



Thermo Scientific
Chromatography Columns
and Consumables 2016-2017

Connected chromatography solutions

LC Columns and Accessories

As a leader in LC column technology including silica, polymer and porous graphitic carbon manufacturing, bonded phase production and column packing for 40 years, you can rely on the quality of Thermo Scientific HPLC products. Here, we showcase our latest and most comprehensive range of innovative columns, accessories and equipment for fast LC, analytical HPLC and UHPLC.

Featured Products



Accucore

Solid core particles enabling high speed, high resolution separations with back pressures significantly lower than those associated with UHPLC.

PAGE 4-005



Hypersil GOLD

Thermo Scientific™ Hypersil GOLD™ columns offers chromatographers outstanding peak shape for reversed phase, ion exchange, HILIC or normal phase chromatography.

PAGE 4-020



Section Contents

Accucore HPLC and UHPLC Columns	4-005	Synchronis HPLC and UHPLC Columns	4-062
Hypersil GOLD HPLC and UHPLC Columns	4-020	Hypersil BDS and Hypersil Classical HPLC Columns	4-070
Acclaim HPLC and UHPLC Columns	4-034	LC Accessories	4-078
Application Specific HPLC Columns	4-048	LC Reagents	4-098
Hypercarb HPLC Columns	4-059	LC and LC-MS Instruments	4-108



Acclaim

Acclaim columns are based on high-purity, porous silica particles with advanced and innovative column bonding technologies. This provides complementary selectivity, high column efficiencies and symmetrical peaks.

PAGE 4-034



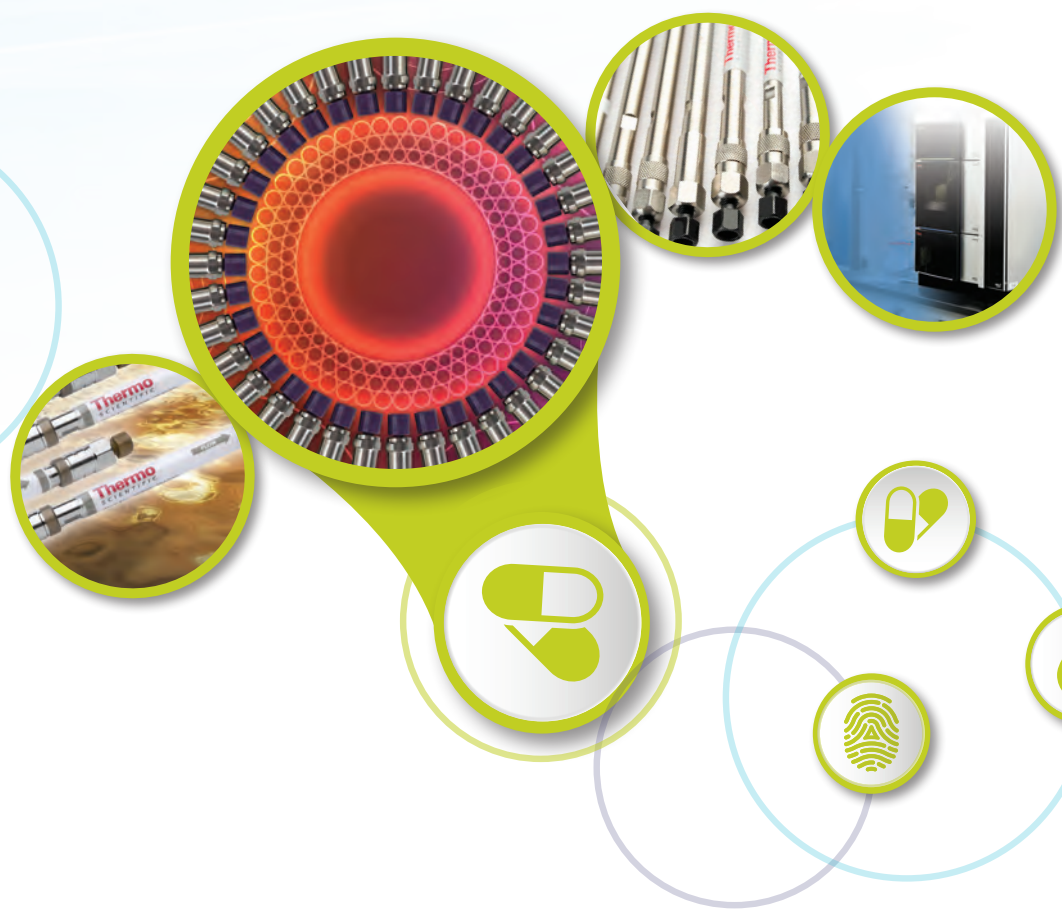
Viper

Maximize liquid chromatography (LC) performance and get zero-dead-volume connections to ensure optimal separations.

PAGE 4-078

LC Columns

Technical Resources



visit www.thermoscientific.com/chromexpert to access the following information:






- HPLC Column Selection
- HPLC Column Selection by US Pharmacopeia Specifications
- Thermo Scientific HPLC Phases
- HPLC Column Selection by Manufacturer
- Method Transfer
- Scaling a Method Up or Down
- HPLC Troubleshooting
- HPLC Definitions and Equations
- Selecting the Correct Buffer
- Preparation of Mobile Phases
- Solvent Properties
- Chromophore Detection Wavelengths
- Column Cleaning and Regeneration



Columns for Fast and Analytical HPLC

The Thermo Scientific LC column portfolio offers a comprehensive range of high quality options for fast and analytical HPLC and UHPLC.

The table below shows our leading column families with details of relative hydrophobicity, key attributes and how the attributes are achieved. Use this table and the information in the subsequent catalogue pages to find the best Thermo Scientific LC columns for your separation needs.

Hydrophobicity		Key Attribute	Achieved through
Low	Accucore Columns Page 4-005 	Ultimate Performance	<ul style="list-style-type: none"> • 1.5, 2.6 and 4µm solid core silica particles • Core Enhanced Technology
	Hypersil GOLD Columns Page 4-020 	Selectivity & Peak Shape	<ul style="list-style-type: none"> • 1.9, 3, 5 and 12µm ultra-high purity silica particles • Wide range of conventional phases
Medium/High	Acclaim Columns Page 4-034 	Traditional, Speciality & Application Specific Phases	<ul style="list-style-type: none"> • 2.2, 3 and 5µm ultra-pure silica particles • Innovative and unique bonded phases
High	Synchronis Columns Page 4-062 	Ruggedness & Reproducibility	<ul style="list-style-type: none"> • 1.7, 3 and 5µm high surface area silica particles • Dense bonding, double endcapping, rigorous testing
Very High	Hypercarb Columns Page 4-059 	Extended Separation Capabilities	<ul style="list-style-type: none"> • 3 and 5µm 100% porous graphitic carbon particles • Polar retention effect on graphite (PREG)



Accucore HPLC and UHPLC Columns

Ultimate Core Performance – Speed and Selectivity Combined

Thermo Scientific™ Accucore™ HPLC and UHPLC columns are a family of high speed, high resolution columns based on Core Enhanced Technology™.

- **Next-Generation Accucore Vanquish UHPLC Columns**
Combines the benefits of a solid core material and the increased chromatographic efficiency of a sub-2 μ m particle
- **Solid Core Particles**
With a solid central core and porous outer layer, these particles generate high speed, high resolution separations without excessive backpressure
- **Tight Control of Particle Diameter**
Enhanced selection process keeps particle size distribution to a minimum and produces high efficiency columns



The Accucore web page contains the latest news, applications and downloads for the Accucore HPLC and UHPLC column range. Visit www.thermoscientific.com/accucore

Accucore Vanquish

Powerful separations are our core performance

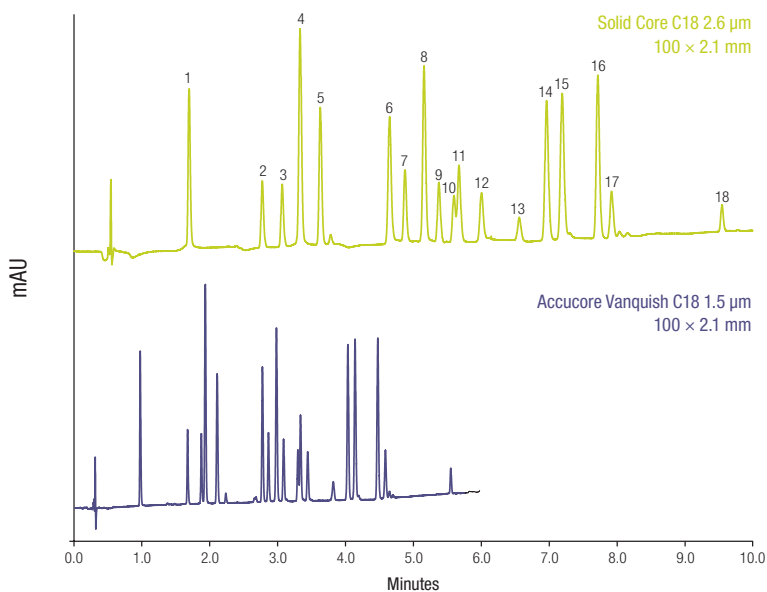
Thermo Scientific™ Accucore™ Vanquish™ UHPLC columns provide a robust chromatography solution to enhance laboratory workflows and productivity. These columns, in combination with Vanquish UHPLC systems, deliver powerful separations to solve your analytical challenges faster and more effectively.

These next-generation UHPLC columns feature 1.5µm solid core particles and combine the benefits of a solid core material and the increased chromatographic efficiency of a sub-2µm particle.

Modern analytical laboratories continue to be driven towards higher throughput workflows which require better separations, more results and easier interaction at a reduced cost. Accucore Vanquish UHPLC columns enable you to achieve this by delivering:

Better separations

The high efficiency offered by Accucore Vanquish UHPLC columns enables the resolution of very complex mixtures.

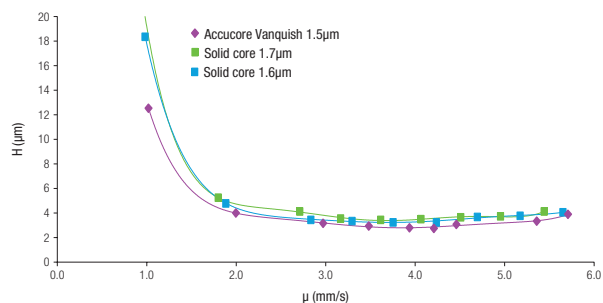


Comparison of separation of 18 pesticides using Accucore Vanquish 1.5µm column to a larger particle size solid core column

Mobile Phase A:	Water
Mobile Phase B:	Acetonitrile
Gradient:	Solid core C18 2.6µm 100 × 2.1mm
Time (min)	%B
0	20
6.9	40
12.1	80
	Accucore Vanquish C18 1.5µm 100 × 2.1mm
Time (min)	%B
0	20
4	40
7	80
Temperature:	43°C
Flow Rate:	Solid Core C18 2.6µm 100 × 2.1mm = 380µL/min
	Accucore Vanquish C18 1.5µm 100 × 2.1mm = 650µL/min
Injection Volume:	0.5µL
Detection:	UV, 230nm (0.1s rise time, 50Hz)
Analytes:	1. Desethylatrazine 10. Diuron 2. Metoxuron 11. Isoproturon 3. Hexazinone 12. Metobromuron 4. Simazine 13. Metazachlor 5. Cyanazine 14. Sebutylazin 6. Methabenzthiazuron 15. Propazine 7. Chlorotoluron 16. Terbutylazine 8. Atrazine 17. Linuron 9. Monolinuron 18. Metolachlor

More results

High efficiency is maintained even at high flow rates enabling fast reproducible separations.

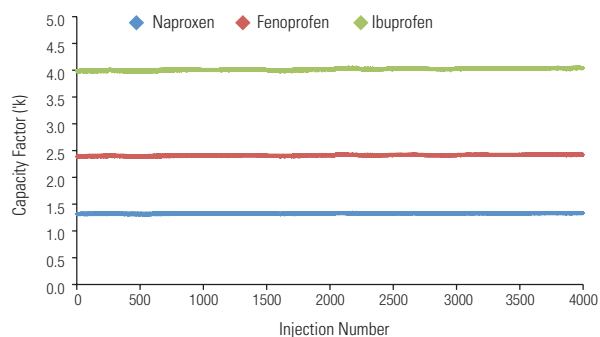


Accucore Vanquish C18, 1.5µm Solid Core C18 1.7µm Solid Core C18 1.6µm

Mobile Phase:	Water:acetonitrile (50:50)
Temperature:	30°C
Flow Rate:	0.1 to 0.6mL/min

Reproducibility

The advanced bonding and automated packing technology used in the manufacture of Accucore Vanquish UHPLC columns results in exceptionally reproducible chromatography.



Accucore Vanquish C18 1.5µm

Mobile Phase:	Acetonitrile:20 mM ammonium formate pH 3.0 (50:50)
Temperature:	30°C
Flow Rate:	0.4mL/min

%RSD for 4000 injections	Naproxen	Fenoprofen	Ibuprofen
Retention time	0.19	0.25	0.29
Capacity factor	0.41	0.42	0.41
Efficiency	2.94	2.74	2.80
Asymmetry	0.92	0.87	1.09
Peak area	0.53	0.50	0.55
Peak height	1.13	1.02	0.91
Pressure	0.53		

- RSD for retention time less than 0.3%
- RSD for peak area less than 0.6%
- RSD for peak height less than 1.2%
- Column pressure stable over 4000 injections (RSD 0.53%)
- Pressure 500 bar

Easier interaction

Accucore Vanquish UHPLC columns, the Vanquish UHPLC System and the Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System are combined into a seamless workflow solution, which allows for simple and easy to implement separations.

Accucore Vanquish

Particle Size (µm)	Format	Length (mm)	ID (mm)	C18+
1.5	UHPLC Column	50	2.1	27101-052130
		100	2.1	27101-102130
		150	2.1	27101-152130

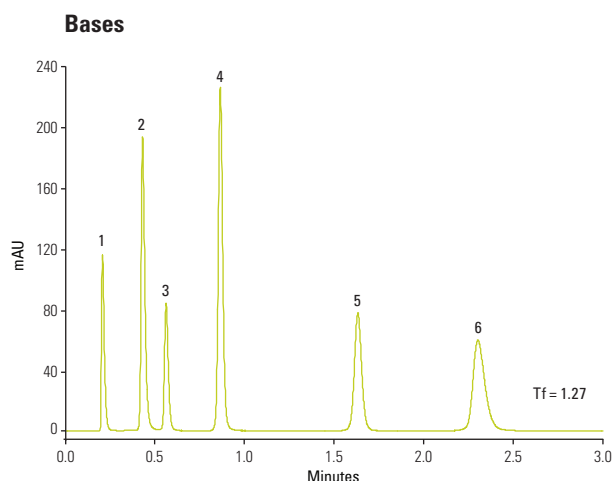
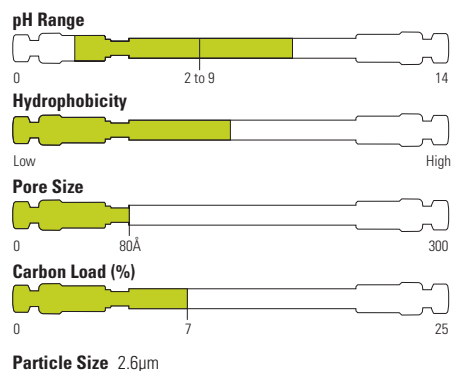
Accucore RP-MS

- 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.



Accucore RP-MS 2.6μm, 50mm x 2.1mm

Mobile Phase:	65% Methanol / 35% 25mM Potassium Phosphate pH7.0
Temperature:	30°C
Flow Rate:	500μL/min
Injection Volume:	1μL
Backpressure:	232 bar
Detection:	UV, 215nm
Analytes:	1. Uracil 2. Propranolol 3. Butylparaben 4. Naphthalene 5. Acenaphthene 6. Amitriptyline

Accucore RP-MS

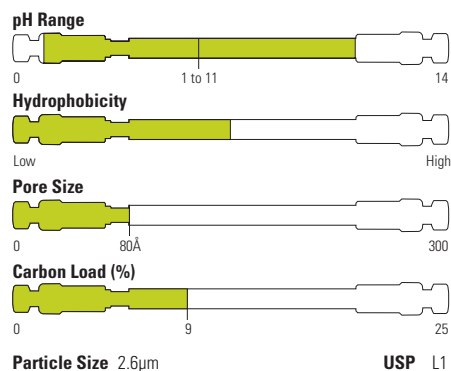
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17626-012105	17626-013005	17626-014005
	HPLC Column	30	17626-032130	-	-
		50	17626-052130	17626-053030	17626-054630
		100	17626-102130	17626-103030	17626-104630
		150	17626-152130	17626-153030	17626-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore C18

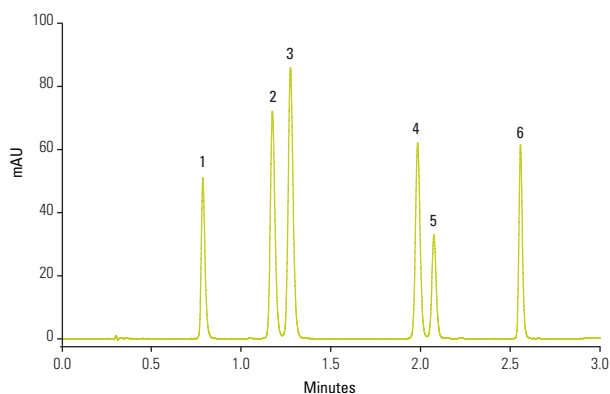
- Optimum retention of non-polar compounds
- Hydrophobic interaction mechanism
- Separates a broad range of analytes

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 2.6 μm, 50mm x 2.1mm

Mobile Phase A:	Water	
Mobile Phase B:	Acetonitrile	
Gradient:	Time (min)	%B
	1.0	35
	2.5	70
Temperature:	25°C	
Flow Rate:	600 μL/min	
Injection Volume:	2 μL	
Backpressure:	298 bar	
Detection:	UV, 280nm	
Analytes:	1.	Simazine
	2.	Simetryn
	3.	Atrazine
	4.	Ametryn
	5.	Propazine
	6.	Prometryn

Accucore C18

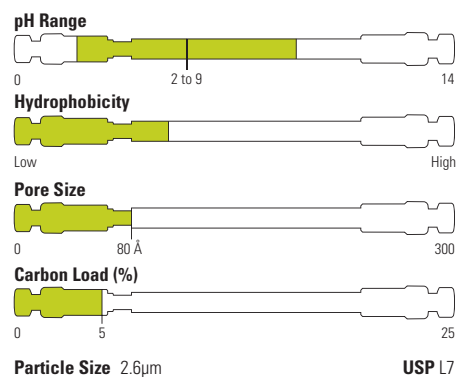
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17126-012105	17126-013005	17126-014005
	HPLC Column	30	17126-032130	-	-
		50	17126-052130	17126-053030	17126-054630
		100	17126-102130	17126-103030	17126-104630
		150	17126-152130	17126-153030	17126-154630
4	Drop-in Guard (4/pk)	10	74104-012101	74104-013001	74104-014001
	HPLC Column	50	74104-052130	74104-053030	74104-054630
		100	74104-102130	74104-103030	74104-104630
		150	74104-152130	74104-153030	74104-154630
		250	74104-252130	74104-253030	74104-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore C8

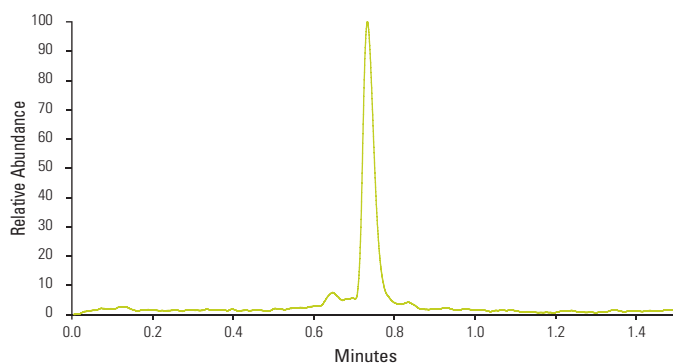
- Lower hydrophobic retention
- Complementary steric selectivity to C18
- Low levels of secondary interactions
- Recommended for moderately polar analytes

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
Temperature:	60°C
Flow Rate:	1500µL/min
Injection Volume:	5µL
Detection:	ESI-MS/MS

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

Data from six injections.

Accucore C8

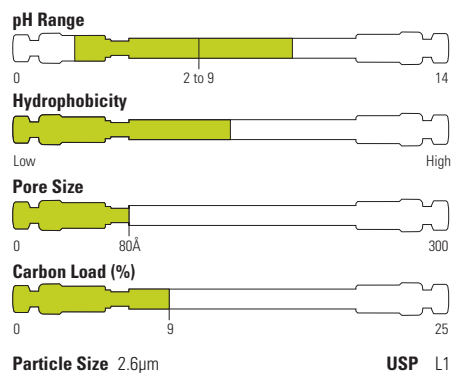
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17226-012105	17226-013005	17226-014005
	HPLC Column	30	17226-032130	-	-
		50	17226-052130	17226-053030	17226-054630
		100	17226-102130	17226-103030	17226-104630
		150	17226-152130	17226-153030	17226-154630
4	Drop-in Guard (4/pk)	10	74204-012101	74204-013001	74204-014001
	HPLC Column	50	74204-052130	74204-053030	74204-054630
		100	74204-102130	74204-103030	74204-104630
		150	74204-152130	74204-153030	74204-154630
		250	74204-252130	74204-253030	74204-254630
		UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00

Accucore aQ

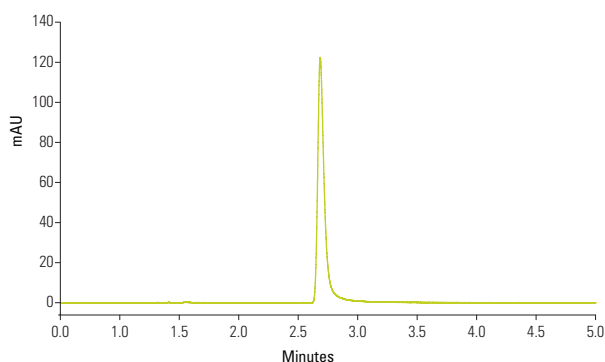
- Retention and resolution of polar analytes
- Polar endcapped C18 stationary phase for alternative selectivity
- Ideal for highly aqueous mobile phases

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 the 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 2.6 μm, 50mm x 2.1mm

Mobile Phase:	95:5 (v/v) Ammonium Acetate, pH 3.80 / Methanol
Temperature:	35°C
Flow Rate:	200 μL/min
Injection Volume:	1 μL
Detection:	UV, 277nm
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 aQ

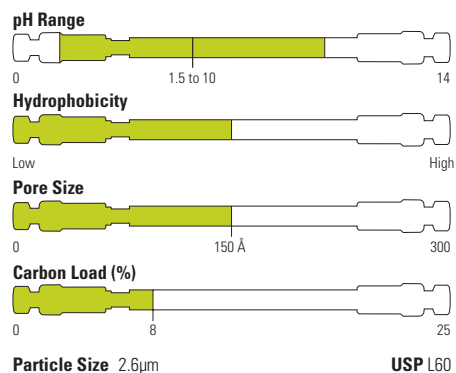
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17326-012105	17326-013005	17326-014005
	HPLC Column	30	17326-032130	-	-
		50	17326-052130	17326-053030	17326-054630
		100	17326-102130	17326-103030	17326-104630
		150	17326-152130	17326-153030	17326-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore Polar Premium

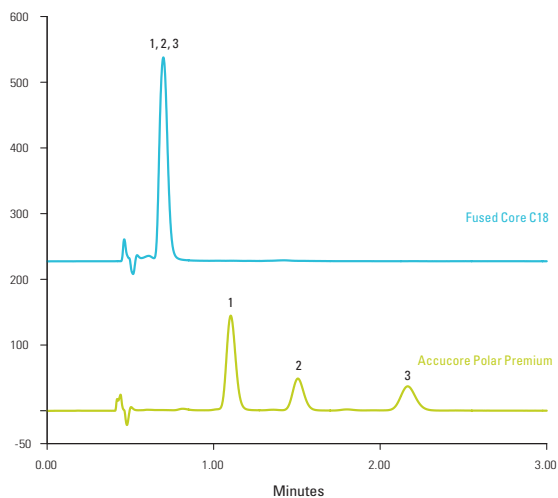
- Rugged amide-embedded C18 phase
- Selectivity complementary to conventional C18 phases
- Stable over a wide pH range and compatible with 100% aqueous mobile phase

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 3.0mm

Mobile Phase:	Methanol : 10mM Phosphoric Acid, 80 : 20
Temperature:	40°C
Flow Rate:	800µL/min
Injection Volume:	6µL
Detection:	UV, 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 Polar Premium

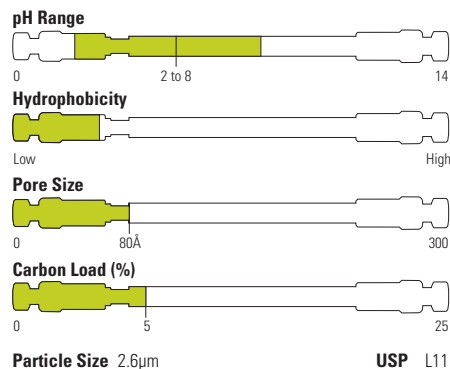
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	28026-012105	-	-
	HPLC Column	50	28026-052130	28026-053030	28026-054630
		100	28026-102130	28026-103030	28026-104630
		150	28026-152130	28026-153030	28026-154630
		250	28026-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore Phenyl-Hexyl

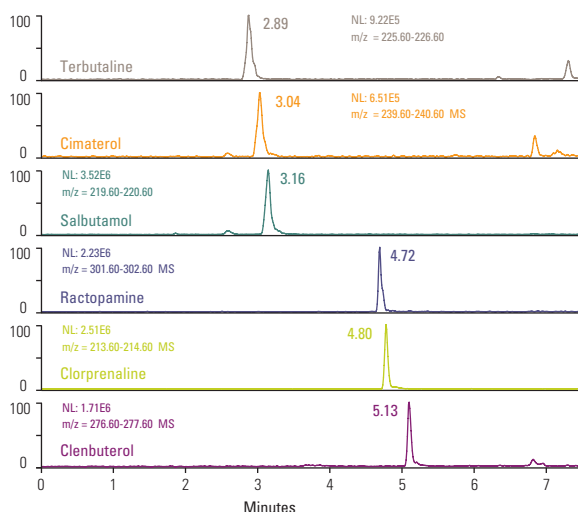
- Mixed-mode selectivity for aromatic and moderately polar analytes
- Enhanced pi-pi interactions with aromatics
- Moderate hydrophobicity

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
Mobile Phase B:	Acetonitrile
Gradient:	Time (min) %B
	0 5
	1 5
	10 100
Temperature:	40°C
Flow Rate:	0.25mL/min
Injection Volume:	1µL
Backpressure:	120 bar (at t0)
Detection:	+ESI-MS (45°C, 4.5kV, 60V, scan 150 – 350)

Accucore Phenyl-Hexyl

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17926-012105	17926-013005	17926-014005
		HPLC Column	30	17926-032130	-
		50	17926-052130	17926-053030	17926-054630
		100	17926-102130	17926-103030	17926-104630
		150	17926-152130	17926-153030	17926-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

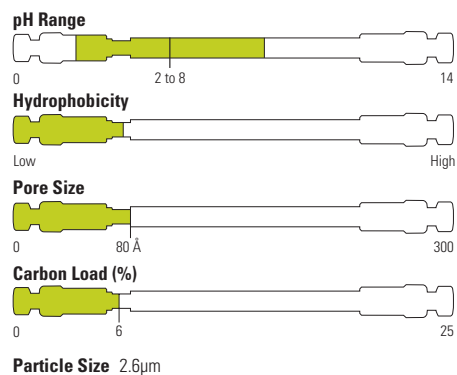
Accucore Phenyl-X

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

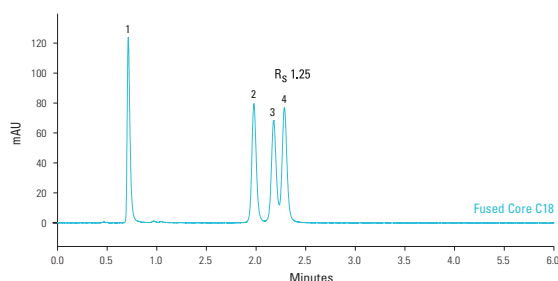
The proprietary Accucore Phenyl-X alkyl aromatic bonded phase provides a unique selectivity when compared to other reversed phase materials such as C18 or Phenyl.

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

Phenyl-X exhibits particularly high aromatic selectivity.

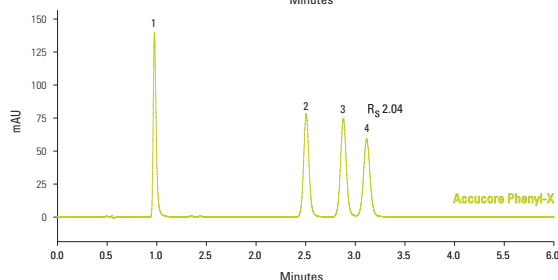


Estrogens

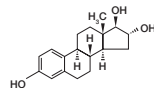


Accucore Phenyl-X 2.6µm, 100 x 2.1mm Fused Core C18, 100 x 2.1mm

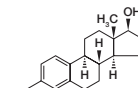
Mobile Phase: 15:40:45 (v/v) Acetonitrile:Methanol:Water
 Temperature: 40°C
 Flow Rate: 400µL/min
 Injection Volume: 1µL
 Detection: UV, 220nm



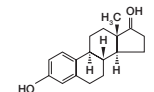
1. Estriol (E3)



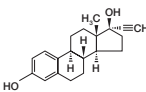
2. Estradiol (E2)



3. Estrone (E1)



4. Ethynylestradiol



Accucore Phenyl-X

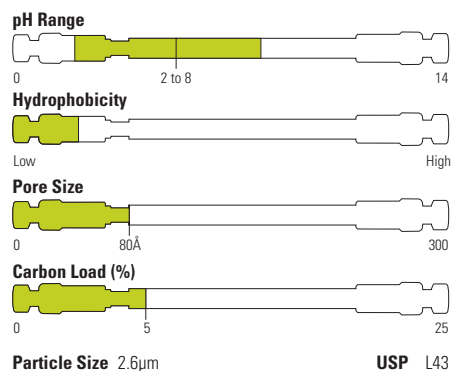
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	27926-012105	-	-
	HPLC Column	50	27926-052130	27926-053030	27926-054630
		100	27926-102130	27926-103030	27926-104630
		150	27926-152130	27926-153030	27926-154630
		250	27926-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore PFP

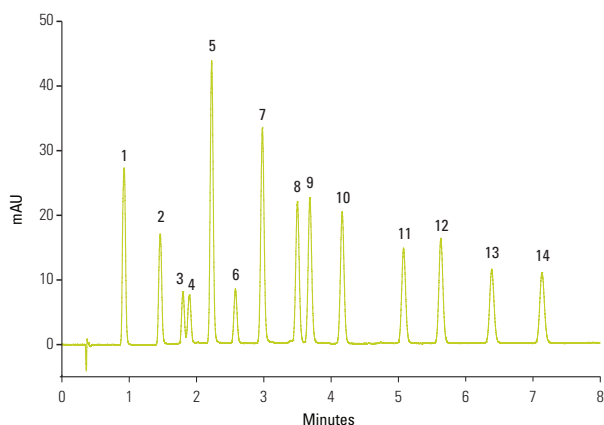
- Alternative selectivity to C18
- Extra retention for halogenated species
- Unique selectivity for non-halogenated polar compounds

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 2.6µm, 50mm x 2.1mm

Mobile Phase A:	0.1% Formic Acid in Water
Mobile Phase B:	0.1% Formic Acid in Acetonitrile
Gradient:	15-30%B in 7 minutes
Temperature:	50°C
Flow Rate:	600µL/min
Injection Volume:	2µL
Detection:	UV, 270nm
Analytes:	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 PFP

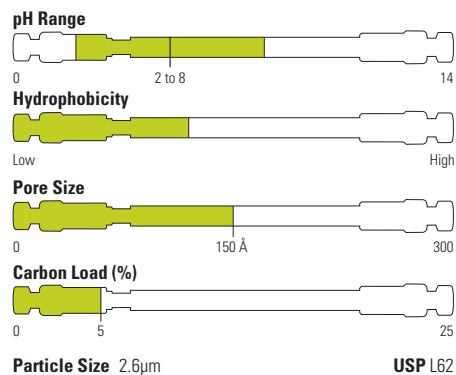
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17426-012105	17426-013005	17426-014005
	HPLC Column	30	17426-032130	-	-
		50	17426-052130	17426-053030	17426-054630
		100	17426-102130	17426-103030	17426-104630
		150	17426-152130	17426-153030	17426-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore C30

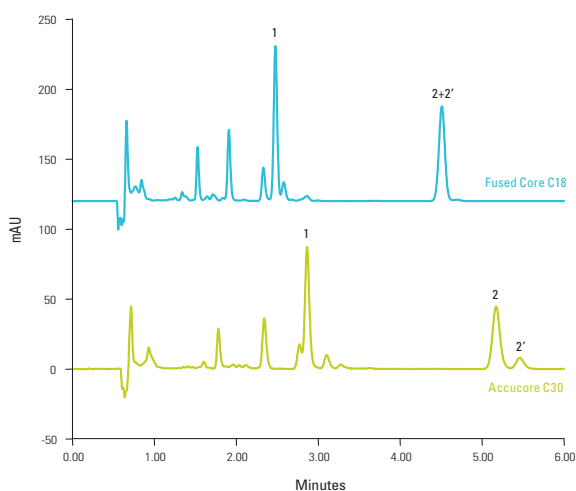
- Ideal for separation of hydrophobic, long alkyl chain compounds
- High shape selectivity for structurally related isomers
- Excellent aqueous-compatibility

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 steric selectivity 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
 Temperature: 20°C
 Flow Rate: 650µL/min
 Injection Volume: 5µL
 Detection: UV, 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 C30

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	27826-012105	-	-
	HPLC Column	50	27826-052130	27826-053030	27826-054630
		100	27826-102130	27826-103030	27826-104630
		150	27826-152130	27826-153030	27826-154630
		250	27826-252130	-	-
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	

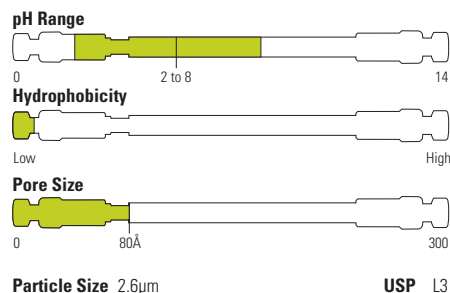
Accucore HILIC

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

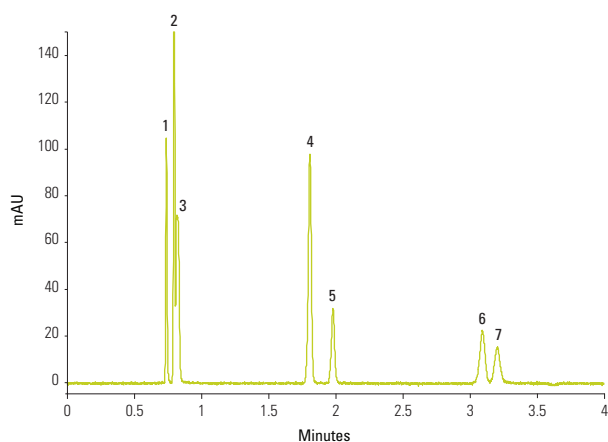
In HILIC mode the separation occurs through two mechanisms. The primary mechanism is a partitioning effect due to the enriched water layer around the polar or charged substrate material. The secondary mechanism involves interaction between the analyte and the active surface moiety.

