

new

Ultra-High Performance on Any LC System

- Achieve sub-2 µm performance within HPLC backpressure limitations
- Substitute 3 µm and 5 µm columns for 2-3x higher efficiency
- Obtain higher throughput without sacrificing resolution
- Easy method transfer across LC system platforms
- Reduce solvent consumption with faster analysis
- Reach lower levels of detection and quantitation

Material Characteristics*

Packing Material	Total Particle Size (µm)	Porous Shell (µm)	Solid Core (µm)	Pore Size (Å)	Effective Surface Area (m ² /g)	Effective Carbon Load %	pH Stability	Pressure Stability
Kinetex XB-C18	2.6	0.35	1.9	100	200	10	1.5 - 10**	1000/600+ bar
Kinetex C18	2.6	0.35	1.9	100	200	12	1.5 - 10**	
Kinetex C8	2.6	0.35	1.9	100	200	8	1.5 - 8.0	
Kinetex PFP	2.6	0.35	1.9	100	200	9	1.5 - 8.0	
Kinetex HILIC	2.6	0.35	1.9	100	200	0	2.0 - 7.5	
Kinetex XB-C18	1.7	0.23	1.25	100	200	12	1.5 - 10**	1000 bar
Kinetex C18	1.7	0.23	1.25	100	200	12	1.5 - 10**	
Kinetex C8	1.7	0.23	1.25	100	200	9	1.5 - 8.0	
Kinetex PFP	1.7	0.23	1.25	100	200	9	1.5 - 8.0	
Kinetex HILIC	1.7	0.23	1.25	100	200	0	2.0 - 7.5	

*For the evaluation of effective surface area and carbon load, please request technical note, TN-1064

**Columns are pH stable from 1.5-10 under isocratic conditions. Columns are pH stable 2-8 under gradient conditions.

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

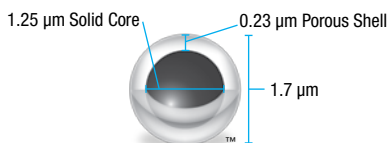


Innovation in Particle Technology

The Kinetex core-shell particle is not fully porous. Using sol-gel processing techniques that incorporate nano structuring technology, a durable, homogenous porous shell is grown on a solid silica core. This highly optimized process combined with uniform particle size distribution produces a column that generates extremely high plate counts. When using Kinetex 2.6 µm, less column backpressure is generated, allowing it to be used on any LC system.†

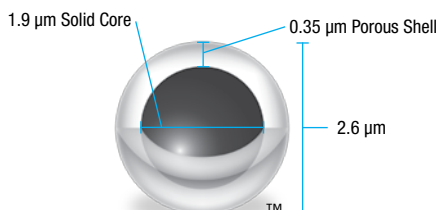
Kinetex 1.7 µm Core-Shell Particle

- Reduced diffusion path maximizes efficiency
- Increased efficiencies compared to traditional fully porous sub-2 µm columns. Typical operating backpressures > 400 bar

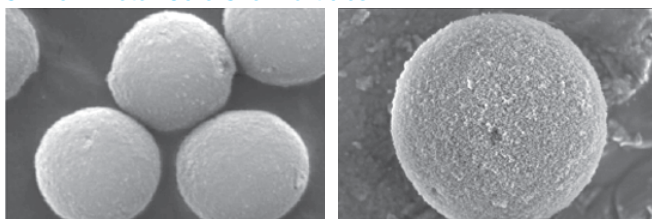


Kinetex 2.6 µm Core-Shell Particle

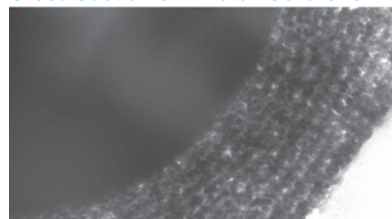
- Reduced diffusion path maximizes efficiency
- Ultra-high performance on any system with Kinetex 2.6 µm columns



SEM of Kinetex Core-Shell Particles



Cross Section of Kinetex Core-Shell Particle



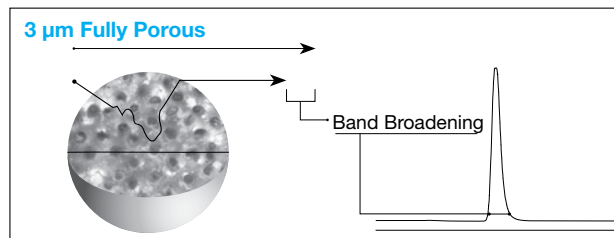
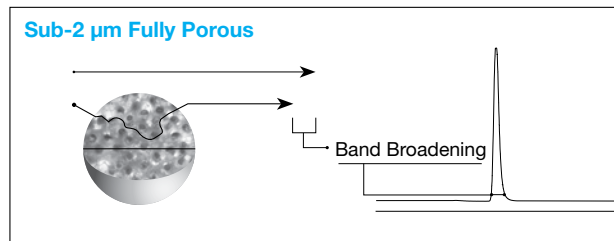
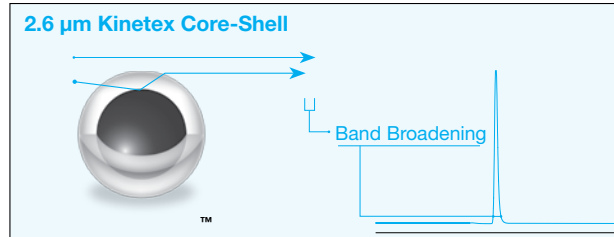
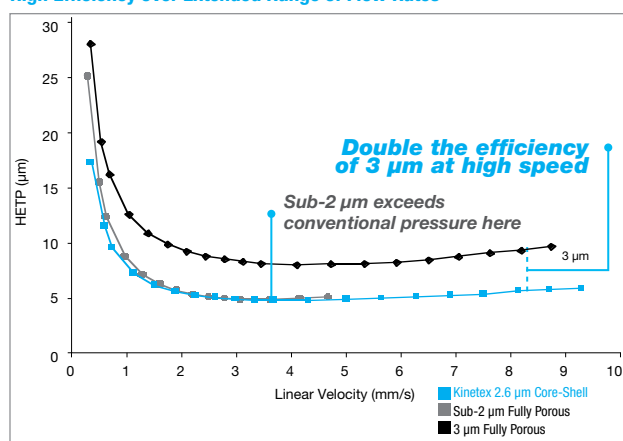
†When using Kinetex 1.7 µm, increased performance can be achieved, however higher pressure-capable instrumentation is required.

