

Thermo Scientific Accucore HPLC Columns

Ultimate Core Performance – Speed and Selectivity Combined

Founded on state-of-the-art Core Enhanced Technology™ and utilizing vast experience in phase bonding and packing, Thermo Scientific™ Accucore™ HPLC columns provide a unique chromatography solution to enhance laboratory workflow and efficiency. Available in a wide range of stationary phase selectivities and compatible with almost any instrument, these columns provide an excellent return on investment.

Containing solid core particles, which are engineered to a diameter of 2.6µm and a very narrow particle size distribution; Accucore HPLC columns allows high speed, high resolution separation, with back pressures significantly lower than those associated with UHPLC. Eleven different stationary phases bonded using advanced technology and packed with highly controlled automated processes result in highly reproducible, rugged columns that offer a wide range of selectivities to meet all your separation needs.



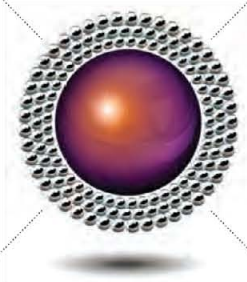
The key components of Core Enhanced Technology

Solid Core Particles

With a solid central core and porous outer layer, these particles generate high speed, high resolution separations without excessive backpressure

Automated Packing Process

Enhanced automated procedures ensure that all columns are packed with the highest quality



Tight Control of Particle Diameter

Enhanced selection process keeps particle size distribution to a minimum and produces high efficiency columns

Advanced Bonding Technology

Optimized phase bonding creates a series of high coverage, robust phases



View product information and application notes

The Accucore web page contains the latest news, applications and downloads for the Accucore HPLC column range.

Visit it at:

www.thermoscientific.com/accucore

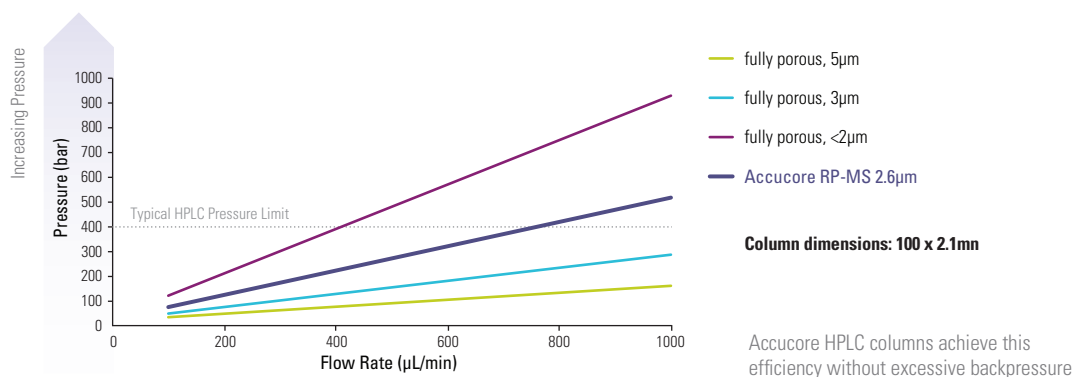
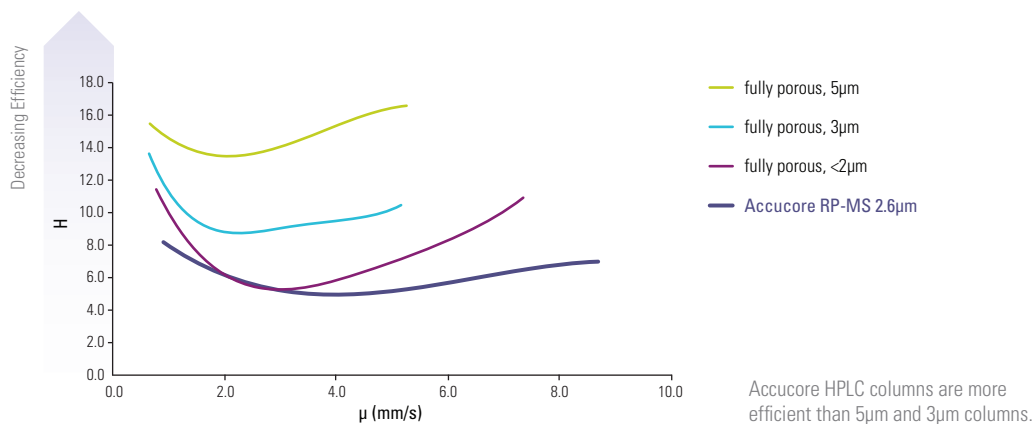


**CHROMATOGRAPHIC
SPECIALTIES INC.**

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Accucore 2.6μm HPLC Columns Optimum Conditions and Ratings

Column ID (mm)	Optimum Flow Rate	Maximum Inj. Volume	Backpressure Rating	Temperature Rating
2.1	400μL/min	1μL	1000 bar	70°C
3.0	800μL/min	3μL	1000 bar	70°C
4.6	1800μL/min	5μL	1000 bar	70°C



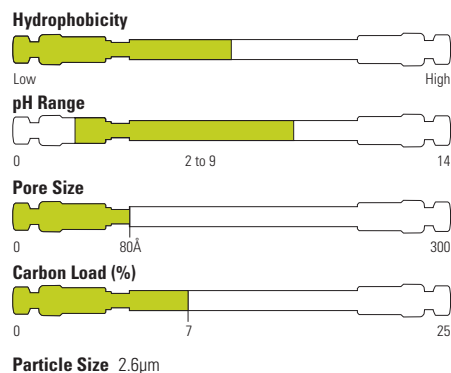
Accucore RP-MS

- Optimized for MS detection
- Excellent peak shapes
- Excellent combination of speed and efficiency

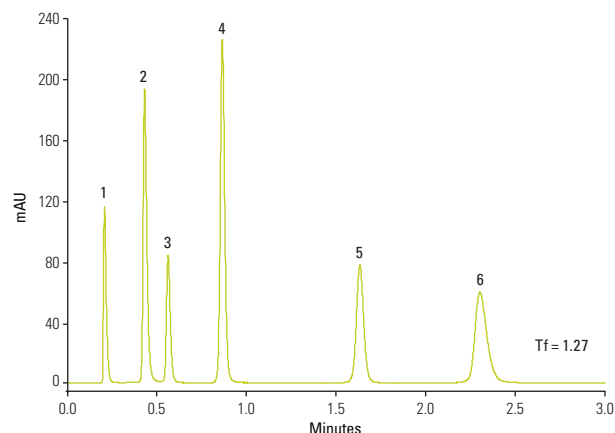
Accucore RP-MS uses an optimized alkyl chain length for more effective coverage of the silica surface. This coverage results in a significant reduction in non-hydrophobic interactions and thus highly efficient peaks with very low tailing.