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 2.6μm, 50mm x 2.1mm

Mobile Phase:	85:15 Acetonitrile:100mM Ammonium Formate, pH 3.2
Temperature:	40°C
Flow Rate:	2mL/min
Injection Volume:	5μL
Backpressure:	157 bar
Detection:	UV, 280nm
Analytes:	1. Catechol 2. 5-HIAA 3. DOPAC 4. Serotonin 5. L-tyrosine 6. Dopamine 7. L-DOPA

Accucore HILIC

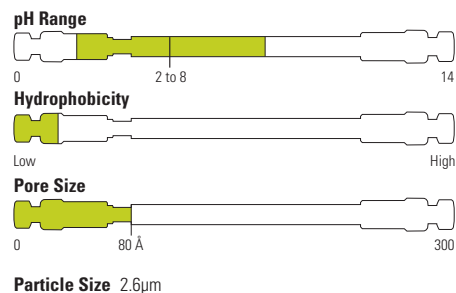
Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	17526-012105	17526-013005	17526-014005
	HPLC Column	30	17526-032130	-	-
		50	17526-052130	17526-053030	17526-054630
		100	17526-102130	17526-103030	17526-104630
		150	17526-152130	17526-153030	17526-154630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

Accucore Urea-HILIC

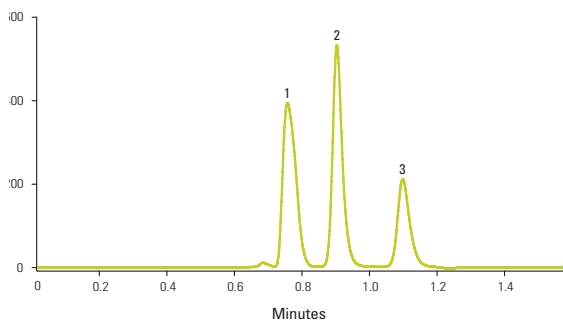
- Bonded hydrophilic stationary phase
- Unique selectivity compared to other HILIC phases
- Low ion exchange activity

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

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



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
Temperature:	35°C
Flow Rate:	300µL/min
Injection Volume:	2µL into 10µL partial loop mode.
Backpressure:	71 bar
Detection:	UV, 230nm

	1. Acetaminophen			2. Salicylic acid			3. 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 Urea-HILIC

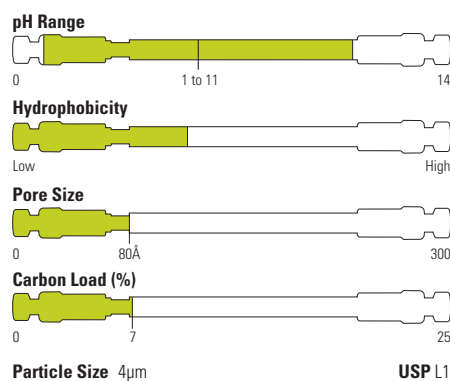
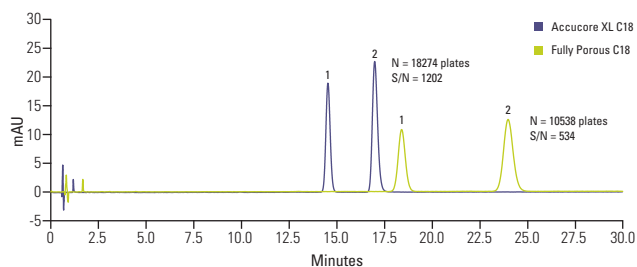
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.6	Defender Guard (4/pk)	10	27726-012105	-	-
	HPLC Column	50	27726-052130	27726-053030	27726-054630
		100	27726-102130	27726-103030	27726-104630
		150	27726-152130	27726-153030	27726-154630
		250	27726-252130	-	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

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.

Ibuprofen and Valerophenone (USP)



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

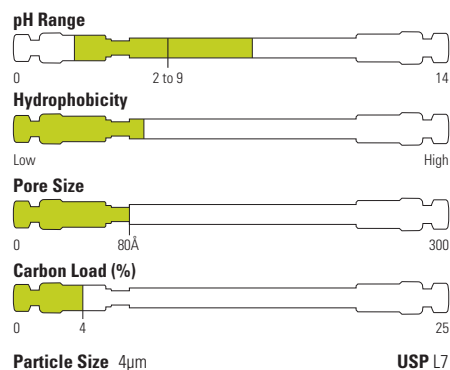
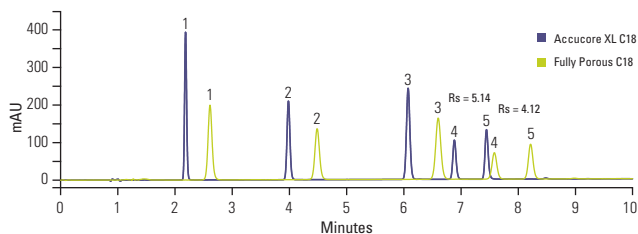
Mobile Phase:	66.3:33.7 (v/v) Water with Phosphoric Acid, pH 2.5:Methanol
Temperature:	30°C
Flow Rate:	2mL/min
Injection Volume:	5µL
Detection:	UV, 214nm
Analytes:	1. Valerophenone 2. Ibuprofen

Accucore XL C8

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

Accucore XL C8 is 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 3.Atrazine 2.Simazine 4.Diuron 5.Bisphenol A

Accucore XL

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

Hypersil GOLD HPLC and UHPLC Columns

Outstanding peak shape for your separations

Thermo Scientific™ Hypersil GOLD™ columns are an ideal choice for new method development, delivering outstanding peak shape and increased sensitivity for your separations.

- **Solutions for all Separation Needs**
Particle sizes and column designs optimized for all analyses
- **Improved Sensitivity**
Excellent peak symmetry
- **Enhanced Resolution**
Separation of complex samples
- **pH Stability**
Robust assays at extended pH



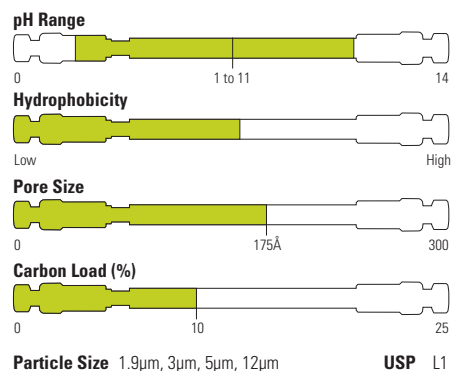
The Hypersil GOLD web page contains the latest news, applications and downloads for the Hypersil GOLD HPLC column range.

Visit www.thermoscientific.com/hypersilgold

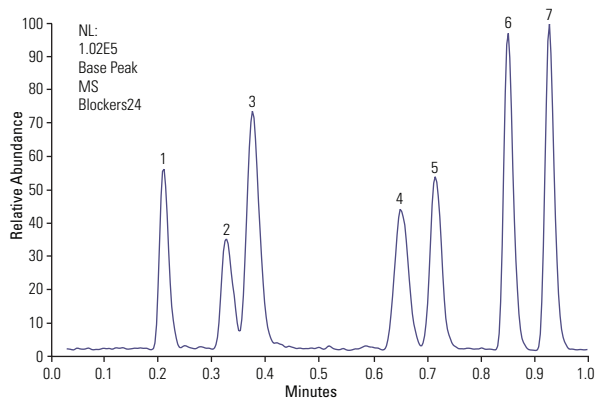
Hypersil GOLD

Endcapped, ultra-pure, silica-based columns with exceptional peak shape and resolution for HPLC and LC-MS

- Significant reduction in peak tailing while retaining C18 selectivity
- Excellent resolution, efficiency and sensitivity
- Confidence in the accuracy and quality of analytical data



Seven β-blockers in 1 minute



Hypersil GOLD, 1.9µm, 20 x 2.1mm

Mobile Phase A:	H ₂ O+0.1%formic acid
Mobile Phase B:	MeCN+0.1%formic acid
Gradient:	15 to 100% B in 1min
Temperature:	30°C
Flow Rate:	0.5mL/min
Detection:	+ESI
Analytes:	1. Atenolol 2. Nadolol 3. Pindolol 4. Timolol 5. Metoprolol 6. Oxprenolol 7. Propranolol

Hypersil GOLD

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25002-022130	-	-	-
		30	25002-031030	25002-032130	-	-	-
		50	25002-051030	25002-052130	25002-053030	-	25002-054630
		100	25002-101030	25002-102130	25002-103030	-	-
		150	-	25002-152130	-	-	-
		200	-	25002-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25003-011001	25003-012101	25003-013001	25003-014001	25003-014001
		30	-	25003-032130	-	-	25003-034630
	HPLC Column	50	-	25003-052130	25003-053030	25003-054030	25003-054630
		100	25003-101030	25003-102130	25003-103030	25003-104030	25003-104630
		150	25003-151030	25003-152130	25003-153030	25003-154030	25003-154630
		200	-	-	-	-	-
5	Drop-in Guard (4/pk)	10	-	25005-012101	25005-013001	25005-014001	25005-014001
		30	-	25005-032130	25005-033030	-	25005-034630
	HPLC Column	50	-	25005-052130	25005-053030	-	25005-054630
		100	-	25005-102130	25005-103030	-	25005-104630
		150	-	25005-152130	25005-153030	25005-154030	25005-154630
		250	-	25005-252130	25005-253030	25005-254030	25005-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

Hypersil GOLD Preparative

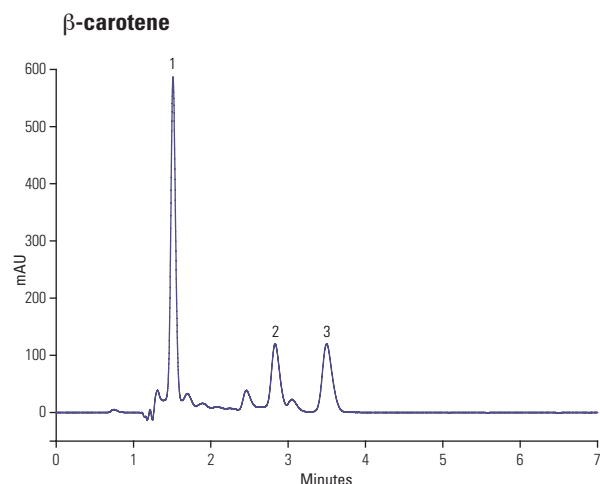
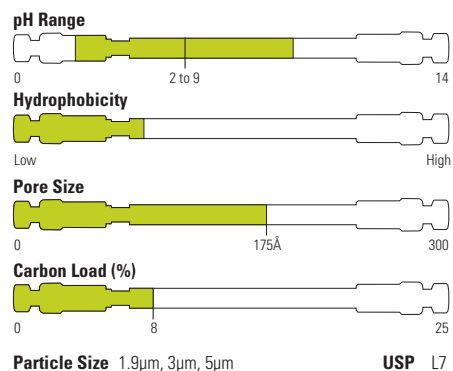
Particle Size (µm)	Format	Length (mm)	10mm ID	20mm ID	21mm ID	30mm ID	50mm ID
5	Preparative Guard Cartridge (3/pk)	10	25005-019023	25005-019223	-	-	-
	Preparative HPLC Column	50	25005-059070	-	-	25005-059370	25005-059570
		100	25005-109070	-	25005-109270	25005-109370	25005-109570
		150	25005-159070	-	25005-159270	25005-159370	25005-159570
		250	25005-259070	-	25005-259270	25005-259370	25005-259570
12	Preparative Guard Cartridge (3/pk)	10	25012-019023	25012-019223	-	-	-
	Preparative HPLC Column	50	25012-059070	-	25012-059270	25012-059370	25012-059570
		100	25012-109070	-	25012-109270	25012-109370	25012-109570
		150	-	-	25012-159270	25012-159370	25012-159570
		250	25012-259070	-	25012-259270	25012-259370	25012-259570
	Preparative Guard Cartridge Holder	10	C-1000	854-00	-	-	-



Hypersil GOLD C8

Recommended for analytes with medium hydrophobicity or when a less hydrophobic phase is required to obtain optimum retention

- Similar selectivity to C18 columns but with reduced retention
- Lower hydrophobicity, allowing compounds to elute quicker
- Faster separations
- Excellent peak shape
- High efficiency
- Outstanding sensitivity



Hypersil GOLD C8 5µm, 150 x 4.6mm

Mobile Phase:	MeOH
Temperature:	25°C
Flow Rate:	1.5mL/min
Detection:	UV, 450nm
Analytes:	1. Lutein 2. Lycopene 3. β-Carotene

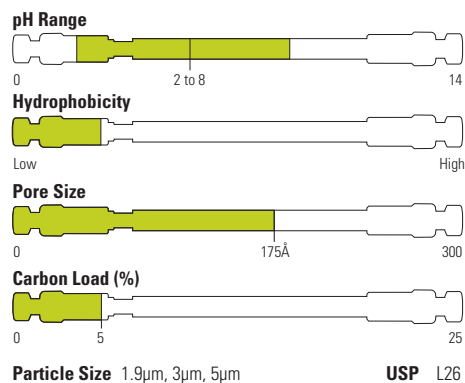
Hypersil GOLD C8

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25202-022130	-	-	-
		30	-	25202-032130	-	-	-
		50	-	25202-052130	25202-053030	-	25202-054630
		100	25202-101030	25202-102130	25202-103030	-	-
		150	-	25202-152130	-	-	-
3	Drop-in Guard (4/pk)	10	25203-011001	25203-012101	25203-013001	25203-014001	25203-014001
	HPLC Column	50	-	25203-052130	25203-053030	25203-054030	25203-054630
		100	25203-101030	25203-102130	25203-103030	25203-104030	25203-104630
		150	-	25203-152130	25203-153030	25203-154030	25203-154630
5	Drop-in Guard (4/pk)	10	-	25205-012101	25205-013001	25205-014001	25205-014001
	HPLC Column	50	-	25205-052130	25205-053030	-	25205-054630
		100	-	25205-102130	25205-103030	-	25205-104630
		150	-	25205-152130	25205-153030	25205-154030	25205-154630
		250	-	25205-252130	25205-253030	25205-254030	25205-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

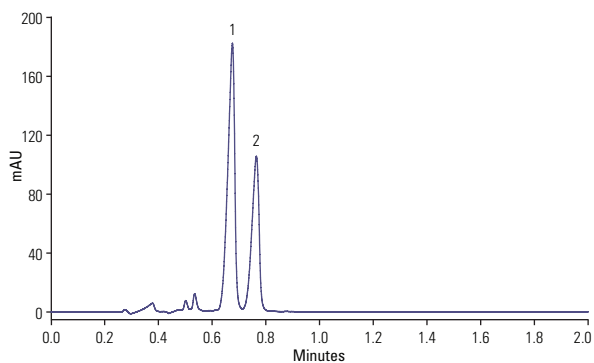
Hypersil GOLD C4

Lower hydrophobicity than C18 or C8 recommended for very hydrophobic analytes

- Lower hydrophobicity
- Faster separations
- Excellent peak shape
- High efficiency
- Outstanding sensitivity



Fatty acids



Hypersil GOLD C4 1.9µm, 100 x 2.1mm

Mobile Phase:	H ₂ O / MeCN (20:80)
Temperature:	30°C
Flow Rate:	0.55mL/min
Injection Volume:	1µL
Detection:	200 nm
Analytes:	1. Linolenic acid 2. Linoleic acid

Hypersil GOLD C4

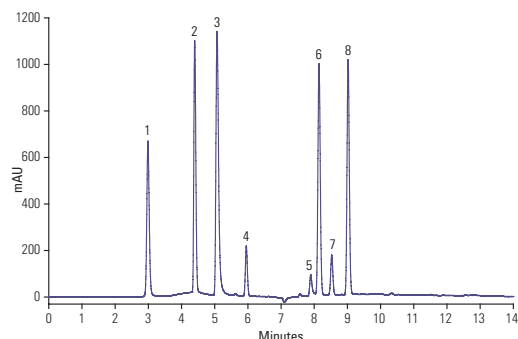
Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25502-052130	-	-
		100	-	25502-102130	-	-
		150	-	25502-152130	-	-
3	Drop-in Guard (4/pk)	10	25503-011001	25503-012101	25503-013001	25503-014001
	HPLC Column	50	-	25503-052130	-	-
		100	-	25503-102130	25503-103030	25503-104630
		150	25503-151030	25503-152130	25503-153030	25503-154630
5	Drop-in Guard (4/pk)	10	-	25505-012101	25505-013001	25505-014001
	HPLC Column	50	-	25505-052130	-	25505-054630
		100	-	25505-102130	25505-103030	25505-104630
		150	-	25505-152130	-	25505-154630
		250	-	25505-252130	25505-253030	25505-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00

Hypersil GOLD aQ

Controlled interaction mechanism by which polar analytes can be retained and resolved

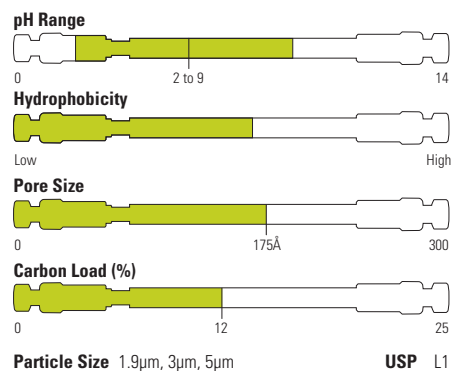
- Polar endcapped C18 phase for alternative selectivity
- Retention and resolution of polar analytes
- Stable in 100% aqueous mobile phases

Water soluble vitamins



Hypersil GOLD aQ 5µm, 150 x 4.6mm

Mobile Phase A:	50 mM KH ₂ PO ₄ , pH 3.5
Mobile Phase B:	MeOH
Gradient:	0 – 100% B in 15 min
Flow Rate:	1mL/min
Detection:	UV, 205nm
Analytes:	<ol style="list-style-type: none"> 1. Vitamin B1 (thiamine) 2. Vitamin B6 (pyridoxine) 3. Vitamin B3 (nicotinamide) 4. Vitamin B5 (pantothenic acid) 5. Folic Acid 6. Vitamin B12 (cyanocobalamin) 7. Vitamin H (biotin) 8. Vitamin B2 (riboflavin)



Hypersil GOLD aQ

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25302-022130	-	-	-
		30	-	25302-032130	-	-	-
		50	25302-051030	25302-052130	25302-053030	-	25302-054630
		100	25302-101030	25302-102130	25302-103030	-	-
		150	-	25302-152130	-	-	-
		200	-	25302-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25303-011001	25303-012101	25303-013001	25303-014001	25303-014001
		30	-	25303-032130	25303-033030	-	-
	HPLC Column	50	-	25303-052130	25303-053030	25303-054030	25303-054630
		100	25303-101030	25303-102130	25303-103030	25303-104030	25303-104630
		150	25303-151030	25303-152130	25303-153030	25303-154030	25303-154630
		250	-	25303-252130	-	25303-254030	25303-254630
UNIGUARD Drop-in Guard Cartridge Holder	10		851-00	852-00	852-00	850-00	850-00

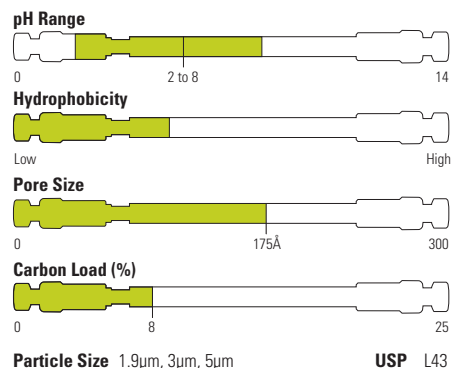
Hypersil GOLD aQ Preparative

Particle Size (µm)	Format	Length (mm)	10mm ID	20mm ID	21mm ID	30mm ID	50mm ID
5	Preparative Guard Cartridge (3/pk)	10	25305-019023	25305-019223	-	-	-
		50	25305-059070	-	25305-059270	25305-059370	25305-059570
	Preparative HPLC Column	100	25305-109070	-	25305-109270	25305-109370	25305-109570
		150	25305-159070	-	25305-159270	25305-159370	25305-159570
		250	25305-259070	-	25305-259270	25305-259370	25305-259570

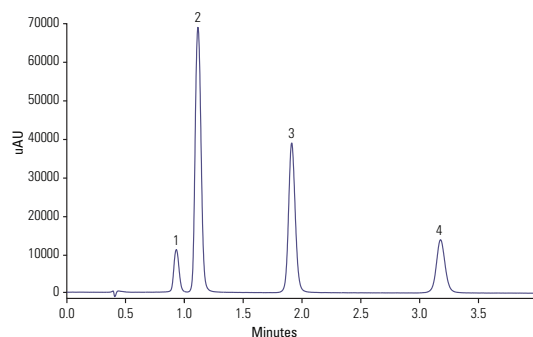
Hypersil GOLD PFP

Introduction of a fluorine group into the stationary phase causes significant changes in solute-stationary phase interaction

- Fluorine atoms around the phenyl ring enhance pi-pi interactions with aromatic molecules
- Extra retention for halogenated species
- Selectivity for non-halogenated polar compounds



Polyphenols



Hypersil GOLD PFP 1.9μm, 50 x 2.1mm

Mobile Phase:	0.1% Acetic Acid
Temperature:	25°C
Flow Rate:	0.5mL/min
Injection Volume:	0.5μL
Detection:	UV, 280nm
Analytes:	1. Pyrogallol 2. Hydroquinone 3. Resorcinol 4. Phenol

Hypersil GOLD PFP

Particle Size (μm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	20	-	25402-022130	-	-	-
		30	-	25402-032130	-	-	-
		50	25402-051030	25402-052130	25402-053030	-	25402-054630
		100	25402-101030	25402-102130	25402-103030	-	-
		150	-	25402-152130	-	-	-
		200	-	25402-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25403-011001	25403-012101	25403-013001	25403-014001	25403-014001
	HPLC Column	30	-	25403-032130	25403-033030	-	25403-034630
		50	-	25403-052130	25403-053030	25403-054030	25403-054630
		100	25403-101030	25403-102130	25403-103030	25403-104030	25403-104630
		150	25403-151030	25403-152130	25403-153030	-	25403-154630
		200	-	25403-202130	-	-	-
5	Drop-in Guard (4/pk)	10	-	25405-012101	25405-013001	25405-014001	25405-014001
	HPLC Column	50	-	25405-052130	25405-053030	-	-
		100	-	25405-102130	25405-103030	-	25405-104630
		150	-	25405-152130	25405-153030	25405-154030	25405-154630
		250	-	25405-252130	-	25405-254030	25405-254630
		UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00

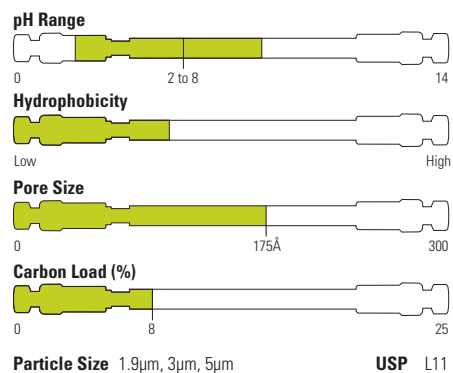
Hypersil GOLD PFP Preparative

Particle Size (μm)	Format	Length (mm)	10mm ID	20mm ID	21mm ID	30mm ID	50mm ID
5	Preparative Guard Cartridge (3/pk)	10	25405-019023	25405-019223	-	-	-
	Preparative HPLC Column	50	25405-059070	-	25405-059270	25405-059370	25405-059570
		100	25405-109070	-	25405-109270	25405-109370	25405-109570
		150	25405-159070	-	25405-159270	25405-159370	25405-159570
		250	25405-259070	-	25405-259270	25405-259370	25405-259570

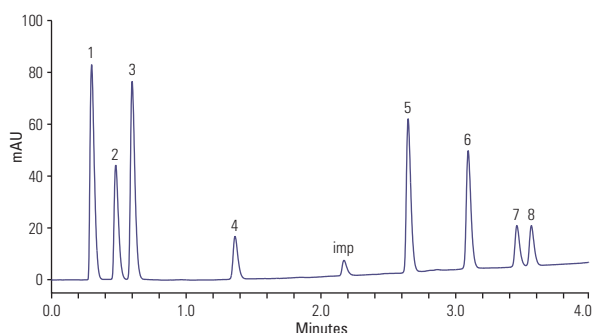
Hypersil GOLD Phenyl

Contains a C4 linker which allows for superior alignment of the phenyl ring with aromatic molecules

- Enhanced pi-pi interactions with aromatics
- Moderate hydrophobicity
- Outstanding peak shape and sensitivity



Antidepressants



Hypersil GOLD Phenyl 1.9µm, 50 x 2.1mm

Mobile Phase A:	0.1% Formic acid
Mobile Phase B:	0.1% Formic acid in MeCN
Gradient:	10 – 60% B in 3.4mins, 60 – 90% B in 0.24 min
Temperature:	60°C
Flow Rate:	0.5mL/min
Injection Volume:	0.7µL
Detection:	UV, 225 and 254nm
Analytes:	1. Uracil 2. Acetaminophen 3. p-Hydroxybenzoic acid 4. o-Hydroxybenzoic acid 5. Oxazepam 6. Diazepam 7. Di-isopropyl phthalate 8. Di-n-propyl phthalate

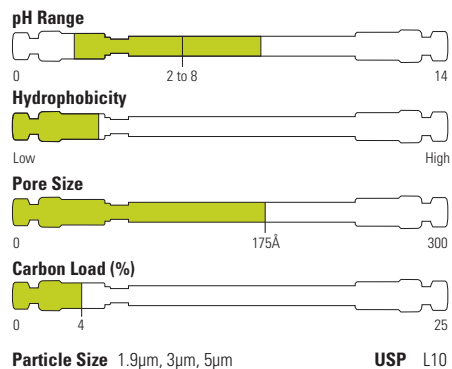
Hypersil GOLD Phenyl

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25902-052130	-	-	-
		100	-	25902-102130	-	-	-
		150	-	25902-152130	-	-	-
		200	-	25902-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25903-011001	25903-012101	25903-013001	25903-014001	25903-014001
	HPLC Column	50	-	25903-052130	-	-	-
		100	-	25903-102130	25903-103030	-	25903-104630
5	HPLC Column	150	25903-151030	-	25903-153030	-	25903-154630
		10	-	25905-012101	25905-013001	25905-014001	25905-014001
		50	-	25905-052130	-	-	25905-054630
	UNIGUARD Drop-in Guard Cartridge Holder	100	-	25905-102130	25905-103030	-	-
		150	-	-	-	-	25905-154630
		250	-	-	25905-253030	25905-254030	25905-254630
		10	851-00	852-00	852-00	850-00	850-00

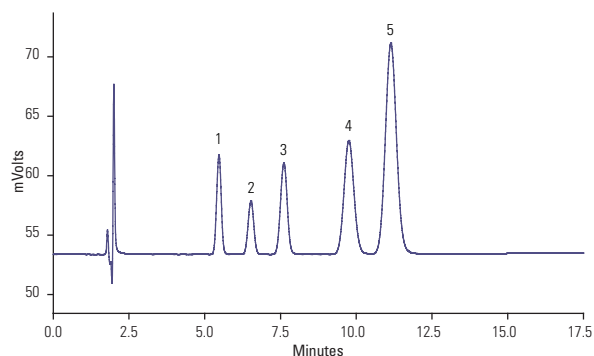
Hypersil GOLD CN

For both normal phase and reversed-phase separations

- Provide alternative selectivity with lower hydrophobicity
- Excellent peak shape
- Outstanding sensitivity
- Less retention for faster analysis



Organic acids



Hypersil GOLD CN 5µm, 150 x 4.6mm

Mobile Phase A:	25 mM KH ₂ PO ₄ , pH2
Mobile Phase B:	MeOH
Temperature:	25°C
Flow Rate:	1.5mL/min
Detection:	UV, 230nm
Analytes:	1. 4-Fluorobenzoic 2. o-Toluic Acid 3. p-Toluic Acid 4. 2,4,6-Trimethylbenzoic Acid 5. 2,5-Dimethylbenzoic Acid

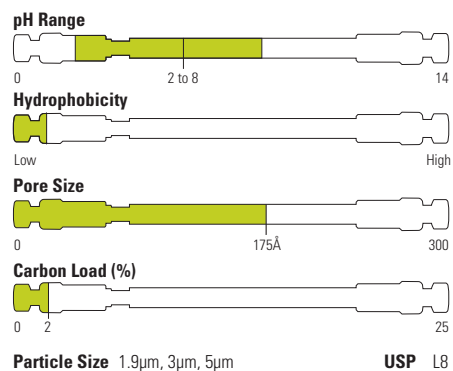
Hypersil GOLD CN

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25802-052130	-	-	-
		100	-	25802-102130	-	-	-
		200	-	25802-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25803-011001	25803-012101	25803-013001	25803-014001	25803-014001
	HPLC Column	30	-	25803-032130	-	-	-
		50	-	25803-052130	-	-	-
		100	-	25803-102130	25803-103030	-	25803-104630
		150	25803-151030	25803-152130	25803-153030	-	25803-154630
5	Drop-in Guard (4/pk)	10	-	25805-012101	25805-013001	25805-014001	25805-014001
	HPLC Column	50	-	25805-052130	-	-	25805-054630
		100	-	25805-102130	25805-103030	-	-
		150	-	25805-152130	-	-	25805-154630
		250	-	25805-252130	25805-253030	25805-254030	25805-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

