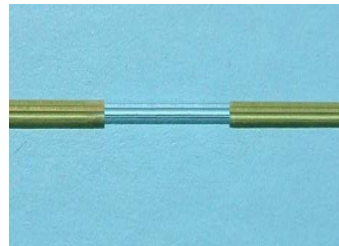
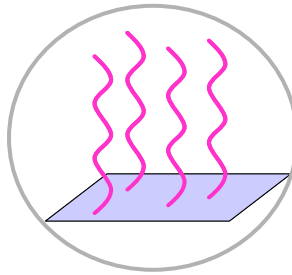
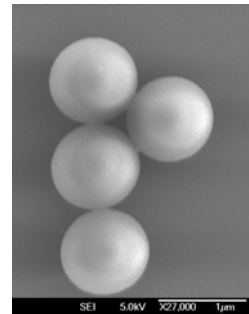


Separation Science & Surface Technology

Better Surface Chemistry for Better Separation



Sepax Technologies, Inc.

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2008-09

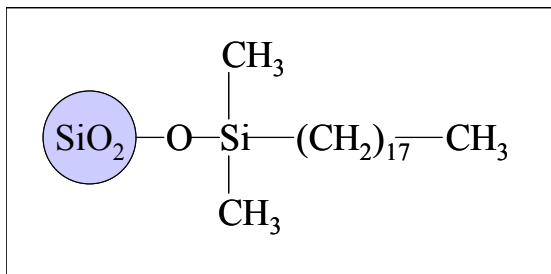
Silica Based Analytical HPLC Columns

Complete Selection of Stationary Phases



Sepax <i>GP</i> -C18	3-8
Sepax <i>HP</i> -C18	9-12
Sepax <i>Bio</i> -C18	13-14
Sepax <i>BR</i> -C18	15
Sepax <i>GP</i> -C8	16
Sepax <i>Bio</i> -C8	16
Sepax <i>GP</i> -C4	17
Sepax <i>Bio</i> -C4	17
Sepax <i>GP</i> -Phenyl	18
Sepax <i>HP</i> -Cyano	19
Sepax <i>HP</i> -Amino	20
Sepax <i>HP</i> -SCX	21
Sepax <i>HP</i> -Silica	22-24
Sepax HILIC Polar-100	25
Column price list	26-33

GP-C18

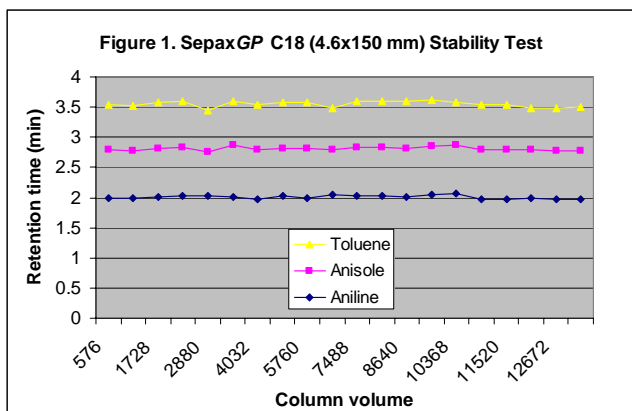


Specification

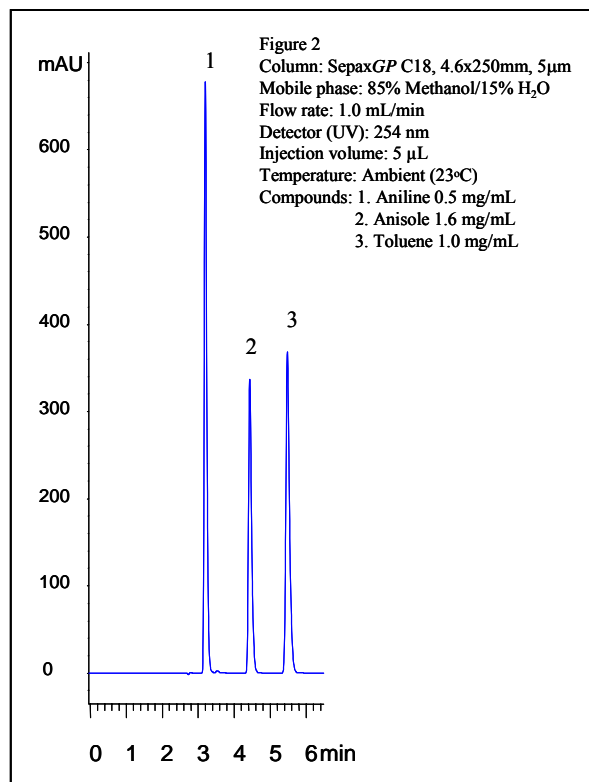
Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 1.8, 2.2, 3, 4, 5, 7 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 300 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 17%

Description

GP-C18 uses full coverage bonded silica packing, which provides exceptionally high stability. Figure 1 shows the highly reproducible retention time for three standard compounds: aniline, anisole and toluene after 13,000 column volume runs in a mobile phase of 85% methanol and 15% water. Such high stability allows GP-C18 extremely suitable for validation of various analytes.



The unique mono-functional bonding chemistry of GP-C18 avoids the formation of multiple C18 layers. Such uniform stationary phase allows the separation to achieve high selectivity and high efficiency. A typical test chromatogram for quality control is shown in Figure 2 using a 4.6x250mm GP-C18 column.



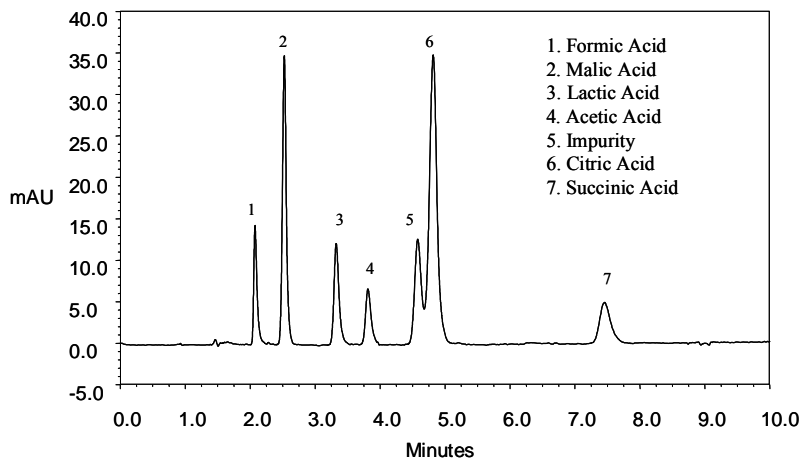
Characteristics

- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Suitable for separations of acidic, neutral and basic organic compounds, as well as pharmaceuticals, peptides, and others
- Recommended for separations in organic or mixed organic/aqueous mobile phases.

APPLICATIONS

Organic Acids

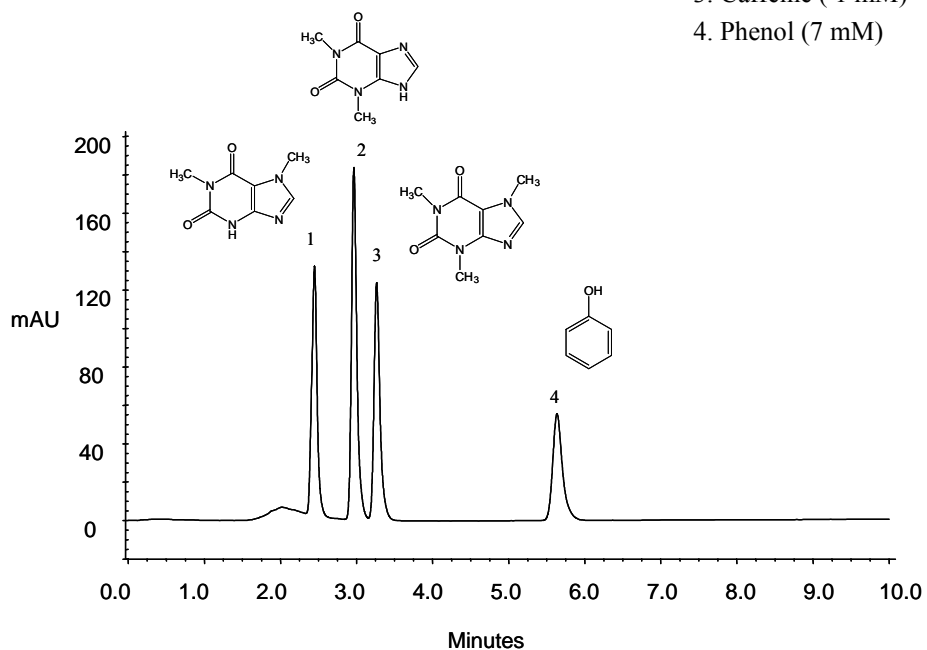
Column: GP-C18, 4.6x150mm, 5 μ m
Eluent: 0.10 M Phosphate buffer, pH 3.1
Flow rate: 1.0 mL/min
Detection: UV 210 nm
Injection: 5 μ L
Temperature: Ambient (23°C)
Compounds: Organic Acids (10 mM)



Purine Alkaloids

Alkaloids are naturally occurring basic compounds with heterocyclic ring structures. Due to ion-exchange and electrostatic interaction with the residual silanols (Si-OH), the separations with silica based reverse phases, such as C18 packing usually results in poor peak shape. The unique bonding chemistry of GP-C18 columns enables separation of alkaloids with high selectivity and high resolution.

Column: GP-C18, 4.6x150mm, 5 μ m
Eluent: 0.10 M Phosphate buffer, pH 3.1
Flow rate: 0.75 mL/min
Detection: UV 254 nm
Injection: 5 μ L
Temperature: Ambient (23°C)
Compounds: 1. Theobromine (1 mM)
2. Theophylline (1 mM)
3. Caffeine (1 mM)
4. Phenol (7 mM)



Catecholamines

Column: GP-C18, 4.6x150mm, 5 μ m

Eluent: 57 mM Citric Acid/43 mM NaAc/0.10 mM EDTA
(disodium form) / 1 mM Octanesulfonic Acid /
10% MeOH (pH 3.4)

Flow rate: 1.0 mL/min

Detection: Electrochemical Detection with GC
(+0.70 V vs. Ag/AgCl, 3 M KCl)

Injection: 25 μ L

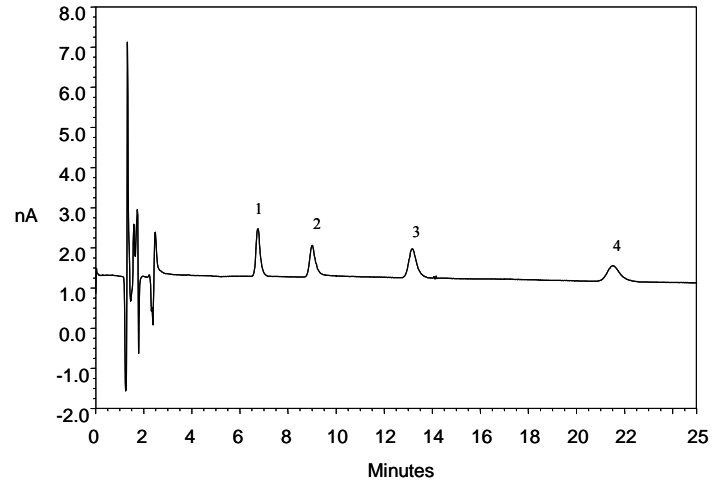
Temperature: Ambient (23°C)

Compounds: 1. Norepinephrine (100 nM)

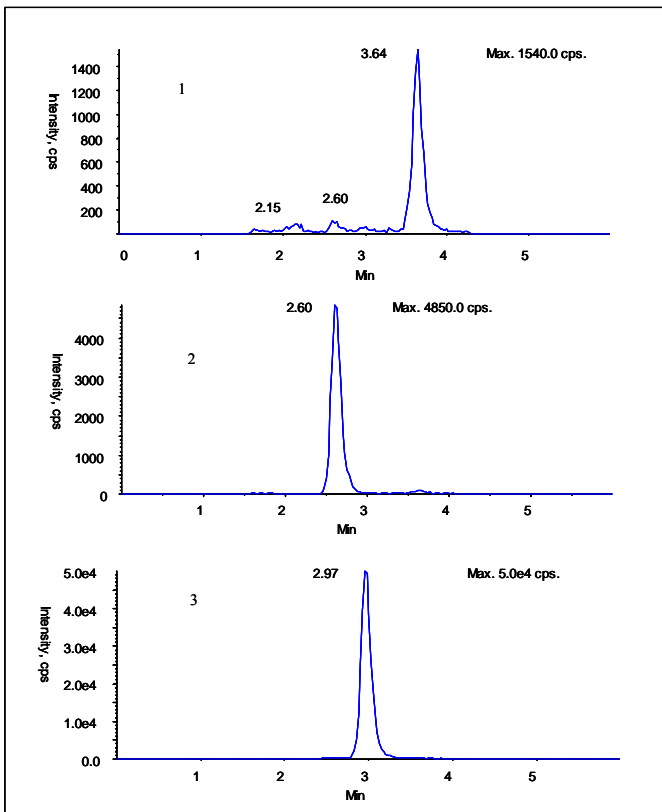
2. Ephinephrine (100 nM)

3. Dihydroxybenzylamine (100 nM)

4. Dopamine (100 nM)



LC/MS/MS Analysis of Pharmaceuticals



(Courtesy of Dr. John Lin of Avantix Laboratories)

Conditions

Column: Sepax GP-C18, 3 μ m, 50x2.1 mm

Mobile phase: 75:25/ACN:1.0 mM ammonium acetate in
water, pH 4.5

Flow rate: 0.2 mL/min

Injection volume: 10 μ L

Temperature: 25 °C

Instrument: API 4000 Q Trap LC-MS/MS system

Compounds:

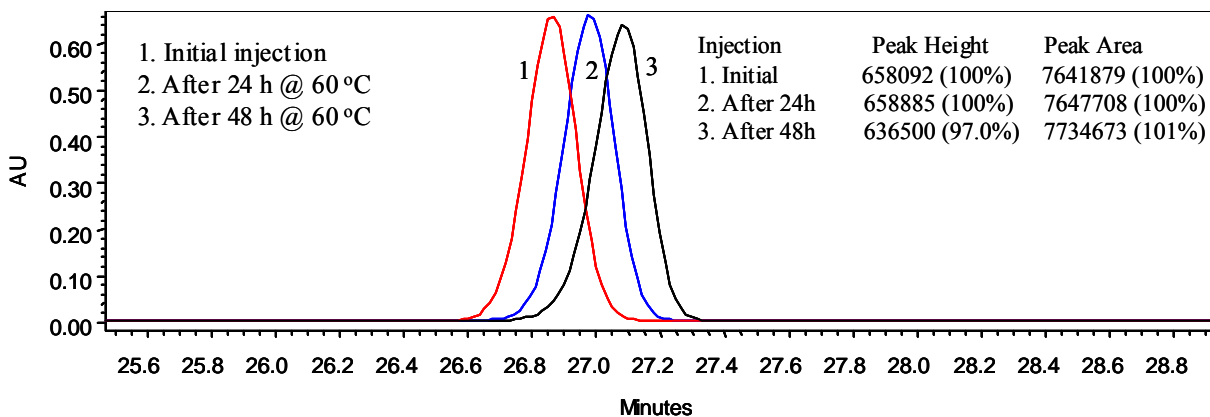
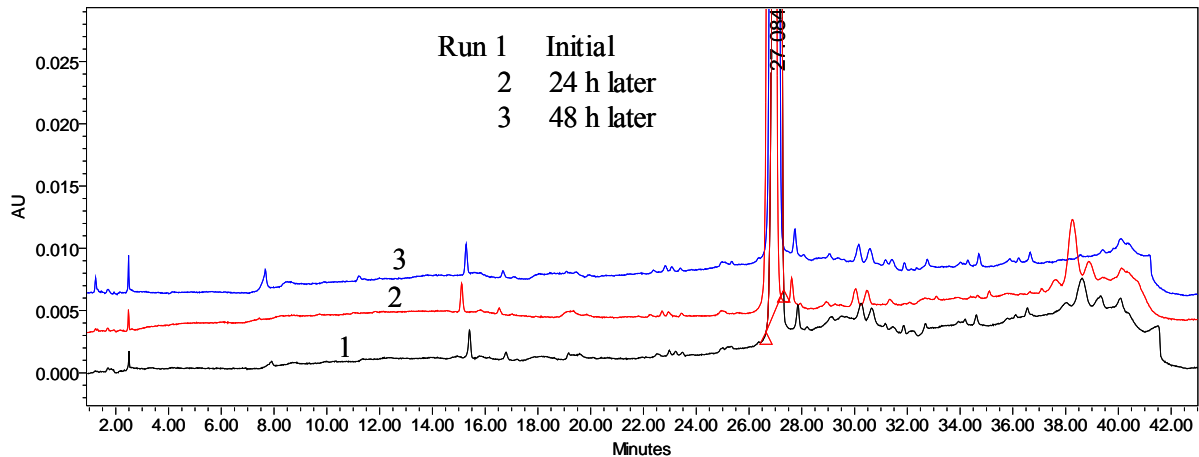
1. Simvastatin

2. Simvastatin hydroxyl acid

3. Lavastatin (internal standard)

Separation of pharmaceuticals at elevated temperature

GP-C18 has excellent stability in aqueous mobile phase at elevated temperature. When a GP-C18 column was tested with a real sample from a big US pharmaceutical company on 0.1 mL/min at 60°C for 24 and 48 hours, the separation chromatograms are shown below. The retention time variation is less than 1.0%, and the resolution change is less than 3.0%.