RP-MS offers slightly lower retention than C18 and this combined with high efficiencies and low peak tailing make this the phase of choice for use with MS detection.

The selectivity offered by Accucore RP-MS matches that of C18 columns.



Bases



Accucore RP-MS 2.6 μm, 50mm x 2.1mm

Mobile phase: 65% Methanol / 35% 25mM Potassium Phosphate pH7.0

Flow rate: 500 μL/min

Temperature: 30°C

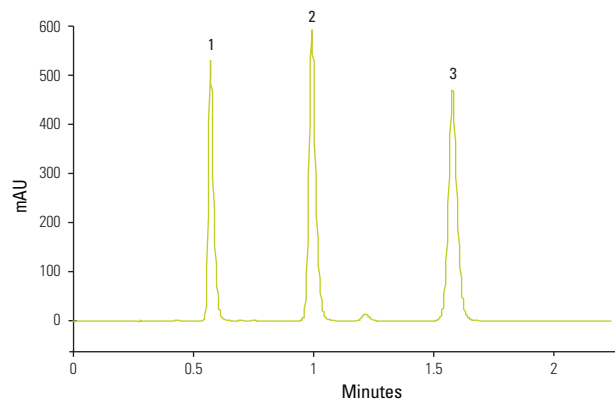
Detection: UV at 215nm

Injection volume: 1 μL

Back pressure: 232 bar

Analytes: 1. Uracil
2. Propranolol
3. Butylparaben
4. Naphthalene
5. Acenaphthene
6. Amitriptyline

Testosterones



Accucore RP-MS 2.6 μm, 100mm x 2.1mm

Mobile phase: 60:40 (v/v) Water / Acetonitrile

Flow rate: 0.6 mL/min

Temperature: 40°C

Detection: UV at 254nm

Injection volume: 1 μL

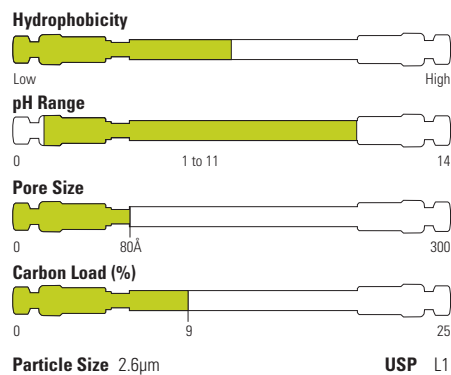
Analytes: 1. 11-Ketotestosterone
2. 19-Nortestosterone (Nandrolone)
3. Epitestosterone

Accucore C18

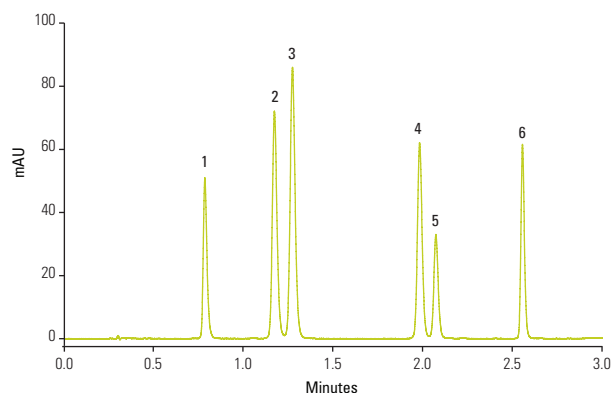
- Optimum retention of non-polar compounds
- Hydrophobic interaction mechanism
- Separates a broad range of analytes

The carbon loading of Accucore C18 phase provides high retention of non-polar analytes via a predominantly hydrophobic interaction mechanism.

The highly retentive nature of Accucore C18 phase means that it can be used to separate a broad range of analytes.



