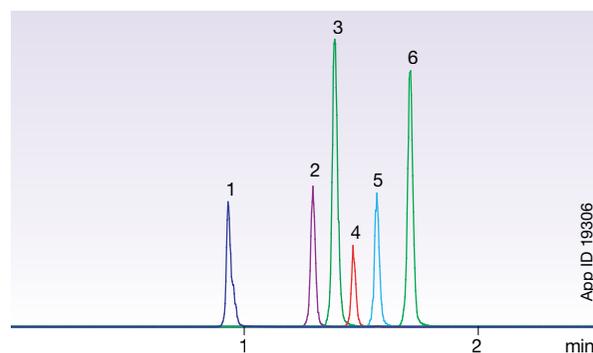
# Wide Applicability Across Many Industries For Pharmaceutical Analysis

## Forced Degradation of Ranitidine



**Column:** Kinetex® 2.6 µm C18  
**Dimensions:** 150 x 4.6 mm  
**Part No.:** 00F-4462-E0  
**Mobile Phase:** A: 0.1 % Formic acid in Water  
 B: 0.1 % Formic acid in Acetonitrile  
**Gradient:** 5% to 20 % B in 7 min. 20% to 95% in 2 min  
**Flow Rate:** 1.4 mL/min  
**Temperature:** 30 °C  
**Detection:** UV @ 230 nm (22 °C)  
**Sample:** Ranitidine 1 mg/mL in Methanol. Heated at 65 °C for 4 days.

## Tricyclic Antidepressants

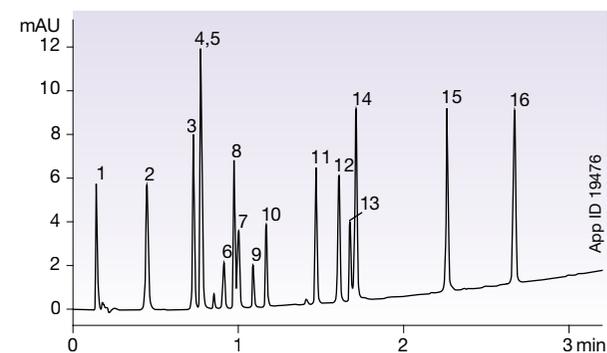


**Column:** Kinetex 1.7 µm C18  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** 00B-4475-AN  
**Mobile Phase:** A: Water with 0.05 % Formic acid  
 B: Acetonitrile with 0.05 % Formic acid

Gradient:	Time (min)	% B
	0	30
	2	40
	3	95
	3.1	30
	4.5	30

**Flow Rate:** 0.6 mL/min  
**Temperature:** 40 °C  
**Detection:** MS (ambient)  
**Sample:** 1. Doxepin  
 2. Desipramine  
 3. Imipramine  
 4. Nortriptyline  
 5. Amitriptyline  
 6. Trimipramine

## Pharmaceutical Mixture



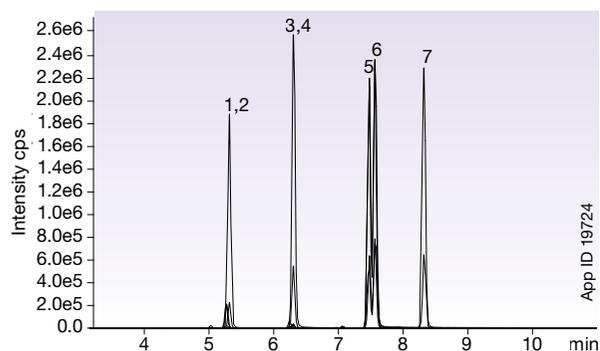
**Column:** Kinetex 2.6 µm C8  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** 00B-4497-AN  
**Mobile Phase:** A: 0.1 % Formic acid in Water  
 B: 0.1 % Formic acid in Acetonitrile

