Колонки HPLC

HPLC for Small Molecules

Supelco, A Pioneer in Chromatography

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Supelco has been a leader in chromatography for over 30 years.
The first base deactivated column, SUPELCOSIL LC-18-DB was introduced in 1982 and provided improved peak shape for basic compounds that tailed with early generation columns. The embedded polar group (EPG) column was also first launched in the early 1980s and has evolved through several generations to include Ascentis Express RP-Amide, the newest EPG column introduced to the market.

The innovative Ascentis Express Column, based on Fused-Core technology, was introduced in 2007 and provides high speed and resolution at low backpressures. Furthermore, expansion into the chiral chromatography market occurred with the acquisition of Astec chiral chromatography products.

Supelco, along with Sigma, Aldrich, and Fluka provides thousands of chromatography related products through worldwide research and development, manufacturing, distribution and sales operations.

HPLC Column Selection

How to Choose an HPLC Column

Reversed-Phase HPLC Column Selection Flow Chart
This flow chart provides information for choosing an initial column for reversed-phase method development.

Packing Pore Size
The size of the molecules to be analyzed will determine the packing pore size. Small molecules can diffuse in and out of 80 to 120 Å pore packings (Ascentis® Express, Ascentis®, and Discovery HS), but peptides and proteins may not. For this reason, it is recommended to use 200 to 300 Å pore-size packings (Discovery and Discovery Biowide) for separations of peptides and proteins.

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Column Diameter
Column diameter defines how much material one can inject onto a column. Conventional analytical HPLC uses 4.6 mm internal diameter. However, smaller diameter columns (2.1 and 3.0 mm) provide increased sensitivity and therefore are commonly used in limited sample applications and LC-MS. Larger diameter columns (10 mm and 21.2 mm) allow for high sample loading which is beneficial for sample collection.

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Particle Size
For conventional analytical HPLC, the standard particle size is 5 µm. However, smaller particles provide higher efficiency and resolution but at a higher backpressure on the HPLC system. The latest particle technology, Fused Core, combines the benefits of higher resolution and lower backpressure into a single column format. Larger particles provide lower backpressure making them amenable to large columns such as those used in preparative chromatography.

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Column Length
The conventional column length for analytical HPLC is 150 mm or 250 mm for high resolution. For fast analysis, shorter columns (30 to 50 mm) should be used.

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Column Bonded Phase
A C18 phase is often utilized as a starting point for many separations. C18 will provide enough retention for most non-polar and moderately polar molecules. Analysis of polar molecules or molecules that are highly functionalized will often be enhanced by using a more polar stationary phase such as Phenyl, RP-Amide, F5, or Cyano.

Custom-prepared HPLC Columns

If the column of your choice is not listed as a stock product in our catalog, Supelco may be able to prepare it for you on a custom basis. In order to discuss a specific request and obtain a quote on price and delivery, please contact Technical Service.

Delivery: Supelco typically ships custom-prepared analytical HPLC columns within 5 to 7 business days to anywhere in the world. Larger sizes and special requests may take longer.

Performance testing: Supelco tests custom-prepared columns for efficiency and symmetry. Please let us know if you have special test criteria.

Assistance with method development: Our Technical Service chemists are available to assist you with your method development needs. They may be able to provide recommendations, technical data and in-house testing in support of your testing needs.

HPLC for Small Molecules

HPLC Column Selection: *Supelco HPLC Columns conform to USP standards*

Supelco HPLC Columns conform to USP standards

HPLC Packings

USP Code	Description	Recommended Packing
L1	Octadecyl silane chemically bonded to porous or non-porous silica or ceramic micro-particles, 1.5 to 10 µm in diameter, or a monolithic rod.	Ascentis® C18 Ascentis® Express C18 Discovery® C18 Discovery® HS F5 Discovery® BIO Wide Pore C18 SUPELCOSIL™ LC-18 SUPELCOSIL™ LC-18-DB SUPELCOSIL™ LC-318
L3	Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Ascentis® Express HILIC Ascentis® Si SUPELCOSIL™ LC-Si SUPELCOSIL™ LC-3Si
L7	Octylsilane chemically bonded to totally or superficially porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Ascentis® C8 Ascentis® Express C8 Discovery® C8 Discovery® BIO Wide Pore C8 SUPELCOSIL™ LC-8, SUPELCOSIL™ LC-8-DB SUPELCOSIL™ LC-308
L8	An essentially monomolecular layer of amino-propylsilane chemically bonded to totally porous silica gel support, 1.5 to 10 µm in diameter.	SUPELCOSIL™ LC-NH2 SUPELCOSIL™ LC-NH2-NP
L9	Irregular or spherical, totally porous silica gel having a chemically bonded, strongly acidic cation-exchange coating, 3 to 10 µm in diameter.	SUPELCOSIL™ LC-SCX
L10	Nitrile groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	Ascentis® ES Cyano Discovery® Cyano SUPELCOSIL™ LC-CN SUPELCOSIL™ LC-PCN
L11	Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	Ascentis® Phenyl Ascentis® Express Phenyl-Hexyl SUPELCOSIL™ LC-DP SUPELCOSIL™ LC-3DP
L13	Trimethylsilane chemically bonded to porous silica particles, 3 to 10 µm in diameter.	SUPELCOSIL™ LC-1
L14	Silica gel having a chemically bonded, strongly basic quaternary ammonium anion-exchange coating, 5 to 10 µm in diameter.	SUPELCOSIL™ SAX1
L17	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in t he hydrogen form, 6 to 12 µm in diameter.	SUPELCOGEL™ C-610H SUPELCOGEL™ H
L19	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, about 9 µm in diameter.	SUPELCOGEL™ Ca
L20	Dihydroxypropane groups chemically bonded to porous silica or hybrid particles, 1.5 to 10 µm in diameter.	Kromasil® Diol SUPELCOSIL™ LC-Diol
L21	A rigid, spherical styrene-divinylbenzene copolymer, 3 to 10 µm in diameter.	PRP-1
L22	A cation-exchange resin made of porous polystyrene gel with sulfonic acid groups, about 10 µm in size.	PRP-X200 PRP-X300 SUPELCOGEL™ C-160H SUPELCOGEL™ H
L23	An anion-exchange resin made of porous polymethacrylate or polyacrylate gel with quaternary ammonium groups, 7 to 12 µm in size.	Discovery® BIO PolyMA-WAX
L26	Butyl silane chemically bonded to totally porous silica particles, 1.5 to 10 µm in diameter.	SUPELCOSIL™ LC-304
L27	Porous silica particles, 30 to 50 µm in diameter.	Discovery® DSC-Si Supelclean™ LC-Si Pelliguard™ LC-Si
L32	A chiral ligand-exchange resin packing-L-proline copper complex covalently bonded to irregularly shaped silica particles, 5 to 10 µm in diameter.	Astec™ CLC-D Astec™ CLC-L
L34	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, about 7 to 9 µm in diameter.	SUPELCOGEL™ Pb
L40	Cellulose tris-3,5-dimethylphenylcarbamate coated porous silica particles, 5 to 20 µm in diameter.	Astec™ Cellulose DMP Kromasil® CelluCoat®
L41	Immobilized a1-acid glycoprotein on spherical silica particles, 5 µm in diameter.	Chiral-AGP
L43	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10 µm in diameter.	Ascentis® Express F5 Discovery® HS F5
L45	Beta cyclodextrin bonded to porous silica particles, 5 to 10 µm in diameter.	Astec™ CYCLOBOND® I 2000 Series
L47	High capacity anion-exchange microporous substrate, fully functionalized with a trimethylamine group, 8 µm in diameter.	PRP-X100
L49	A reversed-phase packing made by coating a thin layer of polybutadiene onto spherical porous zirconia particles, 3 to 10 µm in diameter.	Discovery® Zr-PBD
L52	A strong cation exchange resin made of porous silica with sulfopropyl groups, 5 to 10 µm in diameter.	SUPELCOSIL™ LC-SCX

HPLC for Small Molecules

HPLC Column Selection: *Supelco HPLC Columns conform to USP standards*

HPLC Packings

USP Code	Description	Recommended Packing
L59	Packing for the size-exclusion separations of proteins (separation by molecular weight) over the range of 5 to 7,000 kDa. It is spherical (1.5 to 10 µm), silica or hybrid packing with a hydrophilic coating.	Discovery® BIO GFC 100 Discovery® BIO GFC 150 Discovery® BIO GFC 300 Discovery® BIO GFC 500 Discovery® BIO GFC 1000 Discovery® BIO GFC 2000
L60	Spherical, porous silica gel, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and endcapped.	Ascentis® RP-Amide Ascentis® Express RP-Amide Discovery® RP-AmideC16 SUPELCOSIL™ ABZ+PLUS SUPELCOSIL™ LC-ABZ
L63	Glycopeptide teicoplanin linked through multiple covalent bonds to a 100 Å units spherical silica.	Astec™ CHIROBIOTIC® T Astec™ CHIROBIOTIC® T2 Astec™ CHIROBIOTIC® TAG
L67	Porous vinyl alcohol copolymer with a C18 alkyl group attached to the hydroxyl group of the polymer, 2 to 10 µm in diameter.	apHera™ C18
L68	Spherical, porous silica, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and not endcapped.	Suplex pKb-100

Helpful Hints

Properties of Organic Solvents Commonly Used in HPLC

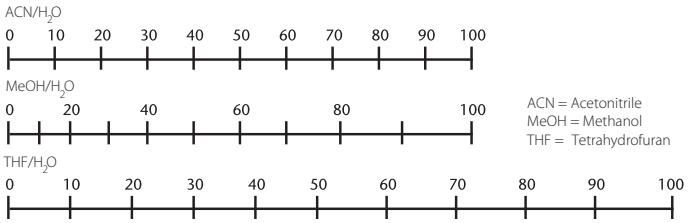
Solvent	Polarity	Miscible with Water?	UV Cutoff[1]	Refractive Index 20 °C	Solvent Strength, ε⁰(silica)	Viscosity at 20 °C, C P
Hexane	nonpolar	no	200	1.3750	0.00	0.33
Isooctane		no	200	1.3910	0.01	0.50
Carbon tetrachloride		no	263	1.4595	0.14	0.97
Chloroform		no	245	1.4460	0.31	0.57
Methylene chloride		no	235	1.4240	0.32	0.44
Tetrahydrofuran		yes	215	1.4070	0.35	0.55
Diethyl ether		no	215	1.3530	0.29	0.23
Acetone		yes	330	1.3590	0.43	0.32
Ethyl acetate		poorly	260	1.3720	0.45	0.45
Dioxane		yes	215	1.4220	0.49	1.54
Acetonitrile		yes	190	1.3440	0.50	0.37
2-Propanol		yes	210	1.3770	0.63	2.30
Methanol		yes	205	1.3290	0.73	0.60
Water	polar	yes	–	1.3328	>0.73	1.00

[1]Typical values

Helpful Hints

Relative Strengths for Different Solvents

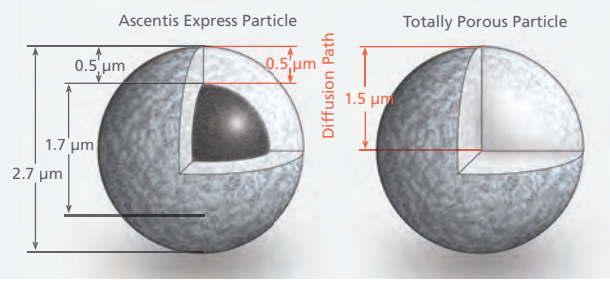
The graph provides for the interconversion of reversed-phase mobile phases having the same strength. Vertical lines in this figure intersect mobile phases having the same strength. For example, 40% Acetonitrile has the same strength as 50% Methanol or 30% THF.



HPLC for Small Molecules

Ascentis® Express 2.7 Micron

Ascentis® Express 2.7 Micron



Ascentis® Express

Ascentis® Express - A Breakthrough in HPLC Performance

Based on innovative Fused-Core® particle technology, Ascentis Express provides the high speed and high efficiency of sub-2 µm particles, but at approximately half the backpressure for the same column length. This lower pressure means that Ascentis Express can be run on conventional HPLC and LC-MS systems, as well as mid-pressure, UPLC® and other ultra-high pressure systems. Lower pressure also means longer columns can be used for additional resolving power. Ascentis Express offers these benefits over sub-2 µm particles, along with excellent column lifetime.

The Fused-Core Advantage

At the heart of Ascentis Express is the 2.7 µm Fused-Core particle which comprises a 1.7 µm solid core and a 0.5 µm porous shell . Compared to totally porous particles, the Fused-Core particles have a much shorter diffusion path because of the solid core. This partial porosity reduces axial dispersion of solutes and minimizes peak broadening. Other features, such as a very tight particle size distribution and high packing density, result in Ascentis Express columns that are capable of 240,000 N/m and higher: comparable to the efficiency of sub-2 µm particle columns and nearly twice the efficiency possible with 3 µm particles.

While the Ascentis Express efficiency is as high as sub-2 µm columns, the larger particle size delivers approximately half the backpressure for the same column dimensions and conditions. This allows Ascentis Express to turn any HPLC system into an extreme performance workhorse for your lab.

Four Benefits of Ascentis® Express

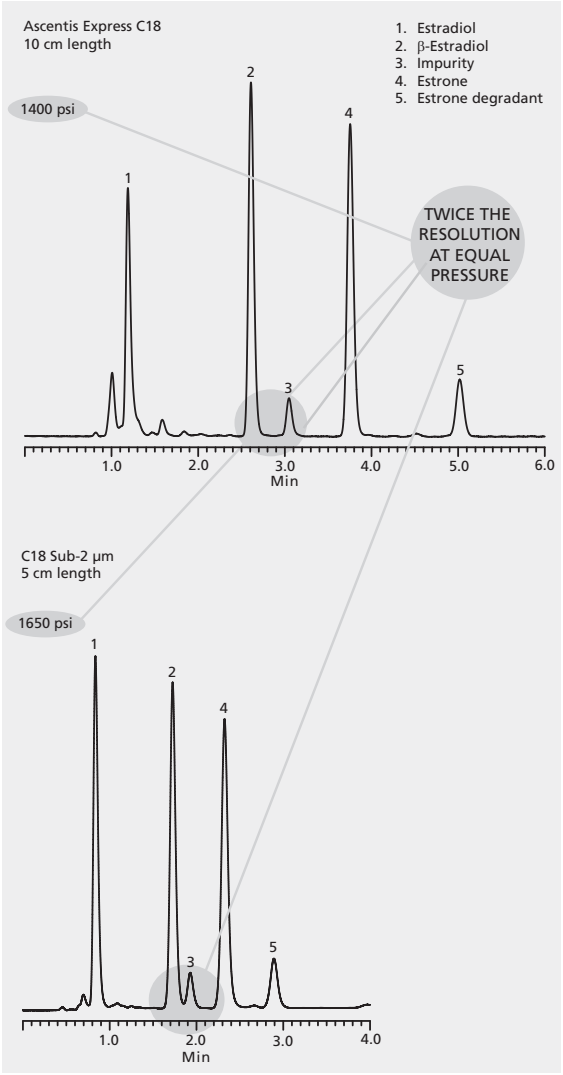
1. Double the Speed

- Designed for high flow rates
- Half the backpressure of sub-2 µm particles

HPLC Analysis of Hyper-Fast Separations on Ascentis® Express at Half the Pressures of sub-2 µm Columns on Ascentis® Express C18

application for HPLC

column ..... Ascentis Express C18, 10 cm × 2.1 mm I.D., 2.7 µm particles and sub-2 µm particle column, 5 cm × 2.1 mm I.D. (53823-U)
mobile phase ..... 55:45 or 54:46, water:acetonitrile
flow rate ..... 0.2 mL/min
column temp. ..... ambient
detector ..... UV at 200 nm
injection ..... 1 µL
Application No. G003973



HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Four Benefits of Ascentis® Express*

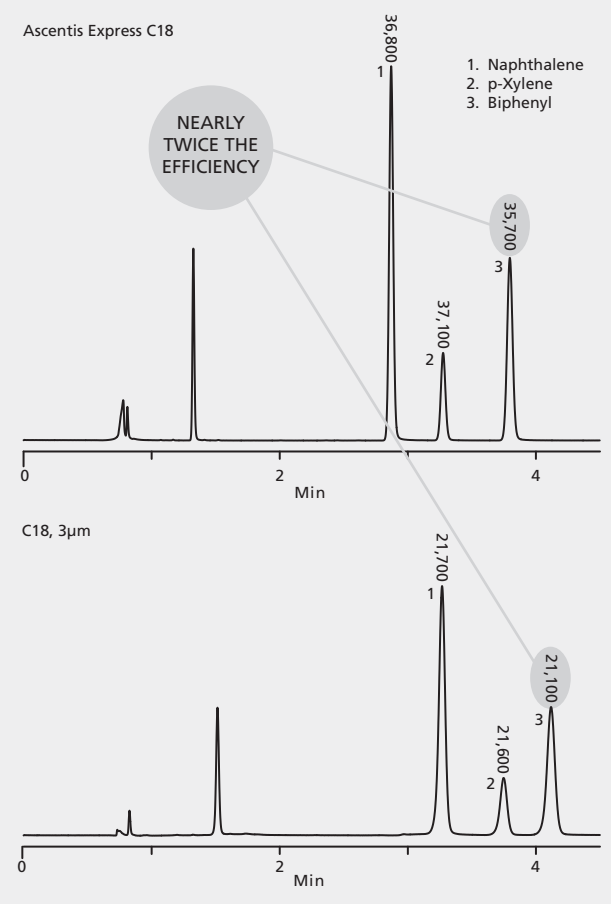
2. Double the Efficiency

- Short analyte diffusion path
- Longer columns permit doubling the plates over sub-2 µm particles
- Twice the efficiency of 3 µm particles

High Efficiency Resolution on Ascentis® Express Versus 3µm Particles

application for HPLC

column .. Ascentis Express C18, 15 cm × 4.6 mm I.D., 2.7 µm particles and C18, 15 cm × 4.6 mm I.D., 3 µm particles (53829-U)
mobile phase ..... 35:65 or 27.5:72.5, water:acetontrile
flow rate ..... 1.5 mL/min
column temp. ..... ambient
detector ..... UV at 220 nm
injection ..... 2 µL
Application No. G003979



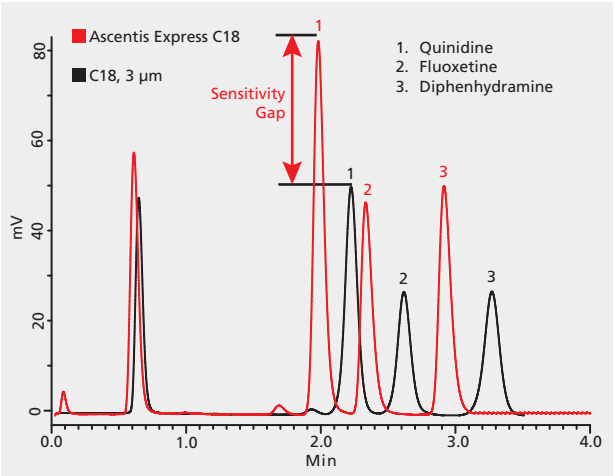
3. High sample loading capacity and signal/noise for trace analysis

- High sample loading from thick, porous shell layer
- High column efficiency for high S/N

HPLC Analysis Higher Efficiency of Ascentis® Express Compared to 3 µm Particles Gives Better Sensitivity on Ascentis® Express C18

application for HPLC

column .. Ascentis Express C18, 5 cm × 2.1 mm I.D., 2.7 µm particles and C18, 5 cm × 2.1 mm I.D., 3 µm particles (53822-U)
mobile phase ..... 35:0:65 or 35:4:61, 25 mM dibasic ammonium phosphate (pH 7.0):water: acetonitrile
flow rate ..... 0.2 mL/min
column temp. ..... 35 °C
detector ..... UV at 220 nm
injection ..... 1 µL
Application No. G003977



4. Extended column lifetime compared to both 3 µm and sub-2 µm columns

- Narrow particle size distributition allows use of 2 µm frits
- Dense particles for more stable bed

HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Improving HPLC Sample Throughput*

Improving HPLC Sample Throughput

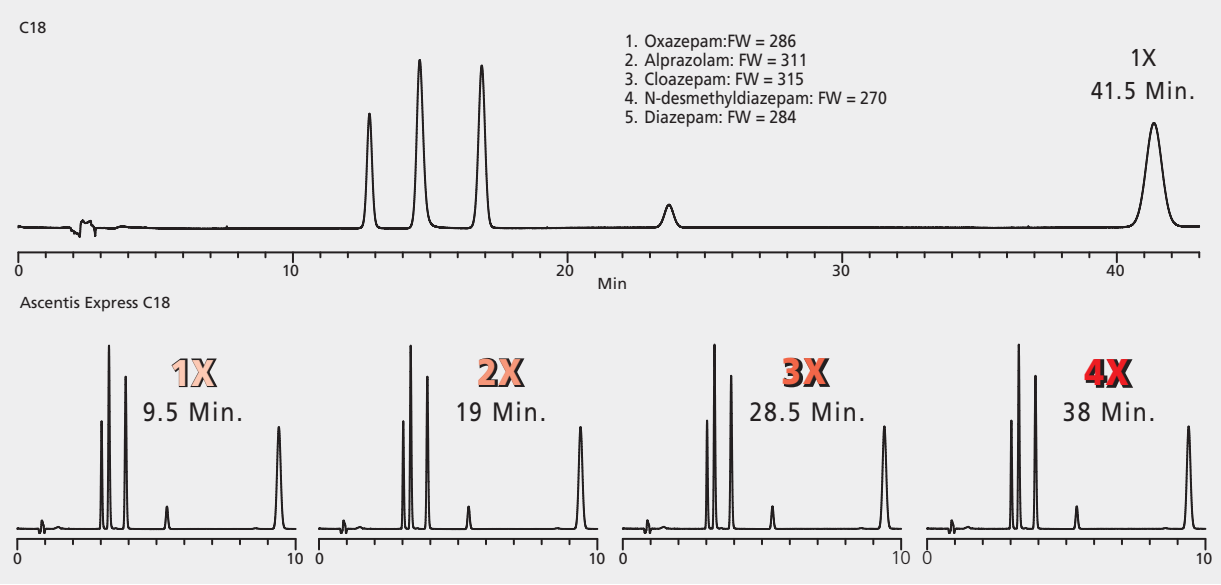
The demand for increased sample throughput and speed of results has driven HPLC users to search for breakthroughs in HPLC instruments and column technology. Although improvements have been realized, setbacks have been encountered. Reduction in column ruggedness, costly replacements of existing instrumentation, and difficulties in transferring methods to new systems have often made these past improvements unappealing to analysts.

The Fused-Core® HPLC particle technology behind Ascentis Express permits 4- to 6-fold reduction in analysis time, with a subsequent increase in sample throughput compared to conventional HPLC columns, without sacrificing resolution or column ruggedness and without the need to change systems or sample prep procedures.

HPLC Analysis of Sample Throughput on Standard C18 versus Ascentis® Express C18

application for HPLC

column	C18, 25 cm × 4.6 mm I.D., 5 µm particles and Ascentis Express C18, 10 cm × 4.6 mm I.D., 2.7 µm particles
mobile phase	65:35, water:acetonitrile
flow rate	1 mL/min
column temp.	ambient
detector	UV at 254 nm
Application No.	G004039



HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Do More Work in Less Time Without Changing your Method*

Do More Work in Less Time Without Changing your Method

Ascentis Express is the ideal choice for HPLC analysts interested in increasing sample throughput while maintaining or even improving resolution. By reducing solute dispersion, the unique Fused-Core technology gives Ascentis Express an advantage over conventional particles. Its low backpressure compared to sub-2 µm particles means that Ascentis Express can achieve UHPLC-like performance on conventional HPLC systems. Under UHPLC conditions, Ascentis Express can exceed the efficiency possible on sub-2 µm columns because longer columns can be used.

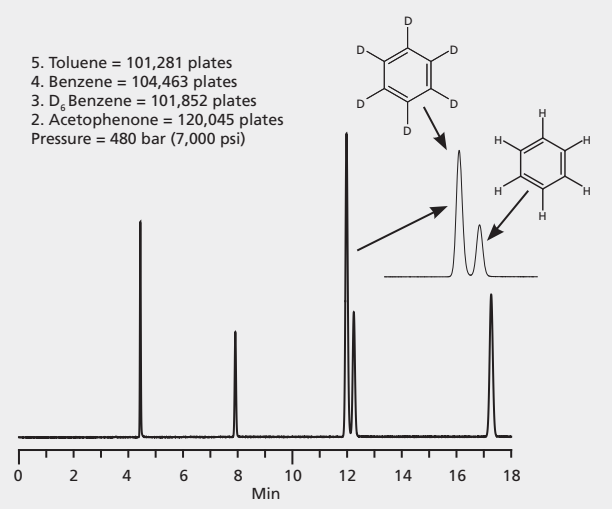
Ultra-High Resolution HPLC: Column Coupling

Column coupling in HPLC is gaining interest since LC systems are being designed to withstand column back pressures of up to 15,000 psi. Column coupling is a simple and practical way to increase resolution by simply increasing column length. Because Ascentis Express HPLC columns provide higher efficiencies at any pressure compared to 3 µm and sub-2 µm particles, the coupling of Ascentis Express columns enables significantly higher resolution than any other column on any commercial HPLC system.

HPLC Analysis of Benzene and Deuterated Benzene on Ascentis® Express C18

application for HPLC

column ..... Ascentis Express C18, 15 cm × 4.6 mm I.D.
mobile phase ..... 55:45, acetonitrile:water
flow rate ..... 1.0 mL/min
column temp. ..... 50 °C
detector ..... 254 nm
injection ..... 10 µL
Application No. G004046



Ascentis® Express C18

Ascentis® Express C18, 2.7 Micron HPLC Column

Ascentis Express HPLC columns, through the use of Fused-Core® particle technology, can provide you with both the high speed and high efficiencies of sub-2 µm particles while maintaining lower backpressures. The combination of high efficiency and low backpressure benefits UPLC® (or other ultra high pressure system) users, as well as conventional HPLC users. Visit the Ascentis Express home page for more information on this new column technology.

Watch a 5-minute presentation that explains how Ascentis Express columns can help Maximize Sample Throughput.

suitable for L1 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH ..... 2 - 9
temp. range ..... 60 °C

Ref: 1. Ethan R. Badman, Richard L. Beardsley, Zhenmin Liang, Surendra Bansal, Accelerating high quality bioanalytical LC/MS/MS assays using fused core columns *J. Chromatogr. B. Analyt. Technol. Biomed. Life Sci.* **878**, 2307-2313 (2010)
2. Ahmed Abrahim, Mohammad Al-Sayah, Peter Skrdla, Yuri Bereznitski, Yadan Chen, Naijun Wu, Practical comparision of 2.7 µm fused-core silica particles and porous sub-2 µm particles for fast separations in pharmaceutical process development *J. Pharm. Biomed. Anal.* **51**, 131-137 (2010)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	2	53799-U	1 ea
2.1	3	53802-U	1 ea
2.1	7.5	53804-U	1 ea
2.1	5	53822-U	1 ea
2.1	10	53823-U	1 ea
2.1	15	53825-U	1 ea
3.0	3	53805-U	1 ea
3.0	5	53811-U	1 ea
3.0	7.5	53812-U	1 ea
3.0	10	53814-U	1 ea
3.0	15	53816-U	1 ea
4.6	3	53818-U	1 ea
4.6	5	53826-U	1 ea
4.6	7.5	53819-U	1 ea
4.6	10	53827-U	1 ea
4.6	15	53829-U	1 ea
1.0	5	582711-U	1 ea
10	15	53793-U	1 ea

Ascentis® Express C18, 2.7 Micron Validation Pack

An Ascentis Express C18 Validation Pack makes it easy to demonstrate method reproducibility on 3 different lots. The validation pack contains a kit with 3 columns - 1 from each of 3 lots of bonded phase. And with Ascentis Express columns, you can be assured that all three columns will meet your expectations.

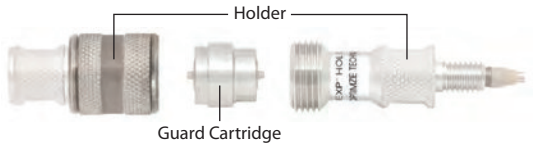
HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Ascentis® Express C18*

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	5	53994-U	3 ea
4.6	10	53995-U	3 ea
4.6	15	53996-U	3 ea

Ascentis® Express C18, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**



Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53501-U	3 ea
2.7	5 × 3.0	53504-U	3 ea
2.7	5 × 4.6	53508-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

Ascentis® Express C8

Ascentis® Express C8, 2.7 Micron HPLC Column

Ascentis Express HPLC columns, through the use of Fused-Core® particle technology, can provide you with both the high speed and high efficiencies of sub-2 µm particles while maintaining lower backpressures. The combination of high efficiency and low backpressure benefits UPLC® (or other ultra high pressure system) users, as well as conventional HPLC users. Visit the Ascentis Express home page for more information on this new column technology.

Watch a 5-minute presentation that explains how Ascentis Express columns can help Maximize Sample Throughput.

suitable for L7 per USP

particle platform	Fused-Core
metals	<5 ppm
endcapped	Yes
pore size	90 Å
operating pH range	2 - 9
temp. range	60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	2	53795-U	1 ea
2.1	3	53839-U	1 ea
2.1	5	53831-U	1 ea
2.1	7.5	53843-U	1 ea
2.1	10	53832-U	1 ea
2.1	15	53834-U	1 ea
3.0	3	53844-U	1 ea
3.0	5	53848-U	1 ea
3.0	7.5	53849-U	1 ea
3.0	10	53852-U	1 ea
3.0	15	53853-U	1 ea
4.6	3	53857-U	1 ea
4.6	5	53836-U	1 ea
4.6	7.5	53858-U	1 ea
4.6	10	53837-U	1 ea
4.6	15	53838-U	1 ea

Ascentis® Express C8, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53509-U	3 ea
2.7	5 × 3.0	53511-U	3 ea
2.7	5 × 4.6	53512-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

HPLC for Small Molecules

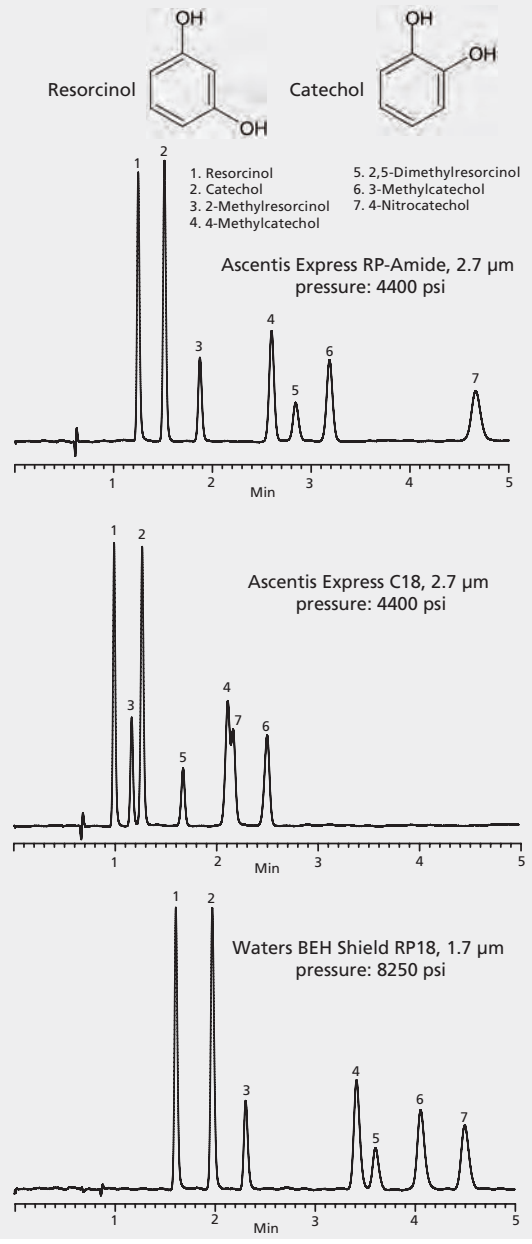
Ascentis® Express 2.7 Micron: *Alternate Selectivity with Ascentis® Express RP-Amide*

Alternate Selectivity with Ascentis® Express RP-Amide

While the Ascentis Express C18 provides classic reversed-phase selectivity, the Ascentis Express RP-Amide provides increased selectivity for polar compounds, especially those that can act as a hydrogen-bond donor. Other attributes of the RP-Amide include improved peak shape for bases, 100% aqueous compatibility, and low bleed for LC-MS applications.

Separation of phenolics - a comparative evaluation

Application No. G004390



Ascentis® Express RP-Amide

Ascentis® Express RP-Amide, 2.7 Micron HPLC Column

Watch a 6-minute presentation on the effective use of phase chemistry to alter retention in this Beverage Analysis Application.

suitable for L60 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH range ..... 2 - 9
temp. range ..... 60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	3	53910-U	1 ea
2.1	5	53911-U	1 ea
2.1	7.5	53912-U	1 ea
2.1	10	53913-U	1 ea
2.1	15	53914-U	1 ea
3.0	3	53915-U	1 ea
3.0	5	53916-U	1 ea
3.0	7.5	53917-U	1 ea
3.0	10	53918-U	1 ea
3.0	15	53919-U	1 ea
4.6	3	53921-U	1 ea
4.6	5	53922-U	1 ea
4.6	7.5	53923-U	1 ea
4.6	10	53929-U	1 ea
4.6	15	53931-U	1 ea
2.1	2	53797-U	1 ea

Ascentis® Express RP-Amide, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53514-U	3 ea
2.7	5 × 3.0	53516-U	3 ea
2.7	5 × 4.6	53519-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Ascentis® Express F5*

Ascentis® Express F5

NEW PRODUCTS

Ascentis® Express F5, 2.7 Micron HPLC Column

The pentafluorophenylpropyl stationary phase of Ascentis Express F5 provides a stable reversed phase packing with electron-deficient phenyl rings due to the presence of electronegative fluorines.In addition to forming pi-pi and mildly steric interactions, F5 phases also retain compounds by polar interactions. Ascentis Express F5 can be used for basic, acidic, or neutral compounds with alternate selectivity from C18.

Watch a 3-minute presentation that demonstrates how the F5 phase can help Solve 2 Common HPLC Problems.

suitable for L43 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH range ..... 1 - 9
temp. range ..... 60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	2	53592-U	1 ea
2.1	3	53566-U	1 ea
2.1	5	53567-U	1 ea
2.1	7.5	53568-U	1 ea
2.1	10	53569-U	1 ea
2.1	15	53571-U	1 ea
3.0	3	53574-U	1 ea
3.0	5	53576-U	1 ea
3.0	7.5	53577-U	1 ea
3.0	10	53578-U	1 ea
3.0	15	53579-U	1 ea
4.6	3	53581-U	1 ea
4.6	5	53583-U	1 ea
4.6	7.5	53584-U	1 ea
4.6	10	53590-U	1 ea
4.6	15	53591-U	1 ea

Ascentis® Express F5, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53594-U	3 ea
2.7	5 × 3.0	53597-U	3 ea
2.7	5 × 4.6	53599-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

Ascentis® Express Phenyl-Hexyl

NEW PRODUCTS

Ascentis® Express Phenyl-Hexyl, 2.7 Micron HPLC Column

The Phenyl-Hexyl phase has unique selectivity arising from solute interaction with the aromatic ring and its delocalized electrons. It is complementary (orthogonal) to both C18 and RP-Amide phases because of this unique aromaticity. The Phenyl-Hexyl phase also tend to exhibit good shape selectivity, which may originate from solute multipoint interaction with the planar ring system. More retention and selectivity will often be observed for solutes with aromatic electron-withdrawing groups (fluorine, nitro, etc.) or with a delocalized heterocyclic ring system such as the benzodiazepine compounds.

Watch a 3-minute presentation that explores the Selectivity Advantage of Phenyl Bonded Phases.

suitable for L11 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
pH-range ..... 2 - 9
temp. range ..... 60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	3	53332-U	1 ea
2.1	5	53334-U	1 ea
2.1	7.5	53335-U	1 ea
2.1	10	53336-U	1 ea
2.1	15	53338-U	1 ea
3.0	3	53341-U	1 ea
3.0	5	53342-U	1 ea
3.0	7.5	53343-U	1 ea
3.0	10	53345-U	1 ea
3.0	15	53346-U	1 ea
4.6	3	53347-U	1 ea
4.6	5	53348-U	1 ea
4.6	7.5	53351-U	1 ea
4.6	10	53352-U	1 ea
4.6	15	53353-U	1 ea
2.1	2	53798-U	1 ea

Ascentis® Express Phenyl-Hexyl, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53524-U	3 ea
2.7	5 × 3.0	53526-U	3 ea
2.7	5 × 4.6	53531-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Ascentis® Express ES-Cyano*

Ascentis® Express ES-Cyano

NEW PRODUCTS

Ascentis® Express ES-Cyano, 2.7 Micron HPLC Column

Ascentis® Express ES-Cyano HPLC column is a high-speed, high-performance liquid chromatography column based on 90Å Fused-Core® particles. The Fused-Core particle provides a thin porous shell of high-purity silica surrounding a solid silica core. This particle design exhibits very high column efficiency due to the shallow diffusion paths in the 0.5-micron thick porous shell and the small overall particle size of 2.7-microns. The sterically protected, extensively endcapped diisopropyl-cyanopropylsilane stationary phase of Ascentis Express ES-Cyano provides a stable, reversed-phase packing that can be used for basic, acidic, or neutral compounds.

particle platform ..... Fused-Core
metals ..... <5 ppm
feature .....
endcapped ..... Yes
pore size ..... 90 Å
pH-range ..... 1 - 8
temp. range ..... ≤100 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	3	53468-U	1 ea
2.1	5	53470-U	1 ea
2.1	7.5	53472-U	1 ea
2.1	10	53473-U	1 ea
2.1	15	53475-U	1 ea
3.0	3	53476-U	1 ea
3.0	5	53478-U	1 ea
3.0	7.5	53479-U	1 ea
3.0	10	53481-U	1 ea
3.0	15	53483-U	1 ea
4.6	3	53484-U	1 ea
4.6	5	53486-U	1 ea
4.6	7.5	53489-U	1 ea
4.6	10	53491-U	1 ea
4.6	15	53492-U	1 ea
2.1	2	53494-U	1 ea

Ascentis® Express ES-Cyano, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53495-U	3 ea
2.7	5 × 3.0	53496-U	3 ea
2.7	5 × 4.6	53497-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

Ascentis® Express OH5

NEW PRODUCTS

Ascentis® Express OH5, 2.7 Micron HPLC Column

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... No
pore size ..... 90 Å
operating pH 2-9
temp. range ..... <60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	2	53779-U	1 ea
2.1	3	53748-U	1 ea
2.1	5	53749-U	1 ea
2.1	7.5	53755-U	1 ea
2.1	10	53757-U	1 ea
2.1	15	53764-U	1 ea
3.0	3	53766-U	1 ea
3.0	5	53767-U	1 ea
3.0	7.5	53768-U	1 ea
3.0	10	53769-U	1 ea
3.0	15	53771-U	1 ea
4.6	3	53772-U	1 ea
4.6	5	53774-U	1 ea
4.6	7.5	53775-U	1 ea
4.6	10	53776-U	1 ea
4.6	15	53778-U	1 ea

Ascentis® Express OH5, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53780-U	3 ea
2.7	5 × 3.0	53781-U	3 ea
2.7	5 × 4.6	53782-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Ascentis® Express Peptide ES C18*

Ascentis® Express Peptide ES C18

NEW PRODUCTS

Ascentis® Express Peptide ES-C18, 2.7 Micron HPLC Column

Ascentis Express Peptide ES-C18 columns are specifically engineered to separate higher molecular weight compounds such as peptides and small proteins. These columns contain advanced Fused-Core particles that have larger pores (160 Å versus 90 Å in standard Ascentis Express), bonded with sterically-protected C18 ligands to provide extra stability (ES) at very low pH (< 1) and high temperatures (up to 100ºC). This greatly expands the application range for Ascentis Express columns.

Watch a 3-minute presentation that describes the Applications and Advantages of Peptide ES-C18 Columns.

suitable for L1 per USP

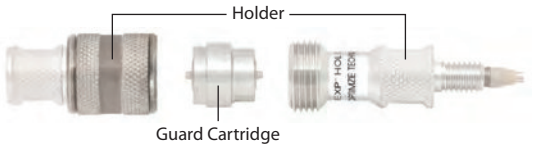
particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... No
pore size ..... 160 Å
operating pH range ..... 1 - 9
temp. range ..... ≤100 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	3	53299-U	1 ea
2.1	5	53301-U	1 ea
2.1	7.5	53304-U	1 ea
2.1	10	53306-U	1 ea
2.1	15	53307-U	1 ea
3.0	3	53308-U	1 ea
3.0	5	53311-U	1 ea
3.0	7.5	53312-U	1 ea
3.0	10	53313-U	1 ea
3.0	15	53314-U	1 ea
4.6	3	53316-U	1 ea
4.6	5	53318-U	1 ea
4.6	7.5	53323-U	1 ea
4.6	10	53324-U	1 ea
4.6	15	53328-U	1 ea

Ascentis® Express Peptide ES-C18, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core®particles. **Order guard column holder (53500-U) separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53536-U	3 ea
2.7	5 × 3.0	53537-U	3 ea
2.7	5 × 4.6	53542-U	3 ea



Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

for use with Ascentis Express Guard Columns

53500-U	1 ea

Polar Compound Retention with Ascentis® Express HILIC

HILIC (Hydrophilic Interaction Liquid Chromatography) is gaining popularity due to the ability to show increased retention of polar compounds. Many classes of polar compounds can be retained in HILIC. These include polar neutrals, polar acids, and polar and non-polar basic amines. Both polar and ionic interactions can contribute to retention and selectivity in this mode of chromatography.

HILIC, also referred to as Aqueous Normal-Phase (ANP) Chromatography, is a variation of normal-phase chromatography with the distinction that one of the major components of the mobile phase is water. Typical eluents of HILIC consists of 60-95% acetonitrile in water or an aqueous buffer. The high volatility of the mobile phase makes HILIC LC-MS friendly where one can realize a dramatic increase in sensitivity compared to reversed-phase chromatography.

Benefits of HILIC Separation

- Retention of highly polar analytes like metabolites
- Complimentary selectivity to reversed-phase chromatography
- Increased MS sensitivity
- Quick transfer from final steps of sample prep (SPE, protein, precipitation, etc.)

Ascentis® Express HILIC

Ascentis® Express HILIC, 2.7 Micron HPLC Column

Ascentis Express HPLC columns, through the use of Fused-Core® particle technology, can provide you with both the high speed and high efficiencies of sub-2 µm particles while maintaining lower backpressures. The combination of high efficiency and low backpressure benefits UPLC® (or other ultra high pressure system) users, as well as conventional HPLC users. Visit the Ascentis Express home page for more information on this new column technology.

Watch a 4-minute presentation that demonstrates the power of the HILIC phase for resolving complex mixtures in this Metabolomic Profiling Study.

suitable for L3 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... No
pore size ..... 90 Å
operating pH range ..... 2 - 8
temp. range ..... ≤100 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	3	53933-U	1 ea
2.1	5	53934-U	1 ea
2.1	7.5	53938-U	1 ea
2.1	10	53939-U	1 ea
2.1	15	53946-U	1 ea
3.0	3	53964-U	1 ea
3.0	5	53967-U	1 ea

HPLC for Small Molecules

Ascentis® Express 2.7 Micron: *Ascentis® Express HILIC*

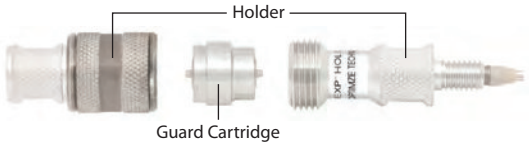
Ascentis® Express HILIC, 2.7 Micron HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
3.0	7.5	53969-U	1 ea
3.0	10	53970-U	1 ea
3.0	15	53972-U	1 ea
4.6	3	53974-U	1 ea
4.6	5	53975-U	1 ea
4.6	7.5	53977-U	1 ea
4.6	10	53979-U	1 ea
4.6	15	53981-U	1 ea

Ascentis® Express HILIC, 2.7 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core®particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
2.7	5 × 2.1	53520-U	3 ea
2.7	5 × 3.0	53521-U	3 ea
2.7	5 × 4.6	53523-U	3 ea



Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

▸ **for use with Ascentis Express Guard Columns**

53500-U	1 ea

Ascentis® Express Capillary HPLC Columns

NEW PRODUCTS

Ascentis Express columns provide a breakthrough in HPLC column performance. Based on Fused-Core particle technology, Ascentis Express provides the benefits of high speed and high efficiencies of sub-2 µm particles. The Fused-Core particle consists of a 1.7 µm solid core and a 0.5 µm porous shell allowing for a smaller diffusion path (0.5 µm) compared to conventional fully porous particles.
Key Benefits:

- Higher peak capacities than traditional columns
- Lower backpressure than sub 2 micron columns
- 90 Angstrom pore size for peptides and digests

Ascentis® Express C18, 2.7 Micron Capillary HPLC Column

suitable for L1 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH ..... 2 - 9
temp. range ..... 60 °C

I.D. (µm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
75	5	53982-U	1 ea
100	5	53985-U	1 ea
200	5	53989-U	1 ea
300	5	53992-U	1 ea
500	5	53998-U	1 ea
75	15	54219-U	1 ea
100	15	54256-U	1 ea
200	15	54261-U	1 ea
300	15	54271-U	1 ea
500	15	54273-U	1 ea

Ascentis® Express Peptide ES-C18, 2.7 Micron Capillary HPLC Column

suitable for L1 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... No
pore size ..... 160 Å
pH-range ..... 1 - 9
temp. range ..... ≤100 °C

I.D.	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
75 µm	5	53543-U	1 ea
100 µm	5	53544-U	1 ea
200 µm	5	53545-U	1 ea
300 µm	5	53546-U	1 ea
500 µm	5	53547-U	1 ea
1.0 mm	5	53548-U	1 ea
75 µm	15	53549-U	1 ea
100 µm	15	53552-U	1 ea
200 µm	15	53553-U	1 ea
300 µm	15	53554-U	1 ea
500 µm	15	53558-U	1 ea
1.0 mm	15	53561-U	1 ea

Ascentis® Express C8 Capillary, 2.7 micron HPLC Column

suitable for L7 per USP

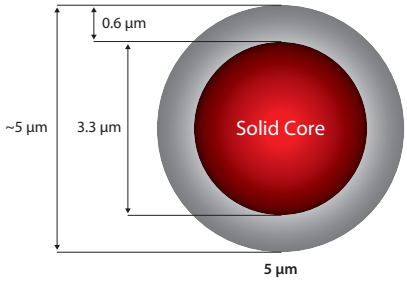
particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH range ..... 2 - 9
temp. range ..... 60 °C

I.D. (µm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
75	5	53983-U	1 ea
100	5	53987-U	1 ea
200	5	53991-U	1 ea
300	5	53997-U	1 ea
500	5	53999-U	1 ea
75	15	54229-U	1 ea
100	15	54260-U	1 ea
200	15	54262-U	1 ea
300	15	54272-U	1 ea
500	15	54275-U	1 ea

HPLC for Small Molecules

Ascentis® Express 5 Micron

Ascentis® Express 5 Micron



Achieve Faster Separations With No Backpressure Concerns

Ascentis Express 5 µm columns provide a new choice for improving the performance of traditional HPLC systems. Ascentis Express provides the benefits of *high speed* and *high efficiencies* without the concerns of smaller particle columns. Due to the high efficiencies at low backpressures, Ascentis Express 5 µm can benefit conventional HPLC users with no drawbacks.

Features at a Glance

- High efficiencies
- Low backpressures
- Same insturment - no change of methods of sample prep
- Faster method development
- Rugged design
- Outperforms popular 3 µm and 5 µm columns

Leverage Easy Implementation on Any System

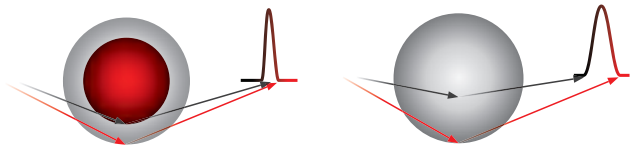
Small Diffusion Path

The new Fused-Core particle consists of a 3.3 µm solid core and a 0.6 µm porous shell. A major benefit of the Fused-Core particle is the small diffusion path (0.6 µm) compared to conventional fully porous particles. The short diffusion path reduces axial dispersion of solutes and minimizes peak broadening. In fact, Ascentis Express 5 µm columns are able to achieve greater speed and efficiency than any other 5 µm particle based column. This means that Ascentis Express 5 µm becomes the standard column for all of your 5 µm based methods.

Beyond the new standard column for all 5 µm based methods, Ascentis Express 5 µm is an excellent choice for bioanalytical LC/MS methods. The Ascentis Express 5 µm excels under high flow rates and the high throughput demands of these methods. Furthermore, the large particle format provides an extremely rugged HPLC column.

Maximize Performance Efficiencies with Fused-Core

Fast HPLC with Shorter Diffusion Path

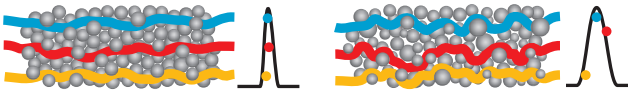


Fused-Core Particles

Traditional Porous Particles

Consistent Bed Yields Shaper Peaks

Consistent Bed Yields Sharper Peaks



Fused-Core Particles

Traditional Porous Particles

Narrow Particle Distribution and Rugged Column Design

Narrow Particle Size Distribution and Rugged Column Design

Fused-Core Particles

Traditional Porous Particles

Ascentis® Express C18

NEW PRODUCTS

Ascentis® Express C18, 5 Micron HPLC Column

Ascentis® Express 5 µm C18 is a high-speed, high-performance liquid chromatography column based on the highly efficient Fused-Core® particle design. The Fused-Core® particle provides a thin porous shell of high-purity silica surrounding a solid silica core. This particle design exhibits very high column efficiency due to the shallow diffusion paths in the 0.5-micron thick porous shell and the highly uniform overall particle size of 5-microns. The densely bonded, extensively endcapped dimethyloctadecyl stationary phase of Ascentis Express 5 µm C18 provides a stable, reversed-phase packing that can be used for basic, acidic, or neutral compounds.

suitable for L1 per USP

particle platform	Fused-Core
metals	<5 ppm
endcapped	Yes
pore size	90 Å
operating pH	2-9
temp. range	60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	50507-U	1 ea
2.1	3	50508-U	1 ea
2.1	5	50509-U	1 ea
2.1	7.5	50511-U	1 ea
2.1	10	50517-U	1 ea
2.1	15	50518-U	1 ea
2.1	25	50521-U	1 ea
3.0	3	50522-U	1 ea
3.0	5	50523-U	1 ea
3.0	7.5	50525-U	1 ea
3.0	10	50526-U	1 ea
3.0	15	50527-U	1 ea

HPLC for Small Molecules

Ascentis® Express 5 Micron: *Ascentis® Express C18*

Ascentis® Express C18, 5 Micron HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
3.0	25	50528-U	1 ea
4.6	3	50529-U	1 ea
4.6	5	50530-U	1 ea
4.6	7.5	50533-U	1 ea
4.6	10	50536-U	1 ea
4.6	15	50537-U	1 ea
4.6	25	50538-U	1 ea

Ascentis® Express C18, 5 Micron Guard Cartridge

Ascentis® Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® articles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
5	5 × 2.1	50539-U	3 ea
5	5 × 3.0	50541-U	3 ea
5	5 × 4.6	50542-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

▸ **for use with Ascentis Express Guard Columns**

53500-U	1 ea

Ascentis® Express C8

NEW PRODUCTS

Ascentis® Express C8, 5 Micron HPLC Column

Ascentis® Express 5 µm C8 is a high-speed, high-performance liquid chromatography column based on the highly efficient Fused-Core® particle design. The Fused-Core particle provides a thin porous shell of high-purity silica surrounding a solid silica core. This particle design exhibits very high column efficiency due to the shallow diffusion paths in the 0.6-micron thick porous shell and the highly uniform overall particle size of 5-microns. The densely bonded, extensively endcapped dimethyloctyl stationary phase of Ascentis Express 5 µm C8 provides a stable, reversed-phase packing that can be used for basic, acidic, or neutral compounds.

suitable for L7 per USP

particle platform	Fused-Core
metals	<5 ppm
endcapped	Yes
pore size	90 Å
operating pH	2-9
temp. range	60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	50362-U	1 ea
2.1	3	50363-U	1 ea
2.1	5	50364-U	1 ea
2.1	7.5	50367-U	1 ea
2.1	10	50368-U	1 ea
2.1	15	50372-U	1 ea
2.1	25	50373-U	1 ea
3.0	3	50376-U	1 ea
3.0	5	50377-U	1 ea
3.0	7.5	50378-U	1 ea
3.0	10	50381-U	1 ea
3.0	15	50382-U	1 ea
3.0	25	50385-U	1 ea
4.6	3	50386-U	1 ea
4.6	5	50389-U	1 ea
4.6	7.5	50390-U	1 ea
4.6	10	50391-U	1 ea
4.6	15	50392-U	1 ea
4.6	25	50394-U	1 ea

Ascentis® Express C8, 5 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
5	5 × 2.1	50395-U	3 ea
5	5 × 3.0	50396-U	3 ea
5	5 × 4.6	50399-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

▸ **for use with Ascentis Express Guard Columns**

53500-U	1 ea

Ascentis® Express F5

NEW PRODUCTS

Ascentis® Express F5, 5 Micron HPLC Column

Ascentis® Express 5 µm F5 is a high-speed, high-performance liquid chromatography column based on the highly efficient Fused-Core® particle design. The bonded, endcapped, dimethylpentafluorophenyl-propylsilane stationary phase of Ascentis Express 5 µm F5 provides a stable, reversed-phase packing with electron-deficient phenyl rings due to the presence of electronegative fluorines. In addition to forming π-π and mildly steric interactions, F5 phases also retain compounds by polar interactions. As a result of having both polar and non-polar character, F5 phases can show dual-mode retention behavior, sometimes producing a "U-shaped" retention as a function of acetonitrile content of the mobile phase, with retention increasing at both low and high concentrations of ACN (reversed-phase and HILIC retention modes). Ascentis Express 5 µm F5 can be used for basic, acidic, or neutral compounds with alternate selectivity from C18.