Triazines



Accucore C18 2.6μm, 50mm x 2.1mm

Mobile phase: A – Water ; B – Acetonitrile

Gradient:	Time (min)	%B
	1.0	35
	2.5	70

Flow rate: 600 μL/min

Temperature: 25°C

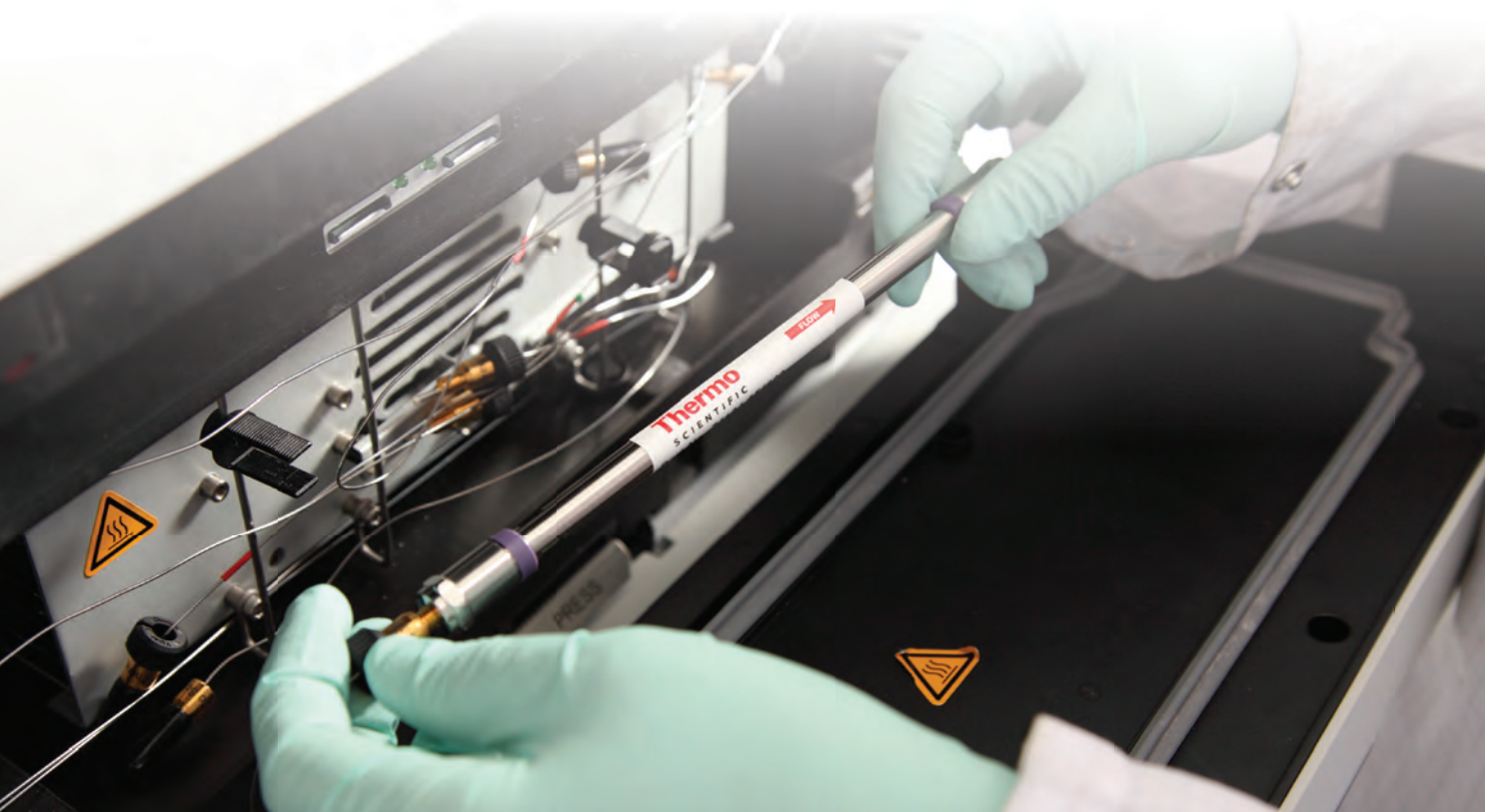
Detection: UV at 280nm

Injection volume: 2 μL

Backpressure: 298 bar

Analytes:

1. Simazine
2. Simetryn
3. Atrazine
4. Ametryn
5. Propazine
6. Prometryn

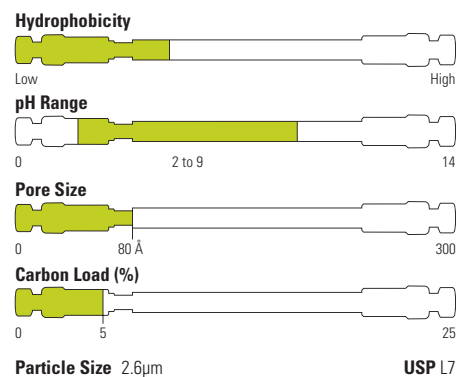


Accucore C8

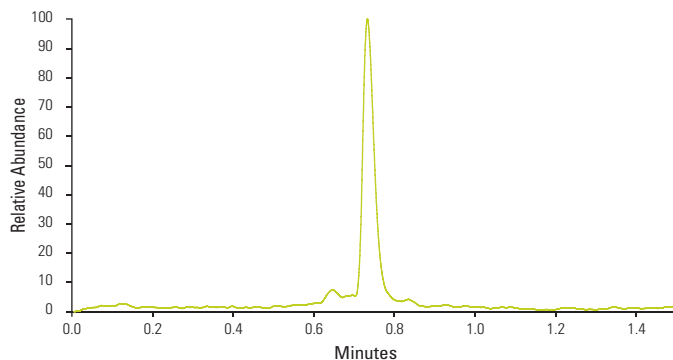
- Lower hydrophobic retention
- Complementary steric selectivity to C18
- Low levels of secondary interactions
- Recommended for moderately polar analytes

Accucore C8 HPLC columns offer lower hydrophobic retention than columns packed with longer alkyl chain length material, such as C18, and are therefore recommended for analytes with medium hydrophobicity or when a less hydrophobic phase provides optimum retention.

The low levels of secondary interactions demonstrated in the phase characterization are the result of excellent bonded phase coverage and allow users of Accucore C8 HPLC columns to benefit from excellent peak shapes.



Testosterone



Accucore C8 2.6µm, 50 x 2.1mm

Mobile phase A:	water + 0.1% formic acid
Mobile phase B:	acetonitrile + 0.1% formic acid
Gradient:	5–95 % B in 0.8 minutes
Flow:	1500 µL/min
Temperature:	60 °C
Injection:	5µL
Detection:	ESI-MS/MS %RSD Peak area

Retention time (tR /min)	0.73
%RSD tR	0.22
%RSD Area	3.01

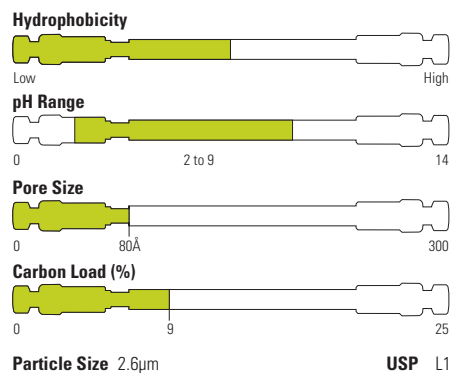
Data from six injections.

Accucore aQ

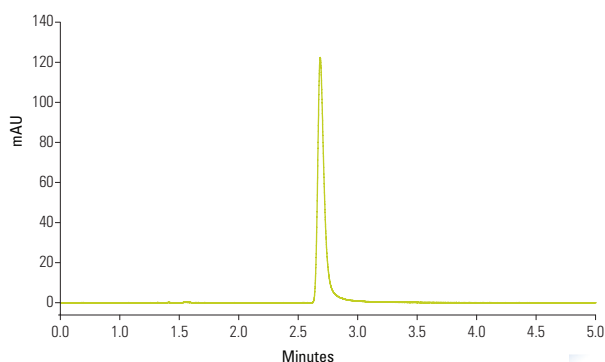
- Retention and resolution of polar analytes
- Polar endcapped C18 stationary phase for alternative selectivity
- Ideal for highly aqueous mobile phases

The polar functional group used to endcap Accucore aQ phase provides an additional controlled interaction mechanism by which polar compounds can be retained and resolved, making Accucore aQ phase ideal for the quantitative analysis of trace levels of polar analytes.

The wettability of reversed phase media can be increased by the introduction of polar functional groups. The polar endcapping of Accucore aQ media also makes it usable in 100% aqueous mobile phases without the risk of loss of performance or poor stability.