Gradient:	Time (min)	% B
	0	5
	0.2	5
	4	95

**Flow Rate:** 0.8 mL/min  
**Temperature:** 22 °C  
**Detection:** UV @ 254 nm (ambient)  
**Sample:** 1. Pyridine  
 2. Acetaminophen  
 3. Sulfathiazole  
 4. Pindolol  
 5. Quinidine  
 6. Benzyl Alcohol  
 7. Phenol  
 8. Acebutolol  
 9. Chlorpheniramine  
 10. Triprolidine  
 11. Prednisolone  
 12. 3-Methyl-4-nitrobenzoic acid  
 13. Nortriptyline  
 14. 2-Hydroxy-5-methylbenzaldehyde  
 15. Diflunisal  
 16. Hexanophenone

# Wide Applicability Across Many Industries For Forensic Analysis

## Barbiturates in Urine

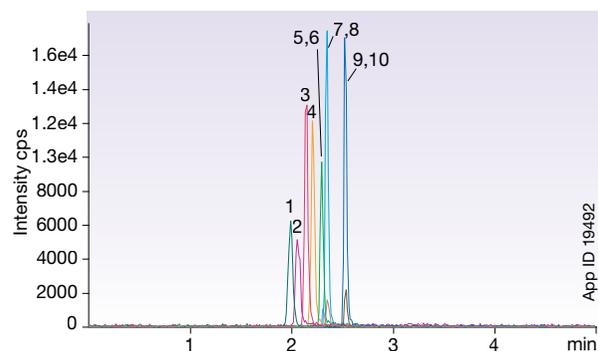


**Column:** Kinetex 2.6  $\mu$ m C18  
**Dimensions:** 100 x 2.1 mm  
**Part No.:** OOD-4462-AN  
**Mobile Phase:** A: 5 mM Ammonium acetate  
 B: Acetonitrile

Gradient:	Time (min)	% B
	0	10
	10	45
	10.01	90
	12	90
	12.01	10
	16	10

**Flow Rate:** 0.4 mL/min  
**Temperature:** 22 °C  
**Detection:** MS  
**Sample:** 1. Phenobarbital-D5  
 2. Phenobarbital  
 3. Butalbital-D5  
 4. Butalbital  
 5. Pentobarbital  
 6. Amobarbital  
 7. Secobarbital

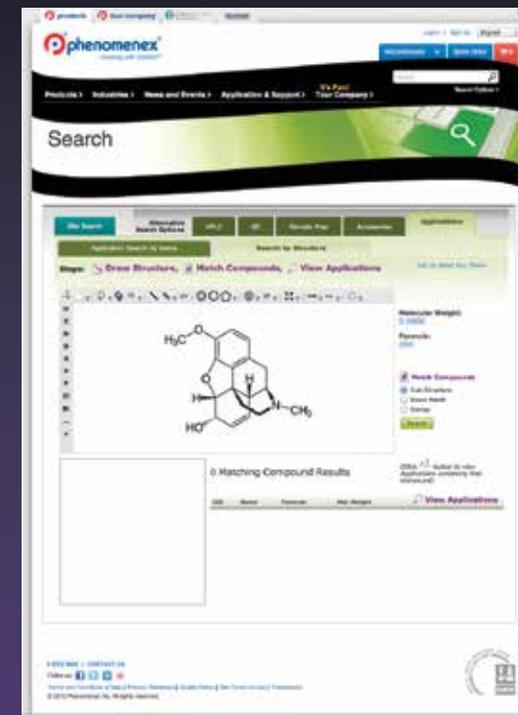
## Amphetamines



**Column:** Kinetex 2.6  $\mu$ m XB-C18  
**Dimensions:** 50 x 2.1 mm  
**Part No.:** OOB-4496-AN  
**Mobile Phase:** A: 5 mM Ammonium formate with 0.1 % Formic acid  
 B: Methanol with 0.1 % Formic acid

Gradient:	Time (min)	% B
	0	10
	1	70
	3	70

**Flow Rate:** 0.4 mL/min  
**Temperature:** 22 °C  
**Detection:** MS  
**Sample:** 1. Amphetamine-D11  
 2. Amphetamine  
 3. Methamphetamine-D14  
 4. Methamphetamine  
 5. MDA-D5  
 6. MDA  
 7. MDMA-D5  
 8. MDMA  
 9. MDEA-D5  
 10. MDEA



Draw it. Find it.

