

Full Range Selectivity for Reversed Phase Separation

Many different mechanisms of retention are utilized within reversed phase chromatography in order to retain and separate target analytes. Whether your compounds are hydrophobic or polar, Synergi columns provide you with a full range of selectivity, ensuring separation of extremely challenging and complex mixtures.

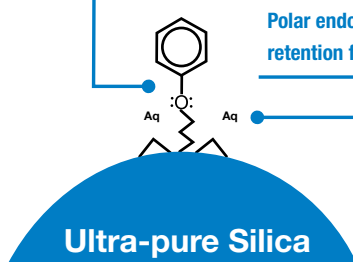
Synergi Polar-RP

Phenyl Ether-Linked

For polar and aromatic mixtures

Ether linkage increases aromaticity of the phenyl group and also provides π - π interactions with conjugated compounds

Polar endcapping provides added retention for polar compounds



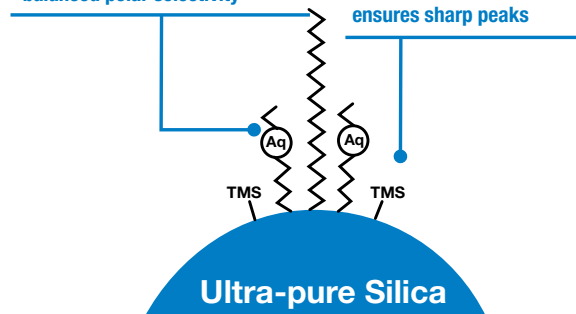
Synergi Fusion-RP

C18 Polar Embedded

Balanced non-polar and polar performance

Embedded polar group complements C18 ligand with balanced polar selectivity

TMS endcapping ensures sharp peaks

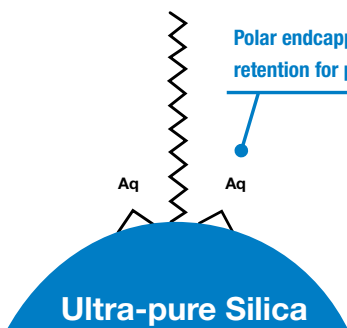


Synergi Hydro-RP

C18 Polar Endcapped

Strong non-polar and polar retention

Polar endcapping provides added retention for polar compounds

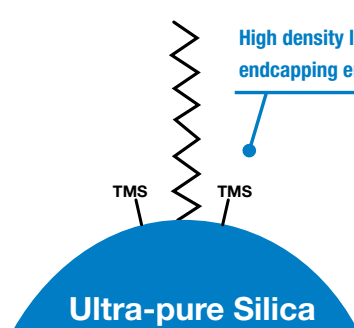


Synergi Max-RP

C12 TMS Endcapped

Excellent for basic compounds at neutral pH

High density ligands and extensive endcapping ensure sharp peaks



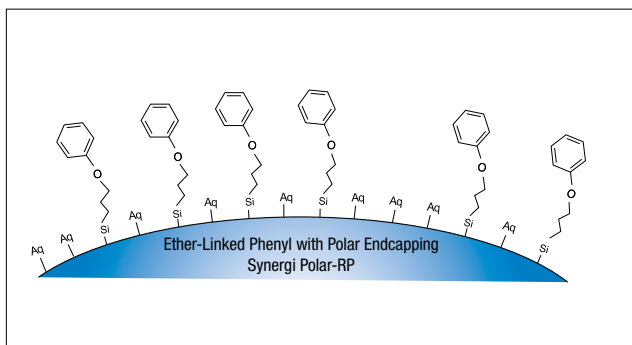
HPLC/UHPLC | SYNERGI

Material Characteristics

Packing Material	Particle Shape/Size (μm)	Pore Size (Å)	Pore Volume (mL/g)	Surface Area (m ² /g)	Carbon Load %	Calculated Bonded Phase Coverage (μmole/m ²)	End Capping
Synergi Max-RP	Spher. 2.5	100	—	400	17	—	TMS
Synergi Hydro-RP	Spher. 2.5	100	—	400	19	—	Hydrophilic
Synergi Polar-RP	Spher. 2.5	100	—	400	11	—	Hydrophilic
Synergi Fusion-RP	Spher. 2.5	100	—	400	12	—	TMS
Synergi Max-RP	Spher. 4, 10	80	1.05	475	17	3.21	TMS
Synergi Hydro-RP	Spher. 4, 10	80	1.05	475	19	2.45	Hydrophilic
Synergi Polar-RP	Spher. 4, 10	80	1.05	475	11	3.15	Hydrophilic
Synergi Fusion-RP	Spher. 4, 10	80	1.05	475	12	N/A	TMS

Synergi Polar-RP

An Ether-linked Phenyl Column with Polar Endcapping



Synergi Polar-RP

USP: L11

pH Stability: 1.5 – 7.0

Particle Size: 2.5 µm, 4 µm, and 10 µm

Phase: Ether-linked phenyl with polar endcapping

Application: For extreme retention of polar and aromatic compounds

Strength: Improved peak shape for acidic and basic analytes and aromatic selectivity with methanol containing mobile phases

Sample Challenge:

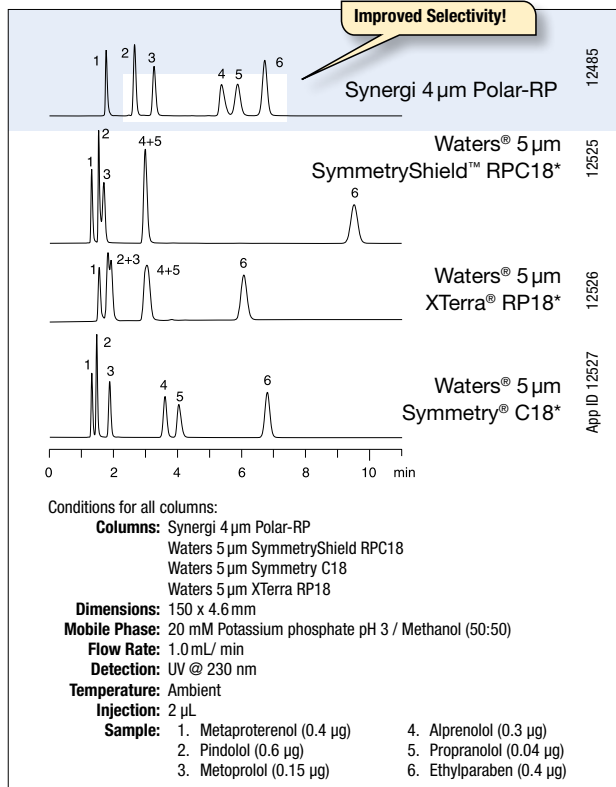
You need greater separation between polar and aromatic compounds with only slight differences chemically or structurally.