Separation conditions:

Column: GP-C18, 5 μ m, 4.6x150 mm

Mobile phase A: 99% Phosphate buffer (5.0 mM, pH 7.2)/1% Acetonitrile

B: 40% Phosphate buffer (5.0 mM, pH 7.2)/60% Acetonitrile

Gradient: Time (min)	A%	B%
0	100	0
3	100	0
38	0	100

Column Temperature: 60 °C

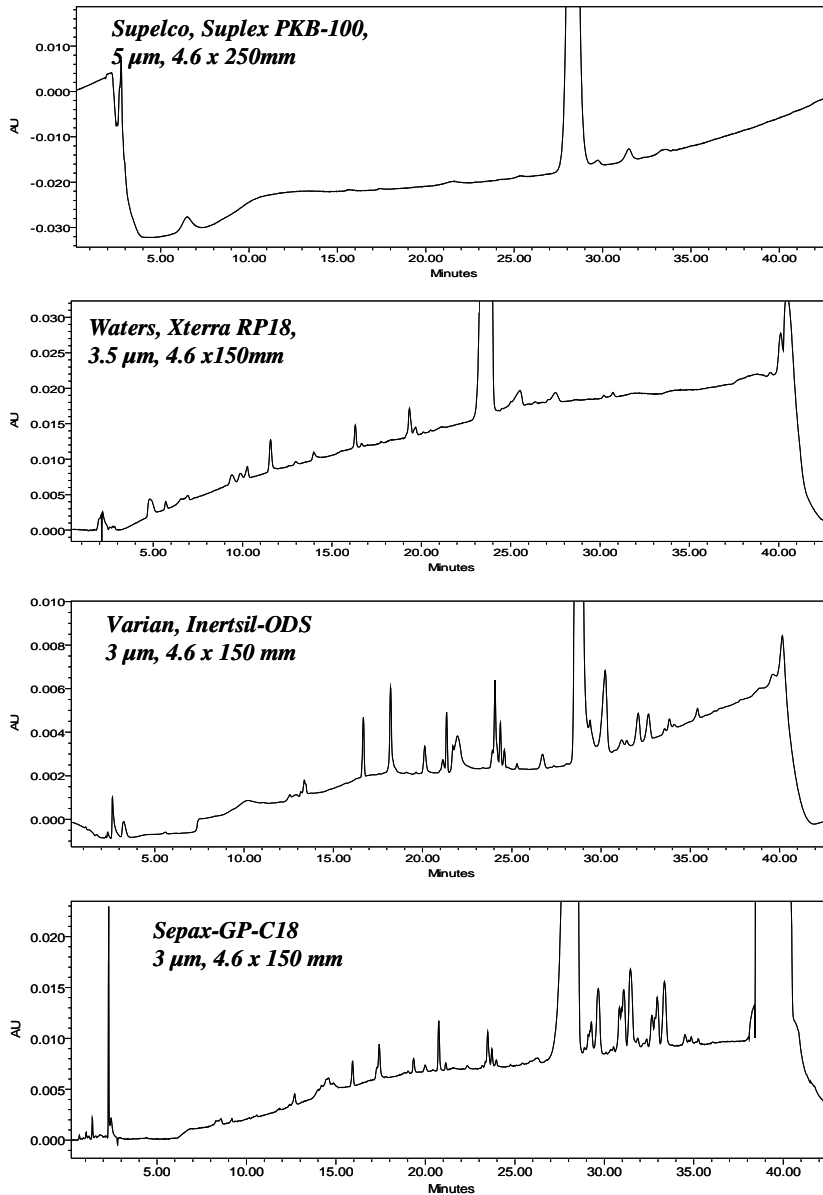
Flow rate: 1.0 mL/min

Detection wavelength: 210 nm

Sample: a real sample from one of big US pharmaceuticals (undisclosed)

Selectivity for GP-C18 and the Competitors' C18 Phases

Selectivity is very important for detection of the components of low abundance and impurities from the analysis of pharmaceuticals in the real applications. The comparative tests shown below from the method development of a drug molecule clearly demonstrated that GP-C18 is among the best products for high selectivity and sensitivity in detecting low abundant components and the impurities.



(Courtesy of Dr. Fang Liu, Novartis)

Column: Inertsil ODS-3, 3 μ m (Varian), Xterra RP18, 3.5 μ m (Waters), Suplex PKB-100, 5 μ m (Supelco), and Sepax GP-C18, 3 μ m

Mobile phase: A: 99% Boric buffer (5.0 mM, pH 7.0)/1% Acetonitrile

B: 40% Boric buffer (5.0 mM, pH 7.0)/60% Acetonitrile

Gradient: 0-3 min (100% A); 3-38min (0-100%B); 38-43 min (100% B)

Column Temperature: 50 $^{\circ}$ C

Flow rate: 1.0 mL/min

Detection wavelength: 210 nm

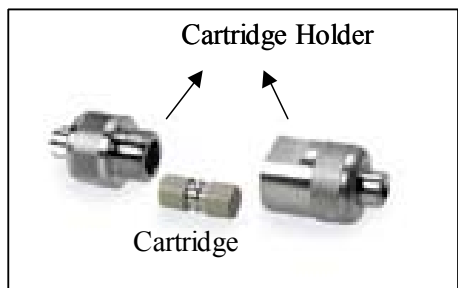
Sample: a real pharmaceutical sample (undisclosed)

GP-C18 Products

GP-C18	Pore size	P/N
5µm, 4.6x250mm	120Å	101185-4625
5µm, 4.6x150mm	120Å	101185-4615
5µm, 4.6x100mm	120Å	101185-4610
5µm, 4.6x50mm	120Å	101185-4605
5µm, 4.6x30mm	120Å	101185-4603
5µm, 3.0x250mm	120Å	101185-3025
5µm, 3.0x150mm	120Å	101185-3015
5µm, 3.0x100mm	120Å	101185-3010
5µm, 3.0x50mm	120Å	101185-3005
5µm, 3.0x30mm	120Å	101185-3003
5µm, 2.1x250mm	120Å	101185-2125
5µm, 2.1x150mm	120Å	101185-2115
5µm, 2.1x100mm	120Å	101185-2110
5µm, 2.1x50mm	120Å	101185-2105
5µm, 2.1x30mm	120Å	101185-2103
4µm, 4.6x250mm	120Å	101184-4625
4µm, 4.6x150mm	120Å	101184-4615
4µm, 4.6x100mm	120Å	101184-4610
4µm, 4.6x50mm	120Å	101184-4605
4µm, 4.6x30mm	120Å	101184-4603
4µm, 3.0x150mm	120Å	101184-3015
4µm, 3.0x100mm	120Å	101184-3010
4µm, 3.0x50mm	120Å	101184-3005
4µm, 3.0x30mm	120Å	101184-3003
4µm, 2.1x250mm	120Å	101184-2125
4µm, 2.1x150mm	120Å	101184-2115
4µm, 2.1x100mm	120Å	101184-2110
4µm, 2.1x50mm	120Å	101184-2105
4µm, 2.1x30mm	120Å	101184-2103
3µm, 4.6x250mm	120Å	101183-4625
3µm, 4.6x150mm	120Å	101183-4615
3µm, 4.6x100mm	120Å	101183-4610
3µm, 4.6x50mm	120Å	101183-4605
3µm, 4.6x30mm	120Å	101183-4603
3µm, 3.0x250mm	120Å	101183-3025
3µm, 3.0x150mm	120Å	101183-3015
3µm, 3.0x100mm	120Å	101183-3010
3µm, 3.0x50mm	120Å	101183-3005
3µm, 3.0x30mm	120Å	101183-3003
3µm, 2.1x150mm	120Å	101183-2115
3µm, 2.1x100mm	120Å	101183-2110
3µm, 2.1x50mm	120Å	101183-2105
3µm, 2.1x30mm	120Å	101183-2103

Guard Columns

GP-C18 guard	Pore size	P/N
For analytical column ID 2.1-3.0mm		
5µm, 2.0x10mm	120Å	101185-2001
5µm, 2.0x20mm	120Å	101185-2002
For analytical column ID 3.1-8.0mm		
5µm, 4.0x10mm	120Å	101185-4001
5µm, 4.0x20mm	120Å	101185-4002



Pre-Column Filters



HP-C18

ODS monolayer formed by special bonding chemistry does not collapse in pure aqueous solution.

Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 3, 4, 5, 7 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 300 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 17%

Pore size: 200 Å
Particle size: 3 and 5 µm
Pore volume: 1.0 ml/g
Surface area: 200 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 10%

Description

HP-C18 uses full coverage bonded silica packing, which provides exceptionally high stability. Compatible with 100% aqueous mobile phase suitable for separations of acidic, neutral and basic organic compounds, as well as pharmaceuticals and peptides.

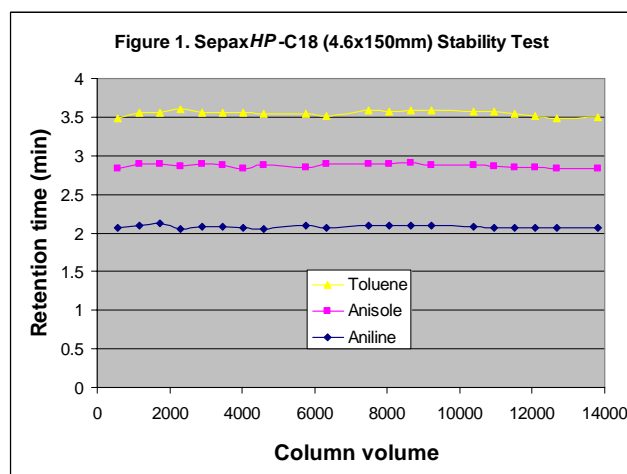
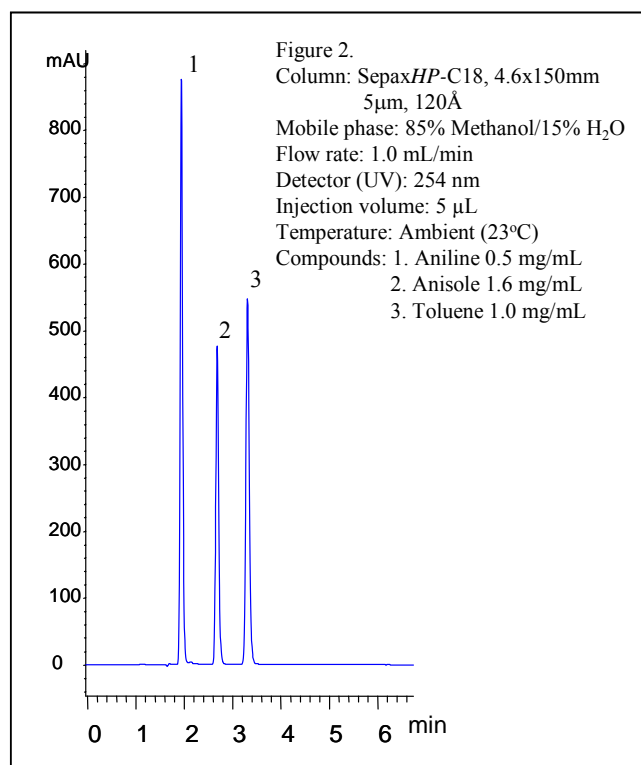


Figure 1 shows highly reproducible retention time for three standard compounds: aniline, anisole and toluene after 13,000 column volume runs in a mobile phase of 85% methanol and 15% water. Such high stability allows HP-C18 well suited for validation of various analytes. The unique mono-functional bonding chemistry of HP-C18

avoids the formation of multiple C18 layers. Such uniform stationary phase allows the separation to achieve high selectivity and high efficiency. A typical test chromatogram for quality control is shown in Figure 2 using a 4.6x150mm HP-C18 column.



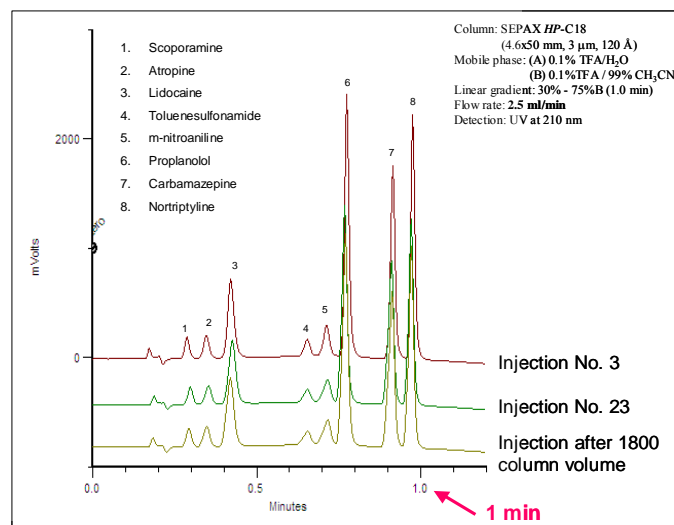
High Reproducibility

Figure 3 is a real application of HP-C18, showing fast separation of 8 pharmaceutical molecules by a 3 µm, 4.6x50mm short column. After 1800 column volume of “0.1% TFA and CH₃CN mobile phase” was pumped, the column still shows almost identical performance.

Characteristics

- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Compatible with 100% aqueous mobile phase
- Suitable for separations of acidic, neutral and basic organic compounds, as well as pharmaceuticals, peptides, and others

Figure 3. Reproducibility of fast separation of 8 drug molecules with a HP-C18 column (Courtesy of Miyako Kawakatsu, M&S Instruments Inc.).