HPLC for Small Molecules

Ascentis® Express 5 Micron: *Ascentis® Express F5*

suitable for L43 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH 1-9
temp. range ..... 60 °C

I.D. (mm)	L	Cat. No.	Qty
particle size 5 µm			
2.1	2 cm	50603-U	1 ea
2.1	3 cm	50604-U	1 ea
2.1	5 cm	50605-U	1 ea
2.1	7.5 cm	50607-U	1 ea
2.1	10 cm	50612-U	1 ea
2.1	15 cm	50613-U	1 ea
2.1	25 cm	50614-U	1 ea
3.0	3 cm	50615-U	1 ea
3.0	5 cm	50616-U	1 ea
3.0	7.5 cm	50619-U	1 ea
3.0	10 cm	50622-U	1 ea
3.0	15 cm	50623-U	1 ea
3.0	25 cm	50624-U	1 ea
4.6	3 cm	50625-U	1 ea
4.6	5 cm	50626-U	1 ea
4.6	7.5 cm	50627-U	1 ea
4.6	10 mm	50628-U	1 ea
4.6	15 cm	50631-U	1 ea
4.6	25 cm	50632-U	1 ea

Ascentis® Express F5, 5 Micron Guard Cartridge

Ascentis® Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® articles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
5	5 × 2.1	50633-U	3 ea
5	5 × 3.0	50634-U	3 ea
5	5 × 4.6	50635-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

▸ **for use with Ascentis Express Guard Columns**

53500-U 1 ea

Ascentis® Express Phenyl-Hexyl

NEW PRODUCTS

Ascentis® Express Phenyl-Hexyl, 5 Micron HPLC Column

The Phenyl-Hexyl phase has unique selectivity arising from solute interaction with the aromatic ring and its delocalized electrons. It is complementary (orthogonal) to both C18 and RP-Amide phases because of this unique aromaticity. The Phenyl-Hexyl phase also tend to exhibit good shape selectivity, which may originate from solute multipoint interaction with the planar ring system. More retention and selectivity will often be observed for solutes with aromatic electron-withdrawing groups (fluorine, nitro, etc.) or with a delocalized heterocyclic ring system such as the benzodiazepine compounds.

suitable for L11 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... Yes
pore size ..... 90 Å
operating pH 2-9
temp. range ..... 60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	50442-U	1 ea
2.1	3	50443-U	1 ea
2.1	5	50446-U	1 ea
2.1	7.5	50451-U	1 ea
2.1	10	50454-U	1 ea
2.1	15	50455-U	1 ea
2.1	25	50456-U	1 ea
3.0	3	50459-U	1 ea
3.0	5	50464-U	1 ea
3.0	7.5	50466-U	1 ea
3.0	10	50469-U	1 ea
3.0	15	50470-U	1 ea
3.0	25	50472-U	1 ea
4.6	3	50474-U	1 ea
4.6	5	50477-U	1 ea
4.6	7.5	50479-U	1 ea
4.6	10	50482-U	1 ea
4.6	15	50483-U	1 ea
4.6	25	50487-U	1 ea

Ascentis® Express Phenyl-Hexyl, 5 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
5	5 × 2.1	50496-U	3 ea
5	5 × 3.0	50497-U	3 ea
5	5 × 4.6	50498-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

▸ **for use with Ascentis Express Guard Columns**

53500-U 1 ea

Ascentis® Express ES-Cyano

NEW PRODUCTS

Ascentis® Express ES-Cyano, 5 Micron HPLC Column

Ascentis® Express 5 micron ES-Cyano HPLC column is a high-speed, high-performance liquid chromatography column based on 90Å Fused-Core® particles. The Fused-Core particle provides a thin porous shell of high-purity silica surrounding a solid silica core. This particle design exhibits very high column efficiency due to the shallow diffusion paths in the 0.6-micron thick porous shell and the overall particle size of 5-microns. The sterically protected, extensively endcapped diisopropyl-cyanopropylsilane stationary phase of Ascentis Express ES-Cyano provides a stable, reversed-phase packing that can be used for basic, acidic, or neutral compounds

HPLC for Small Molecules

Ascentis® Express 5 Micron: *Ascentis® Express ES-Cyano*

Ascentis® Express ES-Cyano, 5 Micron HPLC Column *(continued)*

suitable for L10 per USP

particle platform	(Fused-Core)
metals	<5 ppm
endcapped	Yes
pore size	90 Å
operating pH	2-9
temp. range	60 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	50557-U	1 ea
2.1	3	50558-U	1 ea
2.1	5	50559-U	1 ea
2.1	7.5	50562-U	1 ea
2.1	10	50563-U	1 ea
2.1	15	50564-U	1 ea
2.1	25	50566-U	1 ea
3.0	3	50567-U	1 ea
3.0	5	50568-U	1 ea
3.0	7.5	50569-U	1 ea
3.0	10	50570-U	1 ea
3.0	15	50574-U	1 ea
3.0	25	50575-U	1 ea
4.6	3	50577-U	1 ea
4.6	5	50581-U	1 ea
4.6	7.5	50583-U	1 ea
4.6	10	50585-U	1 ea
4.6	15	50588-U	1 ea
4.6	25	50591-U	1 ea

Ascentis® Express ES-Cyano, 5 Micron Guard Cartridge

Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core® particles. **Order guard column holder separately.**

Particle Size (µm)	L × I.D. (mm)	Cat. No.	Qty
5	5 × 2.1	50592-U	3 ea
5	5 × 3.0	50593-U	3 ea
5	5 × 4.6	50597-U	3 ea

Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

▸ **for use with Ascentis Express Guard Columns**

53500-U	1 ea

Ascentis®

The Ascentis® Family of HPLC Columns

The Ascentis family of columns is the fourth generation of HPLC column technology from Supelco scientists. Ascentis columns are bonded on high purity, 100 Angstrom silica including 3, 5, and 10 micron particle size. Columns are designed for small molecule applications and are scalable from micro columns (1.0 mm I.D.) to preparative dimensions (50 mm I.D.). The family includes C18, C8, Phenyl, Si and embedded polar group phase, RP-Amide.

Columns are manufactured at our ISO 9001 registered facility in Bellefonte, PA. This ISO 9001 registration provides quality oversight into all aspects of the manufacturing process leading to a product that consistently meets exacting specifications.

Maximum Retentivity

High surface area silica (450 m^2/g) and advanced bonding chemistry make the Ascentis family of columns highly retentive.
High retentivity allows the chromatographer to run at higher organic solvent composition. This is ideal for LC-MS applications and can increase MS sensitivity.
Ionization efficiency and the accompanying MS signal are often enhanced when analytes evaporate under higher organic conditions. Utilizing high organic
mobile phases promotes easier sample preparation due to solubility. Preparative chromatography procedures are improved by minimizing evaporation and
reconstitution steps. The high retentivity advantage extends into highly aqueous mobile phases for Phenyl, RP-Amide and C8, thus retaining even the most
polar compounds beyond the void.

Optimized for LC-MS

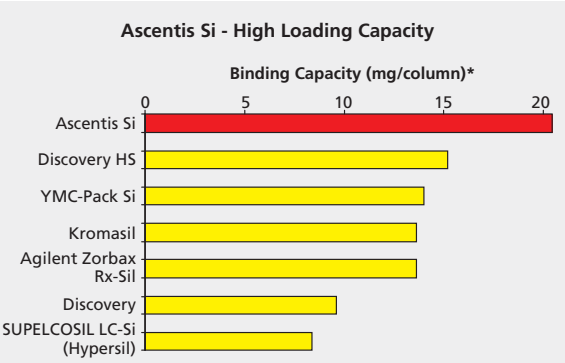
Excellent LC-MS Bleed Characteristics
Mass spectral responses from background ions often inhibit both qualitative and quantitative analysis in LC-MS experiments. Common sources of background ions include the solvents, interface or system contamination and HPLC column bleed. The presence of background ions can be reduced by using high quality solvents such as LC-MS CHROMASOLV®, maintaining a clean LC-MS system and by using high quality HPLC stationary phases from Supelco.
Ascentis utilizes advanced bonding chemistry and highly purified silica to minimize the potential for column bleed.

HPLC for Small Molecules

Ascentis®: *High Loading Capacity*

High Loading Capacity

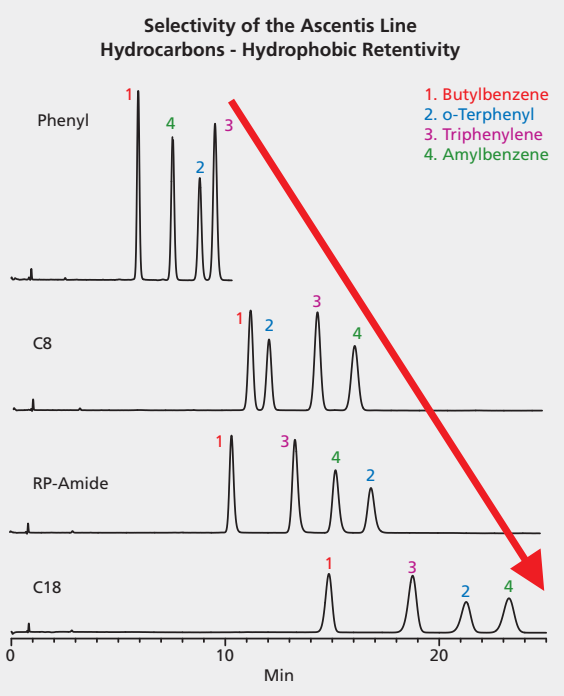
Ascentis Si is a high surface area silica that provides a platform for high loading capacity and longer retention. These features allow for the purification of larger quantities of material per injection.



*4-Nitroaniline in the concentration of 0.2 mg/mL is pumped through a 15 cm x 4.6 mm test column with a mobile phase of hexane/isooctane (50:50) until breakthrough occurs.

Hydrophobic Retentivity

Hydrophobic interactions are the main interaction responsible for the separation of hydrophobic molecules. Even with strictly hydrocarbon molecules, there are selectivity variations based on such phenomena as shape selectivity. Note, each Ascentis phase has a unique selectivity on this test mixture!



Column: 15 cm x 4.6 mm I.D., 5 µm particles
Mobile Phase: 35:65 water:acetonitrile
Temp.: 35 °C
Flow Rate: 1.5 mL/min
Det.: UV, 220 nm

Preparative Scale HPLC Separations

Ascentis phases available in preparative dimensions.
Choose 5 µm particles when you need high efficiency because of a complex sample matrix or closely-eluting peaks. Economical columns containing 10 µm particles are a good choice when compounds of interest are widely spaced or when high throughput or lower back pressure is required. Flow rate and sample volume are related to the column volume, and are proportional to the ratio of the square of the column radius. For fixed column length and linear velocity, the numbers in the table below show a progressive increase in sample capacity and optimum flow rate as column I. D. increases. Sample capacity, however, also is dependent on the elution volume and resolution of the separation. The higher the resolution and longer the retention, the more sample can be purified per injection.

Please contact Technical Service for a quote on a preparative scale column that you require.

Determining Sample Capacities for Preparative Columns

Column Type	I.D. (mm)	Optimum Flow Rate (mL/min)	Optimum Capacity	Max. Analytical Capacity	Max. Purification Multiplier*
Analytical	4.6	0.7	200 µg	1 mg	1
Semi-Prep	10	3.4	1 mg	5 mg	4.8
Preparative	21.2	14.8	4.2 mg	21 mg	21.2
Preparative	50.0	85.4	24 mg	122 mg	122

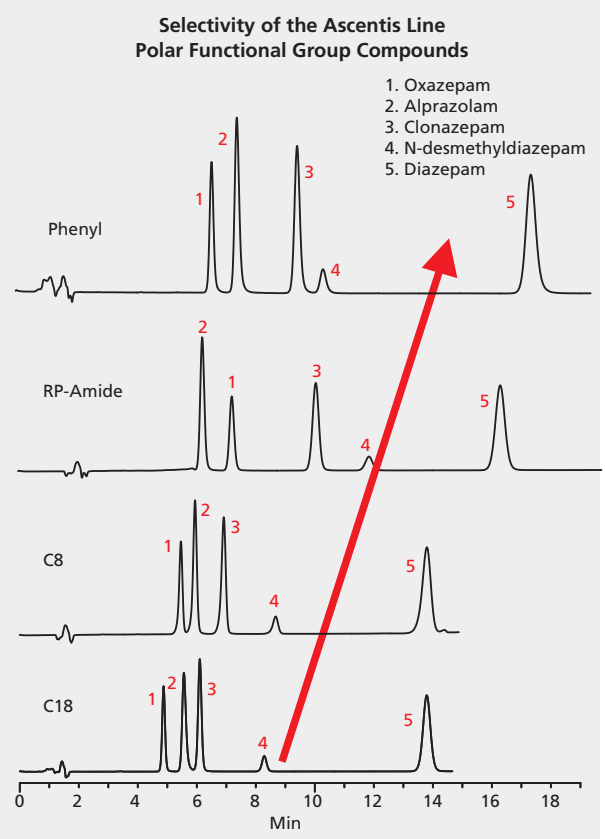
*Relative to 4.6 mm I.D. column

HPLC for Small Molecules

Ascentis®: *Polar Compound Analysis*

Polar Compound Analysis

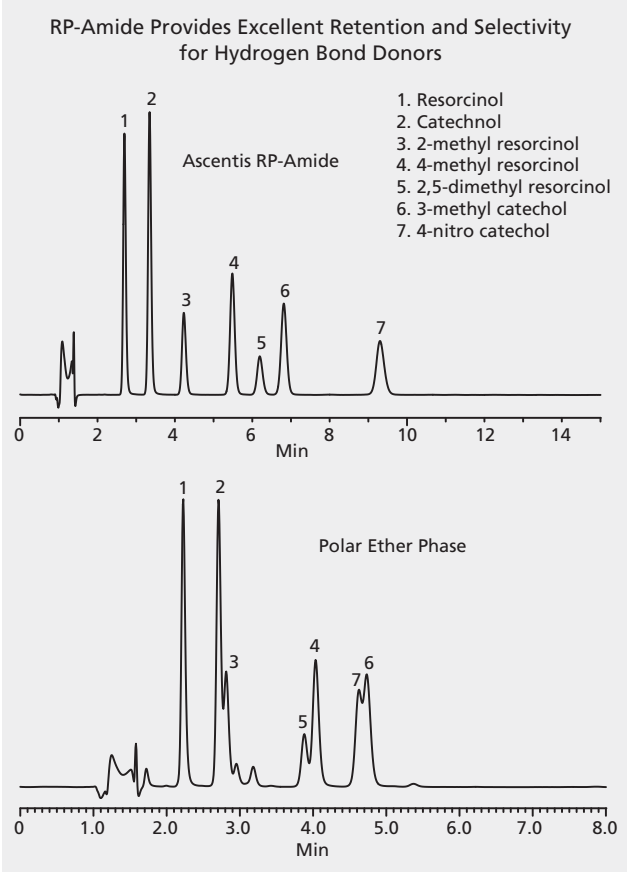
Polar compounds will often have greater retention on Ascentis Phenyl and RP-Amide compared to strictly hydrophobic phases such as C18 or C8. This is due to the polar interactions of these phases such as hydrogen bonding and pi-pi interactions.



Column: 15 cm x 4.6 mm I.D., 5 µm particles
Mobile Phase: 60:40 water:acetonitrile
Temp.: 25C
Flow Rate: 1.0 mL/min
Det.: UV, 254 nm

Ascentis® RP-Amide versus Competition

The chromatograms show that the Ascentis RP-Amide column is more retentive and selective for catechols and resorcinols. The polar phase that contains an ether group does not have the hydrogen bonding ability of an amide group toward phenols.



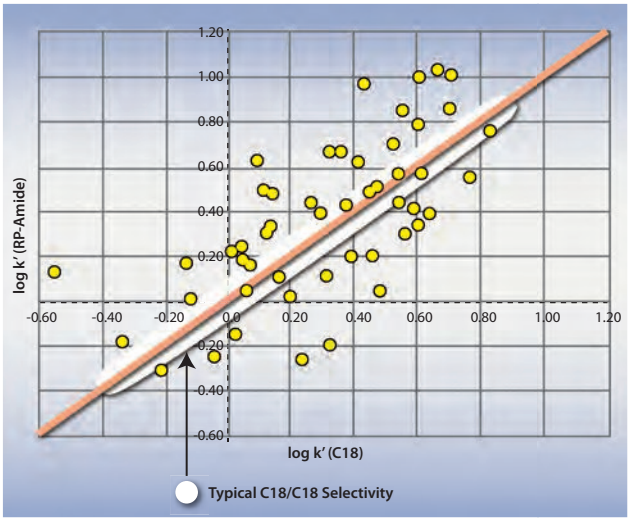
Column: 15 cm x 4.6 mm I.D., 5 µm particles
Mobile Phase: 75:25 20mM phosporic acid:acetonitrile
Temp.: 30 °C
Flow Rate: 1.5 mL/min
Det.: UV, 270 nm

HPLC for Small Molecules

Ascentis®: *Orthogonal Selectivity*

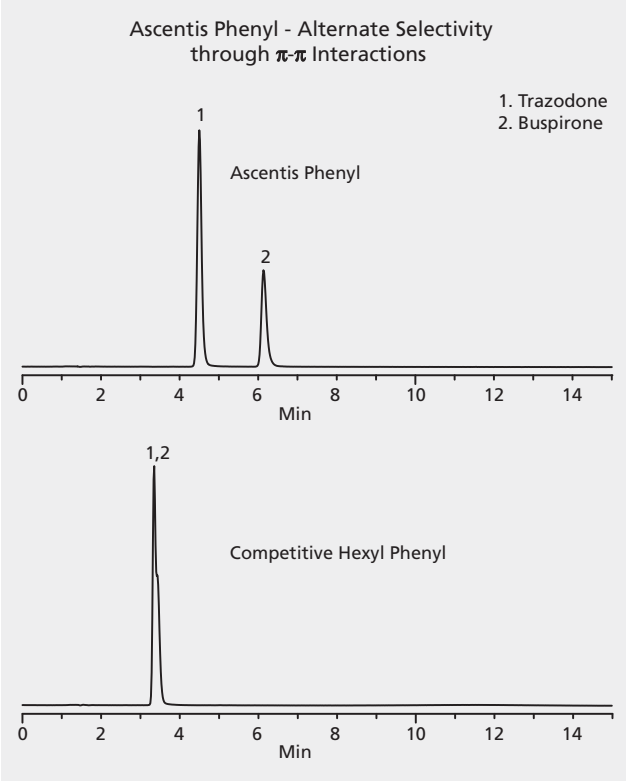
Orthogonal Selectivity

While good retention and high efficiency are important in separations, selectivity is the most powerful parameter for achieving separations. Supelco had that in mind when designing the Ascentis family. Move between the C18 and C8 when small differences in retention and selectivity are desired. The RP-Amide or Phenyl can create larger differences in selectivity for resolving difficult pairs or confirming identity. This orthogonal difference is illustrated clearly in the log k′ vs. log k′ plot. Typical column pairs show less scatter as compared to this plot.



Ascentis® Phenyl versus Competition

The exceptional selectivity of Ascentis Phenyl for compounds that contain aromatic or aromatic-like ring systems is shown in this application. A competitive phenyl that employs a hexyl linker displays very little selectivity for these compounds under these conditions. Ascentis Phenyl provides a clear choice when alternate selectivity is desired.



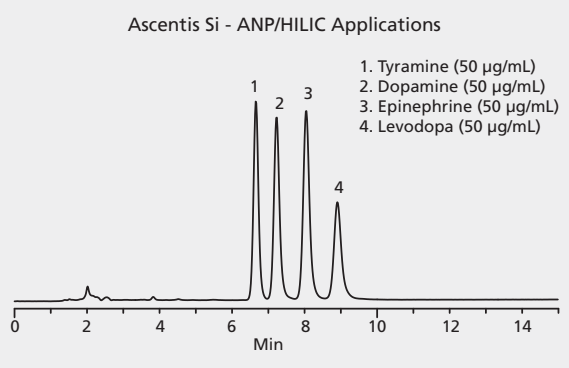
Column: 15 cm x 4.6 mm I.D., 5 µm particles
Mobile Phase: 40:60 10 mM ammonium acetate (pH 5.5 with acetic acid): acetonitrile
Temp.: 35 °C
Flow Rate: 1.0 mL/min
Det.: UV, 254 nm

HPLC for Small Molecules

Ascentis®: *HILIC using Ascentis® Si*

HILIC using Ascentis® Si

Retention of small polar compounds can be achieved using Ascentis Si. In the ANP/HILIC (Aqueous Normal Phase/Hydrophilic Interaction Chromatography) mode, retention is caused by a mix of partitioning and cation exchange. This provides enhanced retention and alternateselectvity for neutral polar and basic compounds. Ascentis Si columns are well suited for ANP/HILIC applications and are shipped with ethanol mobile phase for easy use with ANP/HILIC eluents.



Column: 15 cm x 4.6 mm I.D., 5 µm particles
Mobile Phase: 15:85 0.1% ammonium acetate in water:0.1% ammonium acetate in acetonitrile
Temp.: 35 °C
Flow Rate: 1.0 mL/min
Det.: UV, 280 nm

Ascentis® C18

Ascentis® C18 HPLC Column

The Ascentis family of columns is the fourth generation of HPLC column technology from Supelco scientists. Ascentis columns are bonded on high purity, 100 Angstrom silica including 3, 5, and 10 micron particle size. Columns are designed for small molecule applications and are scalable from micro columns (1.0 mm I.D.) to preparative dimensions (50 mm I.D.). The family includes C18, C8, Phenyl, Si and embedded polar group phase, RP-Amide.

Ascentis C18 is an extremely stable and reliable first choice HPLC column that gives symmetric peak shape and excellent retention even for difficult compounds.

Features and Benefits

- Excellent retention
- Symmetric peak shape
- High reproducibility
- Complete LC-MS compatibility

suitable for L1 per USP

loading	25% Carbon
matrix	silica gel high purity, spherical
phase	octadecylsilane
surface coverage	3.7 µmol/m^2
metals	<5 ppm
surface area	450 m^2/g
endcapped	Yes
pore size	100 Å
operating pH range	2 - 8
temp. range	≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
1.0	5	581311-U	1 ea
1.0	10	581364-U	1 ea
1.0	15	581365-U	1 ea
2.1	2	581312-U	1 ea
2.1	3	581313-U	1 ea
2.1	5	581300-U	1 ea
2.1	10	581301-U	1 ea
2.1	15	581302-U	1 ea
3.0	2	581314-U	1 ea
3.0	3	581306-U	1 ea
3.0	5	581307-U	1 ea
3.0	10	581308-U	1 ea
4.6	2	581315-U	1 ea
4.6	3	581316-U	1 ea
4.6	3.3	581336-U	1 ea
4.6	5	581320-U	1 ea
4.6	10	581321-U	1 ea
4.6	15	581322-U	1 ea
10.0	5	581335-U	1 ea
particle size 5 µm			
2.1	2	581368-U	1 ea
2.1	3	581327-U	1 ea
2.1	5	581303-U	1 ea
2.1	10	581326-U	1 ea
2.1	15	581304-U	1 ea
2.1	25	581305-U	1 ea
3.0	2	581328-U	1 ea
3.0	3	581369-U	1 ea
3.0	5	581329-U	1 ea
4.6	2	581330-U	1 ea
4.6	3	581331-U	1 ea
4.6	5	581323-U	1 ea
4.6	7.5	581332-U	1 ea
4.6	15	581324-U	1 ea
4.6	25	581325-U	1 ea
10.0	5	581340-U	1 ea
10.0	10	581341-U	1 ea
10.0	15	581342-U	1 ea
10.0	25	581343-U	1 ea
21.2	5	581344-U	1 ea
21.2	10	581345-U	1 ea
21.2	15	581346-U	1 ea
21.2	25	581347-U	1 ea
particle size 10 µm			
4.6	15	581350-U	1 ea
4.6	25	581351-U	1 ea
10.0	5	581352-U	1 ea
10.0	10	581353-U	1 ea
10.0	15	581354-U	1 ea
10.0	25	581355-U	1 ea
21.2	5	581356-U	1 ea
21.2	10	581357-U	1 ea
21.2	15	581358-U	1 ea
21.2	25	581359-U	1 ea

HPLC for Small Molecules

Ascentis®: *Ascentis® C18*

Ascentis C18 Validation Pack

An Ascentis C18 Validation Pack makes it easy to demonstrate method reproducibility on 3 different lots. The validation pack contains a kit with 3 columns - 1 from each of 3 lots of bonded phase. And with Ascentis columns, you can be assured that all three columns will meet your expectations.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	581390-U	3 ea
4.6	25	581391-U	3 ea

Ascentis® C18 Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	2	581376-U	1 kit
2.1	2	581377-U	2 ea
4.0	2	581378-U	1 kit
4.0	2	581379-U	2 ea
particle size 5 µm			
2.1	2	581370-U	2 ea
2.1	2	581371-U	1 kit
3.0	2	581374-U	2 ea
3.0	2	581375-U	1 kit
4.0	2	581372-U	2 ea
4.0	2	581373-U	1 kit
particle size 10 µm			
10.0	1	581388-U	1 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules. (10mm i.d guard requires the purchase of 567499-U)

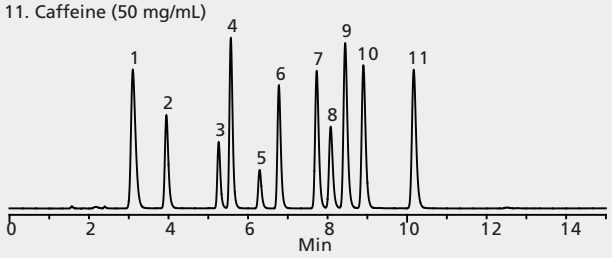
Ascentis® RP-Amide

Ascentis RP-Amide Application

Caffeine is metabolized in the body primarily by cytochrome P450 to form various metabolites and analogs. The baseline resolution of all 11 analytes demonstates the usefullness of the Ascentis RP-Amide for small polar molecule applications.

1. Uric acid (50 mg/mL)
2. Xanthine (30 mg/mL)
3. 7-methylxanthine (20 mg/mL)
4. 1-methyluric acid (40 mg/mL)
5. 1-methylxanthine (20 mg/mL)
6. Theobromine (30 mg/mL)
7. 1,7-dimethyluric acid (40mg/mL)
8. 1,7-dimethylxanthine (50 mg/mL)
9. Theophylline (50 mg/mL)
10. beta-(hydroxyethyl) theophylline (50 mg/mL)
11. Caffeine (50 mg/mL)

Gradient Program		
Time (min)	%A	%B
0	98	2
3	92	8
12	80	20
14	80	20
14.1	98	2
15	98	2



Ascentis® RP-Amide HPLC Column

The Ascentis family of columns is the fourth generation of HPLC column technology from Supelco scientists. Ascentis columns are bonded on high purity, 100 Angstrom silica including 3, 5, and 10 micron particle size. Columns are designed for small molecule applications and are scalable from micro columns (1.0 mm I.D.) to preparative dimensions (50 mm I.D.). The family includes C18, C8, Phenyl, Si and embedded polar group phase, RP-Amide.

Ascentis RP-Amide is a new generation ultra low bleed, embedded polar group (EPG) phase that provides orthogonal selectivity and increased resolution for HPLC and LC-MS analysis of polar compounds. The Ascentis RP-Amide is the first choice in embedded polar group HPLC phases.

Features and Benefits

- Excellent retention and peak shape for polar compounds
- 100% aqueous compatibility
- Ultra low bleed, LC-MS compatible
- Unique selectivity

suitable for L60 per USP

loading ..... 19.5% Carbon
matrix ..... silica gel high purity, spherical
matrix active group ..... amido embedded reversed-phase
surface coverage ..... 2.7 µmol/m^2
metals ..... <5 ppm
surface area ..... 450 m^2/g
endcapped ..... Yes
pore size ..... 100 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
1.0	5	565309-U	1 ea
1.0	10	565389-U	1 ea
1.0	15	65566-U	1 ea
2.1	2	565313-U	1 ea
2.1	3	565314-U	1 ea
2.1	5	565300-U	1 ea
2.1	10	565301-U	1 ea
2.1	15	565302-U	1 ea
3.0	2	565315-U	1 ea
3.0	3	565310-U	1 ea
3.0	5	565311-U	1 ea
3.0	10	565312-U	1 ea
4.6	2	565316-U	1 ea
4.6	3	565317-U	1 ea
4.6	5	565320-U	1 ea
4.6	10	565321-U	1 ea
4.6	15	565322-U	1 ea
particle size 5 µm			
2.1	2	565391-U	1 ea
2.1	3	565331-U	1 ea
2.1	5	565303-U	1 ea
2.1	10	565304-U	1 ea
2.1	15	565305-U	1 ea
2.1	25	565306-U	1 ea
3.0	2	565332-U	1 ea
3.0	3	565392-U	1 ea
3.0	5	565333-U	1 ea
3.0	15	565338-U	1 ea
4.0	25	565327-U	1 ea
4.6	2	565335-U	1 ea
4.6	3	565336-U	1 ea
4.6	5	565323-U	1 ea
4.6	10	565328-U	1 ea

HPLC for Small Molecules

Ascentis®: *Ascentis® RP-Amide*

Ascentis® RP-Amide HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
4.6	15	565324-U	1 ea
4.6	25	565325-U	1 ea
10.0	5	565340-U	1 ea
10.0	10	565341-U	1 ea
10.0	15	565343-U	1 ea
10.0	25	565344-U	1 ea
21.2	5	565345-U	1 ea
21.2	10	565346-U	1 ea
21.2	15	565347-U	1 ea
21.2	25	565348-U	1 ea
particle size 10 µm			
4.6	15	565352-U	1 ea
4.6	25	565353-U	1 ea
10.0	5	565354-U	1 ea
10.0	10	565355-U	1 ea
10.0	15	565356-U	1 ea
10.0	25	565357-U	1 ea
21.2	5	565358-U	1 ea
21.2	10	565359-U	1 ea
21.2	15	565360-U	1 ea
21.2	25	565361-U	1 ea

Ascentis RP-Amide Validation Pack

An Ascentis RP-Amide Validation Pack makes it easy to demonstrate method reproducibility on 3 different lots. The validation pack contains a kit with 3 columns - 1 from each of 3 lots of bonded phase. And with Ascentis RP-Amide columns, you can be assured that all three columns will meet your expectations.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	565394-U	3 ea
4.6	25	565395-U	3 ea

Ascentis® RP-Amide Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	565372-U	2 ea
2.1	2	565373-U	1 kit
3.0	2	565374-U	2 ea
3.0	2	565375-U	1 kit
4.0	2	565370-U	2 ea
4.0	2	565371-U	1 kit
10.0	1	565376-U	1 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules. (10mm i.d guard requires the purchase of 567499-U)

Ascentis® ES Cyano

NEW PRODUCTS

Ascentis® ES-Cyano HPLC Column

Extra stable for low pH mobile phases due to sterically protected phase.

Useful for selectivity in the reversed-phase mode, including π π and dipole-dipole interacting compounds. Can also be used HILIC mode and normal phase chromatography.

Features and Benefits

- Enhanced stability at low pH
- Operates in reversed-phase, HILIC, and normal phase modes of chromatography
- Low MS bleed
- 100% aqueous compatible
- Available as 3 µm and 5 µm particles
- Particle composition: Type B silica gel
- Particle shape: Spherical

suitable for L10 per USP

loading ..... 10% Carbon
matrix ..... silica gel high purity, spherical
phase ..... diisopropyl cyano propyl
surface coverage ..... 2.5 µmol/m²
metals ..... <5 ppm
surface area ..... 450 m²/g
endcapped ..... Yes
pore size ..... 100 Å
operating pH ..... 1 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	577308-U	1 ea
2.1	10	577309-U	1 ea
2.1	15	577310-U	1 ea
4.6	5	577311-U	1 ea
4.6	10	577312-U	1 ea
particle size 5 µm			
2.1	5	577300-U	1 ea
2.1	10	577301-U	1 ea
2.1	15	577303-U	1 ea
4.6	5	577304-U	1 ea
4.6	10	577305-U	1 ea
4.6	15	577306-U	1 ea
4.6	25	577307-U	1 ea

Ascentis® C8

Ascentis® C8 HPLC Column

The Ascentis family of columns is the fourth generation of HPLC column technology from Supelco scientists. Ascentis columns are bonded on high purity, 100 Angstrom silica including 3, 5, and 10 micron particle size. Columns are designed for small molecule applications and are scalable from micro columns (1.0 mm I.D.) to preparative dimensions (50 mm I.D.). The family includes C18, C8, Phenyl, Si and embedded polar group phase, RP-Amide.

The Ascentis C8 is a highly reproducible column with excellent selectivity towards polar compounds. The phase excells in highly aqueous mobile phases as well as high organic mobile phases.

HPLC for Small Molecules

Ascentis®: *Ascentis® C8*

Features and Benefits

- Superior retention for hydrophobic molecules
- Excellent peak shape
- Low bleed LC-MS separations

suitable for L7 per USP

loading ..... 15% Carbon
matrix ..... silica gel high purity, spherical
phase ..... octylsilane
surface coverage ..... 4.0 µmol/m²
metals ..... <5 ppm
surface area ..... 450 m²/g
endcapped ..... Yes
pore size ..... 100 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
1.0	5	581412-U	1 ea
1.0	10	581435-U	1 ea
1.0	15	581436-U	1 ea
2.1	2	581413-U	1 ea
2.1	3	581414-U	1 ea
2.1	10	581401-U	1 ea
2.1	5	581400-U	1 ea
2.1	15	581402-U	1 ea
3.0	2	581415-U	1 ea
3.0	3	581403-U	1 ea
3.0	5	581404-U	1 ea
3.0	10	581405-U	1 ea
4.6	2	581416-U	1 ea
4.6	3	581417-U	1 ea
4.6	5	581406-U	1 ea
4.6	10	581407-U	1 ea
4.6	15	581408-U	1 ea
particle size 5 µm			
2.1	2	581439-U	1 ea
2.1	3	581430-U	1 ea
2.1	5	581420-U	1 ea
2.1	10	581419-U	1 ea
2.1	15	581421-U	1 ea
2.1	25	581422-U	1 ea
3.0	2	581431-U	1 ea
3.0	3	581440-U	1 ea
3.0	5	581432-U	1 ea
4.6	2	581433-U	1 ea
4.6	3	581434-U	1 ea
4.6	5	581423-U	1 ea
4.6	15	581424-U	1 ea
4.6	25	581425-U	1 ea
10	25	581441-U	1 ea
21.2	25	581442-U	1 ea
particle size 10 µm			
4.6	25	581444-U	1 ea
10.0	25	581445-U	1 ea

Ascentis® C8 Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	581426-U	2 ea
4.0	2	581427-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Ascentis® Phenyl

Ascentis® Phenyl HPLC Column

The Ascentis family of columns is the fourth generation of HPLC column technology from Supelco scientists. Ascentis columns are bonded on high purity, 100 Angstrom silica including 3, 5, and 10 micron particle size. Columns are designed for small molecule applications and are scalable from micro columns (1.0 mm I.D.) to preparative dimensions (50 mm I.D.). The family includes C18, C8, Phenyl, Si and embedded polar group phase, RP-Amide.

The Ascentis Phenyl provides superior separations in reversed-phase mode including 100% aqueous conditions. It may also be used in HILIC/ANP (aqueous normal phase) mode and shows low UV/MS bleed for gradient applications.

Features and Benefits

- 100% Aqueous Compatible
- ANP/HILIC and reversed-phase
- Low UV/MS bleed for gradient applications
- Alternate selectivity

suitable for L11 per USP

loading ..... 19% Carbon
matrix ..... silica gel high purity, spherical
phase ..... butyl phenyl
surface coverage ..... 5.2 µmol/m²
metals ..... <5 ppm
surface area ..... 450 m²/g
endcapped ..... Yes
pore size ..... 100 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
1.0	10	581600-U	1 ea
1.0	15	581601-U	1 ea
2.1	3	581602-U	1 ea
2.1	5	581603-U	1 ea
2.1	10	581604-U	1 ea
2.1	15	581605-U	1 ea
3.0	3	581606-U	1 ea
3.0	10	581607-U	1 ea
4.6	5	581608-U	1 ea
4.6	10	581609-U	1 ea
4.6	15	581610-U	1 ea
particle size 5 µm			
2.1	5	581611-U	1 ea
2.1	10	581612-U	1 ea
2.1	15	581613-U	1 ea
2.1	25	581614-U	1 ea
4.6	5	581615-U	1 ea
4.6	15	581616-U	1 ea
4.6	25	581617-U	1 ea
10	25	581618-U	1 ea
21.2	25	581619-U	1 ea

Ascentis Phenyl Validation Pack

An Ascentis Phenyl Validation Pack makes it easy to demonstrate method reproducibility on 3 different lots. The validation pack contains a kit with 3 columns - 1 from each of 3 lots of bonded phase. And with Ascentis Phenyl columns, you can be assured that all three columns will meet your expectations.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	581695-U	3 ea
4.6	25	581696-U	3 ea

HPLC for Small Molecules

Ascentis®: *Ascentis® Phenyl*

Ascentis® Phenyl Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	581620-U	2 ea
4.0	2	581621-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Ascentis® Si

Ascentis® Si HPLC Column

The Ascentis family of columns is the fourth generation of HPLC column technology from Supelco scientists. Ascentis columns are bonded on high purity, 100 Angstrom silica including 3, 5, and 10 micron particle size. Columns are designed for small molecule applications and are scalable from micro columns (1.0 mm I.D.) to preparative dimensions (50 mm I.D.). The family includes C18, C8, Phenyl, Si and embedded polar group phase, RP-Amide.

The Ascentis Si is a high loading capacity silica with excellent peak shape. The Ascentis Si performs in both normal-phase and HILIC/ANP (aqueous normal phase) mode.

suitable for L3 per USP

matrix ..... silica gel high purity, spherical
metals ..... <5 ppm
surface area ..... 450 m^2/g
endcapped ..... No
pore size ..... 100 Å
operating pH range ..... 2 - 6
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
1.0	10	581520-U	1 ea
1.0	15	581521-U	1 ea
2.1	3	581522-U	1 ea
2.1	5	581500-U	1 ea
2.1	10	581501-U	1 ea
2.1	15	581502-U	1 ea
3.0	3	581523-U	1 ea
3.0	10	581503-U	1 ea
4.6	5	581504-U	1 ea
4.6	10	581505-U	1 ea
4.6	15	581506-U	1 ea
particle size 5 µm			
2.1	5	581507-U	1 ea
2.1	10	581508-U	1 ea
2.1	15	581509-U	1 ea
2.1	25	581510-U	1 ea
4.6	5	581511-U	1 ea
4.6	15	581512-U	1 ea
4.6	25	581513-U	1 ea
10.0	25	581514-U	1 ea
21.2	25	581515-U	1 ea
particle size 10 µm			
10.0	25	581516-U	1 ea
21.2	25	581517-U	1 ea
4.6	25	581524-U	1 ea
particle size 5 µm			
3.0	5	581525-U	1 ea
3.0	10	581526-U	1 ea
3.0	25	581527-U	1 ea

Ascentis Si Validation Pack

An Ascentis Silica Validation Pack makes it easy to demonstrate method reproducibility on 3 different lots. The validation pack contains a kit with 3 columns - 1 from each of 3 lots of bonded phase. And with Ascentis Silica columns, you can be assured that all three columns will meet your expectations.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	581595-U	3 ea
4.6	25	581596-U	3 ea

Ascentis® Si Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	581518-U	2 ea
4.0	2	581519-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Ascentis® HPLC Validation Packs

Do you need to validate a method? Do you need to demonstrate method reproducibility on 3 different lots of an HPLC column? An Ascentis HPLC Column Validation Pack makes it easy! Choose the chemistry you want, and we will send you a kit with 3 columns – 1 from each of 3 lots of bonded phase. What could be simpler? And with Ascentis columns, you can be assured that all three columns will meet your expectations.

Ascentis validation packs are available for the C18, RP-Amide, Phenyl and Si phases.

apHera™ - For Higher pH Applications

apHera™ C18 HPLC Column

apHera™ reversed columns were devoloped specifically to provide the superior advantages of both silica and polystyrene columns, without the disadvantages of either. This was accomplished using a vinyl alcohol copolymer base that keeps the surface wetted even with high carbon loads. The porous structure has an average pore diameter large enough to produce ideal results for small analytes, peptides and small proteins. These columns equal silica based columns in separation efficiency with organic solvents but provide efficiency with buffered alkaline solutions not possible on silica. One of the most significant features is logicial elution order of alkylated bases where retention increases proportionately with increasing chain length.

Features of apHera™ Reversed Phase Columns

- Stable vinyl copolymer base
- Stable pH range 2-12
- 300 angstrom pore size
- Stable in all organic solvents
- Expanded applications: peptides, proteins
- Efficient separation of any basic substance
- Amenability to washing and alkaline solutions

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.0	15	56100AST	1 ea
4.6	5	56101AST	1 ea
4.6	15	56102AST	1 ea
4.6	25	56103AST	1 ea
6.0	15	56105AST	1 ea
6.0	25	56106AST	1 ea
10.0	25	56108AST	1 ea

HPLC for Small Molecules

apHera™ - For Higher pH Applications

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 9 µm			
20	30	56112AST	1 ea
particle size 13 µm			
28.0	30	56116AST	1 ea

apHera™ C18 HPLC Guard Column

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.0	1	56129AST	1 ea
4.6	1	56130AST	1 ea
6.0	1	56131AST	1 ea
particle size 13 µm			
7.5	5	56133AST	1 ea
20	10	56135AST	1 ea

apHera™ C4 HPLC Column

apHera™ reversed columns were devoloped specifically to provide the superior advantages of both silica and polystyrene columns, without the disadvantages of either. This was accomplished using a vinyl alcohol copolymer base that keeps the surface wetted even with high carbon loads. The porous structure has an average pore diameter large enough to produce ideal results for small analytes, peptides and small proteins. These columns equal silica based columns in separation efficiency with organic solvents but provide efficiency with buffered alkaline solutions not possible on silica. One of the most significant features is logicial elution order of alkylated bases where retention increases proportionately with increasing chain length.

Features of apHera™ Reversed Phase Columns

- Stable vinyl copolymer base
- Stable pH range 2-12
- 300 angstrom pore size
- Stable in all organic solvents
- Expanded applications: peptides, proteins
- Efficient separation of any basic substance
- Amenability to washing and alkaline solutions

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	56302AST	1 ea
4.6	25	56303AST	1 ea
10.0	25	56308AST	1 ea

apHera™ C4 HPLC Guard Column

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	1	56330AST	1 ea
7.5	5	56332AST	1 ea

apHera™ C8 HPLC Column

apHera™ reversed columns were devoloped specifically to provide the superior advantages of both silica and polystyrene columns, without the disadvantages of either. This was accomplished using a vinyl alcohol copolymer base that keeps the surface wetted even with high carbon loads. The porous structure has an average pore diameter large enough to produce ideal results for small analytes, peptides and small proteins. These columns equal silica based columns in separation efficiency with organic solvents but provide efficiency with buffered alkaline solutions not possible on silica. One of the most significant features is logicial elution order of alkylated bases where retention increases proportionately with increasing chain length.

Features of apHera™ Reversed Phase Columns

- Stable vinyl copolymer base
- Stable pH range 2-12
- 300 angstrom pore size
- Stable in all organic solvents
- Expanded applications: peptides, proteins
- Efficient separation of any basic substance
- Amenability to washing and alkaline solutions

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	56202AST	1 ea
4.6	25	56203AST	1 ea
10.0	25	56208AST	1 ea

apHera™ C8 HPLC Guard Column

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	1	56230AST	1 ea
7.5	5	56232AST	1 ea

apHera™ NH_2 HPLC Column

apHera™ amino columns are based on covalently bonded polyamine specifically optimized for the separation of mono- and oligosaccharides. The elution order mono-, di-, tri-saccharide shows increased eluton volume with increased acetonitrile concentration and complete stability for both acidic and alkaline eluates. The small, robust PVA copolymer bead provides mechanical and chemical strength as well as high column efficiency. Conventional camion columns based on silica do not show long column life, perhaps due to hydrolysis of silica particle by the basic amino group. Since Supelco uses a strong alkaline compatible polymer, these problems are eliminated. Stable retention time and long column life are also characteristic of the column.

Features of Amino apHera™ Columns

- High efficiency for carbohydrate analysis
- Ideal for basic conditions/amphoteric detection
- High selectivity mono- to oligosaccharides
- pH range 2-13
- 300 angstrom pore size
- Stable, predictable retention
- Long column life

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.0	15	56400AST	1 ea
4.6	15	56401AST	1 ea
4.6	25	56403AST	1 ea
10.0	25	56408AST	1 ea
particle size 9 µm			
20	30	56412AST	1 ea
particle size 13 µm			
28.0	30	56416AST	1 ea

apHera™ NH_2 HPLC Guard Column

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.0	1	56429AST	1 ea
4.6	1	56430AST	1 ea
6.0	1	56431AST	1 ea
particle size 13 µm			
7.5	5	56433AST	1 ea

HPLC for Small Molecules

Hamilton Company HPLC Columns

Hamilton Company HPLC Columns

NEW PRODUCTS

Hamilton PRP-X100 HPLC Column

The Hamilton PRP-X100, polymeric HPLC columns used for the separation of anions in ion chromatography.
suitable for L47 per USP

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	15	82017-U	1 ea
4.6	25	82023-U	1 ea
particle size 10 µm			
4.1	10	82026-U	1 ea
4.1	15	82014-U	1 ea
4.1	25	82011-U	1 ea
4.6	15	82028-U	1 ea
4.6	25	82020-U	1 ea

Hamilton PRP-1 HPLC Column

The Hamilton PRP-1, polymeric reversed phase columns are Ideal for high pH (pH 8 - 13) operation or with analytes that give poor chromatogrpahy on silica-based columns.
suitable for L21 per USP

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.1	15	82013-U	1 ea
4.1	25	82021-U	1 ea
4.6	15	82030-U	1 ea
4.6	25	82025-U	1 ea
particle size 7 µm			
4.1	25	82016-U	1 ea
4.6	25	82024-U	1 ea
particle size 10 µm			
4.1	15	82018-U	1 ea
4.1	25	82012-U	1 ea

Hamilton PRP-X300 HPLC Column

The Hamilton PRP-X300, polymeric reversed phase columns are used in the separation of alcohols and organic acids.
suitable for L17 per USP

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 7 µm			
4.1	25	82015-U	1 ea

Hamilton PRP-X200 HPLC Column

The Hamilton PRP-X200, polymeric reversed phase columns are used in the separation of inorganic and organic, mono or divalent cations
suitable for L17 per USP

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 10 µm			
4.1	15	82019-U	1 ea
4.1	25	82027-U	1 ea

Hamilton HC-75 HPLC Column

Hamilton HC-75 columns are used for the separation of mono and disaccharides, orgainc acids, sugars, and sugar alcohols.
suitable for L19 per USP

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 9 µm			
4.1	25	82031-U	1 ea
7.8	30	82022-U	1 ea

Hamilton Company HPLC Guard Cartridge

NEW PRODUCTS

Hamilton PRP-X100 HPLC Guard Cartridge

matrix PRP-X100

Hardware	Particle Size (µm)	L × I.D.	Cat. No.	Qty
stainless steel	10	2 cm × 2.0 mm	82032-U	1 kit
PEEK	10	2 cm × 2.0 mm	82035-U	1 kit
stainless steel	10	2 cm × 2.0 mm	82039-U	5 ea
PEEK	10	2 cm × 2.0 mm	82042-U	5 ea

Hamilton PRP-1 HPLC Guard Cartridge

matrix PRP-1

Hardware	Particle Size (µm)	L × I.D.	Cat. No.	Qty
stainless steel	10	2 cm × 2.0 mm	82033-U	1 kit
PEEK	10	2 cm × 2.0 mm	82038-U	1 kit
stainless steel	10	2 cm × 2.0 mm	82040-U	5 ea
PEEK	10	2 cm × 2.0 mm	82045-U	5 ea

Hamilton PRP-X300 HPLC Guard Cartridge

matrix PRP-X300

Hardware	Particle Size (µm)	L × I.D.	Cat. No.	Qty
stainless steel	12	2 cm × 2.0 mm	82034-U	1 kit
stainless steel	12	2 cm × 2.0 mm	82041-U	5 ea

HPLC for Small Molecules

Hamilton Company HPLC Guard Cartridge

Hamilton PRP-X200 HPLC Guard Cartridge

matrix PRP-X200

Hardware	Particle Size (µm)	L × I.D.	Cat. No.	Qty
stainless steel	10	2 cm × 2.0 mm	82036-U	1 kit
stainless steel	10	2 cm × 2.0 mm	82043-U	5 ea

Hamilton Hydrogen Form HPLC Guard Cartridge

matrix ..... Hydrogen Form

Hardware	Particle Size (µm)	L × I.D.	Cat. No.	Qty
stainless steel	12	2 cm × 2.0 mm	82037-U	1 kit
stainless steel	12	2 cm × 2.0 mm	82044-U	5 ea

Discovery®

The Discovery® Suite of Reversed-Phase HPLC Columns

Discovery® is a suite of HPLC columns featuring functionalized reversed-phases designed to provide differentiated separations vs. C18 based on unique combinations of polar and hydrophobic retention mechanisms.

The Discovery® suite of reversed-phases enables you to optimize your separation with respect to:

- Retention
- Resolution
- Selectivity
- Analysis Time

all while minimizing method development time.

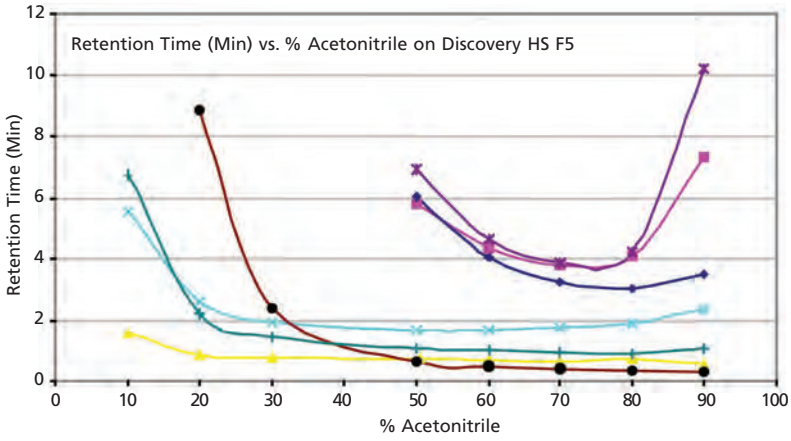
Discovery® HS F5 exhibits unique retention

Discovery® HS F5 Exhibits "U-Shape" Retention Profile

Under certain mobile phase conditions and with certain analytes, certain polar phases, like Discovery® HS F5, can exhibit both reversed-phase and normal-phase behavior. At low percent organic, retention decreases with increasing percent organic following reversed-phase behavior. However, at higher percent organic, retention increases with increasing percent organic following normal-phase behavior. The result is a "U-shape" retention profile for these compounds. If your compounds exhibit this U-shape profile, use it to your advantage to:

- Improve LC-MS detection by using higher % organic mobile phase
- Use mobile phase concentration to alter selectivity at high % organic

U-Shape Retention Profile on Discovery HS F5



Column: Discovery HS F5, 5 cm x 4.6 mm ID, 3 µm particles (567504-U)
Mobile Phase: 10 mM ammonium acetate (pH 6.8) with varying percentages of 100% CH_3CN
Flow Rate: 1 mL/min
Temp.: 35 °C

- Amitriptyline
- Cimetidine
- Clonidine
- Fluoxetine
- Nifedipine
- Trimethoprim
- Verapamil

HPLC for Small Molecules

Discovery®: *Discovery® HS F5*

Discovery® HS F5

Discovery® HS F5 HPLC Column

The Discovery® HS F5 bonded phase provides reversed-phase separations that are distinctly different from C18 columns. However, compounds will generally elute within the same retention time window, making most C18 methods easily transferable.