Application search by compound  
structure!

[www.phenomenex.com/application/structuresearch](http://www.phenomenex.com/application/structuresearch)

# See How Kinetex® Works for YOUR Methods!

PhenoLogix Method Development Services is our in-house analytical support laboratory for all your method development and optimization needs. Our customized and confidential approach to supporting your methods will ensure a successful project and your complete satisfaction.



**Trust your samples in the hands of our experts!**

## LEVEL

### 1 Phase Screening

Identify the correct column stationary phase, particle type, and dimensions to give optimum performance.

## LEVEL

### 2 Pre-Validation

Perform ICH validation parameters to demonstrate method accuracy, precision, and robustness.

## LEVEL

### 3 On-site Method Transfer

A PhenoLogix representative will assist with method transfer and demonstrate that the method works in your laboratory. They will also provide training for your staff on important details of the new method.

For more information or to begin a project today, please contact your local Phenomenex representative. Email us at [PhenoLogix@phenomenex.com](mailto:PhenoLogix@phenomenex.com). You can also visit us online at [www.phenomenex.com/PhenoLogix](http://www.phenomenex.com/PhenoLogix)



# Don't Mask Ultra-High Performance

## Tips and Tricks for Using Core-shell Columns on HPLC Instruments

### Minimize the extra-column volume from the injector to the column

- Use a low-volume injection system if you are not using an autosampler
- Use 0.12 mm ID (0.005 in.) or 0.17 mm ID (0.007 in.) tubing whenever possible
- Minimize the length of all connection tubing
- Ensure tubing is seated properly at every connection
- Use extremely low dead-volume fittings (see page 53)
- Use an extremely low dead-volume in-line filter (see SecurityGuard™ ULTRA on pages 36, 37, 53, and 55)

### Minimize peak dispersion and detector contribution after the column

- To avoid extra column band broadening effects, check the flow cell volume to verify that it is no more than  $\frac{1}{3}$  the peak volume
- Standard flow cells on conventional LC systems can be  $> 10 \mu\text{L}$ . For best results, replace standard flow cells with  $< 3 \mu\text{L}$  flow cells ( $< 2 \mu\text{L}$  when using 2.1 mm ID columns).
- Increase the detector scan rate. 0.1 seconds to 0.15 seconds is recommended for increased data collection.



Watch simple system optimization videos at [www.phenomenex.com/enhancement](http://www.phenomenex.com/enhancement)



Maximize Performance with Kinetex 2.6 $\mu\text{m}$

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

# Choosing the Best Kinetex® Column

## Upgrade Your 3 µm or 5 µm Column

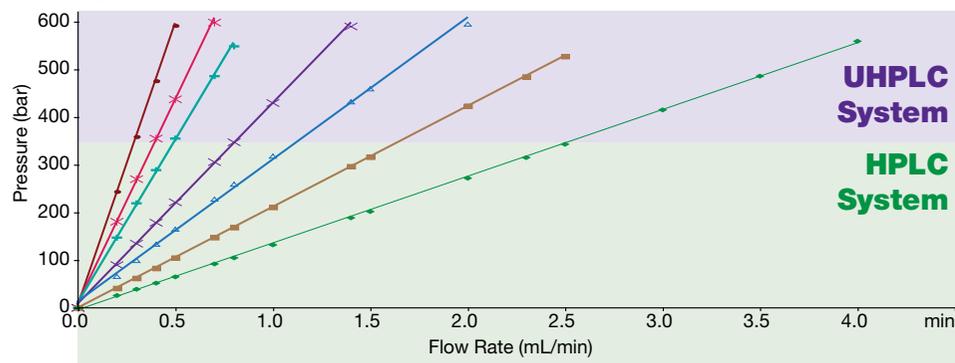
Fully Porous	Kinetex Core-Shell	Kinetex Core-Shell
If Presently Using: (Length, Particle Size)	For Equivalent Resolving Power and Faster Analysis* Use: (Length, Particle Size)	For Greater Resolving Power Use: (Length, Particle Size)
250 mm, 5 µm	150 mm, 5 µm or 75 mm, 2.6 µm	250 mm, 5 µm or 150 mm, 2.6 µm
150 mm, 5 µm	100 mm, 5 µm or 50 mm, 2.6 µm	150 mm, 5 µm or 100 mm, 2.6 µm
150 mm, 3 µm	150 mm, 5 µm or 75 mm, 2.6 µm	250 mm, 5 µm or 150 mm, 2.6 µm
100 mm, 3 µm	100 mm, 5 µm or 50 mm, 2.6 µm	150 mm, 5 µm or 100 mm, 2.6 µm
50 mm, 3 µm	50 mm, 5 µm or 30 mm, 2.6 µm	100 mm, 5 µm or 50 mm, 2.6 µm