Selectivity Solution:

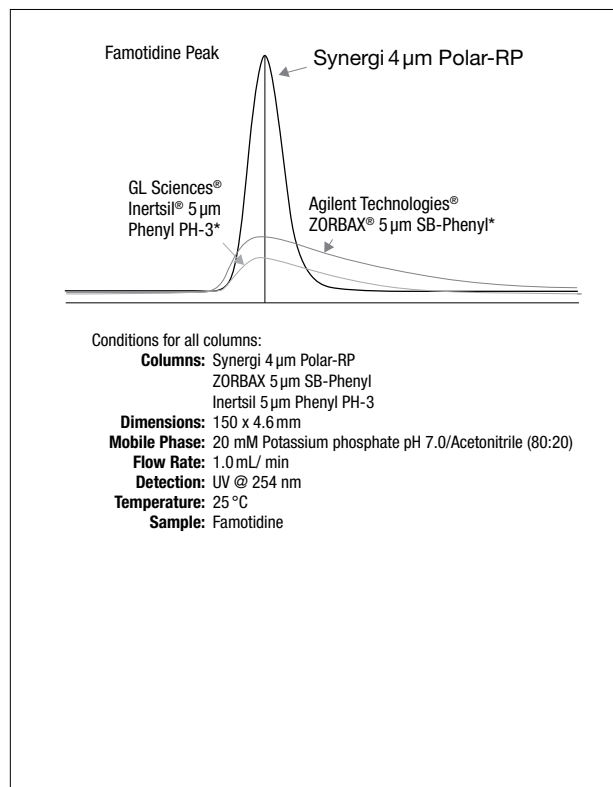
The slightest variations in polarity and aromaticity are exploited by Synergi Polar-RP in order to achieve the greatest separation between polar and/or aromatic compounds.



Increased resolution of polar compounds with Synergi Polar-RP compared to traditional C18 phases



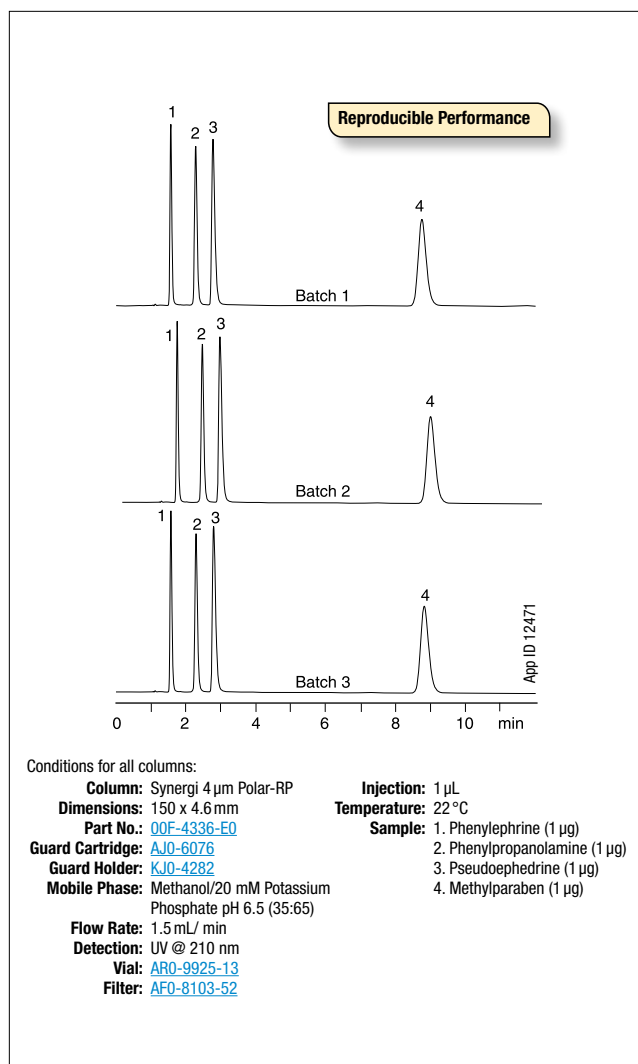
Improve peak symmetry of polar compounds with Synergi Polar-RP compared to other phenyl phases



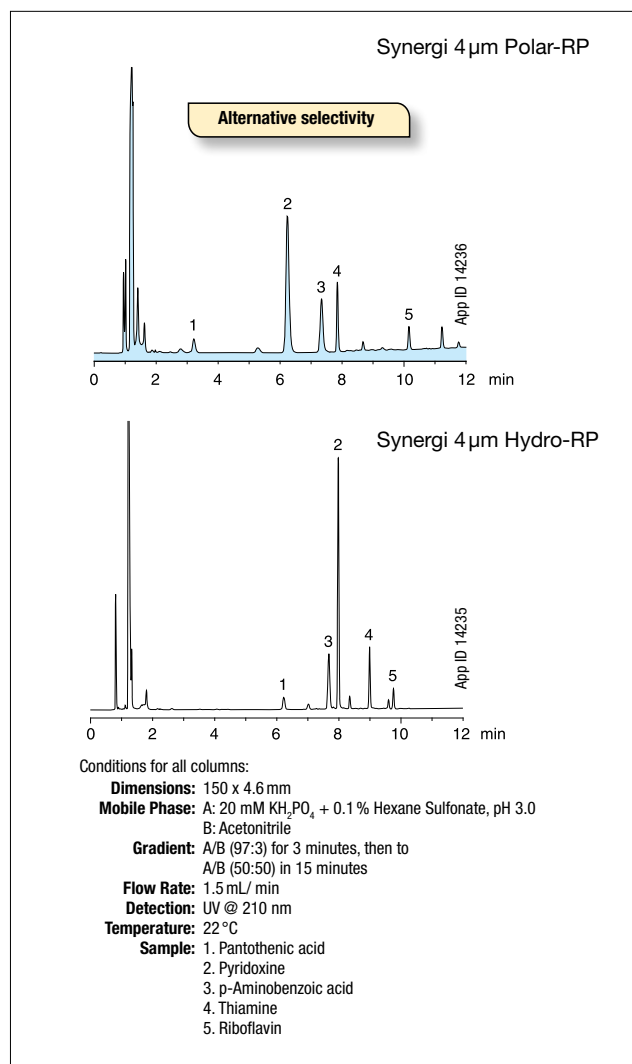
*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

Synergi Polar-RP (cont'd)