Optimized for Ultra-High Performance

Faster Mass Transfer

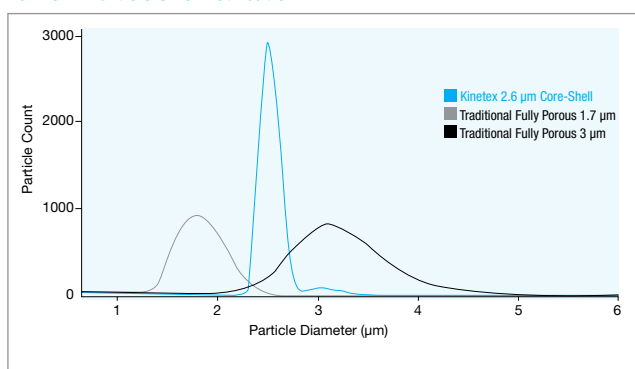
Since the Kinetex particle is not fully porous, analytes spend less time diffusing into and out of the pores as they travel through the column. This shorter diffusion path allows for faster mass transfer. The result is less band broadening for higher peak efficiency comparable to or better than sub-2 μm fully porous particles.

High Efficiency over Extended Range of Flow Rates

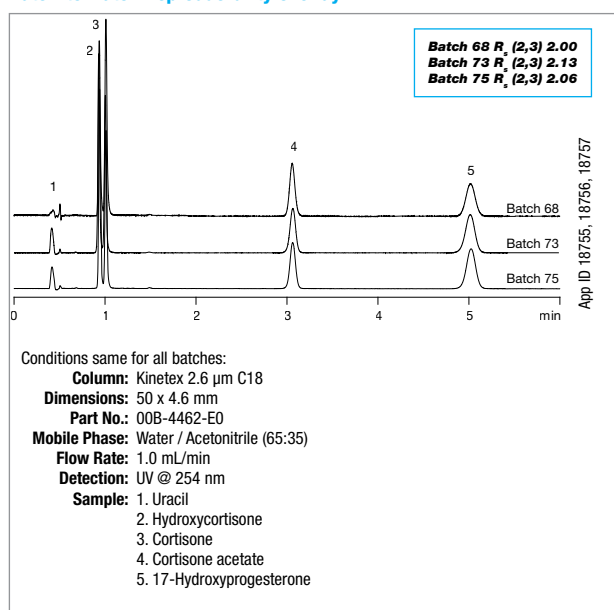


Kinetex particles are nearly monodispersed. This extremely narrow particle size distribution results in ultra-high column efficiency and excellent reproducibility.

Uniform Particle Size Distribution

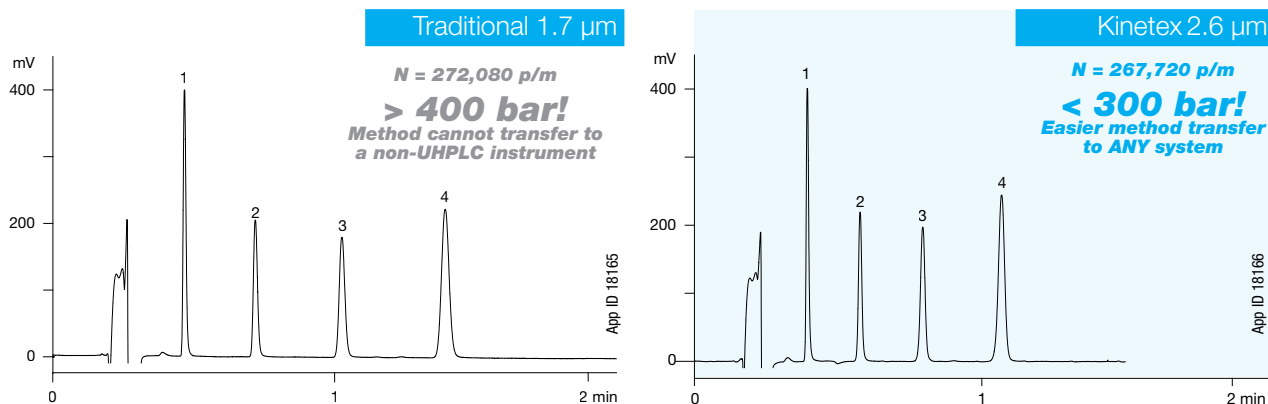


Batch-to-Batch Reproducibility Overlay



Achieve Sub-2 µm Performance within HPLC Backpressure Limitations

With the efficiency of a sub-2 µm column and typical operating backpressure less than 400 bar[†], you can achieve the promise of ultra-high performance on **any LC system**.

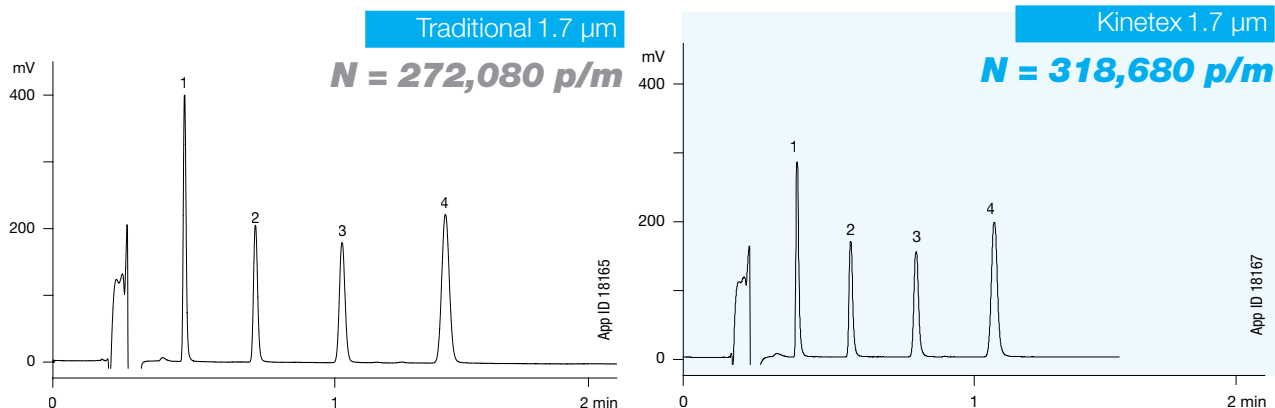


Conditions for both columns:

Column: Kinetex 2.6 µm C18
 Traditional 1.7 µm C18
Dimensions: 50 x 2.1 mm
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 0.6 mL/min
Temperature: 25 °C
Detection: UV @ 254 nm
Instrument: *Waters® ACQUITY® UPLC®
Sample: 0.5 µL test mixture
 1. Acetophenone 3. Toluene
 2. Benzene 4. Naphthalene

Unparalleled Levels of Ultra-High Performance

For users of higher pressure capable instruments who want the highest level of efficiency, we introduce the Kinetex 1.7 µm column - the first sub-2 µm core-shell particle available on the market.