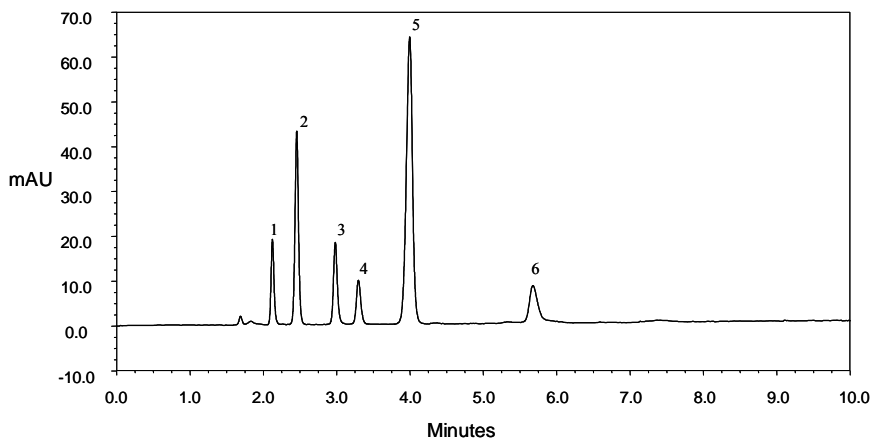
HP-C18 Products

Sepax HP-C18	Pore size	P/N	HP-C18	Pore size	P/N
5 μm, 4.6x250mm	120 Å	103185-4625	5 μm, 4.6x250mm	200 Å	104185-4625
5 μm, 4.6x150mm	120 Å	103185-4615	5 μm, 4.6x150mm	200 Å	104185-4615
5 μm, 4.6x100mm	120 Å	103185-4610	5 μm, 4.6x100mm	200 Å	104185-4610
5 μm, 4.6x50mm	120 Å	103185-4605	5 μm, 4.6x50mm	200 Å	104185-4605
5 μm, 4.6x30mm	120 Å	103185-4603	5 μm, 4.6x30mm	200 Å	104185-4603
5 μm, 2.1x250mm	120 Å	103185-2125	5 μm, 2.1x250mm	200 Å	104185-2125
5 μm, 2.1x150mm	120 Å	103185-2115	5 μm, 2.1x150mm	200 Å	104185-2115
5 μm, 2.1x100mm	120 Å	103185-2110	5 μm, 2.1x100mm	200 Å	104185-2110
5 μm, 2.1x50mm	120 Å	103185-2105	5 μm, 2.1x50mm	200 Å	104185-2105
5 μm, 2.1x30mm	120 Å	103185-2103	5 μm, 2.1x30mm	200 Å	104185-2103
3 μm, 4.6x250mm	120 Å	103183-4625	3 μm, 4.6x250mm	200 Å	104183-4625
3 μm, 4.6x150mm	120 Å	103183-4615	3 μm, 4.6x150mm	200 Å	104183-4615
3 μm, 4.6x100mm	120 Å	103183-4610	3 μm, 4.6x100mm	200 Å	104183-4610
3 μm, 4.6x50mm	120 Å	103183-4605	3 μm, 4.6x50mm	200 Å	104183-4605
3 μm, 4.6x30mm	120 Å	103183-4603	3 μm, 4.6x30mm	200 Å	104183-4603
3 μm, 2.1x250mm	120 Å	103183-2125	3 μm, 2.1x250mm	200 Å	104183-2125
3 μm, 2.1x150mm	120 Å	103183-2115	3 μm, 2.1x150mm	200 Å	104183-2115
3 μm, 2.1x100mm	120 Å	103183-2110	3 μm, 2.1x100mm	200 Å	104183-2110
3 μm, 2.1x50mm	120 Å	103183-2105	3 μm, 2.1x50mm	200 Å	104183-2105
3 μm, 2.1x30mm	120 Å	103183-2103	3 μm, 2.1x30mm	200 Å	104183-2103

Applications

Organic Acids

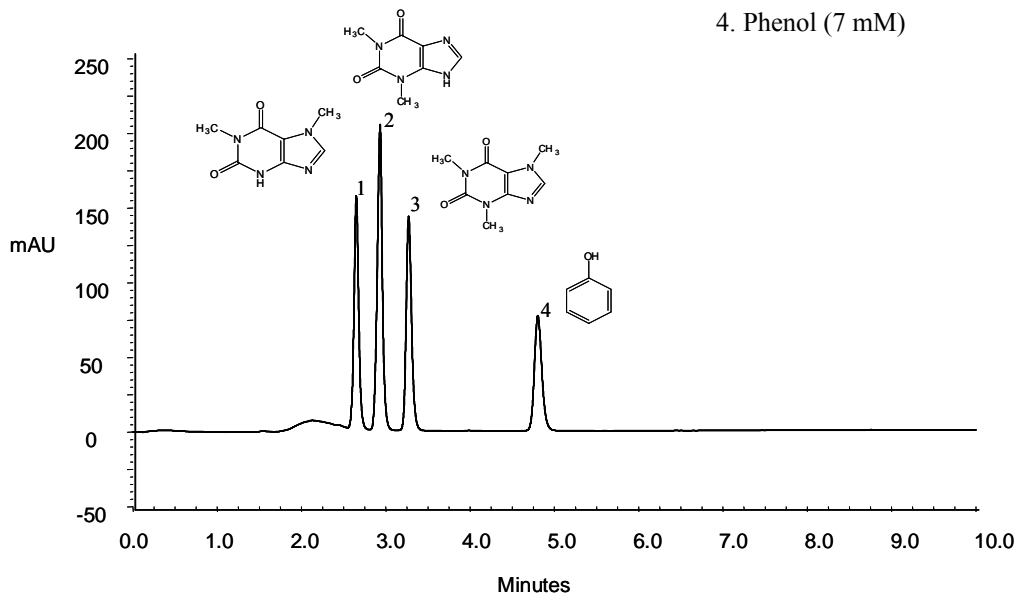
Column: HP-C18, 4.6x150mm,
5 μm , 200 \AA
Eluent: 0.10 M Phosphate buffer, pH 3.1
Flow rate: 1.0 mL/min
Detection: UV 210 nm
Injection: 5 μL
Temperature: Ambient (23 $^{\circ}\text{C}$)
Compounds: 1. Formic Acid (10 mM)
2. Malic Acid (10 mM)
3. Lactic Acid (10 mM)
4. Acetic Acid (10 mM)
5. Citric Acid (10 mM)
6. Succinic Acid (10 mM)



Purine Alkaloids

It is a challenge to separate alkaloids by silica based reverse phases, such as C18 packing, due to ion-exchange and electrostatic interactions between naturally occurring basic compounds of alkaloids with the residual silanols (Si-OH). Both GP-C18 and HP-C18 can separate alkaloids with high selectivity and high resolution. HP-C18 performs even better separation than GP-C18 for alkaloids due to its great compatibility with aqueous solution.

Column: HP-C18, 4.6x150mm, 5 μm
Eluent: 0.10 M Phosphate buffer, pH 3.1
Flow rate: 0.75 mL/min
Detection: UV 254 nm
Injection: 5 μL
Temperature: Ambient (23 $^{\circ}\text{C}$)
Compounds: 1. Theobromine (1 mM)
2. Theophylline (1 mM)
3. Caffeine (1 mM)
4. Phenol (7 mM)



Catecholamines

Column: HP-C18, 4.6x150mm, 5 µm

Eluent: 57 mM Citric Acid/43 mM NaAc/0.10mM

EDTA (disodium form) / 1 mM Octanesulfonic
Acid / 10% MeOH (pH 3.4)

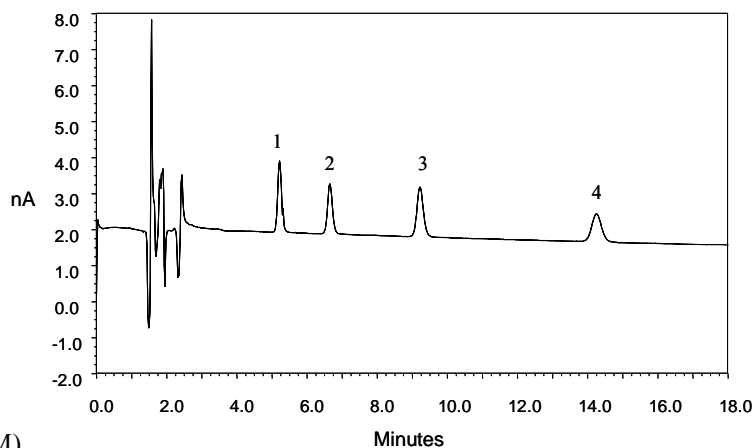
Flow rate: 1.0 mL/min

Detection: Electrochemical Detection with GC
(+ 0.70 V vs. Ag/AgCl, 3 M KCl)

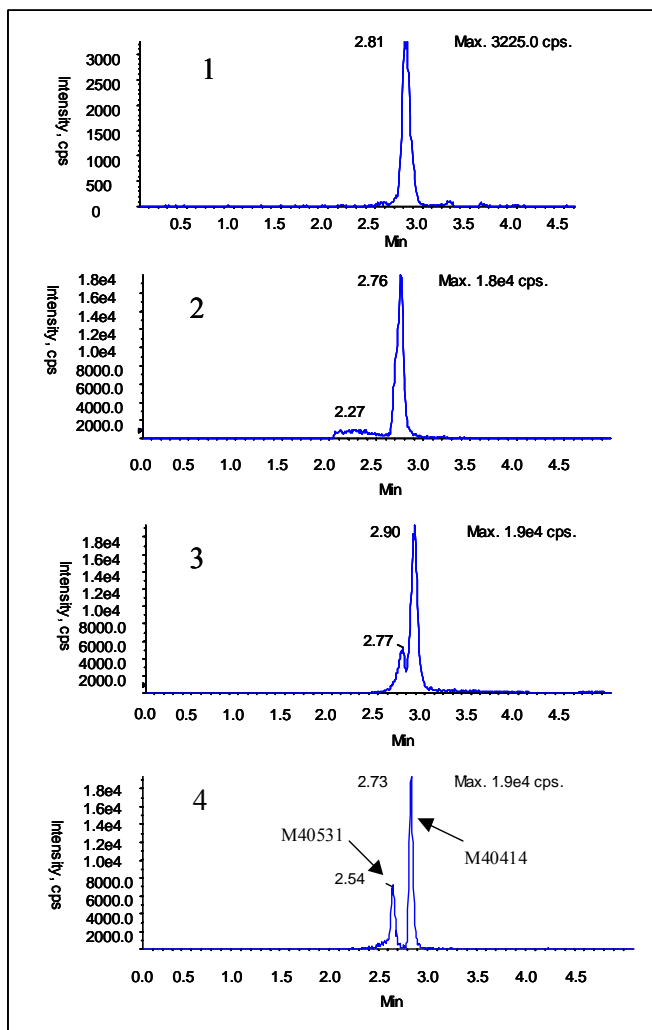
Injection: 25 µL

Temperature: Ambient (23°C)

Compounds: 1. Norepinephrine (NE, 100 nM)
2. Ephinephrine (E, 100 nM)
3. Dihydroxybenzylamine (DHBA, 100 nM)
4. Dopamine (DA, 100 nM)



LC/MS/MS analysis of organometallic complex isomers



(Courtesy of Dr. John Lin of Avantix Laboratories)

HP-C18 has better selectivity and resolution for organometallic complex isomers compared to other competitors' C18 phases.

Conditions:

Column selection:

1. Phenomenex, Synergi, Polar-RP, 4 µm, 50x2.0 mm
2. Keystone, AQ C18, 3 µm, 50x2.0 mm
3. MetaChem, Polaris-C18, 3 µm, 50x2.1 mm
4. HP C18, 3 µm, 50x2.1 mm

Mobile phase:

A: 0.1% TFA in water with 10 mM ammonium formate

B: 0.1% TFA in methanol with 10 mM ammonium
formate

Gradient elution

Flow rate: 0.5 mL/min

Injection volume: 10 µL

Temperature: 25 °C

Instrument: API 4000 LC-MS/MS system

Compounds:

Two organometallic complex isomers: M40403 and M40531 (The molecular structures were not disclosed from the customer.)

Bio-C18

C18 monolayer formed by special bonding chemistry does not collapse in pure aqueous solution.

Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 200 Å
Particle size: 3, 4, 5 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 200 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 10%

Pore size: 300 Å
Particle size: 3, 5 µm
Pore volume: 0.95 mL/g
Surface area: 105 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 7.0%

Description

Wide pore size and high compatibility with 100% aqueous phases make Bio-C18 columns ideal for high resolution mapping of peptides and separation of natural and synthetic peptides and small proteins. The specially designed surface bonding chemistry and the pore sizes allow for extended retention and selectivity for polar and hydrophilic compounds, such as peptides and amino acids.

A test chromatogram of Bio-C18 for quality control shown in Figure 1 exemplifies the high efficiency separation. Figure 2 shows the excellent separation of two 10-mer peptides on a 4.6x250 mm, 5µm, 200 Å Bio-C18 column.

Characteristics

- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Compatible with 100% aqueous mobile phase
- Suitable for separations of peptides, proteins, and pharmaceuticals

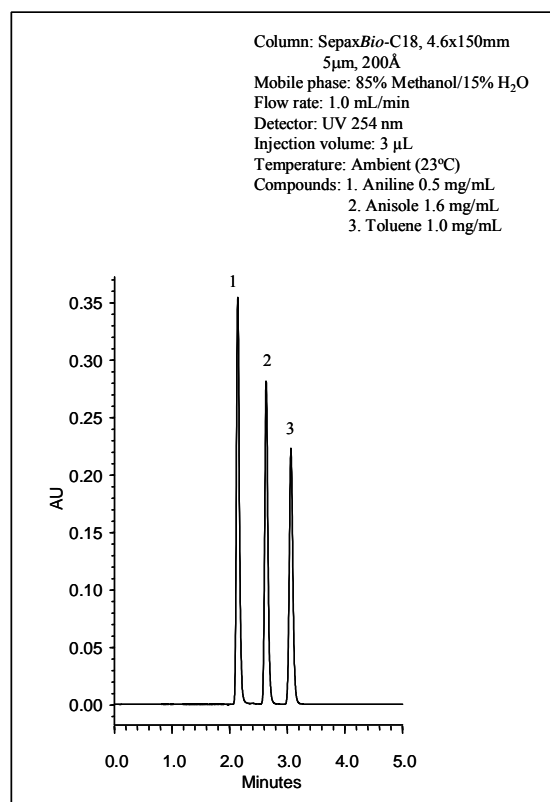


Figure 1. Test chromatogram of a Bio-C18 column.

Applications

Separation of Peptides

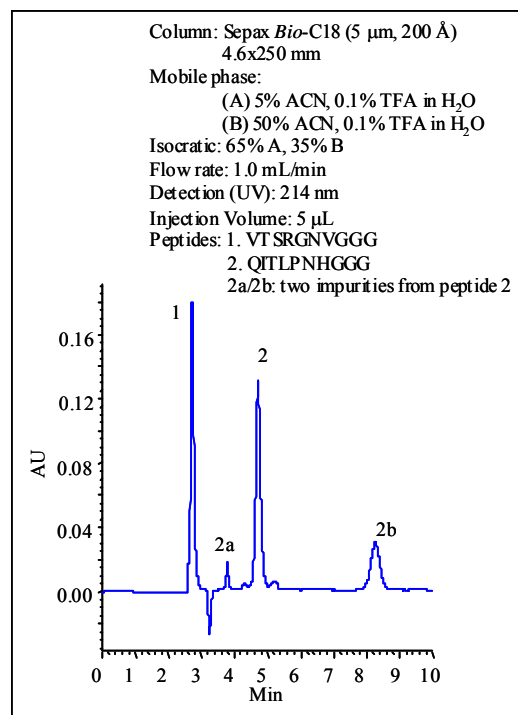


Figure 2. Separation of peptides and impurities.