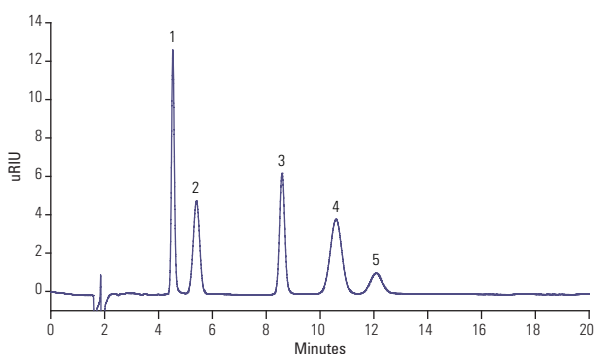
Hypersil GOLD Amino

A high performance aminopropyl phase that gives excellent chromatographic properties in three modes: weak anion exchange, reversed-phase and normal phase

- Retains anions and organic acids in weak anion exchange
- Excellent for carbohydrate analysis in reversed-phase
- Alternative selectivity to silica columns in normal phase chromatography
- Outstanding peak shape and sensitivity



Sugars



Hypersil GOLD Amino 5µm, 150 x 4.6mm

Mobile Phase:	MeCN/Water (80:20)
Temperature:	35°C
Flow Rate:	1.2mL/min
Injection Volume:	20µL
Detection:	RI
Analytes:	1. Fructose 2. Glucose 3. Sucrose 4. Maltose 5. Lactose

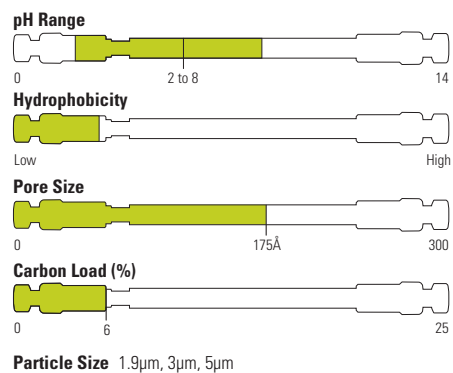
Hypersil GOLD Amino

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25702-052130	-	-	-
		100	-	25702-102130	-	-	-
		150	-	25702-152130	-	-	-
		200	-	25702-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25703-011001	25703-012101	25703-013001	25703-014001	25703-014001
	HPLC Column	30	-	25703-032130	-	-	-
		50	-	25703-052130	-	-	-
		100	-	25703-102130	25703-103030	-	25703-104630
		150	25703-151030	25703-152130	25703-153030	-	25703-154630
5	Drop-in Guard (4/pk)	10	-	25705-012101	25705-013001	25705-014001	25705-014001
	HPLC Column	50	-	25705-052130	-	-	25705-054630
		100	-	25705-102130	25705-103030	-	-
		150	-	-	-	-	25705-154630
		250	-	25705-252130	25705-253030	25705-254030	25705-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

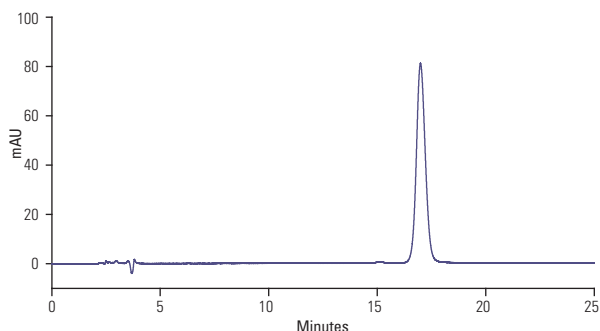
Hypersil GOLD AX

A novel polymeric amine ligand bonded to highly pure base deactivated silica

- Weak anion exchange phase for multiple charged species
- Suitable for HILIC retention and separation of highly polar molecules
- Higher efficiency than polymer based ion exchange columns
- Outstanding peak shape and selectivity



Vitamin C



Hypersil GOLD AX 5µm, 100 x 4.6mm

Mobile Phase:	100 mM Ammonium Acetate pH 6.8/ MeCN (30:70)
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	50µL
Detection:	UV, 240nm

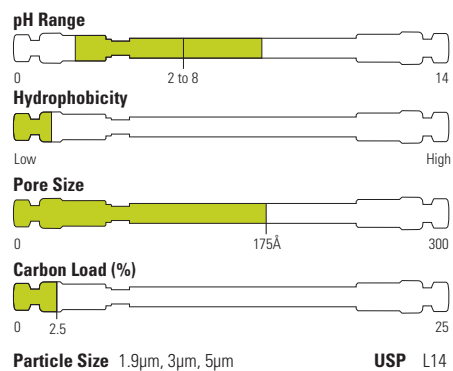
Hypersil GOLD AX

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	26102-052130	-	-	-
		100	-	26102-102130	-	-	-
		150	-	26102-152130	-	-	-
		200	-	26102-202130	-	-	-
3	Drop-in Guard (4/pk)	10	26103-011001	26103-012101	26103-013001	26103-014001	26103-014001
	HPLC Column	30	-	26103-032130	-	-	-
		50	-	26103-052130	-	-	-
		100	-	26103-102130	-	-	26103-104630
		150	26103-151030	26103-152130	26103-153030	-	26103-154630
5	Drop-in Guard (4/pk)	10	-	26105-012101	26105-013001	26105-014001	26105-014001
	HPLC Column	50	-	-	-	-	26105-054630
		100	-	26105-102130	-	-	26105-104630
		150	-	26105-152130	-	-	26105-154630
		250	-	26105-252130	26105-253030	26105-254030	-
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

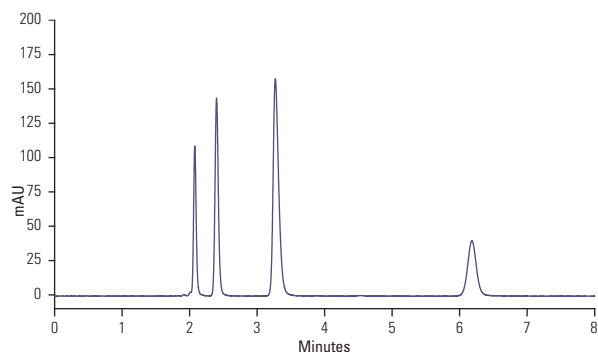
Hypersil GOLD SAX

A highly stable quaternary amine strong anion exchange column for aqueous and low pH mobile phases

- High stability to aqueous and low pH mobile phases
- Ideally suited to the analysis of smaller organic molecules including nucleotides and organic acids
- Outstanding peak shape and sensitivity



Monophosphates



Hypersil GOLD SAX 5µm, 150 x 4.6mm

Mobile Phase: Aqueous KH_2PO_4 (50 mM, pH 3)
 Temperature: 40°C
 Flow Rate: 1.0 mL/min
 Injection Volume: 10 µL
 Detection: UV, 254 nm

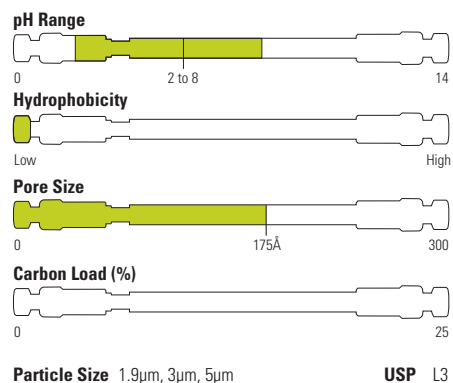
Hypersil GOLD SAX

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	100	26302-102130	-	-	-
		150	26302-152130	-	-	-
3	Drop-in Guard (4/pk)	10	26303-012101	26303-013001	26303-014001	26303-014001
	HPLC Column	50	26303-052130	-	-	-
		100	26303-102130	26303-103030	-	26303-104630
		150	-	26303-153030	-	26303-154630
5	Drop-in Guard (4/pk)	10	26305-012101	26305-013001	26305-014001	26305-014001
	HPLC Column	50	26305-052130	-	-	-
		100	26305-102130	26305-103030	-	26305-104630
		150	26305-152130	-	-	26305-154630
		250	26305-252130	26305-253030	26305-254030	26305-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00

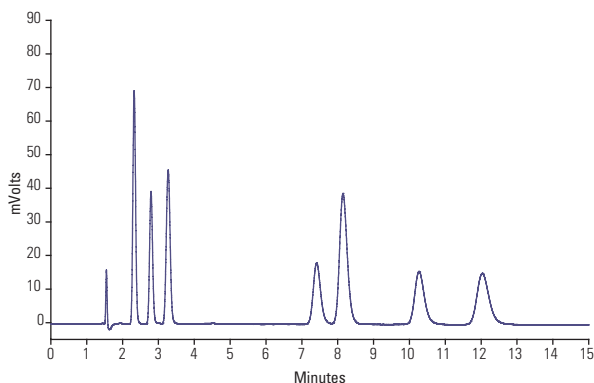
Hypersil GOLD Silica

Unbonded, highly pure base deactivated silica media that is the backbone of the Hypersil GOLD range of columns

- Highly pure base deactivated silica media
- Outstanding peak shape and sensitivity



Steroids



Hypersil GOLD Silica 5µm, 150 x 4.6mm

Mobile Phase:	19:1 (v/v) n-C6H14/EtOH
Temperature:	30°C
Flow Rate:	1.5mL/min
Injection volume:	5µL
Detection:	UV, 254nm
Analytes:	1. Progesterone 2. 21-Hydroxyprogesterone-21-acetate 3. 17- α -Hydroxyprogesterone 4. Cortisone 5. 11- α -Hydroxyprogesterone 6. Corticosterone 7. Hydrocortisone

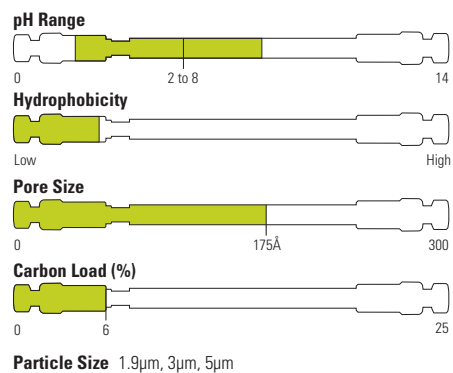
Hypersil GOLD Silica

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	25102-052130	-	-	-
		100	-	25102-102130	-	-	-
		150	-	25102-152130	-	-	-
		200	-	25102-202130	-	-	-
3	Drop-in Guard (4/pk)	10	25103-011001	25103-012101	25103-013001	25103-014001	25103-014001
	HPLC Column	30	-	25103-032130	-	-	25103-034630
		50	-	25103-052130	-	-	-
		100	-	25103-102130	25103-103030	-	-
		150	25103-151030	25103-152130	25103-153030	-	25103-154630
5	Drop-in Guard (4/pk)	10	-	25105-012101	25105-013001	25105-014001	25105-014001
	HPLC Column	50	-	25105-052130	-	-	-
		100	-	25105-102130	25105-103030	-	25105-104630
		150	-	25105-152130	-	-	25105-154630
		250	-	25105-252130	-	25105-254030	25105-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

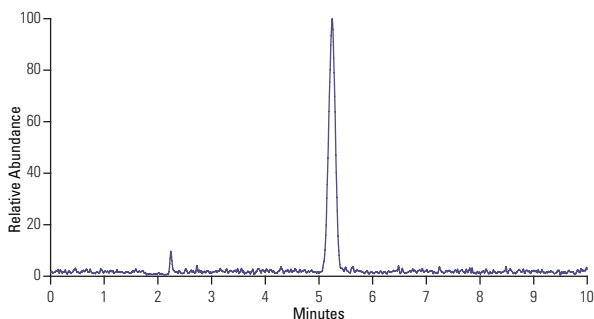
Hypersil GOLD HILIC

Retains and separates polar analytes that are problematic using reversed-phase columns

- Alternative selectivity to C18
- Improved sensitivity for MS detection
- Alternative to ion-pair or derivatization
- Outstanding peak shape and selectivity



Urea

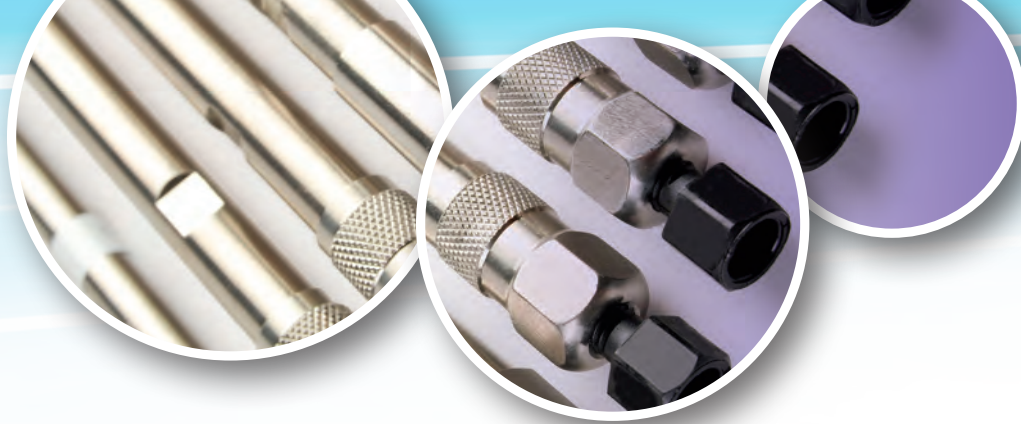


Hypersil GOLD HILIC 5µm, 150 x 4.6mm

Mobile Phase:	H ₂ O/MeCN (10:90) + 0.1% formic acid
Temperature:	30°C
Flow Rate:	0.6mL/min
Injection Volume:	1µL
Detection:	+ESI
Analytes:	1. Urea

Hypersil GOLD HILIC

Particle Size (µm)	Format	Length (mm)	1.0mm ID	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.9	UHPLC Column	50	-	26502-052130	-	-	-
		100	-	26502-102130	-	-	-
		150	-	26502-152130	-	-	-
3	Drop-in Guard (4/pk)	10	26503-011001	26503-012101	26503-013001	26503-014001	26503-014001
	HPLC Column	30	-	26503-032130	-	-	-
		50	-	26503-052130	-	-	-
		100	-	26503-102130	26503-103030	-	26503-104630
		150	26503-151030	26503-152130	26503-153030	-	26503-154630
5	Drop-in Guard (4/pk)	10	-	26505-012101	26505-013001	26505-014001	26505-014001
	HPLC Column	50	-	26505-052130	-	-	26505-054630
		100	-	26505-102130	26505-103030	-	-
		150	-	-	-	-	26505-154630
		250	-	26505-252130	26505-253030	26505-254030	26505-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	851-00	852-00	852-00	850-00	850-00

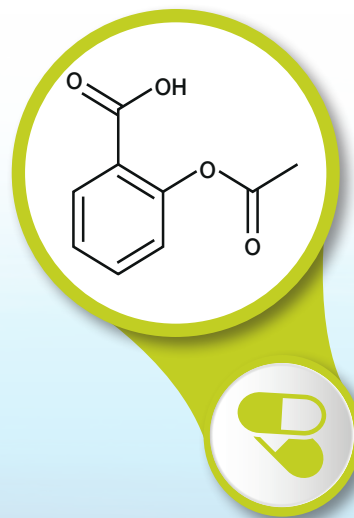


Acclaim HPLC and UHPLC Columns

Optimal selectivity through innovative chemistries

Designed for separating a variety of analytes, from small neutral and polar molecules to complex mixtures. Ideal for pharmaceutical, environmental, food and beverage and chemical applications.

- **Diversified Selectivities**
Novel and proprietary surface chemistries
- **Reproducible and Reliable**
Strict manufacturing and quality processes
- **High Efficiencies**
For optimum resolution of complex mixtures
- **Ultra-pure, Porous, Spherical Silica**
Providing consistent quality and performance



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

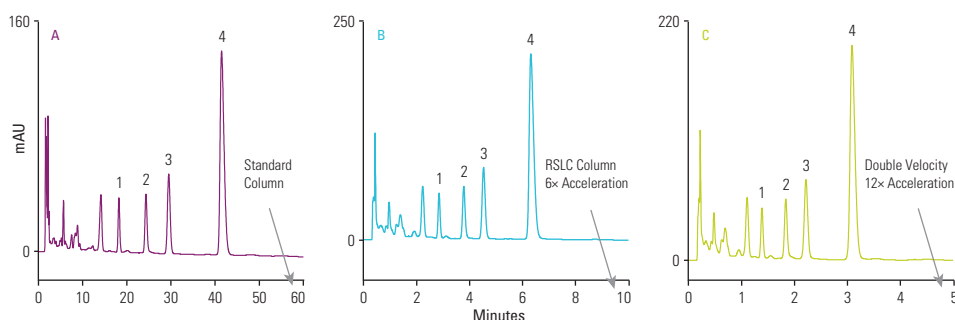
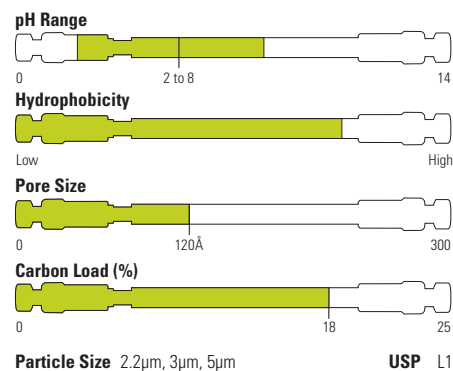
Visit www.thermoscientific.com/acclaim

Acclaim 120 C18

High performance reversed-phase columns for reproducible results

- High hydrophobic retention
- Excellent efficiencies for maximum resolution
- Low silanol activity for excellent peak shapes for basic analytes
- Extremely low bleed, fully compatible with MS

The Acclaim 120 columns are designed for high resolution reversed-phase separations. The very high surface coverage and very low metal content together result in columns with excellent efficiencies. These columns provide exceptional performance for a variety of applications in the pharmaceutical, chemical, environmental and food separations areas.



A: Acclaim 120 C18, 5µm, 150 x 4.6mm
B, C: Acclaim RSLC C18, 2.2µm, 50 x 2.1mm

Mobile Phase:	200mM HOAc in 10% (v/v) MeOH
Temperature:	20°C
Flow Rate:	A: 1.00mL/min B: 0.41mL/min C: 0.82mL/min
Injection Volume:	A: 10µL B: 1.2µL C: 1.2µL
Detection:	UV, 254 nm, A: 1 Hz data rate B: 5 Hz data rate C: 10 Hz data rate
Analytes:	1. p-Hydroxybenzoic acid 2. p-Hydroxybenzaldehyde 3. Vanillic acid 4. Vanillin
Sample:	Commercial vanilla extract in 40% ethanol, filtered
Reference:	AOAC Official Method 990.25

Acclaim 120 C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	30	071402	071609	-
		50	068989	071608	-
		75	-	075699	-
		100	068990	071607	-
		150	071401	-	-
		250	074814	-	-
3	HPLC Column	33	-	066276	-
		50	077999	068973	063189
		75	-	066277	-
		100	077998	078000	078001
		150	063187	063705	063191
		250	077997	070080	-
5	Guard Cartridge	10	069692	071985	069699
	HPLC Column	150	-	-	063197
		250	-	-	063199

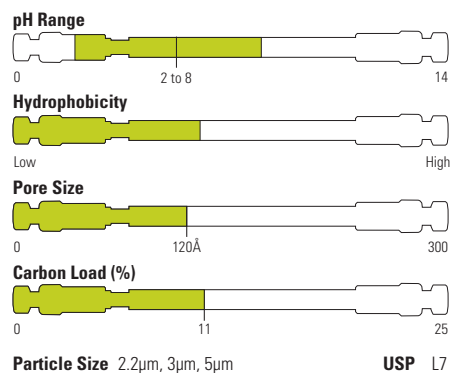
See page 4-037 for Acclaim Guard Holder Ordering Guide

Acclaim 120 C8

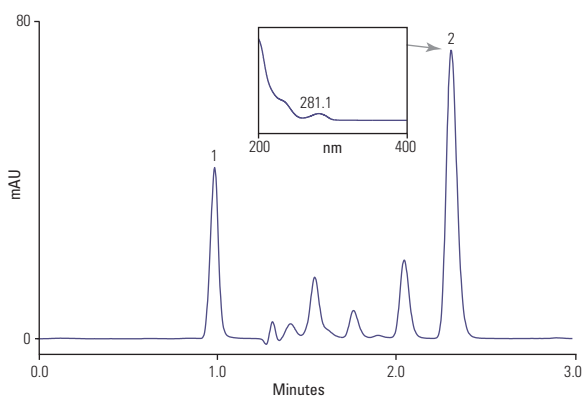
High performance reversed-phase columns with intermediate hydrophobic retention

- Low silanol activity for excellent peak shapes for basic analytes
- Excellent column efficiencies
- LC-MS compatible

Acclaim 120 C8 reversed-phase columns feature densely bonded monolayer C8 ligands on a high-purity, spherical porous silica substrate. The columns are a well-characterized line of LC-MS compatible C8 phases with very high surface coverage and extremely low silanol activity. These columns provide exceptional performance for a variety of applications in the pharmaceutical, environmental, food and many other industrial sectors.



Triclosan in toothpaste



Column: Acclaim RSLC C8, 2.2µm, 50 x 2.1mm

Mobile Phase:	Isocratic, 15% buffer, (2mM Ammonium acetate pH5), 85% methanol (v/v)
Temperature:	50°C
Flow Rate:	0.2mL/min
Injection Volume:	1.0µL
Detection:	Diode array detector, 281nm, 10Hz, 0.1 s resp. time and spectra 200–400 nm
Analytes:	1. Saccharin 2. Triclosan
Sample:	Toothpaste containing 0.3% triclosan

Acclaim 120 C8

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	30	-	072618	-
		50	072615	072619	-
		100	072616	072620	-
		150	072617	-	-
		250	074811	-	-
3	HPLC Column	50	059122	-	059125
		100	059123	-	059126
		150	059124	068970	059127
		250	076185	-	-
5	Guard Cartridge	10	069688	071979	069696
	HPLC Column	50	059134	-	059138
		100	-	-	059139
		150	059136	-	059140
		250	-	-	059141

See page 4-037 for Acclaim Guard Holder Ordering Guide

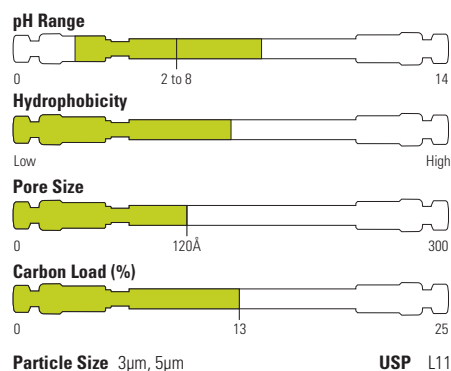
Acclaim Phenyl-1

A unique reversed-phase column with high aromatic selectivity

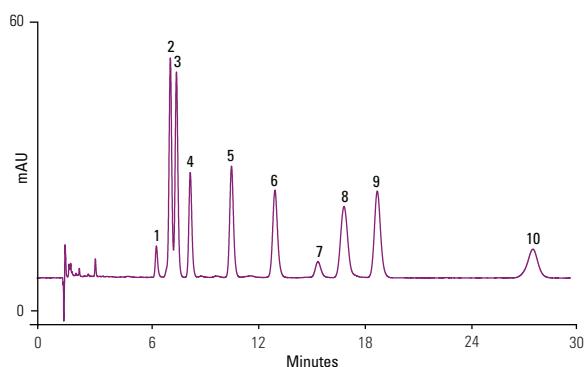
- High aromatic selectivity
- High hydrophobic retention
- Unique and complementary selectivity compared to any other phenyl type column
- Compatibility with highly aqueous mobile phase
- High efficiency and rugged packing

Acclaim Phenyl-1 has a higher pi-pi interaction than other phenyl phases and provides unique selectivity for aromatic compounds while maintaining sufficient hydrophobic interaction and aqueous compatibility for superior chromatographic performance.

The Acclaim Phenyl-1 column can be used in a wide range of applications in pharmaceutical, environmental, food testing and product-quality testing. This column is ideally suited for the analysis of aromatic analytes; some examples include glucocorticosteroids, estrogens, fat-soluble vitamins and phospholipids.



Separation of fat-soluble vitamins



Acclaim Phenyl-1, 3µm, 150 x 3.0mm

Mobile Phase:	Methanol/water v/v 90/10
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	2µL
Detection:	UV, 220nm
Analytes:	(100 ppm each)
	1. Retinol acetate (vitamin A acetate)
	2. Vitamin D2
	3. Vitamin D3
	4. delta-Tocopherol
	5. gamma-Tocopherol
	6. alpha-Tocopherol (vitamin E)
	7. Impurity (unknown)
	8. Vitamin E acetate
	9. Vitamin K2
	10. Vitamin K1

Acclaim Phenyl-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	Guard Cartridge	10	079934	071974	071973
	HPLC Column	150	071971	071970	071969
5	HPLC Column	150	-	-	088016
		250	-	-	079697

Acclaim Guard Holder

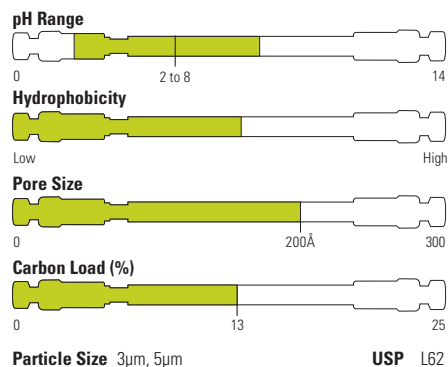
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim C30

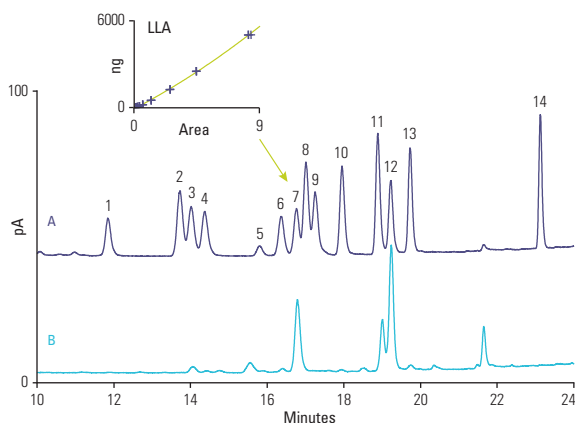
Columns for separating structurally related isomers

- High shape selectivity
- Unique selectivity complementary to other reversed-phase columns
- Compatibility with highly aqueous mobile phase
- High-quality: low column bleed, high efficiency and rugged packing

The Acclaim C30 is designed to provide high shape selectivity for separating hydrophobic structural related isomers and unique selectivity complementary to other reversed-phase columns (e.g. C18).



Omega fatty acids



Acclaim C30, 5µm, 150 x 4.6mm

Mobile Phase A:	Water:formic acid:mobile phase B 900:3.6:100 (v/v)	
Mobile Phase B:	Acetone:acetonitrile:THF:formic acid 675:225:100:4(v/v/v)	
Gradient:	Time (min)	%A %B
	0	100 0
	1	40 60
	13	30 70
	22	5 95
	24	5 95
	29	100 0
	32	100 0
Temperature:	30°C	
Flow Rate:	1.00mL/min	
Injection Volume:	2µL	
Detection:	Corona ultra, nebulizer 15°C, filter high	
Analytes:	1. SDA 2. EPA 3. ALA 4. GLA 5. DHA 6. Arach. 7. LLA	
Samples:	A. Standards in isopropanol B. Saponified chicken fat	

Acclaim C30

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	078666	-	078661
		100	078665	-	-
		150	075725	075724	075723
		250	078664	075726	-
5	Guard Cartridge	10	075722	075721	075720
	HPLC Column	150	-	-	075719
		250	-	-	075718

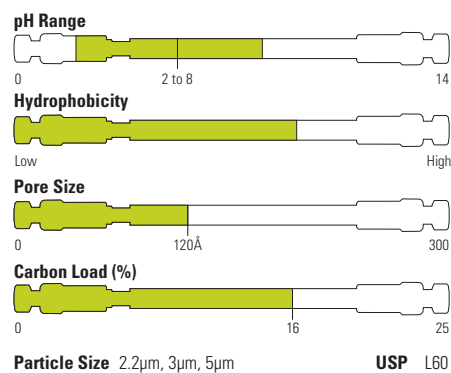
Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim PolarAdvantage

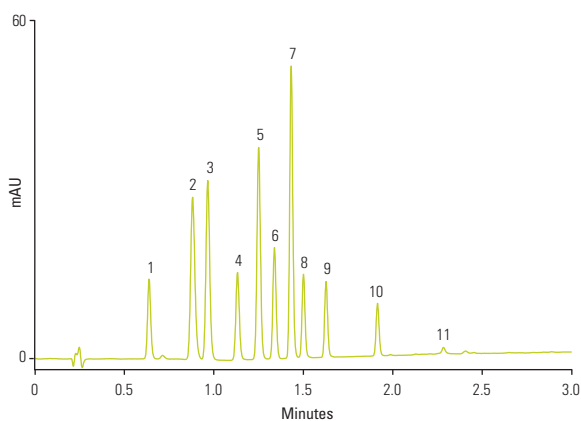
Novel polar-embedded reversed-phase columns with unique selectivity

- Selectivity complementary to the C18 column
- Low silanol activity for excellent peak shape with basic compounds
- Compatible with 100% aqueous mobile phase
- High selectivity for hydrophobic aromatic molecules
- Wide range of applications



Acclaim PolarAdvantage (PA) columns feature a patented bonding column chemistry that incorporates a polar sulfonamide group with an ether linkage near the silica surface. This unique chemistry provides low silanol activity, compatibility with 100% aqueous mobile phase. The Acclaim PA column offers great separation power to resolve a wide variety of polar and non-polar analytes and supports LC-MS analysis.

EPA 604 phenols



Acclaim RSLC PolarAdvantage, 2.2µm, 50 x 3.0mm

Mobile Phase A: 10mM formic acid + 10mM ammonium formate, pH 3.75 ± 0.05

Mobile Phase B: Acetonitrile

Gradient: -1.5 0.0 0.3 2.6 3.0
 %A 70 70 70 10 10
 %B 30 30 30 90 90

Temperature: 30°C

Flow Rate: 1.25mL/min

Injection Volume: 0.5µL

Detection: UV, 280nm, 10Hz, 0.5s resp. time

Analytes: 1. Phenol
 2. 2,4-Dinitrophenol
 3. 4-Nitrophenol
 4. 2-Chlorophenol
 5. 2-Nitrophenol
 6. 2,4-Dimethylphenol
 7. 4,6-Dinitro-2-methylphenol
 8. 4-Chloro-3-methylphenol
 9. 2,4-Dichlorophenol
 10. 2,4,6-Trichlorophenol
 11. Pentachlorophenol

Sample: Calibration mix, 50µg/mL in water

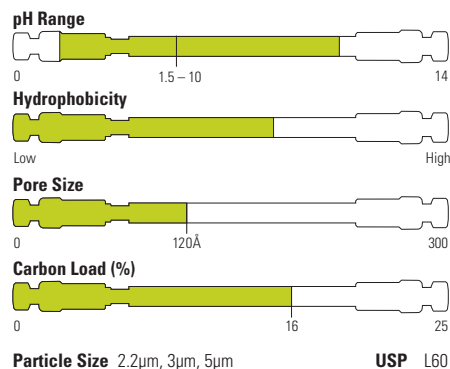
Acclaim PolarAdvantage

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	50	072622	-	-
		75	-	075698	-
		100	072623	072627	-
		150	072624	-	-
		250	074813	-	-
3	HPLC Column	50	063174	068972	-
		100	061316	076214	-
		150	061317	063693	061318
		250	-	070079	-
5	Guard Cartridge	10	069691	071983	069698
	HPLC Column	50	-	-	061319
		150	-	-	061320
		250	-	-	061321

Acclaim PolarAdvantage II

Complementary selectivity and enhanced hydrolytic stability

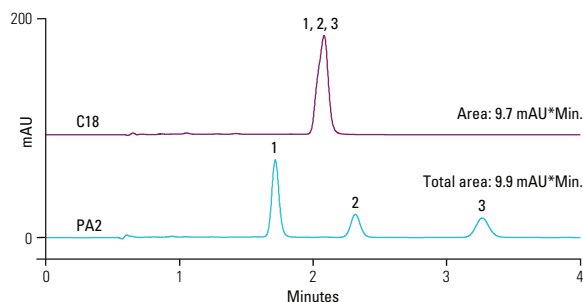
- Unique selectivity complementary to the C18 column
- Novel polar-embedded column chemistry for hydrolytic stability
- Compatible with 100% aqueous mobile phase
- Low bleed for MS compatibility
- Wide range of applications



Acclaim PolarAdvantage II (PA2) columns feature a patented surface chemistry that incorporates an amide-embedded polar group and multi-point attachment between the ligands and the silica surface. This unique chemistry provides enhanced hydrolytic stability from pH 1.5-10 with 100% aqueous mobile phases and exhibits high reversed-phase capacity, with selectivity complementary to conventional C18 columns.

The Acclaim PA2 column is specifically designed to withstand high pH conditions, making it a good choice for the separation of both basic and acidic analytes.