Lamivudine (USP)



Accucore aQ 2.6μm, 50mm x 2.1mm

Mobile phase:	95:5 (v/v) Ammonium Acetate, pH 3.80 / Methanol
Flow rate:	200 μL/min
Temperature:	35°C
Detection:	UV at 277nm
Injection volume:	1 μL
Analytes:	Lamivudine
Asymmetry	1.36
%RSD t_r	0.00
%RSD Peak area	1.72
(%RSD calculated from 6 replicate injections)	
USP acceptance criteria: % RSD (t_r , Peak Area) <2.0	

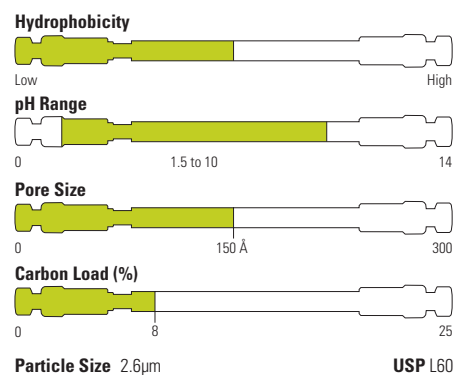


Accucore Polar Premium

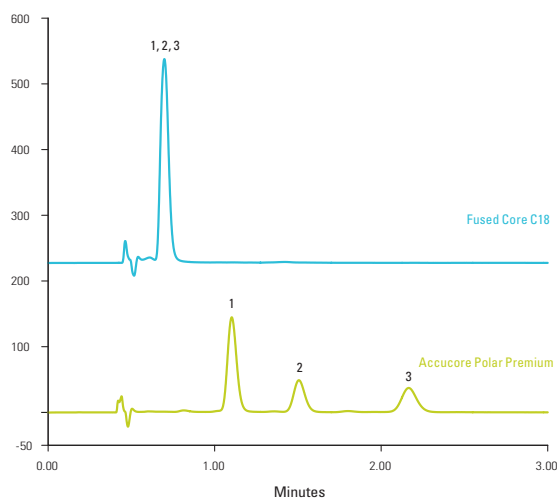
- Rugged amide-embedded C18 phase
- Selectivity complementary to conventional C18 phases
- Stable over a wide pH range and compatible with 100% aqueous mobile phase

Accucore Polar Premium is an exceptionally rugged polar embedded reverse phase material that offers high efficiency, wider operating pH range and unique selectivity complementary to standard C18 phases.

The specially designed bonded phase is stable from pH 1.5 to 10.5 and will not undergo phase collapse in 100% aqueous mobile phase.



Curcuminoids (Turmeric)



Accucore Polar Premium 2.6µm, 100 x 3.0mm Fused Core C18, 100 x 3.0 mm

Mobile phase:	methanol : 10mM phosphoric acid, 80 : 20
Flow:	800 µL/min
Temperature:	40 °C
Injection:	6µL
Detection:	UV at 428nm
Analytes:	1. Curcumin 2. Desmethoxycurcumin 3. Bis-desmethoxycurcumin

The Accucore Polar Premium HPLC column provides desirable selectivity that resolves the major and minor component under simple isocratic conditions in less than three minutes, while the C18 columns fail to separate these components.

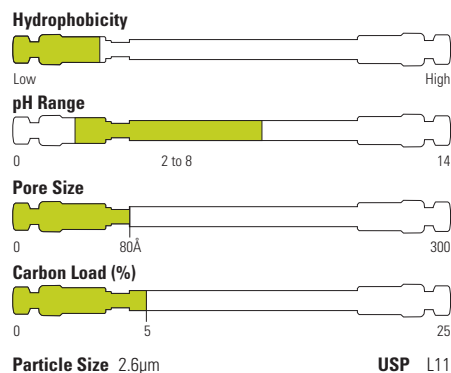


Accucore Phenyl-Hexyl

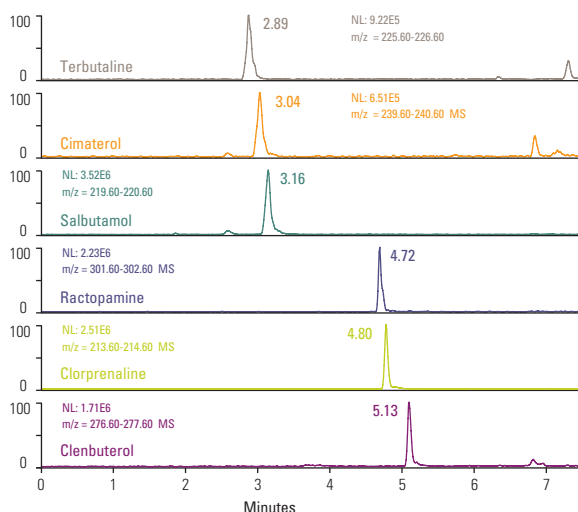
- Mixed-mode selectivity for aromatic and moderately polar analytes
- Enhanced Pi-pi interactions with aromatics
- Moderate hydrophobicity

The C6 chain in Accucore Phenyl-Hexyl phase exhibits classical RP retention and selectivity, while the phenyl ring can add special selectivity by interacting with polar groups within the solutes. This results in a mixed-mode separation mechanism. The reduced hydrophobicity of this phase makes it ideal for the separation of very non-polar compounds.

The Phenyl-Hexyl phase should be selected for complex samples where some peaks are well resolved on a conventional alkyl phases, but are not well resolved on a conventional phenyl phase, or when other peaks are well resolved on a phenyl phase, but not well resolved on a conventional alkyl phase.



Beta-agonists



Accucore Phenyl-Hexyl 2.6µm, 100mm x 2.1mm

Mobile phase:	A – Ammonium acetate 5mM, pH 4
	B – Acetonitrile
Gradient:	Time (min) %B
	0 5
	1 5
	10 100
Flow rate:	0.25mL/min
Temperature:	40°C
Detection:	+ESI-MS (45°C, 4.5kV, 60V, scan 150 – 350)
Injection volume:	1µL
Backpressure:	120 bar (at t0)

Accucore Phenyl-X

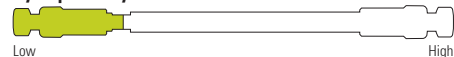
- Unique reversed-phase shape selectivity
- Enhanced selectivity for aromatic compounds
- Compatible with highly aqueous mobile phases
- Robust, high-efficiency, low column bleed

The proprietary Accucore Phenyl-X alkyl aromatic bonded phase provides a unique selectivity when compared to other reversed phase materials such as C18 or Phenyl.

Phenyl-X exhibits particularly high aromatic selectivity.

The advanced design of the bonded phase makes it compatible with highly aqueous mobile phases and robust, demonstrating very low bleed.