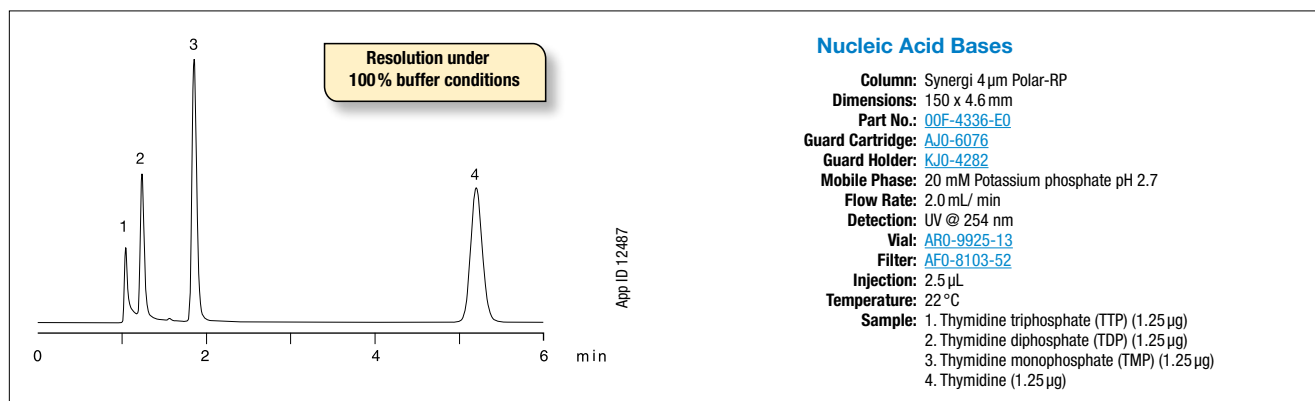
Synergi Polar-RP is highly reproducible



The selectivity of Synergi Polar-RP can provide differences in peak elution order for confirmation or better separation

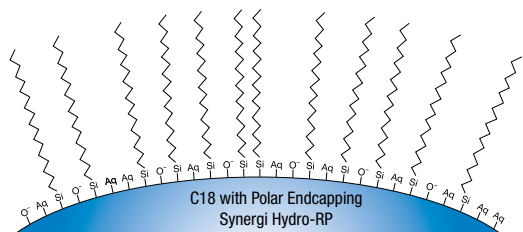


100% buffer mobile phase stability allows for separation of extremely polar compounds, like nucleic acid bases, on Synergi Polar-RP



Synergi Hydro-RP

A Polar Endcapped C18 Column



Sample Challenge:

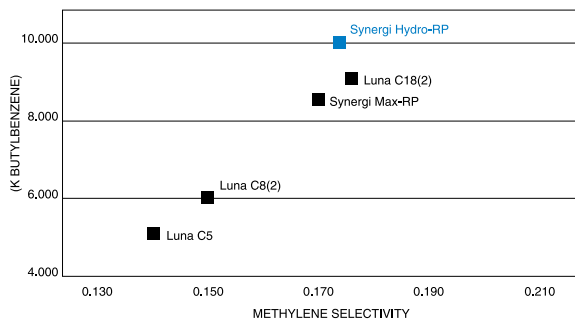
Your sample contains multiple analytes with only slight variations in hydrophobicity.

Selectivity Solution:

The extreme hydrophobic selectivity offered by Synergi Hydro-RP is needed to amplify the small differences in selectivity and get greater separation.



Extreme hydrophobic retention relative to other hydrophobic selectivity phases



Conditions for all columns:

Dimensions:	150 x 4.6 mm
Mobile Phase:	Acetonitrile/20 mM Potassium phosphate pH 7.0 (65:35)
Flow Rate:	1.5 mL/ min
Temperature:	Ambient
Sample:	1. Butylbenzene 2. Amylbenzene

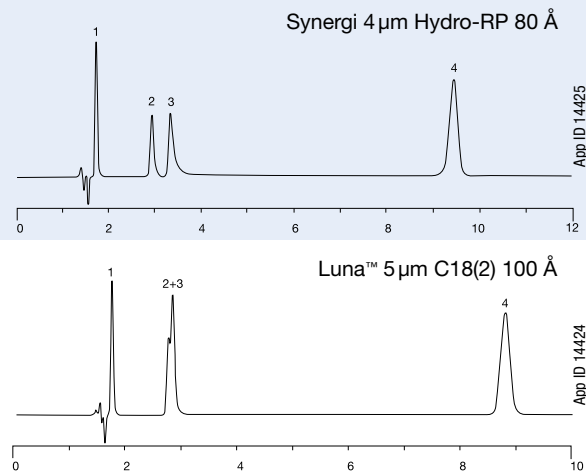
The chart was obtained by plotting hydrophobic retention (k for butylbenzene vs. methylene selectivity ($\log k$ for amylbenzene vs the number of methyl groups) under the stated conditions. A column with high hydrophobicity will better resolve two analytes which subtly differ in their overall hydrophobicity than a column with lower hydrophobic selectivity.

Synergi Hydro-RP

USP: L1

pH Stability:	1.5 – 7.5
Particle Size:	2.5 μm , 4 μm , and 10 μm
Phase:	C18 with polar endcapping
Application:	For extreme retention of non-polar and extremely polar alkyl compounds
Strength:	Resolution of highly polar compounds under 100 % buffer mobile phase conditions

Additional polar selectivity provides separation where traditional C18 columns cannot



Conditions for all columns:

Dimensions: 150 x 4.6 mm

Mobile Phase: 20 mM Potassium phosphate,
pH 7.0 /Methanol (60:40)

Flow Rate: 1 mL/ min

Temperature: 22 °C

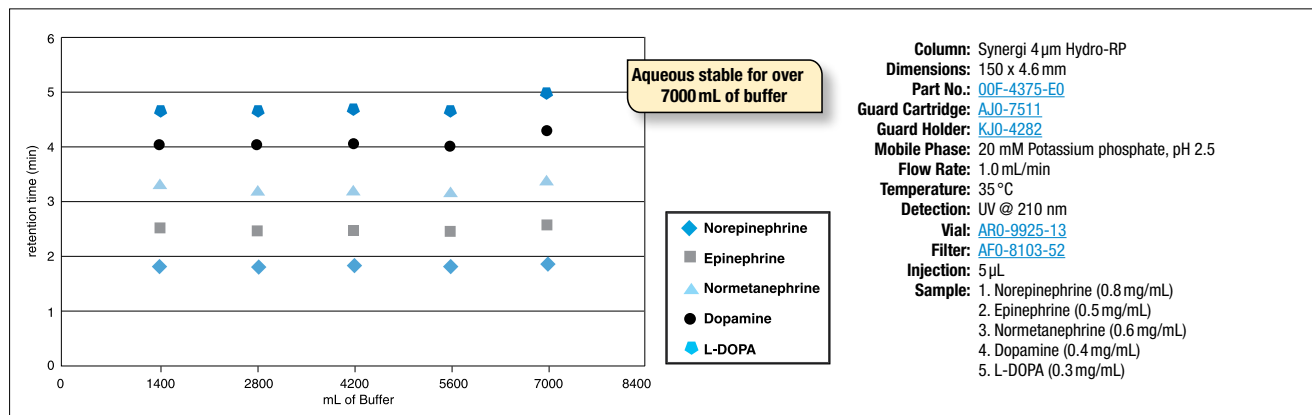
Detection: UV @ 210 nm

Sample:

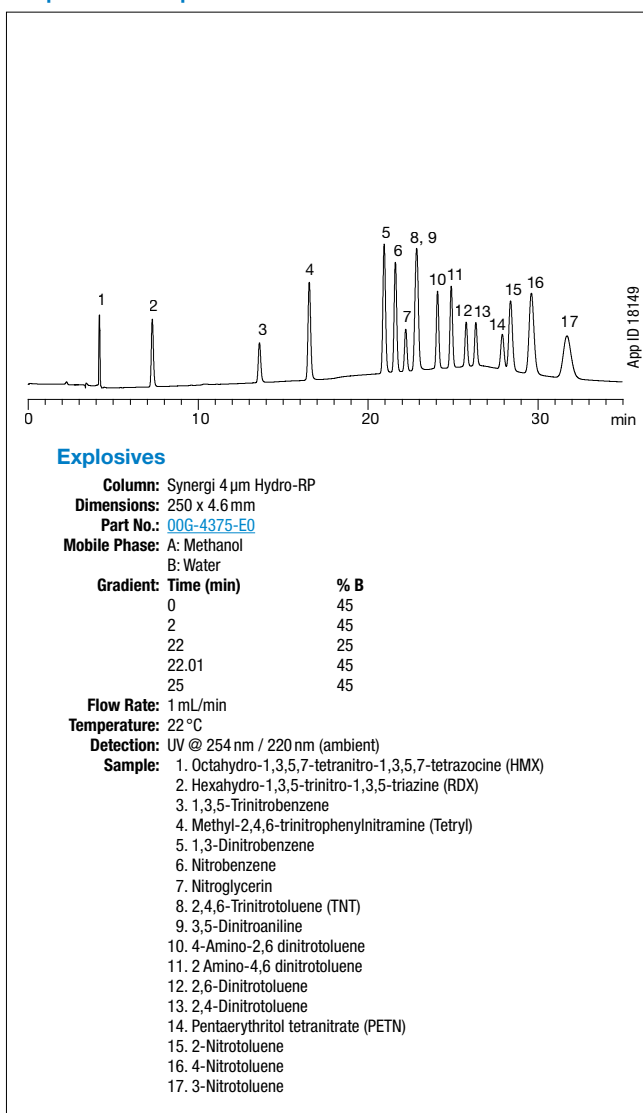
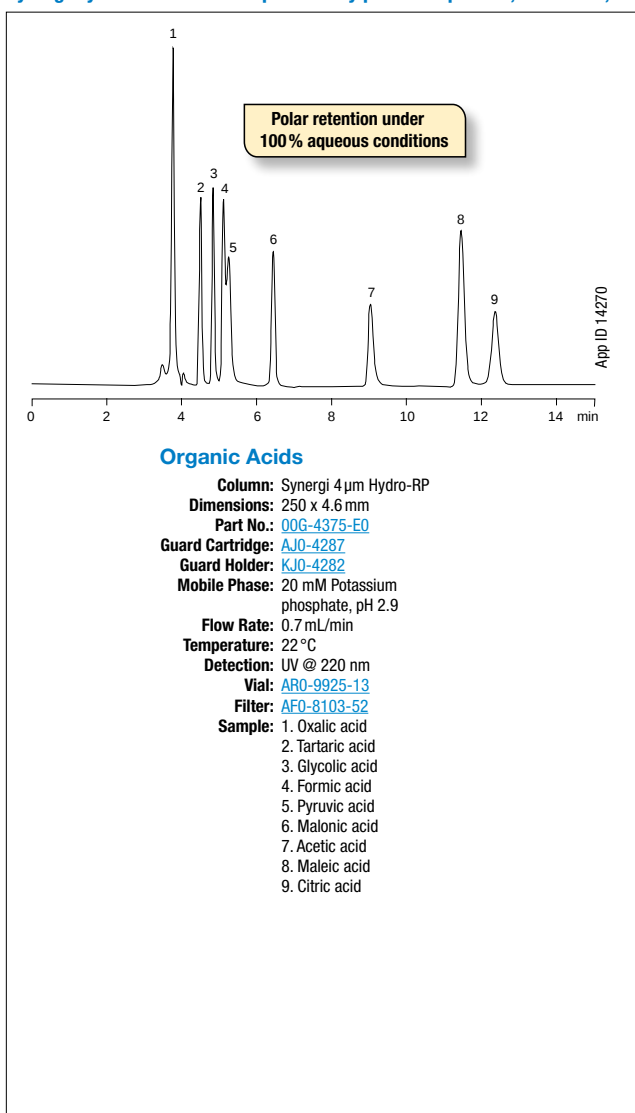
1. Phenylephrine
2. Phenylpropanolamine
3. Pseudoephedrine
4. Methylparaben

Synergi Hydro-RP (cont'd)

Synergi Hydro-RP is stable in 100 % aqueous mobile phase, providing improved retention of extremely polar compounds

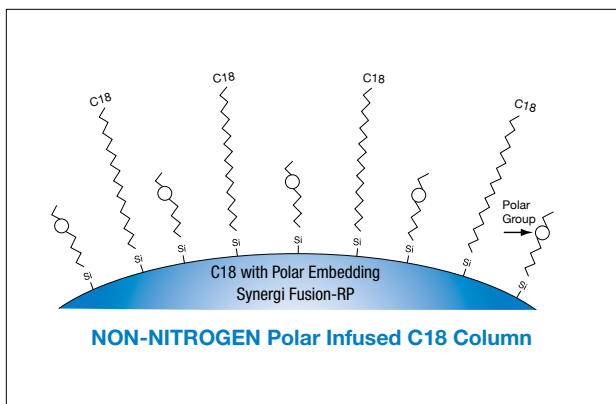


Synergi Hydro-RP is able to separate very polar compounds, as well as, mixtures of polars and non-polars



Synergi Fusion-RP

A Polar Embedded C18 Column



Synergi Fusion-RP

USP: L1

LC-MS
Certified

pH Stability: 1.5 – 9.0**

Particle Size: 2.5 µm, 4 µm, and 10 µm

Phase: Polar embedded C18

Application: For a balanced retention of polar, basic compounds and moderate retention of hydrophobics over a broad pH range

Strength: Analysis of polar, basic compounds with little or no MS phase bleed

** pH range is 1.5 - 10.0 under isocratic conditions.
pH range is 1.5 - 9 under gradient conditions.

Sample Challenge:

You need greater separation of compounds that exhibit moderately polar and hydrophobic characteristics.