Guidelines for transferring a C18 method to Discovery® HS F5:
Generally, bases are retained longer on the HS F5 than on a C18. Increasing the organic content of a C18 separation 5 to 10 percent will generally provide similar retention on an HS F5. Results with other compounds are highly variable. However, it is generally true that solutes with log $P_{o/w}$ values less than 2.5 will be retained longer on HS F5 compared to a C18. The degree of difference is highly solute dependent.

Features and Benefits

- Unique selectivity
- Similar retention to C18 (sometimes requires stronger mobile phase)
- Excellent peak shape
- Stable, low-bleed LC-MS separations
- Scalable separations from 3 to 10µm particle sizes

suitable for L43 per USP

loading ..... 12% Carbon
particle platform ..... silica gel, high purity, spherical
phase ..... pentafluorophenylpropyl
surface coverage ..... 4 µmol/m²
metals ..... <10 ppm
surface area ..... 300 m²/g
endcapped ..... Yes
pore size ..... 120 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	3.3	567501-U	1 ea
2.1	5	567500-U	1 ea
2.1	10	567502-U	1 ea
2.1	15	567503-U	1 ea
3.0	3.3	567505-U	1 ea
3.0	10	567581-U	1 ea
3.0	15	567542-U	1 ea
4	5	567530-U	1 ea
4	10	567531-U	1 ea
4	15	567532-U	1 ea
4.6	3.3	567509-U	1 ea
4.6	5	567504-U	1 ea
4.6	10	567506-U	1 ea
4.6	15	567507-U	1 ea
particle size 5 µm			
2.1	5	567508-U	1 ea
2.1	10	567510-U	1 ea
2.1	15	567511-U	1 ea
2.1	25	567512-U	1 ea
3.0	15	567541-U	1 ea
4	5	567533-U	1 ea
4	10	567534-U	1 ea
4	15	567535-U	1 ea
4	25	567536-U	1 ea
4.6	5	567513-U	1 ea
4.6	10	567515-U	1 ea
4.6	15	567516-U	1 ea
4.6	25	567517-U	1 ea
10	5	567518-U	1 ea
10	10	567537-U	1 ea
10	15	567519-U	1 ea
10	25	567520-U	1 ea
21.2	15	567522-U	1 ea
21.2	25	567523-U	1 ea
particle size 10 µm			
21.2	15	567528-U	1 ea
21.2	25	567529-U	1 ea

Discovery® HS F5 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	2	567570-U	2 ea
2.1	2	567571-U	1 kit
4.0	2	567572-U	2 ea
4.0	2	567573-U	1 kit
particle size 5 µm			
2.1	2	567574-U	2 ea
2.1	2	567575-U	1 kit
4.0	2	567576-U	2 ea
4.0	2	567577-U	1 kit
10	1	567578-U	1 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® HS C18

Discovery® HS C18 HPLC Column

Features and Benefits

- Stable, low bleed for LC-MS applications
- Scalable from analytical to preparatory
- Highly stable to ensure excellent run-to-run and lot-to-lot reproducibility
- Higher hydrophobicity for better resolution of difficult analytes

suitable for L1 per USP

loading ..... 20% Carbon
particle platform ..... silica gel, high purity, spherical
phase ..... octadecyl
surface coverage ..... 3.2 µmol/m²
metals ..... <10 ppm
surface area ..... 300 m²/g
endcapped ..... Yes
pore size ..... 120 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	569253-U	1 ea
2.1	7.5	569254-U	1 ea
2.1	15	569255-U	1 ea
4.6	5	569250-U	1 ea
4.6	7.5	569251-U	1 ea
4.6	15	569252-U	1 ea
particle size 5 µm			
2.1	5	568500-U	1 ea
2.1	10	568501-U	1 ea
2.1	15	568502-U	1 ea
2.1	25	568503-U	1 ea
4	5	568510-U	1 ea
4	15	568512-U	1 ea
4	25	568513-U	1 ea
4.6	5	568520-U	1 ea
4.6	10	568521-U	1 ea
4.6	15	568522-U	1 ea
4.6	25	568523-U	1 ea
10	5	568530-U	1 ea
10	10	568531-U	1 ea

HPLC for Small Molecules

Discovery®: *Discovery® HS C18*

I.D. (mm)	L (cm)	Cat. No.	Qty
10	15	568532-U	1 ea
10	25	568533-U	1 ea
21.2	5	568540-U	1 ea
21.2	10	568541-U	1 ea
21.2	15	568542-U	1 ea
21.2	25	568543-U	1 ea
particle size 10 µm			
10	10	568631-U	1 ea
10	15	568632-U	1 ea
10	25	568633-U	1 ea
21.2	25	568643-U	1 ea
50	25	577521-U	1 ea

Discovery® HS C18 Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	2	569276-U	2 ea
2.1	2	569277-U	1 kit
4.0	2	569274-U	2 ea
4.0	2	569275-U	1 kit
particle size 5 µm			
2.1	2	568570-U	2 ea
2.1	2	568571-U	1 kit
4.0	2	568572-U	2 ea
4.0	2	568573-U	1 kit
10	1	568574-U	1 ea
particle size 10 µm			
10	1	568674-U	1 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® C18

Discovery® C18 HPLC Column

Use Discovery® C18 for any method that specifies a C18. The exceptional peak shape, reproducibility, and stability make it the column of choice for all C18 methods from demanding to routine.

Features and Benefits

- Excellent reproducibility
- Exceptional peak shape for basic and acidic analytes
- Stable, low-bleed LC-MS separations
- Separation of peptides and small proteins
- Lower hydrophobicity than many comparable C18 columns, providing faster analysis

suitable for L1 per USP

loading ..... 12% Carbon
particle platform ..... silica gel, high purity, spherical
phase ..... octadecyl
surface coverage ..... 3 µmol/m^2
metals ..... <10 ppm
surface area ..... 200 m^2/g
endcapped ..... Yes
pore size ..... 180 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	577507-U	1 ea
2.1	3	577508-U	1 ea
2.1	5	50494721	1 ea
2.1	10	569220-U	1 ea
2.1	12.5	569229-U	1 ea
2.1	15	50495521	1 ea
3.0	2	577509-U	1 ea
3.0	3	577510-U	1 ea
3.0	5	504947-30	1 ea
3.0	10	569221-U	1 ea
3.0	12.5	569230-U	1 ea
3.0	15	504955-30	1 ea
3.0	25	504971-30	1 ea
4.0	5	504947-40	1 ea
4.0	10	569222-U	1 ea
4.0	12.5	569231-U	1 ea
4.0	15	504955-40	1 ea
4.0	25	504971-40	1 ea
4.6	5	504947	1 ea
4.6	10	569223-U	1 ea
4.6	12.5	569232-U	1 ea
4.6	15	504955	1 ea
4.6	25	504971	1 ea
10	25	569224-U	1 ea
21.2	25	569226-U	1 ea
2.1	25	569234-U	1 ea

Discovery® C18 Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	505188	2 ea
2.1	2	505161	1 kit
3.0	2	59576-U	2 ea
3.0	2	59575-U	1 kit
4.0	2	505137	2 ea
4.0	2	505129	1 kit
10	1	569283-U	1 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® C18 Validation Pack

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	5	55700-U21	3 ea
4.6	5	55700-U	3 ea
4.6	25	55704-U	3 ea

Pack includes 3 columns, each from a different lot of bonded phase.

Discovery® C8

Discovery® C8 HPLC Column

Features and Benefits

- Excellent reproducibility
- Faster separation of strongly hydrophobic analytes than C18 columns
- Stable, low-bleed LC-MS separations
- Exceptional peak shapes for basic and acidic compounds
- Compatible with low organic/highly aqueous mobile phases

suitable for L7 per USP

loading ..... 7.5% Carbon
base material ..... silica gel, high purity, spherical
phase ..... octyl
surface coverage ..... 3.4 µmol/m^2
metals ..... <10 ppm
surface area ..... 200 m^2/g
endcapped ..... Yes
pore size ..... 180 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

HPLC for Small Molecules

Discovery®: *Discovery® C8*

Discovery® C8 HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	577501-U	1 ea
2.1	3	577502-U	1 ea
2.1	5	59352-U21	1 ea
2.1	10	569420-U	1 ea
2.1	12.5	569424-U	1 ea
2.1	15	59353-U21	1 ea
3.0	2	577503-U	1 ea
3.0	5	59352-U30	1 ea
3.0	10	569421-U	1 ea
3.0	15	59353-U30	1 ea
3.0	25	59354-U30	1 ea
4.0	10	569422-U	1 ea
4.0	12.5	569426-U	1 ea
4.0	15	59353-U40	1 ea
4.0	25	59354-U40	1 ea
4.6	5	59352-U	1 ea
4.6	10	569423-U	1 ea
4.6	12.5	569427-U	1 ea
4.6	15	59353-U	1 ea
4.6	25	59354-U	1 ea

Discovery® C8 Supelguard™ Guard Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59588-U	2 ea
2.1	2	59587-U	1 kit
3.0	2	59580-U	2 ea
3.0	2	59579-U	1 kit
4.0	2	59590-U	2 ea
4.0	2	59589-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Cyano

Discovery® Cyano HPLC Column

Features and Benefits

- Low hydrophobicity for rapid elution of hydrophobic analytes
- Excellent peak shape and retention of strongly basic analytes
- Retention of polar analytes
- Unique selectivity
- Significantly less retention than C18 (typically requires lower % organic mobile phase)
- Stable, low-bleed LC-MS separations
- Compatible with highly aqueous organic phases

suitable for L10 per USP

loading ..... 4.5% Carbon
base material ..... silica gel, high purity, spherical
phase ..... cyanopropyl
surface coverage ..... 3.5 µmol/m^2
metals ..... <10 ppm
surface area ..... 200 m^2/g
endcapped ..... Yes
pore size ..... 180 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	577513-U	1 ea
2.1	5	59355-U21	1 ea
2.1	10	569521-U	1 ea
2.1	15	59356-U21	1 ea
3.0	2	577515-U	1 ea
3.0	10	569522-U	1 ea
3.0	15	59356-U30	1 ea
3.0	25	59357-U30	1 ea
4.0	12.5	569526-U	1 ea
4.0	15	59356-U40	1 ea
4.0	25	59357-U40	1 ea
4.6	2	577517-U	1 ea
4.6	3	577518-U	1 ea
4.6	5	59355-U	1 ea
4.6	10	569520-U	1 ea
4.6	15	59356-U	1 ea
4.6	25	59357-U	1 ea

Discovery® Cyano Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59584-U	2 ea
2.1	2	59583-U	1 kit
3.0	2	569571-U	2 ea
3.0	2	569570-U	1 kit
4.0	2	59586-U	2 ea
4.0	2	59585-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Pack includes 3 columns, each from a different lot of bonded phase.

Discovery® RP-AmideC16

Discovery® RP-AmideC16 HPLC Column

Features and Benefits

- Excellent retention and resolution of polar compounds
- Unique selectivity compared to C18
- Excellent peak shape and efficiency
- Less hydrophobic than C18 columns
- Compatible with 100% aqueous mobile phases

loading ..... 11% Carbon
base material ..... silica gel, high purity, spherical
phase ..... palmitamidopropyl
surface coverage ..... 2.6 µmol/m^2
metals ..... <10 ppm
surface area ..... 200 m^2/g
endcapped ..... Yes
pore size ..... 180 Å
operating pH range ..... 2 - 8
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	5	50500521	1 ea
2.1	10	569320-U	1 ea
2.1	15	50501321	
3.0	5	505005-30	1 ea
3.0	10	569321-U	1 ea
3.0	12.5	569330-U	1 ea
3.0	15	505013-30	1 ea
3.0	25	505064-30	1 ea
4.0	12.5	569331-U	1 ea
4.0	15	505013-40	1 ea

HPLC for Small Molecules

Discovery®: *Discovery® RP-AmideC16*

I.D. (mm)	L (cm)	Cat. No.	Qty
4.0	25	505064-40	1 ea
4.6	5	505005	1 ea
4.6	10	569323-U	1 ea
4.6	12.5	569332-U	1 ea
4.6	15	50501321 505013	1 ea 1 ea
4.6	25	505064	1 ea
10.0	25	569324-U	1 ea
21.2	25	569326-U	1 ea

Discovery® RP-AmideC16 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	505110	2 ea
2.1	2	505102	1 kit
3.0	2	59578-U	2 ea
3.0	2	59577-U	1 kit
4.0	2	505099	2 ea
4.0	2	505080	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® RP-Amide C16 Validation Pack

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	25	55709-U	3 ea

Pack includes 3 columns, each from a different lot of bonded phase.

Discovery® Selectivity Pack

You can conveniently order the four Discovery® column chemistries - RP-AmideC16, C18 , C8, and Cyano - in your choice of column dimensions, in a single kit. Quickly evaluate mobile phases on all four columns to find the optimal combination of chemistries for your separation. The Discovery HPLC Column Selectivity Pack gives you a powerful tool for rapid, efficient, simple pharmaceutical method development.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	15	55722-U21	1 kit

Discovery® Zirconia

Developing Methods on Discovery® Zr

Reversed-phase, zirconia-based particles expand your HPLC method development options by leveraging the unique selectivity and retention provided by pH and temperature extremes.

Discovery® Zr comprises four phase chemistries bonded to porous, spherical, 3 and 5 micron zirconia particles. Zirconia particles have exceptional pH and thermal stability compared to silica and alumina particles. Compared to polymer particles, zirconia does not shrink or swell with changes in temperature, ionic strength, or organic concentration, and has exceptional mechanical strength. The presence of controlled, predictable reversed-phase and ion-exchange retention modes combined with thermal and pH stability open up your method development options.

Discovery® Zr uses all the reversed-phase method development tools you use for developing methods on silica. However, Discovery® Zr gives you four new tools that silica does not allow:

- The full power of pH: to control the ionization state of acids and bases
- The power of temperature: to adjust selectivity and to decrease analysis time
- The power of ionic strength: to alter selectivity, efficiency, and retention
- The power of Lewis acid-base interactions: to give unique selectivity over silica for ionic compounds

The Members of the Discovery® Zr Family

Discovery® Zr-PBD: Polybutadiene-modified zirconia particles give separations most similar to C18-silica, but with benefits of high pH and temperature stability.
Discovery® Zr-PS: Polystyrene modified zirconia particles are ideal for separations of hydrophobic compounds and amines.
Discovery® Zr-CarbonC18: Octadecyl-modified carbon-clad zirconia for universal separations of acids, bases, and neutrals. Very different selectivity relative to C18-silica.
Discovery® Zr-Carbon: Carbon-clad zirconia for separations of geometric isomers and diastereomers.

Discovery Zirconia-based Phases

Specification	Discovery Zr-PS	Discovery Zr-PBD	Discovery Zr-Carbon	Discovery Zr-CarbonC18
USP Code:		L49		
Phase:	Cross-linked polystyrene	Cross-linked polybutadiene	Graphitic-like carbon	Octadecylphenyl modified carbon
Endcap:	No	No	No	No
Particle Platform:	Zirconia	Zirconia	Zirconia	Zirconia
Particle Shape:	Spherical	Spherical	Spherical	Spherical
Particle Sizes (µm):	3 & 5	3 & 5	3 & 5	3 & 5
Pore Size (Å):	300	300	300	300
Surface Area (m^2/g):	30	30	30	30
Packing Density (g/mL):	2.21	2.21	2.21	2.21
% C:	2	2	1	3
Coverage (µmoles/m^2):	n/a	n/a	n/a	2.8
pH Range:	1 to 13	1 to 13	1 to 14	1 to 14
Temperature Range:	≤100 °C[(a)]	≤100 °C[(a)]	≤100 °C[(b)]	≤100 °C[(b)]

[(a)] special hardware for operation between 100 °C and 150 °C is available
[(b)] special hardware for operation between 100 °C and 200 °C is available

Discovery® Zr-PBD HPLC Column

Discovery® Zr-PBD comprises spherical, porous zirconia particles with a durable coating of polybutadiene. It operates via a reverse-phase mechanism, but is less hydrophobic, so less organic solvent is required for elution. Discovery Zr-PBD complements the selectivity offering of the other zirconia and silica-based Discovery phases, and allows the use of a wide range of mobile phase pH from pH 1 to 13.

Features and Benefits

- General purpose zirconia phase
- Selectivity similar to C18-silica

suitable for L49 per USP

loading ..... 2% Carbon
particle platform ..... zirconia, spherical, porous
bonding phase ..... cross-linked polybutadiene
surface area ..... 30 m^2/g
endcapped ..... No
pore size ..... 300 Å
operating pH range ..... 1 - 13
temp. range ..... ≤100 °C (up to 150 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65713-U	1 ea
2.1	7.5	65714-U	1 ea
2.1	15	65715-U	1 ea
4.6	5	65716-U	1 ea
4.6	15	65718-U	1 ea

HPLC for Small Molecules

Discovery® Zirconia: *The Members of the Discovery® Zr Family*

Discovery® Zr-PBD HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	5	65719-U	1 ea
2.1	15	65720-U	1 ea
4.6	5	65722-U	1 ea
4.6	15	65723-U	1 ea
4.6	25	65724-U	1 ea

Discovery® Zr-PBD Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65812-U	2 ea
2.1	1	65811-U	1 kit
4.0	1	65814-U	2 ea
4.0	1	65813-U	1 kit
particle size 5 µm			
2.1	1	65816-U	2 ea
2.1	1	65815-U	1 kit
4.0	1	65818-U	2 ea
4.0	1	65817-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-CarbonC18 HPLC Column

Discovery® Zr-CarbonC18 comprises spherical, porous carbon-clad zirconia particles covalently modified with octadecyl (C18) groups. It complements the selectivity offering of the other zirconia- and silica-based Discovery phases, and allows the use of the full range of mobile phase pH from pH 1 to 14.

Features and Benefits

- Partitioning mechanism
- Shape selectivity
- Resistant to phase hydrolysis

loading ..... 3% Carbon
base material ..... zirconia, spherical, porous
bonding phase ..... octadecylphenyl modified carbon
surface area ..... 30 m^2/g
endcapped ..... No
pore size ..... 300 Å
operating pH range ..... 1 - 14
temp. range ..... ≤100 °C (up to 200 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65701-U	1 ea
2.1	7.5	65702-U	1 ea
2.1	15	65703-U	1 ea
4.6	7.5	65705-U	1 ea
4.6	15	65706-U	1 ea
particle size 5 µm			
2.1	5	65707-U	1 ea
4.6	5	65710-U	1 ea
4.6	15	65711-U	1 ea

Discovery® Zr-CarbonC18 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65801-U	1 kit
2.1	1	65802-U	2 ea
4.0	1	65803-U	1 kit
particle size 5 µm			
2.1	1	65806-U	2 ea
2.1	1	65805-U	1 kit
4.0	1	65807-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-Carbon HPLC Column

Discovery Zr-Carbon comprises spherical, porous carbon-coated zirconia particles. It is ideal for the reversed-phase separation of positional isomers and diastereomers. It complements the selectivity offering of the other zirconia- and silica-based Discovery phases, and allows the use of the full range of mobile phase pH from pH 1 to 14. It is a great alternative when C18 does not work.

Features and Benefits

- Excellent separation of geometric isomers and diastereomers.
- Very hydrophobic surface.
- Most different retention compared to other Discovery Zr phases for non-ionic compounds.
- Similar to porous graphitic carbon, but with added ion-exchange interactions.

Avoid fused-ring aromatics as they are too strongly retained by Discovery Zr-Carbon.

loading ..... 1% Carbon
particle platform ..... zirconia, spherical, porous
bonding phase ..... graphitic-like carbon
surface area ..... 30 m^2/g
endcapped ..... No
pore size ..... 300 Å
operating pH range ..... 1 - 14
temp. range ..... ≤100 °C (up to 150 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65725-U	1 ea
2.1	15	65727-U	1 ea
4.6	15	65730-U	1 ea
particle size 5 µm			
2.1	5	65731-U	1 ea
2.1	15	65732-U	1 ea
4.6	15	65735-U	1 ea

Discovery® Zr-Carbon Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65822-U	2 ea
2.1	1	65821-U	1 kit
particle size 5 µm			
2.1	1	65827-U	2 ea
4.0	1	65829-U	2 ea
4.0	1	65828-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-PS HPLC Column

Discovery® Zr-PS comprises spherical, porous zirconia particles modified with cross-linked polystyrene. It operates via a reversed-phase mechanism, but is less retentive. It has unique selectivity, especially for aromatic compounds. Discovery Zr-PS complements the selectivity offering of the other zirconia- and silica-based Discovery phases, and allows the use of the full range of mobile phase pH from pH 1 to 13.

Features and Benefits

- Good for very hydrophobic compounds
- Good for basic compounds

HPLC for Small Molecules

Discovery® Zirconia: *The Members of the Discovery® Zr Family*

loading ..... 2% Carbon
particle platform ..... zirconia, spherical, porous
bonding phase ..... cross-linked polystyrene
surface area ..... 30 m^2/g
endcapped ..... No
pore size ..... 300 Å
operating pH range ..... 1 - 13
temp. range ..... ≤100 °C (up to 150 °C with special hardware)

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	65737-U	1 ea
2.1	7.5	65738-U	1 ea
2.1	15	65739-U	1 ea
4.6	5	65740-U	1 ea
4.6	7.5	65741-U	1 ea
4.6	15	65742-U	1 ea
particle size 5 µm			
2.1	5	65743-U	1 ea
2.1	15	65744-U	1 ea
4.6	5	65746-U	1 ea
4.6	15	65747-U	1 ea
4.6	25	65748-U	1 ea

Discovery® Zr-PS Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	1	65842-U	2 ea
2.1	1	65841-U	1 kit
4.0	1	65844-U	2 ea
4.0	1	65843-U	1 kit
particle size 5 µm			
2.1	1	65845-U	1 kit
4.0	1	65848-U	2 ea
4.0	1	65847-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® Zr-SAX HPLC Column

Features and Benefits

- Efficient strong anion-exchanger useful for inorganic and organic anions. Stable from pH 1-12.
- Ideal for the separation of water-soluble vitamins.
- Useful for the separation of bio-molecules such as nucleotides, nucleosides, oligonucleotides, oligodeonucleotides, amino acids and peptides.
- High anion-exchange capacity that can be controlled by the amount of polymer deposited on the porous zirconia substrate.
- Does not shrink or swell as a function of anionic strength or organic modifier content of the mobile phase.
- Extremely stable amino phase for normal phase separation of carbohydrates.
- Thermally stable up to 80°C, which causes different selectivity and high speed separations with lower ionic strength mobile phases. This is very important in the preparation of RNA and DNA samples used for further studies.
- Mixed-mode separation modes may be exploited to optimize separations, including Lewis acid-base interactions, hydrophobic interactions and ion-exchange interactions. These modes may be attenuated by adjusting the strong Lewis base content, organic content and ionic strength of the mobile phase, respectively.

loading ..... 25% Carbon
particle platform ..... zirconia spherical, porous
bonding phase ..... polyethyleneimine
surface area ..... 30 m^2/g
pore size ..... 300 Å
operating pH range ..... 1 - 12
temp. range ..... <80 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
4.6	5	65709-U	1 ea
4.6	10	65712-U	1 ea
4.6	15	65721-U	1 ea

Discovery® Zr-SAX Supelguard™ Cartridge

loading ..... 25% Carbon
particle platform ..... (zirconia, spherical, porous)
bonding phase ..... polyethyleneimine
surface area ..... 30 m^2/g
pore size ..... 300 Å
operating pH range ..... 1 - 12
temp. range ..... 80 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
4.0	1	65733-U	2 ea

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Discovery® ZR Column Holder

	Cat. No.	Qty
Discovery® ZR Column Holder		
for use with Discovery ZR Columns	65621-U	1 ea

SUPELCOSIL™

Hydrophobic Phases

SUPELCOSIL™ LC-18 HPLC Column

A general purpose hydrophobic alkyl phase that is very retentive and gives good peak shape for a wide variety of compounds.

suitable for L1 per USP

loading ..... 11.0% carbon
particle platform ..... silica gel, spherical
phase ..... octadecyl
surface coverage ..... 3.1 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH range ..... 2 - 7.5
temp. limit ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	25	57942	1 ea
3.0	3.3	58977C30	1 ea
3.0	5	58973C30	1 ea
3.0	15	58985C30	1 ea
4.0	7.5	58984C40	1 ea
4.0	15	58985C40	1 ea
4.6	3.3	58977	1 ea
4.6	5	58973	1 ea
4.6	7.5	58984	1 ea
4.6	15	58985	1 ea
particle size 5 µm			
1.0	30	57982	1 ea
2.1	15	57934	1 ea
2.1	25	57935	1 ea
3.0	10	59209C30	1 ea
3.0	15	58230C30	1 ea
3.0	25	58298C30	1 ea
4.0	5	58239C40	1 ea
4.0	15	58230C40	1 ea
4.0	25	58298C40	1 ea

HPLC for Small Molecules

SUPELCOSIL™: *Hydrophobic Phases*

SUPELCOSIL™ LC-18 HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
4.0	30	59165	1 ea
4.6	5	58239	1 ea
4.6	10	59209	1 ea
4.6	15	58230-U	1 ea
4.6	25	58298	1 ea
10	25	58368	1 ea
21.2	25	54849	1 ea
particle size 12 µm			
4.6	25	59182	1 ea
21.2	25	59185	1 ea
particle size 3 µm			
4.6	20	58615-U	1 ea

SUPELCOSIL™ LC-18 Supelguard™ Cartridge

use to protect LC-18, LC-PAH

matrix ..... silica gel high purity, spherical
phase ..... octadecyl
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... <70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59613	2 ea
2.1	2	59612	1 kit
3.0	2	59564C30	2 ea
4.0	2	59564	2 ea
4.0	2	59554	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-18-DB HPLC Column

SUPELCOSIL LC-DB phases are specially deactivated for basic compounds. These columns provide shorter retention, better peak shape, and higher efficiency for organic bases than can be obtained on other Type A silica reversed-phase columns.

suitable for L1 per USP

loading ..... 11.0% Carbon
particle platform ..... silica gel, spherical
phase ..... octadecyl
surface coverage ..... 3.1 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	25	57943	1 ea
3.0	3.3	58978C30	1 ea
3.0	7.5	58992C30	1 ea
3.0	15	58993C30	1 ea
4.0	15	58993C40	1 ea
4.6	3.3	58978	1 ea
4.6	7.5	58992	1 ea
4.6	15	58993	1 ea
particle size 5 µm			
2.1	25	57940	1 ea
3.0	10	59208C30	1 ea
3.0	15	58348C30	1 ea
3.0	25	58355C30	1 ea
4.0	15	58348C40	1 ea
4.0	25	58355C40	1 ea
4.0	30	59164	1 ea
4.6	5	58345	1 ea
4.6	10	59208	1 ea
4.6	15	58348	1 ea
4.6	25	58355-U	1 ea
10	25	58358	1 ea
21.2	25	54851	1 ea

SUPELCOSIL™ LC-18-DB Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59617	2 ea
2.1	2	59616	1 kit
3.0	2	59565C30	2 ea
4.0	2	59565	2 ea
4.0	2	59555	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-8 HPLC Column

A phase less hydrophobic than C18. Provides less retention of both polar and non-polar compounds than C18. Use a mobile phase containing 5% less organic modifier for the C8 column than C18. Polar compounds are, relatively, more strongly retained on C8 than C18 columns.

suitable for L7 per USP

loading ..... 6.0% carbon
particle platform ..... silica gel, spherical
phase ..... octyl
surface coverage ..... 3.2 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	3.3	58975C30	1 ea
3.0	7.5	58982C30	1 ea
3.0	15	58983C30	1 ea
4.0	15	58983C40	1 ea
4.6	3.3	58975	1 ea
4.6	7.5	58982	1 ea
4.6	15	58983	1 ea
particle size 5 µm			
2.1	25	57929	1 ea
3.0	25	58297C30	1 ea
4.0	15	58220C40	1 ea
4.0	25	58297C40	1 ea
4.6	5	58238	1 ea
4.6	15	58220-U	1 ea
4.6	25	58297	1 ea
10	25	58367	1 ea
particle size 3 µm			
4.6	25	57997-U	1 ea

SUPELCOSIL™ LC-8 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59615	2 ea
2.1	2	59614	1 kit
3.0	2	59562C30	2 ea
4.0	2	59562	2 ea
4.0	2	59552	1 kit

HPLC for Small Molecules

SUPELCOSIL™: *Hydrophobic Phases*

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-8-DB HPLC Column

SUPELCOSIL LC-DB phases are specially deactivated for basic compounds. These columns provide less retention, better peak shape, and higher efficiency for organic bases than can be obtained on conventional reversed-phase columns.

suitable for L7 per USP

loading ..... 6.0% carbon
particle platform ..... silica gel, spherical
phase ..... octyl
surface coverage ..... 3.2 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	7.5	58990C30	1 ea
3.0	15	58991C30	1 ea
4.0	15	58991C40	1 ea
4.6	3.3	58976	1 ea
4.6	7.5	58990-U	1 ea
4.6	15	58991	1 ea
particle size 5 µm			
4.0	15	58347C40	1 ea
4.0	25	58354C40	1 ea
4.6	5	58344	1 ea
4.6	15	58347	1 ea
4.6	25	58354	1 ea
particle size 3 µm			
2.1	10	59297-U	1 ea
2.1	3.3	58149-U	1 ea

SUPELCOSIL™ LC-8-DB Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59619	2 ea
4.0	2	59563	2 ea
3.0	2	59563C30	2 ea
4.0	2	59553	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-DP HPLC Column

Contains a diphenyl bonded phase, which gives greater selectivity for aromatic groups compared to alkyl-type bonded phases.

suitable for L11 per USP

loading ..... 6% Carbon
particle platform ..... silica gel, spherical
phase ..... diphenyl
surface coverage ..... 2.4 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	15	59150C30	1 ea
4.0	30	59167	1 ea
4.6	10	59211	1 ea
4.6	15	59150-U	1 ea
4.6	25	58842	1 ea

SUPELCOSIL™ LC-DP Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59566	2 ea
4.0	2	59556	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Polar Phases

SUPELCOSIL™ ABZ+Plus HPLC Column

SUPELCOSIL ABZ+Plus columns offer both high deactivation and unique selectivity. Deactivated silica particles of very narrow particle size distribution ensure high efficiency with low back pressure. After bonding and endcapping reactions, the ABZ+Plus phase effectively shields unreacted silanol groups on the silica, preventing them from interacting with most analytes, and provides symmetric peaks regardless of an analyte's functionality. The phase also allows you to use low ionic strength buffers without having to add an ion-suppressing modifier. ABZ+Plus enables you to use simple mobile phases when analyzing the most difficult compounds; acids, strongly basic compounds, and zwitterions.

suitable for L60 per USP

Features and Benefits

- High efficiency for polar, nonpolar, and charged analytes
- Symmetric peaks for the most reactive compounds
- Unique selectivity for polar and charged compounds

loading ..... 12.0% carbon
particle platform ..... silica gel, spherical
phase ..... alkylamide
surface coverage ..... 3.4 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	3.3	5919121	1 ea
2.1	5	5919221	1 ea
2.1	10	57917	1 ea
3.0	7.5	59193C30	1 ea
3.0	15	59194C30	1 ea
4.6	3.3	59191	1 ea
4.6	7.5	59193	1 ea
4.6	15	59194	1 ea
particle size 5 µm			
1.0	30	57978	1 ea
2.1	5	5919521	1 ea
2.1	10	57925	1 ea
2.1	15	57926	1 ea
2.1	25	57927	1 ea
3.0	5	59195C30	1 ea
3.0	15	59196C30	1 ea
3.0	25	59197C30	1 ea
4.0	15	59196C40	1 ea
4.0	25	59197C40	1 ea
4.6	5	59195-U	1 ea
4.6	15	59196	1 ea
4.6	25	59197	1 ea
10	25	59179	1 ea
21.2	10	59148	1 ea
21.2	25	54855	1 ea

HPLC for Small Molecules

SUPELCOSIL™: *Polar Phases*

SUPELCOSIL™ ABZ+Plus HPLC Column *(continued)*

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 12 µm			
4.6	25	59156	1 ea
21.2	25	59174	1 ea

SUPELCOSIL™ ABZ+Plus Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59605	2 ea
2.1	2	59604	1 kit
3.0	2	59535C30	2 ea
4.0	2	59535-U	2 ea
4.0	2	59534-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-ABZ HPLC Column

SUPELCOSIL LC-ABZ phase has a unique deactivation technology which provides excellent reversed-phase performance for basic compounds, as well as those that are acidic, polar neutral, and non-polar. Silanol suppressing practices such as using competing amines, operating at high ionic strength, and adjusting mobile phases to pH extremes are typically not required to obtain good peak shape on the LC-ABZ phase.

Features and Benefits

- For acids, bases, zwitterions
- Increased polar retention relative to standard reversed-phases
- Unique selectivity
- Silanol deactivation
- Peak shape, efficiency, and retention are comparable to C8 phases for non-polar analytes

loading ..... 12.0% carbon
particle platform ..... silica gel, spherical
phase ..... alkylamide
surface coverage ..... 3.4 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. limit ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	25	57936	1 ea
3.0	5	59141C30	1 ea
3.0	15	59140C30	1 ea
3.0	25	59142C30	1 ea
4.0	25	59142C40	1 ea
4.6	5	59141	1 ea
4.6	15	59140-U	1 ea
4.6	25	59142	1 ea
10	25	59170	1 ea

SUPELCOSIL™ LC-ABZ Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59611	2 ea
2.1	2	59610	1 kit
3.0	2	59545C30	2 ea
4.0	2	59545-U	2 ea
4.0	2	59544-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ Suplex™ pKb-100 HPLC Column

Suplex pKb-100 columns feature the same bonded phase functionality as SUPELCOSIL LC-ABZ columns. These specially deactivated columns differ in that Suplex pKb-100 is not endcapped, while SUPELCOSIL LC-ABZ is endcapped. The absence of the end-capping reagent results in better performance from Suplex pKb-100 for the strongest basic compounds, while LC-ABZ is preferred when the sample also contains acids and/or zwitterions.

loading ..... 12.5% carbon
particle platform ..... silica gel, spherical
phase ..... alkylamide
surface coverage ..... 3.4 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... No
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	25	57937	1 ea
3.0	25	58934C30	1 ea
4.0	25	58934C40	1 ea
4.6	5	58921-U	1 ea
4.6	15	58932	1 ea
4.6	25	58934	1 ea
10	25	59172	1 ea

SUPELCOSIL™ Suplex™ pKb-100 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59609	2 ea
2.1	2	59608	1 kit
4.0	2	59541-U	2 ea
4.0	2	59531-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-F HPLC Column

SUPELCOSIL LC-F columns contain a pentafluorophenyl functional group/endcapped packing material. These columns offer selectivities different from traditional reversed-phase columns for halogenated compounds, esters, ketones, bases, and taxanes, including taxol.

suitable for L43 per USP

loading ..... 5% Carbon
particle platform ..... silica gel, spherical
phase ..... pentafluorophenylamido
surface coverage ..... 2.6 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. limit ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	25	59158C40	1 ea
4.6	25	59158	1 ea

SUPELCOSIL™ LC-F Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59521	2 ea
4.0	2	59520	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

HPLC for Small Molecules

SUPELCOSIL™: *Polar Phases*

SUPELCOSIL™ LC-CN HPLC Column

The LC-CN phase is often used as a substitute for silica because it offers the advantages of a bonded phase (such as quick equilibration, and less sensitivity to small changes of the water content in the mobile phase). More often, however, the LC-CN column is operated under reversed-phase mobile phase conditions.

suitable for L10 per USP

loading ..... 4% Carbon
particle platform ..... silica gel, spherical
phase ..... cyanopropyl
surface coverage ..... 3.5 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	3.3	58979C30	1 ea
3.0	7.5	58986C30	1 ea
4.6	3.3	58979	1 ea
4.6	7.5	58986	1 ea
particle size 5 µm			
3.0	5	58211C30	1 ea
3.0	25	58231C30	1 ea
4.0	15	58221C40	1 ea
4.0	25	58231C40	1 ea
4.6	5	58211	1 ea
4.6	15	58221-U	1 ea
4.6	25	58231	1 ea

SUPELCOSIL™ LC-CN Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	2	59567C30	2 ea
4.0	2	59567	2 ea
4.0	2	59557	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-PCN HPLC Column

The LC-PCN cyanopropyl bonded phase columns are preconditioned for fast and reliable analyses of tricyclic antidepressants.

suitable for L10 per USP

loading ..... 4% carbon
particle platform ..... silica gel, spherical
phase ..... cyanopropyl
surface coverage ..... 3.5 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	15	58377C30	1 ea
3.0	25	58378C30	1 ea
4.0	15	58377C40	1 ea
4.6	15	58377	1 ea
4.6	20	59189	1 ea
4.6	25	58378	1 ea

SUPELCOSIL™ LC-PCN Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59514	2 ea
4.0	2	59504	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-1 HPLC Column

Due to a mixed retention mechanism, selectivity differences for polar groups are more pronounced than on C8 and C18 columns. C1 columns require 20-30% less organic modifier to provide retention similar to C18 columns.

suitable for L13 per USP

loading ..... 2% Carbon
particle platform ..... silica gel, spherical
phase ..... methyl
surface coverage ..... 3.4 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	58237	1 ea
4.6	15	58210-U	1 ea
4.6	25	58296	1 ea

SUPELCOSIL™ LC-1 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59561	2 ea

SUPELCOSIL™ LC-NH_2 HPLC Column

The amino column is most often employed for the separation of mono- and disaccharides. As a normal-phase application, amino columns are used in the petroleum industry (see SUPELCOSIL™ LC-NH_2-NP HPLC Columns for additional details).

suitable for L8 per USP

loading ..... 3% Carbon
particle platform ..... silica gel, spherical
phase ..... aminopropyl
surface coverage ..... 5.1 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	7.5	58988C30	1 ea
3.0	15	58989C30	1 ea
4.6	7.5	58988	1 ea
4.6	15	58989	1 ea
particle size 5 µm			
3.0	25	58338C30	1 ea
4.0	25	58338C40	1 ea
4.6	25	58338	1 ea

HPLC for Small Molecules

SUPELCOSIL™: *Polar Phases*

SUPELCOSIL™ LC-NH_2 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	2	59568C30	2 ea
4.0	2	59568	2 ea
4.0	2	59558	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-Si HPLC Column

A typical mobile phase used with normal-phase silica columns consists of a hydrocarbon solvent such as hexane or heptane, mixed with a relatively small percentage of more polar solvent. Non-polar compounds will elute from the column first, while polar solutes show stronger interaction with the silanol groups on the silica surface. The polar selectivity of silica is very helpful for separating mycotoxins. Silica is frequently used in preparative chromatography due to its low operating cost and back pressure compared to reversed-phase columns. Silica is particularly popular among organic chemists as a low-pressure preparative tool. The unmodified silica in SUPELCOSIL LC-Si columns also separate positional isomers.

suitable for L3 per USP

particle platform ..... silica gel, spherical
surface area ..... 170 m^2/g
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. limit ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	7.5	58980C30	1 ea
3.0	15	58981C30	1 ea
4.6	3.3	58974	1 ea
4.6	7.5	58980-U	1 ea
4.6	15	58981	1 ea
particle size 5 µm			
1.0	30	57980-U	1 ea
2.1	25	57930-U	1 ea
3.0	10	59210C30	1 ea
3.0	15	58200C30	1 ea
4.0	15	58200C40	1 ea
4.0	25	58295C40	1 ea
4.0	30	59166	1 ea
4.6	5	58236	1 ea
4.6	10	59210-U	1 ea
4.6	15	58200-U	1 ea
4.6	25	58295	1 ea
10	25	58365	1 ea
21.2	25	54843	1 ea
particle size 12 µm			
4.6	25	59180-U	1 ea
21.2	25	59183	1 ea

SUPELCOSIL™ LC-Si Supelguard™ Cartridge

use to protect LC-Si, LC-3Si

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	2	59560C30	2 ea
4.0	2	59560	2 ea
4.0	2	59550	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-Diol HPLC Column

LC-Diol columns can be used to separate proteins by gel filtration chromatography. When operated with an aqueous buffer, the diol phase can effectively shield the silica surface from interacting with proteins. A well-known use of diol columns, under normal phase conditions, is the separation of steroids and sterols.

loading ..... 3.5% carbon
particle platform ..... silica gel, spherical
phase ..... diol
surface coverage ..... 3.8 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... No
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	25	58201C30	1 ea
4.0	25	58201C40	1 ea
4.6	25	58201	1 ea

SUPELCOSIL™ LC-Diol Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59569	2 ea
4.0	2	59559	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Helpful Hints

Reversed-phase versus Normal Phase

Reversed-phase is characterized by strong interactions between analytes and the polar mobile phase. Interactions between analytes and the nonpolar stationary phase are weak. Mobile phases typically consist of water/organic solvent combinations. Reversed-phase columns include: Amide-C16, C18, C8, Phenyl, C5, Pentafluorinated Phenyl (F5), Cyano, C1, ODP-50, and TPR-100.

Normal phase is characterized by strong interactions between analytes and the polar stationary phase. Interactions between analytes and the nonpolar mobile phase are weak. Mobile phases consist of organic solvents. Normal phase columns include: Cyano, NH_2, and Silica.

Ion-Exchange Phases

SUPELCOSIL™ SAX1 HPLC Column

The SUPELCOSIL SAX1 column has a strongly basic quaternary aminopropyl phase and is used for separating anions.

suitable for L14 per USP

loading ..... 12% carbon
particle platform ..... silica gel, spherical
phase ..... propyltrimethylammonium
surface area ..... 170 m^2/g
pore size ..... 120 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	25	59138C30	1 ea
4.0	25	59138C40	1 ea
4.6	25	59138	1 ea

HPLC for Small Molecules

SUPELCOSIL™: *Ion-Exchange Phases*

SUPELCOSIL™ SAX1 Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59537-U	2 ea
4.0	2	59536-U	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

SUPELCOSIL™ LC-SCX HPLC Column

The LC-SCX cation-exchange columns have strongly acidic propylsulfonic acid groups and are used for separating cations. Adjust pH, ionic strength, and organic modifier concentration to control retention and selectivity.

suitable for L52 per USP

suitable for L9 per USP

particle platform ..... silica gel, spherical
phase ..... propylsulfonic acid
surface area ..... 170 m^2/g
pore size ..... 120 Å
pH-range ..... 2 - 7.5
temp. limit ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	25	58997C30	1 ea
4.6	25	58997	1 ea

SUPELCOSIL™ LC-SCX Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59519	2 ea
4.0	2	59509	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Nucleosides

SUPELCOSIL™ LC-18-S HPLC Column

SUPELCOSIL LC-18-S columns are designed for reliable separations of deoxyribonucleosides and ribonucleosides.

loading ..... 11.0% carbon
particle platform ..... silica gel, spherical
phase ..... octadecyl
surface coverage ..... 3.1 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
1.0	30	57920	1 ea
2.1	25	57939	1 ea
4.6	15	58931	1 ea
4.6	25	58928-U	1 ea

SUPELCOSIL™ LC-18-S Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59162	2 ea
4.0	2	59630	2 ea
4.0	2	59629	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Deoxyribonucleosides and Ribonucleosides on a SUPELCOSIL LC-18-S Column

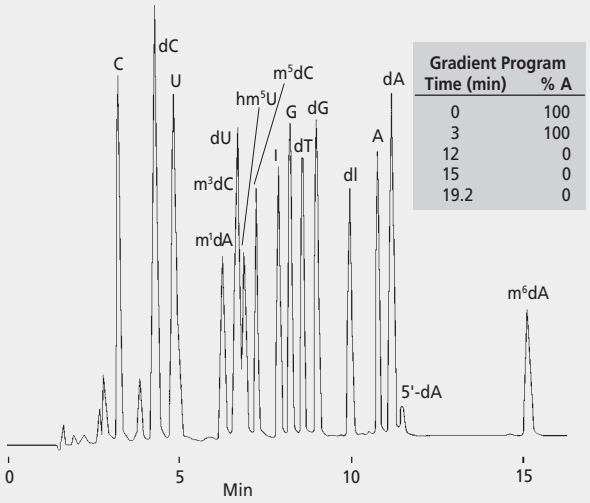


Figure provided by Dr. C. W. Gehrke and K.C. Kuo, University of Missouri-Columbia, Experimental Station Chemical Laboratories, Columbia, MO USA

column: SUPELCOSIL LC-18-S,15 cm × 4.6 mm I.D., 5 m particles 58931
mobile phase: 0.05 M K_2HPO_4/KH_2PO_4, pH 4.0:methanol A = 97.5: 2.5 B = 80:20
flow rate: 1.0 mL/min
det.: UV, 254 nm
temp.: 30 °C
injection: nucleoside standards in water

Nucleotides

SUPELCOSIL™ LC-18-T HPLC Column

SUPELCOSIL LC-18-T columns feature an octadecylsilane bonded phase and a special surface treatment for efficient separations of nucleotides. Each batch of packing material is tested to ensure good peak shape for a representative nucleotide, adenosine diphosphate (ADP). Chromatography of other compounds that exhibit metal chelating properties also can be improved by using this phase.

loading ..... 12.3% carbon
particle platform ..... silica gel, spherical
phase ..... octadecyl
surface coverage ..... 3.1 µmol/m^2
surface area ..... 170 m^2/g
endcapped ..... Yes
pore size ..... 120 Å
temp. range ..... ≤70 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	15	58970C30	1 ea
4.6	15	58970-U	1 ea
particle size 5 µm			
4.6	25	58971	1 ea
4.6	15	59136-U	1 ea

HPLC for Small Molecules

SUPELCOSIL™: *Nucleotides*

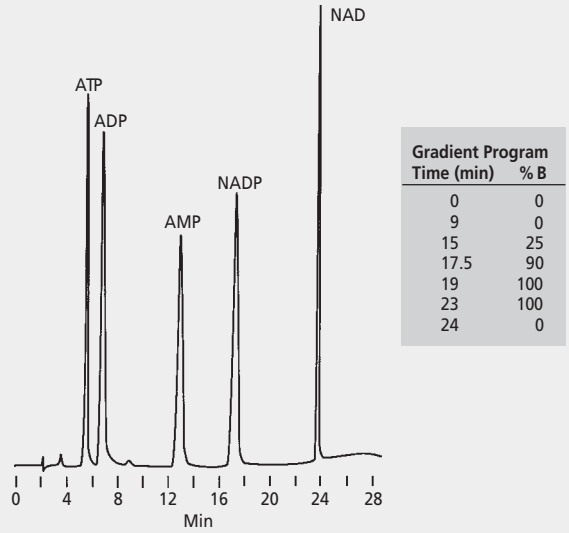
SUPELCOSIL™ LC-18-T Supelguard™ Cartridge

use to protect LC-18-T, LC-DABS

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
3.0	2	59621C30	1 ea
4.0	2	59621	2 ea
4.0	2	59620	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, two nuts and ferrules.

Nucleotides on a SUPELCOSIL LC-18-T Column



Gradient Program Time (min)	% B
0	0
9	0
15	25
17.5	90
19	100
23	100
24	0

column: SUPELCOSIL LC-18-T, 25 cm × 4.6 mm I.D., 5 m particles
58971
mobile phase: A = 0.1 M KH_2PO_4, pH 6.0; B = A:methanol, 90:10
flow rate: 1.3 mL/min
det.: UV, 254 nm

Polyaromatic Hydrocarbons

SUPELCOSIL™ LC-PAH HPLC Column

SUPELCOSIL LC-PAH columns were designed specifically for analyses of the priority pollutant PAHs listed in US EPA Method 610. 2.1 mm and 3.0 mm columns save solvent and improve sensitivity when sample mass is limited. 3 µm columns provide extremely rapid, highly efficient analyses, while retaining the durability of porous silicas. They are excellent and economical substitutes for 1.5 µm nonporous silicas.

particle platform ..... silica gel, spherical
phase ..... octadecyl
pore size ..... 120 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
3.0	10	59134C30	1 ea
4.6	5	59133	1 ea
4.6	10	59134	1 ea
particle size 5 µm			
2.1	25	57945	1 ea
3.0	15	58318C30	1 ea
4.6	15	58318	1 ea
4.6	25	58229	1 ea
3.0	25	59187	1 ea

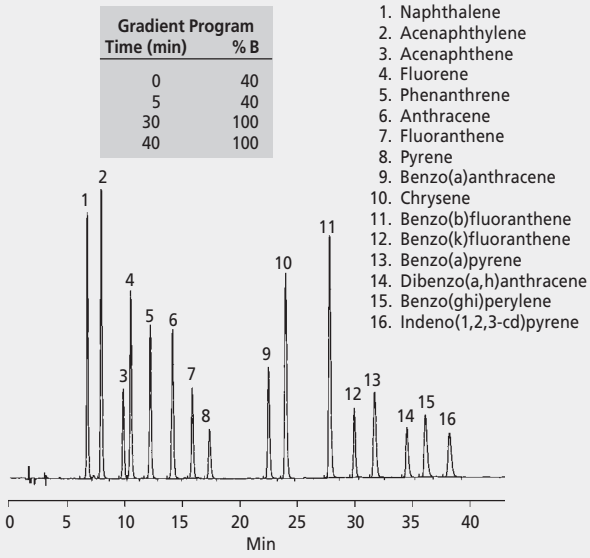
SUPELCOSIL™ LC-18 Supelguard™ Cartridges

use to protect LC-18, LC-PAH

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	2	59613	2 ea
2.1	2	59612	1 kit
3.0	2	59564C30	2 ea
4.0	2	59564	2 ea
4.0	2	59554	1 kit

Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Optimum PAH Resolution: 5 µm Particles



column: SUPELCOSIL LC-PAH, 25 cm × 4.6 mm I.D., 5 m particles (58229)
mobile phase: A = water; B = CH_3CN
flow rate: 1.5 mL/min
det.: UV, 254 nm
injection: 3 L LC-PAH Test Mix (48743), diluted 1:10 with acetonitrile

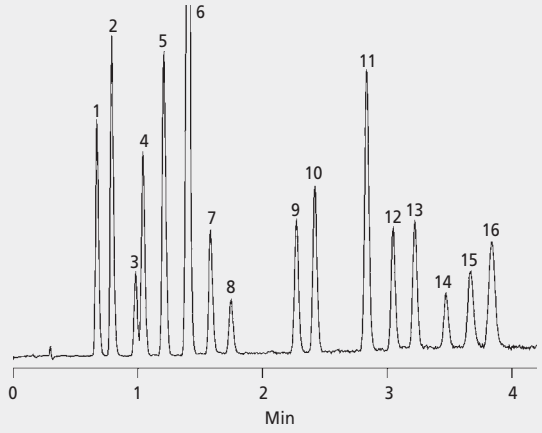
HPLC for Small Molecules

SUPELCOSIL™: *Polyaromatic Hydrocarbons*

Rapid Analyses: 3 µm Particles

Gradient Program Time (min)	% B
0	60
0.3	60
3	100
4	100

1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benz(a)anthracene
10. Chrysene
11. Benzo(b)fluoranthene
12. Benzo(k)fluoranthene
13. Benzo(a)pyrene
14. Dibenz(a,h)anthracene
15. Benzo(ghi)perylene
16. Indeno (1,2,3-cd)pyrene



column:	SUPELCOSIL LC-PAH, 5 cm × 4.6 mm I.D., 3 m particles (59133)
mobile phase:	A = water; B = CH_3CN
flow rate:	3.0 mL/min
det.:	UV, 254 nm

Dedicated Normal-Phase

SUPELCOSIL™ LC-NH_2-NP HPLC Column

An amino phase dedicated to normal-phase chromatography. By employing special bonding technology, and avoiding water in manufacturing and testing the column, we have dramatically reduced the retention variation that is characteristic of normal-phase chromatography. Normal-phase chromatography is especially useful when the analytes are not water soluble – for example, the fat-soluble vitamins A, D, E, and K.

These columns should be used with non-aqueous mobile phases only.

Features and Benefits

- show stable retention in normal-phase separations
- are less sensitive to small or varying amounts of water in mobile phases, relative to unmodified silica
- provide excellent separations of fat-soluble vitamins

suitable for L8 per USP

loading	3% Carbon
particle platform	silica gel, spherical
phase	aminopropyl
surface coverage	5.1 µmol/m^2
surface area	170 m^2/g
endcapped	Yes
pore size	120 Å
pH range	2 - 7.5
temp. range	≤70 °C

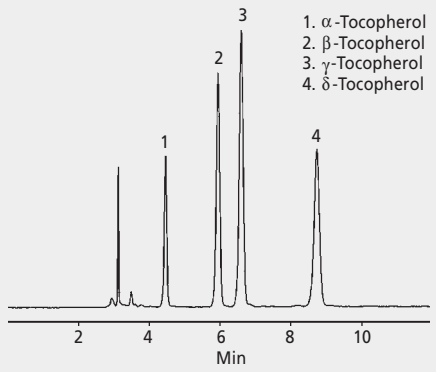
I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	25	59132	1 ea

SUPELCOSIL™ LC-NH_2-NP Supelguard™ Cartridge

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.0	2	59516	2 ea
4.0	2	59515	1 kit

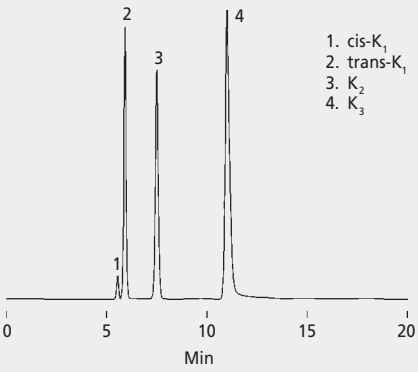
Kit includes one cartridge, a stand-alone holder, a piece of tubing, 2 nuts and ferrules.