Separation of biological molecules

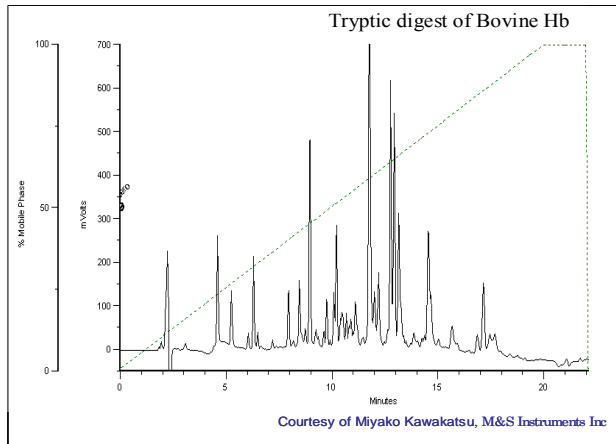


Figure 3. Separation of a protein digest.
 Column: Bio-C18, 4.6x150 mm, 5 μ m, 200 \AA
 Mobile phase: (A) 0.1% TFA/H₂O
 (B) 0.1%TFA /70% CH₃CN
 Linear gradient: 0-95% B (20 min)
 Flow rate: 1.0 mL/min
 Injection volume: 10 μ L (1.0 mg/mL)
 Sample: Tryptic digest of bovine Hb-alpha chain
 Detection: UV at 210 nm

High Reproducibility for Biological Separations

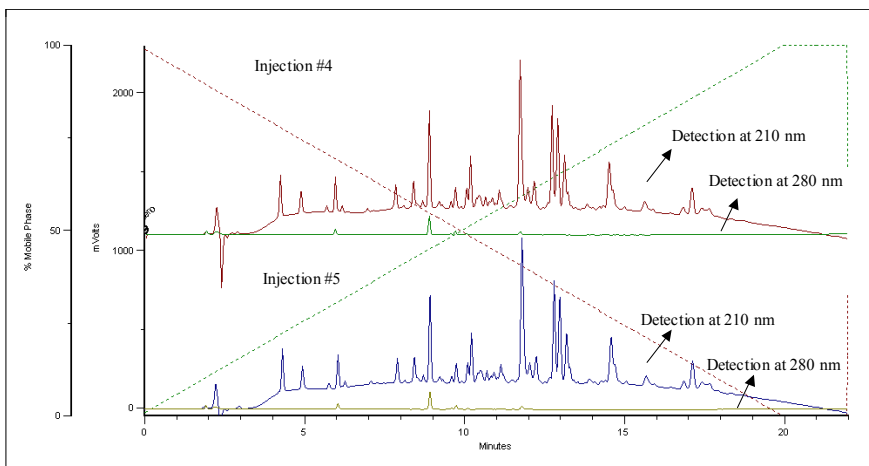


Figure 4. Separation of Tryptic digest of Bovine Hb. Column: Sepax Bio-C18, 4.6x150 mm, 5 μ m, 200 \AA ; Mobile phase: (A) 0.1% TFA in H₂O, (B) 0.1%TFA in 70% CH₃CN/30% H₂O linear gradient; Flow rate: 1.0 mL/min; Sample: 10 μ L (1.0 mg/mL) tryptic digest of Bovine Hb-alpha chain; Detection: UV at 210 nm and 280 nm. (Courtesy of Miyako Kawakatsu, M&S Instruments Inc.)

Sepax Bio-C18 Products

Sepax Bio-C18	Pore size	P/N			
5 μ m, 4.6x250mm	200 \AA	105185-4625	5 μ m, 4.6x250mm	300 \AA	106185-4625
5 μ m, 4.6x150mm	200 \AA	105185-4615	5 μ m, 4.6x150mm	300 \AA	106185-4615
5 μ m, 4.6x50mm	200 \AA	105185-4605	5 μ m, 4.6x50mm	300 \AA	106185-4605
5 μ m, 4.6x30mm	200 \AA	105185-4603	5 μ m, 4.6x30mm	300 \AA	106185-4603
5 μ m, 2.1x150mm	200 \AA	105185-2115	5 μ m, 2.1x150mm	300 \AA	106185-2115
5 μ m, 2.1x100mm	200 \AA	105185-2110	5 μ m, 2.1x100mm	300 \AA	106185-2110
5 μ m, 2.1x50mm	200 \AA	105185-2105	5 μ m, 2.1x50mm	300 \AA	106185-2105
5 μ m, 2.1x30mm	200 \AA	105185-2103	5 μ m, 2.1x30mm	300 \AA	106185-2103
3 μ m, 4.6x250mm	200 \AA	105183-4625	3 μ m, 4.6x250mm	300 \AA	106183-4625
3 μ m, 4.6x150mm	200 \AA	105183-4615	3 μ m, 4.6x150mm	300 \AA	106183-4615
3 μ m, 4.6x50mm	200 \AA	105183-4605	3 μ m, 4.6x50mm	300 \AA	106183-4605
3 μ m, 4.6x30mm	200 \AA	105183-4603	3 μ m, 4.6x30mm	300 \AA	106183-4603
3 μ m, 2.1x150mm	200 \AA	105183-2115	3 μ m, 2.1x150mm	300 \AA	106183-2115
3 μ m, 2.1x100mm	200 \AA	105183-2110	3 μ m, 2.1x100mm	300 \AA	106183-2110
3 μ m, 2.1x50mm	200 \AA	105183-2105	3 μ m, 2.1x50mm	300 \AA	106183-2105

BR-C18

C18 phase formed by special bonding chemistry for applications in wide range of pH (1.5-10.5)

Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 3, 5 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 350 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 19.0%

Description

Utilizing highest purity and enhanced mechanical stability silica and pure bonding reagents, BR-C18 bonded phases have been innovatively and specially designed to ensure maximum surface coverage and full end-capping, which leads to carbon content as high as 19.0%. The bonding chemistry is completely controlled that results in very reliable column-to-column reproducibility. The maximum surface coverage allows BR-C18 to have exceptional stability, resulting in high pH stability in the range of 1.5 to 10.5.

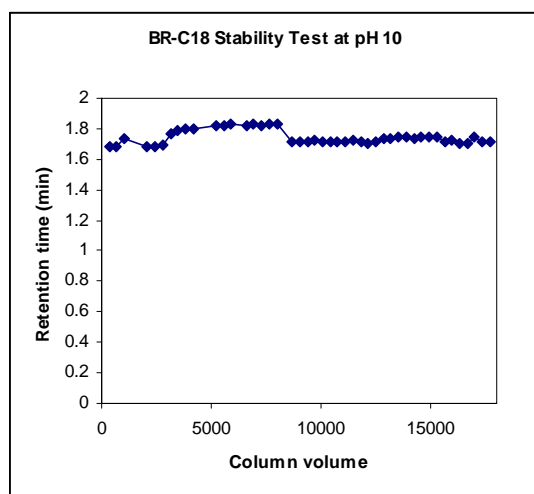


Figure 1. A BR-C18 column (3 µm, 4.6x50 mm) was operated at pH 10 under the conditions: mobile phase, 10 mM ammonium bicarbonate buffer in 55%ACN/45%H₂O; flow rate, 0.5 mL/min; room temperature; detection, UV 254 nm; sample, toluene.

Column Stability at Alkali Conditions

BR-C18 uses full coverage bonded silica packing, which allows high stability at high pH. Figure 1 shows reproducible retention time for a test compound: toluene

after 18,000 column volume runs in a mobile phase of 55% acetonitrile and 45% water at pH 10. Such high stability allows BR-C18 well suited for validation of various analytes at alkali conditions. The proprietary bonding chemistry for BR-C18 allows achieving high selectivity and high efficiency separation. A typical test chromatogram for quality control is shown in Figure 2 for a 4.6x250mm BR-C18 column.

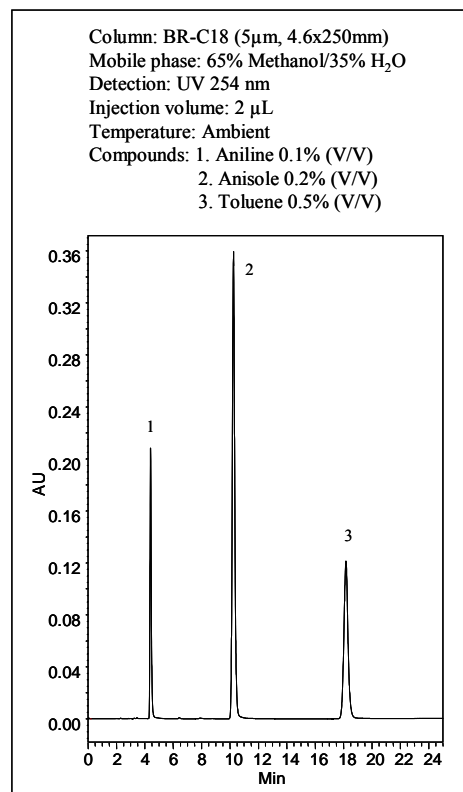


Figure 2. Test chromatogram of a BR-C18 column.

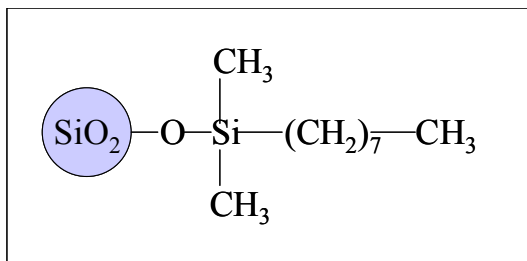
Characteristics

- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- pH range 1.5-10.5
- Suitable for separations of acidic, neutral and basic compounds, peptides, and proteins

BR-C18 Products

Sepax BR-C18	Pore size	P/N
5µm, 4.6x250mm	120Å	102185-4625
5µm, 4.6x150mm	120Å	102185-4615
5µm, 4.6x100mm	120Å	102185-4610
5µm, 4.6x50mm	120Å	102185-4605
3µm, 4.6x150mm	120Å	102183-4615
3µm, 4.6x50mm	120Å	102183-4605

GP-C8



Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 1.8, 2.2, 3, 4, 5, 7 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 300 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 11.0%

Description

GP-C8 phase is synthesized with monomeric and fully endcapped chemistry. The uniform octyl stationary phase allows high efficiency with lower hydrophobicity compared to ODS phase. GP-C8 phase is suitable for separating compounds with a wide range of hydrophobicity. It is highly recommended for separating the compounds which are too strongly retained on C18 phases. A typical test chromatogram for quality control is shown below for a 4.6x150mm GP-C8 column.

Sepax Bio-C8

Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 300 Å
Particle size: 3 and 5 µm
Pore volume: 0.9 mL/g
Surface area: 105 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 4.0%

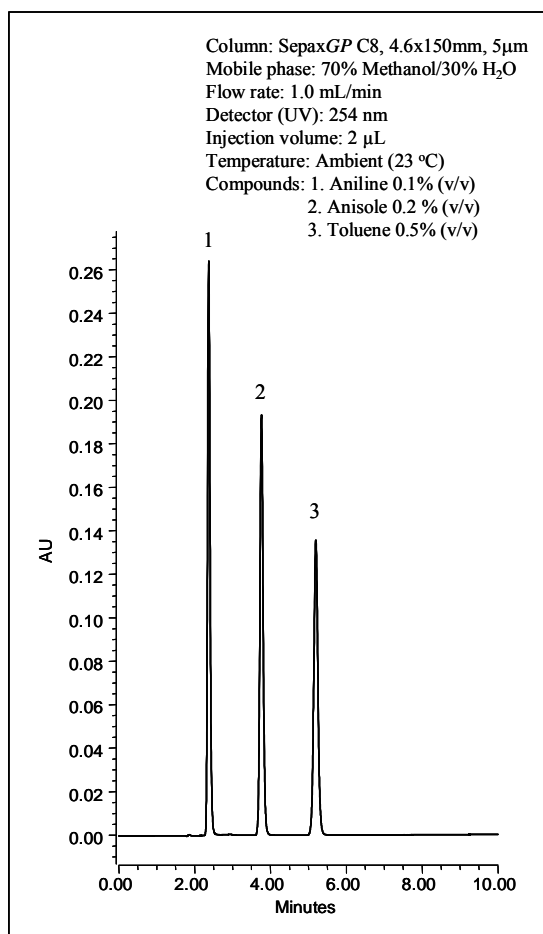
Description

Bio-C8 phase is made of monomeric and fully endcapped chemistry. The uniform stationary phase allows the separation to achieve high selectivity and high efficiency. Bio-C8 packings of 200 and 300 Å pore size selection are ideal for high resolution mapping of peptides and

separation of natural and synthetic peptides and small proteins.

Characteristics

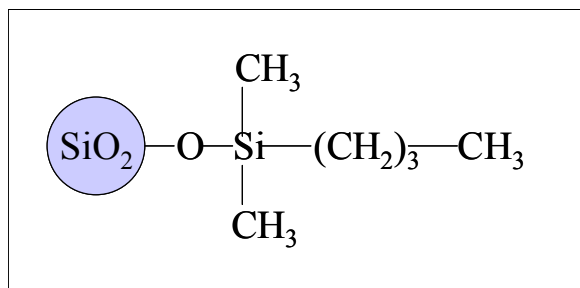
- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Full coverage bonded silica packing to achieve the exceptionally high stability
- Suitable for separations of acidic, neutral and basic organic compounds, such as pharmaceuticals, peptides, and organic acids



GP-C8 Products

Sepax GP-C8	Pore size	P/N
5µm, 4.6x250mm	120Å	107085-4625
5µm, 4.6x150mm	120Å	107085-4615
5µm, 4.6x100mm	120Å	107085-4610
5µm, 4.6x50mm	120Å	107085-4605
5µm, 4.6x30mm	120Å	107085-4603

GP-C4



Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120Å
Particle size: 1.8, 2.2, 3, 5, 7 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 300 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 8.0%

Description

Monomeric and fully endcapped GP-C4 packing is bonded with butyl group that leads to moderate hydrophobicity. GP-C4 columns have the great selectivity and peak symmetry with moderate retention for separations of acidic, neutral and basic organic compounds, such as pharmaceuticals, peptides, and organic acids. A typical test chromatogram for quality control is shown below for a 4.6x150mm GP-C4 column.

Sepax Bio-C4

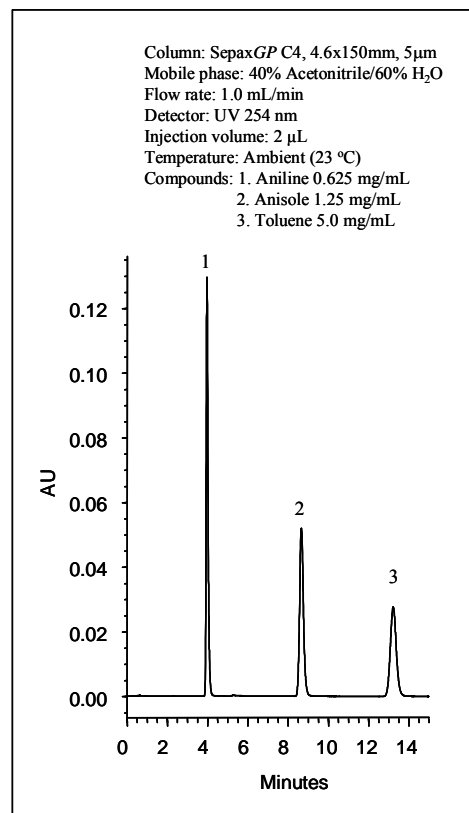
Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 300Å
Particle size: 3 and 5 µm
Pore volume: 1.0 mL/g
Surface area: 105 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 3.0%

Description

Monomeric and fully endcapped GP-C4 packing is bonded with butyl group that leads to moderate hydrophobicity. Bio-C4 packings of 200 and 300 Å pore size selection are ideal for high resolution mapping of peptides and

separation of natural and synthetic peptides and small proteins.