\* Faster analysis via potential increase in linear velocity.

## Expected Backpressure at Different Flow Rates\*\*

There is an optimal Kinetex column for your system and operating conditions. Use these graphs to determine the starting Kinetex particle size and dimension for your method.

### 50:50 (Acetonitrile / Water)



Backpressures for Kinetex 5 µm columns will be approximately half that of a traditional fully porous 3 µm of the same dimension and equal backpressure to a fully porous 5 µm of the same dimension.

\*\* Due to variation in system, sample and method parameters, graphs provided may not be representative of all applications. Data generated on Agilent® 1200 SL.

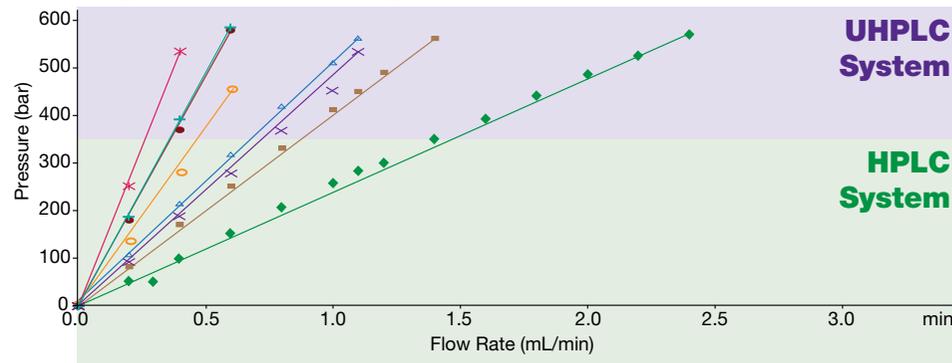
## Upgrade Your Sub-2 µm Column

Fully Porous	Kinetex Core-Shell	Kinetex Core-Shell
If Presently Using: (Length, Particle Size)	For Equivalent Resolving Power and Faster Analysis* Use: (Length, Particle Size)	For Greater Resolving Power Use: (Length, Particle Size)
150 mm, sub-2 µm	150 mm, 2.6 µm	150 mm, 1.7 µm
100 mm, sub-2 µm	100 mm, 2.6 µm	100 mm, 1.7 µm or 150 mm, 2.6 µm
50 mm, sub-2 µm	50 mm, 2.6 µm	50 mm, 1.7 µm or 100 mm, 2.6 µm

- Kinetex 100 x 2.1 mm, 1.7 µm
- Kinetex 50 x 2.1 mm, 1.7 µm
- ✕ Kinetex 150 x 2.1 mm, 2.6 µm
- ✚ Kinetex 100 x 4.6 mm, 2.6 µm
- ✚ Kinetex 50 x 4.6 mm, 2.6 µm
- ✕ Kinetex 50 x 2.1 mm, 2.6 µm
- △ Kinetex 150 x 4.6 mm, 2.6 µm
- Kinetex 100 x 4.6 mm, 2.6 µm
- ◆ Kinetex 50 x 4.6 mm, 2.6 µm



### 60:40 (Methanol / Water)



Backpressures for the Kinetex 1.3 µm will be approximately double that of a core-shell or traditional fully porous 1.7 µm of an equivalent column dimension.