Tocopherols



column:	SUPELCOSIL LC-NH_2-NP, 25 cm × 4.6 mm I.D., 5 m particles 59132
mobile phase:	hexane:ethyl acetate, 70:30
flow rate:	1.0 mL/min
temp.:	30 °C
det.:	UV, 295 nm
injection:	1.0 L hexane, 1.0 mg/mL each analyte

Vitamin K Isomers



column:	SUPELCOSIL LC-NH_2-NP, 25 cm × 4.6 mm I.D., 5 m particles 59132
mobile phase:	hexane:ethyl acetate, 99:1
flow rate:	1.5 mL/min
temp.:	30 °C
det.:	UV, 254 nm
injection:	1.0 L hexane, 0.3 mg/mL each analyte

HPLC for Small Molecules

SUPELCOSIL™: *Amino Acids*

Amino Acids

SUPELCOSIL LC-DABS columns feature a specially treated and tested octadecylsilane bonded phase, for reversed-phase separations of precolumn derivatized dabsyl amino acids. More than 30 amino acids and ammonia can be separated in less than one hour.

Refer to Application Note 124 (T397124) for details on the dabsylation of amino acids.

Columns for Amino Acid Separations

Derivatized Amino Acid	SUPELCOSIL HPLC	Dimension (cm × mm I.D.)	Cat. No.	Supelguard Guard Column	Cat. No.
Dabsyl-AA	LC-DABS (3 µm)	15 × 2.1	59137	LC-18-T	59621
DABTH-AA	LC-18 (3 µm)	15 × 4.6	58985	LC-18	59564
OPA-AA	LC-18 (5 µm)	15 × 4.6	58230-U	LC-18	59564
PTC-AA	LC-18-DB (5 µm)	25 × 4.6	58355-U	LC-18-DB	59565
PTH-AA	LC-18-DB (3 µm)	25 × 2.1	57943	LC-18-DB	59565
	LC-18-DB (5 µm)[1]	25 × 4.6	58355-U	LC-18-DB	59565

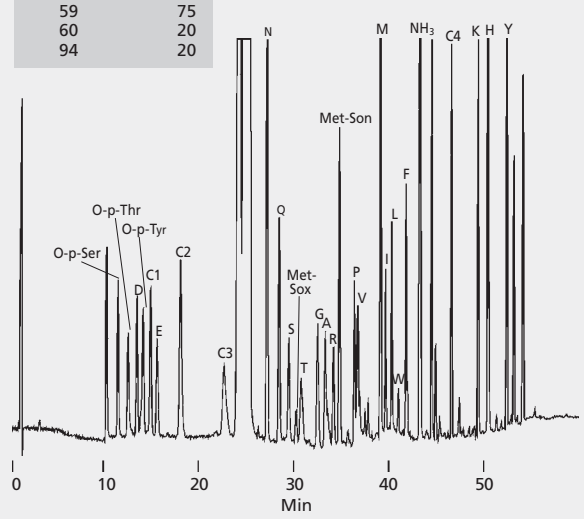
[1]Alternative to 3 µm LC-18-DB

Dabsyl Amino Acid

O-p-Ser	o-Phosphoserine
O-p-Thr	o-Phosphothreonine
D	Aspartic acid
O-p-Tyr	o-Phosphotyrosine
C1	Cysteic acid
E	Glutamic acid
C2	S-Carboxymethylcysteine
C3	S-Sulfocysteine
N	Asparagine
Q	Glutamine
S	Serine
Met-Sox	Methionine sulfoxide
T	Threonine
G	Glycine
A	Alanine
R	Arginine
Met-Son	Methionine sulfone
P	Proline
V	Valine
M	Methionine
I	Isoleucine
L	Leucine
W	Tryptophan
F	Phenylalanine
NH_3	Ammonia
C4	Cystine
K	Lysine
H	Histidine
Y	Tyrosine

Gradient Program

Temp. (min)	% B
0	20
9	25
23	25
24	32
30	32
37	40
46	60
54	75
59	75
60	20
94	20



column: SUPELCOSIL LC-DABS, 15 cm × 4.6 mm I.D., 3 µm particles (59137)
mobile phase: A = 25 mM KH_2PO_4, pH 7.0; B = acetonitrile:methanol (70:30)
flow rate: 1.5 mL/min
det.: VIS, 436 nm
temp.: 30 °C
injection: 5 µL, approx. 50 pM each derivative

Amino Acid Separations - HPLC Column Selection

Compatible	L × I.D.	Cat. No.	Qty
SUPELCOSIL™ LC-DABS HPLC Column			
for use with Dabsyl-AA	15 cm × 4.6 mm	59137	1 ea
SUPELCOSIL™ LC-18 HPLC Column			
for use with DABTH-AA	15 cm × 4.6 mm	58985	1 ea
for use with OPA-AA	15 cm × 4.6 mm	58230-U	1 ea
SUPELCOSIL™ LC-18-DB HPLC Column			
for use with PTH-AA	25 cm × 2.1 mm	57943	1 ea
for use with PTC-AA	25 cm × 4.6 mm	58355-U	1 ea

Amino Acid Separations - Guard Column Selection

Compatible	L × I.D.	Cat. No.	Qty
SUPELCOSIL™ LC-18-T Supelguard™ Cartridge			
use to protect LC-18-T, LC-DABS	2 cm × 4.0 mm	59621	2 ea
SUPELCOSIL™ LC-18 Supelguard™ Cartridge			
use to protect LC-18, LC-PAH	2 cm × 4.0 mm	59564	2 ea
SUPELCOSIL™ LC-18-DB Supelguard™ Cartridge			
use to protect LC-18-DB	2 cm × 4.0 mm	59565	2 ea

HPLC for Small Molecules

SUPELCOGEL™

SUPELCOGEL™

Supelco microbore HPLC columns

For reversed-phase separations at high pH or low pH, we offer SUPELCOGEL TPR-100 and SUPELCOGEL ODP-50 resin-based HPLC columns. SUPELCOGEL resin-based ion exclusion HPLC columns contain sulfonated divinylbenzene resins in six cationic forms, each offering a unique selectivity for analyses of saccharides or organic acids.

Carbohydrates

SUPELCOGEL C-611 columns contain a unique ion exchange resin containing two divalent cations, rather than one. This provides different selectivities for separating monosaccharides and sugar alcohols. As with resins containing a single cation, di-,tri-, and oligosaccharides are separated by class. Galactose and mannose are well separated.

SUPELCOSIL LC-NH_2 column is often employed for the separation of mono- and disaccharides.

SUPELCOGEL Ca columns separate monosaccharides and sugar alcohols. Di-, tri-, and oligosaccharides are separated by class. A frequent application for this column is the separation of sugars in high fructose corn syrup (HFCS).

SUPELCOGEL Pb columns provide the highest resolution and best selectivity for monosaccharides. SUPELCOGEL Pb columns provide excellent separation of xylose, galactose, and mannose, which are not completely resolved on calcium-form resin columns.

SUPELCOGEL K columns are useful for separating raffinose, sucrose, glucose, fructose, and betaine.

SUPELCOGEL C-610H and **SUPELCOGEL H** columns are ideal for separating carbohydrates, alcohols, and organic acids present in the same sample: wines and other fermentation products, fruit juices, and biological samples.

SUPELCOGEL Ag columns provide rapid separation of oligosaccharides. Glycerol and ethanol are well resolved.

Within the different classes of sugars, chemical and physical properties vary only slightly. HPLC separations of carbohydrates depend on differences in conformation, configuration, and column type. Because of this complexity, no single HPLC column or method is capable of separating every carbohydrate.

SUPELCOGEL Carbohydrate Column Characteristics

Particles:	sulfonated polystyrene/divinylbenzene, spherical, 9 µm
Counter Ion:	varies (see following table)
pH Range:	1–13
Organic Compatibility:	<10% in mobile phase
Maximum Temperature:	varies (see following table)
Maximum Flow Rate:	7.8 mm I.D. columns: 1.5 mL/min 4.6 mm I.D. columns: 0.4 mL/min
Maximum Pressure:	1000 psi (70 bar)

SUPELCOSIL LC-NH_2 Column Characteristics

Particles:	spherical silica, 5 µm
Bonded Phase:	aminopropylsilyl
pH Range:	2-7.5
Organic Compatibility:	no limits (avoid aldehydes and ketones)
Maximum Flow Rate:	2 mL/min (4.6 mm I.D. columns)
Maximum Pressure:	4,000 psi (420 bar)

Carbohydrate Column Applications and Mobile Phases

Column	Application	Form	Typical Mobile Phase	Max. Temp. (°C)
SUPELCOGEL K	beet sugar, cane sugar, molasses, corn syrup	potassium	10 mM K_2HPO_4	90
SUPELCOGEL Pb	monosaccharides, xylose/galactose/mannose	lead	deionized water (DH_2O)	90
SUPELCOGEL Ca	high fructose corn syrup, monosaccharides, sugar alcohols, oligosaccharides	calcium	deionized water	90
SUPELCOGEL C-610H	organic acids	hydrogen	0.1% H_2SO_4 or H_3PO_4	60
SUPELCOGEL H	organic acids	hydrogen	0.1% H_2SO_4 or H_3PO_4	90
SUPELCOGEL C-611	mono-, di-, and trisaccharides, galactose/mannose	2 divalent cations	10^{-4} N NaOH	85
SUPELCOGEL Ag1	beer, dark corn syrup	silver	deionized water	90
SUPELCOGEL Ag2	oligosaccharides, glycerol/ethanol, corn syrup, hydrolyzed starch	silver	deionized water	90
SUPELCOSIL LC-NH_2	mono-, di-, some trisaccharides	aminopropyl silica	75% CH_3CN in water	70

HPLC for Small Molecules

SUPELCOGEL™: *Carbohydrates*

Retention Time Index for Carbohydrate Columns

	SUPELCOGEL Columns								SUPELCOSIL
	Ca	C-610H	H	H	Pb	C-611	K	Ag2	LC-NH_2
Cat. No.	59305-U	59320-U	59304-U	59346	59343	59310-U	59342	59315	58338
Dimensions (mm)	300 × 7.8	300 × 7.8	300 × 7.8	250 × 4.6	300 × 7.8	300 × 7.8	300 × 7.8	300 × 7.8	250 × 4.6
Temp	80 °C	30 °C	30 °C	30 °C	85 °C	60 °C	85 °C	85 °C	ambient
Mobile Phase	DH_2O	0.1% H_3PO_4	0.1% H_3PO_4	0.1% H_3PO_4	DH_2O	10^{-4} N NaOH	15 mM K_2HPO_4	DH_2O	ACN:DH_2O(3:1)
Flow Rate (mL/min)	0.5	0.5	0.5	0.17	0.5	0.5	0.5	0.5	1.0
Det.	refractive index								
Compound Retention Times (min)									
Arabinose	15.3	13.9	14.3	13.8	19.2	19.6	16.8	17.1	7.5
Arabitol	19.8	14.1	14.9	14.3	32.3	22.8	13.5	16.0	7.2
Betaine	ND	ND	ND	ND	NR	ND	13.0	ND	ND
Dulcitol	22.3	13.4	14.2	13.7	43.4	25.7	12.9	15.9	9.0
Erythritol	17.7	15.0	15.6	14.8	24.5	20.2	14.0	16.1	5.9
Ethanol	19.4	25.6	ND	ND	ND	21.0	ND	18.4	NR
Fructose	14.9	13.1	13.3	12.9	20.8	20.7	15.2	16.0	8.3
Galactose	13.4	12.9	13.0	12.6	17.6	17.6	15.1	15.8	10.3
Glucose	12.0	12.1	11.9	11.7	14.9	15.8	14.0	14.6	9.8
Glycerol	18.7	16.8	17.6	16.6	23.8	20.9	15.2	17.1	NR
Inositol	14.9	12.6	12.7	12.4	24.5	20.1	15.7	17.4	ND
Isomaltose	9.6	10.3	ND	ND	ND	13.8	ND	11.6	19.4
Isomaltotriose	8.5	9.5	ND	ND	ND	12.6	ND	9.8	NR
Lactitol	ND	ND	11.1	11.0	26.6	ND	10.6	ND	ND
Lactose	10.2	10.8	10.2	10.2	13.5	14.3	10.9	11.8	19.5
Maltitol	13.6	11.0	10.7	10.7	23.8	17.7	10.2	15.0	15.5
Maltoheptaose	7.5	8.8	7.6	7.9	9.2	11.6	7.2	7.3	NR
Maltohexaose	7.7	8.9	7.7	8.1	9.7	12.0	7.4	7.6	NR
Maltopentaose	7.9	9.1	7.9	8.2	10.5	12.6	7.8	8.1	NR
Maltose	9.8	10.5	9.9	9.9	13.0	14.2	10.7	11.5	17.4
Maltotetraose	8.3	9.3	8.2	8.5	11.2	13.2	8.4	8.8	NR
Maltotriose	8.8	9.7	8.8	9.0	12.0	13.6	9.2	9.8	31.0
Mannitol	19.2	13.2	13.7	13.2	32.5	22.1	12.6	15.2	9.2
Mannose	13.7	12.8	12.9	12.5	19.8	18.9	15.6	15.9	9.1
Melezitose	8.7	9.7	8.8	9.0	10.8	12.4	8.6	9.3	24.5
Psicose	22.5	13.4	14.5	13.9	36.5	32.9	15.5	17.2	6.6
Raffinose	8.7	9.7	8.7	8.9	11.2	12.6	8.7	9.6	29.7
Ribitol	16.7	13.7	14.2	13.6	25.1	19.5	13.1	15.3	ND
Ribose	24.3	14.2	15.8	15.0	40.7	34.6	17.7	19.1	6.0
Sorbitol	23.4	13.4	14.4	13.9	46.9	28.3	13.3	16.3	9.0
Stachyose	8.1	9.3	8.1	8.4	10.4	11.9	7.9	8.5	67.3
Sucrose	9.8	10.6	9.9	9.9	12.2	13.6	10.1	11.2	14.0
Xylitol	23.3	14.4	15.7	15.0	42.1	28.0	14.2	17.1	7.3
Xylose	13.2	12.8	12.8	12.6	16.1	17.2	15.3	15.6	6.8

NR—not recommended
ND—no data available

HPLC for Small Molecules

SUPELCOGEL™: *HPLC Columns*

HPLC Columns

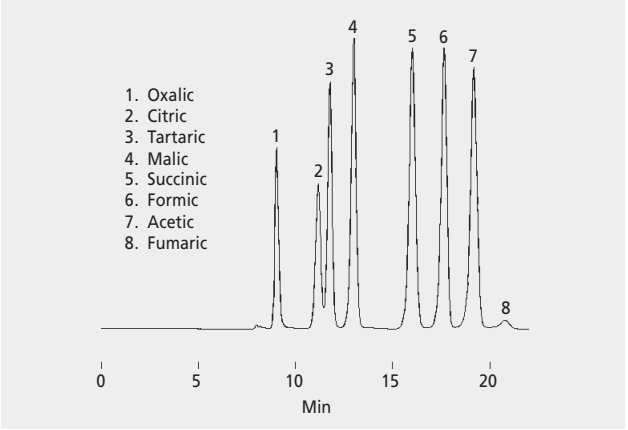
Particle Size (µm)	L × I.D.	Cat. No.	Qty
SUPELCOGEL™ K HPLC Column			
9	30 cm × 7.8 mm	59342	1 ea
SUPELCOGEL™ Pb HPLC Column			
9	30 cm × 7.8 mm	59343	1 ea
SUPELCOGEL™ Ca HPLC Column			
9	30 cm × 7.8 mm	59305-U	1 ea
SUPELCOGEL™ C-610H HPLC Column			
9	30 cm × 7.8 mm	59320-U	1 ea
SUPELCOGEL™ H HPLC Column			
9	25 cm × 4.6 mm	59346	1 ea
9	30 cm × 7.8 mm	59304-U	1 ea
SUPELCOGEL™ C-611 HPLC Column			
9	30 cm × 7.8 mm	59310-U	1 ea
SUPELCOGEL™ Ag1 HPLC Column			
9	30 cm × 7.8 mm	59318-U	1 ea
SUPELCOGEL™ Ag2 HPLC Column			
9	30 cm × 7.8 mm	59315	1 ea
SUPELCOSIL™ LC-NH_2 HPLC Column			
5	25 cm × 4.6 mm	58338	1 ea
SUPELCOGEL™ Pb HPLC Column			
9	10 cm × 7.8 mm	59335-U	1 ea

Supelguard Cartridges

The 5 cm × 4.6 mm guard columns do not include tubing, nuts or ferrules.

Compatible	L × I.D.	Cat. No.	Qty
SUPELCOGEL™ K Guard Column			
use to protect SUPELCOGEL K	5 cm × 4.6 mm	59344	1 ea
SUPELCOGEL™ Pb Guard Column			
use to protect SUPELCOGEL Pb	5 cm × 4.6 mm	59345	1 ea
SUPELCOGEL™ Ca Guard Column			
use to protect SUPELCOGEL Ca and SUPELCOGEL C-611	5 cm × 4.6 mm	59306-U	1 ea
SUPELCOGEL™ H Guard Column			
use to protect SUPELCOGEL C-610H and SUPELCOGEL H	5 cm × 4.6 mm	59319	1 ea
SUPELCOGEL™ Ag1 HPLC Column			
use to protect SUPELCOGEL Ag1	5 cm × 4.6 mm	59317-U	1 ea
SUPELCOGEL™ Ag2 HPLC Column			
use to protect SUPELCOGEL Ag2	5 cm × 4.6 mm	59316	1 ea
SUPELCOSIL™ LC-NH_2 Supelguard™ Cartridge			
use to protect LC-NH_2	2 cm × 4.0 mm	59568	2 ea
use to protect LC-NH_2	2 cm × 4.0 mm	59558	1 kit

Organic Acids



column:	SUPELCOGEL C-610H, 30 cm × 7.8 mm I.D. 59320
mobile phase:	0.1% H_3PO_4
flow rate:	0.5 mL/min
temp.:	30 °C
det.:	UV, 210 nm
injection:	1.0 µL

SUPELCOGEL™ C-610H HPLC Column

SUPELCOGEL C-610H columns are ideal for separating carbohydrates, alcohols, and organic acids present in the same sample: wines and other fermentation products, fruit juices, biological samples, etc.

suitable for L17 per USP

particle platform ..... sulfonated polystyrene/divinylbenzene, spherical

pH range ..... 1 - 13

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 9 µm			
7.8	30	59320-U	1 ea

SUPELCOGEL™ H HPLC Column

SUPELCOGEL H columns are ideal for separating carbohydrates, alcohols, and organic acids present in the same sample: wines and other fermentation products, fruit juices, biological samples, etc.

suitable for L17 per USP

particle platform ..... sulfonated polystyrene/divinylbenzene, spherical

operating pH range ..... 1 - 13

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 9 µm			
4.6	25	59346	1 ea
7.8	30	59304-U	1 ea

SUPELCOGEL™ H Guard Column

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 9 µm			
4.6	5	59319	1 ea

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SUPELCOGEL™: *Organic Acids*

Typical Retention Times for Organic Acids on SUPELCOGEL C-610H and H Columns

Column:	C-610H	H	H
Length (cm):	30	30	25
ID (mm):	7.8	7.8	4.6
Cat. No.:	59320-U	59304-U	59346
Acetic	19.0	19.6	17.6
Adipic	22.5	24.0	21.3
Ascorbic	13.1	13.3	12.1
Benzoic[1]	42.4	44.3	37.9
Butyric	28.0	28.3	24.9
Citric	11.0	10.9	10.1
Formic	17.5	18.1	16.3
Fumaric	19.8	20.9	18.2
Gluconic	12.0	12.0	11.1
Isobutyric	25.6	25.9	22.9
Isocitric	11.2	11.0	10.2
Lactic	16.0	16.9	15.2
Maleic	10.4	10.1	9.0
Malic	12.9	13.2	12.0
Malonic	13.4	13.7	12.5
Oxalic	9.0	7.9	7.3
Phytic	8.3	7.0	6.8
Propionic	22.5	23.1	20.5
Quinic	13.3	14.0	12.8
Shikimic	15.5	16.5	14.9
Succinic	15.7	16.4	14.9
Tartaric	11.7	11.7	10.7
Maleic	10.4	10.1	9.0

Mobile Phase: 0.1% H_3PO_4, 0.5 mL/min (0.17 mL/min for 25 cm × 4.6 mm column), Temperature: 30 °C, Detection: UV, 210 nm

[1]As sodium benzoate

Kromasil® HPLC Columns

NEW PRODUCTS

Kromasil® HPLC Columns

Kromasil® premium silica-based HPLC columns and chromatography packings are developed for analytical up to process scale applications. Kromasil has superior mechanical and chemical stability, high available surface area, and a narrow pore size distribution. This results in long lifetime and high loading capacity. In addition the surface properties are excellent, making it possible to run even basic compounds without the use of additives.

Kromasil® C18 HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 3.5 µm				
2.1	20	100	K08670634	1 ea
2.1	30	100	K08670635	1 ea
4.6	30	100	K08670642	1 ea
2.1	50	100	K08670352	1 ea
3	50	100	K08971207	1 ea
4	50	100	K08670640	1 ea
4.6	50	100	K08670643	1 ea
4.6	75	100	K08670644	1 ea
2.1	100	100	K08670350	1 ea
3	100	100	K08670636	1 ea
4	100	100	K08670638	1 ea
4.6	100	100	K08670353	1 ea
4.6	125	100	K08670641	1 ea
2.1	150	100	K08670351	1 ea
3	150	100	K08670637	1 ea
4	150	100	K08670639	1 ea
4.6	150	100	K08670354	1 ea
particle size 5 µm				
4.6	30	100	K08670666	1 ea
2.1	50	100	K08670650	1 ea
3	50	100	K08670647	1 ea
4	50	100	K08970908	1 ea
4.6	50	100	K08670358	1 ea
21.2	50	100	K08670654	1 ea
4.6	60	100	K08670668	1 ea
2.1	100	100	K08670355	1 ea
3	100	100	K08670645	1 ea
4	100	100	K08970909	1 ea
4.6	100	100	K08670664	1 ea
21.2	100	100	K08670651	1 ea
30	100	100	K08670655	1 ea
4	125	100	K08670658	1 ea
2.1	150	100	K08670649	1 ea
3	150	100	K08670646	1 ea
4	150	100	K08670659	1 ea
4.6	150	100	K08670356	1 ea
21.2	150	100	K08670652	1 ea
30	150	100	K08670656	1 ea
4	200	100	K08670660	1 ea
4.6	200	100	K08670665	1 ea
4	250	100	K08670661	1 ea
4.6	250	100	K08670357	1 ea
10	250	100	K08670648	1 ea
21.2	250	100	K08670653	1 ea
30	250	100	K08670657	1 ea
4	300	100	K08670662	1 ea
4.6	300	100	K08670667	1 ea
2.1	50	300	K08670675	1 ea
3	50	300	K08670671	1 ea
4.6	50	300	K08670679	1 ea
2.1	100	300	K08670673	1 ea

Kromasil® C8 HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 3.5 µm				
2.1	20	100	K08670742	1 ea
2.1	50	100	K08670743	1 ea
4.6	50	100	K08670746	1 ea
2.1	100	100	K08670740	1 ea
4.6	100	100	K08670744	1 ea
2.1	150	100	K08670741	1 ea
3	150	100	K08670739	1 ea
4.6	150	100	K08670745	1 ea
4.6	75	100	K08670747	1 ea
particle size 5 µm				
2.1	50	100	K08670754	1 ea
3	50	100	K08670750	1 ea
4.6	50	100	K08670768	1 ea
21.2	50	100	K08670758	1 ea
2.1	100	100	K08670752	1 ea
3	100	100	K08670748	1 ea
4.6	100	100	K08670764	1 ea

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Kromasil® HPLC Columns: *Kromasil® HPLC Columns*

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
21.2	100	100	K08670755	1 ea
30	100	100	K08670759	1 ea
4	125	100	K08670761	1 ea
4.6	125	100	K08670765	1 ea
2.1	150	100	K08670753	1 ea
3	150	100	K08670749	1 ea
4	150	100	K08670762	1 ea
4.6	150	100	K08670766	1 ea
21.2	150	100	K08670756	1 ea
30	150	100	K08670760	1 ea
4.6	200	100	K08670767	1 ea
4	250	100	K08670763	1 ea
4.6	250	100	K08670369	1 ea
10	250	100	K08670751	1 ea
21.2	250	100	K08670757	1 ea
30	250	100	K08971214	1 ea
2.1	50	300	K08670775	1 ea
3	50	300	K08670771	1 ea
4.6	50	300	K08670780	1 ea
2.1	100	300	K08670773	1 ea
3	100	300	K08670769	1 ea
4.6	100	300	K08670777	1 ea
2.1	150	300	K08670774	1 ea
3	150	300	K08670770	1 ea
4.6	150	300	K08670778	1 ea
4.6	250	300	K08670779	1 ea
10	250	300	K08670772	1 ea
21.2	250	300	K08670776	1 ea
particle size 7 µm				
4.6	150	100	K08970964	1 ea
4.6	250	100	K08970969	1 ea
particle size 10 µm				
21.2	100	100	K08670726	1 ea
30	100	100	K08670729	1 ea
4.6	150	100	K08670731	1 ea
21.2	150	100	K08670727	1 ea

Kromasil® C4 HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 3.5 µm				
2.1	50	100	K08670363	1 ea
4.6	50	100	K08670365	1 ea
2.1	100	100	K08670361	1 ea
4.6	100	100	K08670364	1 ea
2.1	150	100	K08670362	1 ea
3	150	100	K08670693	1 ea
4.6	150	100	K08670694	1 ea
4.6	75	100	K08670695	1 ea
particle size 5 µm				
4.6	30	100	K08670712	1 ea
2.1	50	100	K08670703	1 ea
3	50	100	K08670698	1 ea
4.6	50	100	K08670713	1 ea
21.2	50	100	K08670707	1 ea
2.1	100	100	K08670701	1 ea
3	100	100	K08670696	1 ea
4.6	100	100	K08670711	1 ea
21.2	100	100	K08670704	1 ea
30	100	100	K08670708	1 ea
2.1	150	100	K08670702	1 ea
3	150	100	K08670697	1 ea
4	150	100	K08670710	1 ea
4.6	150	100	K08670366	1 ea
21.2	150	100	K08670705	1 ea
30	150	100	K08670709	1 ea
4.6	250	100	K08670367	1 ea
10	250	100	K08670700	1 ea
21.2	250	100	K08670706	1 ea
30	250	100	K08971213	1 ea
2.1	50	300	K08670720	1 ea
3	50	300	K08670716	1 ea
4.6	50	300	K08670724	1 ea
2.1	100	300	K08670718	1 ea
3	100	300	K08670714	1 ea
4.6	100	300	K08670722	1 ea
2.1	150	300	K08670719	1 ea
3	150	300	K08670715	1 ea
4.6	150	300	K08670723	1 ea
4.6	250	300	K08670368	1 ea
10	250	300	K08670717	1 ea
21.2	250	300	K08670721	1 ea
particle size 7 µm				
4.6	150	100	K08970963	1 ea
4.6	250	100	K08970968	5 ea
particle size 10 µm				
21.2	100	100	K08670681	1 ea
30	100	100	K08670684	1 ea
4.6	150	100	K08670686	1 ea
21.2	150	100	K08670682	1 ea
30	150	100	K08670685	1 ea
10	250	100	K08670680	1 ea
21.2	250	100	K08670683	1 ea

Kromasil® HILIC-D HPLC Column

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I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 5 µm				
2.1	50	60	K08971260	1 ea
2.1	100	60	K08971261	1 ea
2.1	150	60	K08971262	1 ea
3.0	50	60	K08971263	1 ea
3.0	100	60	K08971264	1 ea
3.0	150	60	K08971265	1 ea
4.6	50	60	K08971266	1 ea
4.6	100	60	K08971267	1 ea
4.6	150	60	K08971268	1 ea
4.6	250	60	K08971269	1 ea
10	250	60	K08971270	1 ea
21.2	250	60	K08971271	1 ea
30	250	60	K08971272	1 ea

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Kromasil® HPLC Columns: *Kromasil® HPLC Columns*

Kromasil® Silica HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 3.5 µm				
4.6	50	100	K08670441	1 ea
2.1	100	100	K08670437	1 ea
4.6	100	100	K08670439	1 ea
3	50	100	K08971222	1 ea
2.1	150	100	K08670438	1 ea
4.6	150	100	K08670440	1 ea
particle size 5 µm				
2.1	50	60	K08670476	1 ea
3	50	60	K08670472	1 ea
4.6	50	60	K08670483	1 ea
2.1	100	60	K08670474	1 ea
3	100	60	K08970903	1 ea
4.6	100	60	K08670480	1 ea
30	100	60	K08670470	1 ea
2.1	150	60	K08670475	1 ea
3	150	60	K08670471	1 ea
4.6	150	60	K08670481	1 ea
21.2	150	60	K08670477	1 ea
4.6	250	60	K08670482	1 ea
10	250	60	K08670473	1 ea
21.2	250	60	K08670478	1 ea
30	250	60	K08971209	1 ea
2.1	50	100	K08670448	1 ea
3	50	100	K08670444	1 ea
4.6	50	100	K08670461	1 ea
21.2	50	100	K08670452	1 ea
2.1	100	100	K08670446	1 ea
3	100	100	K08670442	1 ea
4.6	100	100	K08670457	1 ea
21.2	100	100	K08670449	1 ea
2.1	150	100	K08670447	1 ea
3	150	100	K08670443	1 ea
4.6	150	100	K08670458	1 ea
21.2	150	100	K08670450	1 ea
4	200	100	K08670455	1 ea
4	250	100	K08670456	1 ea
4.6	250	100	K08670381	1 ea
10	250	100	K08670445	1 ea
21.2	250	100	K08670451	1 ea
30	250	100	K08971212	1 ea
4.6	300	100	K08670460	1 ea
2.1	50	300	K08670497	1 ea
3	50	300	K08670493	1 ea
4.6	50	300	K08670417	1 ea
2.1	100	300	K08670495	1 ea
3	100	300	K08670491	1 ea
4.6	100	300	K08670499	1 ea
2.1	150	300	K08670496	1 ea
3	150	300	K08670492	1 ea
4.6	150	300	K08670415	1 ea
4.6	250	300	K08670416	1 ea

Kromasil® Cyano HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 5 µm				
2.1	50	60	K08670815	1 ea
3	50	60	K08670811	1 ea
4.6	50	60	K08670824	1 ea
21.2	50	60	K08670818	1 ea
2.1	100	60	K08670813	1 ea
3	100	60	K08670809	1 ea
4.6	100	60	K08670821	1 ea
21.2	100	60	K08670816	1 ea
2.1	150	60	K08670814	1 ea
3	150	60	K08670810	1 ea
4.6	150	60	K08670377	1 ea
21.2	150	60	K08971205	1 ea
30	150	60	K08670820	1 ea
4.6	200	60	K08670822	1 ea
4.6	250	60	K08670823	1 ea
10	250	60	K08670812	1 ea
21.2	250	60	K08670817	1 ea
30	250	60	K08670819	1 ea
particle size 10 µm				
4.6	150	60	K08670802	1 ea
4.6	250	60	K08670803	1 ea
10	250	60	K08670800	1 ea
21.2	250	60	K08670801	1 ea
30	250	60	K08970988	1 ea
50	250	60	K08670804	1 ea
particle size 16 µm				
4.6	150	60	K08670806	1 ea
4.6	250	60	K08670807	1 ea
10	250	60	K08670805	1 ea
50	250	60	K08670808	1 ea

Kromasil® Diol HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 5 µm				
2.1	50	60	K08670841	1 ea
3	50	60	K08670837	1 ea
4.6	50	60	K08670846	1 ea
2.1	100	60	K08670839	1 ea
3	100	60	K08670835	1 ea
4.6	100	60	K08670844	1 ea
2.1	150	60	K08670840	1 ea
3	150	60	K08670836	1 ea
4.6	150	60	K08670378	1 ea
21.2	150	60	K08670842	1 ea
4.6	250	60	K08670845	1 ea
10	250	60	K08670838	1 ea
21.2	250	60	K08670843	1 ea
30	250	60	K08971208	1 ea
particle size 10 µm				
4.6	150	60	K08670827	1 ea
4.6	250	60	K08670828	1 ea
10	250	60	K08670825	1 ea
21.2	250	60	K08670826	1 ea
30	250	60	K08970990	1 ea
50	250	60	K08670829	1 ea

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Kromasil® HPLC Columns: *Kromasil® HPLC Columns*

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 16 µm				
4.6	150	60	K08670832	1 ea
4.6	250	60	K08670833	1 ea
10	250	60	K08670830	1 ea
21.2	250	60	K08670831	1 ea
50	250	60	K08670834	1 ea

Kromasil® NH_2 HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 3.5 µm				
4.6	100	100	K08670858	1 ea
4.6	150	100	K08670859	1 ea
particle size 5 µm				
2.1	50	100	K08670866	1 ea
3	50	100	K08670862	1 ea
4.6	50	100	K08670870	1 ea
2.1	100	100	K08670864	1 ea
3	100	100	K08670860	1 ea
4.6	100	100	K08670868	1 ea
2.1	150	100	K08670865	1 ea
3	150	100	K08670861	1 ea
4.6	150	100	K08670869	1 ea
4.6	250	100	K08670343	1 ea
10	250	100	K08670863	1 ea
21.2	250	100	K08670867	1 ea
30	250	100	K08971210	1 ea
particle size 10 µm				
4.6	150	100	K08670850	1 ea
4.6	250	100	K08670851	1 ea
10	250	100	K08670847	1 ea
21.2	250	100	K08670848	1 ea
30	250	100	K08970989	1 ea
50	250	100	K08670852	1 ea
particle size 16 µm				
4.6	150	100	K08670855	1 ea
4.6	250	100	K08670856	1 ea
10	250	100	K08670853	1 ea
21.2	250	100	K08670854	1 ea
50	250	100	K08670857	1 ea

Kromasil® Phenyl HPLC Column

available only in USA, Canada and Puerto Rico

I.D. (mm)	L (mm)	Pore Size (Å)	Cat. No.	Qty
particle size 5 µm				
2.1	50	100	K08670887	1 ea
3	50	100	K08670883	1 ea
4.6	50	100	K08670893	1 ea
2.1	100	100	K08670885	1 ea
3	100	100	K08670881	1 ea
4.6	100	100	K08670891	1 ea
21.2	100	100	K08670888	1 ea
2.1	150	100	K08670886	1 ea
3	150	100	K08670882	1 ea
4	150	100	K08670890	1 ea
4.6	150	100	K08670892	1 ea
21.2	150	100	K08970924	1 ea
4.6	250	100	K08670379	1 ea
10	250	100	K08670884	1 ea
21.2	250	100	K08670889	1 ea
30	250	100	K08971211	1 ea
particle size 10 µm				
4.6	150	100	K08670873	1 ea
4.6	250	100	K08670874	1 ea
10	250	100	K08670871	1 ea
21.2	250	100	K08670872	1 ea
30	250	100	K08970991	1 ea
50	250	100	K08670875	1 ea
particle size 16 µm				
4.6	150	100	K08670878	1 ea
4.6	250	100	K08670879	1 ea
10	250	100	K08670876	1 ea
21.2	250	100	K08670877	1 ea
50	250	100	K08670880	1 ea

Kromasil® Guard Cartridges, Starter Kits, Holders, and Couplers

Kromasil® C18 Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm
pore size ..... 100 Å

Description	Cat. No.	Qty
use to protect 2.1 mm I.D. columns	K08970942	5 ea
use to protect 3.0 - 4.6 mm I.D. columns	K08970943	5 ea
use to protect 10 mm I.D. columns	K08970944	5 ea
use to protect 21.2 mm I.D. columns	K08970945	5 ea

Kromasil® C8 Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm
pore size ..... 100 Å

Description	Cat. No.	Qty
use to protect 2.1 mm I.D. columns	K08970936	1 ea
use to protect 3.0 - 4.6 mm I.D. columns	K08970937	1 ea
use to protect 10 mm I.D. columns	K08970938	1 ea
use to protect 21.2 mm I.D. columns	K08970939	1 ea

Kromasil® C4 Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm
pore size ..... 100 Å

Description	Cat. No.	Qty
use to protect 2.1 mm I.D. columns	K08970930	5 ea
use to protect 3.0 - 4.6 mm I.D. columns	K08970931	5 ea
use to protect 10 mm I.D. columns	K08970932	5 ea
use to protect 21.2 mm I.D. columns	K08970933	5 ea

Kromasil® HILIC-D Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm

Description	Cat. No.	Qty
use to protect 2.1mm ID columns	K08971273	5 ea
use to protect 3.0 - 4.6 mm ID columns	K08971275	5 ea
use to protect 10 - 21.2 mm ID columns	K08971277	5 ea

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Kromasil® HPLC Columns: *Kromasil® Guard Cartridges, Starter Kits, Holders, and Couplers*

Kromasil® HILIC-D Guard Cartridge Starter Kit

Kit includes 5 guard cartridges, guard cartridge holder, and coupler

phase ..... HILIC-D
L ..... 10 mm
particle size ..... 5 µm

Description	Cat. No.	Qty
use to protect 2.1 mm I.D. columns	K08971274	5 ea
use to protect 3.0 - 4.6 mm I.D. columns	K08971276	5 ea

Kromasil® Silica Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm
pore size ..... 100 Å

Description	Cat. No.	Qty
use to protect 2.1 mm I.D. columns	K08970948	5 ea
use to protect 3.0 - 4.6 mm I.D. columns	K08970949	5 ea
use to protect 10 mm I.D. columns	K08970950	5 ea
use to protect 21.2 mm I.D. columns	K08970951	5 ea

Kromasil® Guard Cartridge Starter Kit

Kit includes 5 guard cartridges, guard cartridge holder, and coupler

L 10mm
particle size ..... 5 µm

Description	Cat. No.	Qty
phase C18, use to protect 2.1 mm I. D. columns	K08970946	1 kit
phase C18, use to protect 3.0 - 4.6 mm I.D. columns	K08970947	1 kit
phase C4, use to protect 2.1 mm I.D. columns	K08970934	1 kit
phase C4, use to protect 3.0 - 4.6 mm I.D. columns	K08970935	1 kit
phase C8, use to protect 2.1 mm I.D. columns	K08970940	1 kit
phase C8, use to protect 3.0 - 4.6 mm I.D. columns	K08970941	1 kit
phase Chiral CelluCoat®, use to protect 3.0 - 4.6 mm I.D columns	K08971109	1 kit
phase Silica, use to protect 2.1 mm I. D. columns	K08970952	1 kit
phase Silica, use to protect 3.0 - 4.6 mm I.D. columns	K08970953	1 kit
phase Chiral AmyCoat®, use to protect 3.0 - 4.6 mm I.D. columns	K08971105	1 kit

Kromasil® Guard Cartridge Holder

Description	Cat. No.	Qty
for use with 2.1 - 4.6 mm I.D. x 10 mm L guard cartridge	K08970954	1 ea
for use with 10 - 21.2 mm I.D. x 10 mm L guard cartridge	K08970956	1 ea

Kromasil® Guard Cartridge Coupler

Description	Cat. No.	Qty
for use with 2.1 - 4.6 mm I.D. x 10 mm L guard cartridge	K08970955	1 ea
for use with 10 - 21.2 mm I.D. x 10 mm L guard cartridge	K08970957	1 ea

Kromasil® Eternity HPLC Columns

Kromasil Eternity™ is the new platform for chromatography with extended chemical stability at any pH between pH 1 and pH 12. Kromasil Eternity is the natural choice for the separation of ionic substances.

Kromasil® Eternity™ PhenylHexyl HPLC Column

suitable for L11 per USP

available only in USA, Canada and Puerto Rico

loading ..... 12% Carbon
phase 6-phenylhexyl
surface area ..... 330 m^2/g
pH-range ..... 2 - 12

I.D. (mm)	L (mm)	Cat. No.	Qty
particle size 2.5 µm			
2.1	50	K08971231	1 ea
4.6	50	K08971233	1 ea
2.1	100	K08971232	1 ea
4.6	100	K08971234	1 ea
particle size 5 µm			
2.1	50	K08971235	1 ea
3.0	50	K08971237	1 ea
4.6	50	K08971241	1 ea
10	50	K08971245	1 ea
21.2	50	K08971248	1 ea
30	50	K08971251	1 ea
3.0	100	K08971238	1 ea
4.6	100	K08971242	1 ea
2.1	150	K08971236	1 ea
3.0	150	K08971239	1 ea
4.6	150	K08971243	1 ea
10	150	K08971246	1 ea
21.2	150	K08971249	1 ea
30	150	K08971252	1 ea
3.0	250	K08971240	1 ea
4.6	250	K08971244	1 ea
10	250	K08971247	1 ea
21.2	250	K08971250	1 ea
30	250	K08971253	1 ea

Kromasil® Eternity™ PhenylHexyl Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm
pore size ..... 100 Å

Description	Cat. No.	Qty
use to protect (2.1mm id column)	K08971254	5 ea
use to protect (3.0-4.6mm id column)	K08971256	5 ea
use to protect (2.1mm id column)	K08971255	5 ea
use to protect (3.0-4.6mm id columns)	K08971257	5 ea
use to protect (10-21.2mm id columns)	K08971258	5 ea
use to protect (30mm id columns)	K08971259	5 ea

Kromasil® Eternity™ C18 HPLC Column

suitable for L1 per USP

available only in USA, Canada and Puerto Rico

loading ..... 14% Carbon
phase C18
surface area ..... 330 m^2/g
pH-range ..... 1 - 12

HPLC for Small Molecules

Kromasil® HPLC Columns: *Kromasil® Eternity HPLC Columns*

I.D. (mm)	L (mm)	Cat. No.	Qty
particle size 5 µm			
2.1	50	K08670898	1 ea
3	50	K08971110	1 ea
4.6	50	K08670900	1 ea
10	50	K08670420	1 ea
21.2	50	K08670423	1 ea
30	50	K08670426	1 ea
3	100	K08971111	1 ea
4.6	100	K08670901	1 ea
2.1	150	K08670899	1 ea
3	150	K08971112	1 ea
4.6	150	K08670902	1 ea
10	150	K08670421	1 ea
21.2	150	K08670424	1 ea
30	150	K08670427	1 ea
3	250	K08971113	1 ea
4.6	250	K08670903	1 ea
10	250	K08670422	1 ea
21.2	250	K08670425	1 ea
30	250	K08670428	1 ea
particle size 2.5 µm			
2.1	50	K08670894	1 ea
4.6	50	K08670896	1 ea
2.1	100	K08670895	1 ea
4.6	100	K08670897	1 ea

Kromasil® Eternity™ C18 Guard Cartridge

L ..... 10 mm
particle size ..... 5 µm
pore size ..... 100 Å

Description	Cat. No.	Qty
use to protect 2.1mm ID columns	K08971215	5 ea
use to protect 2.1mm id columns	K08971216	5 ea
use to protect 3.0 - 4.6mm id columns	K08971217	5 ea
use to protect 3.0 - 4.6 mm id columns	K08971218	5 ea
use to protect 10mm id columns	K08971219	5 ea
use to protect 21.2mm id columns	K08971220	5 ea
use to protect 30mm id columns	K08971221	5 ea

Kromasil® Bulk Silica

High performance Kromasil bulk products can be used in all commercial industrial HPLC, SFC, and SMB systems. Obtain the same mechanical stability, chemical stability, selectivity, superior loadibility and scaling ability whether using Kromasil packed in an analytical column or process scale column.

Kromasil® C18, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	100	K08670382	500 g
		K08971149	1 kg
		K08971180	2 kg
10	300	K08971124	500 g
		K08971155	1 kg
		K08971186	2 kg
13	100	K08971129	500 g
		K08971160	1 kg
		K08971191	2 kg
16	100	K08971136	500 g
		K08971167	1 kg
		K08971198	2 kg
16	300	K08971142	500 g
		K08971173	1 kg
		K08971204	2 kg

Kromasil® C8, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	100	K08971118	500 g
		K08971148	1 kg
		K08971179	2 kg
10	300	K08971123	500 g
		K08971154	1 kg
		K08971185	2 kg
13	100	K08971128	500 g
		K08971159	1 kg
		K08971190	2 kg
16	100	K08971135	500 g
		K08971166	1 kg
		K08971197	2 kg
16	300	K08971141	500 g
		K08971172	1 kg
		K08971203	2 kg

Kromasil® Silica, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	60	K08670383	500 g
		K08971143	1 kg
		K08971174	2 kg
10	100	K08971116	500 g
		K08971146	1 kg
		K08971177	2 kg
10	300	K08971121	500 g
		K08971152	1 kg
		K08971183	2 kg
13	60	K08971125	500 g
		K08971156	1 kg
		K08971187	2 kg
13	100	K08971126	500 g
		K08971157	1 kg
		K08971188	2 kg
16	60	K08971130	500 g
		K08971161	1 kg
		K08971192	2 kg
16	100	K08971133	500 g
		K08971164	1 kg
		K08971195	2 kg

HPLC for Small Molecules

Kromasil® HPLC Columns: *Kromasil® Bulk Silica*

Kromasil® Silica, Bulk *(continued)*

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
16	300	K08971139	500 g
		K08971170	1 kg
		K08971201	2 kg

Kromasil® C4, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	100	K08971117	500 g
		K08971147	1 kg
		K08971178	2 kg
10	300	K08971122	500 g
		K08971153	1 kg
		K08971184	2 kg
13	100	K08971127	500 g
		K08971158	1 kg
		K08971189	2 kg
16	100	K08971134	500 g
		K08971165	1 kg
		K08971196	2 kg
16	300	K08971140	500 g
		K08971171	1 kg
		K08971202	2 kg

Kromasil® NH_2, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	100	K08971119	500 g
		K08971150	1 kg
		K08971181	2 kg
16	100	K08971137	500 g
		K08971168	1 kg
		K08971199	2 kg

Kromasil® Phenyl, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	100	K08971120	500 g
		K08971151	1 kg
		K08971182	2 kg
16	100	K08971138	500 g
		K08971169	1 kg
		K08971200	2 kg

Kromasil® Cyano, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	60	K08971114	500 g
		K08971144	1 kg
		K08971175	2 kg
16	60	K08971131	500 g
		K08971162	1 kg
		K08971193	2 kg

Kromasil® Diol, Bulk

available only in USA, Canada and Puerto Rico

Particle Size (µm)	Pore Size (Å)	Cat. No.	Qty
10	60	K08971115	500 g
		K08971145	1 kg
		K08971176	2 kg
16	60	K08971132	500 g
		K08971163	1 kg
		K08971194	2 kg

Guard Cartridge Accessories

Guard Column Holders

Clockwise, Upper Left: 55205, 504254, 567499-U, 54987, 59660-U

Use these guard column holders with the 2 cm guard cartridges listed on the previous pages.

The direct-connect holders allow a guard cartridge to attach to a Supelco modular column with no dead volume.

The direct-connect holders can only be used with Supelco modular columns.

The swivel-type holders allow the tubing to move independently of the holder, reducing the risk of leaks caused by crimped tubing.

The stand-alone holders include the necessary tubing, nuts, and ferrules for connecting to any analytical column.

Holders for Supelco® Guard Cartridges

Use these guard column holders withSupelguard™cartridges. The Direct-Connect holders allow a guard cartridge to attach to a Supelco modular column with no dead volume. The Direct-Connect holders can only be used with Supelco modular columns. The Swivel-type holders allow the tubing to move independently of the holder, reducing the risk of leaks caused by crimped tubing. The Stand-Alone holders include the necessary tubing, nuts and ferrules for connecting to any analytical columns

Compatibility	Cat. No.	Qty
Supelguard™ Guard Cartridge Holder		
Supelguard cartridges (2 cm L. x 2.1 mm I.D.)	504262	1 ea
Supelguard cartridges (2 cm L. x 3 to 4.6 mm I.D.)	504254	1 ea
Supelguard cartridge (2 cm L. x 3 to 4.6 mm I.D.)	55205	1 ea
Supelguard cartridges (2 cm L. x 2.1 to 4.6 mm I.D.)	59660-U	1 ea
Supelguard cartridges (1 cm L. x 10.0 mm I.D.)	567499-U	1 ea
Stand-Alone Holder		
Pelliguard Cartridges	500054	1 ea
Supelguard™ Guard Cartridge Holder		
Supelguard cartridges (1 cm L. x 21.2 mm I.D.)	581392-U	1 ea

HPLC for Small Molecules

Guard Cartridge Accessories: *Guard Column Holders*

Holders for TSKgel® Guard Cartridges

Compatibility	Cat. No.	Qty
Holder for TSKgel® Super Series Guardfilters		
-	818206	1 ea

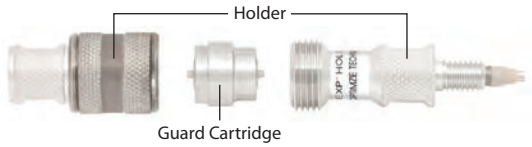
Discovery® ZR Column Holder

Compatibility	Cat. No.	Qty
Discovery® ZR Column Holder		
Discovery ZR Columns	65621-U	1 ea

Helpful Hints

Before flushing a reversed-phase HPLC column that contains a buffer (salt), flush with warm (60 °C) DI H_2O) thoroughly to remove salts. Not following this general rule may result in salt precipitation when returned to 100% organic for long-term storage. For more information, refer to literature T401012, Buffered Mobile Phases in Reversed-Phase Liquid Chromatography.

Ascentis® Express Guard Cartridge Holder



Ascentis® Express Guard Cartridge Holder

Guard cartridge not included with holder

Compatibility	Cat. No.	Qty
Ascentis® Express Guard Cartridge Holder		
Ascentis Express Guard Columns	53500-U	1 ea

Pelliguard™ Guard Cartridges

Pelliguard™ Cartridge Kit

For 5 µm, 10 µm, or 12 µm SUPELCOSIL and other silica-based HPLC columns, where samples are especially dirty, and a small loss of efficiency is acceptable. Each kit contains one cartridge (2 cm × 4.6 mm I.D.) filled with 40 µm Pelliguard packing, a reusable stand-alone column holder, and hardware for connecting the holder to 1/16 inch tubing.

diameter ..... 40 µm

Description	For Use With	Cat. No.	Pkg
LC-Si	Silica	59641	1 kit
LC-8	C8	59643	1 kit
LC-18	C18	59644	1 kit
LC-NH_2	Amino	59646	1 kit

Pelliguard™ Cartridge

For 5 µm, 10 µm, or 12 µm SUPELCOSIL and other silica-based HPLC columns, where samples are especially dirty, and a small loss of efficiency is acceptable. Cartridges come in packages of four.

L × I.D. ..... 2 cm × 4.6 mm

Description	For Use With	Cat. No.	Pkg
LC-Si	Silica	59651	4 ea
LC-NH_2	Amino	59656	4 ea
LC-8	C8	59653	4 ea
LC-18	C18	59654	4 ea

Stand-Alone Holder

	Cat. No.	Qty
Stand-Alone Holder		
-	500054	1 ea

Bulk Pellicular Packing Kits

Pellicular Packing

Reusable 5 cm × 4.6 mm I.D. guard column hardware and 40 µm pellicular packing, for protecting 10 µm columns. Each column kit contains an empty 5 cm × 4.6 mm I.D. column, 10 g of Pelliguard packing, 10 frits, and hardware for connecting the column to 1/16 in. tubing. About 1.3 grams of packing is needed to pack one 5 cm × 4.6 mm column.

diameter ..... 40 µm

Description	Use To Protect	Cat. No.	Pkg
LC-8	C8	58222-U	1 kit
LC-8	C8	58293	10 g
LC-18	C18	58232	1 kit
LC-18	C18	58294	10 g

Guard Column Hardware Kit

Guard Column Hardware Kit, Frits, Funnel and Tubing

Kit includes 5 cm × 4.6 mm I.D. column, end fittings, 2 frits (2.0 µm pores), and 2 in./5 cm of 0.01 in. I.D. × 1/16 in. O.D. SS tubing. Funnel connects to column with tygon tubing (included) for easier column filling.