Conditions for both columns:

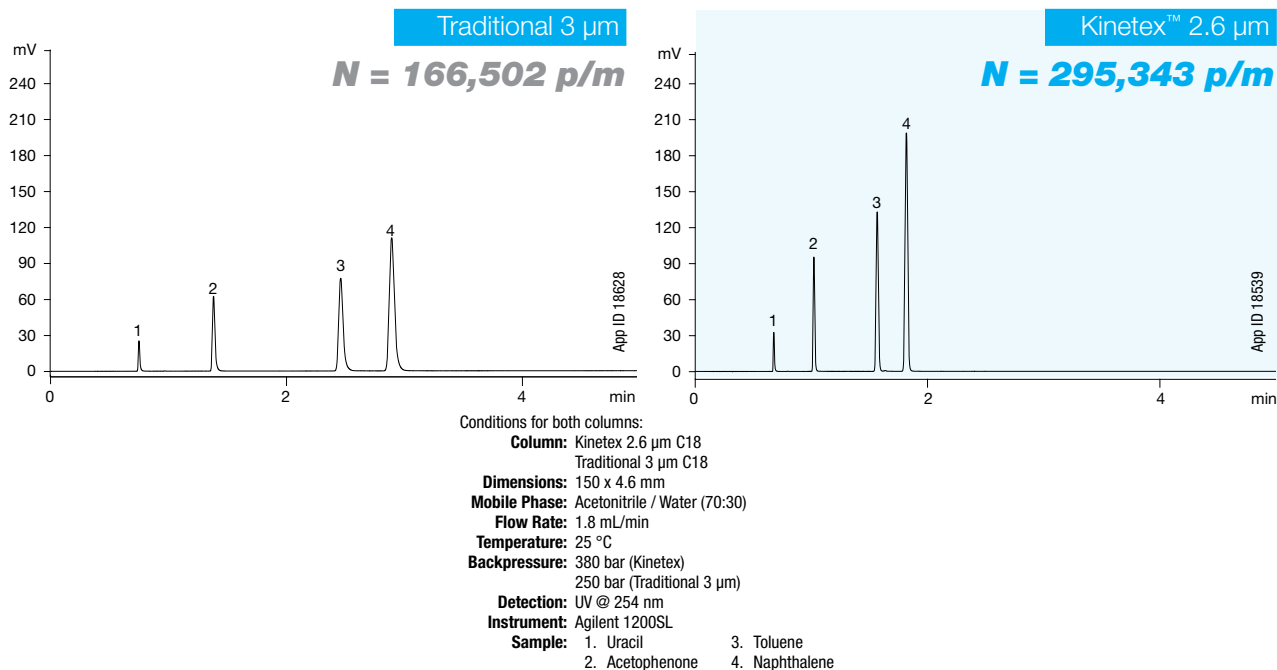
Column: Kinetex 1.7 µm C18
 Traditional 1.7 µm C18
Dimensions: 50 x 2.1 mm
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 0.6 mL/min
Temperature: 25 °C
Detection: UV @ 254 nm
Instrument: *Waters® ACQUITY® UPLC®
Sample: 1. Acetophenone 3. Toluene
 2. Benzene 4. Naphthalene

[†] Kinetex 2.6 µm columns, 2.1 mm ID, are pressure rated to 1000 bar use on both HPLC and UHPLC instrumentation.

* 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.

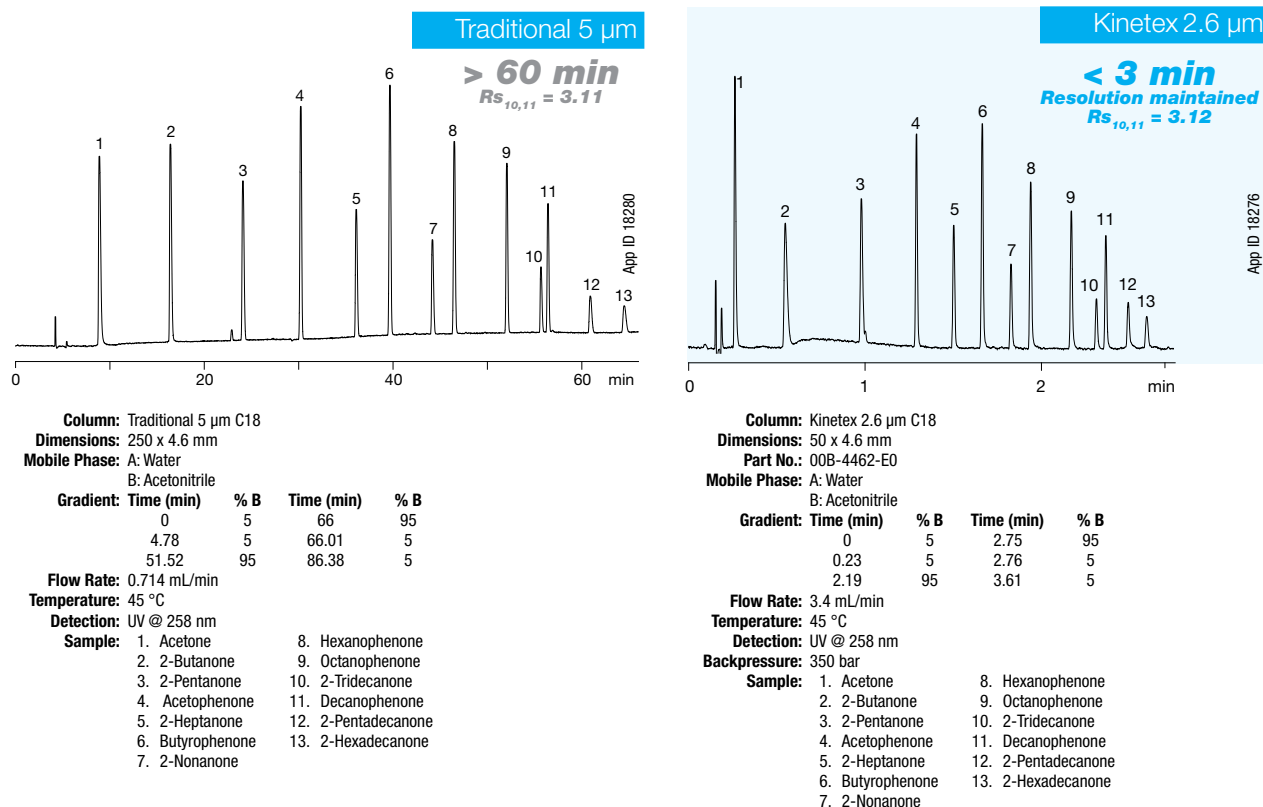
Substitute 3 µm and 5 µm Columns for 2-3x Higher Efficiency

Replace traditional 3 µm or 5 µm analytical columns with Kinetex 2.6 µm core-shell columns for immediate performance improvements in efficiency, speed, resolution, and sensitivity. Optimize methods for ultra-high performance and transfer them to any system.