# Ordering Information

## Phenex™ RC (Regenerated Cellulose) Syringe Filters

- Rapid filtration of HPLC and GC samples prior to analysis
- Particulated, PVC, and extractable-free filters
- Universal filter compatible with both aqueous and mixed organic solutions

Choose filter diameter based on sample volume



### Tip:

When using particle sizes equal to or smaller than 3 µm, we recommend the use of 0.20 µm Phenex syringe filters.

Membrane Type/Size	Part No.	Unit	Price	Part No.	Unit	Price	Part No.	Unit	Price
<b>4 mm Diameter</b> for ≤ 2 mL sample volumes									
<b>15 mm Diameter</b> for 2 - 10 mL sample volumes									
<b>25 - 28 mm Diameter</b> for 10 - 100 mL sample volumes									
<b>0.20 µm</b>									
Phenex-RC (Regenerated Cellulose)	AF0-3203-12	100/ pk		AF0-2203-12	100/ pk		AF0-8203-12 <sup>1</sup>	100/ pk	
	AF0-3203-52	500/ pk		AF0-2203-52	500/ pk		AF0-8203-52 <sup>1</sup>	500/ pk	
<b>0.45 µm</b>									
Phenex-RC (Regenerated Cellulose)	AF0-3103-12	100/ pk		AF0-2103-12	100/ pk		AF0-8103-12 <sup>1</sup>	100/ pk	
	AF0-3103-52	500/ pk		AF0-2103-52	500/ pk		AF0-8103-52 <sup>1</sup>	500/ pk	

Footnote:  
1.26 mm diameter.  
Additional dimensions and membrane types are available. Please contact your local Phenomenex technical consultant or distributor for availability or assistance.  
Larger quantity purchases at significant savings are available.

## UHPLC / HPLC Sure-Lok™ High Pressure PEEK Male Nut Fittings

- UHPLC / HPLC Sure-Lok High Pressure PEEK male nut fittings are recommended for installation of Kinetex columns
- Convenient one-piece design (AQ0-8503) is pressure rated to 12,000 psi (827 bar)
- A handy fitting tightening tool (AQ0-8530) is available to facilitate achievement of a leak-free connection

Part No.	Description	Unit	Price
AQ0-8503	Sure-Lok High Pressure PEEK 1-Pc Nut, 10-32, for 1/16 in. Tubing, 12,000 psi (827 bar)	10/pk	
AQ0-8530	Sure-Lok Fitting Tightening Tool, Aluminum	ea	



## SecurityGuard™ ULTRA Cartridge System\*

The SecurityGuard ULTRA cartridge system protects ultra-high performance columns, like Kinetex, from damaging contaminants and microparticulates.

- Extend Kinetex column lifetime
- Simple to use
- 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 Holder	ea	Price
	AJ0-9000	

\* See p. 55 for SecurityGuard ULTRA Cartridges.

## Core-Shell Performance Enhancement Kit

The Core-Shell Performance Enhancement Kit comes complete with all the tubing and fittings that is needed to decrease the system dwell volume of your HPLC instrument, instantly improving the observed performance of your Kinetex® core-shell column.



Part No.	Description	Unit	Price
AQ0-8892	Core-Shell Performance Enhancement Kit, Includes: PEEKsil™ Tubing, Fittings and Tool	ea	

Core-Shell Performance Enhancement Kit AQ0-8892 includes:	Kit Quantity
PEEKsil Tubing 0.100 mm ID x 1/16 in. OD x 20 cm L, Red	2/pk
PEEKsil Tubing 0.100 mm ID x 1/16 in. OD x 10 cm L, Red	ea
Sure-Lok™ High Pressure PEEK 1-Pc Nut, 10-32, for 1/16 in. Tubing	10/pk
Sure-Lok Fitting Tightening Tool, Aluminum	ea

Part No.	Description	Unit	Price
AT0-8896	PEEKsil Tubing 0.100 mm ID x 1/16 in. OD x 20 cm L, Red	5/pk	
AT0-8897	PEEKsil Tubing 0.100 mm ID x 1/16 in. OD x 10 cm L, Red	5/pk	
AQ0-8503	Sure-Lok High Pressure PEEK 1-Pc Nut, 10-32, for 1/16 in. Tubing	10/pk	
AQ0-8530	Sure-Lok Fitting Tightening Tool, Aluminum	ea	



Verify that your getting  
the best performance out of  
your Kinetex column!