Turmeric



Acclaim RSLC 120 C18 2.2µm, 100 x 2.1mm
Acclaim RSLC PA2, 2.2µm, 100 x 2.1mm

Mobile Phase A:	15mM H ₃ PO ₄
Mobile Phase B:	Methanol
Isocratic:	C18: 70% B (v/v) PA2: 80% B (v/v)
Temperature:	30°C
Flow Rate:	0.41mL/min
Detection:	UV, 428nm
Analytes:	1. Curcumin 2. Demethoxycurcumin 3. Bis-demethoxycurcumin
Sample:	Turmeric extract

Acclaim PolarAdvantage II

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	30	071402	071609	-
		50	068989	071608	-
		100	068990	071607	-
		150	071401	-	-
		250	074814	-	-
3	HPLC Column	33	-	066276	-
		50	077999	068973	063189
		75	-	066277	-
		100	077998	078000	078001
		150	063187	063705	063191
		250	077997	070080	-
5	Guard Cartridge	10	069692	071985	069699
	HPLC Column	150	-	-	063197
		250	-	-	063199

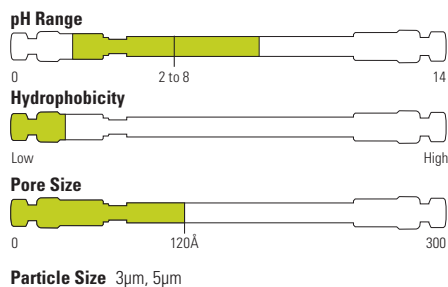
See page 4-037 for Acclaim Guard Holder Ordering Guide

Acclaim HILIC-10

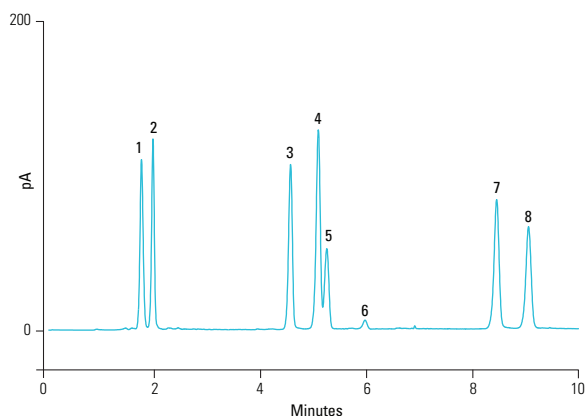
Designed with unique selectivity for hydrophilic molecules

- Retains highly polar molecules that are not retained by reversed-phase chromatography
- Unique selectivity, complementary to reversed-phase columns
- Hydrolytically stable
- Rugged column packing
- Broad application range

The Acclaim HILIC-10 column is designed for separating highly hydrophilic molecules by Hydrophilic Interaction Liquid Chromatography (HILIC). This column is based on high-purity spherical porous silica covalently modified with a proprietary hydrophilic layer.



Glycerides



Acclaim HILIC-10, 3μm, 150 x 3.0mm

Mobile Phase A:	Heptane
Mobile Phase B:	2-Propanol/acetic acid 99.5:0.5
Temperature:	25°C
Flow Rate:	0.50mL/min
Injection Volume:	4μL
Detection:	Corona ultra, nebulizer 15°C
Analytes:	1. Tristearin 2. Trilaurin 3. Distearin isomer 1 4. Dilaurin isomer 1 5. Distearin isomer 2 6. Dilaurin isomer 2 7. Monostearin 8. Monolaurin

Acclaim HILIC-10

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	150	074259	074258	074257
5	Guard Cartridge	10	074263	074261	074262

Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

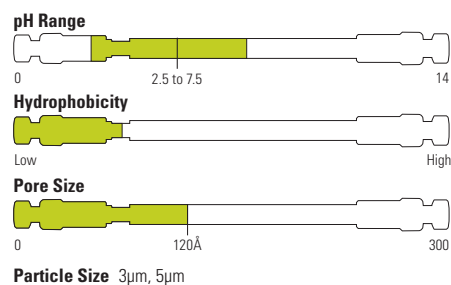
Acclaim Mixed-Mode HILIC-1

Uniquely designed for both reversed-phase and HILIC operations

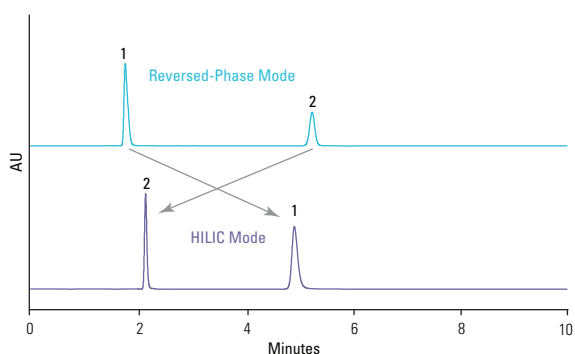
- Can operate in both RP and HILIC modes
- Retains highly polar molecules
- Unique selectivity complementary to RP columns
- Broader application range compared with conventional diol-based columns
- High-efficiency column for high-resolution separations

The Acclaim Mixed-Mode HILIC-1 column features a unique, high-efficiency, silica-based HPLC mixed-mode stationary phase that combines both reversed-phase (RP) and hydrophilic interaction liquid chromatography (HILIC) properties. This combination allows both hydrophobic and hydrophilic interactions to be utilized to optimize separations.

The functional group is of a hydrophobic alkyl chain with a diol group at the terminus. This unique combination results in the adjustable selectivity, making Acclaim Mixed-Mode HILIC-1 separate mixtures that would be impossible for a C18 column. This column is suitable for a broad range of applications, including non-ionic ethoxylated surfactants, drug metabolites, lipids, polyethylene glycols (PEGs), ethoxylated surfactants, and more.



Cytosine and naphthalene



Acclaim Mixed-Mode HILIC-1, 5µm, 150 x 4.6mm

Mobile Phase:	CH ₃ CN/0.1 M NH ₄ OAc, pH 5.2 v/v 52/48 for RP mode v/v 92/8 for HILIC mode
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	10µL
Detection:	UV, 254nm
Analytes:	1. Cytosine (100 ppm) 2. Naphthalene (100 ppm)

Acclaim Mixed-Mode HILIC-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	-	071912	-
		150	070091	070090	-
5	Guard Cartridge	10	069694	071913	069706
	HPLC Column	150	066847	-	066843
		250	-	-	066844

Acclaim Guard Holder

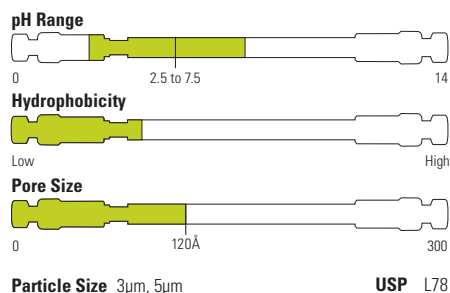
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Mixed-Mode WAX-1

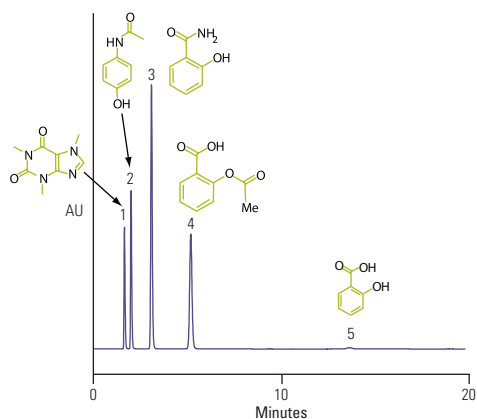
Designed for separating anionic molecules with powerful adjustable selectivity control

- Adjustable selectivity
- Selectivity orthogonal to reversed-phase (RP) columns
- Ideal selectivity for anionic molecules
- Excellent column efficiency and peak asymmetry
- Multimode retention mechanisms: reversed-phase, weak anion exchange, and HILIC modes

The Acclaim Mixed-Mode WAX-1 is a novel, high-efficiency silica HPLC column that combines hydrophobic and weak anion exchange characteristics. Its unique chemistry results in a multimode separation mechanism that includes reversed-phase, anion exchange, and HILIC interactions. Selectivity can be adjusted by changing ionic strength, pH or organic solvent content.



Pain relief medicine



Acclaim Mixed-Mode WAX-1, 5µm, 150 x 4.6mm

Mobile Phase:	40/60 v/v Acetonitrile/buffer (6.8 g potassium monophosphate and 0.5 g pyrophosphate in 1000 g D.I. H ₂ O, pH is adjusted to 6.0 with NaOH)
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	1µL
Detection:	UV, 220nm
Analytes:	1. Caffeine 2. Acetaminophen 3. Salicylamide 4. Acetyl salicylic acid (Aspirin) 5. Salicylic acid

Acclaim Mixed-Mode WAX-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	-	071908	-
		150	070089	070088	-
5	Guard Cartridge	10	069686	071909	069704
	HPLC Column	150	067084	-	064984
		250	-	-	064985

Acclaim Guard Holder

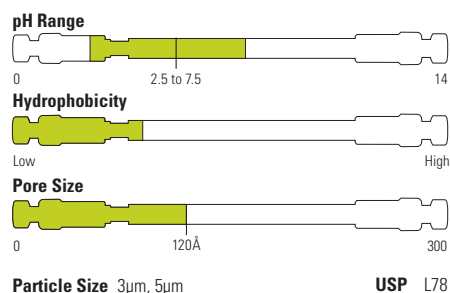
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Mixed-Mode WCX-1

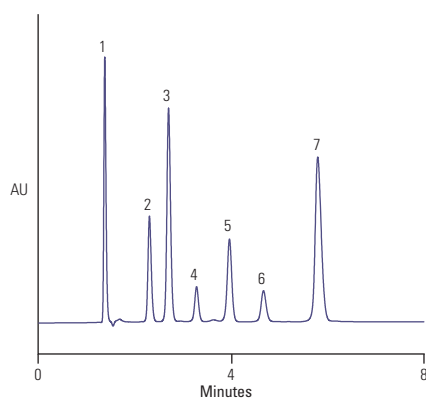
Designed for separating cationic molecules with adjustable selectivity control

- Adjustable selectivity
- Ideal selectivity for separating basic molecules
- Selectivity complementary to C18 RP columns
- Multimode separation mechanism: reversed-phase, weak cation exchange, anion-exclusion and HILIC

The Acclaim Mixed-Mode WCX-1 is a novel, high-efficiency, silica-based column, with a proprietary ligand with both hydrophobic and weak cation exchange properties. Selectivity of ionizable and neutral compounds can be controlled independently or simultaneously by tuning mobile phase ionic strength, pH or organic modifier. This column therefore can separate using multiple separation modes: reversed-phase, cation exchange, and normal-phase/ HILIC and is recommended for a variety of industrial applications, including pharmaceutical, chemical, consumer products, foods and beverages.



Pharmaceutical counterions



Acclaim Mixed-Mode WCX-1, 5µm, 150 x 4.6mm

Mobile Phase:	40/60 v/v CH ₃ CN/NH ₄ OAc, pH 5.2 (20 mM total)
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	5µL
Detection:	UV (225 nm)
Analytes:	1. Maleate 50µg/mL 2. Ketoprofen 30µg/mL 3. Naproxen 30µg/mL 4. Hydrocortisone 60µg/mL 5. Dexamethasone 60µg/mL 6. Oxprenolol 300µg/mL 7. Timolol 250µg/mL

Acclaim Mixed-Mode WCX-1

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	50	-	071910	-
		150	070093	070092	-
5	Guard Cartridge	10	085455	071911	069705
	HPLC Column	150	068371	-	068353
		250	-	-	068352

Acclaim Guard Holder

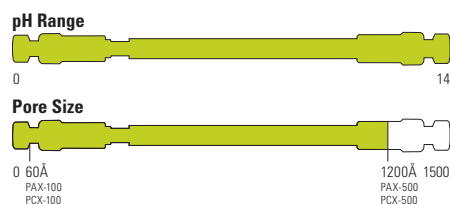
Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and Coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

OmniPac

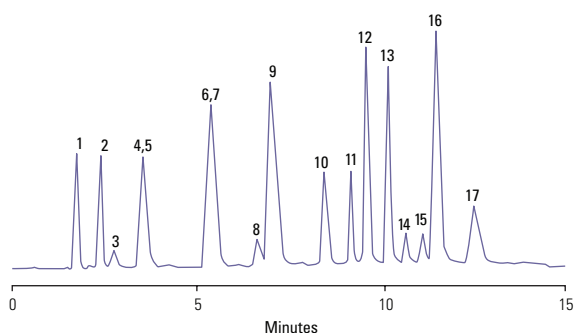
DVB polymer columns for combined ion exchange and reversed-phase separations

- Acid, base and solvent compatible, pH 0 to 14
- Ideal for the separation of high molecular weight organic acids
- Delivers optimal separation of very hydrophobic anions
- Delivers optimal separation of halogenated anions
- Provides simultaneous separation of neutral and ionic species
- Unique selectivity for polar and ionic organic analytes
- Delivers optimal separation of organic, hydrophobic, and halogenated cations

Thermo Scientific™ OmniPac™ is a range of latex-based columns. Both PAX columns have an ion exchange capacity of about 40µeq per column, and the PCX columns have a capacity of approximately 120µeq per column. The PAX-500 and PCX-500 columns separate analytes through both ion exchange and reversed-phase mechanisms, due to their higher reversed-phase capacity relative to the PAX-100 and PCX-100 columns.



Gradient separation of nitrogen-containing compounds



OmniPac PCX-500, 250 x 4.0mm

Mobile Phase: Acetonitrile/Sodium Chloride/
Hydrochloric Acid Gradient

Flow Rate: 1.0mL/min

Detection: UV, 254nm

Analytes:

1. Orotic Acid
2. 4-Hydroxybenzamide
3. Luminol Impurity
4. Luminol
5. Pyridine
6. PABA
7. 2,2'-Bipyridine
8. p-Phenylenediamine
9. Naphthylamine
10. Nitrobenzoic Acid
11. Tribenzylamine
12. p-Nitroaniline
13. 2,4-Dinitroaniline
14. Dibenzylamine
15. N-Methyl-N-nitrosoaniline
16. 4-Chloro-2-nitroaniline
17. 2,6-Dichloro-4-nitroaniline

OmniPac Anion Exchange

Description	Porosity	Length (mm)	4.0mm ID
PAX-100	Microporous	50	042151
		250	042150
PAX-500	Microporous	50	042153
		250	042152

OmniPac Cation Exchange

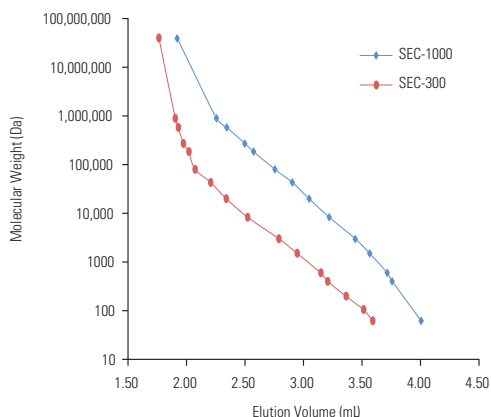
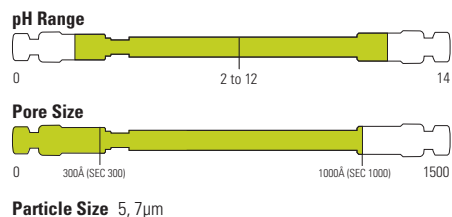
Description	Porosity	Length (mm)	4.0mm ID
PCX-100	Microporous	50	042193
		250	042189
PCX-500	Microporous	50	042195
		250	042191

Acclaim Size Exclusion Chromatography (SEC)

High performance SEC columns for analysis of water soluble polymers

- Proprietary mono-dispersed multi-pore hydrophilic resin: no inflection points in calibration curve
- SEC-300 calibrated from 100 to 50,000 Daltons
- SEC-1000 calibrated from 1,000 to 1,000,000 Daltons
- Availability of small particle sizes packed in 300 x 4.6mm dimension allows for high-resolution analysis at reduced solvent consumption
- Stable surface bonding with low column bleed and compatibility with UV, RI, MS, ELSD and Thermo Scientific™ Dionex™ Corona™ Charged Aerosol Detectors

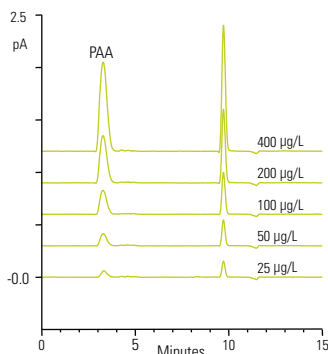
Thermo Scientific™ Acclaim™ SEC-300 and SEC-1000 are a family of resin based, high performance size exclusion chromatography columns specifically designed for the separation of water soluble polymers and oligomers.



Acclaim SEC-300, 5µm, 300 x 4.6mm Acclaim SEC-1000, 7µm, 300 x 4.6mm

Mobile Phase:	10mM sodium perchlorate
Temperature:	25°C
Flow Rate:	0.35mL/min
Injection Volume:	50µL
Detection:	RI
Analytes:	(0.03% - 0.1% in mobile phase) dextran (MW 5,000,000-40,000,000), PEO (MW 895,000, 580,000, 272,000, 185,000, 80,000, 43,000, and 20,000), PEG (MW 8,300, 3,000, 1,500, 600, 400 and 200), diethylene glycol (MW 106 and ethylene glycol (MW 62)

Polyacrylic acid using size-exclusion chromatography with charged-aerosol detection



Acclaim SEC-300, 5µm, 300 x 4.6mm

Mobile Phase A:	Acetonitrile
Mobile Phase B:	Water
Temperature:	30°C
Flow Rate:	0.35mL/min
Injection Volume:	35µL
Detection:	Corona III; evaporator 55°C, Engine 40 °C, 2 Hz, filter 5, power function 1.20
Analytes:	1. PAA standards in water

Acclaim Size Exclusion Chromatography (SEC)

Description	Particle Size (µm)	Format	Length (mm)	4.6mm ID	7.8mm ID
Acclaim SEC-300	5	Guard	33	082740	—
		HPLC Column	150	—	079726
			300	079723	079725
Acclaim SEC-1000	7	Guard	33	082739	—
		HPLC Column	150	—	079722
			300	079724	079721



Application Specific HPLC and UHPLC Columns

Innovative chemistries tailored for challenging and critically important applications

Application specific columns utilize novel and unique chemistries to provide superior resolution with ease of use for key pharmaceutical and environmental applications.

- **Acclaim AmG C18**
Aminoglycoside antibiotics separation
- **Acclaim Trinity P1 and P2**
API & counterion analysis
- **Acclaim Organic Acid**
Fast organic acid analysis
- **Acclaim Surfactant and Surfactant Plus**
Separation of surfactants
- **Acclaim Explosives**
Separation of explosive residues
- **Acclaim Trinity Q1**
Diquat and paraquat analysis
- **Acclaim Carbamate**
The separation of carbamate pesticides
- **Acclaim Carbonyl C18**
Separation of DNPH derivatives of aldehydes and ketones



The Application Specific column web page contains the latest news, applications and downloads for the Application Specific HPLC column range. Visit www.thermoscientific.com/columns

Acclaim AmG C18

Designed to provide rugged and reproducible reversed-phase chromatography of aminoglycoside antibiotics.

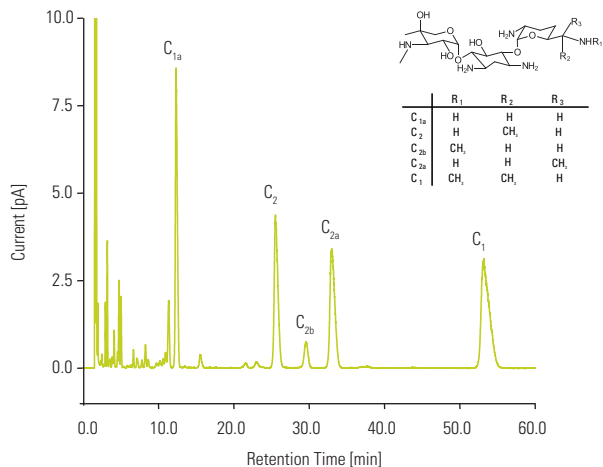
- Rugged and reproducible
- Excellent selectivity for the HPLC of aminoglycosides
- Superior resistance to acidic conditions for long column lifetime
- Easy to use with only aqueous mobile phase; TFA only, or TFA/HFBA or PFPA is needed
- Compatible with simple rugged methods; no solvents are required
- High efficiency and throughput



Aminoglycoside antibiotics are commonly used as clinical and veterinary medicines to treat bacterial infections. HPLC using ion-pairing reversed-phase separations is an effective technique for simultaneous qualitative and quantitative determination of aminoglycosides.

The Acclaim AmG C18 column is designed to provide excellent stability, selectivity and high resolution. It has a unique surface, a polymer encapsulated silica covalently bonded with a C18 ligand. This ensures ultra-stability when exposure to low pH (<1) and high temperature separation conditions.

Isocratic separation of gentamicin sulfate using 100 mM TFA as the mobile phase



Acclaim AmG C18, 3µm, 150 x 3.0mm

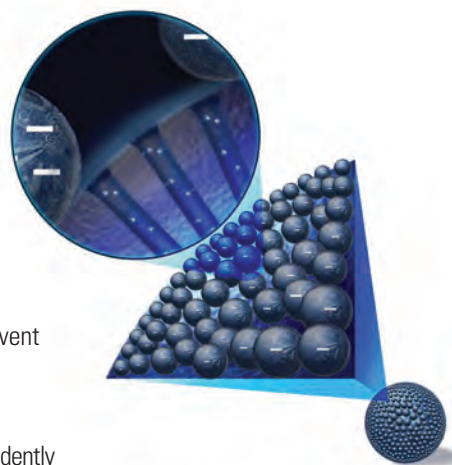
Mobile Phase:	100 mM TFA
Temperature:	30°C
Flow Rate:	0.425 mL/min
Injection Volume:	2µL
Detection:	Corona Veo RS (Filter = 5.0 s; Evaporation Temp = 35°C; Data Rate = 5 Hz; Power Function = 1.00)
Sample:	Gentamicin (1 mg/mL)

Acclaim AmG C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	Guard Cartridges (2/pk)	10	088754	088756	088758
	HPLC Column	150	088753	088755	088757
Guard Cartridge Holder			069580	069580	069580

Acclaim Trinity P1

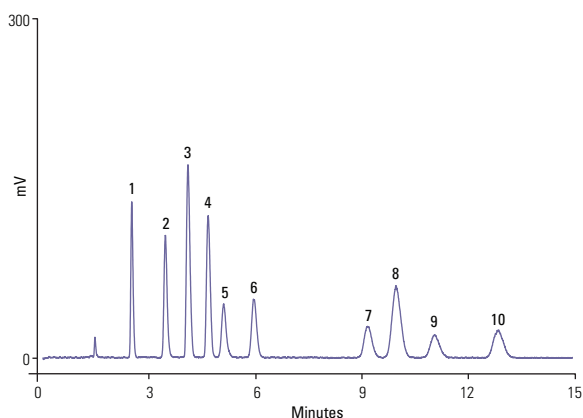
Mixed mode column technology combining reversed-phase, anion exchange and cation exchange functionality on a single support



- Ideal selectivity for simultaneous separation of API and counterion
- Adjustable selectivity by mobile phase ionic strength, electrolyte type, pH, and organic solvent
- Low bleed; compatible with MS, CAD and ELSD
- Retention of hydrophilic ionic and ionizable analytes without ion-pairing reagents
- Greater flexibility in method development: each retention mechanisms can be controlled independently

The Thermo Scientific™ Acclaim™ Trinity™ P1 HPLC column is designed with Nanopolymer Silica Hybrid (NSH) technology, which results in a multimode surface chemistry ideal for the simultaneous separation of drugs and their counterions. The surface chemistry concurrently provides reversed-phase, cation exchange, and anion exchange functionalities. The result is maximum flexibility in method development. Separations can be optimized easily by adjusting the chromatographic parameters (mobile phase pH, ionic strength, and organic strength).

Simultaneous separation of pharmaceutical counterions



Acclaim Trinity P1, 3µm, 100 x 3.0mm

Mobile Phase:	60/40 v/v CH ₃ CN/20mM (total) NH ₄ OAc, pH 5
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	2µL
Detection:	Corona ultra (Gain = 100 pA; Filter = med; Neb Temp = 30°C)
Analytes: (50 to 100ppm)	1. Choline 2. Tromethamine 3. Sodium 4. Potassium 5. Meglumine 6. Mesylate 7. Nitrate 8. Chloride 9. Bromide 10. Iodide

Acclaim Trinity P1

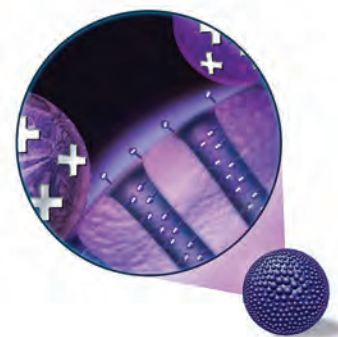
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
3	Guard Cartridges (2/pk)	10	071391	071390
		HPLC Column	075565	071388
		100	071389	071387
		150	075564	075563

Acclaim Guard Holder

Format	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Trinity P2

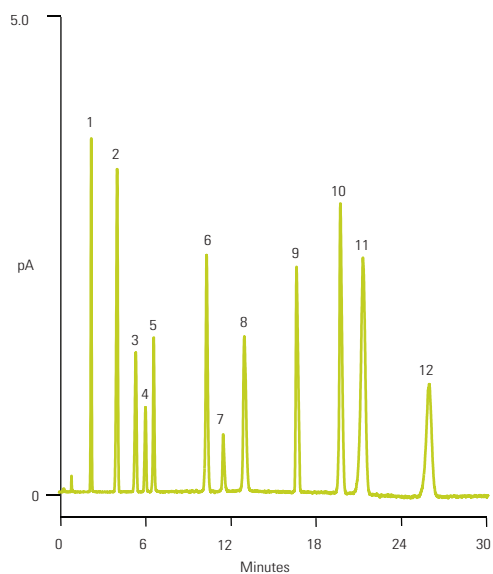
Mixed-mode column technology; hydrophilic interaction combining HILIC, anion exchange and cation exchange functionalities



- Ideal for separating pharmaceutical counterions, including monovalent and divalent cations or anions
- Selectivity complementary to the Trinity P1 column
- Low column bleed, compatible with CAD and MS
- Hydrolytically stable
- High efficiency

The Acclaim Trinity P2 is a unique, high-efficiency, silica-based column specifically designed for separation of pharmaceutical counterions, including monovalent and divalent cations or anions. This column is based on Nanopolymer Silica Hybrid (NSH) technology, which consists of high-purity porous spherical silica particles coated with charged nanopolymer particles. The inner-pore area of the silica bead is modified with a covalently bonded organic layer that provides cation-exchange retention, while the outer surface is modified with anion-exchange nano-polymer beads. Acclaim Trinity P2 column is aimed to complement Acclaim Trinity P1 to provide a total solution for pharmaceutical counter ion analysis by HPLC.

Pharmaceutical-related anions and cations



Acclaim Trinity P2, 3µm, 100 x 3.0mm

Mobile Phase:	D.I. water and 100 mM NH ₄ OFm, pH 3.65 gradient
Temperature:	30°C
Flow Rate:	0.60 mL/min
Injection Volume:	2µL
Detection:	Corona Veo Charged Aerosol Detector
Analytes:	1. Phosphate 2. Sodium 3. Potassium 4. Chloride 5. Malate 6. Bromide 7. Nitrate 8. Citrate 9. Fumarate 10. Sulfate 11. Magnesium 12. Calcium
Samples:	0.02 – 0.10 mg/mL each in D.I. water

Time (min)	H ₂ O	0.1 M Ammonium formate, pH3.65
-10	0.760	1.474
0	80	20
2	80	20
22	0	100
30	0	100

Acclaim Trinity P2

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
3	Guard Cartridges (2/pk)	10	085435	085436
	HPLC Column	50	085431	085433
		100	085432	085434

Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Organic Acid

Optimized and application-tested for the analysis of hydrophilic organic acids

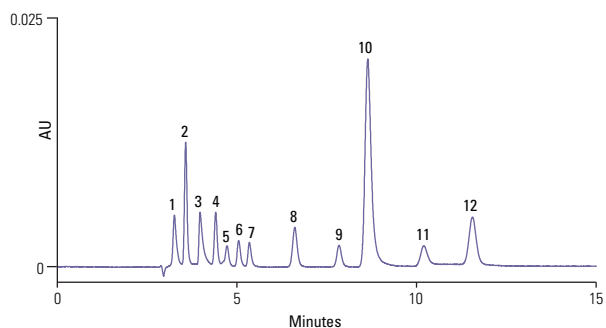
- Tested to guarantee consistent hydrophilic organic acid separations
- Compatible with 100% aqueous mobile phases
- Hydrolytic stability at low-pH conditions
- Ideal selectivity for separating a wide spectrum of organic acids
- Excellent column efficiency and peak shapes for organic acids



The Acclaim Organic Acid (OA) is a silica-based reversed-phase column designed for high-efficiency, high-throughput organic acids analysis. It offers unparalleled performance for separating hydroxyl aliphatic and aromatic organic acids.

The Acclaim OA is the recommended column for determining small hydrophilic organic acids, C1 to C7 aliphatic acids, and hydrophilic aromatic acid and is also valuable for the analysis and quality assurance of food and beverage products, pharmaceutical preparations, plating baths, and manufacturing chemicals, chemical intermediates, and environmental samples.

Hydrophilic organic acids



Acclaim Organic Acid, 5µm, 4 × 250mm

Mobile Phase:	100mM Na ₂ SO ₄ , pH 2.65 (adjusted with methanesulfonic acid)
Temperature:	30°C
Flow Rate:	0.6mL/min
Injection Volume:	5µL
Detection:	UV, 210nm
Analytes:	1. Oxalic acid 15mg/L (ppm) 2. Tartaric acid 120 3. Formic acid 180 4. Malic acid 120 5. iso-Citric acid 120 6. Lactic acid 180 7. Acetic acid 120 8. Citric acid 120 9. Succinic acid 120 10. Fumaric acid 7 11. cis-Aconitic acid * 12. trans-Aconitic acid *

* 7ppm total for cis and trans isomers

Acclaim Organic Acid

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID
3	HPLC Column	150	070087	070086	—
5	Guard Cartridges (2/pkg)	10	—	071987	069700
	HPLC Column	150	—	—	062903
		250	—	—	062902

Acclaim Guard Holder

Format	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Surfactant

Excellent performance for separating a broad range of surfactants

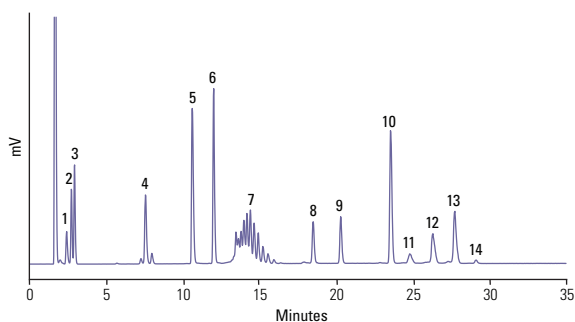
- Ideal selectivity for separation of anionic, nonionic, cationic and amphoteric surfactants
- Excellent peak shapes, especially for cationic surfactants
- Compatible with highly aqueous mobile phases
- Improved resolution for ethoxylated surfactants
- Rugged separations under a variety of conditions



The Acclaim Surfactant columns are the first generation high-efficiency, silica-based columns designed specifically for separating a wide variety of surfactants, including anionic, cationic, nonionic, ethoxylated and amphoteric surfactants using UV, ELSD or RI detection.

Surfactants are widely used in industrial, agricultural, and pharmaceutical markets, in products as diverse as pesticides, detergent powders, petroleum products, cosmetics, and pharmaceuticals. The Acclaim Surfactant column was designed specifically for HPLC separation of these surfactants.