Description	Cat. No.	Qty
Guard Column Hardware Kit	58319	1 kit
Column Frits	58264	10 ea
Funnel and Tubing	20390-U	1 ea

Guard Column Hardware kit

HPLC for Small Molecules

Legacy Columns

Legacy Columns

alphaBond™ HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
alphaBond™ C18			
10	15 cm × 3.9 mm	57488	1 ea
10	30 cm × 3.9 mm	57489	1 ea
alphaBond™ C18 Guard			
10	1 cm × 4.6 mm	57490-U	4 ea

Exsil™ HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase ODS			
5	25 cm × 4.6 mm	50101-U	1 ea

Inertsil® HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase ODS2			
5	12.5 cm × 4.0 mm	50102-U	1 ea
5	15 cm × 4.6 mm	50103-U	1 ea
5	25 cm × 4.6 mm	50108-U	1 ea

LiChrospher® HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase RP-18			
5	15 cm × 3.2 mm	54775	1 ea
5	25 cm × 3.2 mm	54777	1 ea
5	15 cm × 4.6 mm	54774	1 ea
5	25 cm × 4.6 mm	54776	1 ea
5	12.5 cm × 4.6 mm	50136-U	1 ea
5	25 cm × 4.0 mm	50137-U	1 ea
5	25 cm × 4.6 mm	50139-U	1 ea
phase RP-8			
5	15 cm × 4.6 mm	54778	1 ea
5	25 cm × 4.6 mm	54780	1 ea
5	12.5 cm × 4.6 mm	50140-U	1 ea
5	12.5 cm × 4.0 mm	50141-U	1 ea
5	25 cm × 4.0 mm	50143-U	1 ea
phase CN			
5	25 cm × 4.6 mm	54788	1 ea
5	12.5 cm × 4.0 mm	50131-U	1 ea
phase NH2			
5	25 cm × 3.2 mm	54785	1 ea
5	15 cm × 4.6 mm	54782	1 ea
5	25 cm × 4.6 mm	54784	1 ea
5	30 cm × 4.0 mm	50132-U	1 ea
phase Si-60			
5	25 cm × 4.6 mm	54792	1 ea
5	15 cm × 4.6 mm	54790-U	1 ea
phase 60RP-Select B			
5	12.5 cm × 4.0 mm	50146-U	1 ea
5	25 cm × 4.6 mm	50148-U	1 ea

LiChrospher® Guard Cartridge

For all guard cartridges listed here use holder 54987

Description	Cat. No.	Qty
phase RP18, particle size 5 µm, L 1 cm × I.D. 4.6 mm	54794	4 ea
phase CN, particle size 5 µm, L 1 cm × I.D. 4.6 mm	54798	4 ea
phase NH2, particle size 5 µm, L 1 cm × I.D. 4.6 mm	54796-U	4 ea
phase Si60, particle size 5 µm, L 1 cm × I.D. 4.6 mm	54797-U	4 ea

LiChrosorb® HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase RP-18			
5	15 cm × 3.2 mm	54952	1 ea
5	25 cm × 4.6 mm	54949	1 ea
5	10 cm × 4.6 mm	50124-U	1 ea
10	20 cm × 4.6 mm	50125-U	1 ea
phase C18			
5	15 cm × 4.6 mm	54951	1 ea
phase RP-8			
5	15 cm × 4.6 mm	54955-U	1 ea
5	25 cm × 4.6 mm	54953-U	1 ea
7	25 cm × 4.6 mm	50130-U	1 ea
10	25 cm × 4.6 mm	50129-U	1 ea
phase CN			
10	25 cm × 4.0 mm	50121-U	1 ea
10	25 cm × 4.6 mm	50117-U	1 ea
phase Diol			
5	25 cm × 4.0 mm	50122-U	1 ea
phase Si60			
5	25 cm × 4.6 mm	50112-U	1 ea

LiChrosorb® Guard Cartridges

For all guard cartridges listed here use holder 54987

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase RP18			
5	1 cm × 4.6 mm	54965-U	4 ea
phase RP8			
5	1 cm × 4.6 mm	54966	4 ea

Nucleosil® HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase C18			
3	10 cm × 3.2 mm	54917	1 ea
3	10 cm × 4.0 mm	50178-U	1 ea
3	7.5 cm × 4.6 mm	50179-U	1 ea
3	10 cm × 4.6 mm	Z226165	1 ea
3	15 cm × 4.6 m	50159-U	1 ea
5	15 cm × 3.2 mm	54918	1 ea
5	25 cm × 3.2 mm	54919	1 ea
5	12.5 cm × 4.0 mm	50165-U	1 ea
5	10 cm × 4.6 mm	50161-U	1 ea
5	10 cm × 4.6 mm	50181-U	1 ea
5	12.5 cm × 4.6 mm	50164-U	1 ea
5	12.5 cm × 4.6 mm	50184-U	1 ea
5	15 cm × 4.6 mm	50188-U	1 ea
5	25 cm × 4.6 mm	Z226181	1 ea

HPLC for Small Molecules

Legacy Columns

Particle Size (µm)	L × I.D.	Cat. No.	Qty
5	25 cm × 4.6 mm	50189-U	1 ea
5	25 cm × 4.0 mm	50166-U	1 ea
phase C18 EXCEL			
5	15 cm × 4.0 mm	50191-U	1 ea
phase C18			
10	20 cm × 4.0 mm	50151-U	1 ea
5	15 cm × 4.6 mm	Z226173	1 ea
10	25 cm × 4.6 mm	50152-U	1 ea
10	25 cm × 4.6 mm	50177-U	1 ea
phase C8			
3	10 cm × 4.6 mm	Z226203	1 ea
5	25 cm × 3.2 mm	54922	1 ea
5	15 cm × 4.6 mm	Z226211	1 ea
5	25 cm × 4.6 mm	Z226238	1 ea
10	25 cm × 4.0 mm	50154-U	1 ea
phase Phenyl			
7	25 cm × 4.6 mm	Z226246	1 ea
phase CN			
5	15 cm × 3.2 mm	54924	1 ea
5	15 cm × 4.6 mm	Z226254	1 ea
5	25 cm × 4.6 mm	Z226262	1 ea
5	10 cc × 4.6 mm	50171-U	1 ea
phase Si			
5	15 cm × 4.6 mm	Z226149	1 ea
5	25 cm × 4.6 mm	Z226157	1 ea
phase NH2			
5	15 cm × 3.2 mm	54926	1 ea
5	25 cm × 4.6 mm	Z226289	1 ea
phase SA			
5	10 cm × 2.1 mm	50172-U	1 ea
5	15 cm × 4.6 mm	50173-U	1 ea
5	25 cm × 4.6 mm	50174-U	1 ea
10	25 cm × 4.6 mm	50157-U	1 ea
phase SB			
5	25 cm × 4.6 mm	50175-U	1 ea
5	5 cm × 4.6 mm	50176-U	1 ea

Nucleosil® Guard Column

For all guard cartridges listed here use holder 54987

Particle Size (µm)	L × I.D.	Cat. No.	Qty
5	1 cm × 4.6 mm	Z227137	4 ea
Nucleosil® C8			
5	1 cm × 4.6 mm	Z227145	4 ea
5	1 cm × 4.6 mm	Z227129	4 ea
7	1 cm × 4.6 mm	Z227153	4 ea

Partisil™ HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase 5 ODS3			
5	10 cm × 4.6 mm	50204-U	1 ea
phase 5 ODS			
5	15 cm × 4.6 mm	50207-U	1 ea
5	25 cc × 4.6 mm	50208-U	1 ea
phase 10 ODS			
10	25 cm × 4.6 mm	50192-U	1 ea
phase 10 SAX			
10	25 cm × 4.6 mm	50193-U	1 ea
phase 10 SCX			
10	25 cm × 4.6 mm	50197-U	1 ea
phase Silica			
5	25 cm × 4.6 mm	50201-U	1 ea

Spherisorb® HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase ODS1			
5	12.5 cm × 4.6 mm	50231-U	1 ea
5	15 cm × 4.6 mm	50233-U	1 ea
5	25 cm × 4.6 mm	50234-U	1 ea
5	25 cm × 3.2 mm	50235-U	1 ea
10	25 cm × 4.6 mm	50221-U	1 ea
10	25 cc × 4.0 mm	50222-U	1 ea
phase ODS2			
5	10 cm × 4.6 mm	50236-U	1 ea
5	15 cm × 4.0 mm	50237-U	1 ea
3	10 cm × 3.2 mm	54903	1 ea
3	10 cm × 4.6 mm	Z226033	1 ea
3	15 cm × 4.6 mm	50223-U	1 ea
5	15 cm × 3.0 mm	54904	1 ea
5	25 cm × 3.2 mm	54905	1 ea
5	15 cm × 4.6 mm	Z226041	1 ea
5	25 cm × 4.6 mm	Z226068	1 ea
phase ODS2 EXCEL			
5	25 cm × 4.6 mm	50238-U	1 ea
phase C8			
5	10 cm × 4.6 mm	54908	1 ea
5	15 cm × 4.6 mm	Z226084	1 ea
5	25 cm × 4.6 mm	Z226092	1 ea
phenyl			
5	25 cm × 4.6 mm	Z226106	1 ea
phase CN			
5	25 cm × 4.6 mm	Z226114	1 ea
5	10 cm × 4.6 mm	50228-U	1 ea
10	25 cm × 4.6 mm	50211-U	1 ea
Silica			
5	15 cm × 3.2 mm	54901	1 ea
5	25 cm × 3.2 mm	54902	1 ea
5	25 cm × 4.6 mm	Z226025	1 ea
phase NH2			
5	25 cm × 3.2 mm	54911-U	1 ea
5	25 cm × 4.6 mm	Z226122	1 ea
phase SAX			
5	25 cm × 4.6 mm	Z226130	1 ea
phase SCX			
5	10 cm × 2.1 mm	50244-U	1 ea
phase C6			
5	15 cm × 4.6 mm	50226-U	1 ea

Spherisorb® Guard Cartridges

For all guard cartridges listed here use holder 54987

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase C18			
5	1 cm × 4.6 mm	Z226971	4 ea
phase C8			
5	1 cm × 4.6 mm	Z226998	4 ea
phase CN			
5	1 cm × 4.6 mm	Z227013	4 ea
phase NH2			
5	1 cm × 4.6 mm	Z227021	4 ea

HPLC for Small Molecules

Legacy Columns

Supersper HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase RP-18			
4	25 cm × 4.0 mm	50245-U	1 ea
phase RP Select B			
4	12.5 cm × 4.0 mm	50248-U	1 ea

Zorbax® HPLC Column

Particle Size (µm)	L × I.D. (cm)	Cat. No.	Qty
phase C8			
7	15 × 4.6	50249-U	1 ea
phase NH2			
5	25 cm × 4.6 mm	50251-U	1 ea
phase ODS			
5	25 cm × 4.6 mm	50254-U	1 ea

Holder and Coupler for Legacy Guard Columns

Compatibility	Cat. No.	Qty
Holder and Coupler for Legacy Guard Columns		
non-Supelco guard cartridges (not TSKgel guard cartridges)	54987	1 ea

Coupler for Legacy Guard Column Holder

Compatibility	Cat. No.	Qty
Coupler for Legacy Guard Column Holder		
Also a replacement connector for stand-alone guard holder (54987) for use with HPLC columns with 1/16", 10-32 thread end-fittings (Used with all Supelco and Astec columns, plus other brands that have the same thread dimensions.)	54986	1 ea

HPLC for Large Molecules

Separation Techniques for Biomolecules

Biomolecules and the matrixes in which they are analyzed are often complex. To accommodate the complexity and maintain biological activity, if required, many different chromatographic techniques have been employed. We have chosen to include in our product offering select columns and media from the major separation modes, including:

- Reversed-phase (RP)
- Size exclusion chromatography (SEC) - Gel filtration chromatography (GFC)
- Size exclusion chromatography (SEC) - Gel permeation chromatography (GPC)
- Ion-exchange chromatography (IEX)
- Hydrophobic interaction chromatography (HIC)
- Affinity chromatography
- Hydrophilic interaction chromatography (HILIC)

Each of these modes and our corresponding products are described in their respective sections that follow.

Look to Supelco for TSKgel columns and Toyopearl packings

In addition to our own proprietary products and other famous brands for bioseparations, we are pleased to be able to offer the well-respected TSKgel columns and Toyopearl packings from Tosoh Corp. If you do not see the Tosoh product you need in this catalog, please contact us.

Column Selection for Biomolecule Separations

Type of Analyte Molecule	Separation Mode	Supelco Columns	TSKgel Columns
Amino Acids	Reversed-phase	Ascentis or Ascentis Express C18	
	Hydrophilic interaction (HILIC)	Ascentis or Ascentis Express Silica	Amide-80
	Enantiomer separation (chiral)	Astec CHIROBIOTIC®	
DNA/RNA	Gel filtration (GFC)	Discovery BIO GFC	G-DNA-PW
	Ion-exchange	Discovery BIO PolyMA-WAX	DNA-STAT, DEAE-NPR
Nucleotides	Reversed-phase	Ascentis or Ascentis Express C18, SUPELCOSIL LC-18-T	
	Ion-exchange	SUPELCOSIL SAX1	DNA-STAT, DEAE-2SW
Nucleosides	Reversed-phase	Ascentis or Ascentis Express C18, SUPELCOSIL LC-18-S	
Nucleobases	Reversed-phase	Ascentis or Ascentis Express C18	
	Ion-exchange	SUPELCOSIL LC-SCX	DNA-STAT, DEAE-2SW
Oligonucleotides	Ion-exchange	Discovery BIO PolyMA-WAX	DNA-STAT, DEAE-5PW
	Reversed-phase	Discovery BIO Wide Pore C18 Ascentis Express Peptide ES C18	Oligo-DNA RP
PCR Fragments	Ion-exchange	Discovery BIO PolyMA-WAX	DNA-STAT, DEAE-NPR
Polymers (Organic-soluble)	Gel permeation (GPC)		H_{HR} and H_{XL} series
Polymers (Water-soluble)	Gel filtration (GFC)		SuperMultiporePW, PW_{XL}, PW, SuperAW, Alpha series
Polymers (Polar organic-soluble)	Gel filtration (GFC)		SuperAW, Alpha series
Proteins, Peptides	Gel filtration (GFC)	Discovery BIO GFC	SuperSW, SW, SW_{XL}, PW, PW_{XL} series
	Desalting		BioAssist DS
	Reversed-phase	Discovery BIO Wide Pore C18, C8, C5 Ascentis Express Peptide ES C18	Phenyl-5PW, Octadecyl-4PW, Octadecyl-NPR, ODS-140HTP
	Anion-exchange (strong)		Q-STAT
	Anion-exchange (weak)	Discovery BIO PolyMA-WAX	DEAE-5PW, DEAE-NPR
	Cation-exchange (strong)		SP-NPR, SP-STAT, SP-5PW
	Cation-exchange (weak)	Discovery BIO PolyMA-SCX	CM-STAT, CM-5PW
	Hydrophobic interaction (HIC)		Butyl-NPR, Ether-5PW, Phenyl-5PW
	Hydrophilic interaction (HILIC)	Ascentis or Ascentis Express Silica	Amide-80
	Affinity		Boronate-5PW, Chelate-5PW, Heparin-5PW, Tresyl-5PW

Discovery® BIO

Introduction to the Discovery® BIO Product Family

Discovery® BIO Wide Pore reversed-phase HPLC columns and capillaries provide sensitive, stable, efficient, reproducible separations of proteins and peptides. The different phase chemistries and separation modes provide unique selectivity, increasing your resolution options. Separations are completely scalable from analytical to preparative. The low-bleed feature along with microbore and capillary dimensions, make them ideal for proteomics and other LC-MS applications.

Discovery BIO PolyMA columns provide efficient, high-recovery, non-denaturing ion-exchange separations of proteins and peptides.

Discovery BIO GFC columns provide high separation capacity size exclusion separations across an extremely wide molecular weight range.

Choosing a Discovery BIO Phase for Samples and Separation Modes

Sample or Usage	Separation Mode	Discovery BIO Product
Proteomics	Reversed-phase	Discovery BIO Wide Pore C18 in 0.18 to 0.5 mm I.D. capillaries
Peptide Mapping/ Proteolytic Digests	Reversed-phase	Discovery BIO Wide Pore C18 Discovery BIO Wide Pore C8
Hydrophobic Peptides	Reversed-phase	Discovery BIO Wide Pore C5
Proteins	Reversed-phase	Discovery BIO Wide Pore C5
Proteins/Peptides	Cation-Exchange	Discovery BIO PolyMA-SCX
Proteins/Peptides	Anion-Exchange	Discovery BIO PolyMA-WAX
Proteins/Peptides	Size Exclusion	Discovery BIO GFC

HPLC for Large Molecules

Discovery® BIO: *The Challenges of Protein and Peptide Separations*

The Challenges of Protein and Peptide Separations

Many of the challenges facing researchers in the proteomics and biopharmaceutical fields are related to the need to obtain as much information as possible on very limited samples. Supelco designed the Discovery® BIO HPLC columns to address these challenges.

Separate Complex Protein or Peptide Mixtures

The selectivity and efficiency offered by Discovery® BIO gives maximum power for resolving complex mixtures of proteins, natural and synthetic peptides, and peptide maps. Exceptional pH stability allows full use of mobile phase pH to adjust the separation.

Small Sample Volumes and Proteins at Low Concentrations or Low Copy Numbers

The efficiency of Discovery® BIO provides sensitive analyses. Many Discovery® BIO products are available in capillary and microbore dimensions.

The Need for Detailed Characterization

Because of the sample complexity, many biomolecule separations are multi-dimensional. Discovery® BIO columns are designed to be compatible with secondary separation or detection methods. If purified sample is required for further characterization, most Discovery® BIO phases are scalable from capillary to preparative, and exhibit high sample recovery.

Large Number of Samples to Analyze

High sample throughput is achievable with the short analysis times provided by Discovery® BIO in small particles and short columns.

Trouble-Free Operation

The stability and reproducibility of Discovery® BIO phases permit reliable, trouble-free routine and long term operation.

Improved Selectivity

Discovery® BIO Wide Pore phases have different selectivity than other reversed-phase columns, which can increase the resolution of natural and synthetic peptide mixtures.

Solid phase synthesis is a common method to obtain novel peptides quickly and efficiently. Unintended side reactions are common and the RP-HPLC method must be capable of separating the peptides from unwanted by-products. Discovery® BIO Wide Pore columns are ideal for this application. The figure below illustrates the improved resolution of a mixture of synthetic peptides on a Discovery® BIO Wide Pore C18 column versus a competitive C18 column.

Improved Selectivity of Discovery® BIO Wide Pore RP Phases

application for HPLC

compound class: peptides

column ..... Discovery BIO Wide Pore C18, 15 cm x 4.6 mm I.D., 5 µm particles (568222-U) vs. competitive wide pore C18 column of same dimensions

mobile phase ..... A: 0.1% TFA in 80:20 water:acetonitrile
B: 0.1% TFA in 66:34 water:acetonitrile
Gradient of 0 to 100% B in 14 min. after 1 min. delay

flow rate ..... 1 mL/min

column temp. ..... 30 °C

detector ..... UV at 220 nm

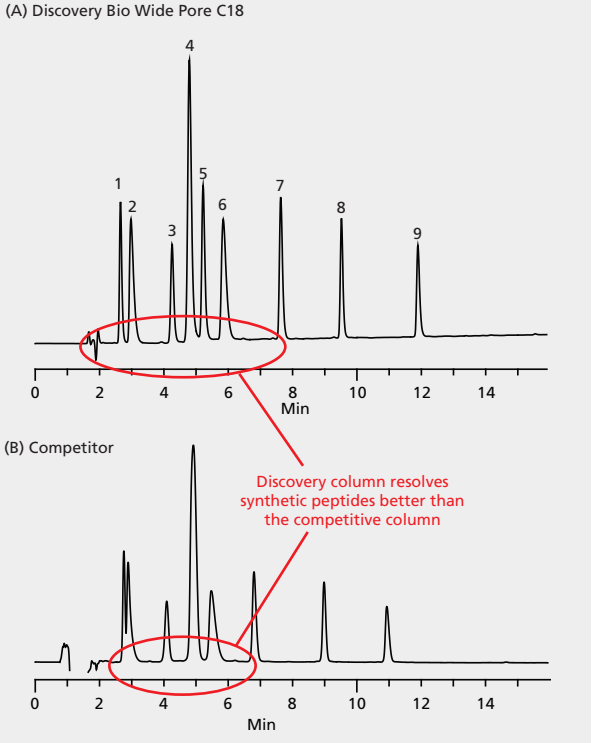
injection ..... 10 µL

sample ..... peptide mixture (Sigma P2693), ~0.25 µg each peptide in 0.1% TFA

Application No. G004415

Peak Peptide	Amino Acid Sequence
1. Arg⁸-vassopressin	CYFQNCPRG-amide; disulfide
2. Bradykinin, fragment 1-5	RPPGF
3. Oxytocin	CYIQNCPLG-amide; disulfide
4. LHRH*	pEHWSYGLRPG-Amide**
5. Met-enkephalin	YGGFM
6. Bradykinin	RPPGFSPFR
7. Leu-enkephalin	YGGFL
8. Bombesin	pEQRLGNQWAVGHLM-amide**
9. Substance P	RPKPQQFFGLM-amide

*Luteinizing Hormone Releasing Hormone
**pE is pyroglutamate



HPLC for Large Molecules

Discovery® BIO: *LC-MS Sensitivity: No TFA Needed*

LC-MS Sensitivity: No TFA Needed

Discovery® BIO Wide Pore phases improve sensitivity by giving symmetrical, efficient peaks without TFA-containing mobile phases.

TFA (trifluoroacetic acid) is a commonly used mobile phase additive for reversed-phase HPLC (RP-HPLC) separations of proteins and peptides. However, TFA interferes with and significantly reduces the LC-MS signal, lowering sensitivity. The ideal column for modern LC-MS analysis should provide symmetrical peak shape without TFA in the mobile phase. The highly inert surface of Discovery® BIO silica results in columns that give symmetrical and efficient peaks for peptides without TFA for maximum LC-MS sensitivity.

While TFA has little effect on UV detection, it has serious disadvantages for LC-MS detection. First, typical concentrations of TFA (0.1% v/v) have high surface tension and prevent efficient spray formation (nebulization). Second, TFA ions in the gas phase to run ion-pairs with the basic groups on the peptide suppressing their ionization and reducing sensitivity.

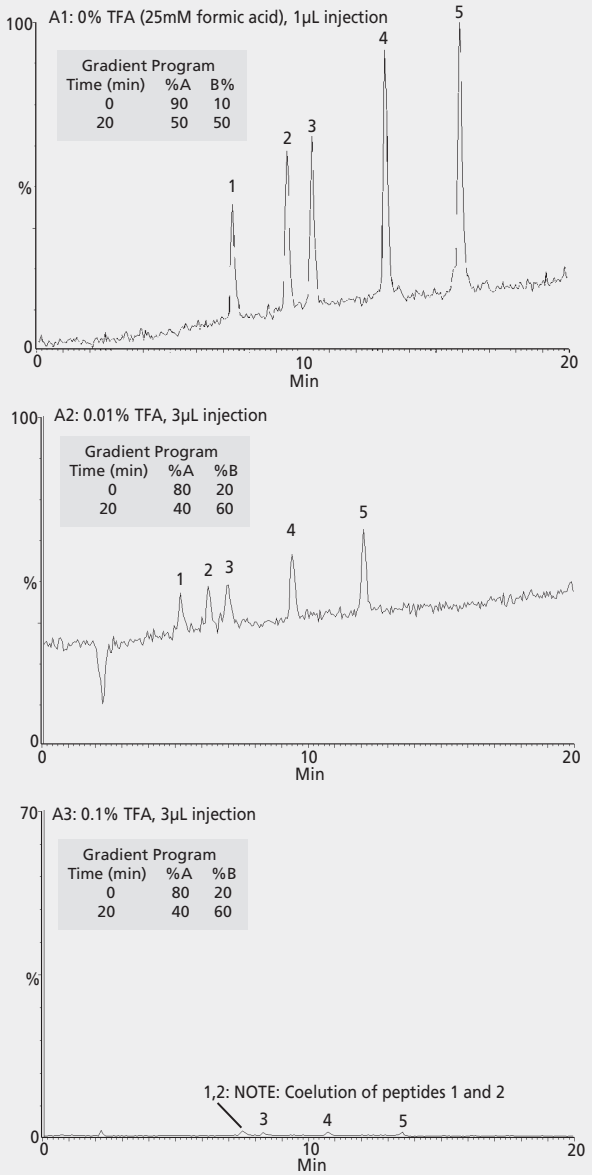
A demonstration of the adverse effect of TFA on LC-MS sensitivity is shown in the following figure. Without TFA, the MS is able to detect much lower concentrations of these peptides. An added benefit is that at low TFA concentrations, resolution is improved because small differences in peptide retention are not masked. This is shown in the increased separation of peptides 1 and 2 as the TFA concentration is decreased. At 0.1% TFA, they co-elute. Therefore, from the mobile phase standpoint, the best LC-MS method employs ionic additives other than TFA that are still volatile, can provide pH control, and do not strongly ion-pair with the peptides.

Effect of TFA Concentration on Peptide MS Signal

application for HPLC

compound class: peptides
column ..... Discovery® BIO Wide Pore C18, 15 cm x 2.1 mm I.D., 3 µm particles (567202-U)
mobile phase ..... A: aqueous component (25 mM formic acid, 0.01% TFA or 0.1% TFA)
B: (50:50) water:acetontrile containing same ionic additives as aq. component
flow rate ..... 0.208 mL/min
column temp. ..... ambient
detector ..... (+)ESI
injection ..... 1-3 µL
sample ..... RP Peptide Performance Standard (Alberta Peptide Inst., Cat. No. RPS-P0010)
Application No. G004414

Peptide 1: ac-RGAGGLGLGK-amide
Peptide 2: ac-RGGGGLGLGK-amide
Peptide 3: ac-RGVGGLGLGK-amide
Peptide 4: ac-RGVVGLGLGK-amide



HPLC for Large Molecules

Discovery® BIO: *Capillary and Microbore Dimensions*

Capillary and Microbore Dimensions

The Benefits of Reducing Column I.D.

With regard to HPLC separations, smaller is often better. Columns with narrow I.D. can enhance sensitivity when dealing with a limited sample size. This makes them ideal for applications where detection at very low concentration in small sample volumes is required. The low flow rates also make narrow I.D. columns ideal for LC-MS applications. Proteomics and other areas of modern biological research often generate large numbers of samples containing very small volumes that need to be analyzed in a minimal amount of time. Additionally, compounds of interest in these samples may exist at very low concentrations.

When sample concentrations and volumes are sufficiently small, injection onto conventional I.D. columns (4.6 mm), and even narrowbore (2.1 mm), immediately reveals that current means of detection lack adequate sensitivity for satisfactory analysis. This may be the case whether detection is by UV absorption or mass spectrometry. This problem of sensitivity with conventional I.D. columns is a simple result of sample dilution within the relatively large volume comprised by the column and tubing.

A direct approach to reducing the extent of dilution and to increase sensitivity is to reduce the column volume. As long as the linear velocity is constant, and for a given limiting sample mass, peak volumes are correspondingly reduced for narrower I.D. columns. Detection levels can be orders of magnitude lower by decreasing the column I.D. These principles. which relate to each other by relative cross-sectional areas of the various column dimensions, are illustrated in the tables below.

Supelco microbore HPLC columns

Effect of Column Dimension on Required Sample Mass for a Given Sensitivity

Column I.D. (mm)	Relative Volumetric Flow*	Relative Sample Mass	Relative Sensitivity
4.6	1	1	1
3.0	0.42	0.42	1
2.1	0.21	0.21	1
1.0	0.047	0.047	1
0.50	0.012	0.012	1
0.32	0.0048	0.0048	1
0.18	0.0015	0.0015	1

*Assumes constant linear velocity, equivalent column length and efficiency (plates/meter), and no significant extra-column volume

Effect of Column Dimension on Sensitivity for a Limiting Sample Mass

Column I.D. (mm)	Relative Volumetric Flow*	Relative Sample Mass	Relative Sensitivity
4.6	1	1	1
3.0	0.42	1	2
2.1	0.21	1	5
1.0	0.047	1	21
0.50	0.012	1	85
0.32	0.0048	1	207
0.18	0.0015	1	653

*Assumes constant linear velocity, equivalent column length and efficiency (plates/meter), and no significant extra-column volume

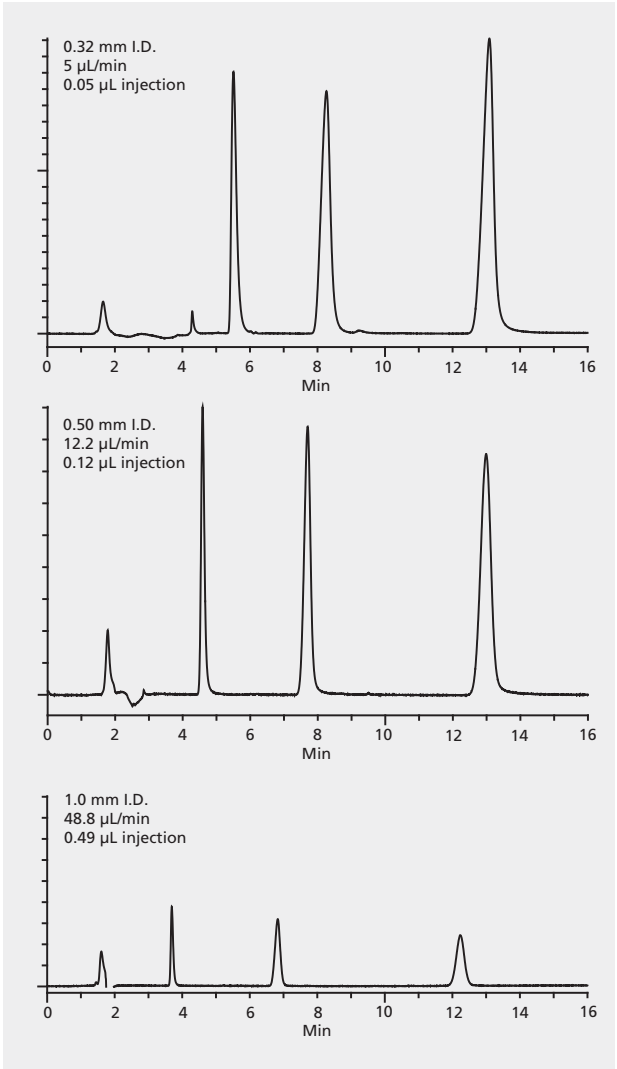
Increased Sensitivity Demonstrated

The following figure shows the improvement in sensitivity upon reducing column I.D. The same sample mass was injected onto Discovery® BIO Wide Pore C18 columns of equal length (10 cm) but varying I.D. from 1.0 mm down to 0.32 mm on the same chromatographic system.

Effect of HPLC Column I.D. on Sensitivity

application for HPLC

column ..... Discovery BIO Wide Pore C18, 10 cm x various I.D., 3 µm particles
mobile phase ..... A: water
B: acetonitrile
Ratio: 65:35 (A:B)
flow rate ..... as indicated
column temp. ..... ambient
detector ..... UV at 254 nm
injection ..... as indicated
sample ..... acetophenone (0.1 µg), benzene (1 µg), toluene (1 µg)
Application No. G004416



Discovery® BIO Wide Pore and many other Supelco HPLC phases are available in capillary dimensions. Please consult the respective section of this catalog.

HPLC for Large Molecules

Discovery® BIO: *Preparative Scale HPLC*

Preparative Scale HPLC

Supelco preparative HPLC column

Separations developed on Discovery® BIO Wide Pore are completely scalable between 3, 5, and 10 µm particles, and capillary to preparative column dimensions.

Analytical separations that are developed on Discovery® 3 or 5 micron particles are completely scalable to preparative separations on Discovery® 10 micron particles and larger columns. Additionally, separations developed on 5 or 10 micron particles can be scaled down for fast analysis on 3 micron particles.

- Discovery® BIO Wide Pore 10 micron particles in large column dimensions are ideal for isolating and purifying mg to gram amounts of substances for further characterization.
- Discovery® 3 or 5 micron particles in short columns are ideal for rapid analysis and LC-MS applications.
- Discovery® BIO Wide Pore 3 or 5 micron particles in long columns provide maximum resolution of complex mixtures compounds.

Preparative dimensions of Discovery® BIO phases are listed in the respective sections of this catalog.

Determining Sample Capacities for Preparative Columns

Column Type	I.D. (mm)	Optimum Flow Rate (mL/min)	Optimum Capacity	Max. Analytical Capacity	Max. Purification Multiplier*
Analytical	4.6	0.7	200 µg	1 mg	1
Semi-Prep	10	3.4	1 mg	5 mg	4.8
Preparative	21.2	14.8	4.2 mg	21 mg	21.2
Preparative	50.0	85.4	24 mg	122 mg	122

*Relative to 4.6 mm I.D. column

Reversed-Phase Chromatography

Reversed-phase (RP) is commonly used with low molecular weight compounds (amino acids, vitamins, drug substances, etc.) and peptides. It is popular in proteomics experiments where it is used to provide high-resolution peptide maps. Separation in RP is based on the analyte's partitioning between a hydrophilic, aqueous mobile phase and a non-polar stationary phase. The common alkyl stationary phases (C18, C8, C5, C4) provide different retention, and selectivity can be imparted by using non-alkyl phases, like amide or phenyl. For biomolecule separations, the pore size of the support particle is an important consideration. Because retention can be strong and the mobile phases contains organic modifiers, RP is usually avoided with proteins that are needed to be recovered in their active forms.

Reversed-phase columns for biomolecule separation offered by Supelco:

- Ascentis Express Peptide ES C18
- Discovery® BIO Wide Pore C18, C8 and C5
- TSKgel silica- and polymer-based phases

Discovery® BIO Wide Pore RP Columns

Highly efficient, reversed-phase separations of proteins and peptides for proteomics, biotherapeutics, peptide mapping, and isolation and purification of natural and synthetic peptides.

Discovery® BIO Wide Pore satisfies the needs of efficiency, selectivity, LC-MS sensitivity, stability, scalability, and reproducibility for reversed-phase HPLC analyses of proteins, peptides, and small biomolecules. Three phase chemistries, C18, C8, and C5, give unmatched selectivity and performance. Separations are completely scalable from analytical to preparative. The low-bleed feature, inert surface chemistry, and microbore and capillary dimensions make them ideal for proteomics and LC-MS applications.

Significant benefits of Discovery® BIO Wide Pore include:

- Increased resolution of proteins and peptides compared to leading RP-HPLC phases
- Ideal for peptide mapping
- Complementary selectivity choices with C5, C8, and C18 phase chemistries
- C5 has enhanced stability and lifetime compared to conventional C4 phases
- Excellent, no-bleed LC-MS properties
- TFA is not required
- Column dimensions from capillary to prep to cover all of your separation needs
- Excellent reproducibility run-to-run, column-to-column, and batch-to-batch

Discovery BIO Wide Pore Properties

	Discovery BIO Wide Pore C18	Discovery BIO Wide Pore C8	Discovery BIO Wide Pore C5
Phase	Octadecyl	Octyl	Pentyl
Endcap (yes/no)	Yes	Yes	Yes
Particle Platform	Silica	Silica	Silica
Particle Shape	Spherical	Spherical	Spherical
Particle Purity	<10 ppm metals	<10 ppm metals	<10 ppm metals
Particle Sizes (µm)	3, 5, 10	3, 5, 10	3, 5, 10
Pore Size (Å)	300	300	300
Surface Area (m^2/g)	100	100	100
%C	9	5	3.5
Coverage (µmoles/m^2)	3.6	4	4.5
pH Range	2–8	2–8	2–8
Temperature Range	≤70 °C	≤70 °C	≤70 °C

HPLC for Large Molecules

Reversed-Phase Chromatography: *Discovery® BIO Wide Pore RP Columns*

Suggestions for Choosing a Discovery BIO Wide Pore Column

Application	Bonded Phase
Proteins	BIO Wide Pore C5
Hydrophobic peptides or proteins (e.g., membrane proteins)	BIO Wide Pore C5
Peptide mapping	BIO Wide Pore C18
Proteomics	BIO Wide Pore C18
Scouting	BIO Wide Pore C8 (because of its intermediate hydrophobicity between a C18 and C5)
Application	**Silica Particle Sizes**
LC-MS	3 micron or 5 micron
Fast analysis, or high-throughput applications	3 micron
Peptide mapping	3 micron or 5 micron
Analytical HPLC	3 micron or 5 micron
Preparative	5 micron or 10 micron
Application	**Column I.D.**
LC-MS	2.1 mm or smaller
Peptide mapping	4.6 mm, 4.0 mm, 2.1 mm
Analytical HPLC	4.0 mm, 4.6 mm
Preparative	10 mm, 21.2 mm
Low-level detection or limited sample volume	0.18 mm, 0.32 mm, 0.5 mm, 1.0 mm

Discovery® BIO Wide Pore C18 HPLC Column

Peptide maps generated by RP-HPLC provide valuable information about protein structure, stability, and purity. To be effective, the RP-HPLC column must be able to resolve a high percentage of the peptides in the sample. The more peptides, the better the information. Discovery BIO Wide Pore C18 gives unsurpassed RP-HPLC resolution of peptide maps from enzymatic digests. The improvements in silica and bonded-phase chemistry we have incorporated into the Discovery BIO Wide Pore line improve resolution by increasing efficiency and reducing the peak tailing. An added benefit to this is the ability to analyze peptides without TFA in the mobile phase, thereby increasing the LC-MS signal.

suitable for L1 per USP

particle platform ..... silica
phase ..... octadecyl
pore size ..... 300 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
0.18	5	65603-U	1 ea
0.32	5	65526-U	1 ea
0.32	10	65527-U	1 ea
0.5	5	65517-U	1 ea
0.5	10	65518-U	1 ea
1.0	5	65504-U	1 ea
1.0	10	65506-U	1 ea
2.1	5	567200-U	1 ea
2.1	10	567201-U	1 ea
2.1	15	567202-U	1 ea
4.6	10	567204-U	1 ea
4.6	15	567205-U	1 ea
particle size 5 µm			
0.18	5	65606-U	1 ea
0.18	15	65608-U	1 ea
0.32	15	65529-U	1 ea
0.5	15	65519-U	1 ea
1.0	15	65508-U	1 ea
1.0	25	65509-U	1 ea
2.1	5	568200-U	1 ea
2.1	10	568201-U	1 ea
2.1	15	568202-U	1 ea
2.1	25	568203-U	1 ea
4	15	568212-U	1 ea
4	25	568213-U	1 ea
4.6	5	568220-U	1 ea
4.6	10	568221-U	1 ea
4.6	15	568222-U	1 ea
4.6	25	568223-U	1 ea
10	25	568230-U	1 ea
particle size 10 µm			
4.6	25	567206-U	1 ea
10	5	567207-U	1 ea
10	15	567208-U	1 ea
10	25	567209-U	1 ea
21.2	5	567210-U	1 ea
21.2	15	567211-U	1 ea
21.2	25	567212-U	1 ea

Discovery® BIO Wide Pore C18 Supelguard™ Cartridge

Kits include one cartridge, a stand-alone holder, a piece of tubing, and 2 nuts and ferrules. Guard cartridges require holders that are sold separately. The 2.1 and 4 mm I.D. cartridges use 21150AST or 59660-U (both stand-alone) or 504254 or 55205 (both integral). The 10 mm I.D. cartridges use 567499-U. The 21.2 mm I.D. cartridges use 581392-U.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	2	567270-U	2 ea
2.1	2	567271-U	1 kit
4.0	2	567272-U	2 ea
4.0	2	567273-U	1 kit
particle size 5 µm			
2.1	2	568270-U	2 ea
2.1	2	568271-U	1 kit
4.0	2	568272-U	2 ea
4.0	2	568273-U	1 kit
particle size 10 µm			
10	1	567282-U	1 ea

Discovery® BIO Wide Pore C8 HPLC Column

Discovery BIO Wide Pore C8 exhibits hydrophobicity intermediate between the Discovery BIO Wide Pore C5 and the Discovery BIO Wide Pore C18. The difference in hydrophobicity gives it unique selectivity relative to these other phases. It is ideal for peptide mapping because it provides complementary information compared to a C18 separation. Because of its intermediate hydrophobicity, we also recommend it for method development or scouting work. As with all Discovery BIO Wide Pore phases, the C8 phase gives efficient, symmetrical peaks, exceptional stability, long column lifetime, and LC-MS compatibility.

suitable for L7 per USP

particle platform ..... silica
phase ..... octyl
pore size ..... 300 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	5	567213-U	1 ea
2.1	10	567214-U	1 ea
2.1	15	567215-U	1 ea
4.6	10	567217-U	1 ea
4.6	15	567218-U	1 ea

HPLC for Large Molecules

Reversed-Phase Chromatography: *Discovery® BIO Wide Pore RP Columns*

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
2.1	5	568300-U	1 ea
2.1	10	568301-U	1 ea
2.1	15	568302-U	1 ea
4	15	568312-U	1 ea
4	25	568313-U	1 ea
4.6	5	568320-U	1 ea
4.6	10	568321-U	1 ea
4.6	15	568322-U	1 ea
4.6	25	568323-U	1 ea
10	25	568330-U	1 ea
particle size 10 µm			
4.6	25	567219-U	1 ea
10	25	567222-U	1 ea
21.2	25	567225-U	1 ea

Discovery® BIO Wide Pore C8 Supelguard™ Cartridge

Kits include one cartridge, a stand-alone holder, a piece of tubing, and 2 nuts and ferrules. Guard cartridges require holders that are sold separately. The 2.1 and 4 mm I.D. cartridges use 21150AST or 59660-U (both stand-alone) or 504254 or 55205 (both integral). The 10 mm I.D. cartridges use 567499-U. The 21.2 mm I.D. cartridges use 581392-U.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	2	567274-U	2 ea
2.1	2	567275-U	1 kit
4.0	2	567276-U	2 ea
4.0	2	567277-U	1 kit
particle size 5 µm			
2.1	2	568370-U	2 ea
2.1	2	568371-U	1 kit
4.0	2	568372-U	2 ea
4.0	2	568373-U	1 kit
particle size 10 µm			
10	1	567284-U	1 ea

Discovery® BIO Wide Pore C5 HPLC Column

Discovery BIO Wide Pore C5 was designed for the efficient and reliable separation of proteins and peptides, especially hydrophobic peptides, by RP-HPLC. Long-chain phases, like C8 or C18, are often too hydrophobic for proteins and can cause excessively long retention time or even irreversible binding to the column. For this reason short-chain phases, typically C3 or C4, are often used for RP-HPLC of proteins. However, these short-chain phases are susceptible to hydrolysis, resulting in short column lifetime, especially at low pH. The Discovery BIO Wide Pore C5 gives elution order similar to a conventional C4, yet has enhanced pH stability for longer column lifetime. Generally, higher efficiency separations are achievable on the Discovery BIO Wide Pore C5 because of the improvements we have made to the silica and bonded-phase chemistry.

particle platform ..... silica
phase ..... pentyl
pore size ..... 300 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
0.32	10	65532-U	1 ea
1.0	5	65511-U	1 ea
1.0	10	65512-U	1 ea
2.1	10	567227-U	1 ea
2.1	15	567228-U	1 ea
4.6	5	567229-U	1 ea
4.6	10	567230-U	1 ea
4.6	15	567231-U	1 ea

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
0.18	10	65613-U	1 ea
0.32	15	65533-U	1 ea
1.0	15	65513-U	1 ea
2.1	5	568400-U	1 ea
2.1	10	568401-U	1 ea
2.1	15	568402-U	1 ea
2.1	25	568403-U	1 ea
4	10	568411-U	1 ea
4	15	568412-U	1 ea
4	25	568413-U	1 ea
4.6	5	568420-U	1 ea
4.6	10	568421-U	1 ea
4.6	15	568422-U	1 ea
4.6	25	568423-U	1 ea
10	25	568430-U	1 ea
particle size 10 µm			
4.6	25	567232-U	1 ea
10	5	567233-U	1 ea
10	15	567234-U	1 ea
10	25	567235-U	1 ea
21.2	5	567236-U	1 ea
21.2	15	567237-U	1 ea
21.2	25	567238-U	1 ea

Discovery® BIO Wide Pore C5 Supelguard™ Cartridge

Kits include one cartridge, a stand-alone holder, a piece of tubing, and 2 nuts and ferrules. Guard cartridges require holders that are sold separately. The 2.1 and 4 mm I.D. cartridges use 21150AST or 59660-U (both stand-alone) or 504254 or 55205 (both integral). The 10 mm I.D. cartridges use 567499-U. The 21.2 mm I.D. cartridges use 581392-U.

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 3 µm			
2.1	2	567278-U	2 ea
2.1	2	567279-U	1 kit
4.0	2	567280-U	2 ea
4.0	2	567281-U	1 kit
particle size 5 µm			
2.1	2	568470-U	2 ea
2.1	2	568471-U	1 kit
4.0	2	568472-U	2 ea
4.0	2	568473-U	1 kit
particle size 10 µm			
10	1	567286-U	1 ea

HPLC for Large Molecules

Reversed-Phase Chromatography: *Ascentis® Express Peptide ES-C18 HPLC Columns*

Ascentis® Express Peptide ES-C18 HPLC Columns

Ascentis Express Peptide ES-C18 columns and capillaries are specifically engineered to separate higher molecular weight compounds such as peptides and small proteins. These columns contain advanced Fused-Core particles that have larger pores (160 Å versus 90 Å in standard Ascentis Express), bonded with sterically-protected C18 ligands to provide extra stability (ES) at very low pH (< 1) and high temperatures (up to 100ºC). This greatly expands the application range for Ascentis Express columns.

NEW PRODUCTS

Ascentis® Express Peptide ES-C18, 2.7 Micron HPLC Column

Ascentis Express Peptide ES-C18 columns are specifically engineered to separate higher molecular weight compounds such as peptides and small proteins. These columns contain advanced Fused-Core particles that have larger pores (160 Å versus 90 Å in standard Ascentis Express), bonded with sterically-protected C18 ligands to provide extra stability (ES) at very low pH (< 1) and high temperatures (up to 100ºC). This greatly expands the application range for Ascentis Express columns.

suitable for L1 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... No
pore size ..... 160 Å
operating pH range ..... 1 - 9
temp. range ..... ≤100 °C

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	3	53299-U	1 ea
2.1	5	53301-U	1 ea
2.1	7.5	53304-U	1 ea
2.1	10	53306-U	1 ea
2.1	15	53307-U	1 ea
3.0	3	53308-U	1 ea
3.0	5	53311-U	1 ea
3.0	7.5	53312-U	1 ea
3.0	10	53313-U	1 ea
3.0	15	53314-U	1 ea
4.6	3	53316-U	1 ea
4.6	5	53318-U	1 ea
4.6	7.5	53323-U	1 ea
4.6	10	53324-U	1 ea
4.6	15	53328-U	1 ea

Ascentis® Express Peptide ES-C18, 2.7 Micron Capillary HPLC Column

suitable for L1 per USP

particle platform ..... Fused-Core
metals ..... <5 ppm
endcapped ..... No
pore size ..... 160 Å
pH-range ..... 1 - 9
temp. range ..... ≤100 °C

I.D.	L (cm)	Cat. No.	Qty
particle size 2.7 µm			
75 µm	5	53543-U	1 ea
100 µm	5	53544-U	1 ea
200 µm	5	53545-U	1 ea
300 µm	5	53546-U	1 ea
500 µm	5	53547-U	1 ea
1.0 mm	5	53548-U	1 ea
75 µm	15	53549-U	1 ea
100 µm	15	53552-U	1 ea
200 µm	15	53553-U	1 ea
300 µm	15	53554-U	1 ea
500 µm	15	53558-U	1 ea
1.0 mm	15	53561-U	1 ea

Ascentis® Express Peptide ES-C18, 2.7 Micron Guard Cartridge

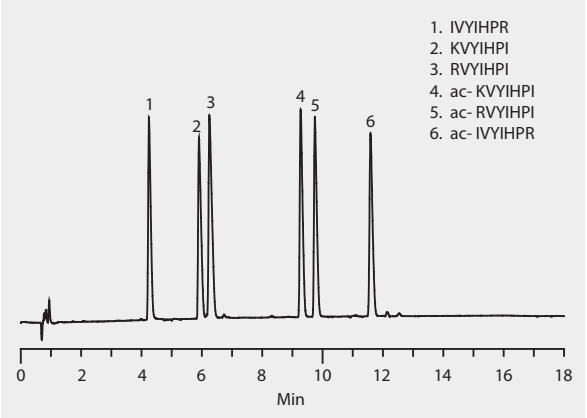
Ascentis Express Guard Columns provide physical (filtration) and chemical protection for costly analytical columns without compromising the very high performance of Ascentis Express columns. These Ascentis Express guard columns are capable of continuous use at pressures up to 9000 psi (600 bar) with only hand-tightening. Guard cartridges are easily replaced without removing the guard column holder from the flow path. The cartridges are packed with Ascentis Express Fused-Core®particles. **Order guard column holder (53500-U) separately.**

I.D. (mm)	L (mm)	Cat. No.	Qty
particle size 2.7 µm			
2.1	5	53536-U	3 ea
3.0	5	53537-U	3 ea
4.6	5	53542-U	3 ea

HPLC Analysis of Basic Peptides (Angiotensin Analogs) on Ascentis® Express Peptide ES-C18

application for HPLC

column ..... Ascentis Express Peptide ES-C18, 10 cm x 3 mm I.D., 2.7µm (53313-U)
mobile phase ..... A: 0.1% (v/v) formic acid, pH 4.0 (titrated with ammonium hydroxide)
B: 50:50, (0.175% formic acid in water, pH 4.0) : acetonitrile
Gradient: 20 to 50% B in 15 min
gradient ..... 20 to 50% B in 15 min
flow rate ..... 0.6 mL/min
pressure ..... 207 bar
column temp. ..... 35 °C
detector ..... UV at 215 nm
injection ..... 2.0 µL
sample ..... 0.5 g/L ea. peptide
Application No. G005379



HPLC for Large Molecules

Reversed-Phase Chromatography: *TSKgel® Reversed-Phase Columns*

TSKgel® Reversed-Phase Columns

Tosoh Corp. offers reversed-phase columns packed with silica or methacrylate particles. Each TSKgel silica column features high purity Type B silica, high efficiency, excellent recovery, and low MS bleed. The polymer-based TSKgel reversed-phase columns are synthesized from polymethacrylate polymers in a range of pore and particle sizes. The hydrophilic backbone improves recovery and reduces secondary interactions. The polymethacrylate particles are also stable from pH 1 to 12 and do not swell in organic solvents. They can withstand rigorous cleaning with either acid or base. NPR (non-porous resin) columns are packed with non-porous methacrylate particles of uniform 2.5 micron size. They offer high efficiency separations and fast anaylses of peptides and proteins. The non-porous particle structure limits product isolation to sub-microgram loads. We recommend using TSKgel guard filters to protect these columns.

TSKgel® Reversed-Phase HPLC Columns (Silica-based)

TSKgel® Reversed Phase HPLC Column (Silica-based)

Reversed-phase liquid chromatography (RPLC) is the preferred method for analysis and purification of polar and nonpolar compounds that are soluble in mixtures of water and organic solvents.

particle platform ..... silica

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase CN-80Ts			
5	15 cm × 4.6 mm	817348	1 ea
5	25 cm × 4.6 mm	817349	1 ea
phase Octyl-80Ts			
5	15 cm × 4.6 mm	817344	1 ea
5	25 cm × 4.6 mm	817345	1 ea
phase ODS-100V			
5	15 cm × 4.6 mm	821455	1 ea
5	25 cm × 4.6 mm	821456	1 ea
phase ODS-120A			
5	15 cm × 4.6 mm	807636	1 ea
5	25 cm × 4.6 mm	807124	1 ea
phase ODS-120T			
5	15 cm × 2 mm	818152	1 ea
5	25 cm × 2 mm	818153	1 ea
5	15 cm × 4.6 mm	807637	1 ea
5	25 cm × 4.6 mm	807125	1 ea
phase ODS-80Tm			
5	15 cm × 4.6 mm	808148	1 ea
5	25 cm × 4.6 mm	808149	1 ea
10	30 cm × 21.5 mm	814002	1 ea
phase ODS-80Ts			
5	15 cm × 2 mm	818150	1 ea
5	25 cm × 2 mm	818151	1 ea
5	15 cm × 4.6 mm	817201	1 ea
5	25 cm × 4.6 mm	817202	1 ea
10	30 cm × 21.5 mm	817380	1 ea
phase Super-Octyl			
2	5 cm × 4.6 mm	818275	1 ea
phase OligoDNA RP			
5	15 cm × 4.6 mm	813352	1 ea
5	15 cm × 7.8 mm	813353	
phase Super-Octyl			
2	10 cm × 4.6 mm	818276	1 ea
phase Super-ODS			
2	5 cm × 2 mm	819541	1 ea
2	10 cm × 2 mm	819542	1 ea
2	5 cm × 4.6 mm	818154	1 ea
2	10 cm × 4.6 mm	818197	1 ea
phase Super-Phenyl			
2	5 cm × 4.6 mm	818277	1 ea
2	10 cm × 4.6 mm	818278	1 ea
phase TMS-250			
10	7.5 cm × 4.6 mm	807190	1 ea

TSKgel® Reversed-Phase HPLC Columns (Polymer-based)

TSKgel® Reversed Phase HPLC Column (Polymer-based)

Polymer-based particles for reversed-phase (RP) HPLC generally have two benefits over silica-based particles: They are more tolerant of high and low pH operating conditions and they do not have the silanol interactions that cause peak tailing of some basic analytes. Also, some silicas have an intrinsic metal content that may cause chelation problems with sensitive biomolecules, leading to poor recovery. Polymeric TSKgel columns come in C18 and phenyl functional groups and a range of particle porosities. Very fast kinetics and quantitative protein recovery at submicrogram loading are characteristic of nonporous resin-based TSKgel C18-NPR columns.