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

# Material Characteristics

## Material Characteristics

Packing Material	Total Particle Size (µm)	Pore Size (Å)	Effective Surface Area (m <sup>2</sup> /g)	Effective Carbon Load %	pH Stability	Pressure Stability
Kinetex XB-C18	5	100	200	10	1.5 - 8.5**	1000/600 <sup>+</sup> bar
Kinetex C18	5	100	200	12	1.5 - 8.5**	
Kinetex C8	5	100	200	8	1.5 - 8.5**	
Kinetex Phenyl-Hexyl	5	100	200	11	1.5 - 8.5**	
Kinetex XB-C18	2.6	100	200	10	1.5 - 8.5**	1000/600 <sup>+</sup> bar
Kinetex C18	2.6	100	200	12	1.5 - 8.5**	
Kinetex C8	2.6	100	200	8	1.5 - 8.5**	
Kinetex HILIC	2.6	100	200	0	2.0 - 7.5	
Kinetex Phenyl-Hexyl	2.6	100	200	11	1.5 - 8.5**	1000 bar
Kinetex XB-C18	1.7	100	200	10	1.5 - 8.5**	
Kinetex C18	1.7	100	200	12	1.5 - 8.5**	
Kinetex C8	1.7	100	200	8	1.5 - 8.5**	
Kinetex HILIC	1.7	100	200	0	2.0 - 7.5	1000 bar
Kinetex Phenyl-Hexyl	1.7	100	200	11	1.5 - 8.5**	
Kinetex C18	1.3	100	200	12	1.5 - 8.5**	

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

<sup>+</sup>2.1 mm ID Kinetex columns are pressure stable up to 1000 bar.

When using Kinetex 1.3 µm or 1.7 µm, increased performance can be achieved, however high pressure-capable instrumentation is required.

## Kinetex Particle

	1.3 µm	1.7 µm	2.6 µm	5 µm
<b>System Compatibility</b>	UHPLC	UHPLC	UHPLC & HPLC	HPLC & PREP LC
<b>Typical Efficiency (p/m)</b>	> 400,000	~320,000	~280,000	~180,000
<b>Typical Backpressure (bar)</b>	> 400	> 400	200-350	< 250 bar

### Terms and Conditions

Subject to Phenomenex Standard Terms & Conditions, which may be viewed at [www.phenomenex.com/TermsAndConditions](http://www.phenomenex.com/TermsAndConditions).

### Trademarks

Phenomenex, Kinetex, Clarity, and Strata are registered trademarks of Phenomenex. Axia, Aeris, Oligo-MS, MidBore, Phenex, SecurityGuard, and Sure-Lok are trademarks of Phenomenex. Waters, ACQUITY, UPLC, Symmetry, and XBridge are registered trademarks, and BEH Technology, OBD, and SunFire are trademarks of Waters Corporation. Agilent, ZORBAX, and Poroshell are registered trademarks of Agilent Technologies, Inc. API 3000, API 4000, and API 5000 are trademarks of AB SCIEX Pte. Ltd. AB SCIEX™ is being used under license. HALO is a registered trademark of Advanced Materials Technology, Inc. Inertsil is a registered trademark of GL Sciences, Inc. Ascentis is a registered trademark of Sigma-Aldrich Biotechnology LP and Sigma-Aldrich Co. Shimadzu and Nexera are registered trademarks of Shimadzu Corporation. JASCO is a registered trademark of JASCO Corporation. PEEKsil is a trademark of SGE. NUCLEOSIL is a registered trademark of Macherey Nagel. Milli-Q is a registered trademark of Merck KGaA, Darmstadt, Germany.

### Disclaimer

Phenomenex is not affiliated with Agilent Technologies, Advanced Materials Technology, Inc., Sigma-Aldrich Biotechnology LP and Sigma-Aldrich Co., JASCO Corporation, Waters Corporation, SGE, or U.S. Silica Co.