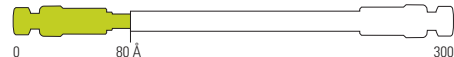
Hydrophobicity



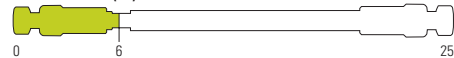
pH Range



Pore Size

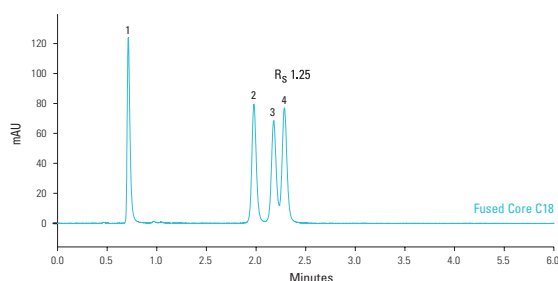


Carbon Load (%)



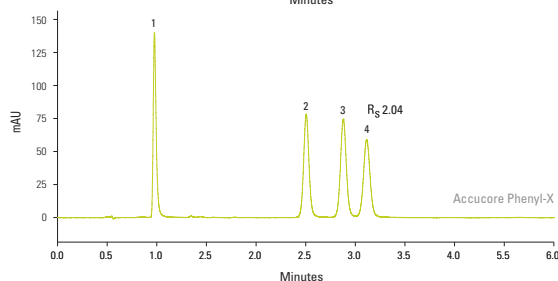
Particle Size 2.6µm

Estrogens

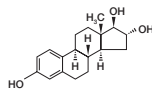


Accucore Phenyl-X 2.6µm, 100 x 2.1mm Fused Core C18, 100 x 2.1mm

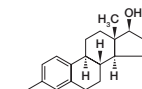
Mobile phase:	15:40:45 (v/v) acetonitrile: methanol : water
Flow:	400 µL/min
Temperature:	40 °C
Injection:	1µL
Detection:	UV at 220nm
Wash solvent:	Same as mobile phase



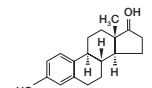
1. Estriol (E3)



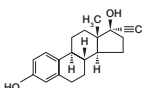
2. Estradiol (E2)



3. Estrone (E1)



4. Ethynylestradiol

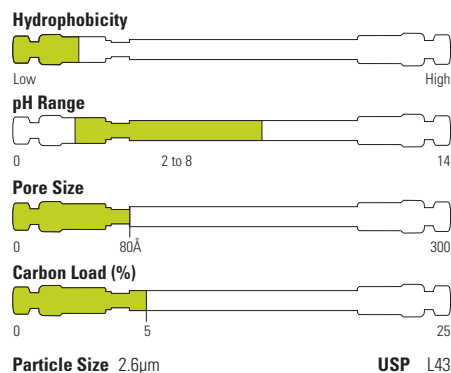


Accucore PFP

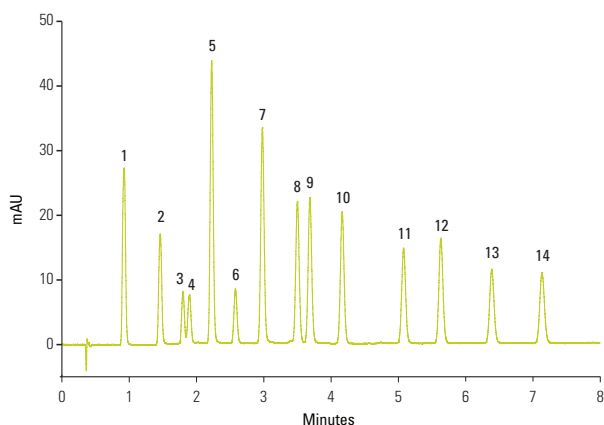
- Alternative selectivity to C18
- Extra retention for halogenated species
- Unique selectivity for non-halogenated polar compounds

The introduction of fluorine groups into the Accucore PFP (pentafluorophenyl) stationary phase causes significant changes in solute-stationary phase interactions. This can lead to extra retention and selectivity for positional isomers of halogenated compounds.

PFP Columns are also well suited to the selective analysis of non-halogenated compounds, in particular polar compounds containing hydroxyl, carboxyl, nitro, or other polar groups. High selectivity is often most apparent when the functional groups are located on an aromatic or other rigid ring system.



Positional isomers



Accucore PFP 2.6 μm, 50mm x 2.1mm

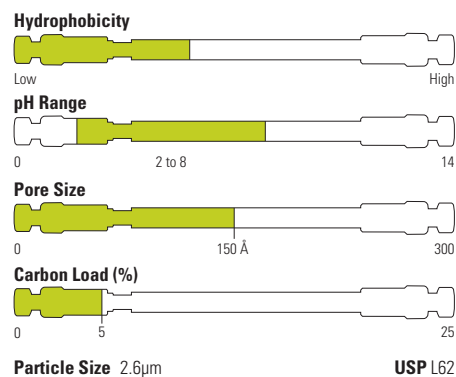
Mobile phase:	A – 0.1% Formic Acid in Water
Mobile phase:	A – 0.1% Formic Acid in Acetonitrile
Gradient:	15-30%B in 7 minutes
Flow rate:	600 μL/min
Temperature:	50°C
Detection:	UV at 270nm
Injection volume:	2 μL
	1. 3,4 – Dimethoxyphenol
	2. 2,6 – Dimethoxyphenol
	3. 2,6 – Difluorophenol
	4. 3,5 – Dimethoxyphenol
	5. 2,4 – Difluorophenol
	6. 2,3 – Difluorophenol
	7. 3,4 – Difluorophenol
	8. 3,5 – Dimethylphenol
	9. 2,6 – Dimethylphenol
	10. 2,6 – Dichlorophenol
	11. 4 – Chloro-3-Methylphenol
	12. 4 – Chloro-2-Methylphenol
	13. 3,4 – Dichlorophenol
	14. 3,5 – Dichlorophenol

Accucore C30

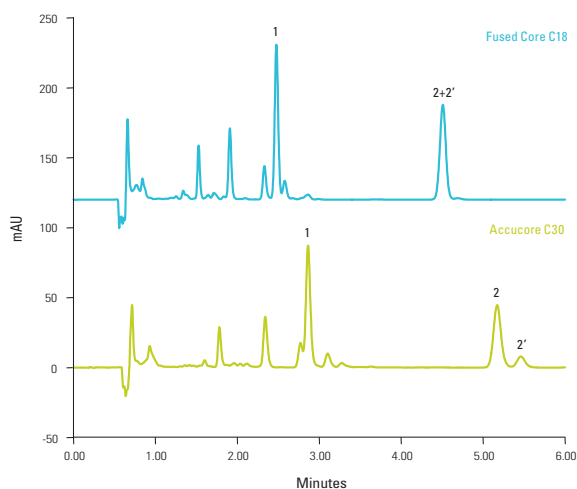
- Ideal for separation of hydrophobic, long alkyl chain compounds
- High shape selectivity for structurally related isomers
- Excellent aqueous-compatibility

Accucore C30 offers high shape selectivity for hydrophobic, long chain, structurally related isomers, for example carotenoids and steroids. This is a different form of shape selectivity from that measured in the SS phase characterisation test.