- 2PW particles have 125Å pores
- 4PW particles have 500Å pores
- 5PW particles have 1000Å pores
- NPR particles are nonporous

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase C18-NPR			
2.5	3.5 cm × 4.6 mm	814005	1 ea
phase Octadecyl-2PW			
5	15 cm × 4.6 mm	817500	1 ea
5	15 cm × 6 mm	817501	1 ea
5	15 cm × 2 mm	818754	1 ea
phase Octadecyl-4PW			
13	15 cm × 21.5 mm	816257	1 ea
7	15 cm × 2 mm	818755	1 ea
7	15 cm × 4.6 mm	813351	1 ea
phase Phenyl-5PW RP			
13	15 cm × 21.5 mm	816260	1 ea
10	7.5 cm × 2 mm	818756	1 ea
10	7.5 cm × 4.6 mm	808043	1 ea

TSKgel® Reversed Phase HPLC Guard Column

TSKgel Guard Columns are stand-alone and do not require separate holders.

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Octadecyl-2PW			
5	1 cm × 4.6 mm	817502	1 ea
5	1 cm × 6 mm	817503	1 ea
phase ODS-80Tm			
10	7.5 cm × 21.5 mm	814098	1 ea
phase ODS-80Ts			
10	7.5 cm × 21.5 mm	817385	1 ea

HPLC for Large Molecules

Reversed-Phase Chromatography: *TSKgel® Reversed-Phase HPLC Columns (Polymer-based)*

TSKgel® Reversed Phase HPLC Guardgel Kit

Kit includes one cartridge, one stand-alone holder, 5 mL packing, 5 cm of 1/16 in. tubing, two nuts, and two ferrules.

Particle Size	L × I.D. (mm)	Cat. No.	Qty
phase Octadecyl-4PW			
20	3.5 × 10	816749	1 kit

TSKgel® Reversed Phase HPLC Guardgel Cartridge

TSKgel Guard cartridges require a holder, which is sold separately. For 2 mm cartridges, the holder is Part No. **819308**. For the 3.2 mm cartridges used to protect 4.6 mm columns, the holder is Part No. **819018**.

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase CN-80Ts			
5	1.5 cm × 3.2 mm	819013	3 ea
phase Octadecyl-2PW			
5	1 cm × 2 mm	842161	3 ea
phase Octadecyl-4PW			
7	1 cm × 2 mm	842160	3 ea
7	1.5 cm × 3.2 mm	819008	3 ea
phase Octyl-80Ts			
5	1.5 cm × 3.2 mm	819012	3 ea
phase ODS-100V			
5	1.5 cm × 3.2 mm	821453	3 ea
phase ODS-120A			
5	1.5 cm × 3.2 mm	819005	3 ea
phase ODS-120T			
5	1.5 cm × 3.2 mm	819006	3 ea
phase ODS-80Tm			
5	1.5 cm × 3.2 mm	819004	3 ea
phase ODS-80Ts			
5	1 cm × 2 mm	819325	3 ea
5	1.5 cm × 3.2 mm	819011	3 ea
phase Phenyl-5PW RP			
10	1 cm × 2 mm	842159	3 ea
10	1.5 cm × 3.2 mm	819007	3 ea
phase Super-ODS			
2	1 cm × 2 mm	819672	3 ea

Gel Filtration Chromatography (GFC)

Gel filtration chromatography (GFC) is a form of size exclusion chromatography (SEC) and is used to separate biomolecules according to differences in their molecular size. The pores of the matrix are comparable in size to the molecules being separated. Relatively small analytes can diffuse into the pores, while relatively large molecules cannot enter the pores (and thus elute more rapidly).

Gel filtration columns for biomolecule separations offered by Supelco:

- TSKgel SW and PW series
- Discovery BIO GFC

TSKgel® Gel Filtration (GFC) Columns

TSKgel GFC columns are available in two particle formats: silica and methacrylate. Both have particle and pore sizes chosen to optimize particular aspects of the separation. TSKgel BioAssist columns are made of PEEK housing material to reduce sample absorption to stainless steel or glass.

TSKgel® Size Exclusion (SW-Type) HPLC Column

TSKgel SW and TSKgel SW_{XL} columns contain silica-based, hydrophilic bonded phase packings that minimize interaction with proteins. A 30 cm TSKgel SW_{XL} column and a 60 cm TSKgel SW column provide similar resolution, but the SW_{XL} column requires half the analysis time. Sample capacity increases in proportion with column length.

Because TSKgel SW_{XL} and TSKgel SW columns are silica-based, they must be operated within the recommended pH range of 2.5 - 7.5. Detailed operating conditions are described in the information accompanying the columns. We recommend protecting these columns with the appropriate SW_{XL} or SW guard column.

TSK-GEL Column	Particle Size (µm)	Pore Size (Å)	Sample MW (Globular Proteins)
SuperSW2000	4	125	5–150 × 10^3
G2000SW_{XL}	5	125	5–150 × 10^3
G2000SW	10	125	5–100 × 10^3
SuperSW3000	4	250	10–500 × 10^3
G3000SW_{XL}	5	250	10–500 × 10^3
G3000SW	10	250	10–500 × 10^3
G4000SW_{XL}	8	450	20–10,000 × 10^3
G4000SW	13	450	20–10,000 × 10^3

Mobile Phase: 0.03 M NaCl in 0.1 M phosphate buffer, pH 7.0

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase BioAssist G2SWxl PEEK			
5	30 cm × 7.8 mm	820027	1 ea
phase BioAssist G3SWxl PEEK			
5	30 cm × 7.8 mm	820026	1 ea
phase BioAssist G4SWxl PEEK			
8	30 cm × 7.8 mm	820025	1 ea
phase G2000SW			
10	30 cm × 7.5 mm	805788	1 ea
10	60 cm × 7.5 mm	805102	1 ea
13	30 cm × 21.5 mm	806727	1 ea
13	60 cm × 21.5 mm	805146	1 ea
phase G2000SWxl			
5	30 cm × 7.8 mm	808540	1 ea

HPLC for Large Molecules

Gel Filtration Chromatography (GFC): *TSKgel® Gel Filtration (GFC) Columns*

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase G3000SW			
10	30 cm × 7.5 mm	805789	1 ea
10	60 cm × 7.5 mm	805103	1 ea
13	30 cm × 21.5 mm	806728	1 ea
13	60 cm × 21.5 mm	805147	1 ea
phase G3000SWxl			
5	30 cm × 7.8 mm	808541	1 ea
phase G4000SW			
13	30 cm × 7.5 mm	805790	1 ea
13	60 cm × 7.5 mm	805104	1 ea
17	30 cm × 21.5 mm	806729	1 ea
17	60 cm × 21.5 mm	805148	1 ea
phase G4000SWxl			
8	30 cm × 7.8 mm	808542	1 ea
phase QC-PAK GFC 200			
5	15 cm × 7.8 mm	816215	1 ea
phase QC-PAK GFC 300			
5	15 cm × 7.8 mm	816049	1 ea
phase SuperSW2000			
4	30 cm × 4.6 mm	818674	1 ea
phase SuperSW3000			
4	30 cm × 4.6 mm	818675	1 ea
4	30 cm × 1.0 mm	821485	1 ea
4	30 cm × 2.0 mm	821845	1 pkg

NEW *PRODUCTS*

Narrow Bore TSKgel® SuperSW3000 Columns

All other conditions the same, when reducing the column diameter, a lower flow rate is required to elute your sample from the column within the same time window as on a wider ID column. In aqueous size exclusion chromatography (GFC) the benefit of pumping less solvent through the column may not amount to significant savings. The benefit of smaller ID columns comes in when considering sample mass and volume.

Let's assume that initial work on the industry-leading 30cm x 7.8mm ID TSKgel G3000SWxl (5µm particles) column was promising but you are looking for better resolution and thus selected a 30cm x 4.6mm ID TSKgel SuperSW3000 (4µm particles) column. Off the bet, you obtained the benefit of running the column at a lower flow rate (0.35 mL/min vs. 1.00 mL/min), and you also observe better resolution, roughly by a factor of 1.1 (square root of 5/4). And, if you injected the same sample volume and you were not overloading the column in terms of volume and mass, you also improved the sensitivity of your analysis as the compounds eluted from the column in narrower (taller) peaks. While this closely resembled a win-win situation: better efficiency, higher sensitivity and lower solvent use, you are not completely satisfied and wonder what an even narrower ID column may do for your sample.

Now consider being limited in sample volume, not mass. Sample dilution and injecting a larger volume seem the obvious solution to this problem. However, in GFC one cannot concentrate the sample on top of the column as one can, e.g., in reversed-phase HPLC. Instead, you need to first determine the maximum injection volume (V max), or the volume at which the efficiency of the column starts to decline. Since V (max) is directly proportional to the volume of the column it only pays to use a smaller diameter column if your sample is mass limited, as we will discuss next.

When limited in sample mass in GFC, and assuming that you are injecting V (max), decreasing the column diameter (and sample volume) is the simplest way to detect your component of interest as the peaks elute in even narrower bands as discussed above for the 4.6 mm ID column. Although smaller ID columns are not always as efficient as wider bore columns, narrow bore columns, such as the 2mm ID and 1mm ID TSKgel SuperSW3000 columns, are sure ways to obtain better sensitivity in sample mass limited cases when injecting the maximum injection volume.

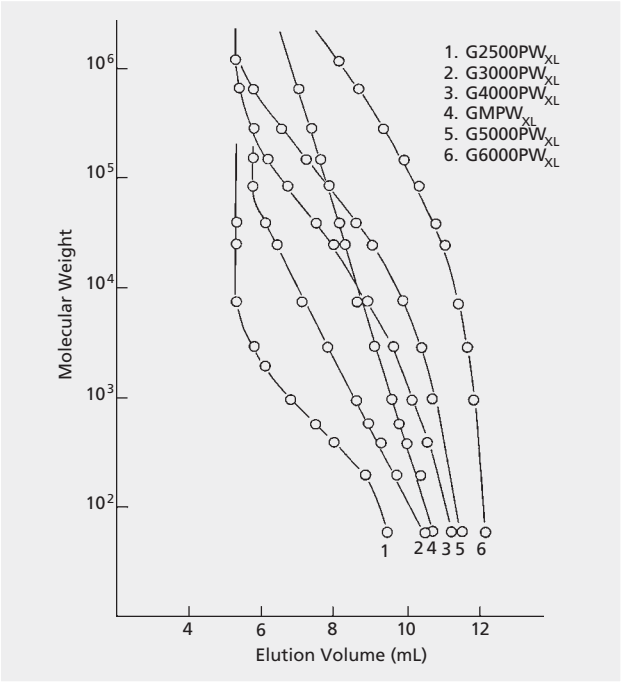
TSKgel® Size Exclusion (SW-Type) HPLC Guard Column

TSKgel Guard Columns are stand-alone and do not require separate holders.

particle platform ..... silica

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase BioAssist SWxl PEEK			
7	4 cm × 6 mm	818008	1 ea
phase G2000SW-G4000SW			
10	7.5 cm × 7.5 mm	805371	1 ea
13	7.5 cm × 21.5 mm	805758	1 ea
phase SuperSW2000 & SuperSW3000			
4	3.5 cm × 4.6 mm	818762	1 ea
phase G2000SWxl-G4000SWxl and QC-PAK GFC			
7	4 cm × 6 mm	808543	1 ea

PEG/PEO Calibration Curves on TSKgel PW_{XL} Columns



Column 1: G2500PW_{XL}, 30 cm x 7.8 mm ID, 6 µm particles (808020)
Column 2: G3000PW_{XL}, 30 cm x 7.8 mm ID, 6 µm particles (808021)
Column 3: G4000PW_{XL}, 30 cm x 7.8 mm ID, 10 µm particles (808022)
Column 4: GMPW_{XL}, 30 cm x 7.8 mm ID, 13 µm particles (808025)
Column 5: G5000PW_{XL}, 30 cm x 7.8 mm ID, 10 µm particles (808023)
Column 6: G6000PW_{XL}, 30 cm x 7.8 mm ID, 13 µm particles (808024)
Mobile Phase: DI Water
Flow Rate: 1 mL/min
Det.: refractaive index
Injection: polyethylene glycols and polyethylene oxides

HPLC for Large Molecules

Gel Filtration Chromatography (GFC): *TSKgel® Gel Filtration (GFC) Columns*

TSKgel® Size Exclusion (PW-Type) HPLC Column

TSKgel PW and TSKgel PW_{XL} columns are used in high performance gel filtration separations of water-soluble polymers and oligosaccharides. The hydrophilic polymer matrix has excellent chemical and mechanical stability. Although commonly used with aqueous solvents, the polymer is compatible with up to 50% organic solvent.

We recommend using a TSKgel PW guard columns with G2500PW - G6000PW columns. Use a TSKgel PW_{XL} guard column with any PW_{XL} column.

Bulk packing can be ordered to repack PW columns and guard columns.–>
particle platform ..... polymer

Column	Particle Size (µm)	Pore Size (Å)	Sample MW PEGS/PEOs	Sample MW Dextrans
G-Oligo-PW	6	125	<2,000	
G2000PW	10	125	<2,000	
$G2500PW_{XL}$	6	<200	<3,000	
G2500PW	10	<200	<3,000	
$G3000PW_{XL}$	6	200	<50,000	<60,000
G3000PW	10	200	<50,000	<60,000
$G4000PW_{XL}$	10	500	2,000–300,000	1,000–700,000
G4000PW	17	500	2,000–300,000	1,000–700,000
$G5000PW_{XL}$	10	1,000	4,000–1,000,000	50,000–7,000,000
G5000PW	17	100	4,000–1,000,000	4,000–1,000,000
$G6000PW_{XL}$	13	>1,000	40,000–8,000,000	500,000–50,000,000
G6000PW	17	>1,000	40,000–8,000,000	500,000–50,000,000
G-DNA-PW	10	4,000	40,000–8,000,000	
$GMPW_{XL}$	13	<100–1000	500–8,000,000	<50,000,000
GMPW	17	<100–1000	500–8,000,000	<50,000,000

Mobile Phase: Polyethylene glycols/polyethylene oxides—distilled water
Mobile Phase: Dextrans—0.2 M phosphate buffer, pH 6.8

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Alpha-2500			
7	30 cm × 7.8 mm	818339	1 ea
phase Alpha-3000			
7	30 cm × 7.8 mm	818340	1 ea
phase Alpha-4000			
10	30 cm × 7.8 mm	818341	1 ea
phase Alpha-5000			
10	30 cm × 7.8 mm	818342	1 ea
phase Alpha-6000			
13	30 cm × 7.8 mm	818343	1 ea
phase Alpha-M			
13	30 cm × 7.8 mm	818344	1 ea
phase G2000PW			
12	60 cm × 7.5 mm	805105	1 ea
12	30 cm × 7.5 mm	805761	1 ea
phase G2500PW			
12	60 cm × 7.5 mm	808029	1 ea
17	30 cm × 21.5 mm	816248	1 ea
17	60 cm × 21.5 mm	808030	1 ea
phase G2500PWxl			
7	30 cm × 7.8 mm	808020	1 ea
phase G3000PW			
12	30 cm × 7.5 mm	805762	1 ea
12	60 cm × 7.5 mm	805106	1 ea
17	30 cm × 21.5 mm	816249	1 ea
phase G3000PWxl			
7	30 cm × 7.8 mm	808021	1 ea

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase G3000PWxl-CP			
7	30 cm × 7.8 mm	821873	1 ea
phase G4000PW			
17	30 cm × 7.5 mm	805763	1 ea
17	60 cm × 7.5 mm	805107	1 ea
phase G4000PWxl			
10	30 cm × 7.8 mm	808022	1 ea
phase G5000PW			
17	30 cm × 7.5 mm	805764	1 ea
17	60 cm × 7.5 mm	805108	1 ea
phase G5000PWxl			
10	30 cm × 7.8 mm	808023	1 ea
phase G5000PWxl-CP			
10	30 cm × 7.8 mm	821874	1 ea
phase G6000PW			
17	30 cm × 7.5 mm	805765	1 ea
17	60 cm × 7.5 mm	805109	1 ea
phase G6000PWxl			
13	30 cm × 7.8 mm	808024	1 ea
phase BioAssist G6PW PEEK			
17	30 cm × 7.8 mm	820024	1 ea
phase G6000PWxl-CP			
13	30 cm × 7.8 mm	821875	1 ea
phase G-DNA-PW			
10	30 cm × 7.8 mm	808032	1 ea
phase GMPW			
17	30 cm × 7.5 mm	808026	1 ea
17	60 cm × 7.5 mm	808027	1 ea
phase GMPWxl			
13	30 cm × 7.8 mm	808025	1 ea
phase G-Oligo-PW			
7	30 cm × 7.8 mm	808031	1 ea
phase SuperAW2500			
4	15 cm × 6 mm	819315	1 ea
phase SuperAW3000			
4	15 cm × 6 mm	819316	1 ea
phase SuperAW4000			
6	15 cm × 6 mm	819317	1 ea
phase SuperAW5000			
7	15 cm × 6 mm	819318	1 ea
phase SuperAW6000			
9	15 cm × 6 mm	819319	1 ea
phase SuperAWM-H			
9	15 cm × 6 mm	819320	1 ea

HPLC for Large Molecules

Gel Filtration Chromatography (GFC): *TSKgel® Gel Filtration (GFC) Columns*

TSKgel® Size Exclusion (PW-Type) HPLC Guard Column

TSKgel Guard Columns are stand-alone and do not require separate holders.

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Alpha			
13	4 cm × 6 mm	818345	1 ea
phase G1000PW-G2000PW			
13	7.5 cm × 7.5 mm	806763	1 ea
phase G2500PW-G3000PW			
17	7.5 cm × 21.5 mm	806758	1 ea
phase G2500PW-GMPW			
13	7.5 cm × 7.5 mm	806762	1 ea
phase Oligo-PW			
13	4 cm × 6 mm	808034	1 ea
phase G2500PWxl-GMPWxl			
12	4 cm × 6 mm	808033	1 ea
phase G3000-G6000PWXL-CP			
13	4 cm × 6 mm	821876	1 ea
phase SuperAW5000-AWM-H			
23	3.5 cm × 4.6 mm	819322	1 ea
phase SuperAW2500-4000			
7	3.5 cm × 4.6 mm	819321	1 ea

TSKgel® Bulk Packing for GFC

Bottles containing 1 gram of bulk packing to top off and or repack TSKgel® columns and guard columns.

TSKgel® Size Exclusion (SW-Type) HPLC Packing

TSKgel® SWxl Top-Off, 5µm, for TSKgel® SWxl and QC-PAK columns, 1g
phase SWxl, particle size 5 µm

particle platform ..... silica

808544 — 1 g

TSKgel® Size Exclusion (PW-Type) HPLC Packing

TSKgel® Top-Off for TSKgel® PWxl and G-DNA-PW columns, 10µm, 1g
phase PWxl, particle size 10 µm

particle platform ..... polymer

808035 — 1 g

HPLC for Large Molecules

Gel Filtration Chromatography (GFC): *Discovery® BIO GFC Gel Filtration Columns*

Discovery® BIO GFC Gel Filtration Columns

Discovery® BIO GFC particles are made of a uniform, nanometer thick hydrophilic film chemically bonded to high purity silica. The specially-designed large pore volume provides high separation capacity and high resolving power. Discovery® BIO GFC phases perform size exclusion/gel filtration separations over a wide molecular weight range, from small biomolecules to virus particles. By eliminating non-specific adsorption, the unique hydrophilic surface treatment and ultra high-purity silica combine to allow reproducibly high recovery of active proteins. The narrow pore and particle size distributions ensure high column efficiency and reproducibility.

The 5 micron spherical silica particles of the Discovery® BIO GFC packings for 100, 150, 300, 500, 1000 and 2000 have nominal pore sizes at 100, 150, 300, 500, 1000 and 2000 Å, respectively.

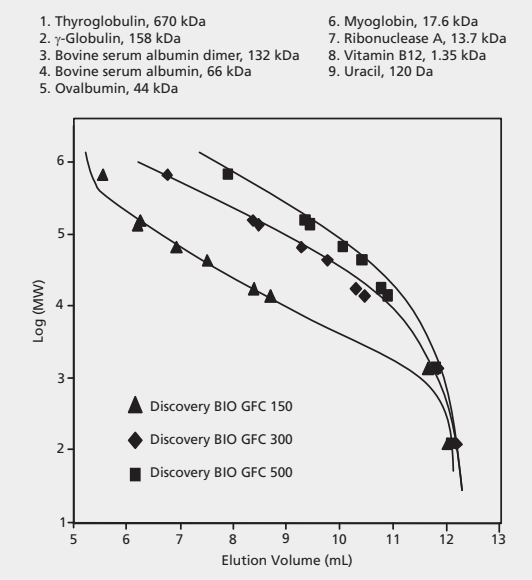
Features:

- Wide molecular weight separation range
- Long column lifetimes
- Extended pH stability
- Inert, hydrophilic surface for high recovery

BIO GFC Pore Size vs. Molecular Weight Cutoff

Description	dp (µm)	Pore Diam. (Å)	mw (min.)	mw (max.)	N (pl/m)	pH Range	Salt Conc.	Max. Temp. (°C)	Typical Pressure (psi) (30 cm × 7.8 mm column)
Discovery BIO GFC 100	5	100	100	100,000	>100,000	2–8.5	20 mM–2 M	80	700
Discovery BIO GFC 150	5	150	500	150,000	>90,000	2–8.5	20 mM–2 M	80	700
Discovery BIO GFC 300	5	300	5,000	1,250,000	>90,000	2–8.5	20 mM–2 M	80	700
Discovery BIO GFC 500	5	500	15,000	5,000,000	>85,000	2–8.5	20 mM–2 M	80	700
Discovery BIO GFC 1000	5	1,000	50,000	7,500,000	>90,000	2–8.5	20 mM–2 M	80	700
Discovery BIO GFC 2000	5	2,000		>10,000,000	>85,000	2–8.5	20 mM–2 M	80	700

Protein MW Calibration Curves for Discovery® BIO GFC Columns

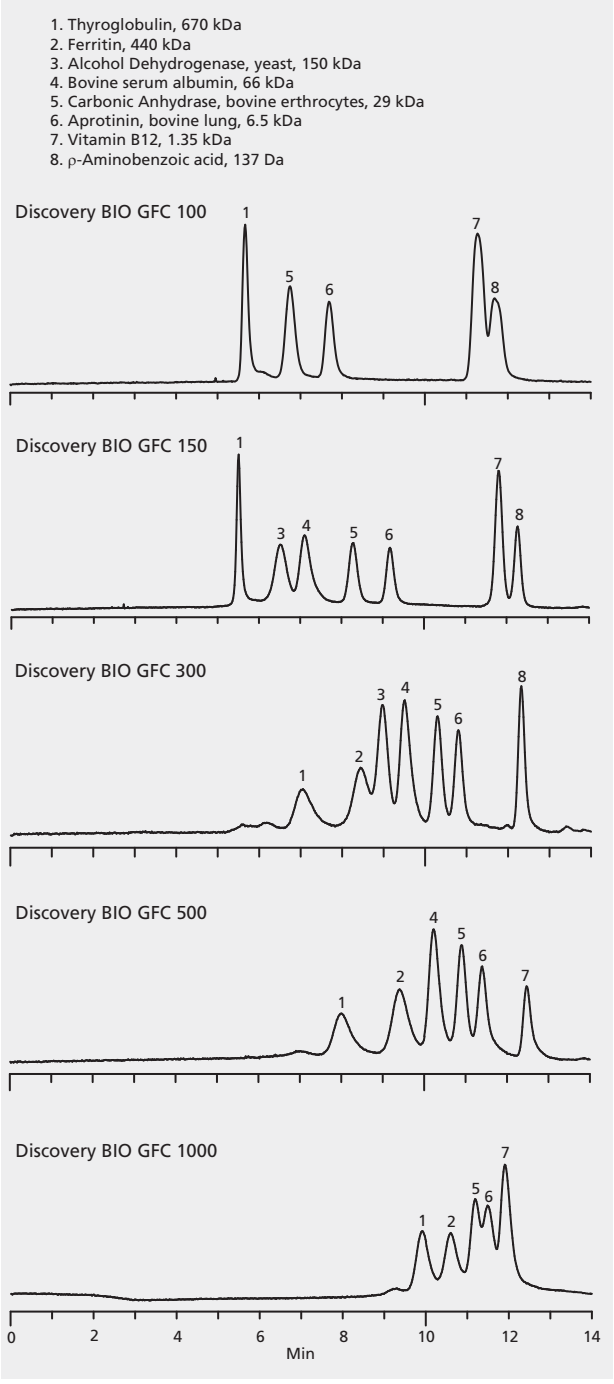


columns: Discovery® BIO GFC, 30 cm x 7.8 mm I.D., 5 µm particles
mobile phase: 150 mM potassium phosphate monobasic, pH 7 (adjusted with KOH)
flow rate: 1 mL/min.
detection: UV at 214 nm
injection: 10 µL

HPLC for Large Molecules

Gel Filtration Chromatography (GFC): *Discovery® BIO GFC Gel Filtration Columns*

Comparison of Protein Separation on Various Discovery® BIO GFC Pore Sizes (100 - 1000 Å)



columns: Discovery® BIO GFC, 30 cm x 7.8 mm I.D., 5 µm particles
mobile phase: 150 mM potassium phosphate monobasic, pH 7 (adjusted with KOH)
flow rate: 1 mL/min.
detection: UV at 280 nm
injection: 10 µL

Discovery® BIO GFC Columns

In addition to the colums listed here, other Discovery® BIO GFC column dimensions are available, please inquire. The 5 cm length columns are used as guard columns to protect the analytical column of corresponding particle and I.D.

Discovery® BIO GFC 100 HPLC Column

for analyte group 100 to 100,000 mw
pore size ..... 100 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	567299-U	1 ea
4.6	30	567297-U	1 ea
7.8	5	567298-U	1 ea
7.8	30	567296-U	1 ea

Discovery® BIO GFC 150 HPLC Column

for analyte group 500 to 150,000 mw
pore size ..... 150 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	567303-U	1 ea
4.6	30	567301-U	1 ea
7.8	5	567302-U	1 ea
7.8	30	567300-U	1 ea

Discovery® BIO GFC 300 HPLC Column

for analyte group 5,000 to 1,250,000 mw
pore size ..... 300 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	567307-U	1 ea
4.6	30	567305-U	1 ea
7.8	5	567306-U	1 ea
7.8	30	567304-U	1 ea

Discovery® BIO GFC 500 HPLC Column

for analyte group 15,000 to 5,000,000 mw
pore size ..... 500 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	567311-U	1 ea
4.6	30	567309-U	1 ea
7.8	5	567310-U	1 ea
7.8	30	567308-U	1 ea

Discovery® BIO GFC 1000 HPLC Column

for analyte group 50,000 to 7,500,000 mw
pore size ..... 1000 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	567315-U	1 ea
4.6	15	567313-U	1 ea
4.6	30	567287-U	1 ea
7.8	5	567314-U	1 ea
7.8	30	567312-U	1 ea

HPLC for Large Molecules

Gel Filtration Chromatography (GFC): *Discovery® BIO GFC Gel Filtration Columns*

Discovery® BIO GFC 2000 HPLC Column

for analyte group >10,000,000 mw

pore size ..... 2000 Å

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	567319-U	1 ea
4.6	15	567317-U	1 ea
4.6	30	567288-U	1 ea
7.8	5	567318-U	1 ea
7.8	30	567316-U	1 ea

Note: Other BIO GFC column dimensions are available, please inquire. The 5 cm length columns are used as guard columns to protect the analytical column of corresponding particle and I.D.

Ion Exchange Chromatography

Ion exchange chromatography (IEX) is based on interaction between the charged biomolecules and oppositely charged functional groups covalently linked to the matrix. Widespread applicability, high resolving power, high capacity, and controllability make ion exchange the technique most frequently used for separating biomolecules.

Ion exchange columns for biomolecule separations offered by Supelco:

- Discovery® BIO PolyMA SCX and WAX
- New! STAT and other ion exchange from Tosoh Bioscience

Discovery® BIO PolyMA Ion Exchange Columns

Discovery® BIO PolyMA polymer-based ion exchange particles have discriminating hydrophilic surface chemistry making them ideally suited for separating proteins, peptides, and other biotechnology-derived products. Differing from reversed-phase separations, ion exchange separates proteins and peptides that may have similar hydrophobic characteristics, but have different degrees of ionization (charge). Two ion exchangers, Discovery® BIO PolyMA-SCX for cation exchange, and Discovery® BIO PolyMA-WAX for anion exchange, complement the Discovery® BIO silica-based materials. The proprietary hydrophilic surface chemistry of Discovery® PolyMA ion exchange particles offers subtle ionic selectivity characteristics that are not available from the typical polystyrene-divinylbenzene (PS-DVB) and standard polymethacrylate based ion exchange resins currently on the market. In contrast to silica-based packings, Discovery® BIO PolyMA is resistant to chemical degradation at acidic and basic pH extremes.

Significant benefits include:

- Excellent separations of protein isoforms
- High resolution at low sample load
- Quantitative recovery – a hydrophilic surface eliminates protein adsorption
- High efficiency
- Wide pH range

Benefits of Polymethacrylic Polymers Over Other HPLC Particles

Competitive Particle	Benefits of Hydrophilic-coated Polymethacrylate (BIO PolyMA)
Polystyrene	BIO PolyMA is less hydrophobic, reducing the amount of secondary, non-specific interactions that can cause low protein recovery
Cross-linked Polysaccharides	BIO PolyMA is more mechanically stable, increasing column lifetime and operating flow rates
Silica	BIO PolyMA is more chemically stable, increasing the range of pH available to alter selectivity, or regenerate with base
Standard Polymethacrylate	BIO PolyMA hydrophilic coating gives better protein recovery

Discovery® BIO PolyMA-WAX Column

For use at pH greater than the protein isoelectric point (pI), usually at pH 7 or higher

mode of use anion-exchange

particle platform ..... polymethacrylate, spherical, monodispersed
phase ..... DEAE (diethylaminoethyl), Cl^- counter ion
surface coverage ..... 0.3 meq/g
pore size ..... 1,000 Å
operating pH range ..... 2 - 11
temp. range ..... 4-50 °C
max. pressure ..... 735 psi

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	59602-U	1 ea

Discovery® BIO PolyMA-SCX Column

For use at pH less than the protein isoelectric point (pI), usually at pH less than 7

mode of use cation-exchange

particle platform ..... polymethacrylate, spherical, monodispersed
phase ..... sulfopropyl, Na^+ counter ion
surface coverage ..... 0.3 meq/g
pore size ..... 1,000 Å
operating pH range ..... 1 - 13
temp. range ..... 4-50 °C
max. pressure ..... 735 psi

I.D. (mm)	L (cm)	Cat. No.	Qty
particle size 5 µm			
4.6	5	59601-U	1 ea

HPLC for Large Molecules

Ion Exchange Chromatography: *TSKgel® Ion Exchange Columns*

TSKgel® Ion Exchange Columns

TSKgel columns are highly efficient and combine sample purification with excellent recovery. Anion exchange and cation exchange columns are available packed with porous polymer, silica, and nonporous resin (NPR) particles. The various column types are described in the table below.

TSKgel 5PW and **NPR** ion exchange columns are stable between pH 2 - 12. **TSKgel SW** columns can be used from pH 2 - 7.5. **TSKgel 2SW** ion exchange columns (125 Å pores) are best suited for small molecular weight solutes, such as nucleotides. Larger biomolecules, including peptides and small proteins, can be analyzed on **TSKgel 3SW** ion-exchange columns (250 Å pores). The wide-pore (1,000 Å), polymer-based 5PW columns are suitable for analyses and purifications of large proteins and nucleic acids. Sample capacity for a 7.5 cm x 7.5 mm 5PW ion exchange column is approximately 1 mg. Proteins and nucleic acids can be analyzed 3-5 times faster on a nonporous **TSKgel NPR** column. The sample capacity of these columns for proteins is, however, 50-100 times smaller. **TSKgel DEAE-NPR** columns are commonly used to separate DNA fragments, particularly those obtained from the polymerase chain reaction (PCR). We strongly recommend using a DEAE-NPR guard column to protect the analytical column when analyzing PCR fragments. SP-NPR columns can provide fast results in hemoglobin A1c screening. Due to their small particle size (2.5 µm), packings in TSKgel NPR columns must be protected by using a precolumn filter containing a 0.5 µm frit (Supelco precolumn filter Cat. No. Z227323). The new **TSKgel STAT Series** columns are packed with non-porous resin particles and enable high speed and high resolution analysis and isolation of biomolecules. Also, **TSKgel BioAssist** columns are made of PEEK housing material to reduce sample absorption to stainless steel or glass.

TSKgel Anion Exchange Columns

	Q-STAT	**DNA-STAT**	**DEAE-5PW**	**DEAE-3SW**	**DEAE-2SW**	**DEAE-NPR**
Matrix	hydrophilic resin	hydrophilic resin	hydroxylated methacrylic polymer	hydrophilic silica	hydrophilic silica	hydroxylated methacrylic polymer
Particle Size (µm)	7, 10 (monodisperse)	5 (monodisperse)	10, 13, 20	10	5	2.5
Pore Size (Å)	non-porous	non-porous	1,000	250	125	non-porous
Functional Group	Quaternary	Quaternary	$-CH_2CH_2N^+(C_2H_5)_3$	$-CH_2CH_2N^+(C_2H_5)_3$	$-CH_2CH_2N^+(C_2H_5)_3$	$-CH_2CH_2N^+(C_2H_5)_3$
Counter Ion	Cl^-	Cl^-	Cl^-	Cl^-	$H_2PO_4^-$	Cl^-
pH Range	3–10	3–10	2–12	2–7.5	2–7.5	2–12
Exclusion Limit (PEG, Daltons)	not suitable for analytes <500 Da	not suitable for analytes <500 Da	1,000,000	30,000	10,000	500
Capacity (mg BSA/mL)	~25 (7 µm), ~20 (10 µm)	~35	30	120	not available	5
Small Ion Capacity	270 µeq/g dry gel	270 µeq/g dry gel	0.1 meq/mL	>0.3 meq/mL	>0.3 meq/mL	>0.1 meq/mL
pKa	10.5	10.5	11.5	11.2	11.2	11.2

TSKgel Cation Exchange Columns

	CM-STAT	**SP-STAT**	**SP-5PW**	**SP-NPR**	**CM-5PW**	**CM-2SW**	**CM-3SW**
Matrix	hydrophilic resin	hydrophilic resin	hydroxylated methacrylic polymer	hydroxylated methacrylic polymer	hydroxylated methacrylic polymer	spherical silica	spherical silica
Particle Size (µm)	7, 10 (monodisperse)	7, 10 (monodisperse)	10, 13, 20	2.5	10, 13	5	10
Pore Size (Å)	non-porous	non-porous	1,000	non-porous	1,000	125	250
Functional Group	Carboxymethyl	Sulfopropyl	$-(CH_2)_3SO_3^-$	$-(CH_2)_3SO_3^-$	$-CH_2COO^-$	$-CH_2COO^-$	$-CH_2COO^-$
Counter Ion	Na^+	Na^+	Na^+	Na^+	Na^+	Na^+	Na^+
pH Range	3–10	3–10	2–12	2–12	2–12	2–7.5	2–7.5
Exclusion Limit (PEG, Daltons)	not suitable for analytes <500 Da	not suitable for analytes <500 Da	1,000,000	500	1,000,000	10,000	30,000
Capacity (mg Lysozyme/mL)	~20 (7 µm), ~15 (10 µm)	~15 (7 µm), ~10 (10 µm)	40	5	45	110	not available
Small Ion Capacity	100 µeq/g dry gel	23 µeq/g dry gel	>0.1 meq/mL	>0.1 meq/mL	>0.1 meq/mL	>0.3 meq/mL	>0.3 meq/mL
pKa	4.9	2.6	2.3	2.3	4.2	4.2	4.2

HPLC for Large Molecules

Ion Exchange Chromatography: *TSKgel® Ion Exchange Columns*

TSKgel® Anion Exchange HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase BioAssist Q PEEK			
10	5 cm × 4.6 mm	819685	1 ea
13	10 cm × 10 mm	821410	1 ea
phase DEAE-2SW			
5	25 cm × 4.6 mm	807168	1 ea
5	25 cm × 2 mm	818761	1 ea
phase DEAE-3SW			
10	7.5 cm × 7.5 mm	807163	1 ea
phase DEAE-5PW			
10	7.5 cm × 7.5 mm	807164	1 ea
13	15 cm × 21.5 mm	807574	1 ea
10	7.5 cm × 2 mm	818757	1 ea
phase DEAE-NPR			
2.5	3.5 cm × 4.6 mm	813075	1 ea
phase DNA-NPR			
2.5	7.5 cm × 4.6 mm	818249	1 ea
phase DNA-STAT			
5	10 cm × 4.6 mm	821962	1 ea
phase Q-STAT			
7	10 cm × 4.6 mm	821961	1 ea
10	3.5 cm × 3.0 mm	821960	1 ea
phase SuperQ-5PW			
10	7.5 cm × 7.5 mm	818257	1 ea
13	15 cm × 21.5 mm	818387	1 ea

TSKgel® Anion Exchange HPLC Guard Column

TSKgel Guard Columns are stand-alone and do not require separate holders.

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase DEAE-NPR			
5	0.5 cm × 4.6 mm	817088	1 ea
phase DNA-NPR			
2.5	0.5 cm × 4.6 mm	818253	1 ea

TSKgel Guard, 0.5 cm x 4.6 mm I.D. (DEAE-NPR, Cat. No. 817088 shown)

TSKgel® Anion Exchange HPLC Guardgel Kit

Kit includes one cartridge, one stand-alone holder, 5 mL packing, 5 cm of 1/16 in. tubing, two nuts, and two ferrules.

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase DEAE-5PW			
20	2.5 cm × 6.0 mm	807210	1 kit
20	3.5 cm × 10 mm	816092	1 ea
phase SuperQ-5PW			
20	2.5 cm × 6 mm	818388	1 ea

TSKguardgel Kit, containing 5 mL packing, cartridge, frits, 1/16" tubing, nuts and ferrules (807210 is shown).

TSKgel® Anion Exchange HPLC Guardgel Cartridge

TSKgel Guard cartridges require a holder, which is sold separately. For 2 mm cartridges, the holder is Part No. **819308**. For the 3.2 mm cartridges used to protect 4.6 mm columns, the holder is Part No. **819018**.

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase DEAE-2SW			
5	1 cm × 2 mm	842154	3 ea
phase DEAE-5PW			
10	1 cm × 2 mm	842152	3 ea

TSKgel® Cation Exchange HPLC Column

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase BioAssist S PEEK			
7	5 cm × 4.6 mm	819686	1 ea
13	10 cm × 10 mm	821411	1 ea
phase CM-2SW			
5	25 cm × 4.6 mm	807167	1 ea
phase CM-3SW			
10	7.5 cm × 7.5 mm	807162	1 ea
phase CM-5PW			
10	7.5 cm × 7.5 mm	813068	1 ea
phase CM-STAT			
7	10 cm × 4.6 mm	821966	1 ea
10	3.5 cm × 3.0 mm	821965	1 ea
phase SP-2SW			
5	25 cm × 4.6 mm	807165	1 ea
phase SP-5PW			
10	7.5 cm × 7.5 mm	807161	1 ea
10	7.5 cm × 2 mm	818758	1 ea
13	15 cm × 21.5 mm	807575	1 ea
phase SP-NPR			
2.5	3.5 cm × 4.6 mm	813076	1 ea
phase SP-STAT			
7	10 cm × 4.6 mm	821964	1 ea
10	3.5 cm × 3.0 mm	821963	1 ea

HPLC for Large Molecules

Ion Exchange Chromatography: *TSKgel® Ion Exchange Columns*

TSKgel® Cation Exchange HPLC Guardgel Kit

Kit includes one cartridge, one stand-alone holder, 5 mL packing, 5 cm of 1/16 in. tubing, two nuts, and two ferrules.

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase CM-5PW			
10	2.5 cm × 6 mm	813069	1 kit
phase CM-SW			
10	2.5 cm × 6 mm	807650	1 kit
phase SP-2SW			
5	2.5 cm × 6 mm	807644	1 kit
phase SP-5PW			
20	2.5 cm × 6 mm	807211	1 kit
20	3.5 cm × 10 mm	816093	1 kit

TSKgel® Cation Exchange HPLC Guardgel Cartridge

TSKgel Guard cartridges require a holder, which is sold separately. For 2 mm cartridges, the holder is Part No. **819308**. For the 3.2 mm cartridges used to protect 4.6 mm columns, the holder is Part No. **819018**.

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase SP-5PW			
10	1 cm × 2 mm	842153	3 ea

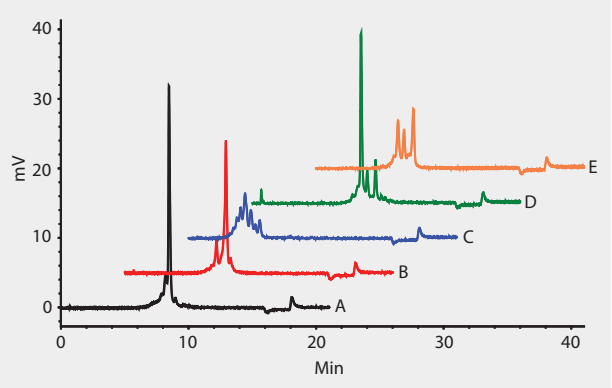
HPLC Analysis of mAb Charge Variants on TSKgel® CM-STAT

application for HPLC

A TSKgel CM-STAT weak cation exchange (WCX) column was applied to separate charge variants of several monoclonal antibodies. The typical analysis time on conventional 25 cm long WCX columns of about eighty minutes could be significantly reduced when separation was performed on a 10 cm TSKgel CM-STAT column, filled with 7 µm particles. The analysis profiles for five antibodies show that high resolution analysis can be obtained in about 20 minutes analysis time.

From "Ion Exchange Chromatography for the Characterization of Biotherapeutics" in The Supelco Reporter, Vol. 29.3, page 20.

compound class: peptides
column: TSKgel CM-STAT, 10 cm x 4.6 mm I.D., 7 µm particles (821966)
mobile phase: A: 20 mM MES buffer, pH 6.0
B: 0.5 M NaCl in buffer A, pH 6.0
gradient: 10% B (0 min.), 30% B (15 min.), 100% B (15 min.), 0% B (17 min.), 10% B (17 min.), 10% B (21 min.)
flow rate: 1 mL/min
column temp.: ambient
detector: UV at 280 nm
injection: 20 µL
sample: monoclonal antibodies (mAb A through E)
Application No.: G005458



Hydrophobic Interaction Chromatography (HIC)

Hydrophobic interaction chromatography (HIC) recognizes differences in protein surface hydrophobicity to achieve separation. Biomolecules adsorb to a hydrophobic surface at high salt concentrations and are eluted by a decreasing salt gradient. As a result, hydrophobic interaction chromatography combines the gentleness of salt precipitation with the precision of chromatography, for excellent recovery of protein activity.

Hydrophobic Interaction (HIC) columns for biomolecule separation offered by Supelco:

- TSKgel Ether-5PW, Phenyl-5PW, Butyl-NPR

TSKgel® Hydrophobic Interaction Chromatography (HIC) Column

Both hydrophobic interaction chromatography (HIC) and reversed-phase liquid chromatography separate on the basis of protein hydrophobicity and allow selective binding and desorption of proteins. However, HIC operates at significantly lower binding energy and uses aqueous mobile phases. These characteristics provide a gentle technique that is less likely to disturb protein conformation. As a result, HIC generally provides better activity recovery.

TSKgel Ether-5PW, Phenyl-5PW, and Butyl-NPR resin-based columns provide a range of hydrophobicities for chromatographic optimization. Ammonium sulfate concentration can be minimized by using a very hydrophobic packing (e.g.,butyl). We recommend an Ether-5PW column for purifying very hydrophobic proteins. Ether-5PW and Phenyl-5PW packings are based on TSKgel G5000PW resin - 10 µm particles with 1000 Å pores. Butyl-NPR packing is prepared from 2.5 µm nonporous particles, allowing rapid analyses. All three column types can be cleaned with 0.2 M NaOH. Scale-up can be performed by using corresponding Toyopearl bulk resins.

particle platform: polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase BioAssist Phenyl PEEK			
10	5 cm × 7.8 mm	820023	1 ea
phase Butyl-NPR			
2.5	3.5 cm × 4.6 mm	814947	1 ea
phase Ether-5PW			
10	7.5 cm × 2 mm	818760	1 ea
10	7.5 cm × 7.5 mm	808641	1 ea
phase Phenyl-5PW			
10	7.5 cm × 2 mm	818759	1 ea
10	7.5 cm × 7.5 mm	807573	1 ea
13	15 cm × 21.5 mm	807656	1 ea

TSKgel® Hydrophobic Interaction Chromatography (HIC) Guardgel Cartridge

TSKgel Guard cartridges require a holder, which is sold separately. For 2 mm cartridges, the holder is Part No. **819308**. For the 3.2 mm cartridges used to protect 4.6 mm columns, the holder is Part No. **819018**.

particle platform: polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Ether-5PW			
10	1 cm × 2 mm	842156	3 ea
phase Phenyl-5PW			
10	1 cm × 2 mm	842155	3 ea

HPLC for Large Molecules

Hydrophobic Interaction Chromatography (HIC)

TSKgel® Hydrophobic Interaction Chromatography (HIC) Guardgel Kit

Kit includes one cartridge, one stand-alone holder, 5 mL packing, 5 cm of 1/16 in. tubing, two nuts, and two ferrules.

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Phenyl-5PW			
20	2.5 cm × 6.0 mm	807652	1 kit
20	3.5 cm × 10 mm	816095	1 kit

Affinity Chromatography

Affinity chromatography allows purification of biomolecules on the basis of biological function or structure. The molecule to be purified is specifically and reversibly adsorbed by a complementary binding ligand immobilized on a matrix. The natural specificities of the interacting molecules offer high selectivities that can greatly reduce the time needed to purify the molecule.

Affinity columns or packings for biomolecule separation offered by Supelco:

- TSKgel Boronate-5PW, Chelate-5PW, Tresyl-5PW

TSKgel Boronate-5PW

- Immobilized Ligand: m-aminophenyl boronic acid
- Adsorption Capacity (per mL Gel): 40 µmol sorbitol
- Typical Uses: glycoproteins, nucleases, nucleotides, catecholamines, carbohydrates, transfer RNAs

TSKgel Chelate-5PW

- Immobilized Ligand: iminodiacetic acid
- Adsorption Capacity (per mL Gel): ~20 µmol Cu^{+2} or Zn^{+2}
- Typical Uses: serum proteins, interferon, collagenase, granule protein, plasminogen activator, lactoferrin

TSKgel Tresyl-5PW

- Immobilized Ligand: 2,2,2-trifluroethanesulfonyl (requires activation with a user-selected ligand containing amino, thiol, phenol, or imidazole groups)
- Adsorption Capacity (per mL Gel): > 60mg/g dry resin (coupling capacity w/soybean trypsin inhibitor)
- Typical Uses: "custom" affinity ligand, glycoproteins, antigens

TSKgel® Affinity HPLC Column

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Boronate-5PW			
10	7.5 cm × 7.5 mm	813066	1 ea
phase Chelate-5PW			
10	7.5 cm × 7.5 mm	808645	1 ea
phase BioAssist Chelate PEEK			
10	5 cm × 7.8 mm	820022	1 ea
phase Heparin-5PW			
10	7.5 cm × 7.5 mm	813064	
phase Tresyl-5PW			
10	4 cm × 6 mm	814455	

TSKgel® Affinity HPLC Guardgel Kit

Kit includes one cartridge, one stand-alone holder, 5 mL packing, 5 cm of 1/16 in. tubing, two nuts, and two ferrules.

mode of use affinity HPLC

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Boronate-5PW			
20	2.5 cm × 6 mm	813125	1 kit
phase Chelate-5PW			
20	2.5 cm × 6 mm	808647	1 kit

TSKgel® Affinity HPLC Packing

phase Tresyl-5PW, particle size 10 µm

TSKgel Tresyl-5PW Guardgel, 10µm, 2g

particle platform ..... polymer

816208 — 2 g

Hydrophilic Interaction Chromatography (HILIC)

Highly suited for polar compounds, like amino acids, metabolites, biogenic amines, phosphates and sugars, hydrophilic interaction chromatography (HILIC) separates compounds on polar stationary phases using highly organic mobile phases. For this reason, it is often considered a normal phase method. Retention in HILIC is thought to be a combination of hydrophilic, ion-exchange and reversed-phase interactions.

Hydrophilic Interaction (HILIC) columns offered by Supelco:

- Ascentis Silica and Ascentis Express Silica (described in the HPLC for Small Molecule section of this catalog)
- TSKgel Amide-80, NH2-100

TSKgel® Normal Phase/Hydrophilic Interaction (HILIC) Column

particle platform ..... silica

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Amide-80			
3	5 cm × 2 mm	821864	1 ea
3	15 cm × 2 mm	821865	1 ea
3	5 cm × 4.6 mm	821866	1 ea
3	15 cm × 4.6 mm	821867	1 ea
5	5 cm × 1 mm	820009	1 ea
5	10 cm × 1 mm	820010	1 ea
5	15 cm × 1 mm	821486	1 ea
5	25 cm × 1 mm	821487	1 ea
5	5 cm × 2 mm	819694	1 ea
5	10 cm × 2 mm	819695	1 ea
5	15 cm × 2 mm	819696	1 ea
5	25 cm × 2 mm	819697	1 ea
5	5 cm × 4.6 mm	819532	1 ea
5	10 cm × 4.6 mm	819533	1 ea
5	25 cm × 4.6 mm	813071	1 ea
10	30 cm × 7.8 mm	814459	1 ea
10	30 cm × 21.5 mm	814460	1 ea

HPLC for Large Molecules

Hydrophilic Interaction Chromatography (HILIC)

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Amide-80 HR			
5	25 cm × 4.6 mm	821982	1 ea
phase NH2-100			
3	5 cm × 4.6 mm	821969	1 ea
3	15 cm × 4.6 mm	821970	1 ea
3	5 cm × 2 mm	821967	1 ea
3	15 cm × 2 mm	821968	1 ea

TSKgel® Normal Phase/Hydrophilic Interaction (HILIC) Guard Column

TSKgel Guard Columns are stand-alone and do not require separate holders.

particle platform ..... silica

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Amide-80			
5	1 cm × 4.6 mm	819021	1 ea
10	7.5 cm × 21.5 mm	814461	1 ea

TSKgel® Normal Phase/Hydrophilic Interaction (HILIC) Guardgel Cartridge

TSKgel Guard cartridges require a holder, which is sold separately. For 2 mm cartridges, the holder is Part No. **819308**. For the 3.2 mm cartridges used to protect 4.6 mm columns, the holder is Part No. **819018**.

particle platform ..... silica

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase Amide-80			
3	1 cm × 2 mm	821862	3 ea
3	1.5 cm × 3.2 mm	821863	3 ea
5	1 cm × 2 mm	821941	3 ea
5	1.5 cm × 3.2 mm	819010	3 ea
phase NH2-100			
3	1.0 cm × 2 mm	821971	3 ea
3	1.5 cm × 3.2 mm	821972	3 ea

Gel Permeation Chromatography (GPC)

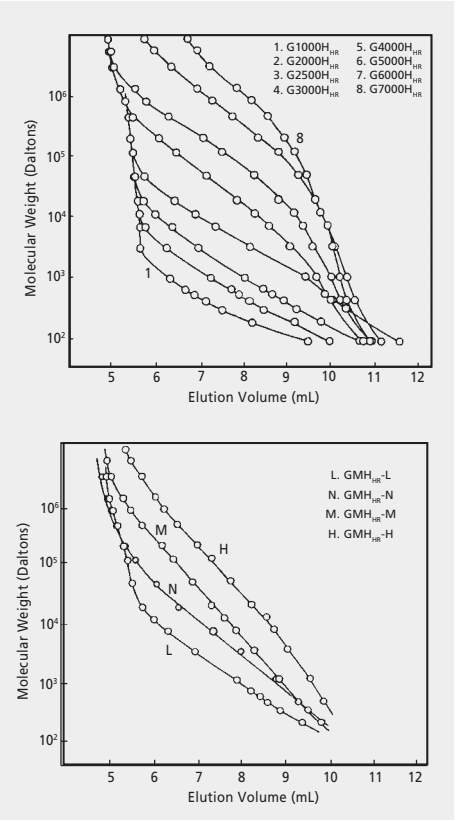
Gel permeation chromatography (GPC) is a form of size exclusion. It is often used for molecular weight determination of synthetic organic polymers. Unlike GFC, mobile phases are totally organic.