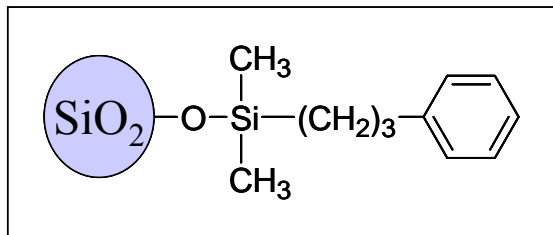
Characteristics

- Very well controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Full coverage bonded silica packing for exceptional high stability
- Suitable for separations of peptides, proteins, as well as the pharmaceuticals

GP-C4 Products

GP-C4	Pore size	P/N
5µm, 4.6x250mm	120Å	109045-4625
5µm, 4.6x150mm	120Å	109045-4615
5µm, 4.6x50mm	120Å	109045-4605
5µm, 2.1x150mm	120Å	109045-2115
5µm, 2.1x50mm	120Å	109045-2105
3µm, 4.6x250mm	120Å	109043-4625
3µm, 4.6x150mm	120Å	109043-4615
3µm, 4.6x50mm	120Å	109043-4605
3µm, 2.1x150mm	120Å	109043-2115
3µm, 2.1x100mm	120Å	109043-2110
3µm, 2.1x50mm	120Å	109043-2105

GP-Phenyl



Specification

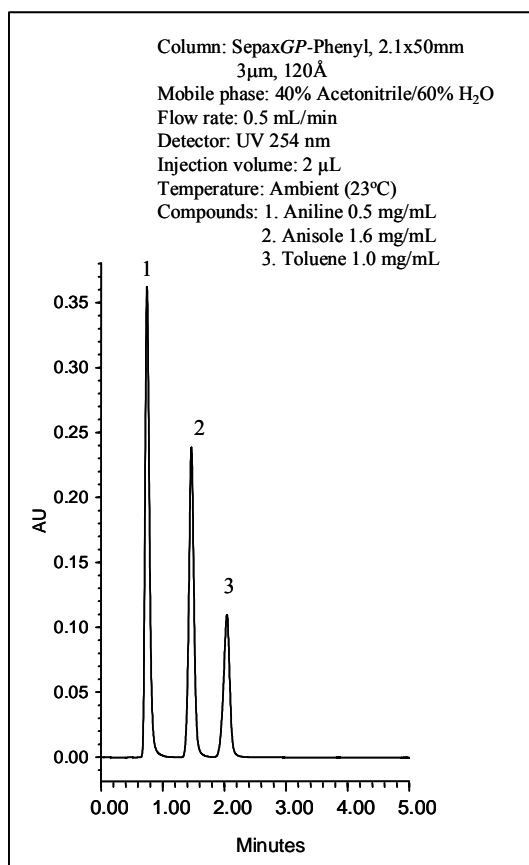
Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 3, 5 µm
Pore volume: 1.0 mL/g
Surface area: 300 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 11%
Coverage: 3.0 µmol/m²

Description

GP-Phenyl packing materials are bonded with propyl phenyl groups that enable special interaction with ring structured compounds. The monomeric bonding chemistry gives very high efficiency and high resolution separations. GP-Phenyl phase is suitable for separations of acidic, neutral and basic organic compounds, as well as the pharmaceuticals. The chromatogram shown below is a typical one for quality control for a 2.1x50mm GP-Phenyl column. Such short columns produce very fast yet highly efficient separations.

Characteristics

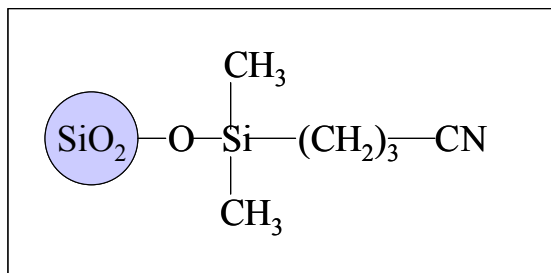
- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Suitable for separations of acidic, neutral and basic organic compounds, as well as the pharmaceuticals
- Recommended for separations in organic or mixed organic and aqueous mobile phases.



GP-Phenyl Products

Sepax GP-Phenyl	Pore size	P/N
5µm, 4.6x250mm	120Å	111365-4625
5µm, 4.6x150mm	120Å	111365-4615
5µm, 4.6x100mm	120Å	111365-4610
5µm, 4.6x50mm	120Å	111365-4605
5µm, 4.6x30mm	120Å	111365-4603
5µm, 2.1x250mm	120Å	111365-2125
5µm, 2.1x150mm	120Å	111365-2115
5µm, 2.1x100mm	120Å	111365-2110
5µm, 2.1x50mm	120Å	111365-2105
5µm, 2.1x30mm	120Å	111365-2103
3µm, 4.6x250mm	120Å	111363-4625
3µm, 4.6x150mm	120Å	111363-4615
3µm, 4.6x100mm	120Å	111363-4610
3µm, 4.6x50mm	120Å	111363-4605
3µm, 4.6x30mm	120Å	111363-4603
3µm, 2.1x250mm	120Å	111363-2125
3µm, 2.1x150mm	120Å	111363-2115
3µm, 2.1x100mm	120Å	111363-2110
3µm, 2.1x50mm	120Å	111363-2105
3µm, 2.1x30mm	120Å	111363-2103

HP-Cyano



Specification

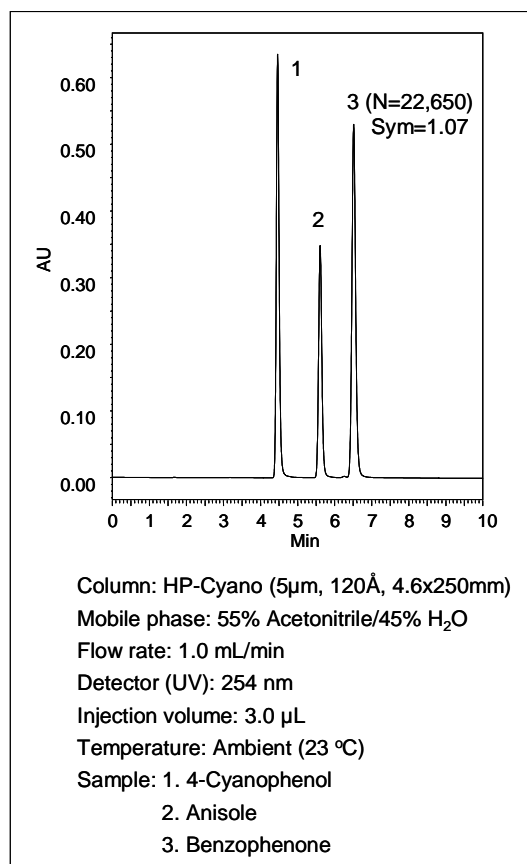
Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 1.8, 2.2, 3, 4, 5 and 10 µm
Pore volume: 1.0 mL/g
Surface area: 300 m²/g
Phase structure: Monomeric and fully endcapped
% Carbon: 7.0%

Description

Synthesized with monomeric and fully endcapped chemistry, HP-Cyano phase is bonded with propylcyano functional group that allows special interaction with polar compounds. The monomeric bonding chemistry enables high efficiency and high resolution separation of peptide, proteins, acidic, neutral and basic organic compound, and pharmaceuticals. The chromatogram shown here is a typical one for quality control for HP-Cyano 4.6x250mm column.

Characteristics

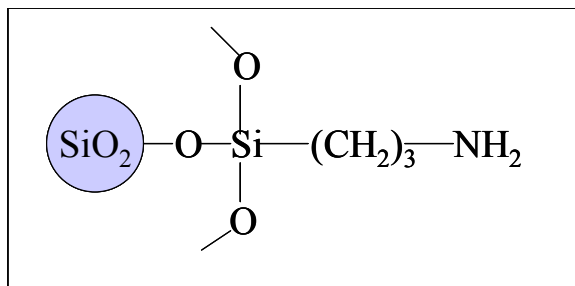
- Highly controlled chemistry of monolayer formation and end-capping
- Extremely high column-to-column reproducibility
- High selectivity and efficiency for separations
- Suitable for separations of peptides, proteins, acidic, neutral and basic organic compounds, and pharmaceuticals



HP-Cyano Products

Sepax HP-Cyano	Pore size	P/N
5µm, 4.6x250mm	120Å	113315-4625
5µm, 4.6x150mm	120Å	113315-4615
5µm, 4.6x100mm	120Å	113315-4610
5µm, 4.6x50mm	120Å	113315-4605
5µm, 4.6x30mm	120Å	113315-4603
5µm, 2.1x250mm	120Å	113315-2125
5µm, 2.1x150mm	120Å	113315-2115
5µm, 2.1x100mm	120Å	113315-2110
5µm, 2.1x50mm	120Å	113315-2105
5µm, 2.1x30mm	120Å	113315-2103
3µm, 4.6x250mm	120Å	113313-4625
3µm, 4.6x150mm	120Å	113313-4615
3µm, 4.6x100mm	120Å	113313-4610
3µm, 4.6x50mm	120Å	113313-4605
3µm, 4.6x30mm	120Å	113313-4603
3µm, 2.1x250mm	120Å	113313-2125
3µm, 2.1x150mm	120Å	113313-2115
3µm, 2.1x100mm	120Å	113313-2110
3µm, 2.1x50mm	120Å	113313-2105
3µm, 2.1x30mm	120Å	113313-2103

HP-Amino



Technical Specifications

Silica: Spherical, high purity (<10 ppm metals)

Pore size: 120 Å

Particle size: 3 μm, 5 μm

Pore volume: 1.0 ml/g

Surface area: 300 m²/g

Phase structure: Polymeric and no endcapping

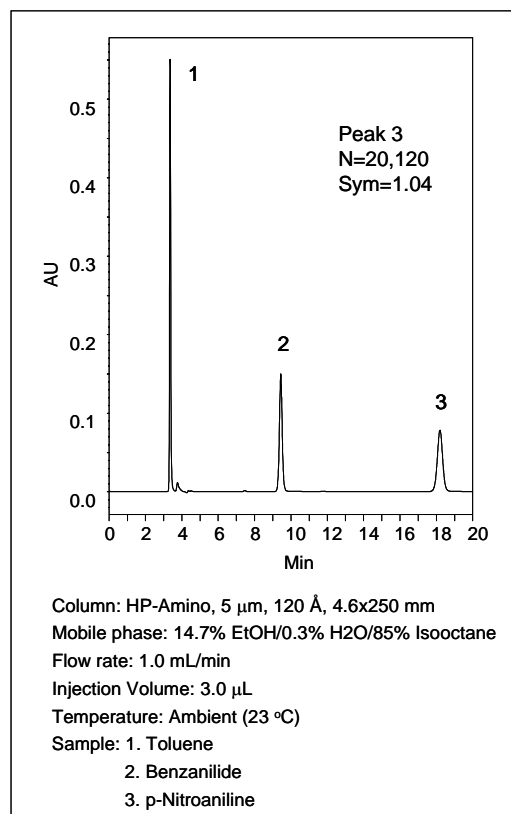
% Carbon: 4.0%

Description

Synthesized with polymeric chemistry, HP-Amino phase is bonded with aminopropyl functional group. HP-Amino phase is compatible with versatile mobile phases from non-aqueous solvents, such as hexane/ethyl acetate and chloroform/methanol, to aqueous solutions. It is recommended for separations of sugars, nucleotides, basic organic compounds, as well as the pharmaceuticals. The chromatogram shown here is typical quality control for a HP-Amino 4.6x250mm column.

Characteristics

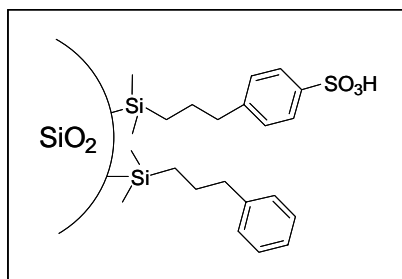
- Well controlled chemistry of polymeric monolayer
- High column-to-column reproducibility
- Utilized as both normal and reverse phase
- Versatile mobile phases: non-aqueous solvents, such as hexane/ethyl acetate and chloroform/methanol, and aqueous solutions
- Recommended for separations of saccharides, nucleotides, basic organic compounds, as well as the pharmaceuticals
- Super critical fluid separation applications
- LC/MS analysis for pharmaceuticals



HP-Amino Products

Sepax HP-Amino	Pore size	P/N
5 μm, 4.6x250mm	120 Å	115305-4625
5 μm, 4.6x150mm	120 Å	115305-4615
5 μm, 4.6x100mm	120 Å	115305-4610
5 μm, 4.6x50mm	120 Å	115305-4605
5 μm, 4.6x30mm	120 Å	115305-4603
5 μm, 2.1x250mm	120 Å	115305-2125
5 μm, 2.1x150mm	120 Å	115305-2115
5 μm, 2.1x100mm	120 Å	115305-2110
5 μm, 2.1x50mm	120 Å	115305-2105
5 μm, 2.1x30mm	120 Å	115305-2103
3 μm, 4.6x250mm	120 Å	115303-4625
3 μm, 4.6x150mm	120 Å	115303-4615
3 μm, 4.6x100mm	120 Å	115303-4610
3 μm, 4.6x50mm	120 Å	115303-4605
3 μm, 4.6x30mm	120 Å	115303-4603
3 μm, 2.1x250mm	120 Å	115303-2125
3 μm, 2.1x150mm	120 Å	115303-2115
3 μm, 2.1x100mm	120 Å	115303-2110
3 μm, 2.1x50mm	120 Å	115303-2105
3 μm, 2.1x30mm	120 Å	115303-2103

HP-SCX



Specifications

Silica: Spherical, high purity (<10 ppm metals)

Pore size: 120 Å

Particle size: 3, 5 µm

Pore volume: 1.0 mL/g

Surface area: 300 m²/g

Phase structure: Polymeric and mixed mode

% Carbon: 11.0%

Description

HP-SCX is a silica based mixed-mode strong cation exchange phase. The phase has a mixed chemical structure of sulfonic acid and phenyl group. The mixed mode of strong cation-exchange and hydrophobicity offers high selectivity and high resolution separation for cationic/basic and nitrogen containing compounds as well as desirable retention for a variety of weak cationic and neutral organic compounds. A uniform, polymeric bonding of HP-SCX enhances its stability under various separation conditions.

HP-SCX has expanded its applications from the traditional SCX separation of cationic and nitrogen containing compounds to weak cationic and neutral organic molecules. Examples include separation of analytes of amines and polyamines, such as alkaloids, peptides, codeine, cough and cold ingredients. A typical test chromatogram for quality control is shown in Figure 1 for a 4.6x150mm column.