Obtain Higher Throughput without Sacrificing Resolution

For the ultimate sample throughput demands, Kinetex columns provide the efficiency needed to significantly reduce run times. In this separation of 13 ketones, a 20-fold increase in productivity is accomplished while still maintaining resolution.



Comparative separations may not be representative of all applications.

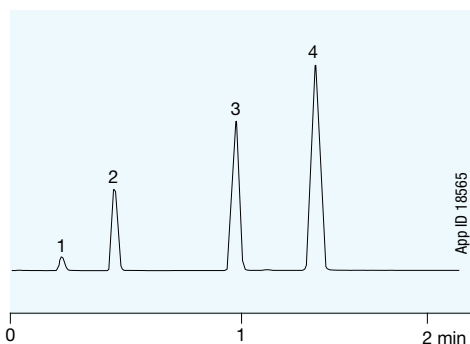
Easy Method Transfer Across LC System Platforms

UHPLC methods developed with fully porous sub-2 µm columns often generate backpressure higher than HPLC system limitations. With Kinetex 2.6 µm core-shell technology, you are no longer restricted from developing high performance LC methods on any system and transferring them anywhere. In these examples different internal diameters of Kinetex columns are used on various systems to illustrate the versatility of Kinetex core-shell technology. Please note the flow rates are scaled to maintain the same linear velocity.



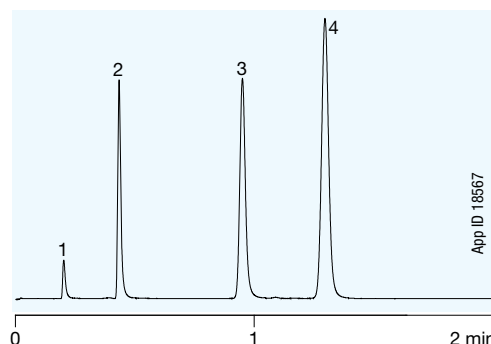
Kinetex 4.6 mm ID on Agilent 1100

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 4.6 mm
Part No.: 00B-4462-E0
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 2.35 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene



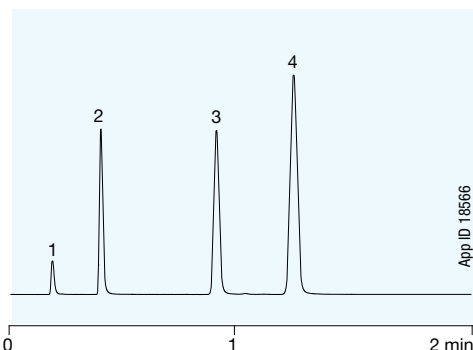
Kinetex 3.0 mm ID on *Shimadzu Prominence™ UFLC_{XR}™

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 3.0 mm
Part No.: 00B-4462-Y0
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 1.0 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene



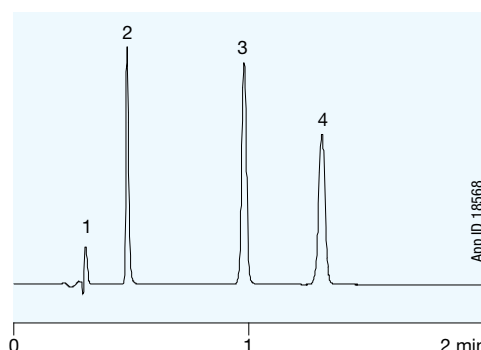
Kinetex 2.1 mm ID on Agilent 1200SL

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 0.49 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene



Kinetex 2.1 mm ID on *Waters® ACQUITY® UPLC®

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: Acetonitrile / Water (50:50)
Flow Rate: 0.49 mL/min
Temperature: Ambient
Detection: UV @ 254 nm
Sample: 1. Uracil
2. Acetophenone
3. Toluene
4. Naphthalene



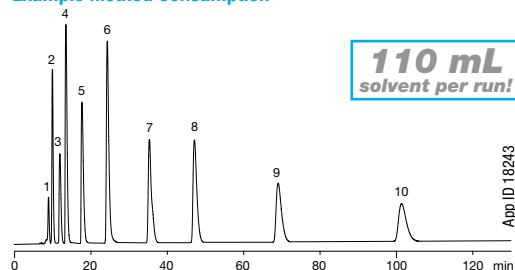
* Waters, ACQUITY, and UPLC are registered trademarks of Waters Corporation. Prominence and UFLC are trademarks of Shimadzu Corporation. Phenomenex is not affiliated with Agilent Technologies, Waters Corp. or Shimadzu.

Improve Performance, Save Solvent

When chromatographic column performance improves you can not only decrease your analysis time but 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.