Comparative separations may not be representative of all applications.

SecurityGuard is patented by Phenomenex. U.S. Patent No. 6,162,362. CAUTION: this patent only applies to the analytical-sized guard cartridge holder, and does not apply to SemiPrep, PREP or ULTRA holders, or to any cartridges.

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

© 2014 Phenomenex, Inc. All rights reserved.

# Ordering Information

5 μm Columns (mm)		SecurityGuard™ ULTRA Cartridges*					SecurityGuard ULTRA Cartridges*
50 x 2.1		3/pk	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
<b>XB-C18</b>	00B-4605-AN	AJO-8782	00B-4605-E0	00D-4605-E0	00F-4605-E0	00G-4605-E0	AJO-8768
<b>C18</b>	00B-4601-AN	AJO-8782	00B-4601-E0	00D-4601-E0	00F-4601-E0	00G-4601-E0	AJO-8768
<b>C8</b>	00B-4608-AN	AJO-8784	00B-4608-E0	00D-4608-E0	00F-4608-E0	00G-4608-E0	AJO-8770
<b>Phenyl-Hexyl</b>	00B-4603-AN	AJO-8788	00B-4603-E0	00D-4603-E0	00F-4603-E0	00G-4603-E0	AJO-8774

\* SecurityGuard ULTRA cartridges require holder, Part No. AJO-9000.

5 μm Axia™ Packed Preparative Columns (mm)					SecurityGuard PREP Cartridges**
50 x 21.2		100 x 21.2	150 x 21.2	250 x 21.2	15 x 21.2
<b>XB-C18</b>	00B-4605-PO-AX	00D-4605-PO-AX	00F-4605-PO-AX	00G-4605-PO-AX	AJO-9145
<b>C18</b>	00B-4601-PO-AX	00D-4601-PO-AX	00F-4601-PO-AX	00G-4601-PO-AX	AJO-9145
<b>C8</b>	00B-4608-PO-AX	00D-4608-PO-AX	00F-4608-PO-AX	00G-4608-PO-AX	AJO-9205
<b>Phenyl-Hexyl</b>	00B-4603-PO-AX	00D-4603-PO-AX	00F-4603-PO-AX	00G-4603-PO-AX	AJO-9147

\*\* SecurityGuard PREP cartridges require holder, Part No. AJO-8223.

5 μm Axia Packed Preparative Columns (mm)					SecurityGuard PREP Cartridges***
50 x 30.0		100 x 30.0	150 x 30.0	250 x 30.0	15 x 30.0
<b>XB-C18</b>	00B-4605-U0-AX	00D-4605-U0-AX	00F-4605-U0-AX	00G-4605-U0-AX	AJO-9204
<b>C18</b>	00B-4601-U0-AX	00D-4601-U0-AX	00F-4601-U0-AX	00G-4601-U0-AX	AJO-9204
<b>C8</b>	00B-4608-U0-AX	00D-4608-U0-AX	00F-4608-U0-AX	00G-4608-U0-AX	AJO-9217
<b>Phenyl-Hexyl</b>	00B-4603-U0-AX	00D-4603-U0-AX	00F-4603-U0-AX	00G-4608-U0-AX	AJO-9216

\*\*\*PREP SecurityGuard Cartridges require holder, Part No.: AJO-8277.

1.3 μm Columns (mm)		SecurityGuard ULTRA Cartridge Holder	
50 x 2.1		Part No.	Unit
<b>C18</b>	00B-4515-AN	<b>AJO-9000</b>	ea