Characteristics

- Highly controlled chemistry of polymeric monolayer formation and end-capping
- Mixed chemical structure of sulfonic acid and phenyl group
- Mixed-mode of ion-exchange and hydrophobic interaction enabling high selectivity and appropriate retention for a variety of compounds

- Polymeric bonding and end-capping to achieve the exceptionally high stability
- pH stability: 1.5-8.0
- Suitable for separations of a complex of cationic, nitrogen containing, and neutral compounds

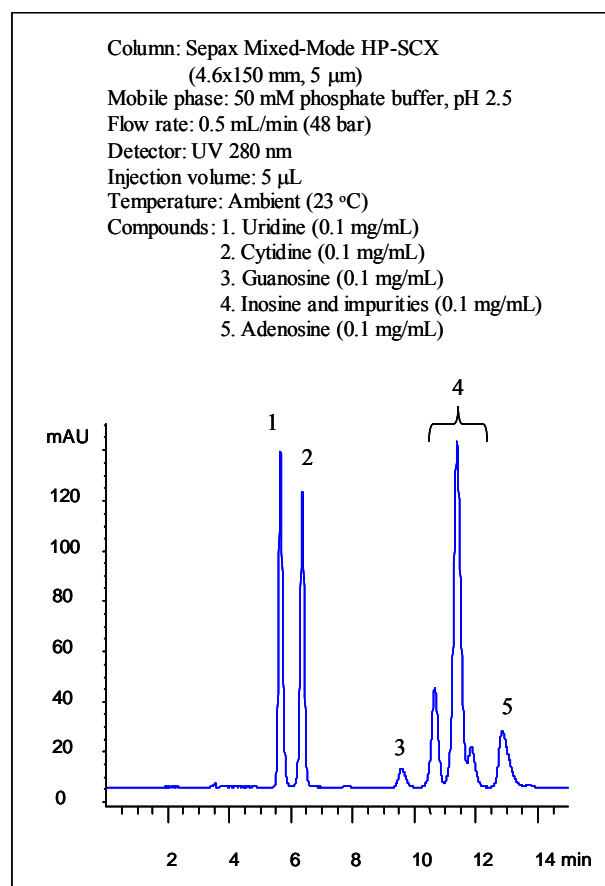
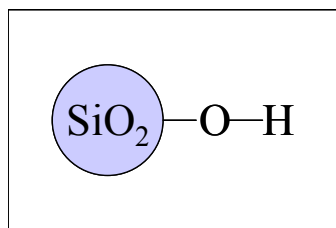


Fig. 1. Typical test chromatogram for a HP-SCX column.

HP-SCX Products

Sepax HP-Amino	Pore size	P/N
5µm, 4.6x250mm	120Å	120365-4625
5µm, 4.6x150mm	120Å	120365-4615
5µm, 4.6x50mm	120Å	120365-4605
5µm, 2.1x150mm	120Å	120365-2115
5µm, 2.1x50mm	120Å	120365-2105
5µm, 2.1x30mm	120Å	120365-2103
3µm, 4.6x250mm	120Å	120363-4625
3µm, 4.6x150mm	120Å	120363-4615
3µm, 4.6x50mm	120Å	120363-4605
3µm, 4.6x30mm	120Å	120363-4603
3µm, 2.1x150mm	120Å	120363-2115
3µm, 2.1x50mm	120Å	120363-2105
3µm, 2.1x30mm	120Å	120363-2103

HP-Silica



Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120, 200, 300, 500, 1000 and 2000 Å
Particle size: 1.8, 2.2, 3, 5, 7 and 10 µm
Pore volume: 1.0 ml/g for 120 Å pore size
Surface area: 300 m²/g for 120 Å pore size
Phase structure: activated hydroxyl (-OH)

Description

HP-Silica phase is made of activated hydroxyl (-OH) functional group with the pore size selection of 60, 120, 200, 300, 500, 1000 and 2000 Å and particle size selection of 1.8, 2.2, 3, 5, 7 and 10 µm. Carbon loading is 0.0%. HP-Silica is used as the normal phase as well as HILIC phase. HP-Silica phases are suitable for separations of polar and basic organic compounds, such as vitamins, steroids, as well as pharmaceuticals. A typical test chromatogram for quality control is shown in Figure 1 for a 4.6x150mm column.

Characteristics

- Activated silica surface
- Ultra high purity
- Narrow pore size distribution
- Enhanced mechanical stability
- Suitable for separations in aqueous and non-aqueous mobile phases

Applications

- Suitable for separations of polar and basic organic compounds, such as vitamins, steroids, as well as pharmaceuticals
- LC/MS method development for analysis of pharmaceuticals, especially nitrogen contained compounds
- Utilized as HILIC phase for separation of polar compounds

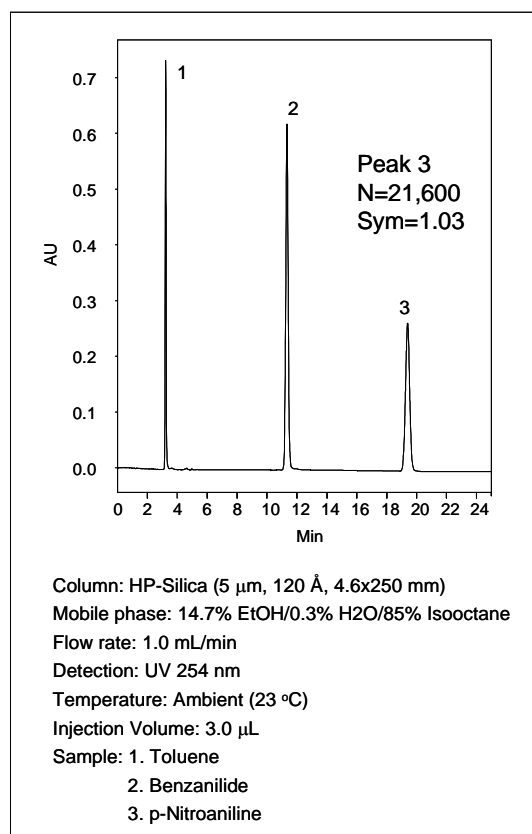
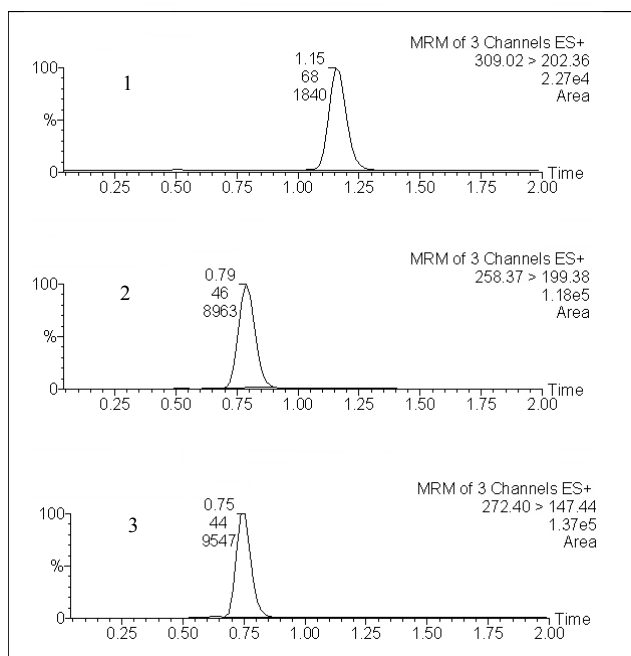


Figure 1. Typical test chromatogram for a HP-Silica column.

HP-Silica Products

Sepax HP-Amino	Pore size	P/N
5µm, 4.6x250mm	120Å	117005-4625
5µm, 4.6x150mm	120Å	117005-4615
5µm, 4.6x50mm	120Å	117005-4605
5µm, 2.1x150mm	120Å	117005-2115
5µm, 2.1x50mm	120Å	117005-2105
5µm, 2.1x30mm	120Å	117005-2103
3µm, 4.6x250mm	120Å	117003-4625
3µm, 4.6x150mm	120Å	117003-4615
3µm, 4.6x50mm	120Å	117003-4605
3µm, 4.6x30mm	120Å	117003-4603
3µm, 2.1x150mm	120Å	117003-2115
3µm, 2.1x50mm	120Å	117003-2105
3µm, 2.1x30mm	120Å	117003-2103

LC/MS Analysis of Metabolite



(Courtesy of Dr. John Lin of Avantix Laboratories)

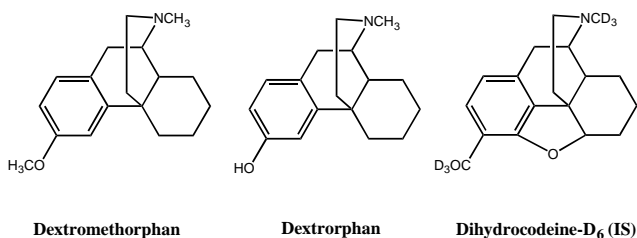
Column: HP-Silica (3 μ m, 50x2.1 mm) (25 $^{\circ}$ C)

Mobile phase: CH₃CN/water (85/15) with 0.1% TFA and 5.0 mM CH₃COONH₄

Flow rate: 0.5 mL/min; Injection volume: 5 μ L

Instrument: Micromass Quattro LC LC-MS/MS system

Compounds: 1. Dextromethorphan; 2. Dextrophan (metabolite); 3. Dihydrocodeine-D₆ (internal standard)



Column: HP-Silica (3 μ m, 50x2.1 mm) (25 $^{\circ}$ C)

Mobile phase: ACN/water (80/20) with 0.1% TFA and 5.0 mM CH₃COONH₄

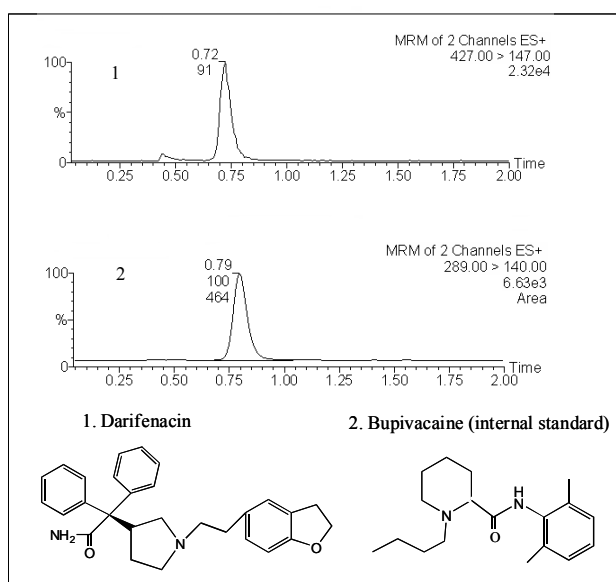
Flow rate: 0.5 mL/min; Injection volume: 20 μ L

Instrument: Micromass Quattro LC LC-MS/MS system

Compounds:

1. Morphine-D₆ (internal standard)
2. Morphine
3. Morphine-6 β -glucuronide-D₆ (internal standard)
4. Morphine-3 β -glucuronide-D₆ internal standard)
5. Morphine-6 β -glucuronide
6. Morphine-3 β -glucuronide

LC/MS/MS Analysis of Pharmaceuticals



(Courtesy of Dr. John Lin of Avantix Laboratories)

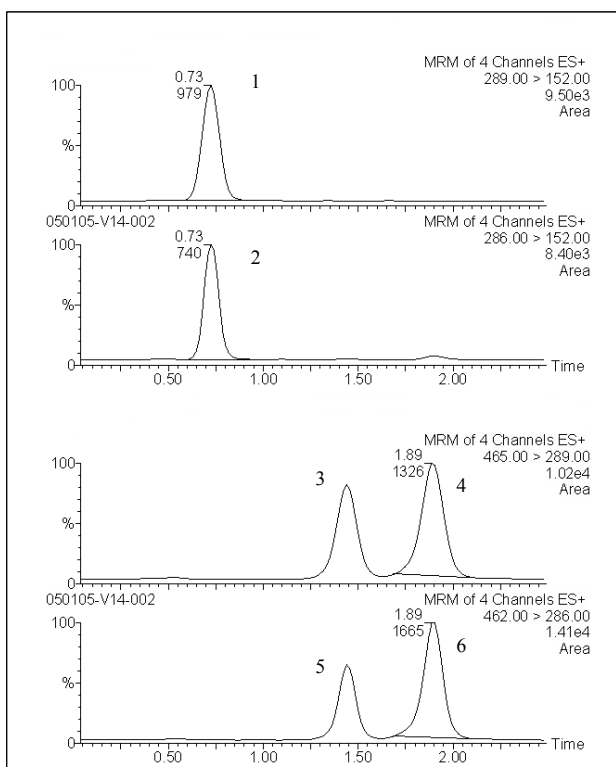
Column: HP-Silica (3 μ m, 50x2.1 mm)

Mobile phase: 85:15 ACN/water with 5.0 mM ammonium acetate and 0.1% formic acid

Flow rate: 0.5 mL/min; Injection volume: 5 μ L

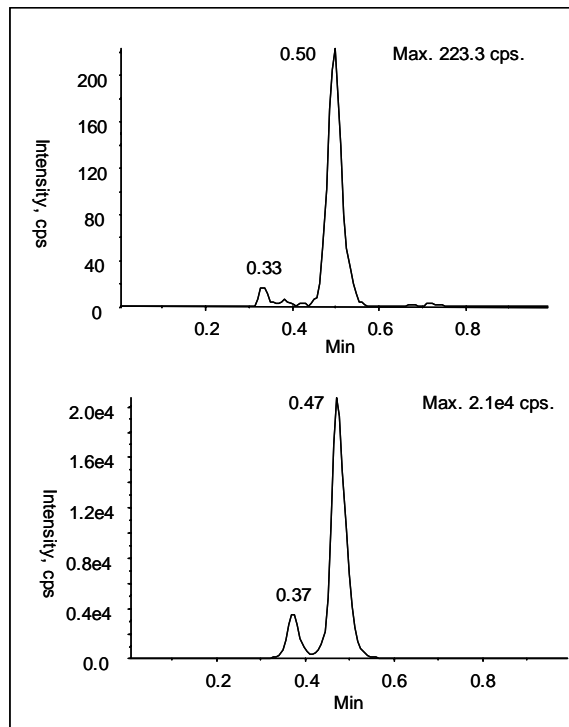
Temperature: 25 $^{\circ}$ C

Instrument: Micromass Quattro LC LC-MS/MS system



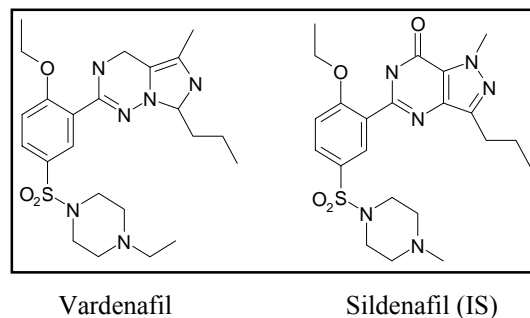
(Courtesy of Dr. John Lin of Avantix Laboratories)

An LC-MS/MS Method for Determination of Vardenafil in Human



(Courtesy of Dr. John Lin, et al of Avantix Laboratories, ASMS Conference 2005, San Antonio, TX)

Chromatogram of Extracted Vardenafil at Low Limit of Quantitation (LLOQ) of 0.1 ng/mL: (A) Vardenafil and (B) Sildenafil (IS)