Gel Permeation (GPC) columns for polymer separation offered by Supelco:

- TSKgel H, SuperH, H_{HR}, and H_{XL} series

Using Calibration Curves

GPC is widely used for fingerprinting molecular weights of industrial polymers. For compounds of similar molecular shape, a sigmoidal calibration curve is obtained by plotting the logarithm of molecular weight (MW) versus the elution volume (V_e) for molecules of known weight. The optimal separation range is defined by the linear portion of this curve. Once a calibration curve is prepared, the elution volume for a polymer of similar shape, but unknown weight, can be used to determine the MW. Results are most accurate when the investigator prepares the calibration curve and determines the molecular weight of the unknown molecule on the same day, with the same mobile phases, etc.



Sample elution by molecular weight on TSKgel H_{HR} GPC columns

columns: TSKgel H_{HR} Series, 30 cm x 7.8 mm I.D., 5 µm particles
mobile phase: THF
flow rate: 1 mL/min.
temp.: ambient
det.: UV at 254 nm
sample: polystyrene standards

HPLC for Large Molecules

Gel Permeation Chromatography (GPC): *TSKgel® Gel Permeation (GPC) Columns*

TSKgel® Gel Permeation (GPC) Columns

Column	Analyte Molecular Weight Range (Daltons)
G1000H	<1,500
G2000H	<4,000
G2500H	$<1.2 \times 10^4$
G3000H	$<3.0 \times 10^4$
G4000H	$<5.5 \times 10^5$
G5000H	$<1.5 \times 10^6$
G6000H	$<\sim1 \times 10^7$
G7000H	$<\sim5 \times 10^7$
GMH-H	$<\sim1 \times 10^7$
GMH-L	$<1.0 \times 10^4$
GMH-M	$<1.0 \times 10^6$

TSKgel® Size Exclusion (H-Type) HPLC Column

TSKgel H series gel permeation columns are stable in solvents having a wide range of polarities. The particles do not swell or shrink as the solvent is changed from toluene through methanol. However, these columns cannot be used with polar solvents, such as water or water:methanol mixtures. Spherical 5 µm polystyrene/divinylbenzene particles provide a minimum of 16,000 plates per 30 cm x 7.8 mm I.D. column. Eight pore sizes are available, ranging from an exclusion limit of about 2,000 Daltons for G1000H_{HR} columns to more than 10,000,000 Daltons for G7000H_{HR} columns. The four mixed bed columns (H, L, M, N) feature extended linear molecular weight operating ranges for sample screening or more formal analyses.

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase G1000Hhr			
5	30 cm × 7.8 mm	817352	1 ea
phase G1000Hxl			
5	30 cm × 7.8 mm	816131	1 ea
phase G2000Hhr			
5	30 cm × 7.8 mm	817353	1 ea
phase G2000Hxl			
5	30 cm × 7.8 mm	816134	1 ea
phase G2500Hhr			
5	30 cm × 7.8 mm	817354	1 ea
phase G2500Hxl			
5	30 cm × 7.8 mm	816135	1 ea
phase G3000Hhr			
5	30 cm × 7.8 mm	817355	1 ea
phase G3000Hxl			
6	30 cm × 7.8 mm	816136	1 ea
phase G4000Hhr			
5	30 cm × 7.8 mm	817356	1 ea
phase G4000Hxl			
6	30 cm × 7.8 mm	816137	1 ea
phase G5000Hhr			
5	30 cm × 7.8 mm	817357	1 ea
phase G5000Hxl			
9	30 cm × 7.8 mm	816138	1 ea
phase G6000Hhr			
5	30 cm × 7.8 mm	817358	
phase G6000Hxl			
9	30 cm × 7.8 mm	816139	1 ea
phase G7000Hxl			
9	30 cm × 7.8 mm	816140	1 ea
phase GMHhr-H(S) HT			
13	30 cm × 7.8 mm	818393	1 ea
phase GMHhr-L			
5	30 cm × 7.8 mm	817362	1 ea
phase GMHhr-M			
5	30 cm × 7.8 mm	817392	1 ea
phase GMHxl-L			
6	30 cm × 7.8 mm	816652	1 ea
phase Multipore Hxl-M			
5	30 cm × 7.8 mm	818403	1 ea
phase SuperH1000			
3	15 cm × 6 mm	817990	1 ea
phase SuperH2000			
3	15 cm × 6 mm	817991	1 ea
phase SuperH2500			
3	15 cm × 6 mm	817992	1 ea
phase SuperH3000			
3	15 cm × 6 mm	817993	1 ea
phase SuperH4000			
3	15 cm × 6 mm	817994	1 ea
phase SuperH5000			
3	15 cm × 6 mm	817995	1 ea
phase SuperH6000			
5	15 cm × 6 mm	817996	1 ea
phase SuperH7000			
5	15 cm × 6 mm	817997	1 ea
phase SuperHM-H			
3	15 cm × 6 mm	818001	1 ea
phase SuperHM-L			
3	15 cm × 6 mm	817998	1 ea
phase SuperHM-M			
3	15 cm × 6 mm	818000	1 ea
phase SuperHM-N			
3	15 cm × 6 mm	817999	1 ea
phase SuperH-RC			
4	15 cm × 4.6 mm	818004	1 ea
phase SuperHZ1000			
3	15 cm × 4.6 mm	819309	1 ea
3	15 cm × 6 mm	819302	1 ea
phase SuperHZ2000			
3	15 cm × 4.6 mm	819310	1 ea
3	15 cm × 6 mm	819303	1 ea
phase SuperHZ2500			
3	15 cm × 4.6 mm	819311	1 ea
3	15 cm × 6 mm	819304	1 ea
phase SuperHZ3000			
3	15 cm × 4.6 mm	819312	1 ea
3	15 cm × 6 mm	819305	1 ea
phase SuperHZ4000			
3	15 cm × 4.6 mm	819313	1 ea
3	15 cm × 6 mm	819306	1 ea

HPLC for Large Molecules

Gel Permeation Chromatography (GPC): *TSKgel® Gel Permeation (GPC) Columns*

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase SuperHZM-H			
10	15 cm × 6 mm	819665	1 ea
phase SuperHZM-N			
3	15 cm × 4.6 mm	819660	1 ea
3	15 cm × 6 mm	819661	1 ea
phase SuperMultiporeHZ-H			
6	15 cm × 4.6 mm	821885	1 ea
phase SuperMultiporeHZ-M			
4	15 cm × 4.6 mm	821488	1 ea
phase SuperMultiporeHZ-N			
3	15 cm × 4.6 mm	821815	1 ea

TSKgel® Size Exclusion (H-Type) HPLC Guard Column

TSKgel Guard Columns are stand-alone and do not require separate holders.

particle platform ..... polymer

Particle Size (µm)	L × I.D.	Cat. No.	Qty
phase GMH			
30	7.5 cm × 7.5 mm	818397	1 ea
phase HHR-H			
5	4 cm × 6 mm	817369	
phase HHR-L			
5	4.0 cm × 6.0 mm	817368	1 ea
phase Hxl-H			
13	4.0 cm × 6.0 mm	813727	1 ea
phase Hxl-L			
6	4.0 cm × 6.0 mm	807113	1 ea
phase Multipore			
5	4 cm × 6 mm	818404	1 ea
phase SuperH-H			
3	3.5 cm × 4.6 mm	818003	1 ea
phase SuperH-L			
3	3.5 cm × 4.6 mm	818002	1 ea
phase SuperHZ			
3	3.5 cm × 4.6 mm	819666	1 ea
phase SuperHZ-L			
3	2 cm × 4.6 mm	819314	1 ea

H_{HR}-L guard used to protect G1000H_{HR} to G4000H_{HR} and GMH_{HR}-L columns.

TSKgel® Hardware and Accessories

Hardware for TSKgel columns is available from Supelco. Photographs of these items can be found on our website.

Description	Cat. No.	Qty
Endfitting with fixed 1 µm frit for TSKgel® Super Series columns	818255	1 ea
Endfitting with fixed 1 µm frit for TSKgel® NPR columns	813998	1 ea
Endfitting with fixed 2 µm frit for all 4.6 mm I.D. TSKgel® stainless steel columns	807619	1 ea
Endfitting with fixed 2 µm frit for all 6 mm I.D. TSKgel® stainless steel columns	808092	1 ea
Endfitting with fixed 2 µm frit for all 7.8 mm I.D. TSKgel® stainless steel columns	808095	1 ea
Endfitting with fixed 10 µm frit for all 7.5 mm I.D. TSKgel® stainless steel columns	805748	1 ea
Replacement 0.5 µm stainless steel frits for 2 mm I.D. TSKgel® columns	803411	10 ea
Replacement 2 µm stainless steel frits for 7.5 mm I.D. TSKgel® Guardgel holder	803430	10 ea
Low dead volume precolumn filter with 0.5 µm stainless steel frit	803410	1 ea
Guardfilter for 4.6 mm I.D. TSKgel® Super Series columns	818207	3 ea
Holder for TSKgel® Super Series Guardfilters	818206	1 ea
Holder for 2 mm I.D. TSKgel® Guardgel cartridges	819308	1 ea
Holder for 3.2 mm I.D. TSKgel® Guardgel cartridges	819018	1 ea
Holder for 7.5 mm I.D. TSKgel® Guardgel cartridges	807093	1 ea
Holder for 21.5 mm I.D. TSKgel® Guardgel cartridges	816106	1 ea

Note: 807093 replaces 803432.

HPLC Column Test Mixes

Performance Evaluation

HPLC Column Test Mixes

Performance Evaluation

Well-defined test mixes enable you to troubleshoot chromatographic problems, optimize system efficiency, and evaluate columns under conditions where their performance is understood. We ship these test mixes in amber ampules to prevent photodegradation, and we include instructions for proper use and interpretation of results. Choose from column-specific or application-specific mixes. All mixes except the amino phase test mix (Cat. No. 58424) call for UV detection; the amino phase test mix (sugars) calls for refractive index detection. We recommend our HPLC Troubleshooting Guide (Bulletin 826) for additional information about using test mixes.

HPLC Column Test Mixes

LC-NH_2 Test Mix

in acetonitrile: water (25:75), analytical standard

use to QA LC-NH2 columns

Components

D-(−)-Fructose 25 mg/mL
α-D-Glucose 25 mg/mL
Lactose 25 mg/mL
Maltose 25 mg/mL
Sucrose 25 mg/mL

58424	1 mL

LC-CN/LC-PCN Test Mix

in acetonitrile: water (varied conc.), solution, analytical standard

use to QA LC-CN, LC-PCN columns, any weakly hydrophobic phase

Components

Acetophenone 7 µg/mL
Benzene 750 µg/mL
Toluene 775 µg/mL
Uracil 7 µg/mL

58299	1 mL

Normal Phase Test Mix

in methylene chloride (varied conc.), analytical standard

use to QA LC-Si (silica) columns

Components

Acetanilide 20 µg/mL
Benzanilide 20 µg/mL
Benzene 600 µg/mL

58281	1 mL

Normal Phase Mix 2

1000 µg/mL each component in ethanol:hexane (05:95), analytical standard

use to QA LC-Si, LC-CN, LC-NH2 columns

Components

Diethyl phthalate
Dimethyl phthalate
Toluene

store at: 2-8°C

47640-U	1 mL

Nucleosides Test Mix

in 1% sodium formate (varied conc.), analytical standard

use to QA LC-18-S columns

Components

Cytidine 50 µg/mL
Guanosine 25 µg/mL
Inosine 25 µg/mL
1-Methyladenosine 25 µg/mL
5-Methylcytidine 50 µg/mL
2′-O-Methylcytidine 20 µg/mL
3-Methylcytidine methosulfate 100 µg/mL
7-Methylguanosine 25 µg/mL
5-Methyluridine 100 µg/mL
β-Pseudouridine 25 µg/mL
2-Thiocytidine 10 µg/mL
Uridine 25 µg/mL

store at: 2-8°C

47310-U	1 mL

HPLC peptide standard mixture

Peptide standard

use to QA Reversed phase columns

composition

angiotensin II
Gly-Tyr
Leu enkephalin
Met enkephalin
Val-Tyr-Val

Amber vials containing a dried film composed of approx. 0.5 mg each of Gly-Tyr, Val-Tyr-Val, methionine enkephalin, leucine enkephalin and angiotensin II.

concentration ..... ~0.5 mg each component (dried film)

store at: −20°C

H2016-1VL	1 vial

Reversed Phase Test Mix 1

in methanol: water (3:2) (varied conc.), analytical standard

use to QA hydrophobic reversed phase columns

Components

Acetophenone 7 µg/mL
Benzene 750 µg/mL
Toluene 775 µg/mL
Uracil 7 µg/mL

58278	1 mL

Reversed Phase Test Mix 2

in acetonitrile: water (varied conc.), solution, analytical standard

use to QA hydrophobic reversed phase columns

Components

N,N-Diethyl-*m*-toluamide 600 µg/mL
Phenol 700 µg/mL
Toluene 4000 µg/mL
Uracil 5 µg/mL

store at: 2-8°C

47641-U	1 mL

HPLC Column Test Mixes

Performance Evaluation

Amide Test Mixture

in acetonitrile: water (1:1) (varied conc.), analytical standard

use to QA hydrophobic reversed phase columns

Components

Uracil 7 µg/L
Acetophenone 7 µg/L
Benzene 750 µg/L
Toluene 775 µg/L

47084-U	1 mL

Chiral Test Mix for Astec CHIROBIOTIC®

5-Methyl-5-phenylhydantoin
$C_{10}H_{10}N_2O_2$ FW 190.20

analytical standard

5-Methyl-5-phenylhydantoin is used to evaluate the performance of Astec CHIROBIOTIC® chiral HPLC columns. The mobile phase is 100% methanol and detection is by UV at 254 nm. The test mix is supplied as a racemic mixture of two enantiomers in methanol.

Components

5-Methyl-5-phenylhydantoin 5000 µg/mL

40095-U	1 mL

Chiral Normal Phase Test Mix

30 µg/mL each component in hexane, analytical standard

Trans-stilbene oxide (TSO) is used to evaluate the performance of Astec Cellulose DMP and other polysaccharide-based chiral HPLC columns. The recommended mobile phase is 10:90 IPA:hexane and detection is by UV at 220 nm. The test mix is supplied as a racemic mixture of the two TSO enantiomers with 1,3,5-tri-tert-butylbenzene as a void volume marker. The solvent is hexane.

Components

trans-Stilbene oxide
1,3,5-tri-t-Butylbenzene

40119-U	1 mL

Custom Test Mixes

For information on made-to-order standards and test mixes, call our Technical Service chemists, or request our Custom Chemical Reference brochure (Publication No. 196905).

System Diagnostics

System diagnostics: test kits and column regeneration solutions.

Silica Column Regeneration Solution

This solution effectively regenerates a silica column that has come into contact with very strongly polar solvents, such as water or alcohols. Simply flush the column with regeneration solution for 10 minutes, then re-equilibrate with mobile phase for 10 minutes. Column performance usually is restored to that obtained before exposure to the polar solvent.

System Diagnostic Kit

Take a systematic approach to diagnosing problems in an HPLC system. This kit consists of:

- 5 cm × 4.6 mm SUPELCOSIL LC-18 column
- 6 × 1 mL Isocratic Evaluation Mix
- 6 × 1 mL Gradient Evaluation Mix

When you need to determine the cause of a problem, install the 5 cm column, prepare a simple methanol:water mobile phase, and inject 10 µL of Isocratic Evaluation Mix onto the column.

Compare your chromatogram with that from a properly performing system and use the information sheet included with the kit to help isolate the source of the problem. If necessary, make injections with the gradient mix.

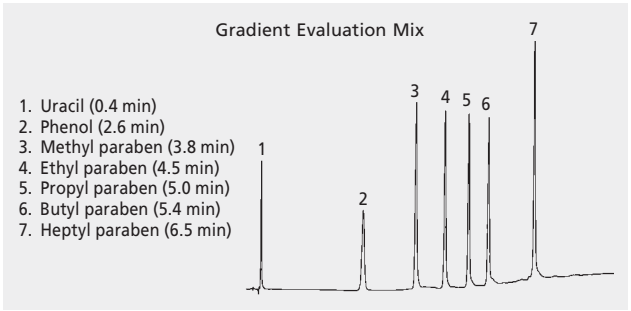
We recommend our HPLC Troubleshooting Guide (Bulletin 826, available free on request) to help you interpret the results you obtain.

Evaluation Test Mixes

Six 1 mL ampules of test compounds in methanol:water (60:40).
These formulations are designed for evaluating how reliably a chromatographic system is providing such fundamentally important parameters as flow rate, proportioning, and mixing.

HPLC Column Evaluation Test Mix

Description	Cat. No.	Qty
HPLC Gradient System Diagnostics Mix	48271	6 × 1 mL
HPLC Isocratic Systems Diagnostics Mix	48270-U	6 × 1 mL
LC-18SD System Diagnostic Kit	58543	1 ea
Silica Column Regeneration Solution	33175	200 mL



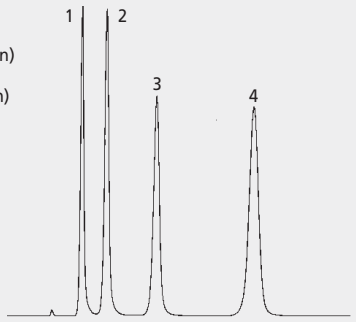
flow rate: 2 mL/min methanol:water, 10:90 to 90:10 in 5 min
det.: UV, 254 nm
injection: 10 µL

HPLC Column Test Mixes

System Diagnostics

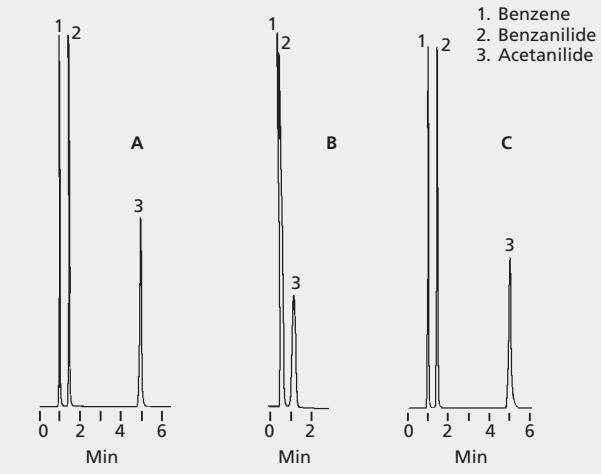
Isocratic Evaluation Mix

1. Methyl paraben (0.9 min)
2. Ethyl paraben (1.2 min)
3. Propyl paraben (1.7 min)
4. Butyl paraben (2.9 min)



flow rate: 2 mL/min
det.: UV, 254 nm
injection: 10 L

Properly performing column (A) is exposed to water and alcohol (B), then treated with Silica Column Regeneration Solution (C).



column: SUPELCOGEL LC-Si, 15 cm × 4.6 mm I.D., 3 µm particles
58981
mobile phase: A = methylene chloride:methanol:water (99.4:0.5:0.1)
B = 2-propanol:water (50:50)
C = Silica Column Regeneration Solution, 4 mL/min for 10 min,
then methylene chloride:methanol:water (99.4:0.5:0.1),
2 mL/min for 10 min
det.: UV, 254 nm
injection: 10 µL

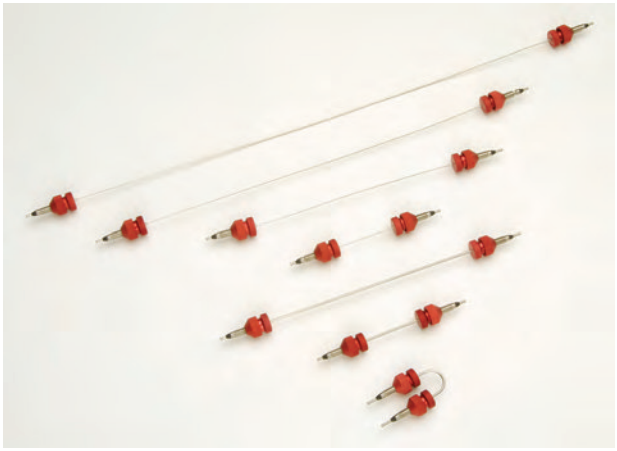
HPLC Accessories

Supel™Connect High Performance Fittings

The use of HPLC systems to achieve faster analyses and increased resolution pushes systems toward higher operating pressures. Our selection of Supel™Connect High Performance Interconnects and Fittings will assist the chromatographer in maximizing system performance and relibility.

Double Ended Interconnects

These high pressure HPLC fittings/interconnects help eliminate dead volume, a leading contributor of peak broadening and decreased resolution. The fittings, made of 316 stainless steel, incorporate a sliding ferrule design for use in any port. Two degrees of freedom in compressing the ferrule provide ease of use. Partial separation of radial and axial tightening forces allows the fitting to withstand pressures greater than 15,000 psi. Available in both rigid and flexible versions, these high performance fittings will not damage HPLC ports even if over-tightened.



Top to Bottom: 53684-U, 53683-U, 53682-U, 53681-U, 53689-U, 53688-U, 53686-U

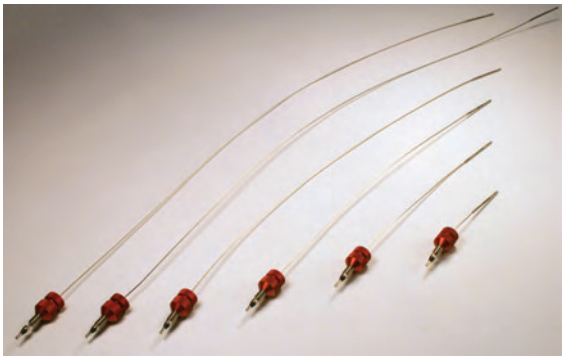
Length (cm)	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
10	1/32	0.005	53681-U	1 ea
20	1/32	0.005	53682-U	1 ea
30	1/32	0.005	53683-U	1 ea
40	1/32	0.005	53684-U	1 ea
20	1/32	0.010	53685-U	1 ea
10	1/16	0.005	53686-U	1 ea
10	1/16	0.005	53687-U	1 ea
10	1/16	0.010	53688-U	1 ea
20	1/16	0.010	53689-U	1 ea
55	1/16	0.005	54252-U	1 ea
55	1/16	0.007	54253-U	1 ea

HPLC Accessories

Supel™Connect High Performance Fittings: *Single Ended Interconnects*

Single Ended Interconnects

High Performance Fittings are available in single ended configurations. The single ended fitting is useful when only a single end will have frequent connections and the other end will be permanently connected.



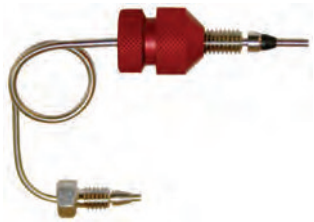
Left to Right: 53628-U, 53627-U,53625-U, 53617-U, 53614-U, 53613-U

Length (cm)	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
10	1/32	0.005	53613-U	1 ea
20	1/32	0.005	53614-U	1 ea
30	1/32	0.005	53617-U	1 ea
40	1/32	0.005	53625-U	1 ea
55	1/32	0.007	53627-U	1 ea
55	1/32	0.005	53628-U	1 ea

Agilent® 1100/1200 Interconnect

For Agilent 1100/1200

The high performance fitting is now available for the Agilent 1100/1200 HPLC system. Semi-rigid 316 stainless steel tubing connects one end to the heater outlet, and allows use of columns by any manufacturer with confidence that the high performance UHPLC fitting is completely seated in the column inlet port. An improtant feature of this fitting is the 'service loop ', which allows the column to be semi-rigdily supported.



Length (cm)	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
15	1/16	0.005	53629-U	1 ea

Ferrules

Replacement Ferrules for High Performance HPLC Fittings

for use with 1/16 in. O.D. tubing
black PEEK (with stainless steel lock rings)

53690-U	10 ea

Supel™Connect Fittings

- Fitting are for use with PEEK/PEEKSil or stainless steel tubing
- Used at pressures to 15,000 psi
- SupelConnect Better Nut allows use in tighter places

SupelConnect Long and Short High Performance fitting adjust to any port depth

Bottom, 51368-U. Counter clockwise left to right, 51361-U, 51389-U, 51367-U, 51369-U, 51366-U, 51380-U, 51365-U

Description	Cat. No.	Qty
Better Nut, 1/16 in.	51359-U	10 ea
Better Nut with stainless steel ferrule	51361-U	2 ea
Better Nut with PEEK ferrule	51365-U	2 ea
Better Nut, XL (extra long) with stainless steel ferrule, 1/16 in.	51389-U	2 ea
Better Nut, XL (extra long) with PEEK ferrule, 1/16 in.	51380-U	2 ea
Short Fitting with Ferrules	51366-U	2 ea
Long Fitting with Ferrules	51367-U	2 ea
UHPLC fitting	51368-U	1 ea
UHPLC fitting ferrule crimping tool	51369-U	1 ea
stainless steel ferrule	51392-U	10 ea
PEEK ferrrule	51394-U	10 ea

HPLC Accessories

Upchurch Scientific Fittings and Accessories: *Ultra-High Performance Fingertight Fittings*

Upchurch Scientific Fittings and Accessories

Ultra-High Performance Fingertight Fittings

Ultra-High Performance Fingertight Fittings

The innovative line of Upchurch Ultra High Performance fittings are desigined to withstand extreme temperature anf pressures. This line of fittings is perfect for use within the increasingly demanding requirements for today's high performance analytical systems. The fittings are a 10/32 fingertight style for use with 1/16" and 1/32" OD tubing.

51256-U

51263-U

51262-U

Description	Cat. No.	Qty
PEEK (LiteTouch® Nut (Black), 10-32), for use with 1/32" tubing	51256-U	10 ea
PEEK (LiteTouch micro ferrule (black), 1/32 in.), for use with (1/32" tubing)	51257-U	10 ea
PEEK (LiteTouch ferrule assembly 1/16" (black)), for use with (1/16" tubing)	51258-U	10 ea
PEEK (FingerTight nut (black) 10-32), for use with (1/16" tubing)	51262-U	10 ea
PEEK (SealTight Short fitting (black) with ferrule, 10-32), for use with (1/16" tubing)	51263-U	10 ea

Ultra-High Pressure Stainless Steel Fittings

Description	Cat. No.	Qty
for use with (1/16" tubing)	51264-U	10 ea
for use with (1/32" tubing)	51265-U	10 ea

Ultra-High Pressure Stainless Steel Adapter

Description	Cat. No.	Qty
configured for (for adapting 1/16" OD to 1/32" tubing)	51267-U	1 ea

Upchurch Ultra Low Volume Precolumn Filter

Upchurch Ultra-Low Volume Precolumn Filter

These precolumn filters have a .020" diameter through hole, a stainless steel body, and are pressure rated to 9000 psi (620 bar). They will accept 1/16" tubing and standard 10-32 threaded high pressure fittings.

Description	Cat. No.	Qty
2 µm	51231-U	1 ea
0.5 µm, Solvent filter assembly with frit (1.3µL swept volume)	51232-U	1 ea

Upchurch Ultra-Low Volume Precolumn Filter

With a .010" diameter thru-hole, this filter has one of the lowest swept volumes of any HPLC precolumn filter available, ensuring maximum protection with very little band broadening. It is pressure rated to 9,000 psi (620 bar).

Description	Cat. No.	Qty
0.5 µm	51233-U	1 ea

Frits for Upchruch Ultra-Low Volume Precolumn Filter

stainless steel

Description	Cat. No.	Qty
2 µm	51234-U	10 ea
0.5 µm	51235-U	10 ea

Upchurch Mini MicroFilter Assembly

Upchurch Mini MicroFilter Assembly

Ultra-low swept volume - 0.85 µL. Use with Microtight tubing sleeves for capillary tubing. Available with 1 µm or 2 µm frit capsules (stainless steel frit in color-coded PEEK capsule). 57421-U includes 5, 2µm filter capsules, 2 microferrules, and 2 female natural PEEK nuts and catalog number 54722-U includes 5, 1µm filter capsules, 2 microferrules, and 2 female natural PEEK nuts. 51242-U includes 5, 1 µm nano filter capsule (PEEK with stainless steel frit), 2, microferrule for 360 µm O. D. tubing, 2 female nuts. 51243-U ncludes 5, 1 µm nano filter capsule (PEEK with titanium frit), 2, microferrule for 360 µm O. D. tubing, 2 female nuts.

Description	Cat. No.	Qty
1 µm, stainless steel screen	54722-U	1 ea
2 µm, stainless steel screen	54721-U	1 ea
1 µm, stainless steel frit	51242-U	1 ea
1 µm, titanium frit	51243-U	1 ea

Capsules for Mini MicroFilter Assembly

Description	Cat. No.	Qty
2.0 µm, PEEK natural	54723-U	2 ea
1.0 µm, red PEEK	54724-U	2 ea

HPLC Accessories

Upchurch Scientific Fittings and Accessories: *Nonmelallic Check Valves*

Nonmelallic Check Valves

Nonmetallic 1/4-28 and Inline Cartridge Check Valves

These check valves function well in both low and high pressure applications. Low internal volume also allows them to be used in areas where flow path volume is important; however, higher flows can pass through with minimal pressure drop. Metal-free composition makes the check valve perfect for use with corrosive fluids or biological samples.

Description	Cat. No.	Qty
inlet check valve,1/4"-28 male to 1/4"- 28 female	51245-U	1 ea
inlet/outlet check valve,1/4"-28 female to 1/4' female	51246-U	1 ea

Nonmetallic Micro-Volume Inlet Check Valve

Micro-Volume check valve is ideal for applications where low flow path volume is critical, such as micro or nano LC post-column derivitization. It is made of biocompatible and chemically resistant PEEK material.

Description	Cat. No.	Qty
inlet/outlet check valve, 10/32 female to 10-32 female	51247-U	1 ea

Disposable Filters

Disposable Sample Filters

The disposable sample filters are designed to remove particles from analytical HPLC samples. The polypropylene holder incorporates a 1/32" thick, 1/8" diameter stainless steel frit, which causes very little back pressure. To use, attach the filter onto the end of any standard luer syringe.

Description	Cat. No.	Qty
2 µm	51249-U	100 ea
0.5 µm	51252-U	100 ea

Low Pressure Valves, Micro Valves

Upchurch Micro-Valves

- Inert PEEK construction
- Flow rates as low as 3.5 µL/minute (water)
- 1/4-28 or 10-32 $^{1}/_{16}$ in. fittings

Micro-Metering Valve (Low Pressure)

Micro-Splitter Valve (Low Pressure)

Micro-Splitter Valve (High Pressure)

Specifications

Internal Volume	1/4–28 valves	4/13 µL fully opened; 2.1 µL closed
	10–32 valves:	2.8 µL fully opened; 1.2 µL closed
	10–32/6–32 valves:	2.5 µL fully opened; 1.2 µL closed
Thru-Hole	54720-U:	0.010 in.
	All others:	0.020 in.
Pressure Rating	Low pressure valves:	800 psi (54 bar)
	High pressure valves:	5,000 psi (338 bar)

Description	Cat. No.	Qty
Micro-Metering Valve (Low Pressure), 1/4-28 flangeless fittings	502367	1 ea
Micro-Metering Valve (Low Pressure), 10-32 fingertight fittings	502375	1 ea
Micro-Splitter Valve (Low Pressure), 1/4-28 flangeless fittings	502383	1 ea
Micro-Splitter Valve (Low Pressure), 10-32 fingertight fittings	502391	1 ea
Micro-Splitter Valve (High Pressure), 10-32 fingertight fitting	54719-U	1 ea
Micro-Splitter Valve (High Pressure), 10-32 for × 2, 6-32 for × 1 fingertight fitting	54720-U	1 ea

Upchurch Micro-Valve Replacement Fittings

Description	Cat. No.	Qty
Flangeless Fitting, nut and ferrule: 1/4-28 male Upchurch, for tubing $^{1}/_{16}$ in. O.D.	58685	5 ea
Ferrules, 1/4-28 Upchurch for tubing $^{1}/_{16}$ in. O.D. (requires Flangeless nut), ferrule only	56700-U	10 ea
MicroFingertight I Fitting, one-piece design	502405	10 ea

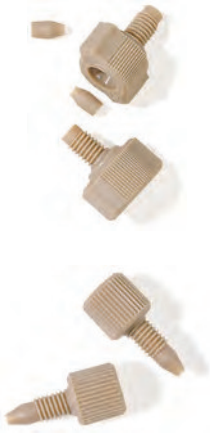
HPLC Accessories

Upchurch Scientific Fittings and Accessories: *Low Pressure Valves, Micro Valves*

Upchurch PEEK Fingertight Fitting

The one-piece fitting, 55067-U, is convenient to use because the ferrule will not stick in a receiving port and can be easliy found if dropped onto the floor. The two-piece fitting features a separate ferrule so you can replace just the ferrule instead of the entire unit. The Upchurch PEEK Fingertight fittings are for use with 1/16″ O.D. tubing and can be used to 6,000 psi (420 kg/cm^2).

I.D. ..... 0.0625 in. (1.5875 mm)



Description	Cat. No.	Qty
fitting: 10-32 (one-piece)	55067-U	10 ea
nut and ferrule: 10-32	57654	10 ea
nut and ferrule: 1/4-28	57656	10 ea

Upchurch Precolumn MicroFilter

PEEK housing with in-line filter connects capillary tubing (using Microtight tubing sleeves) or $^1/_{16}$ in. O.D. tubing to female 10-32 fitting. Swept volume of 0.3 µL. Includes 5 × 0.5 µm frits (one installed).

Left to right-502669, 502693

Description	Cat. No.	Qty
for use with 0.025 in. O.D. tubing, PEEK frit	502677	1 ea
for use with 0.025 in. O.D. tubing, stainless steel frit	502669	1 ea
for use with $^1/_{16}$ in. O.D. tubing, PEEK frit	502693	1 ea
for use with $^1/_{16}$ in. O.D. tubing, stainless steel frit	502685	1 ea

Frits for Precolumn MicroFilter

Description	Cat. No.	Qty
PEEK, 0.5 µm	502790	10 ea
stainless steel, 2.0 µm	502723	10 ea
stainless steel, 0.5 µm	502731	10 ea

Upchurch PEEK Micro-Fittings

Upchurch PEEK Microtight Fittings

These fittings are designed for connecting fused silica or other capillary tubing, using Upchurch PEEK Microtight tubing sleeves. For the appropriate sized tubing sleeve, choose one that has an I.D. 0.002 - 0.003 in. greater than the O.D. of your tubing.

MicroFingertight I Fitting

- **one-piece design**

The 6-32 fitting connects capillary tubing to Microtight union, adapter, or filter.

MicroFingertight I Fitting

502405	10 ea

MicroTight Unions

Description	Cat. No.	Qty
PEEK, for use with 1/32" tubing	51268-U	1 ea
PEEK (.006" thru-hole), for use with (360 µm tubing)	51271-U	1 ea

Upchurch PEEK Microtight® Connector

Description	Cat. No.	Qty
Connects 1/16″ capillary tubing	502421	1 ea
Butt connects 2 pieces of capillary. True zero dead volume design	502413	1 ea

MicroTight Adapters

These adapters will help create a true zero dead volume (ZDV) connection between 1/16" I.D. tubing and capillary tubing. MicroTight Adapters allow connection of 1/16" O.D. tubing directly to 1/32" O.D. and 360 µm tubing.

Description	Cat. No.	Qty
PEEK, for use with (1/16" to 1/32" tubing)	51272-U	1 ea
PEEK, for use with (1/16" to 320 µm tubing)	51273-U	1 ea

Upchurch PEEK Microtight® Connector

Description	Cat. No.	Qty
Connects 1/16″ capillary tubing	502421	1 ea
Butt connects 2 pieces of capillary. True zero dead volume design	502413	1 ea

Ultra-High Performance Micro Fingertight Unions

PEEK fittings and stainless steel body

Description	Cat. No.	Qty
for use with 1/32" Tubing	51274-U	1 ea
for use with 360 µm tubing	51277-U	1 ea
for use with 1/32" O.D. tubing	51279-U	1 ea
for use with 1/16" O.D. and 1/32" O. D. tubing	51281-U	1 ea

HPLC Accessories

Upchurch Scientific Fittings and Accessories: *Upchurch PEEK Micro-Fittings*

MicroTee

Connects 3 capillary tubes, using MicroFingertight II fittings. Includes 3 MicroFerrules for 0.025 in. O.D. tubing, 3 female nuts.

Description	Cat. No.	Qty
for use with MicroTight Sleeves	502472	1 ea
for use with 1/32" O.D. tubing	51283-U	1 ea
for use with 360 µm O.D. tubing	51285-U	1 ea
for use with 1/16" O.D. tubing	51286-U	1 ea

MicroCross

Description	Cat. No.	Qty
for use with MicroTight sleeves	502480	1 ea
for use with 1/32" O. D. tubing	51288-U	1 ea
for use with 360 µm O.D. tubing	51293-U	1 ea
for use with 1/16" O.D. tubing	51294-U	1 ea

Upchurch Microtight® Fittings Kit

Description	Cat. No.	Qty
-	502804	1 ea

Upchurch Microtight® Tubing Sleeves

Use these PEEK sleeves with all Microtight fittings, to connect capillary tubing. All are 0.025 in. O.D.; normally, choose an I.D. that is 0.002-0.003 in. larger than the O.D. of the capillary tubing. Color-coded.

I.D. (in.)	Material	Cat. No.	Qty
0.005 (125 µm)	red	502510	10 ea
0.007 (178 µm)	yellow	502561	10 ea
.009 (230 µm)	natural	51296-U	10 ea
0.013 (330 µm)	orange	502618	10 ea
0.015 (380 µm)	green	502626	10 ea
.011 (280 µm)	blue	51297-U	10 ea
0.018 (460 µm)	black	502634	10 ea
.021 (535 µm)	natural	51298-U	10 ea
.006 (152 µm)	purple	51303-U	10 ea

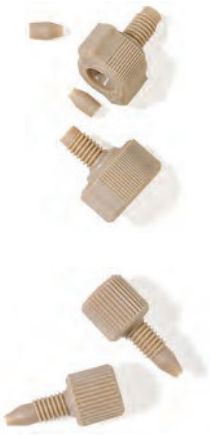
Upchurch Microtight® Tubing Sleeve Kit

Contains six each of the five PEEK Microtight tubing sleeves (Cat Nos. 502510, 502561, 502618, 502626, 502634)
Kit of 5 sizes

502650	1 ea

Upchurch PEEK Fingertight Fitting

The one-piece fitting, 55067-U, is convenient to use because the ferrule will not stick in a receiving port and can be easliy found if dropped onto the floor. The two-piece fitting features a separate ferrule so you can replace just the ferrule instead of the entire unit. The Upchurch PEEK Fingertight fittings are for use with 1/16" O.D. tubing and can be used to 6,000 psi (420 kg/cm^2).
I.D. ..... 0.0625 in. (1.5875 mm)



Description	Cat. No.	Qty
fitting: 10-32 (one-piece)	55067-U	10 ea
nut and ferrule: 10-32	57654	10 ea
nut and ferrule: 1/4-28	57656	10 ea
long 2 piece	51395-U	10 ea

Column End Plugs

Description	Cat. No.	Qty
1/4-28 male UNF	58745	5 ea
for 10-32 coned ports, red Delrin®	59031	10 ea
for 10-32 coned ports, blue ETFE	51342-U	10 ea

Column End Plugs for M6 Male

Column End Plugs

Description	Cat. No.	Qty
Domed nut	54865	4 ea

PEEK Inline Microfilter

Install between 2 pieces of capillary tubing, using Microtight tubing sleeves. PEEK housing with special PEEK fitting that encases the 0.5 µm PEEK frit. Through hole 0.006 in., swept volume 0.24 µL. Includes 2 MicroFingertight nuts, and 5 frits (1 installed).

502707	1 ea

Frits for PEEK Inline MicroFilter

for use with In-Line MicroFilter (502707)

502715	10 ea

HPLC Accessories

Optimize Technologies®

Optimize Technologies®

EXP® Fitting System

The EXP® Fitting System is the premier adjustable nut and ferrule compression fitting for extreme high-pressure connections between 1/16 inch tubing and any 10-32 port. The Titanium Hybrid ferrule provides a perfect seal with every connection, yet can be released without tools to adjust to the different port depths of various hardware. With this fitting system there is no longer the need to clip off and replace ferrules from tubing.

- Auto-adjusting Zero Dead Volume (ZDV) connection
- Intended for many repeat uses
- Rated to 20,000 psi

Description	Cat. No.	Qty
hand tight nut and titanium hybrid ferrule	51384-U	1 ea
hand tight nut and titanium hybrid ferrule	51385-U	10 ea

EXP® Titanium Hybrid Ferrule

Description	Cat. No.	Qty
1/16 in.	51391-U	10 ea

EXP® Pre-Column Filter

The OPTI-SOLV® EXP® hand tight pre column filters are ideal for extreme high pressure applications. They protect columns with small particle material employing ultra high pressure techniques. The OPTI-SOLV® EXP® help extend and protect the life our your columns without sacrificing performance.

Note: cartridges not included with holder

Description	Cat. No.	Qty
holder with EXP titanium hybrid ferrule	51163-U	1 ea
0.5µm cartridge	51164-U	5 ea
0.5µm cartridge	51165-U	10 ea
0.2µm cartridge	51166-U	5 ea
0.2µm cartridge	51167-U	10 ea

OPTI-SOLV® Mini, Micro, and Nano Filter

The OPTI-SOLV® Mini Filter provides low-impact filtering in a package no longer that a finger tight fitting. Use them to prolong the life of your analytical colum, or before your mass spectrometer as a last line of defense against debris.

The OPTI-SOLV® Micro Filter is based on the same design as the Mini Filter and cuts the internal volume to less that 200 nL. It retains the Mini Filter's ease of use and functionality. The OPTI-SOLV® Micro Filter features a zero-dead volume connection utilizing Optimize Technologies® patented floating stem technology.

Description	Cat. No.	Qty
mini filter, 0.5µm	51168-U	5 ea
mini filter,2µm	51170-U	5 ea
mini filter, 5.0µm	51171-U	5 ea
micro filter, 1.0µm	51172-U	5 ea
micro filter, 2.0µm	51173-U	5 ea
micro filter, biocompatible,0.5µm	51174-U	5 ea
micro filter, 10µm	51175-U	5 ea
nano filter, biocompatible,0.5µm	51176-U	5 ea

OPTI-GUARD® 1mm Guard Column

OPTI-GUARD® sets the standard for low-impact, easy to use pre-column protection. Designed for use with analytical (4.6 mm, 3.0 mm I.D.) and narrow bore (2.1 mm, 1.0 mm) columns, the patented floating stem design automatically adjusts to any manufactures tube stop depth for a zero-dead volume connection every time. The OPTI-GUARD® 1 mm requires no special connecting hardware or tools for installation.

particle size ..... 40 µm

Description	Cat. No.	Qty
C18 (violet label)	51177-U	5 ea
silica (orange label)	51178-U	5 ea
CN (blue label)	51179-U	5 ea
anion exchange (black label)	51180-U	5 ea
cation exchange (white label)	51181-U	5 ea
C18, biocompatible	51183-U	5 ea
C8	51184-U	5 ea
phenyl	51185-U	5 ea
amino NH_2	51187-U	5 ea

HPLC Accessories

Optimize Technologies®

OPTI-GUARD® 3mm Guard Column

The OPTI-GUARD® 3 mm maintains the tool free connectivity of the OPTI-GUARD® 1 mm, but incorporates a cartridge-based format to allow for a larger bed with more capacity. The two part holder is designed for use with any analytical column providing vital protection from dirty samples and strongly retained contaminants. An auto adjusting stem conforms perfectly to any tube stop depth resulting in a perfect zero-volume connection.
Note: cartridges not included with holder.

Description	Cat. No.	Qty
PEEK/stainless steel holder	51188-U	1 ea
C18 cartridge	51191-U	3 ea
C8 cartridge	51193-U	3 ea
Amino NH_2 cartridge	51194-U	3 ea
Silica cartridge	51196-U	3 ea

HPLC Dispersion Measurement

HPLC Dispersion Measurement Kit

Kit for reliable measurement of HPLC instrument bandwidth.

Kit contains:
2 - NanoTight Unions with 0.007" thru-hole
1 - 20 cm x 1/32" O. D. x 0.005" I. D. High Performance Doubled Ended Fitting
Instruction Sheet

52806-U	1 kit

Nano Tight Union, ZDV, with 0.007in Thru-Hole

52807-U	1 ea

PEEK HPLC Fittings

Upchurch PEEK LiteTouch® Fitting

Unique design prevents twisting of PEEK tubing. The fitting consists of a special PEEK ferrule, a stainless steel ring, and a PEEK or stainless steel nut for 1/16 in. tubing. The fitting will not leak at pressures to 5000 psi/340 bar with the PEEK nut, 2500 psi/175 bar with the stainless steel nut finger-tightened or 7000 psi/480 bar with wrench tightening. After wrench-tightening the stainless steel nut, subsequent finger-tightening will hold to 5000 psi. Compatible with all manufacturers' stainless steel nuts. Order nuts and ferrules separately.

57651

Description	Cat. No.	Qty
natural PEEK nut	57651	10 ea
-	57650-U	10 ea
PEEK with stainless steel lock ring ferrule (for 1/8" tubing)	57652-U	10 ea
natural PEEK nut double-winged	57653	10 ea

PEEK Nuts & Ferrules

PEEK (polyetheretherketone) fingertight fittings are convenient, inert, and bio-compatible. Use these fittings with 1/16 in. O.D. PEEK, stainless steel, titanium, Tefzel, or PTFE tubing. PEEK fittings are compatible with all HPLC solvents (avoid concentrated sulfuric and nitric acids), and can be used at temperatures to 150 °C. Unlike stainless steel ferrules, PEEK ferrules do not permanently lock into place on the tubing. This allows you to interchange fittings with tubing and columns, from manufacturer to manufacturer (e.g., from Agilent to Waters), and still form a zero dead volume, leak-free connection. All fittings on these pages can be used with internal fittings provided my most major suppliers.

Supelco® PEEK Fitting

Biocompatible fittings for all 1/16 in. tubing connections.

Description	Cat. No.	Qty
One-piece fingertight	Z227250	5 ea
Two-piece with ferrule	Z227269	5 ea
Two-piece with ferrule, fingertight/ wrenchtight	Z227285	5 ea
Hex-head nut, short, wrenchtight	Z226874	5 ea
Hex-head nut, long, wrenchtight	Z226866	5 ea

HPLC Accessories

PEEK HPLC Fittings: *PEEK Nuts & Ferrules*

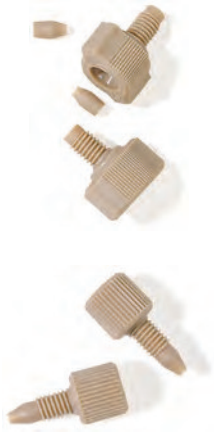
Ferrules for Supelco® PEEK Fittings

PEEK

Description	Cat. No.	Qty
Single-taper, for use with Z227269	Z227277	5 ea
Double-tapered, for use with Z227285, Z226874, Z226866	Z226858	5 ea

Upchurch PEEK Fingertight HPLC Fittings

The one-piece fitting, 55067-U, is convenient to use because the ferrule will not stick in a receiving port and can be easliy found if dropped onto the floor. The two-piece fitting features a separate ferrule so you can replace just the ferrule instead of the entire unit. The Upchurch PEEK Fingertight fittings are for use with 1/16″ O.D. tubing and can be used to 6,000 psi (420 kg/cm^2).



Description	Cat. No.	Qty
fitting: 10-32 (one-piece)	55067-U	10 ea
nut and ferrule: 10-32	57654	10 ea
ferrule: 10-32	57655-U	10 ea
nut and ferrule: 1/4-28	57656	10 ea
ferrule: 1/4-28	57657	10 ea

Upchurch Two-Piece Stainless Steel/PEEK Fitting

This 10-32 fitting for $^1/_{16}$ in. tubing will hold to 6000 psi (420 kg/cm^2) when finger-tightened, or 10,000 psi (700 kg/cm^2) when wrench-tightened.

Description	Cat. No.	Qty
stainless steel nut, PEEK ferrule	58478-U	1 ea
PEEK ferrule	58479	5 ea

Upchurch Sealtight™ Fittings

Description	Cat. No.	Qty
Extra-long nut, 10-32, with ferrule	55006-U	10 ea
ferrule pack	55007-U	10 ea
Long nut, M6, with ferrule	55004-U	10 ea
Long nut, 10-32, with ferrule	55003-U	10 ea
Short nut, 10-32, with ferrule	55002-U	10 ea

Dynaseal™ Fittings

These hand-tight fittings will seal against pressures to over 7,000 psi (490 kg/cm^2). Each fitting consists of a reusable nut (10-32 for $^1/_{16}$ in. O.D. tubing), collet, and ferrule. The polymer ferrule will not deform stainless steel seats and can be reused. They are compatible with all $^1/_{16}$ in. compression-type 10-32 fittings now used on HPLC columns (but not with Rheodyne valves).

Description	Cat. No.	Qty
Set of nuts, collet, and ferrule	58462	2 ea
ferrule (polymer)	58463	5 ea
Kel-F™ ferrule	58468	10 ea
stainless steel	58464	2 ea
-	58679	2 ea

Upchurch Fingertight Fittings Kit

High pressure fittings with 10-32 threads for $^1/_{16}$ in. O.D. tubing. Kit includes:

- Delrin Fingertight nut, good to 4,000 psi (280 kg/cm^2), 5 ea
- Stainless steel Fingertight nut, good to 6,000 psi (420 kg/cm^2), wrench-tight to 10,000 psi (700 kg/cm^2), 5 ea
- PEEK gripping ferrule, 20 ea.

58632	1 ea

HPLC Accessories

PEEK HPLC Fittings: *PEEK Nuts & Ferrules*

Upchurch PEEK Fingertight Connections

Upchurch PEEK Fingertight Union

Operate the PEEK zero dead volume unions to 5,000 psi (352 kg/cm^2), the PEEK tees and crosses to 4,000 psi (281 kg/cm^2). All items include Fingertight III nuts and ferrules.

Description	Cat. No.	Qty
Union, bore 0.010 in., thread: 10-32	57658	1 ea
Union, bore 0.020 in., thread: 10-32	57659	1 ea
Union, bore 0.020 in., thread: 1/4-28	57660-U	1 ea
Cross, bore 0.020 in., thread: 10-32	57663	1 ea
Tee, bore 0.020 in., thread: 10-32	57661	1 ea
Tee, bore 0.020 in., thread: 1/4-28	57662-U	1 ea

RheFlex® PEEK Fittings

For Rheodyne valves. Hold to 5000 psi/350kg/cm^2.

Long fitting set (57690-U)

Description	Cat. No.	Qty
Short fitting set, configured for 1/16 in. tubing	57691	5 ea
Long fitting set, configured for 1/16 in. tubing	57690-U	5 ea
Ferrule pack, configured for 1/16 in. tubing	57692	5 ea
Fitting set, configured for 1/8 in. tubing	57477	1 ea

Stainless Steel Fittings

Rheodyne® Fittings

from left to right: 58258, 58256, 58257

Description	Cat. No.	Qty
long nut, for 1/16 in. tubing	58257	10 ea
ferrule, for 1/16 in. tubing	58258	10 ea
nut, for 1/16 in. tubing	58256	10 ea
nut and ferrule, for 1/8 in. tubing	57479	1 ea

Each connection requires one ferrule and one male nut.

Valco® Fittings

From left to right: 22990-U, 22989

Description	Cat. No.	Qty
ferrule, configured for 1/16 in. tubing	22988	10 ea
ferrule, configured for 1/8 in. tubing	22989	10 ea
ferrule, for 1/4 in. tubing	58245-U	10 ea
nut, for for 1/16 in. tubing	22990-U	10 ea
nut, for for 1/8 in. tubing	22991	10 ea

Waters® fittings

58458

Description	Cat. No.	Qty
1/16 in.	58458	5 ea

SSI™ Fittings

From left to right: 58760-U, 58766

Description	Cat. No.	Qty
cap: 1/4-28, stainless steel	58766	1 ea
for 1/16 in. tubing	58764	1 ea
nut: 1/4-28	58760-U	10 ea
ferrule, for for 1/16 in. tubing	58762	10 ea

HPLC Accessories

Stainless Steel Fittings

SSI™ Fittings Kit

Save time when looking for the fitting you need. This kit contains everything you need to connect most columns to a 1/16 in. tubing system, regardless of the column manufacturer. It is designed for easy storage and easy parts identification – everything is clearly labeled to help you quickly locate what you need.

The kit contains:

- SSI ferrules (5)
- E-Z Grip gland nuts (3)
- SSI gland nuts (5)
- CPI fittings, KEL-F (2)
- CPI ferrules (5)
- SSI coupling, 0.10 in. I.D. (1)
- CPI gland nuts (5)
- SSI to CPI couplings (2)
- E-Z Grip ferrules (3)

59280-U	1 ea

Ferrule Saver Tool

- Quickly and simply dislodges swaged ferrule from 1/16 in. O.D. (0.010-0.030 in. I.D.) tubing
- Saves time, money, and needless aggravation

Removes high pressure CPI-type stainless steel ferrules without the need for disassembling your HPLC system plumbing or cutting the tubing. Eliminates the need for opening, filing, and passivating tubing before installing a new ferrule. Opens and permits reuse of the removed ferrule. Not recommended for self-locking SSI and Rheodyne ferrules (could damage ferrule or tool).