1.7 μm MidBore Columns (mm)				SecurityGuard ULTRA Cartridges*
30 x 3.0		50 x 3.0	100 x 3.0	3/pk
<b>XB-C18</b>	00A-4498-Y0	00B-4498-Y0	00D-4498-Y0	AJO-8775
<b>C18</b>	—	00B-4475-Y0	00D-4475-Y0	AJO-8775
<b>C8</b>	00A-4499-Y0	00B-4499-Y0	00D-4499-Y0	AJO-8777
<b>HILIC</b>	—	00B-4474-Y0	—	AJO-8779
<b>Phenyl-Hexyl</b>	—	—	—	AJO-8781

for 3.0 mm ID

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

for 2.1 mm ID

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

for 4.6 mm ID

2.6 μm MidBore™ Columns (mm)						SecurityGuard ULTRA Cartridges*
30 x 3.0		50 x 3.0	75 x 3.0	100 x 3.0	150 x 3.0	3/pk
<b>XB-C18</b>	00A-4496-Y0	00B-4496-Y0	00C-4496-Y0	00D-4496-Y0	00F-4496-Y0	AJO-8775
<b>C18</b>	00A-4462-Y0	00B-4462-Y0	00C-4462-Y0	00D-4462-Y0	00F-4462-Y0	AJO-8775
<b>C8</b>	00A-4497-Y0	00B-4497-Y0	00C-4497-Y0	00D-4497-Y0	00F-4497-Y0	AJO-8777
<b>HILIC</b>	00A-4461-Y0	—	—	—	00F-4461-Y0	AJO-8779
<b>Phenyl-Hexyl</b>	—	—	—	00D-4495-Y0	00F-4495-Y0	AJO-8781

for 3.0 mm ID

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

\* SecurityGuard ULTRA cartridges require holder, Part No. AJO-9000.

for 2.1 mm ID



If you are not completely satisfied with Kinetex core-shell columns, send in your comparative data to a similar product within 45 days and keep the column for FREE.

**Australia**

t: 02-9428-6444  
f: 02-9428-6445  
auinfo@phenomenex.com

**Austria**

t: 01-319-1301  
f: 01-319-1300  
anfrage@phenomenex.com

**Belgium**

t: 02 503 4015 (French)  
t: 02 511 8666 (Dutch)  
f: +31 (0)30-2383749  
beinfo@phenomenex.com

**Canada**

t: (800) 543-3681  
f: (310) 328-7768  
info@phenomenex.com

**Denmark**

t: 4824 8048  
f: +45 4810 6265  
nordicinfo@phenomenex.com

**Finland**

t: 09 4789 0063  
f: +45 4810 6265  
nordicinfo@phenomenex.com

**France**

t: 01 30 09 21 10  
f: 01 30 09 21 11  
franceinfo@phenomenex.com

**Germany**

t: 06021-58830-0  
f: 06021-58830-11  
anfrage@phenomenex.com

**India**

t: 040-3012 2400  
f: 040-3012 2411  
indiainfo@phenomenex.com

**Ireland**

t: 01 247 5405  
f: +44 1625-501796  
eireinfo@phenomenex.com

**Italy**

t: 051 6327511  
f: 051 6327555  
italiainfo@phenomenex.com

**Luxembourg**

t: +31 (0)30-2418700  
f: +31 (0)30-2383749  
nlinfo@phenomenex.com

**Mexico**

t: 001-800-844-5226  
f: 001-310-328-7768  
tecnicomx@phenomenex.com

**The Netherlands**

t: 030-2418700  
f: 030-2383749  
nlinfo@phenomenex.com

**New Zealand**

t: 09-4780951  
f: 09-4780952  
nzinfo@phenomenex.com

**Norway**

t: 810 02 005  
f: +45 4810 6265  
nordicinfo@phenomenex.com

**Puerto Rico**

t: (800) 541-HPLC  
f: (310) 328-7768  
info@phenomenex.com

**Sweden**

t: 08 611 6950  
f: +45 4810 6265  
nordicinfo@phenomenex.com

**United Kingdom**

t: 01625-501367  
f: 01625-501796  
ukinfo@phenomenex.com

**United States**

t: (310) 212-0555  
f: (310) 328-7768  
info@phenomenex.com

**All other countries:  
Corporate Office USA** 

t: (310) 212-0555  
f: (310) 328-7768  
info@phenomenex.com



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

Phenomenex products are available worldwide. For the distributor in your country, contact Phenomenex USA, International Department at [international@phenomenex.com](mailto:international@phenomenex.com)