It is also an excellent alternative to normal-phase columns for lipid analysis. The optimized bonding density of the long alkyl chains facilitated by a wider pore diameter particle result in a phase that is stable even in highly aqueous mobile phases.



Vitamin K isomers



Accucore C30 2.6µm, 100 x 3.0mm Fused Core C18, 100 x 3.0mm

Mobile phase: methanol: 2mM ammonium acetate, 98:2
Flow: 650µL/min
Temperature: 20 °C
Injection: 5µL
Detection: UV at 250nm

Accucore C30 shows better separation for vitamin K1 isomers than the C18 column.

Chromatogram showing the separation of Vitamin K compounds
Minutes 1-Vitamin K2, 2-Vitamin K1 (trans isomer), 2'-Vitamin K1 (cis isomer)

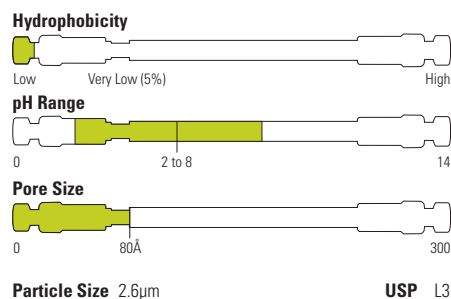
Accucore HILIC

- Enhanced retention of polar and hydrophilic analytes
- Alternative selectivity to C18 without ion-pair or derivatization

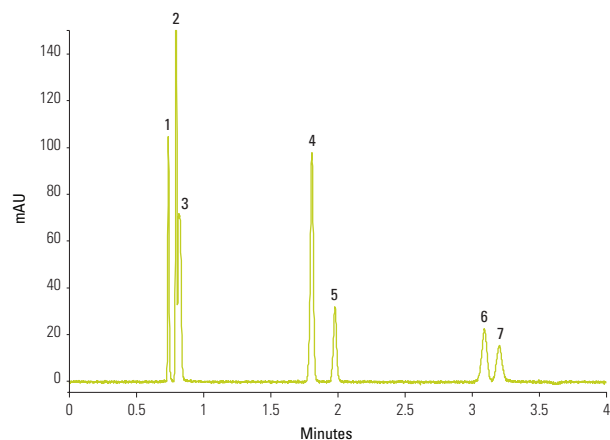
In HILIC mode the separation occurs through two mechanisms. The primary mechanism is a partitioning effect due to the enriched water layer around the polar or charged substrate material. The secondary mechanism involves interaction between the analyte and the active surface moiety.

Analyte properties that govern retention with HILIC phases are acidity/basicity, which determines hydrogen bonding, and polarizability which determines dipole-dipole interactions.

The highly organic mobile phases used with Accucore HILIC phase ensure efficient desolvation in ESI MS detection, which in turn leads to improved sensitivity.



Catecholamines



Accucore HILIC 2.6 μm, 50 mm x 2.1 mm

Mobile phase: 85:15 Acetonitrile:100mM Ammonium Formate, pH 3.2

Flow rate: 2 mL/min

Temperature: 40°C

Detection: UV at 280nm

Injection volume: 5 μL

Backpressure: 157 bar

Analytes:
1. Catechol
2. 5-HIAA
3. DOPAC
4. Serotonin
5. L-tyrosine
6. Dopamine
7. L-DOPA

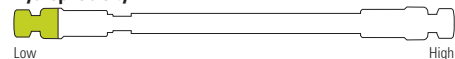
Accucore Urea-HILIC

- Bonded hydrophilic stationary phase
- Unique selectivity compared to other HILIC phases
- Low ion exchange activity

Accucore Urea-HILIC has an alternative selectivity and lower ion exchange activity than other HILIC phases.

The bonded hydrophilic stationary phase provides retention of broad range of polar analytes using up to 20% aqueous mobile phase.

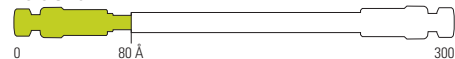
Hydrophobicity



pH Range

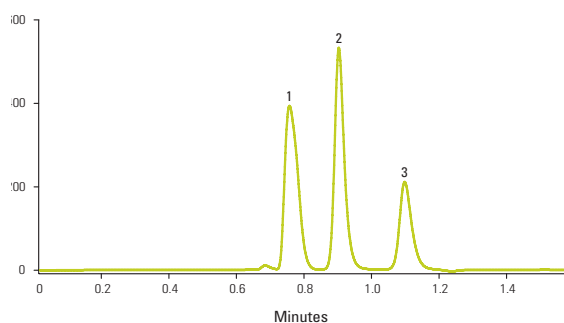


Pore Size



Particle Size 2.6µm

Analgesic compounds



Accucore Urea-HILIC 2.6µm, 100 x 2.1mm

Mobile phase:	composition 10:80:10, A : B : C
	A: water
	B: acetonitrile
	C: 100 mM ammonium acetate adjusted to pH 4.9
Flow:	300 µL/min
Run Time:	2 minutes
Temperature:	35 °C
Injection:	2 µL into 10 µL partial loop mode.
Injection wash solvent:	water:acetonitrile 20:80
Detection:	UV at 230 nm
Backpressure:	71 bar

	Acetaminophen			Salicylic acid			Aspirin		
	t_R	A_s	R_s	t_R	A_s	R_s	t_R	A_s	R_s
Mean	0.760	1.474	0.908	1.303	2.359	1.100	1.318	3.264	
CV %	0.00	1.17	0.48	0.92	0.49	0.00	0.63	0.48	

Data from eight replicate analyses of a mixture of acetaminophen, salicylic acid and aspirin

Retention time (t_R), peak asymmetry (A_s), peak resolution (R_s)

Accucore XL HPLC Columns

Based on Core Enhanced Technology using 4 μ m solid core particles, Accucore XL HPLC columns allow users of conventional HPLC methods to enjoy performance far beyond that of columns packed with 5 μ m, 4 μ m or even 3 μ m fully porous particles. Very high separation efficiencies using standard HPLC instruments and conditions provide increased peak resolution and lower limits of detection. An ultra-stable packed bed results in exceptionally robust columns that demonstrate excellent retention and response reproducibility.