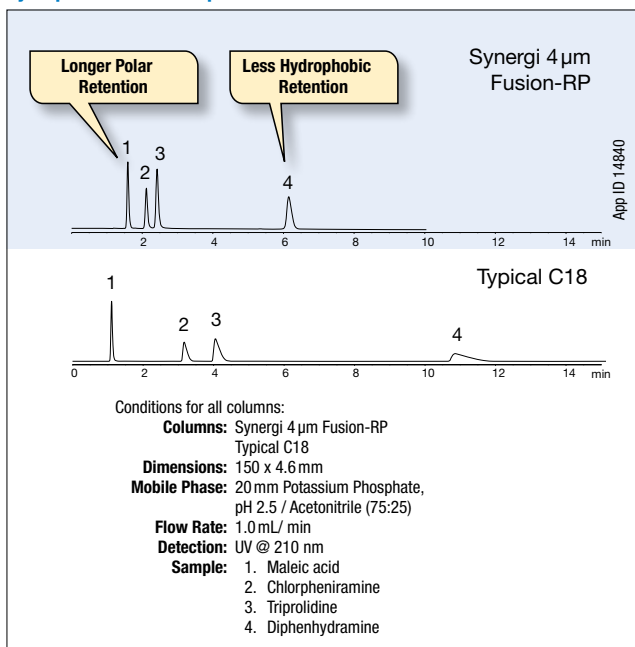
Selectivity Solution:

Offering a balanced combination of hydrophobic and polar selectivity, Synergi Fusion-RP will allow you to separate compounds exhibiting polar and hydrophobic characteristics.

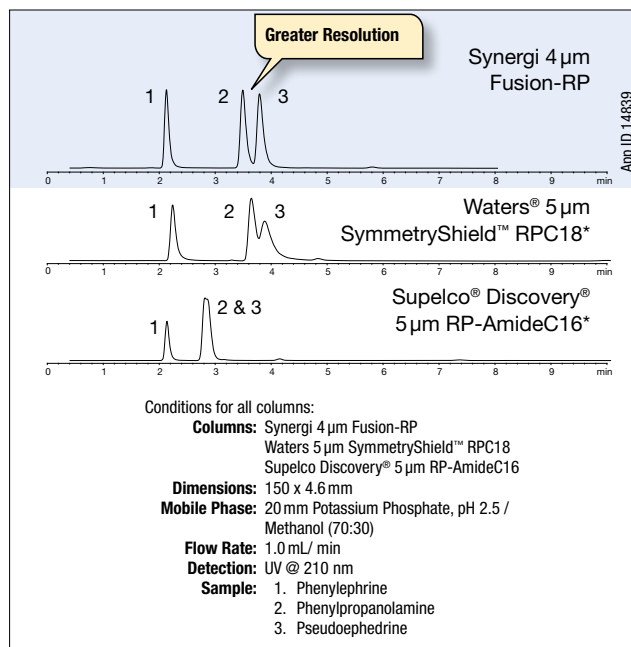


Balanced Polar and Hydrophobic Retention Allows for Superior Selectivity

Hydrophobic Basic Compounds



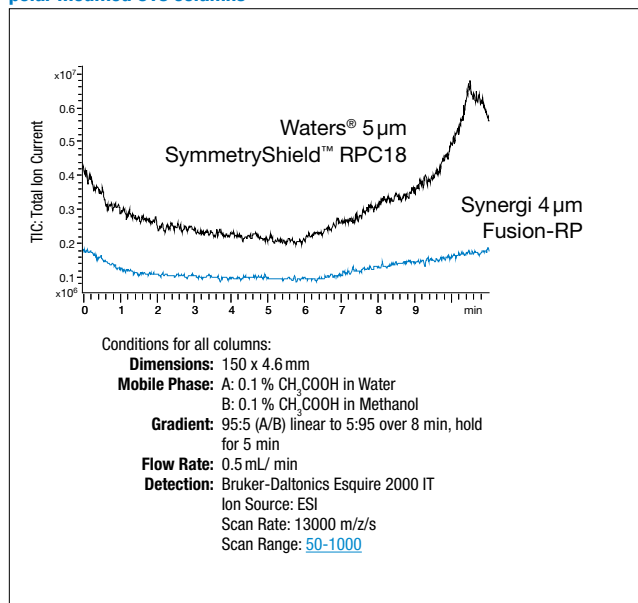
Antihistamines



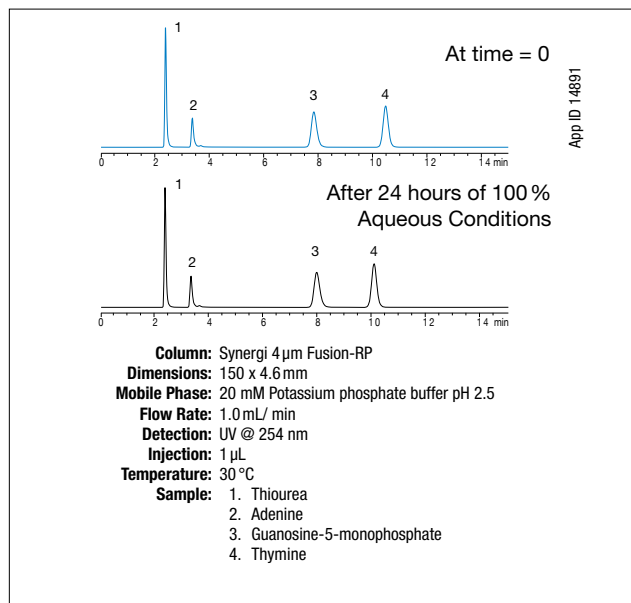
*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

Synergi Fusion-RP (cont'd)

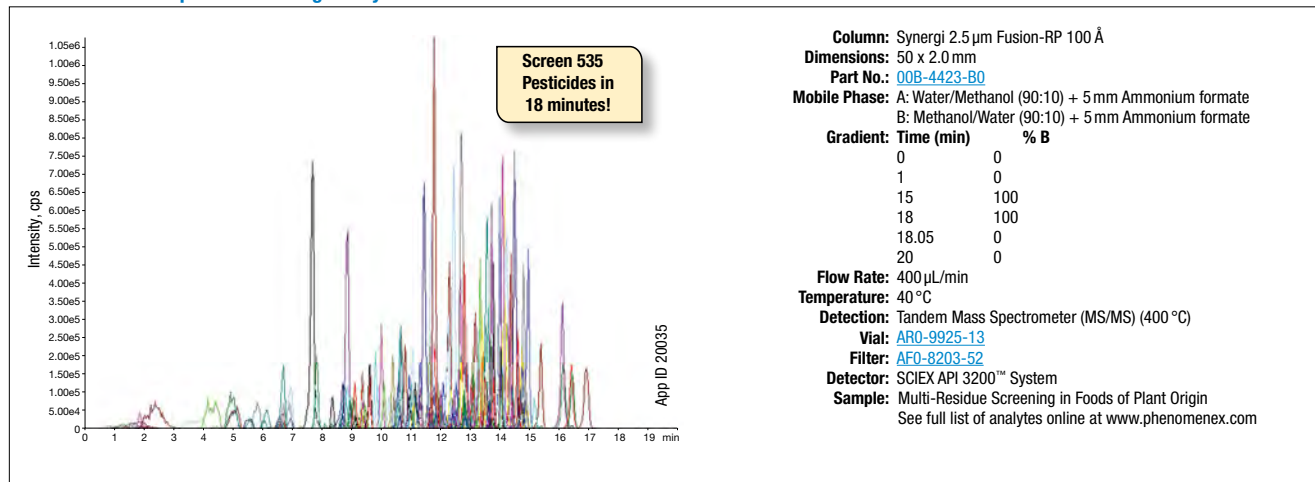
Synergi Fusion-RP has negligible MS bleed compared to other polar modified C18 columns