Inorganic anion, hydrotropes, cationic, nonionic, amphoteric, and anionic surfactants



Acclaim Surfactant, 5µm, 150 x 4.6mm

Mobile Phase A:	CH ₃ CN
Mobile Phase B:	0.1 M NH ₄ OAc, pH 5.4
Gradient:	25% to 85% A in 25min, then hold 85% A for 10min
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	25µL
Detection:	ELS detector
Analytes:	1. Chloride 2. Bromide 3. Nitrate 4. Xylene sulfonate 5. Laurylpyridinium chloride 6. Lauryldimethylbenzyl-ammonium chloride 7. Triton X-100 8. Cetyl betaine 9. Decyl sulfate 10. Dodecyl sulfate 11. C ₁₀ -LAS 12. C ₁₁ -LAS 13. C ₁₂ -LAS 14. C ₁₃ -LAS

Acclaim Surfactant

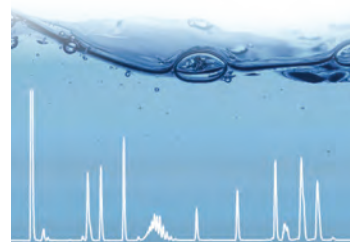
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	150	070085	070084	—
5	Guard Cartridges (2/pk)	10	069693	071991	069701
	HPLC Column	150	068123	—	063201
		250	—	—	063203

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Surfactant Plus

Column of choice for surfactant analysis using higher sensitivity detection: performance, versatility, throughput

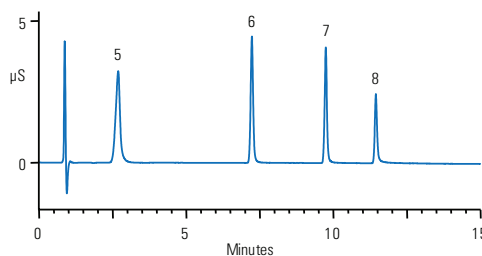
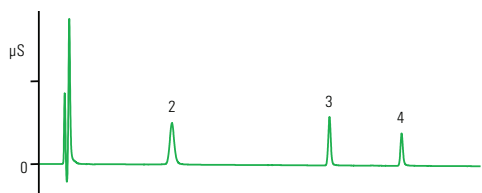


- Ideal selectivity for simultaneous separation of anionic, nonionic, cationic, and amphoteric surfactants
- Compatible with multiple detectors including MS, CAD, ELSD and UV
- Well suited for the determination of cationic surfactants
- High efficiency and fast analysis
- Rugged separations under a variety of conditions

Acclaim Surfactant Plus is a new generation of columns offering improved performance and higher throughput for analyzing surfactants. These columns exhibit exceptionally low bleed and are ideal for use with charged aerosol detectors (CAD) and mass spectrometers (MS). These columns can be used to separate a wide variety of surfactants including anionic, cationic, nonionic and amphoteric surfactants, as well as isomers of xylene sulfonate.

These columns can be used with evaporative light scattering detectors (ELSD), suppressed conductivity detectors (SCD), and UV-Vis detectors (UV). Non-metallic PEEK hardware is available for best compatibility with Dionex ion chromatography systems.

Cationic surfactants



Acclaim Surfactant Plus, 3μm, 150 x 3.0mm

Mobile Phase A: Acetonitrile
 Mobile Phase B: 100mM Formic acid
 Mobile Phase C: Water
 Gradient:

Time (min)	%A	%B	%C
-12	5	5	90
0	5	5	90
12	40	5	55
20	40	5	55

Temperature: 25°C
 Flow Rate: 0.5mL/min
 Injection Volume: 5μL
 Detection: Conductivity with blank subtraction

- Analytes:
1. Tetrabutylammonium
 2. Tetrapentylammonium
 3. Tetrahexylammonium
 4. Tetraheptylammonium
 5. Decyl-trimethylammonium
 6. Dodecyl-trimethylammonium
 7. Tetradecyl-trimethylammonium
 8. Hexadecyl-trimethylammonium

Acclaim Surfactant Plus

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID	4.0mm ID PEEK
3	HPLC Column	100	078955	078952	—	—
		150	078954	078951	078950	—
		250	078953	—	—	—
5	Guard Cartridges (2/pk)	10	078960	078959	082773	—
		HPLC Column	250	—	—	082767
	HPLC Column	250	—	—	082768	—
		150	—	—	082768	078956

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Explosives E2

The best solution for explosives analysis (EPA Method 8330)

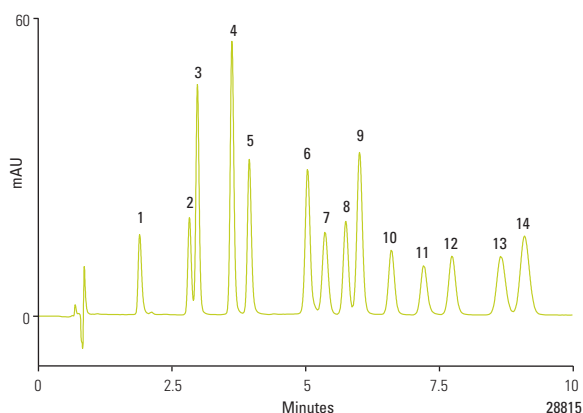
- Acclaim E2 columns provide baseline resolution of all 14 compounds targeted by EPA Method 8330
- Columns available in 2.2, 3 and 5µm particle size
- Simple isocratic elution conditions
- Rugged columns with good lot-to-lot reproducibility



Acclaim Explosives E2 columns are specifically designed to resolve all 14 explosives listed in EPA SW-846 Method 8330: Nitroaromatics and Nitramines by HPLC. The novel and unique chemistries of these columns provide superior resolution with complementary selectivities.

The Acclaim Explosives E2 may be used as either a primary or a confirmatory column. The unique selectivity and versatility of this column provides a wider application range, including the analysis of explosives beyond U.S. EPA Method 8330 (ISO22478).

Rapid determination of EPA 8330A explosives



Acclaim RSLC Explosives E2, 2.2µm, 100 x 2.1mm

Mobile Phase:	Methanol:water 48:52 (v/v)	
Temperature:	31°C	
Flow Rate:	0.34mL/min (293 bar)	
Injection Volume:	1µL	
Detection:	UV, 254nm	
Analytes:	1. HMX	8. 2,6-DNT
	2. RDX	9. 2,4-DNT
	3. 1,3,5-TNB	10. 2-NT
	4. 3,5-DNB	11. 4-NT
	5. NB	12. 3-NT
	6. 2,4,6-TNT	13. 4-Am-2,6-DNT
	7. Tetryl	14. 2-Am-4,6-DNT
Sample:	Calibration mix, 25µg/mL in 50% acetonitrile	

Acclaim Explosives E2

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	076225	076227	–
		150	076226	–	–
3	HPLC Column	150	070083	070082	–
		250	–	070081	–
5	Guard Cartridges (2/pk)	10	–	071989	069703
	HPLC Column	250	–	–	064309

See page 4-054 for Acclaim Guard Holder Ordering Guide

Acclaim Trinity Q1

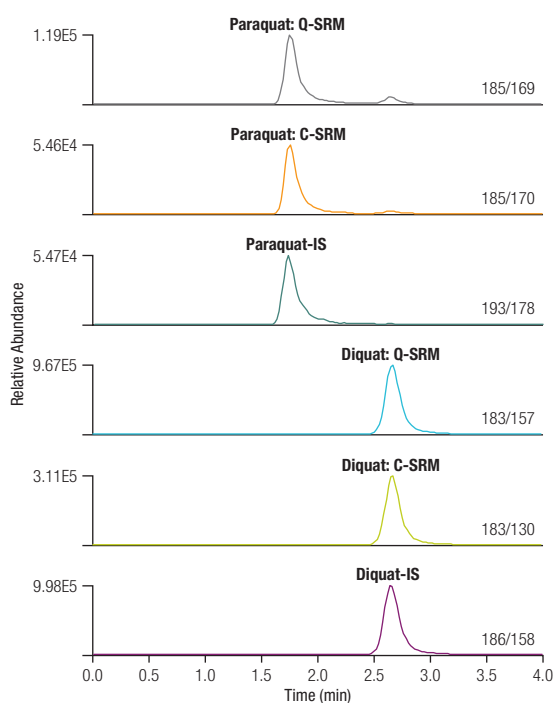
For trace analysis of diquat and paraquat

- Excellent resolution of diquat and paraquat
- Good peak shape
- Fast analysis
- LC-MS compatible
- No ion-pairing reagent needed



Acclaim Trinity Q1 columns are unique, high-efficiency, silica-based columns designed for the separation of the herbicides diquat and paraquat. These herbicides are toxic and residues are monitored in drinking water, wastewater and agricultural products. The Acclaim Trinity Q1 column is a tri-mode (WCX, WAX, RP), column based on Nano-polymer Silica Hybrid technology. It offers unmatched high-resolution and high-throughput trace analysis of the herbicides diquat and paraquat by LC-MS/MS and LC-UV methods.

Diquat and paraquat



Acclaim Trinity Q1, 3µm, 50 x 3.0mm

Mobile Phase:	25% ammonium acetate (100mM, pH 5.0); 75% acetonitrile
Temperature:	Ambient
Flow Rate:	0.5mL/min
Injection Volume:	5µL
Detection:	Show Mass Spectrometric conditions and the scan events etc. table underneath are the peaks section
Mass Spectrometric Conditions	
System:	Thermo Scientific TSQ Quantiva Access MAX Quadrupole Mass Spectrometer
Interface:	Heated Electrospray Ionization with HESI II probe
Spray Voltage:	1500 V
Vaporizer Temp:	400 °C
Sheath Gas Pressure:	70
Aux Gas Pressure:	10
Capillary Temp:	350 °C
Quantitation Mode:	Selected Reaction Monitoring (SRM)

Scan Events	Precursor	Quantitative SRM (CID)	Confirmative SRM (CID)
Paraquat	185	169 (27)	170 (17)
Paraquat-d ₆	193	178 (17)	
Diquat	183	157 (22)	130 (31)
Diquat-d ₃	186	158 (22)	

Acclaim Trinity Q1

Particle Size		Length (mm)	2.1mm ID	3.0mm ID
3	HPLC Column	50	083242	083241
		100	079717	079715
5	Guard Cartridges (2/pk)	10	083244	079719

Acclaim Carbamate

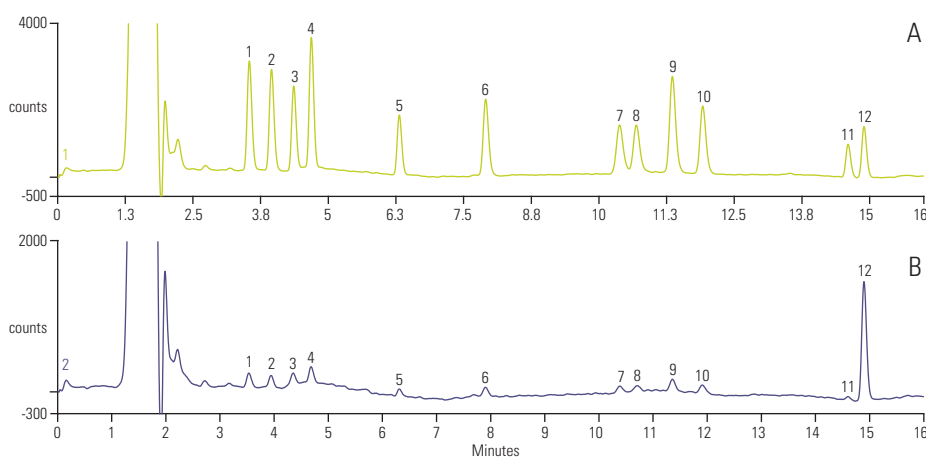
Designed for baseline separation of carbamate pesticides specified in US EPA Method 531.2

- Baseline separation of carbamate pesticides specified in US EPA Method 531.2
- Use with either LC/postcolumn derivatization/fluorescence or LC-MS detection
- Available in 2.2, 3 and 5µm particle size
- Compatible with both binary (methanol/water) and ternary (acetonitrile/methanol/water) mobile phase gradients
- High-efficiency, extremely low column bleed, and rugged column packing



Acclaim Carbamate columns are designed for baseline separation of carbamates (*N*-methylcarbamate and *N*-methylcarbamoyloxime pesticides) specified in US EPA Method 531.2. Carbamate pesticides are widely used throughout the world. Drinking water and raw surface water is monitored for the presence of carbamate pesticides and related compounds using an established EPA Method 531.2 that uses HPLC with postcolumn derivatization. LC-MS is the method of choice for the ultimate sensitivity.

Carbamate standard - spiked rice samples



A: without dispersive SPE
B: with dispersive SPE using PSA

Acclaim Carbamate, 3µm, 150 x 3.0mm

Mobile Phase:	Methanol-H ₂ O
Gradient:	Methanol, -4.0-0.0 min, 14%; 2.0 min, 20%; 8.0 min, 40%; 13.6-16 min, 70%
Temperature:	50 °C
Flow Rate:	0.9mL/min
Injection Volume:	250µL
Detection:	Excitation/330nm and Emission/465nm
Analytes:	1. Aldicarb sulfoxide 2. Aldicarb sulfone 3. Oxamyl 4. Methomyl 5. 3-Hydroxy carbofuran 6. Aldicarb 7. Propoxur 8. Carbofuran 9. Carbaryl 10. 1-Naphthol 11. Methiocarb 12. BDMC (I.S.)

Acclaim Carbamate

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	075597	—	—
		150	075596	—	—
3	Guard Cartridges (2/pk)	10	072930	072929	072928
	HPLC Column	150	072927	072926	072925
5	HPLC Column	250	—	—	072924

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	069580
Acclaim Guard Kit (Holder and coupler) V-2	069707
Guard to Analytical Column Coupler V-2	074188

Acclaim Carbonyl C18

A silica-based, reversed-phase column designed specifically for separating DNPH derivatives of aldehydes and ketones

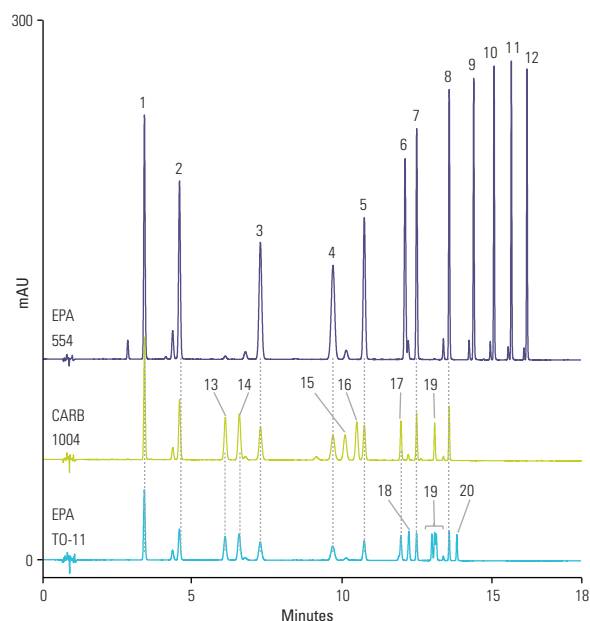
- Ideal selectivity for baseline resolution of DNPH derivatives of aldehydes and ketones regulated by various official methods, including EPA 554, EPA 8315, EPA 1667, EPA TO-11, and CARB 1004
- High efficiency for UHPLC performance
- Rugged columns with good lot-to-lot reproducibility
- Proven robust methods



Acclaim Carbonyl C18 columns are silica-based reversed phase columns designed specifically for separating DNPH derivatives of aldehydes and ketones. They exhibit superior resolution compared with other commercially available columns.

Aldehydes and ketones are common pollutants in air and water. Several standard methods have been developed to apply using dinitrophenylhydrazine (DNPH) to various environmental situations to measure these compounds. Some of the better known ones include CARB 1004 for vehicle exhaust, EPA 554 for drinking water, EPA 1667 for pharmaceutical wastewater, and EPA 8315 for general wastewater.

DNPH aldehydes and ketones



Acclaim Carbonyl RSLC, 2.2µm, 150 x 2.1mm

Mobile Phase A:	D.I. water
Mobile Phase B:	Acetonitrile
Gradient (min):	-4.5 0.0 8.3 15.0 18.0
	%A 48 48 48 0 0
	%B 52 52 52 100 100
Flow Rate:	0.400mL/min
Injection Volume:	1µL
Temperature:	28°C
Detection:	UV, 360nm
Samples:	Calibration mixes diluted in methanol
Analytes:	1. Formaldehyde DNPH 2. Acetaldehyde DNPH 3. Propionaldehyde DNPH 4. Crotonaldehyde DNPH 5. Butyraldehyde DNPH 6. Cyclohexanone DNPH 7. Valeraldehyde DNPH 8. Hexanal DNPH 9. Heptanal DNPH 10. Octanal DNPH 11. Nonanal DNPH 12. Decanal DNPH 13. Acetone DNPH 14. Acrolein DNPH 15. Butanone DNPH 16. Methacrolein DNPH 17. Benzaldehyde DNPH 18. Isovaleraldehyde DNPH 19. Toluvaldehyde DNPH 20. Xylylaldehyde DNPH

Acclaim Carbonyl C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	077972	077974	—
		150	077973	—	—
3	HPLC Column	150	079011	079010	—
		250	—	079009	—
5	Guard Cartridge (2/pk)	10	079012	079013	079014
	HPLC Column	150	—	—	079008
		250	—	—	083214



Hypercarb HPLC Columns

100% porous graphitic carbon for extended separation capabilities

Used for the retention and separation of highly polar species. Thermo Scientific™ Hypercarb™ columns are ideally suited to solve in both reversed phase and normal phase HPLC and LC-MS applications.

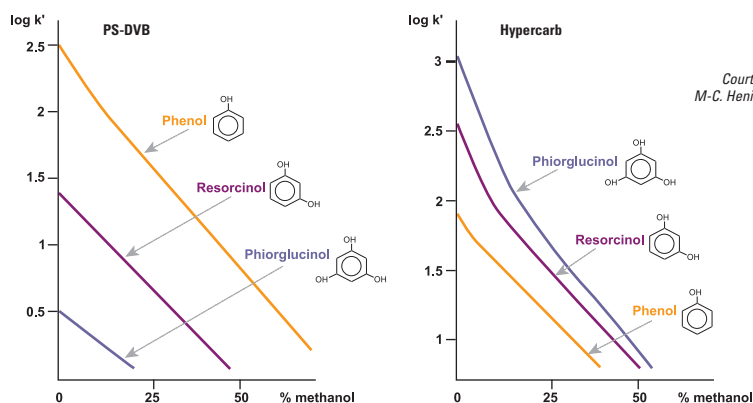
- **Exceptional Retention of Very Polar Analytes**
Ideal for complex separations
- **Separates Structurally Related Substances**
More effective than silica-based columns
- **pH Stable from 0 to 14**
Extended temperature and pressure capabilities



The Hypercarb web page contains the latest news, applications and downloads for the Hypercarb HPLC column range. Visit www.thermoscientific.com/hypercarb

Increased Retention of Polar Analytes

In typical reversed phase chromatography, the retention of an analyte is directly related to its hydrophobicity: the more hydrophobic the analyte, the longer its retention. Conversely, as the polarity of the analyte increases, analyte-solvent interactions begin to dominate and retention is reduced. This observation holds true for the majority of reversed phase systems. An exception to this rule is Hypercarb columns, for which retention may in some cases increase as the polarity of the analyte increases, illustrated to the right. This phenomenon is referred to as the "polar retention effect on graphite" (PREG). This property makes Hypercarb columns particularly useful for the separation of highly polar compounds (with logP as low as -4) that are normally difficult to retain and resolve on silica-based alkyl chain phases. The retention of very polar solutes on Hypercarb columns can be achieved without ion pair reagents or complex mobile phase conditions, as illustrated in the chromatogram below.



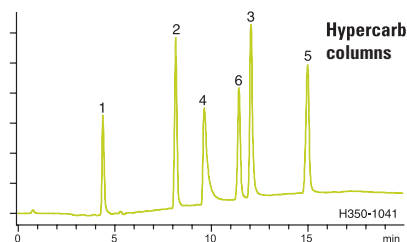
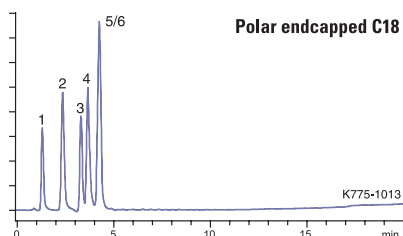
Courtesy V. Coquart and M.-C. Henion, J. Chrom., 1992

Retention on Hypercarb columns increases as polarity of the analyte increases, which is the opposite of typical reversed phase materials such as PS-DVB

Extended pH Range

One of the other key benefits of Hypercarb columns is the extreme stability of the phase to chemical or physical attack. Due to the unique characteristics of the media, it can withstand chemical attack across the entire pH range of 0 to 14, allowing applications to be run at pH levels that are incompatible

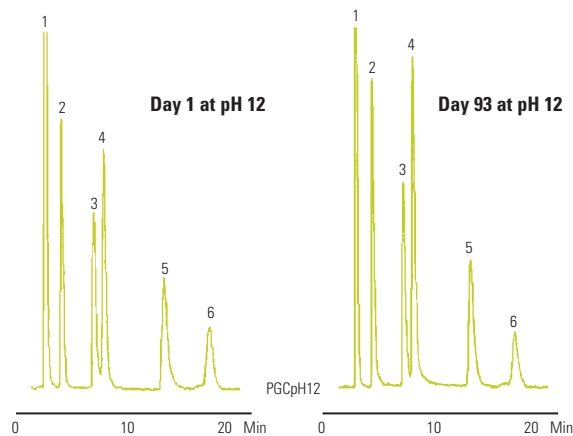
with typical silica-based columns. Hypercarb columns offer more choice in buffer selection while handling both high temperature and high pressure.



Additional retention is achieved for polar compounds using a Hypercarb column compared to a polar endcapped C18. Note also the change in elution order.

Hypercarb, 5µm, 100 x 0.32mm

Mobile Phase A:	H ₂ O + 0.1% formic acid
Mobile Phase B:	ACN + 0.1% formic acid
Gradient:	0 to 25% B in 15 minutes
Temperature:	25°C
Flow Rate:	8µL/min
Detection:	UV, 254nm
Analytes:	1. Cytosine 2. Uracil 3. Guanine 4. Adenine 5. Xanthine 6. Thymine



Hypercarb, 5µm, 100 x 4.6mm

Mobile Phase:	MeOH:H ₂ O
Gradient:	70:30
Flow Rate:	0.7mL/min
Detection:	UV, 254nm
Analytes:	1. Acetone 2. Phenol 3. p-Cresol 4. Anisol 5. Phenetole 6. 3,5-Xylenol

Hypercarb column stability at pH 12: retention and selectivity do not change even after 93 days of storage in 0.1M NaOH/MeOH

Hypercarb

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.		
3	Drop-in Guard (4/pk)	10	2.1	35003-012101		
			3.0	35003-013001		
			4.6	35003-014001		
	HPLC Column	30	50	1.0	35003-032130	
				3.0	35003-033030	
				4.6	35003-034030	
			100	2.1	35003-052130	
				3.0	35003-053030	
				4.6	35003-054630	
		150	2.1	35003-102130		
			3.0	35003-103030		
			4.6	35003-104630		
			High Temperature HPLC Column	30	2.1	35003-032146
					4.6	35003-052146
					4.6	35003-054646
	100	2.1	35003-102146			
		3.0	35003-103046			
		4.6	35003-104646			
	5	Drop-in Guard (4/pk)	10	2.1	35005-012101	
				3.0	35005-013001	
				4.6	35005-014001	
HPLC Column		30	50	2.1	35005-032130	
				3.0	35005-033030	
				4.6	35005-034630	
			100	2.1	35005-052130	
				3.0	35005-053030	
				4.6	35005-054630	
		150	2.1	35005-102130		
			3.0	35005-103030		
			4.6	35005-104630		
			High Temperature HPLC Column	30	2.1	35005-032146
					4.6	35005-034646
					4.6	35005-052146
		50	2.1	35005-052146		
			4.6	35005-054646		
			4.6	35005-102146		
		100	2.1	35005-102146		
			4.6	35005-104646		
			4.6	35005-104646		
Javelin HTS Column		20	2.1	35005-022135		
Preparative HPLC Column		100	10	35005-109070		
			21.2	35005-109270		
			30	35005-109370		
		150	10	35005-159070		
			21.2	35005-159270		

Format	Length (mm)	ID (mm)	Cat. No.
UNIGUARD Guard Cartridge Holder	10	1.0	851-00
		2.1	852-00
		3.0	852-00
		4.6	850-00



Synchronis HPLC and UHPLC Columns

Remarkable separations guaranteed time after time

Thermo Scientific™ Synchronis™ HPLC columns are used to achieve consistent, reproducible separations. Chemistries available for a variety of applications.

- **Consistent Separations**

Highly pure, high surface area silica

- **Dense Bonding and Double Endcapping**

Reduction of residual silanols available to interact with basic analytes

- **Strong Quality Control**

Rigorously tested to ensure quality



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

Visit www.thermoscientific.com/synchronis

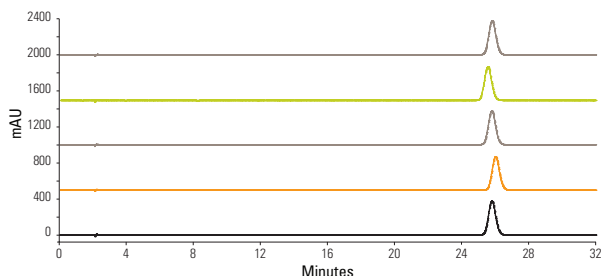
Synchronis C18

Synchronis C18 columns deliver remarkable separations, time after time

- Highly pure, high surface area silica
- High carbon load for increased retention
- Double endcapped for extra surface coverage
- Highly inert towards basic compounds
- Rigorously tested to ensure quality

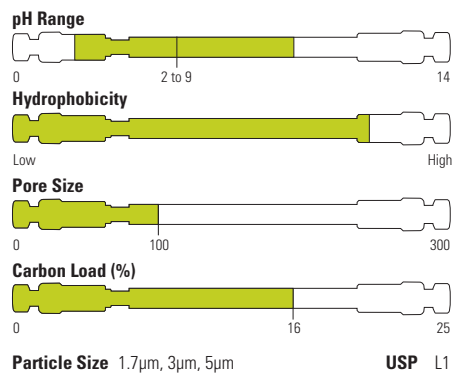
Synchronis C18 columns show excellent column to column reproducibility, as illustrated here by the analysis of zidovudine using five separate columns. The reproducibility in terms of retention time and peak area is less than or equal to 0.5%, column to column.

Zidovudine



Synchronis C18, 5µm, 150 x 4.6mm

Mobile Phase: Water:Methanol (4:1)
 Temperature: 25°C
 Flow Rate: 1.0mL/min
 Injection Volume: 10µL
 Detection: UV, 265nm
 Analytes: 1. Zidovudine



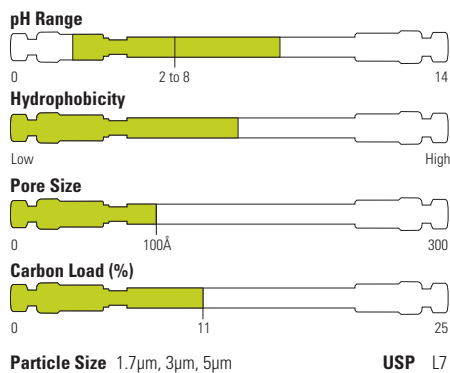
Synchronis C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	30	97102-032130	-	-
		50	97102-052130	-	-
		100	97102-102130	-	-
3	HPLC Column	30	97103-032130	-	-
		50	97103-052130	-	97103-054630
		100	97103-102130	97103-103030	97103-104630
		150	97103-152130	-	97103-154630
5	Drop-in Guard (4/pk)	10	97105-012101	97105-013001	97105-014001
	HPLC Column	30	97105-032130	-	-
		50	97105-052130	97105-053030	97105-054630
		100	97105-102130	97105-103030	97105-104630
		150	97105-152130	97105-153030	97105-154630
		250	97105-252130	97105-253030	97105-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	

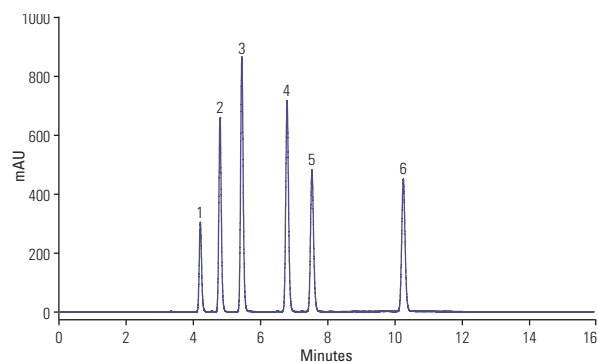
Synchronis C8

Reduces hydrophobic interactions allowing compounds to elute quicker from the column. Recommended for analytes with medium hydrophobicity or when a less hydrophobic phase is required to obtain optimum retention.

- Highly pure, high surface area silica
- Less hydrophobic than Synchronis C18
- Double endcapped for extra surface coverage
- Rigorously tested to ensure quality



Uron herbicides



Synchronis C8, 5µm, 150 x 4.6mm

Mobile Phase A:	Water
Mobile Phase B:	Acetonitrile
Gradient:	35 to 60% B in 10 minutes
Temperature:	30°C
Flow Rate:	1.0mL/min
Injection Volume:	20µL
Detection:	240nm
Analytes:	1. Tebuthiuron 2. Metoxuron 3. Monuron 4. Chlorotoluron 5. Diuron 6. Linuron

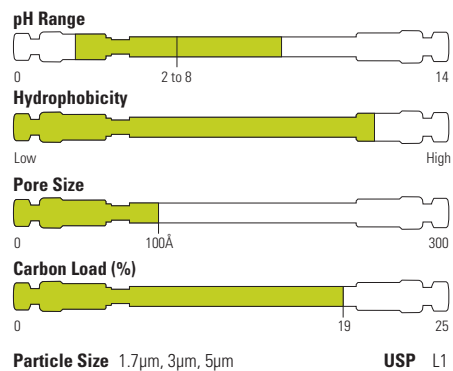
Synchronis C8

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97202-052130	-	-
		100	97202-102130	-	-
3	HPLC Column	50	97203-052130	-	-
		100	-	97203-103030	97203-104630
		150	-	-	97203-154630
5	Drop-in Guard (4/pk)	10	97205-012101	97205-013001	97205-014001
	HPLC Column	30	97205-032130	-	-
		50	97205-052130	97205-053030	97205-054630
		100	97205-102130	97205-103030	97205-104630
		150	97205-152130	97205-153030	97205-154630
		250	-	97205-253030	97205-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	

Synchronis aQ

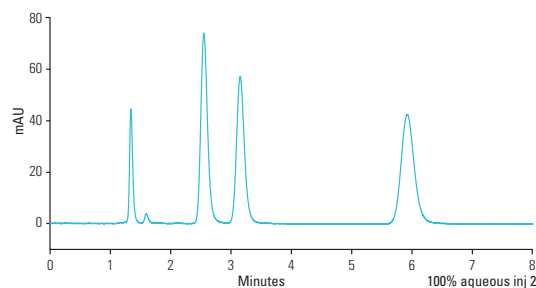
Polar endcapped Synchronis aQ columns provide a controlled interaction mechanism that retains and resolves polar analytes

- Stable in 100% aqueous mobile phase
- Enhanced retention of polar compounds
- Rigorously tested to ensure quality

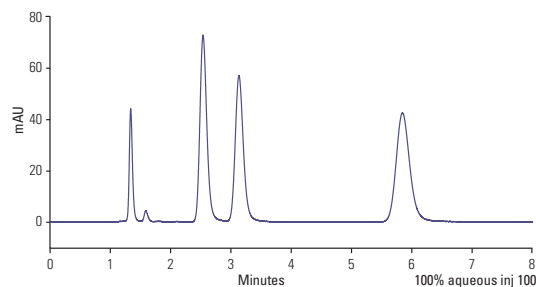


In comparison to a conventionally endcapped C18, the Synchronis aQ polar end-capped C18 stationary phase exhibits superior stability towards aqueous mobile phase. Synchronis aQ shows no degradation in performance after 100 injections in a buffered 100% aqueous eluent.