Chromatographic Conditions

Column: Sepax HP Silica, 3 μ m, 50x2.1 mm

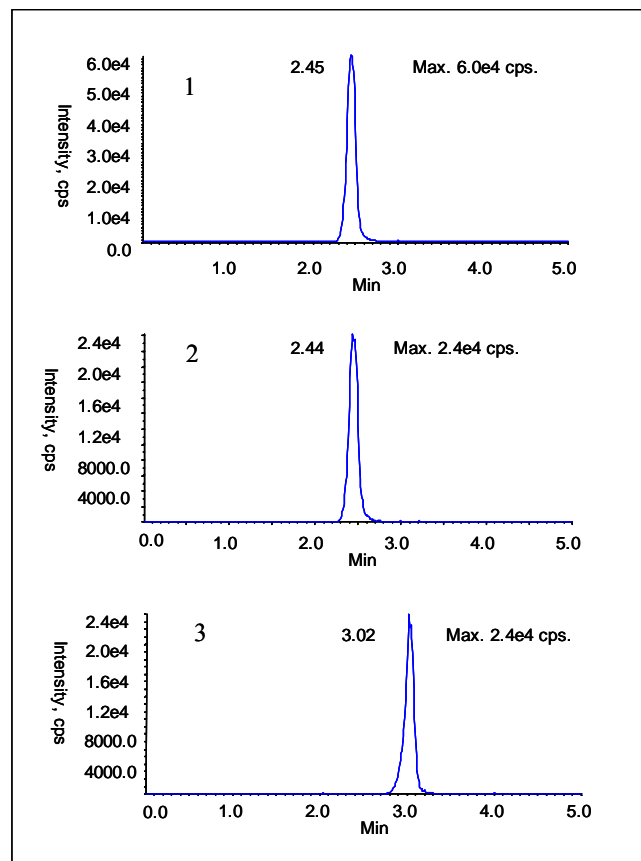
Column Temperature: Ambient

Mobile Phase: CH₃CN:H₂O with 0.1% formic acid and 5.0 mM ammonium acetate (80:20)

Flow Rate: 0.5 mL/min

Autosampler Temperature: Ambient

Injection volume: 10 μ L



(Courtesy of Dr. John Lin of Avantix Laboratories)

LC/MS Analysis of Metabolite

Conditions:

Column: Sepax HP Silica, 3 μ m, 100x2.1 mm

Mobile phase: ACN/water (97/3) with 0.05% TFA

Flow rate: 0.5 mL/min

Injection volume: 20 μ L

Temperature: 25 $^{\circ}$ C

Instrument: API 4000 LC-MS/MS system

Compounds:

1. Midazolam
2. 1'-hydroxymidazolam (metabolite)
3. Alprazolam-D5 (internal standard)

HILIC Polar-100

Specification

Silica: Spherical, high purity (<10 ppm metals)
Pore size: 120 Å
Particle size: 3 µm, 5 µm
Pore volume: 1.0 ml/g
Surface area: 300 m²/g
Phase structure: chemically bonded highly hydrophilic monolayer
Coverage: ~3.5 µmol/m²

Description

HILIC Polar-100 packing materials are bonded with a highly hydrophilic monolayer that enables special interaction with polar compounds. The nature of the Polar-100 chemistry is more polar than that of regular normal phases. The neutral character of the Polar-100 phase is specially designed for retention and resolution of both neutral and charged polar compounds. The monomeric bonding chemistry benefits separations with high efficiency. The high hydrophilicity of the Polar-100 phase allows separations in both organic or aqueous mobile phases. The chromatogram shown below is a typical example of quality control for a HILIC Polar-100 column.

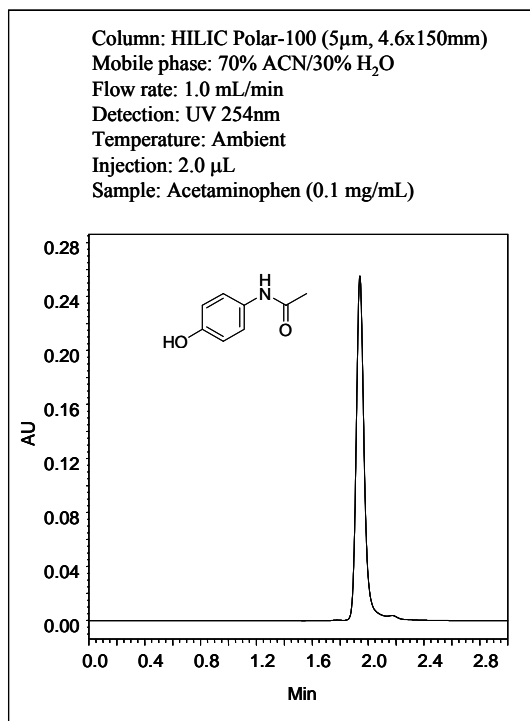


Figure 1. Retention of acetaminophen with a HILIC Polar-100 column.

Characteristics

- Highly hydrophilic and neutral phase
- Complementary to negatively charged HILIC HP-Silica phase for selectivity
- Controlled chemistry of monolayer formation
- High retention and resolution for highly polar or charged compounds
- Extremely high column-to-column reproducibility
- Suitable for organic and aqueous mobile phases
- Ideal for separations of LC/MS applications of acidic, neutral and basic compounds that do not have enough retention at reversed phases

Applications

Uracil and acetaminophen are two of very polar compounds with very little retention on C18 phase. As a contrast, HILIC Polar-100 shows good retention and resolution of those two compounds, as shown in Figure 2.

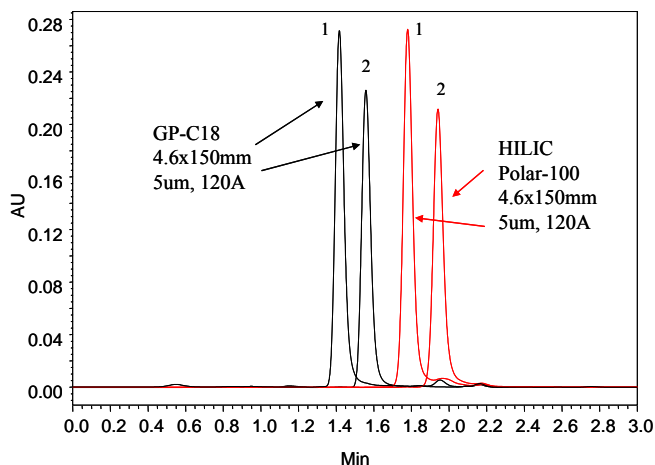


Figure 2. Separation of uracil and acetaminophen by GP-C18 and HILIC Polar-100 phases. Columns: 4.6x150mm (5µm). Mobile phase: 70% ACN/30% H₂O. Flow rate: 1.0 mL/min. Detection: UV 254nm. Temperature: Ambient. Injection: 2.0 µL. Sample (0.1 mg/mL): (1) uracil and (2) Acetaminophen.

HILIC Polar-100 Products

HILIC Polar-100	Pore size	P/N
5µm, 4.6x250mm	120Å	131585-4625
5µm, 4.6x150mm	120Å	131585-4615
5µm, 4.6x100mm	120Å	131585-4610
5µm, 4.6x50mm	120Å	131585-4605
5µm, 4.6x250mm	120Å	131583-4625
5µm, 4.6x150mm	120Å	131583-4615
5µm, 4.6x100mm	120Å	131583-4610
5µm, 4.6x50mm	120Å	131583-4605

Sepax Silica Based HPLC Column Products

Ordering Information

3 μm Microbore Columns (length x ID mm)						
	50x0.75	100x0.75	150x0.75	50x1.0	100x1.0	150x1.0
Phases	\$375	\$425	\$465	\$375	\$425	\$465
GP-C18 (120 Å)	101183-0705	101183-0710	101183-0715	101183-1005	101183-1010	101183-1015
BR-C18 (120 Å)	102183-0705	102183-0710	102183-0715	102183-1005	102183-1010	102183-1015
HP-C18 (120 Å)	103183-0705	103183-0710	103183-0715	103183-1005	103183-1010	103183-1015
HP-C18 (200 Å)	104183-0705	104183-0710	104183-0715	104183-1005	104183-1010	104183-1015
Bio-C18 (200 Å)	105183-0705	105183-0710	105183-0715	105183-1005	105183-1010	105183-1015
Bio-C18 (300 Å)	106183-0705	106183-0710	106183-0715	106183-1005	106183-1010	106183-1015
GP-C8 (120 Å)	107083-0705	107083-0710	107083-0715	107083-1005	107083-1010	107083-1015
Bio-C8 (300 Å)	108083-0705	108083-0710	108083-0715	108083-1005	108083-1010	108083-1015
GP-C4 (120 Å)	109043-0705	109043-0710	109043-0715	109043-1005	109043-1010	109043-1015
Bio-C4 (300 Å)	110043-0705	110043-0710	110043-0715	110043-1005	110043-1010	110043-1015
GP-Ph ¹ (120 Å)	111363-0705	111363-0710	111363-0715	111363-1005	111363-1010	111363-1015
HP-CN ² (120 Å)	113313-0705	113313-0710	113313-0715	113313-1005	113313-1010	113313-1015
HP-NH ₂ (120 Å)	115303-0705	115303-0710	115303-0715	115303-1005	115303-1010	115303-1015
HP-SCX (120 Å)	120363-0705	120363-0710	120363-0715	120363-1005	120363-1010	120363-1015
HP-Silica (120 Å)	117003-0705	117003-0710	117003-0715	117003-1005	117003-1010	117003-1015
HILIC Polar-100 (120 Å)	131583-0705	131583-0710	131583-0715	131583-1005	131583-1010	131583-1015

4 μm Microbore Columns (length x ID mm)						
	50x0.75	100x0.75	150x0.75	50x1.0	100x1.0	150x1.0
Phases	\$375	\$425	\$465	\$375	\$425	\$465
GP-C18 (120 Å)	101184-0705	101184-0710	101184-0715	101184-1005	101184-1010	101184-1015
HP-C18 (120 Å)	103184-0705	103184-0710	103184-0715	103184-1005	103184-1010	103184-1015
GP-C8 (120 Å)	107084-0705	107084-0710	107084-0715	107084-1005	107084-1010	107084-1015
GP-C4 (120 Å)	109044-0705	109044-0710	109044-0715	109044-1005	109044-1010	109044-1015
GP-Ph (120 Å)	111364-0705	111364-0710	111364-0715	111364-1005	111364-1010	111364-1015
HP-CN (120 Å)	113314-0705	113314-0710	113314-0715	113314-1005	113314-1010	113314-1015
HP-NH ₂ (120 Å)	115304-0705	115304-0710	115304-0715	115304-1005	115304-1010	115304-1015
HP-SCX (120 Å)	120364-0705	120364-0710	120364-0715	120364-1005	120364-1010	120364-1015
HP-Silica (120 Å)	117004-0705	117004-0710	117004-0715	117004-1005	117004-1010	117004-1015
HILIC Polar-100 (120 Å)	131584-0705	131584-0710	131584-0715	131584-1005	131584-1010	131584-1015

Ordering Information

Phases	5 μ m Microbore Columns (length x ID mm)					
	50x0.75 \$375	100x0.75 \$425	150x0.75 \$465	50x1.0 \$375	100x1.0 \$425	150x1.0 \$465
GP-C18 (120 Å)	101185-0705	101185-0710	101185-0715	101185-1005	101185-1010	101185-1015
BR-C18 (120 Å)	102185-0705	102185-0710	102185-0715	102185-1005	102185-1010	102185-1015
HP-C18 (120 Å)	103185-0705	103185-0710	103185-0715	103185-1005	103185-1010	103185-1015
HP-C18 (200 Å)	104185-0705	104185-0710	104185-0715	104185-1005	104185-1010	104185-1015
Bio-C18 (200 Å)	105185-0705	105185-0710	105185-0715	105185-1005	105185-1010	105185-1015
Bio-C18 (300 Å)	106185-0705	106185-0710	106185-0715	106185-1005	106185-1010	106185-1015
GP-C8 (120 Å)	107085-0705	107085-0710	107085-0715	107085-1005	107085-1010	107085-1015
Bio-C8 (300 Å)	108085-0705	108085-0710	108085-0715	108085-1005	108085-1010	108085-1015
GP-C4 (120 Å)	109045-0705	109045-0710	109045-0715	109045-1005	109045-1010	109045-1015
Bio-C4 (300 Å)	110045-0705	110045-0710	110045-0715	110045-1005	110045-1010	110045-1015
GP-Ph ¹ (120 Å)	111365-0705	111365-0710	111365-0715	111365-1005	111365-1010	111365-1015
HP-CN ² (120 Å)	113315-0705	113315-0710	113315-0715	113315-1005	113315-1010	113315-1015
HP-NH ₂ (120 Å)	115305-0705	115305-0710	115305-0715	115305-1005	115305-1010	115305-1015
HP-SCX (120 Å)	120365-0705	120365-0710	120365-0715	120365-1005	120365-1010	120365-1015
HP-Silica (120 Å)	117005-0705	117005-0710	117005-0715	117005-1005	117005-1010	117005-1015
HILIC Polar-100 (120 Å)	131585-0705	131585-0710	131585-0715	131585-1005	131585-1010	131585-1015

1. Phenyl phase; 2. Cyano phase



Ordering Information

Phases	3 μm Analytical Columns (length x ID mm)					Guard column
	30x2.1	50x2.1	100x2.1	150x2.1	250x2.1	10x20*
	\$315	\$315	\$375	\$415	\$465	\$150
GP-C18 (120 Å)	101183-2103	101183-2105	101183-2110	101183-2115	101183-2125	101183-2001
BR-C18 (120 Å)	102183-2103	102183-2105	102183-2110	102183-2115	102183-2125	102183-2001
HP-C18 (120 Å)	103183-2103	103183-2105	103183-2110	103183-2115	103183-2125	103183-2001
HP-C18 (200 Å)	104183-2103	104183-2105	104183-2110	104183-2115	104183-2125	104183-2001
Bio-C18 (200 Å)	105183-2103	105183-2105	105183-2110	105183-2115	105183-2125	105183-2001
Bio-C18 (300 Å)	106183-2103	106183-2105	106183-2110	106183-2115	106183-2125	106183-2001
GP-C8 (120 Å)	107083-2103	107083-2105	107083-2110	107083-2115	107083-2125	107083-2001
Bio-C8 (300 Å)	108083-2103	108083-2105	108083-2110	108083-2115	108083-2125	108083-2001
GP-C4 (120 Å)	109043-2103	109043-2105	109043-2110	109043-2115	109043-2125	109043-2001
Bio-C4 (300 Å)	110043-2103	110043-2105	110043-2110	110043-2115	110043-2125	110043-2001
GP-Ph (120 Å)	111363-2103	111363-2105	111363-2110	111363-2115	111363-2125	111363-2001
HP-CN (120 Å)	113313-2103	113313-2105	113313-2110	113313-2115	113313-2125	113313-2001
HP-NH ₂ (120 Å)	115303-2103	115303-2105	115303-2110	115303-2115	115303-2125	115303-2001
HP-SCX (120 Å)	120363-2103	120363-2105	120363-2110	120363-2115	120363-2125	120363-2001
HP-Silica (120 Å)	117003-2103	117003-2105	117003-2110	117003-2115	117003-2125	117003-2001
HILIC Polar-100	131583-2103	131583-2105	131583-2110	131583-2115	131583-2125	131583-2001