100% aqueous stable for added method flexibility



Excellent Multi-Compound Screening Ability

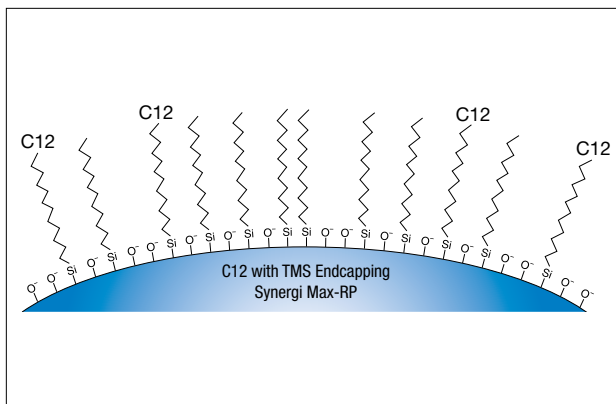


*Comparative separations may not be representative of all applications.

Columns used for comparison studies were manufactured by and purchased from Agilent Technologies Inc., Waters Corporation, GL Sciences Inc., Macherey-Nagel, and Sigma-Aldrich Co., LLC.



Synergi Max-RP A Reversed Phase C12 Column



Sample Challenge:

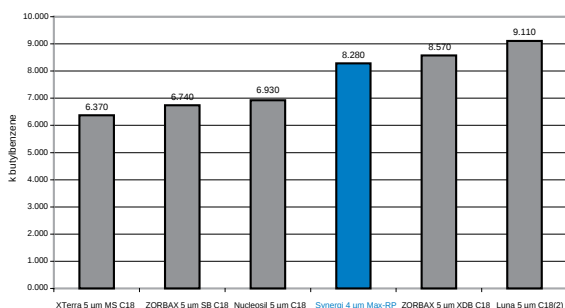
You need to retain compounds based on hydrophobic selectivity exclusively, but cannot accomplish peak separation with C18 column.

Selectivity Solution:

The C12 ligands on Synergi Max-RP give a hydrophobic selectivity that may separate peaks where C18 columns cannot.



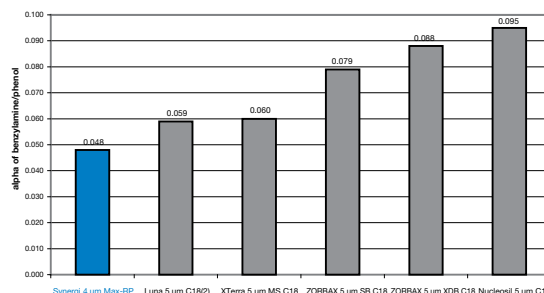
Hydrophobic Retention: Synergi Max-RP (C12) Performs Like a C18*



Conditions for all columns:

Columns: Waters Xterra 5 µm MS C18
Agilent Technologies ZORBAX 5 µm SB C18
Macherey Nagel Nucleosil 5 µm C18
Synergi 4 µm Max-RP
Agilent Technologies ZORBAX 5 µm XDB C18
Luna 5 µm C18(2)
Dimensions: 150 x 4.6 mm
Mobile Phase: Acetonitrile/Water (80:20)
Flow Rate: 1 mL/min
Detection: UV @ 254 nm
Injection: 1 µL
Temperature: Ambient
Sample: Butylbenzene

Silanol Activity at Low pH: C12 vs. C18 Phases



Conditions for all columns:

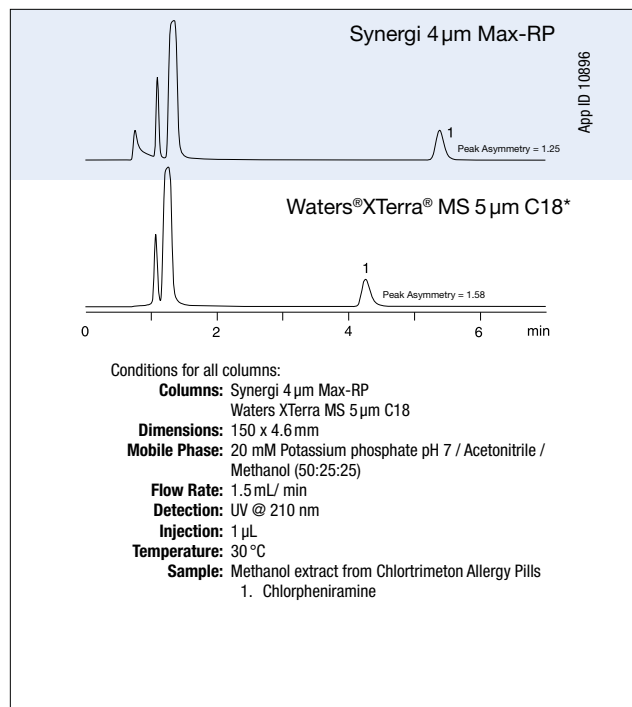
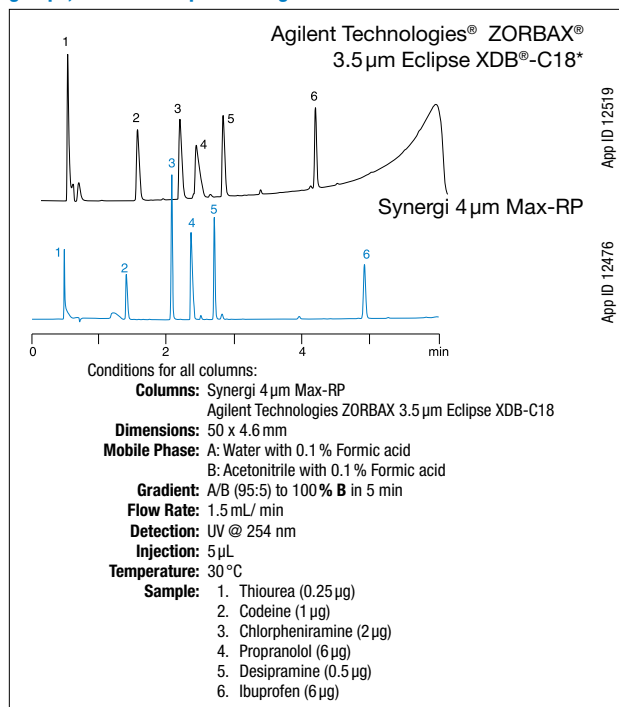
Columns: Waters Xterra 5 µm MS C18
Agilent Technologies ZORBAX 5 µm SB C18
Macherey Nagel Nucleosil 5 µm C18
Synergi 4 µm Max-RP
Agilent Technologies ZORBAX 5 µm XDB C18
Luna 5 µm C18(2)
Dimensions: 150 x 4.6 mm
Mobile Phase: Methanol/20 mM Potassium phosphate, pH 2.5 (30:70)
Flow Rate: 1 mL/min
Detection: UV @ 254 nm
Injection: 5 µL
Temperature: Ambient
Sample: 1. Benzylamine
2. Phenol