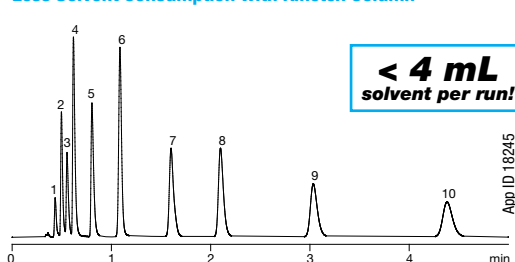
Column: Traditional 5 μ m C18
Dimensions: 250 x 4.6 mm
Flow Rate: 1.0 mL/min

Example Method Consumption



Column: Kinetex 2.6 μ m C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Flow Rate: 0.6 mL/min

Less Solvent Consumption with Kinetex Column



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

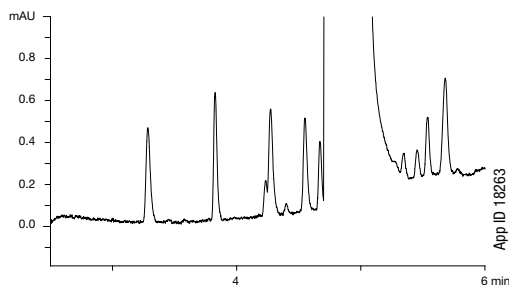
Sample:

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

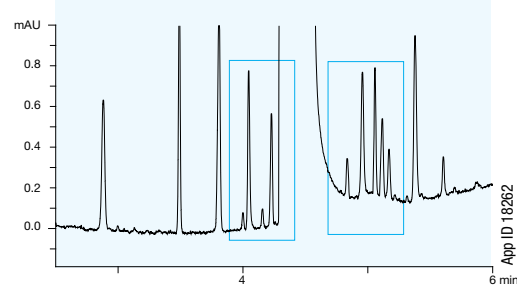
Reach Lower Levels of Detection and Quantitation

The combination of the small particle size, 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 on sensitivity since higher chromatographic efficiencies translate into significantly narrower and taller peaks, making it easier to detect low level impurities.

*ZORBAX® 3.5 μ m SB-C18



Kinetex 2.6 μ m C18



Conditions for both columns:

Dimensions: 150 x 4.6 mm
Mobile Phase: A: Water
B: Acetonitrile
Gradient: (95:5) A/B for 1.16 min, then to (5:95) A/B
Flow Rate: 1.5 mL/min
Temperature: 45 °C
Detection: UV @ 254 nm
Instrument: Agilent 1200

Sample:

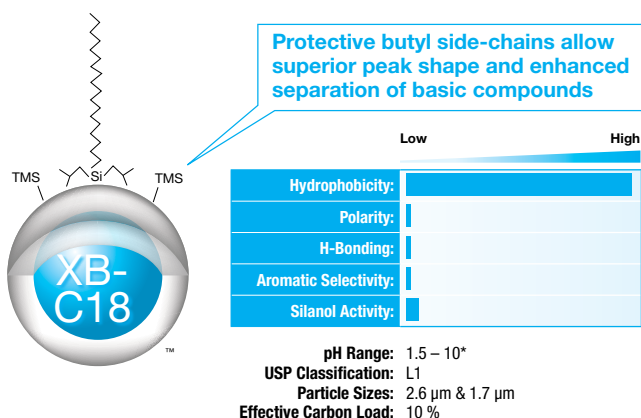
- | | |
|---------------------|-------------------------------------|
| 1. Pyridine | 9. Nortriptyline |
| 2. Acetaminophen | 10. 4-Chlorobenzoic acid |
| 3. Pindolol | 11. 5-Methyl-2-hydroxy benzaldehyde |
| 4. Quinine | 12. 4-Chlorocinnamic acid |
| 5. Acebutolol | 13. Diazepam |
| 6. Chlorpheniramine | 14. Diflunisal |
| 7. Triprolidine | 15. Niflumic acid |
| 8. Prednisolone | 16. Hexanophenone |

* ZORBAX is a registered trademark of Agilent Technologies. Comparative separations may not be representative of all applications. Phenomenex is not affiliated with Agilent Technologies.

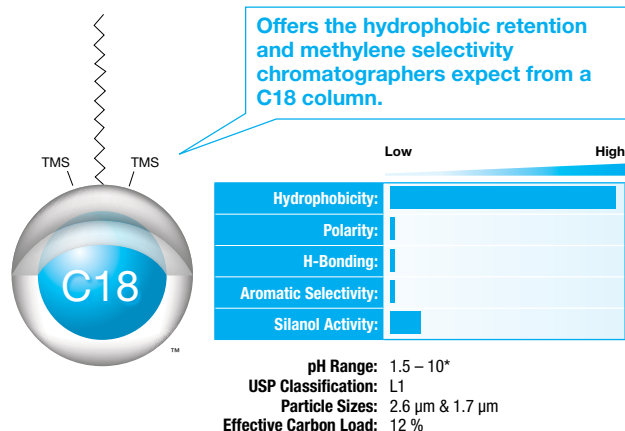
Complementary and Orthogonal Selectivities

To provide alternative and orthogonal selectivity phases, Kinetex™ columns are available in 5 selectivities: XB-C18, C18, C8, PFP (Pentafluorophenyl), and HILIC (Hydrophilic Interaction Liquid Chromatography), for resolution of a wide range of compounds from polar to hydrophobic, aromatic, and isomers.