Stability of Synchronis aQ in 100% aqueous mobile phase



Synchronis aQ, 5µm, 100 x 4.6mm
 Mobile Phase: 50mM Aqueous K₂HPO₄ (pH 6)
 Temperature: 30°C
 Flow Rate: 0.7mL/min
 Injection Volume: 2µL
 Detection: 260nm
 Analytes: 1. Cytidine-5'-diphosphate
 2. Adenosine-5'-triphosphate
 3. Adenosine-5'-diphosphate
 4. Adenosine-5'-monophosphate



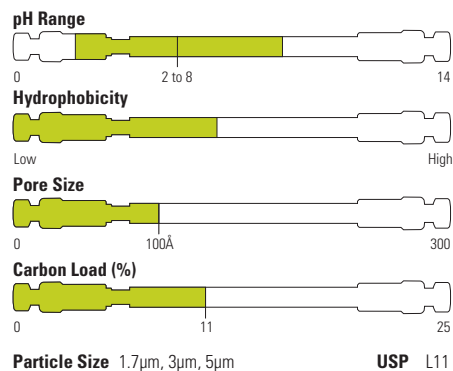
Synchronis aQ

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97302-052130	-	-	97302-054630
		100	97302-102130	97302-103030	-	-
3	HPLC Column	50	97303-052130	-	-	-
		100	-	97303-103030	-	97303-104630
		150	-	-	-	97303-154630
5	Drop-in Guard (4/pk)	10	97305-012101	97305-013001	97305-014001	97305-014001
		50	97305-052130	97305-053030	-	97305-054630
		100	97305-102130	-	-	97305-104630
		150	97305-152130	97305-153030	97305-154030	97305-154630
		250	-	97305-253030	97305-254030	97305-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00

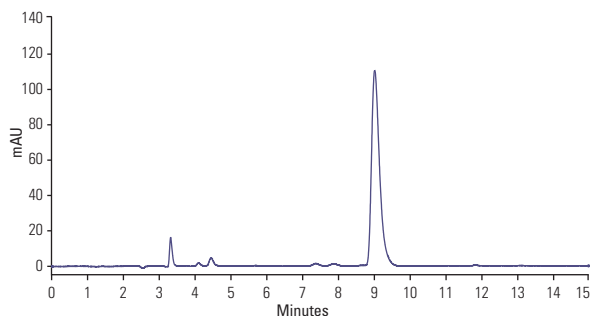
Synchronis Phenyl

Provides an alternative to Synchronis C18 and is particularly useful for retention of aromatic compounds

- Alternative selectivity to Synchronis C18
- Double endcapped for extra surface coverage
- Highly inert towards basic compounds
- Rigorously tested to ensure quality



Oxacillin sodium (USP)



Synchronis Phenyl, 5µm, 300 x 4.0mm

Mobile Phase:	Phosphate Buffer: MeCN:MeOH (70:30:10)
Temperature:	25°C
Flow Rate:	1.0mL/min (2mL/min in USP method)
Injection Volume:	10µL
Detection:	UV, 225nm
Analytes:	1. Oxacillin Sodium (0.11mg/mL)

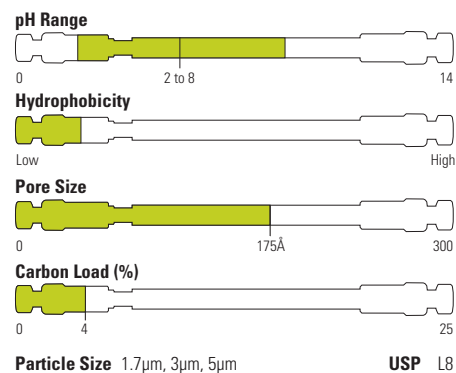
Synchronis Phenyl

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97902-052130	-	-
		100	97902-102130	-	-
3	HPLC Column	50	97903-052130	-	-
		100	-	-	97903-104630
		150	-	-	97903-154630
5	Drop-in Guard (4/pk)	10	97905-012101	97905-013001	97905-014001
	HPLC Column	50	-	97905-053030	97905-054630
		100	-	97905-103030	97905-104630
		150	97905-152130	-	97905-154630
		250	-	-	97905-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00

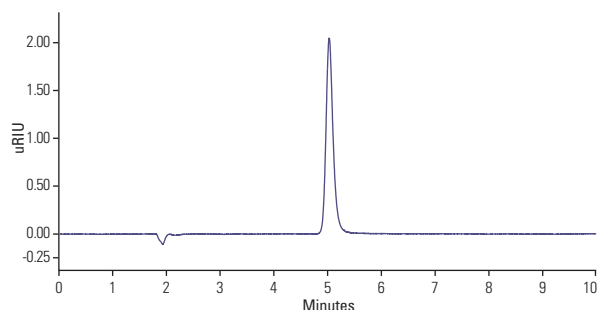
Synchronis Amino

Provides a versatile aminopropyl phase that gives excellent chromatographic properties in four modes: weak anion exchange, reversed-phase, normal phase and HILIC

- Highly pure, high surface area silica
- Double endcapped for extra surface coverage
- Rigorously tested to ensure quality



Lactulose



Synchronis Amino 5µm, 150 x 4.6mm

Mobile Phase:	Water: MeCN (30:70)
Temperature:	35°C
Flow Rate:	1.0mL/min
Detection:	RI
Injection Volume:	5µL
Analytes:	1. Lactulose

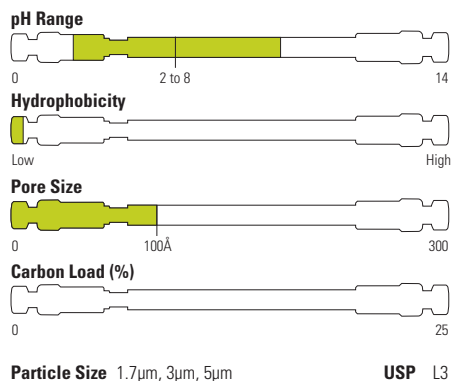
Synchronis Amino

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97702-052130	-	-	-
		100	97702-102130	-	-	-
3	HPLC Column	50	97703-052130	-	-	-
5	Drop-in Guard (4/pk)	10	97705-012101	97705-013001	97705-014001	97705-014001
	HPLC Column	30	97705-032130	-	-	-
		50	97705-052130	-	-	97705-054630
		150	97705-152130	97705-153030	97705-154030	97705-154630
		250	-	97705-253030	97705-254030	97705-254630
UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00	

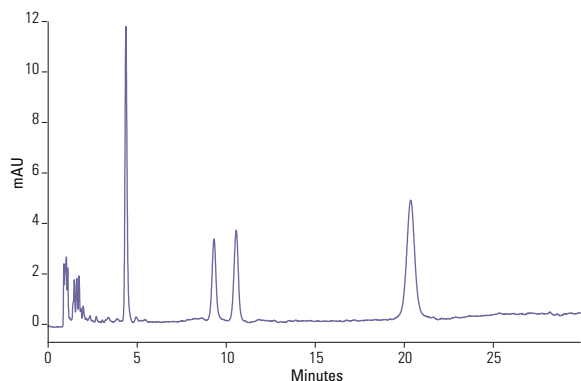
Synchronis Silica

Serves as a powerful and efficient tool for the chromatography of moderately polar organic compounds by normal phase chromatography

- Highly pure, high surface area silica
- Excellent reproducibility for normal phase chromatography
- Rigorously tested to ensure quality



Tocopherols



Synchronis Silica 5 μm, 150 x 4.6mm

Mobile Phase: Hexane +0.2% propan-2-ol (IPA)
 Temperature: 40°C
 Flow Rate: 2.0mL/min
 Injection Volume: 10 μL
 Detection: UV, 254nm
 Analytes: α-tocopherol
 β-tocopherol
 γ-tocopherol
 δ-tocopherol

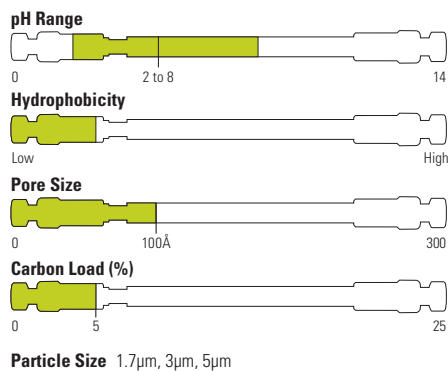
Synchronis Silica

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97002-052130	-	-	-
		100	97002-102130	-	-	-
3	HPLC Column	50	97003-052130	-	-	-
5	Drop-in Guard (4/pk)	10	97005-012101	97005-013001	97005-014001	97005-014001
	HPLC Column	50	97005-052130	-	-	-
		100	97005-102130	-	-	-
		150	97005-152130	97005-153030	97005-154030	97005-154630
		250	-	97005-253030	97005-254030	97005-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00	850-00

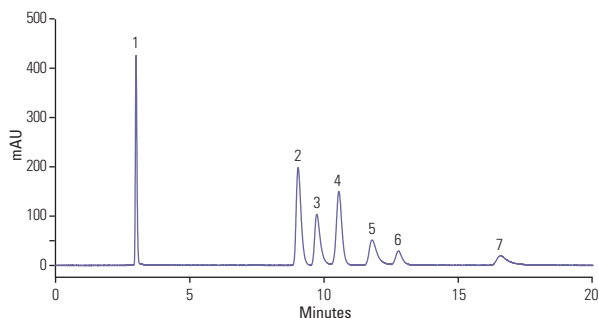
Synchronis HILIC

Provides enhanced retention of polar and hydrophilic analytes

- Alternative selectivity to Synchronis C18
- Improved sensitivity with MS detection
- No need for ion-pair or derivatization
- Outstanding peak shape and sensitivity
- Highly pure, high surface area silica particles
- Neutral (uncharged), highly polar surface



Catecholamines

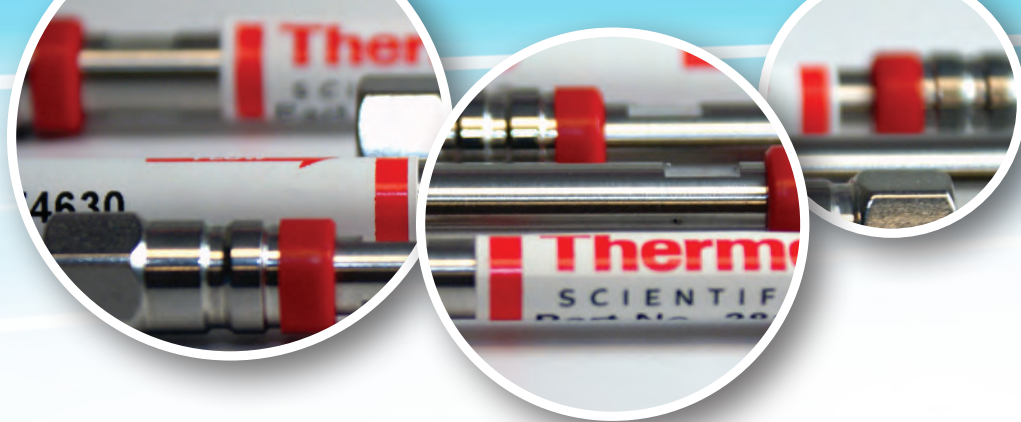


Synchronis HILIC, 5μm, 250 x 4.6mm

Mobile Phase:	Water : acetonitrile : 200mM ammonium formate (10.5 : 84.5 : 5)
Temperature:	40°C
Flow Rate:	1.0mL/min
Injection Volume:	5μL
Detection:	UV, 280nm
Analytes:	1. catechol 2. 5-HIAA 3. DOPAC 4. serotonin 5. tyrosine 6. dopamine 7. L-DOPA

Synchronis HILIC

Particle Size (μm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
1.7	UHPLC Column	50	97502-052130	-	97502-054630
		100	97502-102130	-	-
3	HPLC Column	50	97503-052130	-	-
		100	-	-	97503-104630
		150	-	-	97503-154630
5	Drop-in Guard (4/pk)	10	97505-012101	97505-013001	97505-014001
	HPLC Column	50	97505-052130	-	97505-054630
		100	97505-102130	-	97505-104630
		150	97505-152130	97505-153030	97505-154630
		250	-	-	97505-254630
	UNIGUARD Drop-in Guard Cartridge Holder	10	852-00	852-00	850-00



Hypersil BDS and Hypersil Classical HPLC Columns

Exceptionally reliable and reproducible general purpose columns

Exceptionally reliable robust columns that guarantee you have the same results time after time, even after changing your column. Chemistries available for a variety of applications.

- **Excellent Reproducibility**
Manufactured to the highest standards
- **Very Robust and Rugged**
Rigorous quality control under certified processes
- **Long Column Lifetimes**
Ideal for QA/QC labs



The Hypersil BDS/Classical web page contains the latest news, applications and downloads for the Hypersil BDS/Classical HPLC column range. Visit www.thermoscientific.com/columns

Hypersil BDS

A good choice for robust, general purpose columns

Hypersil BDS

Particle Size (µm)	Format	Length (mm)	ID (mm)	C18	C8	Phenyl	CN		
2.4	Drop-in Guard (4/pk)	10	2.1	28102-012101	28202-012101	-	-		
			4.0/4.6	28102-014001	28202-014001	-	-		
		50	2.1	28102-052130	28202-052130	-	-		
			4.6	28102-054630	-	-	-		
	100	2.1	2.1	28102-102130	28202-102130	-	-		
			4.6	28102-104630	28202-104630	-	-		
		4.6	-	28202-154630	-	-	-		
			-	-	-	-	-		
	3	Drop-in Guard (4/pk)	10	2.1	28103-012101	28203-012101	-	-	
				3.0	28103-013001	28203-013001	-	-	
4.0/4.6				28103-014001	28203-014001	28903-014001	28803-014001		
HPLC Column		30	2.1	28103-032130	-	-	-		
			2.1	28103-052130	28203-052130	-	-		
			3.0	28103-053030	-	-	-		
		100	4.6	4.6	28103-054630	28203-054630	-	-	
				2.1	28103-102130	-	-	-	
				3.0	28103-103030	-	-	-	
			4.0	4.0	28103-104030	-	-	-	
				4.6	28103-104630	28203-104630	-	-	
				2.1	28103-152130	-	-	-	
		150	3.0	3.0	28103-153030	28203-153030	-	-	
				4.0	28103-154030	-	-	-	
			4.6	4.6	28103-154630	28203-154630	28903-154630	28803-154630	
-				-	-	-	-		
-				-	-	-	-		
5		Drop-in Guard (4/pk)	10	2.1	28105-012101	28205-012101	-	-	
				3.0	28105-013001	28205-013001	-	-	
				4.0/4.6	28105-014001	28205-014001	28905-014001	28805-014001	
		HPLC Column	50	2.1	28105-052130	28205-052130	-	-	
				3.0	28105-053030	28205-053030	-	-	
	4.6			28105-054630	28205-054630	-	-		
	100			2.1	28105-102130	28205-102130	-	-	
				3.0	28105-103030	-	-	-	
				4.0	28105-104030	-	-	-	
	125		4.6	4.6	28105-104630	28205-104630	-	-	
				3.0	28105-123030	-	-	-	
				4.0	28105-124030	-	-	-	
			4.6	4.6	28105-124630	-	-	-	
				2.1	28105-152130	-	-	-	
				3.0	28105-153030	-	-	-	
	150		4.0	4.0	28105-154030	28205-154030	-	-	
				4.6	28105-154630	28205-154630	28905-154630	28805-154630	
				2.1	28105-252130	-	-	-	
			250	3.0	3.0	28105-253030	-	-	-
					4.0	28105-254030	28205-254030	28905-254030	-
				4.6	4.6	28105-254630	28205-254630	28905-254630	28805-254630
		-			-	-	-	-	
		-		-	-	-	-		

Format	Length (mm)	ID (mm)	Cat. No.
UNIGUARD Guard Cartridge Holder	10	1.0	851-00
		2.1	852-00
		3.0	852-00
		4.0/4.6	850-00

Hypersil Classical

A global standard for many existing methods

Hypersil ODS

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.		
3	Drop-in Guard (4/pk)	10	2.1	30103-012101		
			3.0	30103-013001		
			4.0/4.6	30103-014001		
	HPLC Column	50	50	3.0	30103-053030	
				4.6	30103-054630	
				100	2.1	30103-102130
					3.0	30103-103030
					4.0	30103-104030
				125	4.6	30103-104630
		150	4.0		30103-124030	
			4.6		30103-124630	
		250	150	150	2.1	30103-152130
					3.0	30103-153030
					4.0	30103-154030
			250	250	4.6	30103-154630
	2.1				30103-252130	
	3.0				30103-253030	
	4.0		250	250	4.0	30103-254030
					4.6	30103-254630
					5	Drop-in Guard (4/pk)
	3.0	30105-013001				
4.0/4.6	30105-014001					
HPLC Column	50	50	3.0	30105-053030		
			4.6	30105-054630		
			100	2.1		30105-102130
				3.0		30105-103030
				4.0		30105-104030
			125	125		4.6
	150	3.0				30105-123030
		4.0				30105-124030
	150	150	4.6	30105-124630		
			200	2.1	30105-152130	
				3.0	30105-153030	
	250	200		4.0	30105-154030	
			4.6	30105-154630		
			250	250	2.1	30105-202130
	4.0	30105-204030				
	4.6	30105-204630				
	250	250	2.1	30105-252130		
			3.0	30105-253030		
			4.0	30105-254030		
	4.6	250	250	4.6	30105-254630	

Hypersil ODS-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
3	Drop-in Guard (4/pk)	10	4.0/4.6	31603-014001
	HPLC Column	50	4.6	31603-054630
		100	4.0	31603-104030
			4.6	31603-104630
		150	4.6	31603-154630
5	Drop-in Guard (4/pk)	10	4.0/4.6	31605-014001
	HPLC Column	50	4.6	31605-054630
		100	4.6	31605-104630
		150	4.6	31605-154630
		250	4.0	31605-254030
	4.6	31605-254630		

Hypersil MOS (C8)

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30205-014001
	HPLC Column	50	4.6	30205-054630
		100	4.6	30205-104630
		150	4.6	30205-154630
		250	4.0	30205-254030
	4.6	30205-254630		

Hypersil MOS-2 (C8)

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30305-014001
	HPLC Column	150	4.6	30305-154630
		250	4.0	30305-254030
			4.6	30305-254630

Hypersil SAS (C1)

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30505-014001
	HPLC Column	150	4.6	30505-154630
		250	4.6	30505-254630

Hypersil Phenyl

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	30905-014001
	HPLC Column	50	4.6	30905-054630
		150	4.6	30905-154630
		250	4.0	30905-254030
	4.6	30905-254630		

Hypersil Phenyl-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.0/4.6	31905-014001
	HPLC Column	150	4.6	31905-154630
		250	4.6	31905-254630

Hypersil CPS

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
3	Drop-in Guard (4/pk)	10	4.0/4.6	30803-014001
	HPLC Column	150	4.6	30803-154630
5	Drop-in Guard (4/pk)	10	4.0/4.6	30805-014001
	HPLC Column	150	4.6	30805-154630
		250	4.0	30805-254030
			4.6	30805-254630

Hypersil CPS-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	4.6	31805-014001
	HPLC Column	150	4.6	31805-254630
		250	4.6	31805-254630

Hypersil APS-2

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.	
3	Drop-in Guard (4/pk)	10	2.1	30703-012101	
			4.6	30703-014001	
	HPLC Column	50	4.6	30703-054630	
			100	2.1	30703-102130
			150	2.1	30703-152130
			4.6	30703-154630	
5	Drop-in Guard (4/pk)	10	3.0	30705-013001	
			4.0/4.6	30705-014001	
	HPLC Column	100	3.0	30705-103030	
			4.6	30705-104630	
			150	4.6	30705-154630
			250	4.0	30705-254030
		4.6	30705-254630		

Hypersil Silica

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.	
3	Drop-in Guard (4/pk)	10	2.1	30003-012101	
			3.0	30003-013001	
			4.0/4.6	30003-014001	
	HPLC Column	50	2.1	30003-052130	
			4.6	30003-054630	
			150	4.6	30003-154630
5	Drop-in Guard (4/pk)	10	3.0	30005-013001	
			4.0/4.6	30005-014001	
	HPLC Column	50	4.6	30005-054630	
			100	4.6	30005-104630
			150	4.6	30005-154630
			250	4.0	30005-254030
		4.6	30005-254630		

Hypersil Classical *continued*

Hypersil SAX

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
5	Drop-in Guard (4/pk)	10	3.0	34105-013001
			4.6	34105-014001
	HPLC Column	250	3.0	34105-253030
			4.6	34105-254630

Hypersil Green PAH

Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
3	Guard Cartridge	10	2.1	31103-012101
			3.0	31103-013001
			4.6	31103-014001
	HPLC Column	100	2.1	31103-102130
			3.0	31103-103030
			4.6	31103-104630
	HPLC Column	150	2.1	31103-152130
			4.6	31103-154630
			4.6	31103-154630
5	Guard Cartridge	10	4.6	31105-014001
	HPLC Column	100	4.6	31105-104630
		150	4.6	31105-154630
		250	4.6	31105-254630

IonPac NS1 and NS2

Polymeric reversed-phase column ideal for the separation of hydrophobic, ionizable compounds

- Excellent resolution
- Good peak shape
- Ideal for separation of large molecules that carry localized charges, such as surfactants
- Compatible with acids, bases, and solvent from pH 0 to 14
- Can also be used for traditional polymeric reversed-phase applications
- Utilize ion-pair chromatography for difficult separations

Thermo Scientific™ IonPac™ NS1-10µm and NS1-5µm columns are packed with a neutral, macroporous, high-surface-area, ethylvinylbenzene polymer crosslinked with 55% divinylbenzene. This resin makes the NS1 resistant to solvents, acids, and bases, and permits the use of eluent from pH 0 to 14. The Dionex IonPac NS1 column is the column of choice for routine ion pair chromatography.

IonPac NS2 is a silica-based column for mobile-phase ion chromatography (MPIC) applications using eluents containing trifluoroacetic acid (TFA), heptafluorobutyric acid (HFBA), or tetrabutylammonium borate (TBAB). It provides high performance analysis for hydrophobic amines and hydrophobic acids using suppressed conductivity detection.

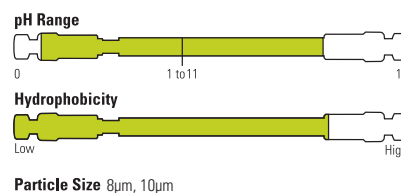
IonPac NS1 and NS2

Description	Particle Size (µm)	Format	Length (mm)	2.0mm ID	4.0mm ID
IonPac NS1	5	HPLC Column	150	–	039568
	10	Guard Column	35	088763	039567
		HPLC Column	250	088762	035321
IonPac NS2	5	Guard Column	35	–	088788
		HPLC Column	150	–	088787
			250	–	088786

HyperREZ XP

Polymer-based columns for carbohydrate analysis

- Designed for the determination of carbohydrates, saccharides, organic acids, and alcohols
- Efficient and reproducible monodisperse particles
- Stable for long column lifetimes even at low pH and high temperatures



HyperREZ XP

	Particle Size (µm)	Format	Length (mm)	ID (mm)	Cat. No.
HyperREZ XP Carbohydrate H+	8	Guard Cartridge (2/pk)	5	3.0	69008-903027
		Guard Column	50	7.7	69008-057726
		HPLC Column	300	7.7	69008-307780
HyperREZ XP Carbohydrate Ca ²⁺	8	Guard Cartridge (2/pk)	5	3.0	69208-903027
		Guard Column	50	7.7	69208-057726
		HPLC Column	300	7.7	69208-307780
HyperREZ XP Carbohydrate Pb ²⁺	8	Guard Cartridge (2/pk)	5	3.0	69108-903027
		Guard Column	50	7.7	69108-057726
		HPLC Column	300	7.7	69108-307780
HyperREZ XP Carbohydrate Na+	10	Guard Cartridge (2/pk)	5	3.0	69310-903027
		Guard Column	50	7.7	69310-057726
		HPLC Column	300	7.7	69310-307780
HyperREZ XP Organic Acids	8	Guard Cartridge (2/pk)	5	3.0	69008-903027
		HPLC Column	100	7.7	69608-107780
HyperREZ XP Sugar Alcohols	8	Guard Cartridge (2/pk)	5	3.0	69208-903027
		HPLC Column	250	4.0	69708-254080

Format	Length (mm)	ID (mm)	Cat. No.
HyperRez Guard Cartridge Holder	5	3	60002-354

Retention Times of Common Saccharides (min)

Saccharide	H ⁺	Ca ²⁺	Pb ²⁺
Adonitol	11.5	14.9	20.4
Arabinose	11.4	13.6	19.4
Erythritol	12.7	15.6	20.3
Fructose	10.6	13.5	19.3
Fucose	12.2	13.7	17.1
Galactose	1.07	12.2	15.6
Glucose	9.9	11.1	13.9
Glycerol	14.1	16.1	19.5
Lactose	8.6	9.7	12.8
Maltose	8.4	9.5	12.5
Maltotriose	7.7	8.7	11.9
Mannitol	11.0	17.3	28.9
Mannose	1.5	12.5	16.7
Raffinose	8.2	8.6	11.4
Sorbitol	11.1	20.7	N/A
Sucrose	9.8	9.4	11.9
Xylose	10.6	12.0	15.0

HyperREZ Carbohydrate H+ 300 x 7.7mm HyperREZ Carbohydrate Ca²⁺ 300 x 7.7mm HyperREZ Carbohydrate Pb²⁺ 300 x 7.7mm

Mobile Phase:	H ₂ O
Flow Rate:	0.6mL/min
Detection:	RI
Temperature:	75°C (H ⁺)
	85°C (Ca ²⁺)
	80°C (Pb ²⁺)

Note: partial hydrolysis may occur with some saccharides using H⁺.



LC Accessories

Excellence in LC accessories providing optimal performance

Thermo Scientific offers a wide range of accessories to suit your LC needs, ensuring confidence in your analysis and delivery of exceptionally reproducible data and reliable chromatography.

- **Viper Fingertight Fitting**
Providing zero dead volume fingertight connections up to 1,250 bar
- **Rheodyne Sample Injectors**
Biocompatible and stainless steel versions for highly accurate and precise injections
- **LC Syringes**
Supporting manual and automated injections

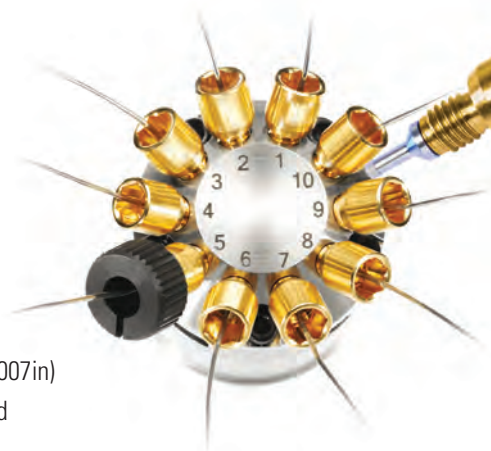


Learn more about LC Accessories.
Visit www.thermoscientific.com/columns

Viper Fingertight Fittings

Provides ease of use and dead-volume free plumbing of every conventional HPLC and UHPLC system

- Provides zero-dead volume fingertight connections
- Supports operating pressures up to 1,500 bar (22,000 psi)
- Available in different lengths: 65mm and from 150 to 950mm in 100mm steps
- Available in different inner diameters: 0.1mm (0.004in), 0.13mm (0.005in) or 0.18mm (0.007in)
- Easy to use due to stainless steel or biocompatible MP35N™ capillaries (1/32in OD) and fingertight design
- Works with virtually any valve and column from any manufacturer
- Fits narrow connections such as 10-port valves and enables mixed use with different designs



The Thermo Scientific™ Viper™ fingertight fitting system provides ease of use and dead-volume free plumbing of every conventional HPLC and modern UHPLC system. Together with flexible stainless steel (SST) or biocompatible MP35N® capillaries, it opens a new dimension in liquid chromatography. The Viper system improves chromatographic results, independent of various different connection geometries and system backpressures. Connecting LC modules,

valves, and columns quickly and easily without tools is simple with the Viper system.

Extra column volumes in HPLC have the most detrimental effects on the separation efficiency of an LC system and must be minimized. Conventional fittings tightened by hand or using tools have considerable drawbacks which can compromise efficiency. The Viper fitting system overcomes these drawbacks by design, working without ferrules

to reduce the dead volume of any fluidic connection to zero. The Viper system unifies robust performance, ease of use, acceptable lifetime, and universal compatibility with virtually all different valves and columns for HPLC system users. All Thermo Scientific™ Dionex™ UltiMate™ 3000 XRS, RS, BioRS and SD systems are equipped with Viper fingertight fitting system as a standard.

Viper Fingertight Fitting Systems - SST

Length (mm)	0.1mm ID	0.13mm ID	0.18mm ID
65	6040.2207	6040.2307	6040.2357
150	6040.2215	6040.2315	6040.2360
250	6040.2225	6040.2325	6040.2385
350	6040.2235	6040.2335	6040.2375
450	6040.2245	6040.2345	6040.2365
550	6040.2255	6040.2305	6040.2355
650	6040.2265	6040.2310	6040.2395
750	-	6040.2320	6040.2370
850	-	6040.2330	6040.2380
950	-	6040.2340	6040.2390

Viper Fingertight Fitting Systems - Biocompatible

Length (mm)	0.065mm ID, PEEK	0.090mm ID, PEEK	0.1mm ID, MP35N	0.13mm ID, MP35N	0.13mm ID, PEEK	0.18mm ID, MP35N
65	-	6041.9075*	6042.2306	-	-	-
150	6041.5615	-	6042.2320	-	6041.5616	6042.2315
250	6041.5625	6041.9025	6042.2330	-	-	6042.2327
350	-	-	6042.2340	-	-	6042.2337
450	-	-	6042.2350	-	-	6042.2365
550	-	-	6042.2360	-	-	6042.2355
650	6041.5665	-	6042.2370	6042.2363	-	6042.2380
750	6041.5675	-	6042.2390	6042.2373	-	6042.2375
850	6041.5685	-	-	-	-	-
950	-	-	6042.2395	-	-	6042.2385

* 75mm length

Viper Accessories

Description	Cat. No.	Quantity
Plug, Biocompatible	6040.2303	1 Each
Union, SST	6040.2304	1 Each
Calibration Tool	6040.2312	1 Each
Inline Filter	6036.1045	1 Each



Viper Fingertight Fitting Kits for UltiMate 3000 Systems

Viper Fingertight Fitting Kits for UltiMate 3000 Systems

Description	SD Systems	RS Systems
Viper Capillary Kit for ISO, LPG or DGP pumps	6040.2302	6040.2301
Viper Capillary Kit for HPG pumps	6040.2309	6040.2308
Viper Capillary Kit for biocompatible RSLC systems	–	6841.2301
Online SPE Solution Kit for x2 Dual Standard or RSLC systems	6040.2802	6040.2801
Tandem Operation Solution Kit for x2 Dual Standard or RSLC systems	6040.2804	6040.2803
Application Switching Solution Kit for x2 Dual Standard or RSLC systems	6040.2806	6040.2805
Parallel Setup Solution Kit for x2 Dual Standard or RSLC systems	6040.2810	6040.2809
Inverse Gradient Kit for x2 Dual Standard or RSLC systems	6040.2819	6040.2820
Automated Method Scouting Solution Kit for Standard or RSLC systems	6040.2808	6040.2807
MS Connection Kit for MS-frontends with WPS autosampler, excluding UV detection	6720.0355	6720.0370
MS Connection Kit for MS-frontends with WPS autosampler, including UV detection	6720.0365	6720.0375
MS Connection Kit for MS-frontends with HPG-RS pump and OAS autosampler excluding UV detection	–	6720.0372
MS Connection Kit for MS-frontends with HPG-RS pump and OAS autosampler including UV detection	–	6720.0377

Description	XRS Systems
Viper Capillary Kit for standalone system with with WPS autosampler	6043.2301
Viper Capillary Kit for standalone system with with OAS autosampler	6845.2301A
MS Connection Kit for MS-frontends with WPS autosampler excluding UV detection	6720.0380
MS Connection Kit for MS-frontends with WPS autosampler including UV detection	6720.0385
MS Connection Kit for MS-frontends with LPG-XRS pump and OAS autosampler excluding UV detection	6720.0372
MS Connection Kit for MS-frontends with LPG-XRS pump and OAS autosampler including UV detection	6720.0377

Javelin Direct-Connection Column Filters

One-piece filter protects HPLC systems

- Direct-connection design for maximum efficiency
- Replace entire disposable filter unit for easy changes
- Recommended for use as dedicated filters for a column rather than the HPLC system
- 1/16in CPI tip attaches directly to HPLC column inlet without tubing or wrenches
- 0.5µm porosity



Javelin Direct-Connection Column Filter

Description	2.1mm ID	3.0mm ID	4.0/4.6mm ID	Quantity
Javelin Column Filter	88200	88700	88400	4 Pack

ColumnSaver Precolumn Filters

Filter mesh size 2µm

ColumnSaver Precolumn Filters

Filter Mesh Size (µm)	Cat. No	Quantity
2	60140-412	10 Pack

UNIFILTER Direct-Connection HPLC Filter Systems

Quickly replaced for minimal down time

- Replaceable 0.5µm drop-in filter enhances column lifetime and improved performance
- Holder attached directly to the inlet of your analytical system for maximum convenience



UNIFILTER Direct-Connection HPLC Filter Systems

Description	2.1/3.0mm ID	4.0/4.6mm ID	Quantity
UNIFILTER Direct Connection Holder	27002	27000	1 Each
Replacement Filter, 0.5µm	22017	22155	5 Pack
Replacement Tip, CPI, Standard	850-RT	850-RT	1 Each
Replacement Tip, Waters End-fitting	850-WT	850-WT	1 Each

UHPLC Filter

Column protection for Hypersil GOLD 1.9µm and Synchronis 1.7µm columns without compromising performance

- Low volume filter cartridge design
- Maintain peak shape
- Minimal efficiency loss through dispersion



UHPLC Filter

Description	Cat. No.	Quantity
UHPLC Direct Connect Filter Holder	27006	1 Each
2.1mm ID Replacement Filter Cartridge, 0.2µm	22180	5 Pack
1.0mm ID Replacement Filter Cartridge, 0.2µm	22185	5 Pack