*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

Synergi Max-RP (cont'd)

Sharper Peaks

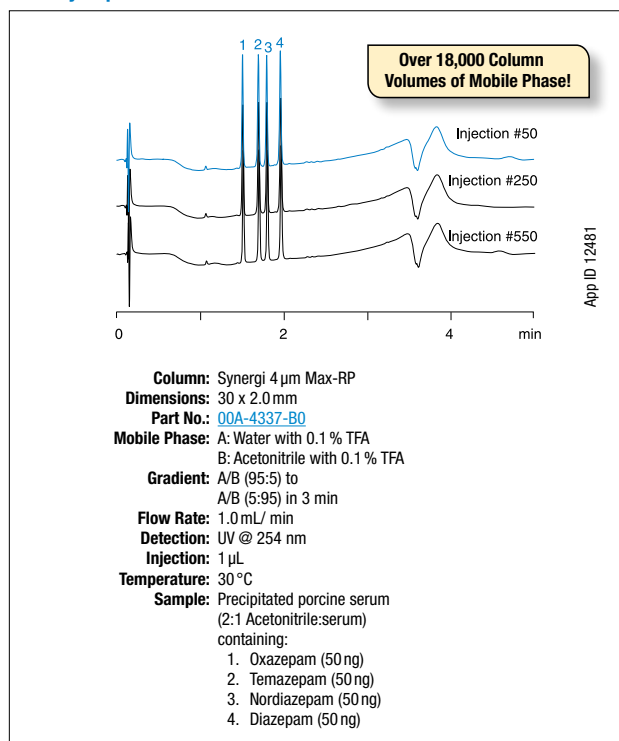
The Synergi Max-RP C12 ligands are densely bound to silica surface, significantly decreasing the number of active silanol groups, which cause peak tailing



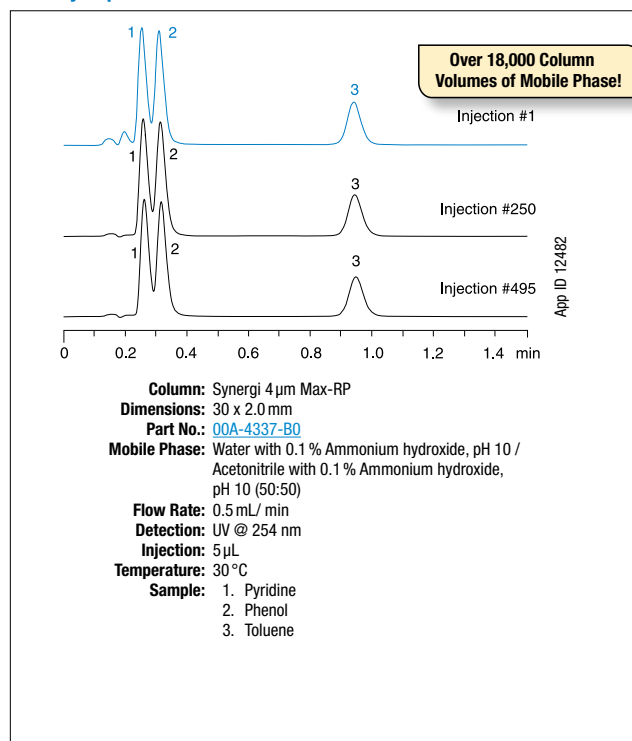
*See p. 349 for disclaimer information. Comparative separations may not be representative of all applications.

Achieve Reproducibility and Long Column Lifetimes Even at pH Extremes with Synergi Max-RP

Stability @ pH 1.5



Stability @ pH 10.0



Fast LC Solutions

Ordering Information

2.5 µm High Speed Technology (HST) Columns (mm)						
Phases	30 x 2.0	50 x 2.0	100 x 2.0	50 x 3.0	100 x 3.0	50 x 4.6
Max-RP	00A-4372-B0	00B-4372-B0	00D-4372-B0	00B-4372-Y0	00D-4372-Y0	00B-4372-E0
Hydro-RP	00A-4387-B0	00B-4387-B0	00D-4387-B0	00B-4387-Y0	00D-4387-Y0	00B-4387-E0
Polar-RP	00A-4371-B0	00B-4371-B0	00D-4371-B0	00B-4371-Y0	00D-4371-Y0	00B-4371-E0
Fusion-RP	00A-4423-B0	00B-4423-B0	00D-4423-B0	00B-4423-Y0	00D-4423-Y0	00B-4423-E0



For information about HST Columns, contact your Phenomenex technical consultant or local distributor.

Ordering Information

2.5 µm MercuryMS LC-MS Cartridges (mm)					Columns (mm)	
Phases	10 x 2.0	10 x 4.0	20 x 2.0	20 x 4.0	20 x 2.0	20 x 4.0
Max-RP	00N-4372-B0-CE	—	00M-4372-B0-CE	00M-4372-D0-CE	—	—
Hydro-RP	00N-4387-B0-CE	—	00M-4387-B0-CE	—	—	—
Polar-RP	00N-4371-B0-CE	00N-4371-D0-CE	00M-4371-B0-CE	—	00M-4377-B0	—
Fusion-RP	00N-4423-B0-CE	—	—	—	—	00M-4423-D0

MercuryMS™ Cartridge Holders



Direct-Connect Holder



Standard Holder

Ordering Information

Direct-Connect Cartridge Holders

Part No.	Description
CH0-7187	10 mm direct-connect holder
CH0-7188	20 mm direct-connect holder

Standard Cartridge Holders

Part No.	Description
CH0-5846	10 mm standard holder
CH0-5845	20 mm standard holder



Increase lab safety with HPLC / UHPLC solvent protection, see SecurityCAP™ products on pp. 417-418

Micro LC Columns

Ordering Information

4 µm Synergi Micro LC Columns (mm)					
Phases	50 x 0.3	150 x 0.3	50 x 0.5	150 x 0.5	250 x 0.5
Max-RP	—	—	00B-4337-AF	00F-4337-AF	—
Hydro-RP	00B-4375-AC	00F-4375-AC	00B-4375-AF	—	00G-4375-AF
Fusion-RP	—	00F-4424-AC	—	00F-4424-AF	—
Polar-RP	—	—	—	00F-4336-AF	—