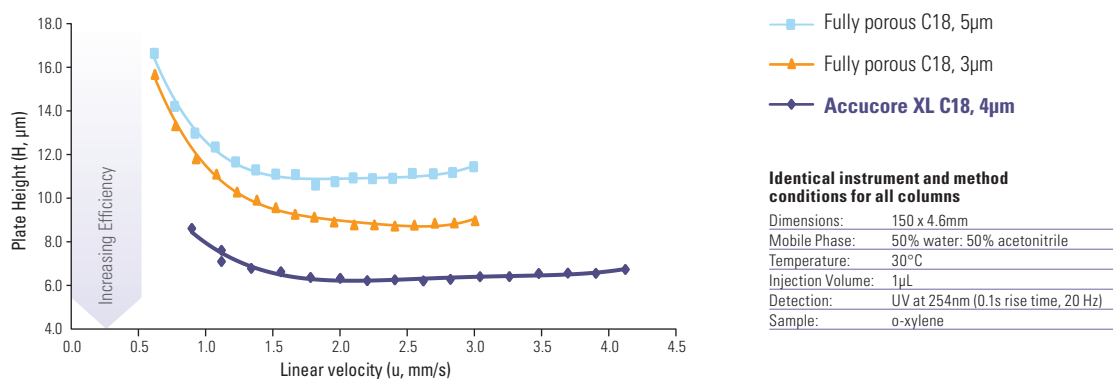
4 μ m Solid Core Particles for all Users

The 4 μ m solid core particles used in Accucore XL HPLC columns have been specifically designed to get the optimum chromatographic performance from conventional HPLC instruments.

- Very high efficiencies
- Little decrease in efficiency as flow rate is increased
- Moderate backpressures

Efficiency

Accucore XL HPLC columns generate higher efficiencies than columns packed with 5 μ m and 3 μ m fully porous material – as shown in the van Deemter curve below.

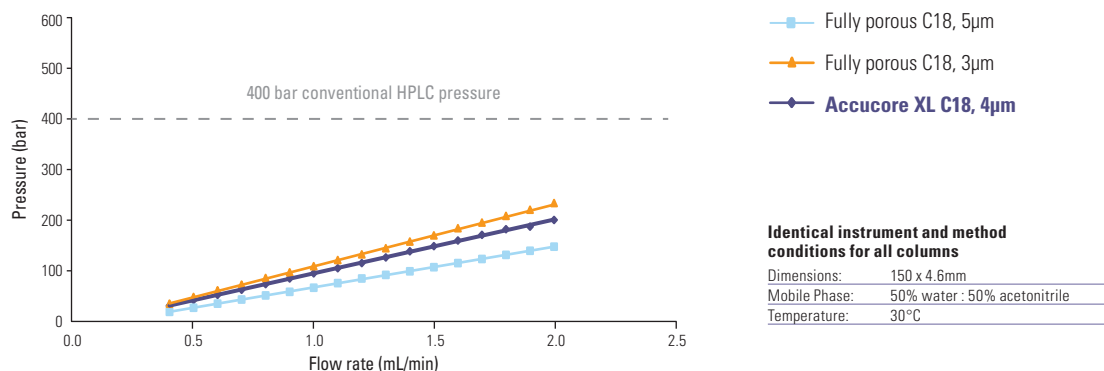


- 75% higher efficiency than 5 μ m fully porous
- 50% higher efficiency than 3 μ m fully porous



Backpressure

Accucore XL HPLC columns generate reasonable backpressures, moderately higher than fully porous 5µm and lower than fully porous 3µm, that are compatible with conventional HPLC instruments.

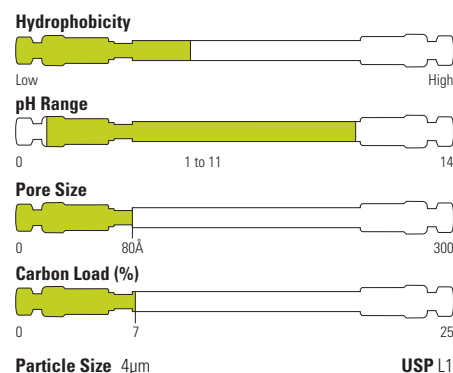


- Backpressures between those generated by 3µm and 5µm fully porous particles
- Within conventional HPLC instrumentation pressure limit – even at high flow rates

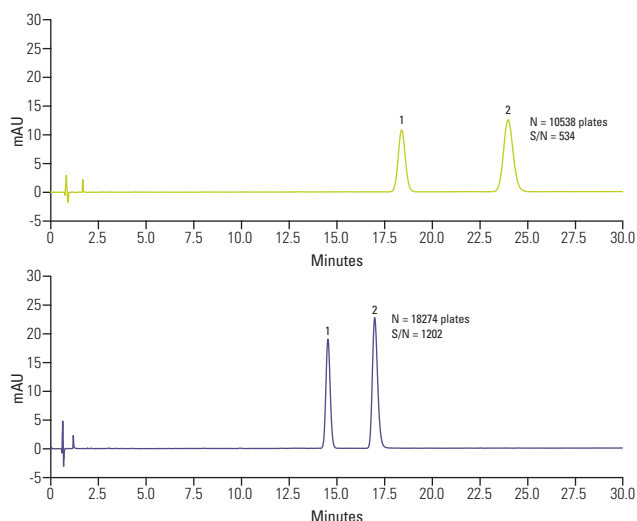
Accucore XL C18

- Optimum retention of non-polar compounds
- Hydrophobic interaction mechanism
- Separates a broad range of analytes

The carbon loading of Accucore XL C18 provides high retention of non-polar analytes via a predominantly hydrophobic interaction mechanism. The highly retentive nature of the phase means that it can be used to separate a broad range of analytes.