PTFE One-Piece Column Connector

Excellent for high-throughput screening and quick connection

- Fingertight, leak-free connection of analytical and guard columns with 10-32 threads
- Minimizes dead volume
- Inert and biocompatible material



PEEK One-Piece Column Connector




Description	Cat. No.	Quantity
One Piece Coupler	60170-370	1 Each



Solvent Filters

- Efficient draw
- 100% PTFE polymer, including 2µm filters
- Built-in helium sparge port and frit

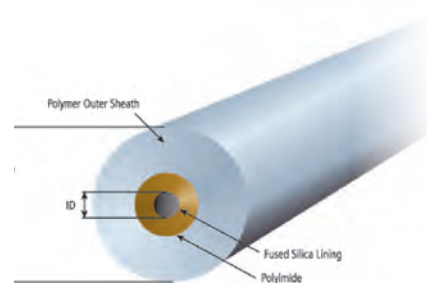
Solvent Filters

	Type	For Use with	Cat. No.	Quantity
	Stainless Steel	Fit 1/16in OD tube to 1/8in OD plastic tubing	A-302	1 Each
	Stainless Steel	Fit to 1/8in OD plastic tubing using 1/8in PP nut	A-302A	1 Each
	Bottom-of-the-Bottle	3/16in OD plastic tubing	A-436	1 Each
	Bottom-of-the-Bottle	1/8in OD tubing	A-437	1 Each

PEEKsil Capillary Tubing

Excellent chemical compatibility and very low carryover

- Precision-bore fused silica tubing coated with 1/16in OD PEEK covering
- Usable in most standard chromatography systems
- Withstands high pressures
- Smooth internal surface for excellent flow characteristics
- Tubing is stiff: not recommended for uses requiring tubing bends
- Precut lengths only: cutting in the lab may damage tubing



PEEKsil Capillary Tubing

ID (in)	Length (cm)	Cat. No.	Quantity
0.002	10	60182-500	5 Pack
	20	60182-501	5 Pack
	50	60182-502	2 Pack
0.004	10	60182-503	5 Pack
	20	60182-504	5 Pack
	50	60182-505	2 Pack
0.007	10	60182-506	5 Pack
	20	60182-507	5 Pack
	50	60182-508	2 Pack

Applications:

- HPLC
- LC-MS

PEEK Sleeves for Fused Silica Capillary Tubing

Withstands high pressures

1/16in OD PEEK Sleeves for Fused Silica Capillary Tubing

ID (in)	Color	Cat. No.	Quantity
0.008	Yellow	F-227	1 Each
0.010	Blue	F-228	1 Each
0.012	Natural	F-229	1 Each
0.015	Orange	F-230	1 Each
0.021	Natural	F-231	1 Each
0.030	Natural	F-232	1 Each



316 Stainless Steel Capillary Tubing

Cleaned, polished, passivated and ready-to-use

- Suitable for ultra high pressure applications
- Wide chemical compatibility
- Prefinished, square, burr-free ends and interiors to minimize dead volume connections
- Not recommended for biological samples
- Rough internal surface may lead to sample carryover



316 Stainless Steel Capillary Tubing

ID (in)	Length (cm)	Color	Cat. No.	Quantity
1/16in OD Precut Tubing				
0.005	5	Red	U-152	1 Each
	10	Red	U-153	1 Each
	20	Red	U-154	1 Each
	30	Red	U-155	1 Each
	50	Red	U-156	1 Each
	100	Red	U-157	1 Each
0.007	5	Black	U-126	1 Each
	10	Black	U-127	1 Each
	20	Black	U-128	1 Each
	30	Black	U-129	1 Each
	50	Black	U-130	1 Each
	100	Black	U-131	1 Each
0.010	5	Blue	U-111	1 Each
	10	Blue	U-112	1 Each
	20	Blue	U-113	1 Each
	30	Blue	U-114	1 Each
	50	Blue	U-132	1 Each
	100	Blue	U-133	1 Each
1/32in OD Precut Tubing with 1/16in Sleeves				
0.005	10.5	Red	30011-FLEX	1 Each
	15	Red	30015-FLEX	1 Each
	28	Red	30028-FLEX	1 Each
	40	Red	30040-FLEX	1 Each
0.007	10.5	Yellow	39011-FLEX	1 Each
	15	Yellow	39015-FLEX	1 Each
	28	Yellow	39028-FLEX	1 Each
	40	Yellow	39040-FLEX	1 Each

1/16in 316 Stainless Steel Tubing, 5-Foot Coil

ID (in)	Cat. No.	Quantity
0.005	U-158	1 Each
0.007	U-108	1 Each
0.010	U-106	1 Each
0.020	U-105	1 Each
0.030	U-107	1 Each
0.040	U-144	1 Each

Terry Tool Tubing Cutters

Description	Cat. No.	Quantity
1/16in stainless steel tubing	60182-509	1 Each
1/8in stainless steel tubing	60182-510	1 Each

PEEK Capillary Tubing

Pre-cut and color-coded for easy identification and use



- Broad chemical compatibility
- Biocompatible
- Easily cut to desired length
- Appropriate for many HPLC applications
- Resistant to most organic solvents, except for nitric acid, sulfuric acid, dichloromethane, THF and DMSO

1/16in OD Precut PEEK Tubing

ID (in)	Length (cm)	Color	Cat. No.	Quantity
0.003	5	Natural	37003-5	1 Each
	10	Natural	37003-10	1 Each
	20	Natural	37003-20	1 Each
	30	Natural	37003-30	1 Each
	50	Natural	37003-50	1 Each
0.005	5	Red	37005-5	1 Each
	10	Red	37005-10	1 Each
	20	Red	37005-20	1 Each
	30	Red	37005-30	1 Each
	50	Red	37005-50	1 Each
0.007	5	Yellow	37007-5	1 Each
	10	Yellow	37007-10	1 Each
	20	Yellow	37007-20	1 Each
	30	Yellow	37007-30	1 Each
	50	Yellow	37007-50	1 Each
0.010	5	Blue	37010-5	1 Each
	10	Blue	37010-10	1 Each
	20	Blue	37010-20	1 Each
	30	Blue	37010-30	1 Each
	50	Blue	37010-50	1 Each
0.020	5	Orange	37020-5	1 Each
	10	Orange	37020-10	1 Each
	20	Orange	37020-20	1 Each
	30	Orange	37020-30	1 Each
	50	Orange	37020-50	1 Each

1/16in OD PEEK Tubing, 5-Foot Coil

ID (in)	Cat. No.	Quantity
0.003	37003	1 Each
0.005	37005	1 Each
0.007	37007	1 Each
0.010	37010	1 Each
0.020	37020	1 Each
0.030	37030	1 Each
0.040	37040	1 Each

Polymer Tubing Cutter





Description	Cat. No.	Quantity
Polymeric Tubing Cutter	A-327	1 Each
Replacement blades	A-328	5 Pack

High Pressure Stainless Steel Nuts and Ferrules

Accommodate a wide range of configurations

- Designed for 10-32 port configurations
- Burr and contaminant free

High Pressure Stainless Steel Nuts and Ferrules

Type	Nut Cat. No.	Quantity	Description	Replacement Ferrule Cat. No.	Quantity
 10-32 thread nut with ferrule	F-190	1 Each	Replacement PEEK Ferrules	F-192x	10 Pack
 Male hex nut	U-400x	10 Pack	Universal Ferrules, 0.625in	U-401x	10 Pack
 Valco male hex nut, 10-32 thread	U-320x	10 Pack	Valco ferrules, 0.625in	U-321x	10 Pack
 Male hex nut, Waters compatible	U-410x	10 Pack	Universal Ferrules, 0.625in	U-401x	10 Pack

Reducing Union for Preparative Columns

Connects 30 to 50mm ID preparative columns to 1/16in tubing

- Stainless steel construction
- 1.0mm bore
- Without frit

Reducing Union for Preparative Column








Description	Cat. No.	Quantity
1/8in to 1/16in Reducing Union for Preparative Column	60182-357	1 Each

PEEK Fingertight Fittings

Machined for reliability and ease of use

- Resist cracking, breaking, thread stripping and leaking in both low and high pressure applications
- Biocompatible for a broad range of applications

PEEK Fingertight Fittings


Type	Cat. No.	Quantity
 One-Piece Fingertight Fitting, 1/16in, 0.37in head	F-120x	10 Pack
 One-Piece Long Fingertight Fitting, 1/16in, 0.37in head	F-130x	10 Pack
 One-Piece PEEK Fingertight Fitting, 1/32in, 0.25in head	M-645	1 Each
 Two-Piece Fingertight Wing Nut with Ferrule, 1/16in	F-300x	10 Pack
 Replacement PEEK Ferrules	F-142x	10 Pack
 Column End Plug, 1/16in, 10-32 coned, Delrin, Red	U-467R	1 Each
 Column End Plug, 1/16in, 10-32 coned, Delrin, Black	U-467BLK	1 Each

Stainless Steel Unions, Tees and Crosses

Well-suited to high-pressure applications

- Absolute zero or low dead volume formats
- Includes two stainless steel nuts and ferrules

Stainless Steel Unions, Tees and Crosses





	Description	Through Hole (in)	Swept Volume (μL)	Cat. No.	Quantity
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.010	0.025	U-435	1 Each
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.020	0.134	U-402	1 Each
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.050	0.836	U-437	1 Each
	Union, stainless steel, Upchurch Scientific/Parker fittings compatible, includes 2 stainless steel nuts and ferrules	0.062	~0.0	U-438	1 Each
	Union, stainless steel, Waters fittings compatible, includes 2 stainless steel nuts and ferrules	0.020	0.129	U-412	1 Each
	Union, stainless steel, Valco fittings compatible, includes 2 stainless steel nuts and ferrules	0.020	0.103	U-322	1 Each
	Tee, stainless steel, 10-32 fittings for use with 1/16in OD tubing	0.020	0.57	U-428	1 Each
	Cross, stainless steel, 10-32 fittings for use with 1/16in OD tubing	0.020	0.72	U-430	1 Each

PEEK Unions, Tees and Crosses

Well-suited to high pressure applications

- Absolute zero or low dead volume formats
- Biocompatible

PEEK Unions, Tees and Crosses

	Description	Through Hole (in)	Swept Volume (μL)	Cat. No.	Quantity
	Union, PEEK polymer, includes two PEEK 2-piece fittings	0.010	0.070	P-742	1 Each
	Union, PEEK polymer, includes two PEEK 2-piece fittings	0.020	0.28	P-704	1 Each
	Tee, PEEK, 10-32 fittings for use with 1/16in OD tubing, includes three 10-32 PEEK double-winged nuts	0.020	0.57	P-727	1 Each
	PEEK, 10-32 fittings for use with 1/16in OD tubing, includes four 10-32 PEEK double-winged nuts	0.020	0.72	P-729	1 Each

Rheodyne 7725 and 7725i Sample Injectors

Allow continuous flow between the load and inject positions to protect against pressure shock



- Stainless steel construction
- Make-Before-Break (MBB) design
- Can use partial filling for zero sample waste or complete filling for better reproducibility
- Inject 1µL to 5mL with high accuracy and precision
- 7725i features a position sensing switch for a reproducible start signal

Rheodyne 7725 and 7725i Sample Injectors

Model	Mode	Features	Cat. No.	Quantity
7725	Dual	Continuous flow	7725	1 Each
7725i	Dual	Continuous flow, position sensing switch	7725i	1 Each

Stainless Steel Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 7725 and 7725i injectors	5µL	0.18 / 0.007	7755-020	1 Each
	10µL	0.30 / 0.012	7755-021	1 Each
	20µL	0.30 / 0.012	7755-022	1 Each
	50µL	0.51 / 0.020	7755-023	1 Each

RheBuild Kits

For Use with Rheodyne Models	Cat. No.	Quantity
7725/7725i	7725-999	1 Each

Rheodyne Stators

For Use with Rheodyne Models	Cat. No.	Quantity
7725	7725-010	1 Each

Rheodyne 9725 and 9725i Sample Injectors

Allow continuous flow between the load and inject positions to protect against pressure shock

- Biocompatible PEEK construction
- Make-Before-Break (MBB) design
- Can use partial filling for zero sample waste or complete filling for better reproducibility
- Inject 1µL to 5mL with high accuracy and precision
- 9725i features a position sensing switch for a reproducible start signal

Rheodyne 9725 and 9725i Sample Injectors

Model	Mode	Features	Cat. No.	Quantity
9725	Dual	Continuous flow	9725	1 Each
9725i	Dual	Continuous flow, position sensing switch	9725i	1 Each

PEEK Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 9725 and 9725i injectors	2µL	Internal	7755-015	1 Each
	5µL	0.18 / 0.007	9055-020	1 Each
	10µL	0.25 / 0.010	9055-021	1 Each
	20µL	0.25 / 0.010	9055-022	1 Each
	50µL	0.51 / 0.020	9055-023	1 Each
	100µL	0.51 / 0.020	9055-024	1 Each
	200µL	0.51 / 0.020	9055-025	1 Each
	500µL	0.76 / 0.030	9055-026	1 Each
	1mL	0.76 / 0.030	9055-027	1 Each
	5mL	0.76 / 0.030	9055-029	1 Each

Rheodyne Suction Needle Adapter

For Use with	Cat. No.	Quantity
Rheodyne Injector Models 9725 and 9725i	9125-076	1 Each

Rheodyne 8125 Low-Dispersion Microscale Injector

Designed for use with 1 and 2mm ID HPLC columns

- Can use partial filling for zero sample waste or complete filling for better reproducibility
- Position sensing switch provides reproducible start signal
- Suitable for use with 5 to 50µL sample loops



Rheodyne 8125 Low-Dispersion Microscale Injector

Model	Mode	Features	Cat. No.	Quantity
8125	Dual	Continuous flow	8125	1 Each

Stainless Steel Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 8125 injectors	5µL	0.20 / 0.008	8020	1 Each
	10µL	0.20 / 0.008	8021	1 Each
	20µL	0.25 / 0.010	8022	1 Each
	50µL	0.30 / 0.012	8023	1 Each

RheBuild Kits

For Use with Rheodyne Models	Cat. No.	Quantity
8125	8125-999	1 Each

Rheodyne Replacement Rotor Seals for Injectors

For Use with Rheodyne Models	Cat. No.	Quantity
Vespel Seals		
8125/8126	8125-038	1 Each
Tefzel Seals		
8125	8125-097	1 Each

Rheodyne Stators

For Use with Rheodyne Models	Cat. No.	Quantity
8125/8126	8125-098	1 Each

Rheodyne Stator Face Assemblies

For Use with Rheodyne Models	Cat. No.	Quantity
8125	8125-074	1 Each

Rheodyne 7010 Sample Injector

Single-mode sample injector designed for the complete filling method



Rheodyne 7010 Sample Injector

Model	Mode	Features	Cat. No.	Quantity
7010	Single	Complete filling method	7010	1 Each

Compatible with:

Sample loop sizes 5µL to 20mL

Rheodyne Ports for Rheodyne Injectors

For Use with Rheodyne Model	Cat. No.	Quantity
7010 Filler Port, Stainless Steel	7012	1 Each

Stainless Steel Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 7010 and 7125 injectors	5µL	0.18 / 0.007	7020	1 Each
	10µL	0.30 / 0.012	7021	1 Each
	20µL	0.30 / 0.012	7022	1 Each
	50µL	0.51 / 0.020	7023	1 Each
	100µL	0.51 / 0.020	7024	1 Each
	200µL	0.76 / 0.030	7025	1 Each
	500µL	0.76 / 0.030	7026	1 Each
	1mL	0.76 / 0.030	7027	1 Each
	5mL	1.0 / 0.040	7029	1 Each

RheBuild Kits

For Use with Rheodyne Models	Cat. No.	Quantity
7010/7000	7010-999	1 Each

Rheodyne Replacement Rotor Seals for Injectors

For Use with Rheodyne Models	Cat. No.	Quantity
Vespel Seals		
7010	7010-039	1 Each
Tefzel Seals		
7010	7010-071	1 Each

Rheodyne 9010 Sample Injector

Single-mode sample injector designed for the complete filling method

- Compatible with sample loop sizes 5 μ L to 10mL
- PEEK stator
- Position sensing switch provides a reproducible start signal

Rheodyne 9010 Sample Injector

Model	Mode	Features	Cat. No.	Quantity
9010	Single	Continuous flow, position sensing switch	9010	1 Each

Rheodyne Ports for Rheodyne Injectors

For Use with Rheodyne Model	Cat. No.	Quantity
9010 Filler Port, PEEK	9012	1 Each
9010 Needle Port, PEEK	9013	1 Each

PEEK Sample Loops

Description	Volume	ID (mm / in)	Cat. No.	Quantity
Sample loops for 9010 injectors	2 μ L	Internal	7755-015	1 Each
	5 μ L	0.18 / 0.007	9055-020	1 Each
	10 μ L	0.25 / 0.010	9055-021	1 Each
	20 μ L	0.25 / 0.010	9055-022	1 Each
	50 μ L	0.51 / 0.020	9055-023	1 Each
	100 μ L	0.51 / 0.020	9055-024	1 Each
	200 μ L	0.51 / 0.020	9055-025	1 Each
	500 μ L	0.76 / 0.030	9055-026	1 Each
	1mL	0.76 / 0.030	9055-027	1 Each
	5mL	0.76 / 0.030	9055-029	1 Each

Rheodyne Replacement Rotor Seals for Injectors

For Use with Rheodyne Models	Cat. No.	Quantity
Tefzel Seals		
9010	9010-051	1 Each

Rheodyne Stators

For Use with Rheodyne Models	Cat. No.	Quantity
9010	9125-043	1 Each





Rheodyne Stator Face Assemblies

For Use with Rheodyne Models	Cat. No.	Quantity
9125	8125-094	1 Each

RheFlex High Pressure Fittings

Precision machined from 316 stainless steel

RheFlex High Pressure Fittings

	Type	Cat. No.	Quantity
	Short Fittings Set	6000-109	5 Pack
	Short Fittings Set	6000-209	10 Pack
	Long Fittings Set	6000-111	5 Pack
	Long Fittings Set	6000-211	10 Pack
	Extra Long Fittings Set	6000-162	5 Pack
	Extra Long Fittings Set	6000-262	10 Pack
	1/16in Ferrule	6000-110	5 Pack
	1/16in Ferrule	6000-210	10 Pack



RheFlex Two-Piece PEEK Fittings

Provide inert, metal-free connections

- Slotted backside of the ferrule is squeezed down onto the tube by the mating conical surface of the nut
- May be used on 1/16in metal or plastic tubing reliably up to 5000psi
- Reusable ferrule and nut

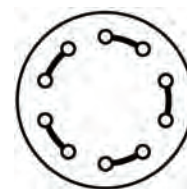


RheFlex Two-Piece PEEK Fittings

Type	Cat. No.	Quantity
Fitting set, standard length	6000-054	5 Pack
Fitting set, short	6000-055	5 Pack
Fitting set, X-long	6000-066	1 Each
Replacement ferrules	6000-051	5 Pack

Cheminert Model C2 Microbore Injector

Can be used as an injector or switching valve



- 1/16in fittings
- 0.010in ports
- Available in 6-port or 10-port configurations
- Available with manual or microelectric actuator

Cheminert Model C2 Microbore Injector

Description	Sample Volume	Cat. No.	Quantity
Model C2 injector, N60 stainless stator, 5µL loop, manual	6 ports	C2-1006	1 Each
	10 ports	C2-1000	1 Each
Model C2 injector, N60 stainless stator, 5µL loop, microelectric actuator	6 ports	C2-1006EH	1 Each
	10 ports	C2-1000EP	1 Each
Sample injector loops, stainless steel	5µL	CSL5	1 Each
	10µL	CSL10	1 Each
	20µL	CSL20	1 Each
	50µL	CSL50	1 Each
	100µL	CSL100	1 Each
Model C4 injector, PAEK stator, 5µL loop, microelectric actuator	6 ports	C2-1346EH	1 Each
Sample injector loops, PAEK	5µL	CZSL5PK	1 Each
	10µL	CZSL10PK	1 Each
	50µL	CZSL50PK	1 Each

Valco Injector Model C6W

Description	Volume	Cat. No.	Quantity
Model C6W injector, six 0.016in ports, manual	20µL loop	C6W	1 Each
Model EPC6W injector, six 0.016in ports, microelectric actuator	20µL loop	EPC6W	1 Each
Replacement rotor	—	SSAC6W	1 Each
Sample injector loop, stainless steel	2µL	SL2CW	1 Each
Sample injector loop, stainless steel	5µL	SL5CW	1 Each
Sample injector loop, stainless steel	10µL	SL10CW	1 Each
Sample injector loop, stainless steel	20µL	SL20CW	1 Each
Sample injector loop, stainless steel	50µL	SL50CW	1 Each
Sample injector loop, stainless steel	100µL	SL100CW	1 Each

Valco Accessories

Description	Volume	Cat. No.	Quantity
Valco syringe ports	22 ga. needles; 1/16in fittings	VISF-1	1 Each
Valco syringe ports	22 ga. 2in needles	VISF-2	1 Each
Valco Nuts and Ferrules	1/16in standard nut	ZN1-10	10 Pack
Valco Nuts and Ferrules	1/16in long nut	LZN1-10	10 Pack
Valco Nuts and Ferrules	1/16in SS ferrule	ZF1-10	10 Pack

LC Syringes for Manual Injection valves

Easy, accurate and reproducible manual injection

- Square tip to prevent damage to the injector
- Wide range of volumes
- Precision made from borosilicate glass and stainless steel
- Robust design and easy-to-read markings

Removable Needle, Gas Tight Syringes for Rheodyne / Valco Injectors

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
10	50	22	90° Blunt End	365DLG21	1 Each	365RNL15	5 Pack
25	50	22	90° Blunt End	365FLG31	1 Each	365RNL25	5 Pack
50	50	22	90° Blunt End	365GLG41	1 Each	365RNL25	5 Pack
100	50	22	90° Blunt End	365HLG51	1 Each	365RNL25	5 Pack
500	50	22	90° Blunt End	365JLG71	1 Each	365RNL25	5 Pack

Fixed Needle, Gas Tight Syringes for Rheodyne / Valco Injectors

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	50	22	90° Blunt End	365DL263	1 Each
25	50	22	90° Blunt End	365F6315	1 Each
50	50	22	90° Blunt End	365G6316	1 Each
100	50	22	90° Blunt End	365H6317	1 Each
500	50	22	90° Blunt End	365J6319	1 Each

Fixed Needle Syringes for Rheodyne / Valco Injectors

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
5	50	22	90° Blunt End	365CL221	1 Each
10	50	22	90° Blunt End	365DL231	1 Each
25	50	22	90° Blunt End	365FL241	1 Each
50	50	22	90° Blunt End	365GL251	1 Each
100	50	22	90° Blunt End	365HL261	1 Each
250	50	22	90° Blunt End	365IL271	1 Each
500	50	22	90° Blunt End	365JL281	1 Each



HPLC Syringes

- Instrument specific syringes
- Luer-Lok syringes ideal for priming
- Macro volume sampling syringes suitable for liquid or gas samples

Removable Needle Syringes for Thermo Scientific Instruments

Volume (µL)	Length (mm)	Gauge	Instrument	Cat. No.	Quantity
250	50	22	LCQ	365ILT21	1 Each
500	50	22	LCQ	365JLT41	1 Each
250	–	–	AS1000, AS3000	365ILT91	1 Each
500	–	–	AS1000, AS3000	365JLT61	1 Each
2500	–	–	AS3000, AS3500	365LLT81	1 Each

Mass Spectrometry Replacement ESI Probe Needles

Instrument	Cat. No.	Quantity
LCQ, XP, DECA, Advantage	365RNL1	1 Each
LCQ MS	365RNL2	1 Each
LCQ.XSQ	365RNL3	1 Each

Fixed Needle Syringes for CTC Instruments

Volume (µL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
10	50	22	–	365DL991	1 Each
25	50	22	–	365FL715	1 Each
50	50	22	–	365GL810	1 Each
100	50	22	–	365HL331	1 Each

PTFE Luer-Lok Syringes

Volume (mL)	Cat. No.	Quantity	Replacement Needle Cat. No.	Quantity
1	365KL531	1 Each	365RNL22	2 Pack
2.5	365LL541	1 Each	365RNL22	2 Pack
5	365ML551	1 Each	365RNL22	2 Pack
10	365NL561	1 Each	365RNL22	2 Pack
25	365PL571	1 Each	365RNL22	2 Pack

Syringes for Macro Volume Sampling

Volume (mL)	Length (mm)	Gauge	Tip Style	Cat. No.	Quantity
1	50	22s	Bevel	365K3051	1 Each
2.5	50	22s	Bevel	365LL375	1 Each
5	50	22s	Bevel	365M5212	1 Each
10	50	22s	Bevel	365N5214	1 Each

HOT POCKET and COOL POCKET Column Temperature Controllers

Wrap-around column temperature control systems

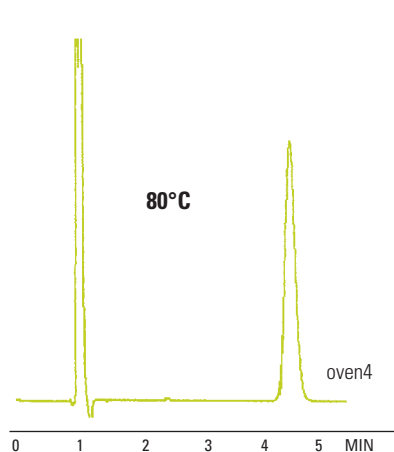
- Easy to install and use with a variety of column lengths
- Dual display of both actual and set point temperature
- HOT POCKET range from just above ambient to 85°C
- COOL POCKET range from 5°C to 55°C
- Explore sample selectivity and stability on both sides of ambient



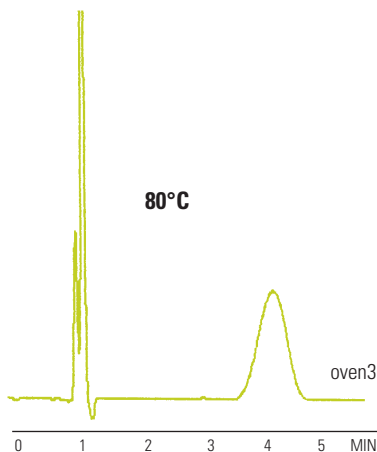
Product Specifications

	HOT POCKET	COOL POCKET
Operating Range	5°C above ambient to 85°C	5°C to 55°C
Display	Dual LED displays of actual and set point temperatures in °C	
Temperature Accuracy	± 2°C over entire range	± 2°C over entire range
Temperature Repeatability	± 1°C	± 1°C
Temperature Stability	± 0.1°C	± 0.1°C
Time to Stabilization (from ambient)	85°C in less than 30 minutes	55°C in 25 minutes, 5°C in 20 minutes

With Eluent Pre-heater



Without Eluent Pre-heater

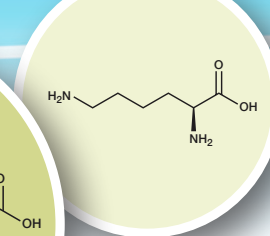
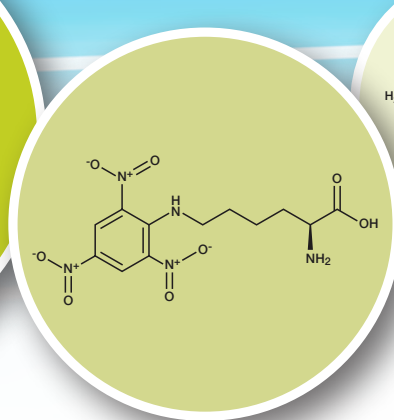
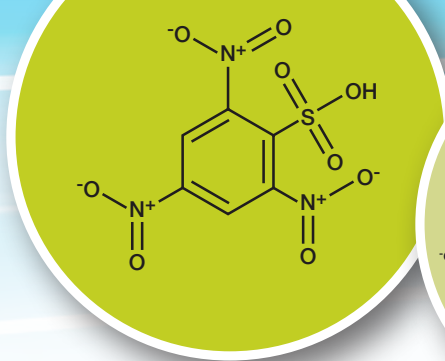


Effect of eluent pre-heater on efficiency

Data courtesy of Dr. Richard F. Myer, Quantitative Technologies, Inc., Whitehouse, NJ

HOT POCKET Column Heaters, Eluent Preheater/Precooler and COOL POCKET Chiller

Description	Cat. No.	Quantity
HOT POCKET Column Heater	92016	1 Each
HOT POCKET Column Heater – short version	92016-150	1 Each
COOL POCKET Column Chiller	92017	1 Each
Eluent Preheater/Precooler	92018	1 Each



LC Reagents

Providing the selectivity needed for high-quality separation of charged compounds

Control selectivity, resolve complex ionic mixtures and improve peak symmetry with the use of our LC reagents.

By Using the Correct Reagent You Achieve:

- Increased or decreased retention, permitting controlled selectivity
- Resolution of complex ionic mixtures without using ion exchange columns
- Improved peak symmetry

Reagent Types:

- High purity pre-column derivatization reagents
- Hydrolysis reagents
- HPLC ion pair reagents
- Derivatization and visualization reagents
- Amino acid detection reagents
- Peptide standards

The LC Reagents web page contains the latest news, applications and downloads for the LC Reagents HPLC column range. Visit www.thermoscientific.com/columns



LC Reagents

Technical Resources



visit www.thermoscientific.com/chromexpert to access the following information:

- Derivatization and Visualization Reagents for HPLC
- Developments in Amino Acid Analysis
- Hydrolysis
- Methods for Fractionation of Peptide Mixtures



HPLC Ion Pair Reagents

Heptafluorobutyric Acid

Ion-pair reagent for the reversed-phase HPLC separation of proteins and peptides

- Typical purity is 99.7% by GC; <0.1% water
- Sequencing reagent for classical and automated Edman degradation of peptides and proteins
- Density: 1.645
- B.P. 120°C
- Packaged under nitrogen in amber glass ampules or bottles
- Clear, colorless liquid

Heptafluorobutyric Acid

Description	Quantity	Cat. No.	Quantity
Heptafluorobutyric Acid, Sequencing Grade	100mL	X TS-25003	1 Each
Heptafluorobutyric Acid, HPLC Grade	10 x 1mL ampules	TS-53104	1 Pack

X in the ordering table indicates that hazardous shipping charges apply.

Triethylamine (TEA)

Ideal for HPLC separation and analysis of peptides

Triethylamine is an ion-pairing reagent that alters selectivity in reversed-phase HPLC separations. By pairing with peptides, it effectively sharpens peaks, resulting in improved peak resolution.

- 99.5% triethylamine purity, allowing sensitive peptide detection at low UV wavelengths in reverse-phase HPLC peptide separation systems
- Packaged in amber glass bottles with protective PTFE-lined fluorocarbon caps for reagent integrity
- Has a low UV absorbance to provide the most sensitive detection across all wavelengths

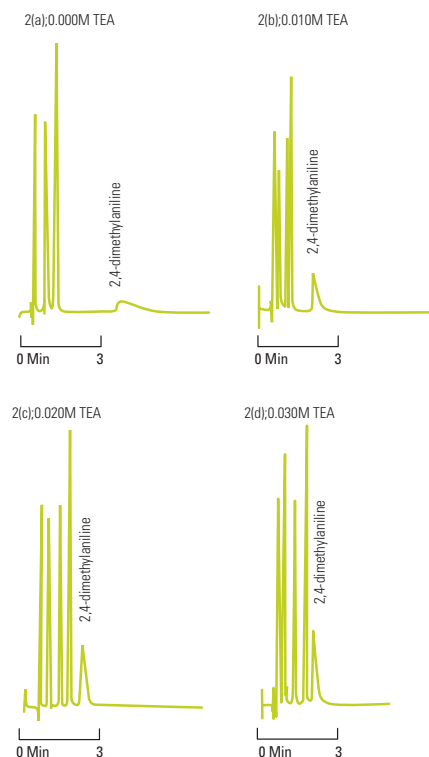
Properties of Triethylamine

- Alternate names TEA, Diethylethanamine
- Molecular formula $C_6H_{15}N$
- Molecular weight 101.19
- Density 0.726g/mL

Triethylamine (TEA)

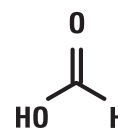
Description	Quantity	Cat. No.	Quantity
Triethylamine, Sequencing Grade	100g	X TS-25108	1 Each

X in the ordering table indicates that hazardous shipping charges apply.



Formic Acid Ampules

Well suited for HPLC and mass spectrometry applications



Formic Acid
MW 46.03

Formic acid is a component found in reverse-phase mobile phases to provide protons for LC-MS analysis. The presence of a low concentration of formic acid in the mobile phase is also known to improve the peak shapes of the resulting separation. Unlike trifluoroacetic acid (TFA), formic acid is not an ion-pairing reagent, and it does not suppress MS ionization of polypeptides when used as a mobile phase component.