For information on Micro LC Columns, Traps, and Fittings, see pp. 359-361

Synergi™ Full Range Selectivity LC Columns

HPLC Columns

Ordering Information

4 µm Microbore and Minibore Columns (mm)								SecurityGuard™ Cartridges (mm)
Phases	50 x 1.0	150 x 1.0	30 x 2.0	50 x 2.0	75 x 2.0	150 x 2.0	250 x 2.0	4 x 2.0* /10pk
Max-RP	00B-4337-A0	—	00A-4337-B0	00B-4337-B0	00C-4337-B0	00F-4337-B0	—	AJO-6073
Hydro-RP	00B-4375-A0	00F-4375-A0	00A-4375-B0	00B-4375-B0	00C-4375-B0	00F-4375-B0	00G-4375-B0	AJO-7510
Polar-RP	—	—	00A-4336-B0	00B-4336-B0	00C-4336-B0	00F-4336-B0	00G-4336-B0	AJO-6075
Fusion-RP	00B-4424-A0	00F-4424-A0	00A-4424-B0	00B-4424-B0	00C-4424-B0	00F-4424-B0	00G-4424-B0	AJO-7556

for ID: 2.0-3.0 mm

4 µm MidBore™ Columns (mm)					SecurityGuard Cartridges (mm)
Phases	30 x 3.0	50 x 3.0	150 x 3.0	250 x 3.0	4 x 2.0* /10pk
Max-RP	—	00B-4337-Y0	00F-4337-Y0	00G-4337-Y0	AJO-6073
Hydro-RP	—	00B-4375-Y0	00F-4375-Y0	00G-4375-Y0	AJO-7510
Polar-RP	00A-4336-Y0	00B-4336-Y0	00F-4336-Y0	00G-4336-Y0	AJO-6075
Fusion-RP	—	00B-4424-Y0	00F-4424-Y0	00G-4424-Y0	AJO-7556

for ID: 2.0-3.0 mm

4 µm Analytical Columns (mm)						SecurityGuard Cartridges (mm)
Phases	30 x 4.6	50 x 4.6	75 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0* /10pk
Max-RP	00A-4337-E0	00B-4337-E0	00C-4337-E0	00F-4337-E0	00G-4337-E0	AJO-6074
Hydro-RP	00A-4375-E0	00B-4375-E0	00C-4375-E0	00F-4375-E0	00G-4375-E0	AJO-7511
Polar-RP	—	00B-4336-E0	00C-4336-E0	00F-4336-E0	00G-4336-E0	AJO-6076
Fusion-RP	—	00B-4424-E0	00C-4424-E0	00F-4424-E0	00G-4424-E0	AJO-7557

for ID: 3.2-8.0 mm



For UHPLC system connections, see SecurityLINK™ UHPLC fingertight fitting system on pp. 336-337

Preparative Columns

Ordering Information

Axia™ Packed Preparative Columns (mm)					SecurityGuard Cartridges (mm)
Phases	50 x 21.2	100 x 21.2	150 x 21.2	250 x 21.2	15 x 21.2**
4 µm					/ea
Max-RP	—	—	00F-4337-P0-AX	00G-4337-P0-AX	AJO-7842
Hydro-RP	00B-4375-P0-AX	—	00F-4375-P0-AX	00G-4375-P0-AX	AJO-7843
Polar-RP	00B-4336-P0-AX	00D-4336-P0-AX	00F-4336-P0-AX	00G-4336-P0-AX	AJO-7845
Fusion-RP	—	00D-4424-P0-AX	00F-4424-P0-AX	00G-4424-P0-AX	AJO-7844
10 µm					/ea
Hydro-RP	—	—	Inquire	00G-4376-P0-AX	AJO-7843
Polar-RP	—	—	Inquire	00G-4351-P0-AX	AJO-7845
Fusion-RP	—	—	00F-4425-P0-AX	00G-4425-P0-AX	AJO-7844

for ID: 18-29 mm

Ordering Information

Axia™ Packed Preparative Columns (mm) continued		SecurityGuard Cartridges (mm)
Phases	250 x 30	15 x 30.0*
4 µm		/ea
Max-RP	00G-4337-UQ-AX	AJO-8304

for ID: 30-49 mm

Ordering Information

4 µm Semi-Prep Columns (mm)		SecurityGuard Cartridges (mm)
Phases	250 x 10	10 x 10†
Max-RP	00G-4337-NQ	AJO-7275
Hydro-RP	00G-4375-NQ	AJO-7512
Polar-RP	00G-4336-NQ	AJO-7276
Fusion-RP	00G-4424-NQ	AJO-7558

for ID: 9-16 mm

*SecurityGuard™ Analytical Cartridges require holder, Part No.: [KJO-4282](#)

†SemiPrep SecurityGuard™ Cartridges require holder, Part No.: [AJO-9281](#)

**PREP SecurityGuard™ Cartridges require holder, Part No.: [AJO-8223](#)

*PREP SecurityGuard™ Cartridges require holder, Part No.: [AJO-8277](#)



For more dimensions and phases of Axia packed preparative columns, see pp. 393-394, or contact your Phenomenex Technical Consultant

Pilot Scale Columns and Bulk Material

Ordering Information

10 µm Analytical and Semi-Prep Columns (mm)				SecurityGuard Cartridges (mm)
Phases	250 x 4.6	250 x 10	4 x 3.0*	10 x 10†
			/10pk	/3pk
Max-RP	—	00G-4350-N0	AJO-6074	AJO-7275
Hydro-RP	00G-4376-E0	00G-4376-N0	AJO-7511	AJO-7512
Polar-RP	00G-4351-E0	00G-4351-N0	AJO-6076	AJO-7276
Fusion-RP	00G-4425-E0	00G-4425-N0	AJO-7557	AJO-7558

for ID: 3.2-8.0 mm 9-16 mm

10 µm Bulk Packings		
Phases	100 g	1 kg
Max-RP	04G-4350	04K-4350
Hydro-RP	04G-4376	04K-4376
Polar-RP	04G-4351	04K-4351
Fusion-RP	04G-4425	04K-4425

Larger quantities of bulk media available upon request.

Synergi Bulk Media

Beyond our largest preparative column dimensions, Synergi phases are available in bulk quantities for HPLC purification at the process, pilot, and commercial scale. These medias offer a complementary selectivity to the standard C18, C8, or Silica phases traditionally employed in larger scale HPLC. Additionally, due to the diverse chemical properties of each of the Synergi phases, dramatic differences in chromatographic parameters such as retention time, selectivity, and resolution are often observed. For those challenging purifications where chromatography still makes the most sense, the Synergi family offers an excellent alternative to evaluate! Get your Synergi preparative scout column(s) and evaluate these phases today!