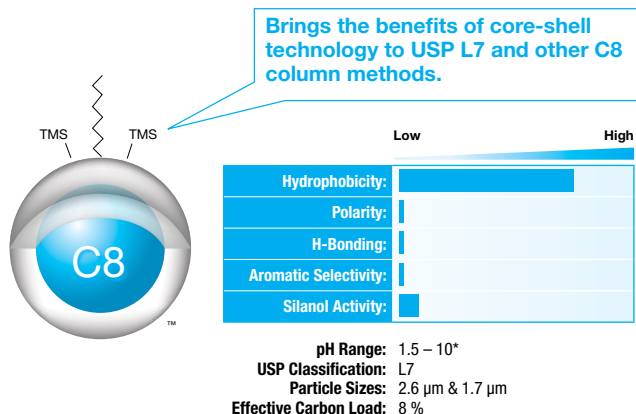
NEW! Kinetex XB-C18



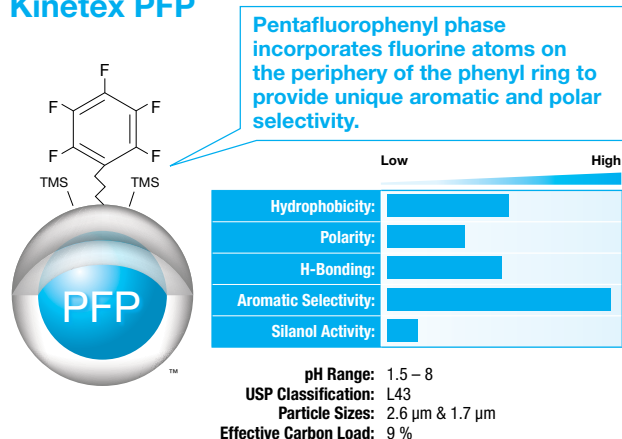
Kinetex C18



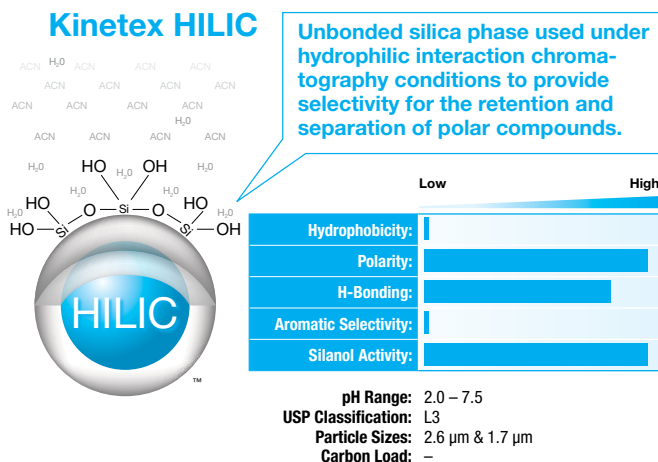
NEW! Kinetex C8



Kinetex PFP

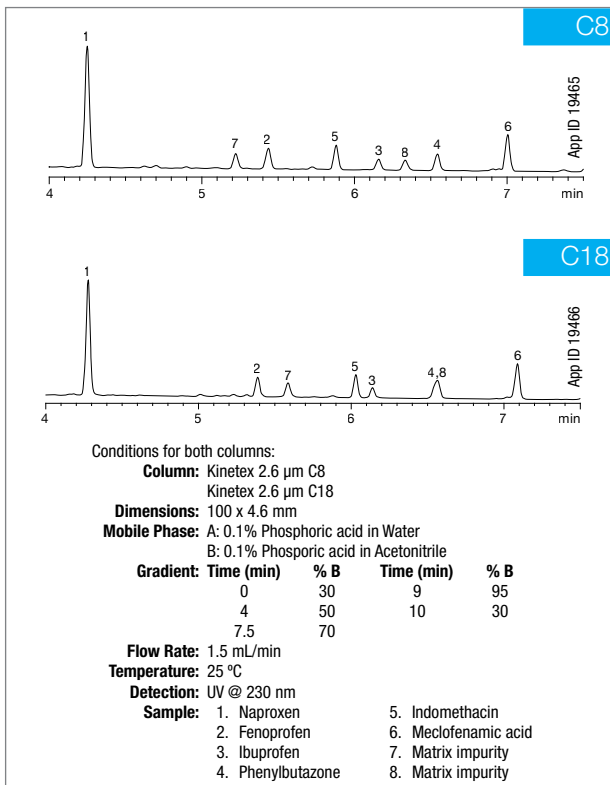


Kinetex HILIC

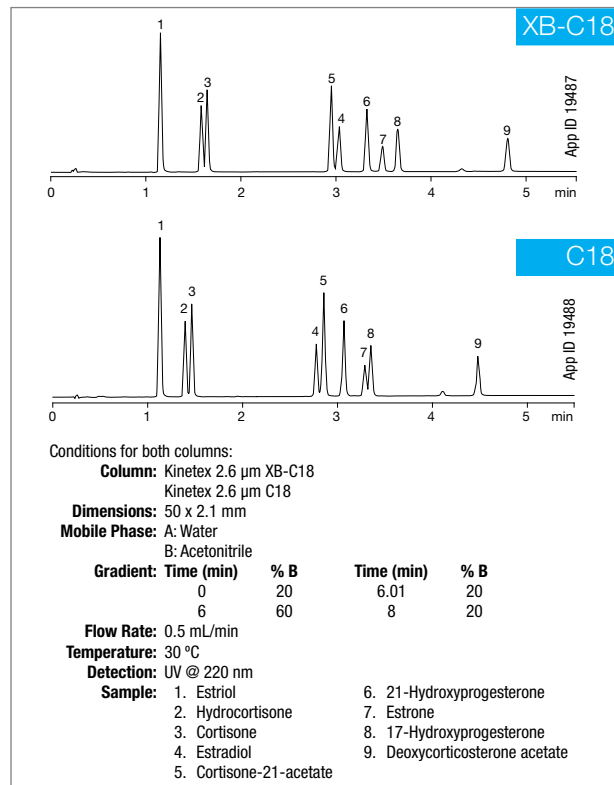


*Columns are pH stable from 1.5-10 under isocratic conditions. Columns are pH stable 2-8 under gradient conditions.