Phases	3 μm Analytical Columns (length x ID mm)					Guard column
	30x3.0	50x3.0	100x3.0	150x3.0	250x3.0	10x20*
	\$315	\$315	\$375	\$415	\$465	\$150
GP-C18 (120 Å)	101183-3003	101183-3005	101183-3010	101183-3015	101183-3025	101183-2001
BR-C18 (120 Å)	102183-3003	102183-3005	102183-3010	102183-3015	102183-3025	102183-2001
HP-C18 (120 Å)	103183-3003	103183-3005	103183-3010	103183-3015	103183-3025	103183-2001
HP-C18 (200 Å)	104183-3003	104183-3005	104183-3010	104183-3015	104183-3025	104183-2001
Bio-C18 (200 Å)	105183-3003	105183-3005	105183-3010	105183-3015	105183-3025	105183-2001
Bio-C18 (300 Å)	106183-3003	106183-3005	106183-3010	106183-3015	106183-3025	106183-2001
GP-C8 (120 Å)	107083-3003	107083-3005	107083-3010	107083-3015	107083-3025	107083-2001
Bio-C8 (300 Å)	108083-3003	108083-3005	108083-3010	108083-3015	108083-3025	108083-2001
GP-C4 (120 Å)	109043-3003	109043-3005	109043-3010	109043-3015	109043-3025	109043-2001
Bio-C4 (300 Å)	110043-3003	110043-3005	110043-3010	110043-3015	110043-3025	110043-2001
GP-Ph (120 Å)	111363-3003	111363-3005	111363-3010	111363-3015	111363-3025	111363-2001
HP-CN (120 Å)	113313-3003	113313-3005	113313-3010	113313-3015	113313-3025	113313-2001
HP-NH ₂ (120 Å)	115303-3003	115303-3005	115303-3010	115303-3015	115303-3025	115303-2001
HP-SCX (120 Å)	120363-3003	120363-3005	120363-3010	120363-3015	120363-3025	120363-2001
HP-Silica (120 Å)	117003-3003	117003-3005	117003-3010	117003-3015	117003-3025	117003-2001
HILIC Polar-100	131583-3003	131583-3005	131583-3010	131583-3015	131583-3025	131583-2001

Ordering Information

3 µm Analytical Columns (length x ID mm)						Guard column
	30x4.6	50x4.6	100x4.6	150x4.6	250x4.6	10x40*
Phases	\$315	\$315	\$375	\$415	\$465	\$150
GP-C18 (120 Å)	101183-4603	101183-4605	101183-4610	101183-4615	101183-4625	101183-4001
BR-C18 (120 Å)	102183-4603	102183-4605	102183-4610	102183-4615	102183-4625	102183-4001
HP-C18 (120 Å)	103183-4603	103183-4605	103183-4610	103183-4615	103183-4625	103183-4001
HP-C18 (200 Å)	104183-4603	104183-4605	104183-4610	104183-4615	104183-4625	104183-4001
Bio-C18 (200 Å)	105183-4603	105183-4605	105183-4610	105183-4615	105183-4625	105183-4001
Bio-C18 (300 Å)	106183-4603	106183-4605	106183-4610	106183-4615	106183-4625	106183-4001
GP-C8 (120 Å)	107083-4603	107083-4605	107083-4610	107083-4615	107083-4625	107083-4001
Bio-C8 (300 Å)	108083-4603	108083-4605	108083-4610	108083-4615	108083-4625	108083-4001
GP-C4 (120 Å)	109043-4603	109043-4605	109043-4610	109043-4615	109043-4625	109043-4001
Bio-C4 (300 Å)	110043-4603	110043-4605	110043-4610	110043-4615	110043-4625	110043-4001
GP-Ph (120 Å)	111363-4603	111363-4605	111363-4610	111363-4615	111363-4625	111363-4001
HP-CN (120 Å)	113313-4603	113313-4605	113313-4610	113313-4615	113313-4625	113313-4001
HP-NH ₂ (120 Å)	115303-4603	115303-4605	115303-4610	115303-4615	115303-4625	115303-4001
HP-SCX (120 Å)	120363-4603	120363-4605	120363-4610	120363-4615	120363-4625	120363-4001
HP-Silica (120 Å)	117003-4603	117003-4605	117003-4610	117003-4615	117003-4625	117003-4001
HILIC Polar-100	131583-4603	131583-4605	131583-4610	131583-4615	131583-4625	131583-4001

4 µm Analytical Columns (length x ID mm)						Guard column
	30x2.1	50x2.1	100x2.1	150x2.1	250x2.1	10x20*
Phases	\$315	\$315	\$375	\$415	\$465	\$150
GP-C18 (120 Å)	101184-2103	101184-2105	101184-2110	101184-2115	101184-2125	101184-2001
HP-C18 (120 Å)	103184-2103	103184-2105	103184-2110	103184-2115	103184-2125	103184-2001
GP-C8 (120 Å)	107084-2103	107084-2105	107084-2110	107084-2115	107084-2125	107084-2001
GP-C4 (120 Å)	109044-2103	109044-2105	109044-2110	109044-2115	109044-2125	109044-2001
GP-Ph (120 Å)	111364-2103	111364-2105	111364-2110	111364-2115	111364-2125	111364-2001
HP-CN (120 Å)	113314-2103	113314-2105	113314-2110	113314-2115	113314-2125	113314-2001
HP-NH ₂ (120 Å)	115304-2103	115304-2105	115304-2110	115304-2115	115304-2125	115304-2001
HP-SCX (120 Å)	120364-2103	120364-2105	120364-2110	120364-2115	120364-2125	120364-2001
HP-Silica (120 Å)	117004-2103	117004-2105	117004-2110	117004-2115	117004-2125	117004-2001

Ordering Information

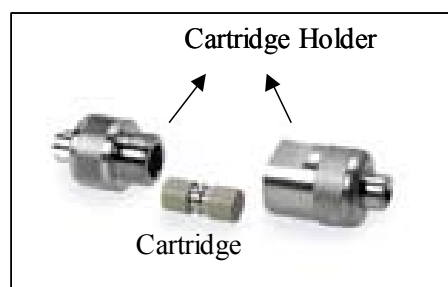
Phases	4 µm Analytical Columns (length x ID mm)						Guard column
	30x3.0	50x3.0	100x3.0	150x3.0	250x3.0	10x20*	
	\$315	\$315	\$375	\$415	\$465	\$150	
GP-C18 (120 Å)	101184-3003	101184-3005	101184-3010	101184-3015	101184-3025	101184-2001	
HP-C18 (120 Å)	103184-3003	103184-3005	103184-3010	103184-3015	103184-3025	103184-2001	
GP-C8 (120 Å)	107084-3003	107084-3005	107084-3010	107084-3015	107084-3025	107084-2001	
GP-C4 (120 Å)	109044-3003	109044-3005	109044-3010	109044-3015	109044-3025	109044-2001	
GP-Ph (120 Å)	111364-3003	111364-3005	111364-3010	111364-3015	111364-3025	111364-2001	
HP-CN (120 Å)	113314-3003	113314-3005	113314-3010	113314-3015	113314-3025	113314-2001	
HP-NH ₂ (120 Å)	115304-3003	115304-3005	115304-3010	115304-3015	115304-3025	115304-2001	
HP-SCX (120 Å)	120364-3003	120364-3005	120364-3010	120364-3015	120364-3025	120364-2001	
HP-Silica (120 Å)	117004-3003	117004-3005	117004-3010	117004-3015	117004-3025	117004-2001	

Phases	4 µm Analytical Columns (length x ID mm)						Guard column
	30x4.6	50x4.6	100x4.6	150x4.6	250x4.6	10x40*	
	\$315	\$315	\$375	\$415	\$465	\$150	
GP-C18 (120 Å)	101184-4603	101184-4605	101184-4610	101184-4615	101184-4625	101184-4001	
HP-C18 (120 Å)	103184-4603	103184-4605	103184-4610	103184-4615	103184-4625	103184-4001	
GP-C8 (120 Å)	107084-4603	107084-4605	107084-4610	107084-4615	107084-4625	107084-4001	
GP-C4 (120 Å)	109044-4603	109044-4605	109044-4610	109044-4615	109044-4625	109044-4001	
GP-Ph (120 Å)	111364-4603	111364-4605	111364-4610	111364-4615	111364-4625	111364-4001	
HP-CN (120 Å)	113314-4603	113314-4605	113314-4610	113314-4615	113314-4625	113314-4001	
HP-NH ₂ (120 Å)	115304-4603	115304-4605	115304-4610	115304-4615	115304-4625	115304-4001	
HP-SCX (120 Å)	120364-4603	120364-4605	120364-4610	120364-4615	120364-4625	120364-4001	
HP-Silica (120 Å)	117004-4603	117004-4605	117004-4610	117004-4615	117004-4625	117004-4001	

* Cartridge holder

P/N# 102000-2001, \$42.50/EA for 10x20 mm guard cartridge

P/N# 102000-4001, \$42.50/EA for 10x40 mm guard cartridge



Ordering Information

Phases	5 μm Analytical Columns (length x ID mm)					Guard column
	30x2.1 \$300	50x2.1 \$300	100x2.1 \$350	150x2.1 \$400	250x2.1 \$450	10x20* \$150
GP-C18 (120 Å)	101185-2103	101185-2105	101185-2110	101185-2115	101185-2125	101185-2001
BR-C18 (120 Å)	102185-2103	102185-2105	102185-2110	102185-2115	102185-2125	102185-2001
HP-C18 (120 Å)	103185-2103	103185-2105	103185-2110	103185-2115	103185-2125	103185-2001
HP-C18 (200 Å)	104185-2103	104185-2105	104185-2110	104185-2115	104185-2125	104185-2001
Bio-C18 (200 Å)	105185-2103	105185-2105	105185-2110	105185-2115	105185-2125	105185-2001
Bio-C18 (300 Å)	106185-2103	106185-2105	106185-2110	106185-2115	106185-2125	106185-2001
GP-C8 (120 Å)	107085-2103	107085-2105	107085-2110	107085-2115	107085-2125	107085-2001
Bio-C8 (300 Å)	108085-2103	108085-2105	108085-2110	108085-2115	108085-2125	108085-2001
GP-C4 (120 Å)	109045-2103	109045-2105	109045-2110	109045-2115	109045-2125	109045-2001
Bio-C4 (300 Å)	110045-2103	110045-2105	110045-2110	110045-2115	110045-2125	110045-2001
GP-Ph (120 Å)	111365-2103	111365-2105	111365-2110	111365-2115	111365-2125	111365-2001
HP-CN (120 Å)	113315-2103	113315-2105	113315-2110	113315-2115	113315-2125	113315-2001
HP-NH ₂ (120 Å)	115305-2103	115305-2105	115305-2110	115305-2115	115305-2125	115305-2001
HP-SCX (120 Å)	120365-2103	120365-2105	120365-2110	120365-2115	120365-2125	120365-2001
HP-Silica (120 Å)	117005-2103	117005-2105	117005-2110	117005-2115	117005-2125	117005-2001
HILIC Polar-100	131585-2103	131585-2105	131585-2110	131585-2115	131585-2125	131585-2001

Phases	5 μm Analytical Columns (length x ID mm)					Guard column
	30x3.0 \$300	50x3.0 \$300	100x3.0 \$350	150x3.0 \$400	250x3.0 \$450	10x20* \$150
GP-C18 (120 Å)	101185-3003	101185-3005	101185-3010	101185-3015	101185-3025	101185-2001
BR-C18 (120 Å)	102185-3003	102185-3005	102185-3010	102185-3015	102185-3025	102185-2001
HP-C18 (120 Å)	103185-3003	103185-3005	103185-3010	103185-3015	103185-3025	103185-2001
HP-C18 (200 Å)	104185-3003	104185-3005	104185-3010	104185-3015	104185-3025	104185-2001
Bio-C18 (200 Å)	105185-3003	105185-3005	105185-3010	105185-3015	105185-3025	105185-2001
Bio-C18 (300 Å)	106185-3003	106185-3005	106185-3010	106185-3015	106185-3025	106185-2001
GP-C8 (120 Å)	107085-3003	107085-3005	107085-3010	107085-3015	107085-3025	107085-2001
Bio-C8 (300 Å)	108085-3003	108085-3005	108085-3010	108085-3015	108085-3025	108085-2001
GP-C4 (120 Å)	109045-3003	109045-3005	109045-3010	109045-3015	109045-3025	109045-2001
Bio-C4 (300 Å)	110045-3003	110045-3005	110045-3010	110045-3015	110045-3025	110045-2001
GP-Ph (120 Å)	111365-3003	111365-3005	111365-3010	111365-3015	111365-3025	111365-2001
HP-CN (120 Å)	113315-3003	113315-3005	113315-3010	113315-3015	113315-3025	113315-2001
HP-NH ₂ (120 Å)	115305-3003	115305-3005	115305-3010	115305-3015	115305-3025	115305-2001
HP-SCX (120 Å)	120365-3003	120365-3005	120365-3010	120365-3015	120365-3025	120365-2001
HP-Silica (120 Å)	117005-3003	117005-3005	117005-3010	117005-3015	117005-3025	117005-2001
HILIC Polar-100	131585-3003	131585-3005	131585-3010	131585-3015	131585-3025	131585-2001

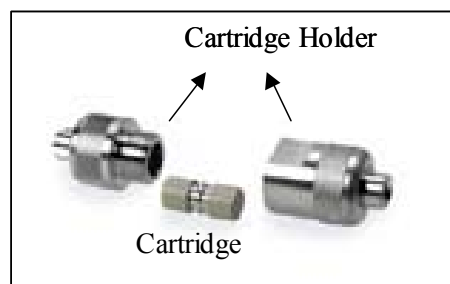
Ordering Information

Phases	5 μ m Analytical Columns (length x ID mm)						Guard column
	30x4.6	50x4.6	100x4.6	150x4.6	250x4.6	10x40*	
	\$300	\$300	\$350	\$400	\$450	\$150	
GP-C18 (120 Å)	101185-4603	101185-4605	101185-4610	101185-4615	101185-4625	101185-4001	
BR-C18 (120 Å)	102185-4603	102185-4605	102185-4610	102185-4615	102185-4625	102185-4001	
HP-C18 (120 Å)	103185-4603	103185-4605	103185-4610	103185-4615	103185-4625	103185-4001	
HP-C18 (200 Å)	104185-4603	104185-4605	104185-4610	104185-4615	104185-4625	104185-4001	
Bio-C18 (200 Å)	105185-4603	105185-4605	105185-4610	105185-4615	105185-4625	105185-4001	
Bio-C18 (300 Å)	106185-4603	106185-4605	106185-4610	106185-4615	106185-4625	106185-4001	
GP-C8 (120 Å)	107085-4603	107085-4605	107085-4610	107085-4615	107085-4625	107085-4001	
Bio-C8 (300 Å)	108085-4603	108085-4605	108085-4610	108085-4615	108085-4625	108085-4001	
GP-C4 (120 Å)	109045-4603	109045-4605	109045-4610	109045-4615	109045-4625	109045-4001	
Bio-C4 (300 Å)	110045-4603	110045-4605	110045-4610	110045-4615	110045-4625	110045-4001	
GP-Ph (120 Å)	111365-4603	111365-4605	111365-4610	111365-4615	111365-4625	111365-4001	
HP-CN (120 Å)	113315-4603	113315-4605	113315-4610	113315-4615	113315-4625	113315-4001	
HP-NH ₂ (120 Å)	115305-4603	115305-4605	115305-4610	115305-4615	115305-4625	115305-4001	
HP-SCX (120 Å)	120365-4603	120365-4605	120365-4610	120365-4615	120365-4625	120365-4001	
HP-Silica (120 Å)	117005-4603	117005-4605	117005-4610	117005-4615	117005-4625	117005-4001	
HILIC Polar-100	131585-4603	131585-4605	131585-4610	131585-4615	131585-4625	131585-4001	

* Cartridge holder

P/N# 102000-2001, \$42.50/EA for 10x20 mm guard cartridge

P/N# 102000-4001, \$42.50/EA for 10x40 mm guard cartridge



Ordering Information

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