Ibuprofen and Valerophenone (USP)



Accucore XL C18 4µm, 150 x 4.6mm Fully porous C18 5µm, 150 x 4.6mm

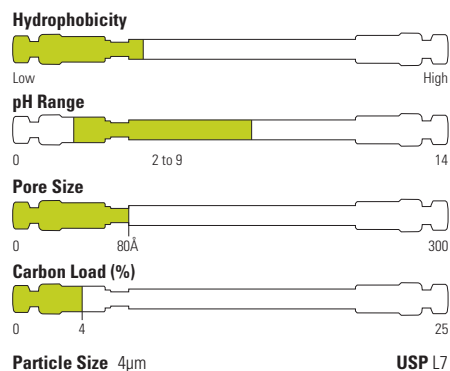
Mobile phase:	66.3:33.7 (v/v) water with phosphoric acid, pH 2.5:methanol
Flow rate:	2mL/min
Temperature:	30°C
Detection:	UV at 214nm
Injection volume:	5µL
Analytes:	1. Valerophenone 2. Ibuprofen

- 73% higher efficiency
- 125% higher sensitivity

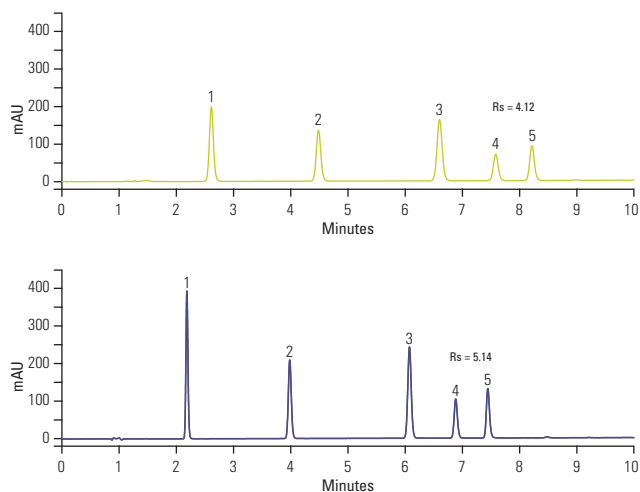
Accucore XL C8

- Similar selectivity to C18 with lower retention
- Recommended for analytes with moderate hydrophobicity

Accucore XL C8 offers lower hydrophobic retention than columns packed with longer alkyl chain length material, such as C18. It is then therefore recommended for analytes with moderate hydrophobicity, or when a less hydrophobic phase provides optimum retention.



Endocrine Disruptors



Accucore XL C8 4µm, 150 x 4.6mm Fully porous C8 5µm, 150 x 4.6mm

Mobile phase A:	water
Mobile phase B:	acetonitrile
Gradient:	Time (min) % B
	0.0 25
	20.0 70
	20.1 75
	25.0 25
Flow rate:	1.5mL/min
Temperature:	25°C
Detection:	UV at 220nm
Injection volume:	5µL
Analytes	1. Desethyl Atrazine
	2. Simazine
	3. Atrazine
	4. Diuron
	5. Bisphenol A

- 31% better resolution of critical pair
- 37% narrower peaks
- 226% higher sensitivity

Accucore Ordering Guide

Particle Size (µm)	Format	Length (mm)	ID (mm)	RP-MS	C18	C8	aQ
2.6	Defender Guard (4/pk)	10	2.1	17626-012105	17126-012105	17226-012105	17326-012105
			3.0	17626-013005	17126-013005	17226-013005	17326-013005
			4.6	17626-014005	17126-014005	17226-014005	17326-014005
	HPLC Column	30	2.1	17626-032130	17126-032130	17226-032130	17326-032130
			2.1	17626-052130	17126-052130	17226-052130	17326-052130
			3.0	17626-053030	17126-053030	17226-053030	17326-053030
		50	4.6	17626-054630	17126-054630	17226-054630	17326-054630
			2.1	17626-102130	17126-102130	17226-102130	17326-102130
			3.0	17626-103030	17126-103030	17226-103030	17326-103030
		100	4.6	17626-104630	17126-104630	17226-104630	17326-104630
			2.1	17626-152130	17126-152130	17226-152130	17326-152130
			3.0	17626-153030	17126-153030	17226-153030	17326-153030
		150	4.6	17626-154630	17126-154630	17226-154630	17326-154630
			2.1	—	—	—	—
			3.0	—	—	—	—
		250	2.1	—	—	—	—

Particle Size (µm)	Format	Length (mm)	ID (mm)	C18	C8
4	Drop-in Guard (4/pk)	10	2.1	74104-012101	74204-012101
			3.0	74104-013001	74204-013001
			4.6	74104-014001	74204-014001
	HPLC Column	50	2.1	74104-052130	74204-052130
			3.0	74104-053030	74204-053030
			4.6	74104-054630	74204-054630
		100	2.1	74104-102130	74204-102130
			3.0	74104-103030	74204-103030
			4.6	74104-104630	74204-104630
		150	2.1	74104-152130	74204-152130
			3.0	74104-153030	74204-153030
			4.6	74104-154630	74204-154630
		250	2.1	74104-252130	74204-252130
			3.0	74104-253030	74204-253030
			4.6	74104-254630	74204-254630



Polar Premium	Phenyl-Hexyl	Phenyl-X	PFP	C30	HILIC	Urea-HILIC
28026-012105	17926-012105	27926-012105	17426-012105	27826-012105	17526-012105	27726-012105
—	17926-013005	—	17426-013005	—	17526-013005	—
—	17926-014005	—	17426-014005	—	17526-014005	—
—	17926-032130	—	17426-032130	—	17526-032130	—
28026-052130	17926-052130	27926-052130	17426-052130	27826-052130	17526-052130	27726-052130
28026-053030	17926-053030	27926-053030	17426-053030	27826-053030	17526-053030	27726-053030
28026-054630	17926-054630	27926-054630	17426-054630	27826-054630	17526-054630	27726-054630
28026-102130	17926-102130	27926-102130	17426-102130	27826-102130	17526-102130	27726-102130
28026-103030	17926-103030	27926-103030	17426-103030	27826-103030	17526-103030	27726-103030
28026-104630	17926-104630	27926-104630	17426-104630	27826-104630	17526-104630	27726-104630
28026-152130	17926-152130	27926-152130	17426-152130	27826-152130	17526-152130	27726-152130
28026-153030	17926-153030	27926-153030	17426-153030	27826-153030	17526-153030	27726-153030
28026-154630	17926-154630	27926-154630	17426-154630	27826-154630	17526-154630	27726-154630
28026-252130	—	27926-252130	—	27826-252130	—	27726-252130

Format	Length (mm)	ID (mm)	Cat. No.
UNIGUARD Guard Cartridge Holder	10	2.1	852-00
		3.0	852-00
		4.6	850-00

Particle Size (µm)	Length (mm)	ID (mm)	Format	Validation	Narrow Selectivity	Wide Selectivity	Polar Selectivity
2.6	50	2.1	3-column Kit	17126-052130-3V	17X26-052130-3VA	17X26-052130-3VB	17X26-052130-3VC
	100			17126-102130-3V	17X26-102130-3VA	17X26-102130-3VB	17X26-102130-3VC
	150			17126-152130-3V	17X26-152130-3VA	17X26-152130-3VB	17X26-152130-3VC
Kit contains				C18	C18	C18	aQ
				C18	RP-MS	Phenyl-Hexyl	PFP
				C18	aQ	PFP	HILIC



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