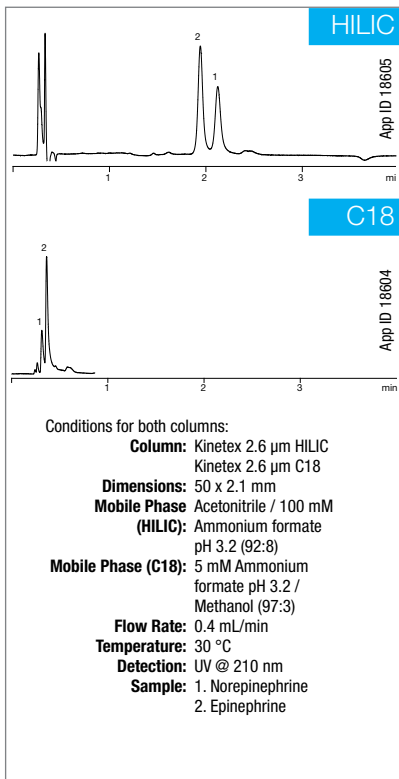
Veterinary Drugs



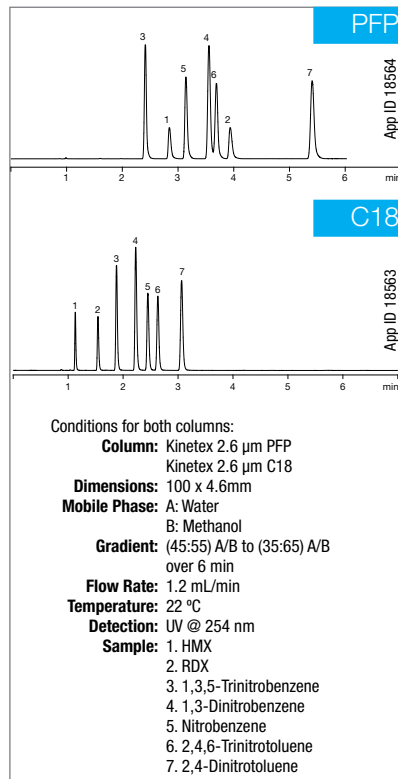
Steroids



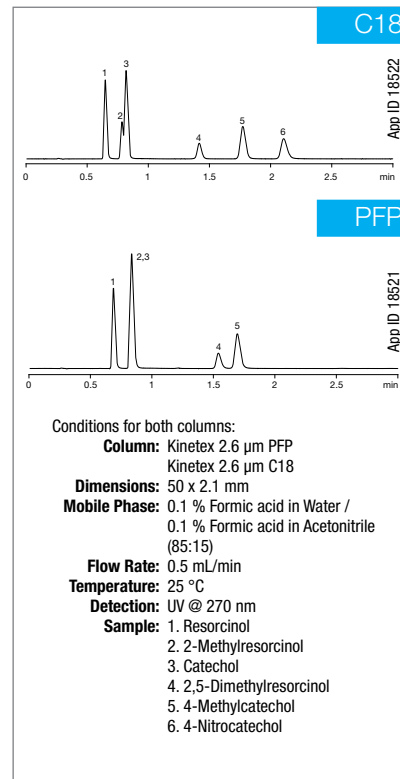
Norepinephrine and Epinephrine



Explosives



Resorcinol



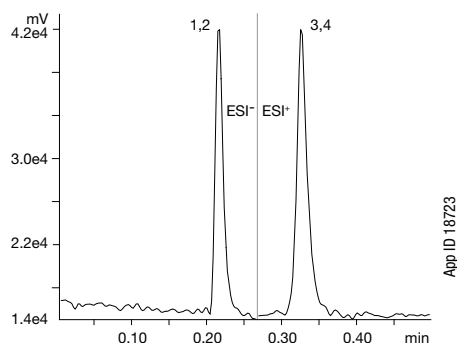
Comparative separations may not be representative of all applications.

Applications

Food Testing

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

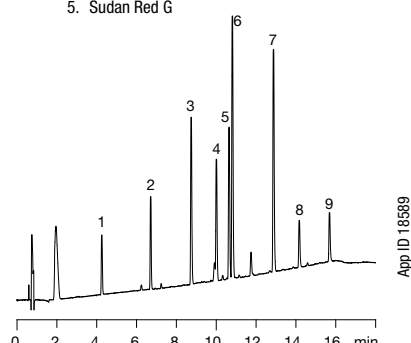


Azo Dyes

Column: Kinetex 2.6 µm C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4462-E0
Mobile Phase: A: 0.1% Phosphoric acid in Water
 B: 0.1% Phosphoric acid in Acetonitrile

Gradient	Time (min)	% B	Time (min)	% B
	0	25	17.01	25
	15	95	20	25
	17	95		

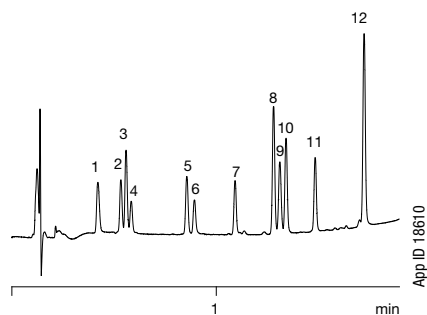
Flow Rate: 1.8 mL/min
Temperature: 50 °C
Detection: UV @ 215 nm
Backpressure: 380 bar
Sample: 1. Orange II 6. Sudan I
 2. Sudan Orange G 7. Sudan II
 3. Fast Garnet GBC 8. Sudan III
 4. Dimethyl yellow 9. Sudan IV
 5. Sudan Red G



Environmental

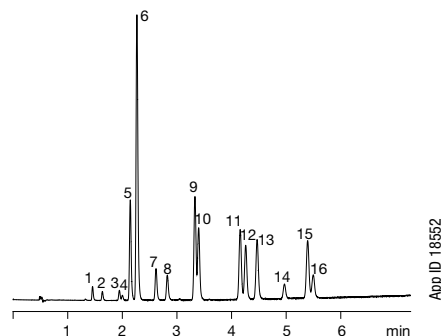
Carbamate Pesticides: EPA Method 531.1

Column: Kinetex 2.6 µm C18
Dimensions: 50 x 2.1 mm
Part No.: 00B-4462-AN
Mobile Phase: A: 0.1 % Phosphoric acid in Water
 B: 0.1 % Phosphoric acid in Acetonitrile
Gradient: (95:5) A/B to (5:95) A/B over 3 min
Flow Rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV @ 210 nm
Sample: 1. Aldicarb sulfoxide 7. Aldicarb
 2. Oxamyl 8. Baygon (Propoxur)
 3. Aldicarb sulfone 9. Carbofuran
 4. Methomyl 10. Carbaryl
 5. 3-OH-Carbofuran 11. 1-Naphthol
 6. Aldicarb sulfone-related impurity 12. Methiocarb



Polyaromatic Hydrocarbons (PAHs): EPA Method 610

Column: Kinetex 2.6 µm C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-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



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 † Waters, ACQUITY, and UPLC are registered trademarks of Waters Corporation.
 Phenomenex is not affiliated with Life Technologies Corporation or Waters Corporation.

Applications

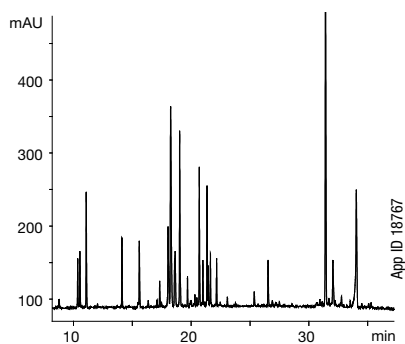
Biopharmaceutical

Peptide Map of Biogenic α -Interferon (unreduced)

Column: Kinetex 2.6 μ m C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4462-E0
Mobile Phase: A: 0.1 % Trifluoroacetic acid / 2 % Acetonitrile / Water
 B: 0.9 % Trifluoroacetic acid / 98 % Acetonitrile / Water
Gradient:

Time (min)	% B
0	1
40	56
41	56

Flow Rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV @ 214 nm
Sample: Human α -Interferon tryptic digest

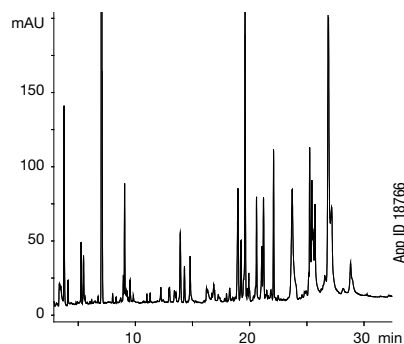


Peptide Map of Reduced and Alkylated Ig-G1

Column: Kinetex 2.6 μ m C18
Dimensions: 150 x 4.6 mm
Part No.: 00F-4462-E0
Mobile Phase: A: 0.1 % Trifluoroacetic acid / 2 % Acetonitrile / Water
 B: 0.085 % Trifluoroacetic acid in Acetonitrile
Gradient:

Time (min)	% B
0	1
40	56
41	56

Flow Rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV @ 214 nm
Sample: Hu-Ig-G1 Reduced and Alkylated Tryptic Digest

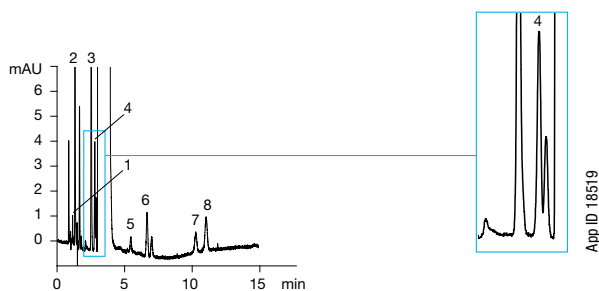


Pharmaceutical

Atenolol Impurity Profile

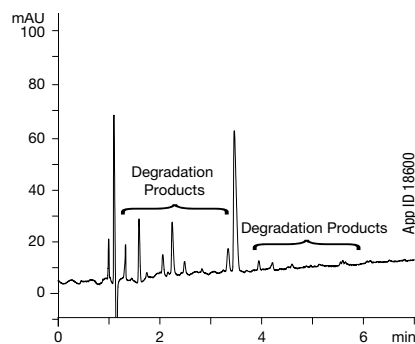
Column: Kinetex 2.6 μ m C18
Dimensions: 100 x 4.6 mm
Part No.: 00D-4462-E0
Mobile Phase: 12.5 mM Phosphoric acid in Water, pH 3.0 + 2.0 g Sodium Octanesulfonate + 0.8 g Tetrabutyl Ammonium Hydrogen Sulfate / Methanol / THF (80:18:2)
Flow Rate: 1.0 mL/min
Temperature: 22 °C
Detection: UV @ 226 nm
Sample:

1. Impurity B	5. Impurity D and E
2. Impurity A	6. Impurity F
3. Impurity J	7. Impurity G
4. Impurity I	8. Impurity H



Forced Degradation of Ranitidine

Column: Kinetex 2.6 μ m 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.



new

Ordering Information

2.6 µm Analytical Columns (mm)						SecurityGuard™ Ultra Cartridges†
Phases	30 x 4.6	50 x 4.6	75 x 4.6	100 x 4.6	150 x 4.6	4.0 mm ID
						/3pk
XB-C18	—	00B-4496-E0	00C-4496-E0	00D-4496-E0	00F-4496-E0	AJO-8768
C18	00A-4462-E0	00B-4462-E0	00C-4462-E0	00D-4462-E0	00F-4462-E0	AJO-8768
C8	—	00B-4497-E0	00C-4497-E0	00D-4497-E0	00F-4497-E0	AJO-8770
PFP	00A-4477-E0	00B-4477-E0	00C-4477-E0	00D-4477-E0	00F-4477-E0	AJO-8773
HILIC	—	00B-4461-E0	00C-4461-E0	00D-4461-E0	00F-4461-E0	AJO-8772

for 4.6 mm ID

2.6 µm Solvent Saver MidBore™ Columns (mm)						SecurityGuard™ Ultra Cartridges†
Phases	30 x 3.0	50 x 3.0	75 x 3.0	100 x 3.0	150 x 3.0	3.0 mm ID
						/3pk
XB-C18	—	00B-4496-Y0	—	00D-4496-Y0	—	AJO-8775
C18	00A-4462-Y0	00B-4462-Y0	00C-4462-Y0	00D-4462-Y0	00F-4462-Y0	AJO-8775
C8	—	00B-4497-Y0	—	00D-4497-Y0	—	AJO-8777
PFP	00A-4477-Y0	00B-4477-Y0	00C-4477-Y0	00D-4477-Y0	00F-4477-Y0	AJO-8780
HILIC	—	—	—	—	00F-4461-Y0	AJO-8779

for 3.0 mm ID

2.6 µm Minibore Columns (mm)					SecurityGuard™ Ultra Cartridges†
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	2.1 mm ID
					/3pk
XB-C18	—	00B-4496-AN	00D-4496-AN	—	AJO-8782
C18	00A-4462-AN	00B-4462-AN	00D-4462-AN	00F-4462-AN	AJO-8782
C8	—	00B-4497-AN	00D-4497-AN	—	AJO-8784
PFP	00A-4477-AN	00B-4477-AN	00D-4477-AN	00F-4477-AN	AJO-8787
HILIC	—	00B-4461-AN	00D-4461-AN	00F-4461-AN	AJO-8786

for 2.1 mm ID

1.7 µm Minibore Columns (mm)				SecurityGuard™ Ultra Cartridges†
Phases	50 x 2.1	100 x 2.1	150 x 2.1	2.1 mm ID
				/3pk
XB-C18	00B-4498-AN	00D-4498-AN	—	AJO-8782
C18	00B-4475-AN	00D-4475-AN	00F-4475-AN	AJO-8782
C8	00B-4499-AN	00D-4499-AN	—	AJO-8784
PFP	00B-4476-AN	00D-4476-AN	00F-4476-AN	AJO-8787
HILIC	00B-4474-AN	—	—	AJO-8786

for 2.1 mm ID



†SecurityGuard Ultra cartridges require holder, Part No.: AJO-9000

SecurityGuard™ Ultra Cartridge System

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

- Extend Kinetex column lifetime
- Simple to use
- Pressure rated to 15,000 psi (1,000 bar)
- Fits virtually all manufacturers' columns

New High Pressure
Rated Format

SecurityGuard Ultra Cartridge Holders

Ordering Information

Part No.	Description	Unit	Price
AJO-9000-1	SecurityGuard Ultra Cartridge Holder	ea	
AJO-9000	SecurityGuard Ultra Cartridge Holders	3/pk	



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

Ordering Information

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

See p. 350 for more information.



For a convenient, disposable in-line filter that fits virtually all UHPLC / HPLC columns 1.0 to 4.6 mm ID, use KrudKatcher Ultra, found on p. 348.



For Ultra-High Performance Stainless Steel Nut and Ferrule Set, see p. 350



For Column Heaters, see p.343