- Prescored, nitrogen-flushed, amber glass to protect formic acid from light and moisture
- 99% purity for consistent LC baselines and no interference introduced into LC and mass spectrometry applications
- Convenient format simplifies preparation of gradient and isocratic mobile phases containing 0.1% (v/v) formic acid in water or acetonitrile
- Contents of a single vial in a final volume of 1L solvent yields a mobile phase of the most common formic acid concentration

Formic Acid Ampules

Description	Quantity	Cat. No.	Quantity
Formic Acid 99+%	10 x 1mL ampules	TS-28905	1 Each

For complex peptide separations, the key to success can be to vary selectivity. Varying mobile phase composition on the same column can change selectivity enough to resolve peptides that would otherwise overlap. The TFA concentration is usually specified as 0.1% for reverse-phase HPLC of peptides. For reproducible separations from run-to-run or from lab-to-lab, it is essential to make concentrations the same.



Derivatization and Visualization Reagents for HPLC

Trifluoroacetic Acid (TFA)

Routinely used ion-pairing agent in reversed-phase peptide separations

- Purity: >99.5% TFA and exceptional clarity allows sensitive, non-destructive peptide detection at low UV wavelengths
- High-performance packaging: Packaged under nitrogen in amber glass with protective TFE-lined fluorocarbon caps to ensure TFA integrity
- Choice of formats for convenience: 1mL ampules can prepare 1L of 0.1% v/v TFA solution for the mobile phase in reversed-phase chromatography in moments

Trifluoroacetic Acid (TFA)

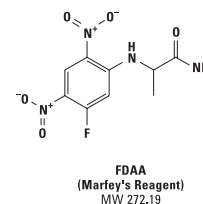
Description	Quantity	Cat. No.	Quantity
Trifluoroacetic Acid, Sequencing Grade	500mL	X TS-28901	1 Each
Trifluoroacetic Acid, Sequencing Grade	100g	X TS-28903	1 Each
Trifluoroacetic Acid, Sequencing Grade	10 × 1mL	X TS-28904	1 Pack
Trifluoroacetic Acid, Sequencing Grade	1g	X TS-28902	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

FDAA, Marfey's Reagent

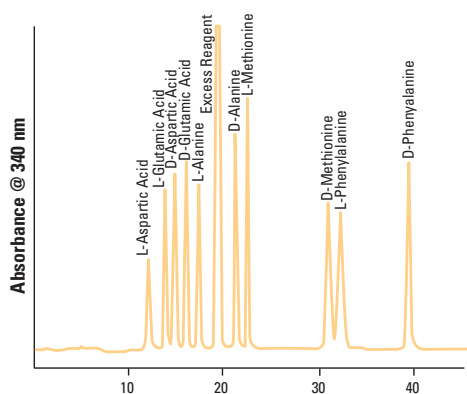
Makes separation and quantitation of optical isomers of amino acids by reversed-phase chromatography quick and easy

- Optical isomers of amino acids derivatization complete in just 90 minutes
- Derivatives have an absorption coefficient of $\sim 3 \times 10^4$
- Derivatives can be detected by UV at 340nm with picomole sensitivity



FDAA, Marfey's Reagent

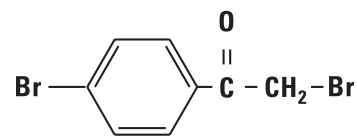
Description	Quantity	Cat. No.	Quantity
FDAA, Marfey's Reagent	50mg	TS-48895	1 Each



p-Bromophenacylate Reagent

Gives quantitative yields with few or no side reactions

- Premixing of phenacylbromide and crown ether is not necessary
- Derivatization is both rapid and quantitative, with yields of >95% in 15 to 20 minutes at 80°C
- Excess reactants do not interfere
- Large excess of alkylating reagent is not necessary
- Small amounts of water or alcohol do not interfere
- If isolation is desired, products are usually crystalline



p-Bromophenacylate
MW 277.94

p-Bromophenacylate Reagent

Description	Quantity	Cat. No.	Quantity
p-Bromophenacylate Reagent	10mL	TS-48891	1 Each

TNBSA (Trinitrobenzene Sulfonic Acid)

An excellent choice for spectrophotometric detection

- Couples with primary amines, sulfhydryls and hydrazides in aqueous solution at pH 8, without undesirable side reactions
- Excellent for solution or solid phase analysis
- Suitable for qualitative and quantitative estimation of biomolecules; including amino acids, peptides or proteins
- Chromogenic, $O_{\max} = 335\text{nm}$
- Colored derivatives are monitored at 345nm and have extinction coefficients in range of $1-1.5 \times 10^4$

TNBSA

Description	Quantity	Cat. No.	Quantity
TNBSA	100mL	X TS-28997	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

Hydrolysis Reagents

Constant Boiling (6N) Hydrochloric Acid

Sequencing-grade reagent for total protein hydrolysis

- Hydrolyzes peptides in 6 hours at 150°C
- Specially purified to give ninhydrin-negative blank on hydrolysis
- Packaged in prescored ampules to eliminate contamination and ensure product integrity

Constant Boiling (6N) Hydrochloric Acid

Description	Quantity	Cat. No.	Quantity
Hydrochloric Acid 6N	10 × 1mL	TS-24308	1 Pack

Amino Acid Standard H

High-purity calibration standard for protein hydrolysates

- Uses L-form configuration to permit standardization of microbial and other assays
- Molar concentration verified by conventional amino acid analysis methods
- With the exception of cystine, each amino acid is supplied at a concentration of 2.5µmoles/mL in 0.1N HCl

The following amino acids are included in Amino Acid Standard H:

L-Alanine, Ammonia [(NH₄)₂SO₄], L-Arginine, L-Aspartic Acid, L-Cystine, L-Glutamic Acid, Glycine, L-Histidine, L-Isoleucine, L-Leucine, L-Lysine•HCl, L-Methionine, L-Phenylalanine, L-Proline, L-Serine, L-Threonine, L-Tyrosine, L-Valine.

Amino Acid Standard H

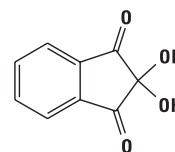
Description	Quantity	Cat. No.	Quantity
Amino Acid Standard H	10 × 1mL	TS-20088	1 Pack

When kept frozen, an unopened vial has an indefinite storage life. Once the seal is broken, the reagent has a maximum storage life of six months. Store frozen between uses.

Amino Acid Detection Reagents

Ninhydrin

The reagent of choice for detection of amino acids



Ninhydrin
MW 178.14

- Used in amino acid chromatography
- Offers superb color response and low blank
- Indefinitely stable and requires no refrigeration

Ninhydrin

Description	Quantity	Cat. No.	Quantity
Ninhydrin	500g	TS-21003	1 Each

Indefinitely stable. No refrigeration required. Keep bottle tightly sealed. Avoid exposure to direct sunlight and ammonia.

HPLC and Spectrophotometric Grade Solvents

Ultrapure solvents are carefully packed for thorough protection

- Distilled in glass, filtered through 0.2µm TFE membranes and packed in solvent-rinsed, amber glass bottles
- TFE-lined screw caps seal bottles

Acetonitrile, HPLC Grade, Physical Properties

- UV Cutoff: 190nm
- Optical Absorbance: <0.02 at 220nm
- Refractive Index at 25°C: 1.342

Water, HPLC Grade, Physical Properties

- UV Cutoff: 190nm
- Optical Absorbance: <0.005 at 220nm
- Refractive Index at 25°C: 1.332

Dimethylformamide (DMF), Sequencing Grade, Physical Properties

- $\text{HCON}(\text{CH}_3)_2$
- Purity (GC): ≥99%
- MW: 73.09
- Density: 0.944
- B.P. 153°C
- Water: 0.1%

Dimethylsulfoxide (DMSO), Sequencing Grade, Physical Properties

- $\text{C}_2\text{H}_6\text{OS}$
- Purity (GC): >99.5%
- MW: 78.13
- Density: 1.101
- Water: ≤0.2%

Pyridine, Physical Properties

- $\text{C}_5\text{H}_5\text{N}$
- Purity (GC): ≥99%
- MW: 79.10
- Density: 0.978
- B.P. 115°C

HPLC and Spectrophotometric Grade Solvents

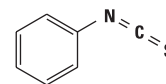
Description	Quantity		Cat. No.	Quantity
Acetonitrile	1L	X	TS-51101	1 Each
Water	1L		TS-51140	1 Each
Dimethylformamide (DMF)	50mL	X	TS-20673	1 Each
Dimethylsulfoxide (DMSO)	950mL	X	TS-20688	1 Each
Pyridine	100g	X	TS-25104	1 Each

X in the ordering table indicates that hazardous shipping charges apply.

High-Purity Pre-Column Derivatization Reagents

PITC (Phenylisothiocyanate)

High-purity reagent for pre-column quantitative derivatization of amino acids by reversed-phase HPLC



PITC
Edman's Reagent
MW 135.19

- Also known as Edman's Reagent
- Reacts readily with amino acids in 5 to 10 minutes at room temperature
- Resulting phenylthiocarbonyl derivatives can be separated and quantified in 30 minutes using reverse-phase HPLC to produce stable products with all amino acids including proline

PITC (Phenylisothiocyanate)

Description	Quantity	Cat. No.	Quantity
PITC (Edman's Reagent)	10 × 1mL	TS-26922	1 Pack

Peptide Standards

Peptide Retention Standard

Allows accurate prediction of elution time for peptides of known amino acid composition up to 20 residues in length

- Save time in peptide purification
- Simplify identification of specific peptides in a complex mixture
- Increase the efficiency of predicting peptide elution profiles
- Determine the relative order of peptide elution of a complex mixture
- Evaluate reverse-phase supports of varying n-alkyl chain lengths and ligand densities

Retention times are predicted by totaling the values that represent the contribution in minutes of each amino acid residue and the peptide terminal groups. Retention time is dependent upon the molecular weight of the peptide. The effect on retention is relatively unimportant with a small peptide, but it increases with the size of the molecule. The accuracy of predicting peptide retention time significantly decreases beyond 20 residues. To ensure accuracy, a peptide standard is used to correct for instrument variation, column aging, n-alkyl chain length variation and ligand density.

Peptide Retention Standard

Description	Quantity	Cat. No.	Quantity
Peptide Retention Standard, S1-S5	1 vial	TS-31700	1 Each

Peptide Retention Time Calibration Mixture

Heavy peptide mixture for column assessment and prediction of peptide retention times

- Assessment of chromatography and MS instrument performance
- Prediction of peptide retention across multiple instrument platforms
- Prediction of peptide retention time from sequence using calculated hydrophobicity factor
- Optimization of scheduled MS acquisition windows for improving quantification and increased multiplexing
- Internal standard to normalize for variation in retention times and peak intensities between runs

Peptide Retention Time Calibration Mixture

Description	Quantity	Cat. No.	Quantity
Peptide Retention Time Calibration Mixture, 0.5pmol/μL	50μL	TS-88320	1 Each
Peptide Retention Time Calibration Mixture, 5pmol/μL	200μL	TS-88321	1 Each

LC and LC-MS Instruments

Our liquid chromatographs and mass spectrometers advance scientific knowledge, enable drug discovery, improve manufacturing processes and protect people and the environment. You can expect the best results and highest productivity, keeping your research or processes moving smoothly.

Vanquish Flex System

The Thermo Scientific™ Vanquish™ Flex system is a biocompatible UHPLC system with state-of-the-art quaternary solvent blending, ideally suited for the biopharma industry.

The Vanquish UHPLC platform is designed to set new benchmarks on accuracy, precision, and sensitivity in liquid chromatography. As a new part of this family, the Vanquish Flex system shares all Vanquish-inherent values, such as a design focus on uptime, robustness and reliability.



Vanquish System

The Vanquish system takes high-end UHPLC to a new level, offering more resolution while meeting the throughput demands of modern laboratories. The system is driven by the gold standard Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS) software and delivers better separations, more results and easier interaction. The Vanquish system delivers these values simultaneously, without compromise.

When combined with the Thermo Scientific Charger module, the Vanquish system allows for added sample capacity, performing the highest throughput UHPLC analysis. This setup combines enough sample capacity to run over the weekend, while Chromeleon CDS ensures convenient sample tracking and results processing of even the largest sample sets.

Visit www.thermoscientific.com/vanquish



Basic Automated and Standard (SD) Systems

The Thermo Scientific™ Dionex™ UltiMate™ 3000 Basic Automated System is optimized for reliability and ease-of-use with routine LC applications, and also offers full UHPLC compatibility. The ACC-3000 Autosampler Column Compartment is at the heart of the system. Its unique instrument design combines a rugged sample injection principle with a powerful column oven.

UltiMate 3000 Standard (SD) Systems are designed to meet current and future challenges. System components provide low extra-column and gradient delay volume for high separation efficiency and low gradient response times, as well as superior mixing performance. They offer full support of all HPLC applications and provide UHPLC compatibility – allowing you to move to UHPLC whenever you are ready.

Visit www.thermoscientific.com



Rapid Separation (RS) and BioRS Systems

UltiMate 3000 Rapid Separation (RS) Systems provides unrivaled performance and flexibility in UHPLC. Precision-engineered instrumentation, advanced data processing, and highly optimized chemistries meet all chromatographic performance challenges. With an outstanding product portfolio, UltiMate 3000 RS Systems offers industry-leading versatility covering the maximum range of UHPLC applications, while keeping fully compatible to conventional LC.

UltiMate 3000 Biocompatible Rapid Separation (BioRS) Systems are powered by UltiMate 3000 Rapid Separation technology to support the high pressures required for the separation of bioanalytes on high resolution bio UHPLC columns. This state-of-the-art technology combined with a biocompatible, low-dispersion flow path, provides the highest peak capacity and sensitivity for complex samples, whether proteins, peptides, or biotherapeutics. Bio UHPLC enables faster gradients and shorter run times compared to conventional Bio LC analysis. This results in increased sample throughput in typical modes of biochromatography.

Visit www.thermoscientific.com



x2 Dual LC Systems

UltiMate 3000 x2 Dual LC Systems are the ideal choice to maximize sample throughput of conventional HPLC and UHPLC separations by combining the flexibility of ternary solvent selection with the productivity and performance of x2 Dual technology.

Operate conventional or high speed applications, increase sample throughput, achieve higher chromatographic resolution, or automate tedious sample preparation steps such as analyte enrichment or matrix elimination.

Visit www.thermoscientific.com



Thermo Scientific LC-MS Systems

Ion Traps and Orbitrap Series

Thermo Scientific™ Orbitrap™ LC-MS systems are the recognized standards for high-resolution, accurate-mass measurements.

Orbitrap LC-MS technology routinely delivers the superior mass resolution and mass accuracy necessary to reduce analysis times and increase confidence in results. This makes it the platform of choice for the most confident protein and metabolite identification, characterization and quantitation. Combined with superior dynamic range and unsurpassed sensitivity, Orbitrap systems are the only mass spectrometers capable of providing all four benefits at the same time, without compromise.

With market and technology leadership for over 25 years, we offer ion trap LC-MS systems for every application and budget. Ion trap LC-MS systems offer unique capabilities such as MSⁿ and data-dependent analysis along with excellent full-scan sensitivity to provide routine detection and rapid identification of low-level analytes. Ion trap systems support a variety of applications from compound identification and routine HPLC detection through the most demanding analyses of low-level components in complex biological matrices.

Visit www.thermoscientific.com/orbitrap

TSQ Series Triple Quadrupole LC-MS

Robust triple-stage quadrupole LC-MS systems enable ultra-sensitive quantitation of target compounds in complex matrices.

TSQ Series triple-stage quadrupole LC-MS systems offer a wide range of capabilities. From the value-conscious Thermo Scientific™ TSQ Endura™ LC-MS to the precise Thermo Scientific™ TSQ Quantiva™ LC-MS, our mass spectrometers couple perfectly with our HPLC, UHPLC, and nano-LCs to easily accommodate complex matrices encountered in a variety of applications.

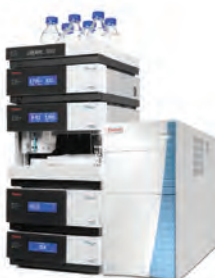
Visit www.thermoscientific.com/tsq

MSQ Plus Single Quadrupole LC-MS

Our single quadrupole LC-MS system offers superior ease-of-use and modest price and space requirements.

The system can be used with both HPLC and IC systems in a wide range of applications and methodologies.

Visit www.thermoscientific.com



Terms and Conditions of Sale

UNLESS OTHERWISE EXPRESSLY AGREED IN WRITING, ALL SALES ARE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

1. **GENERAL.** Thermo Fisher Scientific ("Seller") hereby offers for sale to the buyer named on the face hereof ("Buyer") the products listed on the face hereof (the "Products") on the express condition that Buyer agrees to accept and be bound by the terms and conditions set forth herein. Any provisions contained in any document issued by Buyer are expressly rejected and if the terms and conditions in this Agreement differ from the terms of Buyer's offer, this document shall be construed as a counter offer and shall not be effective as an acceptance of Buyer's document. Buyer's receipt of Products or Seller's commencement of the services provided hereunder will constitute Buyer's acceptance of this Agreement. This is the complete and exclusive statement of the contract between Seller and Buyer with respect to Buyer's purchase of the Products. No waiver, consent, modification, amendment or change of the terms contained herein shall be binding unless in writing and signed by Seller and Buyer. Seller's failure to object to terms contained in any subsequent communication from Buyer will not be a waiver or modification of the terms set forth herein. All orders are subject to acceptance in writing by an authorized representative of Seller.

2. **PRICE.** All prices published by Seller or quoted by Seller's representatives may be changed at any time without notice. All prices quoted by Seller or Seller's representatives are valid for thirty (30) days, unless otherwise stated in writing. All prices for the Products will be as specified by Seller or, if no price has been specified or quoted, will be Seller's price in effect at the time of shipment. All prices are subject to adjustment on account of specifications, quantities, raw materials, cost of production, shipment arrangements or other terms or conditions which are not part of Seller's original price quotation.

3. **TAXES AND OTHER CHARGES.** Prices for the Products exclude all sales, value added and other taxes and duties imposed with respect to the sale, delivery, or use of any Products covered hereby, all of which taxes and duties must be paid by Buyer. If Buyer claims any exemption, Buyer must provide a valid, signed certificate or letter of exemption for each respective jurisdiction.

4. **TERMS OF PAYMENT.** Seller may invoice Buyer upon shipment for the price and all other charges payable by Buyer in accordance with the terms on the face hereof. If no payment terms are stated on the face hereof, payment shall be net thirty (30) days from the date of invoice. If Buyer fails to pay any amounts when due, Buyer shall pay Seller interest thereon at a periodic rate of one and one-half percent (1.5%) per month (or, if lower, the highest rate permitted by law), together with all costs and expenses (including without limitation reasonable attorneys' fees and disbursements and court costs) incurred by Seller in collecting such overdue amounts or otherwise enforcing Seller's rights hereunder. Seller reserves the right to require from Buyer full or partial payment in advance, or other security that is satisfactory to Seller, at any time that Seller believes in good faith that Buyer's financial condition does not justify the terms of payment specified. All payments shall be made in U.S. Dollars.

5. **DELIVERY; CANCELLATION OR CHANGES BY BUYER.** The Products will be shipped to the destination specified by Buyer, F.O.B. Seller's shipping point. Seller will have the right, at its election, to make partial shipments of the Products and to invoice each shipment separately. Seller reserves the right to stop delivery of Products in transit and to withhold shipments in whole or in part if Buyer fails to make any payment to Seller when due or otherwise fails to perform its obligations hereunder. All shipping dates are approximate only, and Seller will not be liable for any loss or damage resulting from any delay in delivery or failure to deliver which is due to any cause beyond Seller's reasonable control. In the event of a delay due to any cause beyond Seller's reasonable control, Seller reserves the right to terminate the order or to reschedule the shipment within a reasonable period of time, and Buyer will not be entitled to refuse delivery or otherwise be relieved of any obligations as the result of such delay. Products as to which delivery is delayed due to any cause within Buyer's control may be placed in storage by Seller at Buyer's risk and expense and for Buyer's account. Orders in process may be canceled only with Seller's written consent and upon payment of Seller's cancellation charges. Orders in process may not be changed except with Seller's written consent and upon agreement by the parties as to an appropriate adjustment in the purchase price therefor. Credit will not be allowed for Products returned without the prior written consent of Seller.

6. **TITLE AND RISK OF LOSS.** Notwithstanding the trade terms indicated above and subject to Seller's right to stop delivery of Products in transit, title to and risk of loss of the Products will pass to Buyer upon delivery of possession of the Products by Seller to the carrier; provided, however, that title to any software incorporated within or forming a part of the Products shall at all times remain with Seller or the licensor(s) thereof, as the case may be.

7. **WARRANTY.** Seller warrants that the Products will operate or perform substantially in conformance with Seller's published specifications and be free from defects in material and workmanship, when subjected to normal, proper and intended usage by properly trained personnel, for the period of time set forth in the product documentation, published specifications or package inserts. If a period of time is not specified in Seller's product documentation, published specifications or package inserts, the warranty period shall be one (1) year from the date of shipment to Buyer for equipment and ninety (90) days for all other products (the "Warranty Period"). Seller agrees during the Warranty Period, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said published specifications; provided that Buyer shall (a) promptly notify Seller in writing upon the discovery of any defect, which notice shall include the product model and serial number (if applicable) and details of the warranty claim; and (b) after Seller's review, Seller will provide Buyer with service data and/or a Return Material Authorization ("RMA"), which may include biohazard decontamination procedures and other product-specific handling instructions, then, if applicable, Buyer may return the defective Products to Seller with all costs prepaid by Buyer. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Shipment to Buyer of repaired or replacement Products shall be made in accordance with the Delivery provisions of the Seller's Terms and Conditions of Sale. Consumables are expressly excluded from this warranty.

Notwithstanding the foregoing, Products supplied by Seller that are obtained by Seller from an original manufacturer or third party supplier are not warranted by Seller, but Seller agrees to assign to Buyer any warranty rights in such Product that Seller may have from the original manufacturer or third party supplier, to the extent such assignment is allowed by such original manufacturer or third party supplier.

In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage and handling of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by this warranty, Buyer shall pay Seller therefor at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

THE OBLIGATIONS CREATED BY THIS WARRANTY STATEMENT TO REPAIR OR REPLACE A DEFECTIVE PRODUCT SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A DEFECTIVE PRODUCT. EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY STATEMENT, SELLER DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THE PRODUCTS, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE PRODUCTS ARE ERROR-FREE OR WILL ACCOMPLISH ANY PARTICULAR RESULT.

8. **INDEMNIFICATION.**

8.1 By Seller. Seller agrees to indemnify, defend and save Buyer, its officer, directors, and employees from and against any and all damages, liabilities, actions, causes of action, suits, claims, demands, losses, costs and expenses (including without limitation reasonable attorney's fees) ("Indemnified Items") for (i) injury to or death of persons or damage to property to the extent caused by the negligence or willful misconduct of Seller, its employees, agents or representatives or contractors in connection with the performance of services at Buyer's

premises under this Agreement and (ii) claims that a Product infringes any valid United States patent, copyright or trade secret; provided, however, Seller shall have no liability under this Section to the extent any such Indemnified Items are caused by either (i) the negligence or willful misconduct of Buyer, its employees, agents or representatives or contractors, (ii) by any third party, (iii) use of a Product in combination with equipment or software not supplied by Seller where the Product would not itself be infringing, (iv) compliance with Buyer's designs, specifications or instructions, (v) use of the Product in an application or environment for which it was not designed or (vi) modifications of the Product by anyone other than Seller without Seller's prior written approval. Buyer shall provide Seller prompt written notice of any third party claim covered by Seller's indemnification obligations hereunder. Seller shall have the right to assume exclusive control of the defense of such claim or, at the option of the Seller, to settle the same. Buyer agrees to cooperate reasonably with Seller in connection with the performance by Seller of its obligations in this Section.

Notwithstanding the above, Seller's infringement related indemnification obligations shall be extinguished and relieved if Seller, at its discretion and at its own expense (a) procures for Buyer the right, at no additional expense to Buyer, to continue using the Product; (b) replaces or modifies the Product so that it becomes non-infringing, provided the modification or replacement does not adversely affect the specifications of the Product; or (c) in the event (a) and (b) are not practical, refund to Buyer the amortized amounts paid by Buyer with respect thereto, based on a five (5) year amortization schedule. THE FOREGOING INDEMNIFICATION PROVISION STATES SELLER'S ENTIRE LIABILITY TO BUYER FOR THE CLAIMS DESCRIBED HEREIN.

8.2 By Buyer. Buyer shall indemnify, defend with competent and experienced counsel and hold harmless Seller, its parent, subsidiaries, affiliates and divisions, and their respective officers, directors, shareholders and employees, from and against any and all damages, liabilities, actions, causes of action, suits, claims, demands, losses, costs and expenses (including without limitation reasonable attorneys' fees and disbursements and court costs) to the extent arising from or in connection with (i) the negligence or willful misconduct of Buyer, its agents, employees, representatives or contractors; (ii) use of a Product in combination with equipment or software not supplied by Seller where the Product itself would not be infringing; (iii) Seller's compliance with designs, specifications or instructions supplied to Seller by Buyer; (iv) use of a Product in an application or environment for which it was not designed; or (v) modifications of a Product by anyone other than Seller without Seller's prior written approval.

9. **SOFTWARE.** With respect to any software products incorporated in or forming a part of the Products hereunder, Seller and Buyer intend and agree that such software products are being licensed and not sold, and that the words "purchase", "sell" or similar or derivative words are understood and agreed to mean "license", and that the word "buying" or similar or derivative words are understood and agreed to mean "licensing". Notwithstanding anything to the contrary contained herein, Seller or its licensor, as the case may be, retains all rights and interest in software products provided hereunder.

Seller hereby grants to Buyer a royalty-free, non-exclusive, nontransferable license, without power to sublicense, to use software provided hereunder solely for Buyer's own internal business purposes on the hardware products provided hereunder and to use the related documentation solely for Buyer's own internal business purposes. This license terminates when Buyer's lawful possession of the hardware products provided hereunder ceases, unless earlier terminated as provided herein. Buyer agrees to hold in confidence and not to sell, transfer, license, loan or otherwise make available in any form to third parties the software products and related documentation provided hereunder. Buyer may not disassemble, decompile or reverse engineer, copy, modify, enhance or otherwise change or supplement the software products provided hereunder without Seller's prior written consent. Seller will be entitled to terminate this license if Buyer fails to comply with any term or condition herein. Buyer agrees, upon termination of this license, immediately to return to Seller all software products and related documentation provided hereunder and all copies and portions thereof.

Certain of the software products provided by Seller may be owned by one or more third parties and licensed to Seller. Accordingly, Seller and Buyer agree that such third parties retain ownership of and title to such software products. The warranty and indemnification provisions set forth herein shall not apply to software products owned by third parties and provided hereunder.

10. **LIMITATION OF LIABILITY.** NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, THE LIABILITY OF SELLER UNDER THESE TERMS AND CONDITIONS (WHETHER BY REASON OF BREACH OF CONTRACT, TORT, INDEMNIFICATION, OR OTHERWISE, BUT EXCLUDING LIABILITY OF SELLER FOR BREACH OF WARRANTY (THE SOLE REMEDY FOR WHICH SHALL BE AS PROVIDED UNDER SECTION 7 ABOVE)) SHALL NOT EXCEED AN AMOUNT EQUAL TO THE LESSER OF (A) THE TOTAL PURCHASE PRICE THEREFORE PAID BY BUYER TO SELLER WITH RESPECT TO THE PRODUCT(S) GIVING RISE TO SUCH LIABILITY OR (B) ONE MILLION DOLLARS (\$1,000,000). NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES (INCLUDING WITHOUT LIMITATION DAMAGES FOR LOSS OF USE OF FACILITIES OR EQUIPMENT, LOSS OF REVENUE, LOSS OF DATA, LOSS OF PROFITS OR LOSS OF GOODWILL), REGARDLESS OF WHETHER SELLER (a) HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES OR (b) IS NEGLIGENT.

11. **EXPORT RESTRICTIONS.** Buyer acknowledges that each Product and any related software and technology, including technical information supplied by Seller or contained in documents (collectively "Items"), is subject to export controls of the U.S. government. The export controls may include, but are not limited to, those of the Export Administration Regulations of the U.S. Department of Commerce (the "EAR"), which may restrict or require licenses for the export of Items from the United States and their re-export from other countries. Buyer shall comply with the EAR and all other applicable laws, regulations, laws, treaties, and agreements relating to the export, re-export, and import of any Item. Buyer shall not, without first obtaining the required license to do so from the appropriate U.S. government agency, (i) export or re-export any Item, or (ii) export, re-export, distribute or supply any Item to any restricted or embargoed country or to a person or entity whose privilege to participate in exports has been denied or restricted by the U.S. government. Buyer shall, if requested by Seller, provide information on the end user and end use of any Item exported by the Buyer or to be exported by the Buyer. Buyer shall cooperate fully with Seller in any official or unofficial audit or inspection related to applicable export or import control laws or regulations, and shall indemnify and hold Seller harmless from, in connection with, any violation of this Section by Buyer or its employees, consultants, or agents.

12. **MISCELLANEOUS.** (a) Buyer may not delegate any duties nor assign any rights or claims hereunder without Seller's prior written consent, and any such attempted delegation or assignment shall be void. (b) The rights and obligations of the parties hereunder shall be governed by and construed in accordance with the laws of the State of Seller's manufacturing location, without reference to its choice of law provisions. Each party hereby irrevocably consents to the exclusive jurisdiction of the state and federal courts located in the county and state of Seller's manufacturing location, in any action arising out of or relating to this Agreement and waives any other venue to which it may be entitled by domicile or otherwise. (c) In the event of any legal proceeding between the Seller and Buyer relating to this Agreement, neither party may claim the right to a trial by jury, and both parties waive any right they may have under applicable law or otherwise to a right to a trial by jury. Any action arising under this Agreement must be brought within one (1) year from the date that the cause of action arose. (d) The application to this Agreement of the U.N. Convention on Contracts for the International Sale of Goods is hereby expressly excluded. (e) In the event that any one or more provisions contained herein shall be held by a court of competent jurisdiction to be invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall remain in full force and effect, unless the enforcement materially changes the bargain. (f) Seller's failure to enforce, or Seller's waiver of a breach of, any provision contained herein shall not constitute a waiver of any other breach or of such provision. (g) Unless otherwise expressly stated on the Product or in the documentation accompanying the Product, the Product is intended for research only and is not to be used for any other purpose, including without limitation, unauthorized commercial uses, in vitro diagnostic uses, ex vivo or in vivo therapeutic uses, or any type of consumption by or application to humans or animals. (h) Buyer agrees that all pricing, discounts and technical information that Seller provides to Buyer are the confidential and proprietary information of Seller. Buyer agrees to (1) keep such information confidential and not disclose such information to any third party, and (2) use such information solely for Buyer's internal purposes and in connection with the Products supplied hereunder. Nothing herein shall restrict the use of information available to the general public. (i) Any notice or communication required or permitted hereunder shall be in writing and shall be deemed received when personally delivered or three (3) business days after being sent by certified mail, postage prepaid, to a party at the address specified herein or at such other address as either party may from time to time designate to the other.

Resources

for Chromatographers



Chromatography Resource Center

Our web-based resource center provides technical support, applications, technical tips and literature to help move your separations forward.

Visit www.thermoscientific.com/chromatography

How to order

USA and Canada

800 332 3331
865 354 4616 fax
chromatography@thermofisher.com

France

+33 (0)1 60 92 48 34
+33 (0)1 60 92 49 00 fax
Consommableslscgcf@thermofisher.com

Germany

+49 (0) 2423 9431 -20 or -21
+49 (0) 6103 408 1640 fax
lcgc.consumables.DE@thermofisher.com

United Kingdom

+44 1928 534110
+44 1928 534001 fax
lcgc.consumables@thermofisher.com

China

+86 21 6865 4588

India

+91 22 6742 9494
+91 27 1766 2352
+91 22 6742 9495 fax
analyze.in@thermofisher.com

Japan

+81 3 5826 1615
+81 3 5826 1611 fax
analyze.jp@thermofisher.com

Thermo Fisher Scientific Australia Pty Ltd

1300 735 292 (free call domestic)
1800 067 639 fax
AUinfo@thermofisher.com

Thermo Fisher Scientific New Zealand Ltd

0800 933 966 (free call domestic)
0800 329 246 fax
NZinfo@thermofisher.com

All Other Enquiries

+44 (0) 1928 534 050
+44 (0) 1928 534 049 fax
salesorders.columns.uk@thermofisher.com

Technical Support

**For advice and support,
please visit our website:**

www.thermoscientific.com/chromexpert

For more information visit: www.thermoscientific.com/chromatography

© 2015 Thermo Fisher Scientific Inc. All rights reserved.
Specifications, terms and pricing are subject to change. Not all products are available in all countries.
Please consult your local sales representative for details.

Thermo
SCIENTIFIC

A Thermo Fisher Scientific Brand