58647	1 ea

Upchurch Fittings Kit

If you have ever been caught without the fitting you need to install a column, new plumbing line, etc., you will appreciate these kits.They contain all the fittings and tubing you normally need to operate your HPLC system, conveniently stored in a plastic case.

For Use With	Cat. No.	Qty
Agilent/HP	58635-U	1 ea
Beckman/Rheodyne	58634	1 ea
PerkinElmer	58636	1 ea
Spectra-Physics/Rheodyne	58637	1 ea
Varian/Rheodyne	58638	1 ea
Waters	58639	1 ea
Bio-Rad/Rheodyne	58640-U	1 ea

HPLC Accessories

Stainless Steel Fittings

HPLC System/Cat. No. of Kit

Component	Agilent/HP	Beckman/ Rheodyne	PerkinElmer	Spectra-Physics/ Rheodyne	Varian/Rheodyne	Waters	BioRad/ Rheodyne
Cat. No.	58635-U	58634	58636	58637	58638	58639	58640-U
S.S. ZDV Union, 0.020 in.	2	2	2	2	2	2	2
S.S. ZDV Union, 0.050 in.	–	–	–	–	–	–	2
S.S. Waters ZDV Union, 0.020 in.	–	–	–	–	–	2	–
PerkinElmer Male Nut (SSI)	–	–	5	–	–	–	–
PerkinElmer Ferrule (SSI)	–	–	5	–	–	–	–
Rheodyne Short Male Nut	–	4	4	4	4	–	4
Rheodyne Long Male Nut	–	2	2	2	2	–	2
Rheodyne Extra-Long Male Nut	–	2	2	2	2	–	2
Rheodyne Ferrule	–	10	10	10	10	–	10
Waters Male Nut	–	–	–	–	–	10	–
Waters Ferrule	–	–	–	–	–	10	–
S.S. Male Nut	10	5	5	5	5	5	5
S.S. Female Nut	10	5	5	5	5	5	5
S.S. Ferrule	20	10	10	10	10	–	10
Tefzel Cap	2	2	2	2	2	2	2
Delrin Plug	2	2	2	2	2	2	2
Fingertight II Male Nut (Delrin)	2	2	2	2	2	2	–
Fingertight I Male Nut (one piece)	–	–	–	–	–	–	2
PEEK Replacement Ferrule	4	4	4	4	4	4	–
1/16 in. Flangeless Male Nut, Black, Delrin	6	6	6	6	6	6	–
1/16 in. Flangeless Ferrule, Tefzel	6	6	6	6	6	6	–
Stainless Steel Tubing							
5 cm × 0.01 in. I.D.	4	4	4	4	4	4	4
10 cm × 0.01 in. I.D.	4	4	4	4	4	4	4
20 cm × 0.01 in. I.D.	4	4	4	4	4	4	4
5 cm × 0.02 in. I.D.	4	4	4	4	4	4	4
10 cm × 0.02 in. I.D.	4	4	4	4	4	4	4
20 cm × 0.02 in. I.D.	4	4	4	4	4	4	4

In-Line Filters

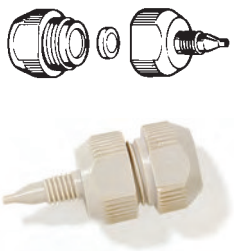
A precolumn filter is essential for protecting HPLC columns against particulate matter which can accumulate on the column frit, leading to split peaks and high backpressure. Sources of particles include mobile phases (especially when buffers are mixed with organic solvents), leaking pump and injector seals, and samples. Use a 2.0 µm frit to protect columns containing 5 µm or larger particles, or a 0.5 µm frit for columns with particles smaller than 5 µm.

Supelco® Precolumn Filter

Direct-connect, PEEK

Direct-connect; protects analytical and guard columns. Our precolumn filter can be connected directly, hand-tightened, into any HPLC column or guard column that has Valco-compatible end fittings. PEEK cap and body, 2 µm stainless steel frit. For a metal-free system, order PEEK (biocompatible) replacement frits (57430-U).

bore ..... 0.015 in.
max. temp. ..... 100 °C
max. pressure ..... 5000 psi



Z227323	1 ea

Frit for Supelco® Filter

Description	Cat. No.	Qty
stainless steel, 0.5 µm	Z290874	5 ea
stainless steel, 2.0 µm	Z227331	5 ea
PEEK, 2.0 µm	57430-U	5 ea

HPLC Accessories

In-Line Filters

Supelco® ColumnSaver Precolumn Filter

- Economical protection for your guard or analytical HPLC column
- No wrenches or tools required to install, fingertight to 5,000 psi
- Lower dead volume than conventional filters with holders
- Universal connection is compatible with all manufacturers fittings

The Supelco ColumnSaver offers all of the protection of conventional precolumn filters at much less the cost. With its convenient direct connect design, changeover time is measured in seconds, and requires no wrenches or tools to install.

The PEEK filter body contains a HiFlo filter element and is designed for maximum filtration of particulate matter with mimimal dead volume or backpressure. As soon as an increase in backpressure is observed, simply remove and dispose of the Supelco ColumnSaver and install a new one. The direct connect design is compatible with all $^{1}/_{16}$ in., 10-32 internal fitting ports regardless of the manufacturer.

Description	Cat. No.	Qty
0.5 µm	55214-U	10 ea
2.0 µm	55215-U	10 ea

SSI™ High Pressure Preinjector Filter

Place between the pump and injector to provide final filtration for the mobile phase. Includes 316 stainless steel filter element (0.5 µm pores) that is easy to replace. Maximum operating pressure: 15,000 psi (105 MPa). For $^{1}/_{16}$ in. O.D. tubing, 10-32 threads.

Description	Cat. No.	Qty
stainless steel	59262-U	1 ea

SSI™ High Pressure Precolumn Filter

In-line installation. The 316 stainless steel filter disc (0.5 µm pores) is easily replaced without removing the column end fitting. For $^{1}/_{16}$ in. tubing. Maximum operating pressure: 15,000 psi (1,054 kg/cm^2).

Description	Cat. No.	Qty
thread: 10-32 Valco compatible	59269	1 ea
thread: 10-32 Waters	59271	1 ea

Filter Element for SSI™ Filter Unit

Select 0.5 µm or 2.0 µm stainless steel filter elements for your SSI High Pressure Filter Unit.

Description	Cat. No.	Qty
Preinjector, 0.5 µm	59264	2 ea
Preinjector, 2.0 µm	59265	2 ea
Precolumn, 0.5 µm	59273	10 ea
Precolumn, 2.0 µm	59272	10 ea

Isolation Technologies Precolumn Filter

In-line installation. High capacity inlet filter, with 0.5 µm stainless steel frit. Minimizes dead volume and band broadening, to prevent loss of column efficiency while protecting your column. Includes two each of tubing, nut, and ferrule.

Description	Cat. No.	Qty
use to protect 4.6 mm I.D. HPLC column, frit diam. 3 mm	57675-U	1 ea
use to protect 2.1 mm I.D. HPLC column, frit diam. 1.5 mm	57676-U	1 ea

Frits for Isolation Technologies Precolumn Filter

pore size ..... 0.5 µm

Description	Cat. No.	Qty
frit diam. 3 mm	57677	10 ea
frit diam. 1.5 mm	57678	10 ea

Upchurch Biocompatible Precolumn Filter

In-line installation. Stainless steel body with inert polyetherether-ketone (PEEK) end fittings. Choose either a 0.5 µm or 2 µm PEEK frit in one endfitting.

Description	Cat. No.	Qty
2.0 µm	55078	1 ea
0.5 µm	55079	1 ea

Frits for Upchurch Biocompatible Precolumn Filter

PEEK

Description	Cat. No.	Qty
2.0 µm	55081	10 ea
0.5 µm	55080-U	10 ea

HPLC Accessories

In-Line Filters

Valco® Pre-Column Filter

In-line installation. Efficient, low dead volume filters protect your columns from particles without reducing column performance. The replaceable 1/8 in. frit has 0.5 µm pores to protect 3 µm or 5 µm column packings, the replaceable screen has 2 µm pores. Choose the frit filter for higher filtration capacity (most applications) or the screen filter for less dead volume (e.g., with microbore columns). Use with 1/16 in. O.D. tubing; 1/16 in. fittings included.

Frits and screens should not be interchanged in these filters.

Description	Cat. No.	Qty
Frit Filter, 1/8 in., 0.5 µm	58420-U	1 ea
Screen Filter, 2.0 µm	58279-U	1 ea

Frits for Valco® Pre-Column Frit Filter

Description	Cat. No.	Qty
diam. 1/8 in., 0.5 µm	59037	10 ea
diam. 1/8 in., 2.0 µm	59129	10 ea

Screen for Valco® Pre-Column Screen Filter

Description	Cat. No.	Qty
2.0 µm, stainless steel	58284	10 ea

Frits and screens should not be interchanged in these filters.

In-Line Filter Assembly 21.2mm, 2um

52588-U	1 ea

In-Line Frit 21.2mm, 2um

52589-U	5 ea

Back-Pressure Regulators

SSI™ Flow-Through Back-Pressure Regulator

Designed to apply constant pressure to an HPLC detector outlet, over a wide range of mobile phase flows and viscosities. Can be used with flowmeters. Minimizes bubble formation in the detector cell, improves baseline stability. Flow-through design minimizes band spreading. Immune to clogging. Adjustable from 0.3 to 5 atmospheres (factory set at 4 atmospheres), for compatibility with any detector. Small, inert to common HPLC solvents, biocompatible flow path.

59284	1 ea

SSI™ Back-Pressure Regulator

Prevents bubbles and improves baseline stability. This 1/16 in. flange-type unit (4 × 1.3 cm) has a unique mechanism that ensures constant back-pressure over a wide range of mobile phase flows and viscosities. It is immune to clogging and other problems common to restrictor-type devices. Easily adjusts from 1-4 atm.(15-60 psi/1-4 kg/cm^2).

58788	1 ea

Upchurch In-Line Cartridge Check Valve

The inline Cartridge Check Valve is designed to limit flow to one direction. The cartridge and flangeless fitting is for use with 1/16″ O.D. tubing. The internal volume of the check valve is less than 150µL. Place in the flow system where you wish to restrict fluid flow to one direction. These assemblies withstand system pressures of 1.000 psi (69 bar). Complete with wrench.

55085-U	1 ea

Stainless Steel Unions, Tubing

SSI™ Unions

Stainless steel, 1/4-28 threads

From left to right: 58768, 58780-U

	Cat. No.	Qty
Coupling		
1/4-28 1/16 in. O.D., bore diam. 0.043 in.	58768	1 ea
1/4-28 1/16 in. O.D., bore diam. 0.015 in.	58769	1 ea
1/4-28 1/16 in. O.D., bore diam. 0.010 in.	58770	1 ea
Tee		
bore diam. 0.043 in.	58780-U	1 ea
bore diam. 0.015 in.	58781	1 ea

Nuts and ferrules included with all of the above except 58774-U.

HPLC Accessories

Stainless Steel Unions, Tubing

Valco® Unions

Stainless steel, unless noted otherwise. Nuts and ferrules included.
All items include nuts and ferrules.

Clockwise from bottom left: 22949, Z226807, 58283, Z227242, 22997-U, 58625-U

	Cat. No.	Qty
Valco® Unions		
internal reducing, for connecting 1/16 to 1/32 in., bore 0.25 mm	59026	1 ea
internal reducing, bore 0.75 mm, for connecting 1/8 to 1/16 in.	22999	1 ea
internal reducing, configured for 1/4 to 1/16 in., bore 0.75 mm	58249	1 ea
external reducing, configured for 1/4 to 1/16 in., bore 0.25 mm	59110-U	1 ea
Union		
for connecting 1/16 in., bore 0.75 mm	22997-U	1 ea
for connecting 1/16 in., bore 0.25 mm	58627	1 ea
Union, reducing		
for connecting 1/16 to 1/32 in., bore 0.25 mm	59025-U	1 ea
zero dead volume, for connecting 1/8 to 1/16 in., bore 0.25 mm	22949	1 ea
Tee		
zero dead volume, for connecting 1/16 in., bore 0.75 mm	58283	1 ea
zero dead volume, for connecting 1/16 in., bore 0.25 mm	58626	1 ea
Cross		
for connecting 1/16 in., bore 0.25 mm	58625-U	1 ea
Union		
PEEK, for connecting 1/16 in., bore 0.25 mm	Z227242	1 ea
for connecting 1/16 in., bore 0.25 mm	Z226807	1 ea

Stainless Steel 1/16 in. Capillary Tubing

316 stainless steel, 1/16 in. O.D. 1 m length is coiled, all other dimensions are straight.

Length	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
5 cm	1/16	0.005	56707	1 ea
10 cm	1/16	0.005	56708	1 ea
20 cm	1/16	0.005	56709	1 ea
30 cm	1/16	0.005	56710-U	1 ea
0.5 m	1/16	0.005	56711	1 ea
1.0 m	1/16	0.005	56712-U	1 ea
5 cm	1/16	0.007	56713	1 ea
10 cm	1/16	0.007	56714	1 ea
20 cm	1/16	0.007	56715-U	1 ea
30 cm	1/16	0.007	56716	1 ea
0.5 m	1/16	0.007	56717	1 ea
1.0 m	1/16	0.007	56718-U	1 ea
5 cm	1/16	0.010	56719	1 ea
10 cm	1/16	0.010	56720-U	1 ea
20 cm	1/16	0.010	56721	1 ea
30 cm	1/16	0.010	56722	1 ea
0.5 m	1/16	0.010	56723	1 ea
1.0 m	1/16	0.010	56724	1 ea
20 cm	1/16	0.020	56727	1 ea
30 cm	1/16	0.020	56728	1 ea
0.5 m	1/16	0.020	56729	1 ea
1.0 m	1/16	0.020	56730-U	1 ea
5 cm	1/16	0.030	56731	1 ea
10 cm	1/16	0.030	56732	1 ea
20 cm	1/16	0.030	56733-U	1 ea
30 cm	1/16	0.030	56734-U	1 ea
1.0 m	1/16	0.030	56736	1 ea
5 cm	1/16	0.040	56737	1 ea
10 cm	1/16	0.040	56738	1 ea
20 cm	1/16	0.040	56739	1 ea
30 cm	1/16	0.040	56740-U	1 ea
0.5 m	1/16	0.040	56741-U	1 ea
1.0 m	1/16	0.040	56742-U	1 ea

Stainless Steel Tubing Kits

Ready-to-use lengths. Each kit contains ten 5 cm and ten 10 cm pieces of 1/16 in. tubing.

stainless steel

O.D. × I.D. (in.)	Cat. No.	Qty
1/16 × 0.005	502839	1 ea
1/16 × 0.007	502820	1 ea
1/16 × 0.010	502812	1 ea
1/16 × 0.020	502847	1 ea
1/32 × 0.005	58404	1 ea

Waters® Union

Description	Cat. No.	Qty
-	58289	1 ea

PEEK Tubing, PEEKsil™ Tubing, PTFE Tubing

PEEK Tubing

Refer to the table below for maximum operating pressure.

Polyetheretherketone (PEEK) tubing has become a popular replacement for stainless steel tubing in various places in the HPLC system. It is especially useful when contact between the sample and metal components must be avoided, such as when working with metal complexing agents or certain biochemical compounds. PEEK tubing also offers other advantages: it is flexible, easy to cut, has excellent mechanical stability and chemical compatibility, and can be used to 100 °C. Tetrahydrofuran (THF), dimethyl sulfoxide (DMSO), methylene chloride, and concentrated nitric and sulfuric acids should not be used with PEEK tubing. Our 1/16 in. PEEK tubing is color coded for easy identification of the internal diameter. 10 ft./3 m length.

HPLC Accessories

PEEK Tubing, PEEKsil™ Tubing, PTFE Tubing

Max. Pressure (psi)	I.D. (in.)	Color	Cat. No.	Pkg
O.D. 1/16 in.				
8000	0.005	red	Z227307	1 ea
8000	0.007	yellow	Z226688	1 ea
6000	0.010	blue	Z226661	1 ea
6000	0.020	orange	Z227293	1 ea
5000	0.030	green	Z226955	1 ea
1000	0.055	natural	54994	1 ea
O.D. 1/8 in.				
5000	0.062	natural	54995	1 ea

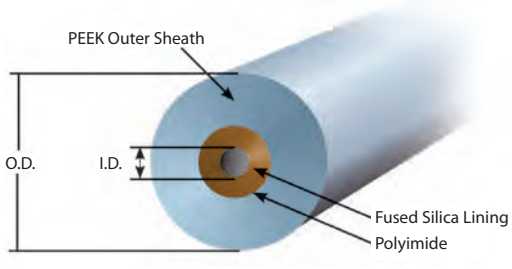
PEEK Tubing

Length (ft)	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
10	1/16	0.007	57670-U	1 ea
10	1/16	0.010	57671	1 ea
10	1/16	0.020	57672-U	1 ea

PEEKsil™ Tubing

PEEKsil is fused silica tubing sheathed in PEEK polymer, with an effective outer diameter. The PEEK sheating is mechanically strong and has ideal characteristics for sealing with metal or polymer fittings. The fused silica core provides a consistent and rigid fluid pathway with very tight tolerances and industry-accepted chemical properties. Like traditional fused silica tubing, PEEKsil has excellent chemical compatibility and extremely low absorption characteristics, especiall when compared to stainless steel.

Please note: **Do not cut this tubing.** It should be used as its precut lengths because of permanent damage caused by conventional cutters.



Length (cm)	O.D. (in.)	I.D. (µm)	Cat. No.	Pkg
10	1/32	25 (.001 in.)	51308-U	2 ea
50	1/32	25 (.001 in.)	51316-U	2 ea
10	1/32	50 (.002 in.)	51319-U	2 ea
50	1/32	50 (.002 in.)	51321-U	2 ea
20	1/32	75 (.003 in.)	51324-U	2 ea
50	1/32	75 (.003 in.)	51328-U	2 ea
50	1/32	150 (.006 in.)	51329-U	2 ea
10	1/16	25 (.001 in.)	51333-U	5 ea
50	1/16	25 (.001 in.)	51335-U	2 ea
50	1/16	50 (.002 in.)	51332-U	2 ea
20	1/16	50 (.002 in.)	51334-U	2 ea
50	1/16	100 (.004 in.)	51337-U	2 ea

PTFE Tubing

Economical, flexible PTFE tubing is ideal for use at pressures up to 500 psi (35 kg/cm^2). Use in automatic analyzer, postcolumn reaction, preparative scale systems, in-stream sampling devices, and when monitoring physiologically important compounds.

The maximum recommended operating temperature for PTFE is 200 °C, but short term exposure to higher temperatures seldom causes damage.

Length (ft)	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
10	1/16	0.031	58700-U	1 ea
10	1/16	0.023	58701	1 ea
10	1/16	0.012	58702	1 ea
10	1/8	0.063	58703	1 ea
50	1/16	0.031	58696-U	1 ea
50	1/16	0.023	58697-U	1 ea
50	1/16	0.012	58698-U	1 ea
50	1/8	0.063	58699	1 ea

FEP Tubing

For connecting pump to reservoirs. Use 1/8 in. O.D. × 0.0625 in. I.D. tubing with most pumps, 0.15 in. O.D. × 0.118 in. I.D. tubing with Waters pumps. 10 ft./3 m length.

PTFE FEP tubing is ideal for use at pressures up to 500 psi (35 kg/cm^2).

max. temp. ..... 50 °C
max. pressure ..... 500 psi (35 kg)

Length (ft)	O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
10	1/8	0.0625	58694-U	1 ea
10	0.15	0.118	58695-U	1 ea

Saturator Column Kits

Supelco® Silica and C18 Saturator Columns

To protect your column from alkaline mobile phases which can dissolve silica (pH >7.0), saturate the mobile phase with silica by passing it through a silica saturator column.

To protect your column from acidic mobile phases which can strip bonded phase (pH <2.0), use a C18 saturator column.

Each kit consists of 10 g of packing (12 µm spherical particles, 180 m^2/g surface area), a 7.5 cm × 4.6 mm column, two frits, and fittings to connect the column to 1/16 in. tubing.

The optional plastic funnel is helpful for filling these columns (Cat. No. 20390-U).

Description	Cat. No.	Qty
Silica Saturator Column Kit	58410	1 kit
C18 Saturator Column Kit	58418	1 kit

C18 packing

Bulk replacement packing for 58418

surface area ..... 180 m^2/g
particle size ..... 12 µm

58419	10 g

Funnel and Tubing

A small funnel and short piece of tubing simplify the process packing columns.

20390-U	1 ea

HPLC Accessories

Tubing Cutters

Tubing Cutters

SSI™ TC-20 Tubing Cutter

The SSI Model TC-20 electric stainless steel tube cutter assures a zero dead volume connection. Because the tubing is held securely in a clamp vise on the vertical swing arm, a square cut is produced when the swing arm is lowered against the abrasive cutting wheel, which produces a finished end. No lubricant or cutting fluid is required. The unit, which is CE marked, will cut most common tubing used in chromatography. Tubing with 1/16 in., 1/8 in., and 1/4 in. outside diameter, can be smooth-cut and dressed without distortion.

The precision ground dressing tool for the 1/16 in. O.D. tubing is included and is attached directly to the swing arm: it cannot be misplaced or lost. A dressing tool (deburring tool - Cat. No. 58804) for 1/8 in. diameter can be ordered separately.

58539-U

Description	Cat. No.	Qty
SSI™ TC-20 Tubing Cutter, 110 V / 220 V, 50-60 Hz (voltage selectable), CE compliant	58539-U	1 ea

TC-20 Replacement Parts

Description	Cat. No.	Qty
Cutting Wheel for TC-20	58540-U	3 ea
Deburring Tool, configured for 1/16 in. tubing	58804	1 ea
Deburring Tool, configured for 1/8 in. tubing	58806	1 ea
Needle Insert for Dressing Tool, configured for 1/16 in.	58805	1 ea
Needle Insert for Dressing Tool, configured for 1/8 in.	58807	1 ea

Cutting Wheel for TC-10

Replacement cutting wheel for SSI Model TC-10 tubing cutter. Will not fit Model TC-20.

Description	Cat. No.	Qty
Cutting Wheel for TC-10	58803	3 ea

Replacement cutting wheels for SSI Model TC-10 tubing cutter. It will not fit Model TC-20.

Manual Cutting Tool Accessories

	Cat. No.	Qty
Cutting Wheel for 22410-U and 58692-U		
for use with IMP Cutting Tool	22411	2 ea
Deburring Kit		
for use with 1/16 in. tubing	58691-U	1 ea

	Cat. No.	Qty
Deburring Tool		
configured for 1/16 in. tubing	58804	1 ea

Straightening Pliers

	Cat. No.	Qty
Straightening Pliers		
-	58646	1 ea

Manual Cutting Tool

Easily cut 1/16 in. stainless steel tubing, then deburr the cut end to ensure a uniform flow of gas or liquid. Order tubing cutter and deburring kit (Cat. No. 58691-U) separately.

58692-U

58692-U	1 ea

PEEK Tubing Cutter

Makes burr-free, perpendicular cuts through polymer tubing with outside diameters from 1/16 in. to 1/8 in.. Designed for cutting PEEK tubing, but also easily slices through PTFE and Tefzel capillary tubing. Compact design includes a safety locking mechanism. One spare blade included.

Z290882-1EA	1 ea

Replacement Blade

for use with PEEK Tubing Cutter

Z290947-1EA	1 ea

Upchurch Polymer Tubing Cutter

Upchurch designed this reliable and durable device specifically for cutting 1/8" - 1/16" PEEK, PTFE, and Tefzel tubing. Includes 4 replacement blades. sufficient for, for cutting 1/8-1/16" polymer tubing

57665-U	1 ea

Replacement Blades

for use with Polymer Tubing Cutter

57666-U	5 ea

Column Hardware

Column Blank Kit for HPLC

Each column blank kit includes a precision-bore polished 316 stainless steel column blank, two zero dead volume external reducing unions (internal unions with 10 mm I.D. blanks) with nuts and ferrules for 1/16 in. O.D. tubing, and two
2 µm frits.

I.D. × O.D. × L	Cat. No.	Qty
2.1 mm × 1/4 in. × 25 cm	59127	1 ea
4.6 mm × 1/4 in. × 15 cm	59101	1 ea
4.6 mm × 1/4 in. × 25 cm	59102-U	1 ea
10.0 mm × 1/2 in. × 25 cm	58217	1 ea

HPLC Column Blank Replacement Frits

Choose frits with 0.5 µm pores to retain packings prepared from 3 µm particles, frits with 2 µm pores to retain larger particles.

From left to right: 59038, 59129, 59037

Diam. (in.)	Cat. No.	Qty
1/8	59037	10 ea
1/8	59129	10 ea
1/4	59038	10 ea
1/4	58264	10 ea
1/2	58255	10 ea

Frit Cap Assemblies for Supelco® Column Hardware

PEEK with stainless steel frit

From left to right: 55204, 55203, 55207

Size (mm)	Pore Size (µm)	Cat. No.	Pkg
2.1	0.5	55203	2 ea
3.0	2	55208	2 ea
4.0-4.6	0.5	55209	2 ea
4.0-4.6	2	55210	2 ea

4.6 mm ID = 3/8" OD tubing with 2 lines
4.0 mm ID = 3/8" OD tubing with no lines
3.0 mm ID = 3/8" OD tubing with 1 line
2.1 mm ID = 1/4" OD tubing with 2 lines

Supelco frit assemblies are color-coded as follows:

Gray = 2.0 µm pores
Black = 0.5 µm pores

Frit Removing Tool for Supelco® Analytical Columns

Removes frits from 2.1 mm I.D. to 4.6 mm I.D. Supelco Discovery and SUPELCOSIL analytical columns.

55216	1 ea

HPLC Column Coupler

for use with Discovery and SUPELCOSIL columns, 3.0, 4.0, 4.6 mm I.D.

55213	1 ea

PEEK, I.D. 0.007 in. × O.D. 1/16 in. × Overall L 1 in.

This guard column coupler may be used with all Astec and CHIRALPAK® AGP, CBH, and HSA columns of 2 or 3 mm I.D. For 4 mm I.D columns, use coupler 54986.
10-32 male (Valco compatible)
for use with HPLC columns with 1/16", 10-32 thread end-fittings (Used with all Supelco and Astec columns, plus other brands that have the same thread dimensions.)

58162AST	1 ea

HPLC Column Endfitting

stainless steel

Configured For	Cat. No.	Qty
3.0 mm, 4.0 mm, and 4.6 mm I.D. hardware Ascentis, Discovery,and SUPELCOSIL columns	55200-U	2 ea
2.1 mm I.D. hardware Ascentis, Discovery, and SUPEL-COSIL columns	55201-U	2 ea

Column End Plugs for M6 Male

Column End Plugs

Domed nut

This Amersham Biosciences fitting is made of inert Delrin construction, and is compatible with most common HPLC solvents.

54865	4 ea

HPLC Accessories

Column Hardware

Column End Plugs

for 10-32 coned ports, red Delrin®

Use column end plugs with all female 10-32 compression type end fittings, compatible with any common HPLC solvent.

10-32 male

59031	10 ea

TSKgel® Hardware and Accessories

Supelco's offering of Tosoh Bioscience's TSKgel columns and packings can be found in the "HPLC for Large Molecules" section of this catalog under the corresponding separation mode. Photographs of TSKgel hardware listed here can be found on our website.

Note: Catalog number 807093 replaces catalog number 803432.

Description	Cat. No.	Qty
Endfitting with fixed 1 µm frit for TSKgel® Super Series columns	818255	1 ea
Endfitting with fixed 1 µm frit for TSKgel® NPR columns	813998	1 ea
Endfitting with fixed 2 µm frit for all 4.6 mm I.D. TSKgel® stainless steel columns	807619	1 ea
Endfitting with fixed 2 µm frit for all 6 mm I.D. TSKgel® stainless steel columns	808092	1 ea
Endfitting with fixed 2 µm frit for all 7.8 mm I.D. TSKgel® stainless steel columns	808095	1 ea
Endfitting with fixed 10 µm frit for all 7.5 mm I.D. TSKgel® stainless steel columns	805748	1 ea
Replacement 0.5 µm stainless steel frits for 2 mm I.D. TSKgel® columns	803411	10 ea
Replacement 2 µm stainless steel frits for 7.5 mm I.D. TSKgel® Guardgel holder	803430	10 ea
Low dead volume precolumn filter with 0.5 µm stainless steel frit	803410	1 ea
Guardfilter for 4.6 mm I.D. TSKgel® Super Series columns	818207	3 ea
Holder for TSKgel® Super Series Guardfilters	818206	1 ea
Holder for 2 mm I.D. TSKgel® Guardgel cartridges	819308	1 ea
Holder for 3.2 mm I.D. TSKgel® Guardgel cartridges	819018	1 ea
Holder for 7.5 mm I.D. TSKgel® Guardgel cartridges	803432	1 ea
Holder for 7.5 mm I.D. TSKgel® Guardgel cartridges	807093	1 ea
Holder for 21.5 mm I.D. TSKgel® Guardgel cartridges	816106	1 ea

Whatman® Syringe & Syringeless Filters

Whatman® Mini-UniPrep® syringeless filters with slit septa

The Whatman® Mini-UniPrep® Syringeless Filters provide a faster and easier way to remove particulates from samples being prepared for High Performance Liquid Chromatography (HPLC)/ Ultra High Performance Liquid Chromatography (UHPLC) analysis. In fact, Mini-UniPrep lets you prepare samples in 1/3 the time required by other methods. Add up the time savings, plus the money saved from cutting multiple consumables out of the sample preparation process and you'll see huge benefits for your laboratory.

Mini-UniPrep is a preassembled filtration device consisting of a 0.4 mL capacity chamber and a plunger. The plunger contains a filtration membrane at one end and a preattached cap/septum at the other. The plunger is pressed through the sample in the outer chamber and positive pressure forces the filtrate into the reservoir of the plunger. Air escapes through the vent hole until the locking ring is engaged providing an air-tight seal. Within seconds the Mini-UniPrep can be placed into any device able to contain 2 mL vials for injection into your instrument.

The device can be used either manually or with a compressor unit. The multi-compressor can process up to 6 samples at one time, further improving sample processing time and reducing the risk of hand stress. The Mini-UniPrep device is designed to fit into any autosampler accommodating 12 x 32 mm vials. Alternatively the septum can be pierced with a needle and the sample drawn off for manual injection into an analyzer.

Features and Benefits:

- All-in-one filtration process allows you to process sample loads in 1/3 the time
- Wide range of membrane choices from 0.2 and 0.45 µm pore sizes
- Compatible with most major autosamplers
- Fewer consumables required. Reduce costs by up to 40%

Applications:

- Routine HPLC/UHPLC analysis
- Composite assays
- Content uniformity
- Protein precipitation
- Solubility testing
- Dissolution testing
- Sample filtration

Continuous Improvement and Innovation:
Whatman has listened to customers and created a whole family of Mini-UniPrep filters to meet specific needs. Customers who need to filter light sensitive samples can use the Amber Mini-UniPrep, customers using robotics to maximize throughput can use Slit Septa Mini-UniPrep.

Amber Mini-UniPrep Syringeless Filter

Features and Benefits:

- Amber color prevents photodegradation of light sensitive samples
- Same colorant used in pharmaceutical containers designed to meet USP specifications for light resistance
- Translucent amber chamber and plunger enable easy visual inspection

Applications:

- Use with any compound that requires protection from light, such as catecholamines or vitamins

HPLC Accessories

Whatman® Syringe & Syringeless Filters

Slit Septa Mini-UniPrep® Syringeless Filter

Features and Benefits:

- Slit septum cap enables use with current robotics on HPLC instruments for high throughput automation
- Durable yet flexible slit septum cap has been specially designed for instruments with sensitive sampling needs. Sample evaporation is minimal

Applications:

- Use with standard robotics on HPLC instruments with sensitive needles, allowing for higher throughput

suitable for (standard robotics on HPLC instruments with sensitive needles, allowing for higher throughput; high throughput applications)

polypropylene housing and slit-septa cap (compatible with all major autosamplers)

vial size ..... 12 mm × 32 mm
filter capacity ..... 400 µL
feature ..... approximately 18 lb / 8.2 kg

Pore Size (µm)	Cat. No.	Qty
membrane Nylon		
0.2	Z557935-100EA	100 ea
	Z557935-1000EA	1000 ea
0.45	Z557943-100EA	100 ea
	Z557943-1000EA	1000 ea
membrane PTFE		
0.2	Z557951-100EA	100 ea
	Z557951-1000EA	1000 ea
0.45	Z557978-100EA	100 ea
	Z557978-1000EA	1000 ea
membrane polypropylene		
0.2	Z557986-100EA	100 ea
	Z557986-1000EA	1000 ea
0.45	Z557994-100EA	100 ea
	Z557994-1000EA	1000 ea
membrane PVDF		
0.2	Z558001-100EA	100 ea
	Z558001-1000EA	1000 ea
0.45	Z558028-100EA	100 ea
	Z558028-1000EA	1000 ea
membrane polyethersulfone		
0.2	Z558036-100EA	100 ea
	Z558036-1000EA	1000 ea
0.45	Z558044-100EA	100 ea
	Z558044-1000EA	1000 ea
membrane polypropylene (polypropylene depth filter: Depth PP or dpPP)		
0.45	Z558052-100EA	100 ea
	Z558052-1000EA	1000 ea
membrane glass fiber (glass microfiber: GMF)		
0.45	Z558060-100EA	100 ea
	Z558060-1000EA	1000 ea

Whatman® 6-place compressor

Manual station for processing six Whatman® Mini-Uniprep® syringeless filters at the same time, reducing hand stress and speeding workflow.
Whatman Article No.„ 28421456 (US reference)
product of Whatman, CR0000006
Field of Use : For internal research use only. Products are not intended for diagnostic use or resale.

Z558079-1EA	1 ea

Syringe Tip Filters

Minisart-Plus filters

Minisart-Plus Filters - An integral glass fiber prefilter greatly reduces the clogging associated with typical disposable syringe filtration units. Cellulose acetate filters, 26mm in diameter, with 0.2 µm, or 0.45 µm pores. The Minisart-Plus have a hold-up volume of 0.1mL. Sterile; individually packaged.
product of Sartorius Minisart

Description	Cat. No.	Qty
0.2 µm	17823K	50 ea
0.45 µm	17829K	50 ea

Minisart filters

Minisart filters have a Luer Lock inlet and outlet, for positive attachment to the syringe. The filter is 26 mm in diameter with a hold-up volume of 0.1 mL. Suitable for clear aqueous solutions not requiring preliminary filtration.
cellulose acetate/surfactant-free membrane
product of Sartorius Minisart

Description	Cat. No.	Qty
0.2 µm	16534K	50 ea
0.45 µm	16555K	50 ea
0.8 µm	16592K	50 ea
1.2 µm	17593K	50 ea
5.0 µm	17594K	50 ea

Iso-Disc™ Syringe Tip Filter Unit

Sample filtration can prolong column life and minimize downtime. Use Iso-Disc syringe filters to protect your HPLC column and instrument. Filters are available in Nylon, PTFE, and PVDF.

HPLC Accessories

Syringe Tip Filters

Iso-Disc™ Syringe Tip Filter Unit *(continued)*

Specifications

Housing: Polypropylene			
Connectors: Female luer lock inlet; Male luer outlet			
Pressure Rating			
	PTFE	Nylon	PVDF
25 mm	100 psi	90 psi	50 psi
13 mm	100 psi	100 psi	50 psi
4 mm	75 psi	75 psi	n/a
Typical Sample Volume (depends on condition of sample)			
25 mm: <100 mL			
13 mm: <10 mL			
4 mm: <2 mL			
Typical Holdup Volume (with air purge)			
25 mm: <100 µL			
13 mm: <10 µL			
4 mm: <10 µL			

Recommendations

Nylon Membrane:	General filtration, especially for aqueous or other hydrophilic samples. Not recommended for use with acids.
PTFE Membrane:	General filtration for hydrophobic samples. High solvent resistance.
PVDF Membrane:	Similar to PTFE, but recommended where low protein binding is important.
0.45 µm Pores:	Most HPLC applications.
0.2 µm Pores:	Use when using 3 µm HPLC columns or when suspended particles must be minimized.

Membrane	Part Diam. (mm)	Pore Size (µm)	Color	Cat. No.	Qty
PTFE	25	0.2	green	54120-U	50 ea
PTFE	25	0.45	green	54121-U	50 ea
PTFE	25	1	green	54128-U	50 ea
PTFE	13	0.2	green	54131-U	50 ea
PTFE	13	0.45	green	54132-U	50 ea
PTFE	4	0.2	natural	54143-U	100 ea
PTFE	4	0.45	white/red	54144-U	100 ea
Nylon	25	0.2	orange	54122-U	50 ea
Nylon	25	0.45	orange	54123-U	50 ea
Nylon	13	0.2	orange	54133-U	50 ea
Nylon	13	0.45	orange	54134-U	50 ea
Nylon	4	0.2	natural	54145-U	100 ea
PVDF	25	0.2	red	54124-U	50 ea
PVDF	25	0.45	red	54125-U	50 ea
PVDF	13	0.2	red	54135-U	50 ea
PVDF	13	0.45	red	54136-U	50 ea

Rheodyne® Injectors

Rheodyne® Model 3725i Preparative Sample Injectors

Model 3725i sample injectors for 1-10 cm I.D. HPLC columns combine the ease of use and versatility of Rheodyne's analytical scale injectors with the ability to handle large samples and high flow rates. Rugged and easily maintained, in a choice of stainless steel or PEEK flowpaths. Includes 10 mL sample loop, $\frac{1}{8}$ in. fittings for all ports, 5 cm large-bore syringe needle (16 gauge/0.65 in. O.D.) for rapid injection of large samples, needle port cleaner, two vent tubes, wrenches, mounting screws, and instructions.

Specifications

Tubing and Fittings:	1/8 in.
Valve Flow Passages:	1 mm/0.04 in.
Flow Rates:	10–800 mL/min
Pressure Rating:	Model 3725i: 276 bar/4,000 psi* Model 3725i-038: 345 bar/5,000 psi

*Usable pressure depends of sample loop ID, organic solvent concentration, and organic solvent exposure time

Description	Cat. No.	Qty
PEEK	57461	1 ea
stainless steel	57463	1 ea

HPLC Accessories

Rheodyne® Injectors

Rheodyne® Model 3725i Replacement Components

	Cat. No.	Qty
Rheodyne® 3725i Rotor Seal		
for use with 3725i Injector	57473	1 ea
Stator Face Assembly		
for use with model 3725 injector	57474	1 ea
Needle for Model 3725i Prep Sample Injector		
PEEK	57475	1 ea
stainless steel, needle size 16 ga	57476	1 ea
RheFlex® PEEK Fittings		
Fitting set, configured for 1/8 in. tubing	57477	1 ea
Rheodyne® Fittings		
nut and ferrule, for 1/8 in. tubing	57479	1 ea
RheBuild® Kit		
for use with 3725/3725I/3725-038/3725I-038	55043	1 ea

Sample Loop for Rheodyne® Injector Model 3725i

Supplied with unswaged fittings for connection to Model 3721i injector.

Two 1/8 in.x 1/16 in. reducing unions (Cat. No. 22999), two short pieces of 1/16 in. capillary tubing, and 1/16 in. nuts and ferrules are needed to connect a preparative sample loop to a valve with 1/16 in. ports.

Volume (mL)	Material	Cat. No.	Qty
2	PEEK	57464-U	1 ea
5	PEEK	57465	1 ea
10	PEEK	57466-U	1 ea
20	PEEK	57467	1 ea
2	stainless steel	57468-U	1 ea
5	stainless steel	57469	1 ea
10	stainless steel	57470-U	1 ea
20	stainless steel	57471	1 ea

Rheodyne® Model 7000 Stream Switching Valve

Designed specifically for column selection, sample clean-up and enrichment, column programming, backflushing, and other stream switching operations. Six peripheral ports (no center port) are interconnected through a two-position rotor. Low volume flow passages (0.6 mm I.D.) minimize dead volume that can affect column switching analyses. The pressure limit is factory set at 5000 psi (350 kg/cm^2), but can be adjusted to 7000 psi (490 kg/cm^2).

The flat-face seal is easy to adjust.

58920-U	1 ea

Rheodyne® Model 7000L Stream Switching Valve, Large Bore

The 2-position 7000L Stream Switching Valve has a flow passage of 1 mm (0.040").

54479	1 ea

Rheodyne® Model 7000 Replacement Components

	Cat. No.	Qty
Vespel™ Rotor Seal		
for use with 7010 Injector	58831	1 ea
RheBuild® Kit		
for use with 7000/7010	55044	1 ea
Tefzel® Rotor Seal		
for use with 7000L	54647	1 ea

Rheodyne® Model 7010 Injector

The original Rheodyne HPLC injector, Model 7010 introduces 5 µL - 5 mL samples onto a column with excellent reproducibility (intended for complete loop filling only). Six clustered ports allow compact interconnections, minimizing tubing volume. The flat-face seal is easy to adjust and service. Operates at pressures to 7000 psi (490 kg/cm^2). Supplied with a 20 µL loop; order fill port separately.

58827	1 ea

Rheodyne® Model 7010 Replacement Components

	Cat. No.	Qty
Loop Fill Port		
for use with 7010 Injector	58825-U	1 ea
Vespel™ Rotor Seal		
for use with 7010 Injector	58831	1 ea
RheBuild® Kit		
for use with 7000/7010	55044	1 ea
Tefzel® rotor seal		
for use with 7010	54656	1 ea

Sample Loop for Rheodyne® Injector Models 7010

Note: Use Vespel seals to pH 10, Tefzel seals to pH 14.

stainless steel sample loop and fittings

Volume	Cat. No.	Qty
5 µL	58840-U	1 ea
10 µL	58832	1 ea
20 µL	58833-U	1 ea
50 µL	58834	1 ea
100 µL	58835	1 ea
200 µL	58836	1 ea
500 µL	58837	1 ea
1 mL	58838	1 ea
2 mL	58839	1 ea
5 mL	57637	1 ea

HPLC Accessories

Rheodyne® Injectors

Rheodyne® Model 7060 Selection Valve

For column or mobile phase selection. Instead of frequently connecting and disconnecting columns to your system, connect the injector outlet to the common center port of a Model 7060 valve, and connect up to 6 columns to the peripheral ports. (We recommend allowing one port for bypass/flushing operations.) The common port can be sequentially connected to each of the 6 peripheral ports by manually rotating the handle in either direction. Connect the column outlets to a second Model 7060 valve to direct the flow from the columns to the detector. Low dispersion 0.41 mm/0.016 in. I.D. passages and an internal volume of less than 2 µL ensure minimal extra-column band broadening.

58817	1 ea

Rheodyne® Model 7520 Microsample (Syringe Loading) Injector

Designed specifically for use with narrow bore HPLC columns. 0.13 mm/0.005 in. I.D. passages and a built-in needle port (0.3 µL hold-up volume) minimize dispersion of small samples. A 0.5 µL sample rotor is included; order other rotors separately.

max. pressure ..... 7000 psi

58819	1 ea

Rheodyne® Model 7520 Replacement Components

RheBuild® Kit

These kits include all of the tools and parts you need to repair your Rheodyne injector. The parts included are those most likely to be damaged, worn, or lost. Kits for front-loading injectors include: rotor seal, stator face assembly, isolation seal, needle guide, needle port cleaner, 2 hex keys, operating instructions, and a mini-manual. Parts may vary, depending on valve model.

For Use With	Cat. No.	Qty
7520/7526	55048	1 ea

Sample Rotor for Model 7520 Microsample Injector

Size (µL)	Cat. No.	Qty
0.2	58820	1 ea
1.0	58822-U	1 ea

Rheodyne® Model 7125 Injector

The Rheodyne Model 7125 syringe loading injector allows injection of the entire contents of the syringe into the sample loop – you will not have to flush the valve between injections, unless you are conducting trace analyses. It also injects samples from a partially filled loop (you save time by not having to change the sample loop).

The Model 7125 injector can be used at pressures to 7000 psi (490 kg/cm^2) and is supplied with a Vespel rotor seal for operation at pH 0-10. A 20 µL sample loop is included; order additional loops separately.

58826	1 ea

Rheodyne® Model 7125 Replacement Components

Description	Cat. No.	Qty
Rotor Seal for Model 7125/7725/7725i Injector, Vespel	58830-U	1 ea
Rotor Seal for Model 7125/7725/7725i Injector, Tefzel®	57633	1 ea
Needle port cleaner	57635	1 ea
Valve angle bracket, for use with all metal Rheodyne valves	57636	1 ea
RheBuild® Kit, for use with 7125/7126 series	55045	1 ea
Thrust Bearing, for use with 7125	54547	1 ea
Stator Face Assembly, for use with (7125)	54675	1 ea

Sample Loop Rheodyne® Injector Model 7125

stainless steel sample loop and fittings

Use Vespel seals to pH 10, Tefzel seals to pH 14.

Volume	Cat. No.	Qty
5 µL	58840-U	1 ea
10 µL	58832	1 ea
20 µL	58833-U	1 ea
50 µL	58834	1 ea
100 µL	58835	1 ea
200 µL	58836	1 ea
500 µL	58837	1 ea
1 mL	58838	1 ea
2 mL	58839	1 ea
5 mL	57637	1 ea

Rheodyne® Model 7725 and 7725i Injectors

The Rheodyne Model 7725 injector allows you to inject 1 µL - 5 mL samples with accuracy and precision. The rugged, easily maintained design offers many advanced features:

- Patented continuous flow design (Figure A) – flow is uninterrupted when you switch from LOAD to INJECT
- Easy seal adjustment using pressure screw on front of injector
- Easy access to fittings (Figure B)

Injector includes a 20 µL sample loop and is supplied with a Vespel rotor seal that can be replaced with a Tefzel rotor seal for operation at pH 0-14. Factory set at 5,000 psi/345 bar, adjustable to 7,000 psi/483 bar. Model 7725i has an internal position sensing switch.

number of ports 6
number of positions 2
max. pressure ..... 7000 psi

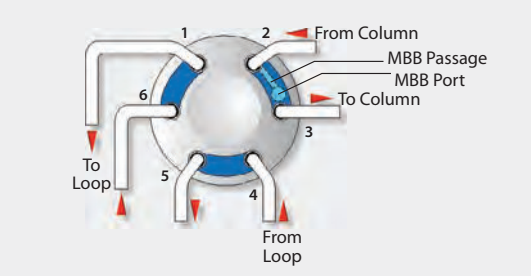


Figure A. A conventional HPLC valve momentarily interrupts flow during sample injection, subjecting your column to repetitive pressure shocks. Rheodyne's patented MBB (make-before-break) design makes the new connection before breaking the old one, providing uninterrupted flow.

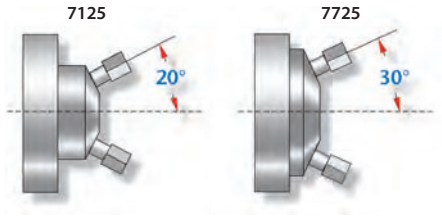


Figure B. Model 7725 injectors also feature a wide port angle (30°), for easy access to the fittings

Description	Cat. No.	Qty
Rheodyne® injector	57620-U	1 ea
Rheodyne® injector	57621	1 ea

Rheodyne® Model 7725 and 7725i Replacement Components

Description	Cat. No.	Qty
Rotor Seal for Model 7125/7725/7725i Injector, Vespel	58830-U	1 ea
Rotor Seal for Model 7125/7725/7725i Injector, Tefzel®	57633	1 ea
Stator face assembly, for use with model 7725 injector	57634	1 ea
Needle port cleaner	57635	1 ea
Valve angle bracket, for use with all metal Rheodyne valves	57636	1 ea
RheBuild® Kit, for use with 7725/7725i/7726	55049	1 ea

Sample Loop for Rheodyne® Injector Model 7725/7725i

Volume	Cat. No.	Qty
5 µL	57623	1 ea
10 µL	57624	1 ea
20 µL	57625	1 ea
50 µL	57626	1 ea
100 µL	57627	1 ea
200 µL	57628-U	1 ea
500 µL	57629-U	1 ea
1 mL	57630	1 ea
2 mL	57631	1 ea
5 mL	57632	1 ea

Rheodyne® Model 8125 Low Dispersion Injector

Inject as little as 0.1 µL of sample with high accuracy and zero waste. Small diameter flow channels in a low-dispersion version of the popular Model 7125 injector. Excellent for use with narrow bore columns (1-3 mm I.D.), but also well suited for larger diameter columns. Resolution is most improved with relatively unretained low peaks, the peaks most affected by extra-column effects.

Additional features include:

- Built-in zero-holdup needle port
- Built-in position switch to signal injection
- Long rotor seal lifetime – make up to 30,000 injections before replacing seal (Vespel)
- User-adjustable to 7000 psi (490 kg/cm^2)
- Easy-to-service flat-face rotor design

Supplied with a 5 µL sample loop, fittings for all ports, 22-gauge luer hub needles, needle port cleaner, two vent tubes, wrenches, mounting screws and instructions. Order additional sample loops separately.

57950-U		1 ea

Rheodyne® Model 8125 Replacement Components

	Cat. No.	Qty
Rheodyne® 8125 Rotor Seal		
for use with 8125 Injector	57955	1 ea
RheBuild® Kit		
for use with 8125/8126 valves	55050-U	1 ea

HPLC Accessories

Rheodyne® Injectors

Sample Loop for Rheodyne® Injector Model 8125

Volume (µL)	Cat. No.	Qty
5	57951	1 ea
10	57952	1 ea
20	57953	1 ea

All flow passages in the 6-port injectors on this page are inert PEEK (polyetheretherketone) or alumina-ceramic materials. They are unaffected by buffers, acids, bases, or halide salts, including 1 M sodium chloride, over the entire pH range. Both valves are rated for pressures up to 5,000 psi (350 kg/cm^2), but the usable operating pressure may be lower, depending on the loop and solvents used.

Rheodyne® Model 9010 Injector

This injector is similar in function to the Model 7010 stainless steel injector, but is constructed of inert PEEK and Tefzel materials for use in the pH range 0-14. It can be used for HPLC, soft gel chromatography, or ion chromatography.

A position-sensing switch closes in the INJECT position and stays closed until the handle is returned to the LOAD position.
Supplied with a 20 µL sample loop; order additional loops separately.

57695	1 ea

Rheodyne® Model 9010 Replacement Components

	Cat. No.	Qty
Tefzel® Rotor Seal		
for use with model 9010 injector	57696	1 ea
Loop Fill Port		
for use with 9010 Injector	57638	1 ea
Needle Port		
for use with 9010 Injector	57639	1 ea
RheBuild® Kit		
for use with 9010/9040 Injector	55052	1 ea

Rheodyne® Model 9725 Injector

The Model 9725 injector is ideal for both HPLC and soft gel LC purification procedures for biomolecules. Performance of this 6-port rotary injector is similar to that of the Model 7725 injector, but no metal contacts the samples. Model 9725 incorporates the patented make-before-break design (see Cat. No. 57620-U).

The 0.25 mm I.D. flow channels provide low dispersion when used with narrow I.D. columns, but prevent excessive flow resistance at flow rates used with larger analytical columns and preparative columns. Use with Rheodyne HPT fittings and high pressure PEEK tubing. Model 9725i includes a position-sensing switch.

Supplied with a 20 µL PEEK sample loop, Tefzel rotor seal, fittings for all ports, 22-gauge luer hub needle, needle port cleaner, two Tefzel vent tubes, wrenches, mounting screws and instructions.

Order additional sample loops separately.

54432	1 ea

Rheodyne® Model 9725i PEEK Injector

The 9725i contains a switch and has the make before break (MBB). With the MBB, flow is not interupted when switching from laod to inject.

54632	1 ea

Rheodyne® Model 9725 Replacement Components

	Cat. No.	Qty
Tefzel® Rotor Seal		
for use with 9725 Injector	57971-U	1 ea
RheBuild® Kit		
for use with 9725/9725i/9726 Injectors	55053	1 ea

Sample Loop for 9010, 9125, and 9725 Injectors

O.D. ..... 1/16 in.

Volume	Cat. No.	Qty
20 µL	57642	1 ea
50 µL	57643	1 ea
100 µL	57644	1 ea
200 µL	57645	1 ea
500 µL	57646	1 ea
1 mL	57647	1 ea
2 mL	57648	1 ea
5 mL	57649	1 ea

HPLC Accessories

Rheodyne® High Pressure Valves

Rheodyne® High Pressure Valves

MXT Valves for Fast Chromatography

The MXT715-000 2-position, 6-port switching valve is ideal for use as a two-column switching valve, enabling the same system to be used with more than one column to easily accommodate multiple users and applications. It can also be used in a traditional injection valve configuration and offers the Rheodyne patented MMB (Make-Before Break) feature for improved reproducibility and system stability.

Description	Cat. No.	Qty
stainless steel	51343-U	1 ea

Sample Loops for MXT Fast Chromatography Valves

stainless steel

Volume (µL)	Cat. No.	Qty
5	51344-U	1 ea
10	51345-U	1 ea
20	51347-U	1 ea
50	51350-U	1 ea
100	51353-U	1 ea

MXP High Pressure Valves for HPLC

The MXP7900-000 valve is the standard 2-position, 6-port switching valve designed for traditional HPLC and related techniques, used for traditional sample injections or to provide dual-column functionality in your system.

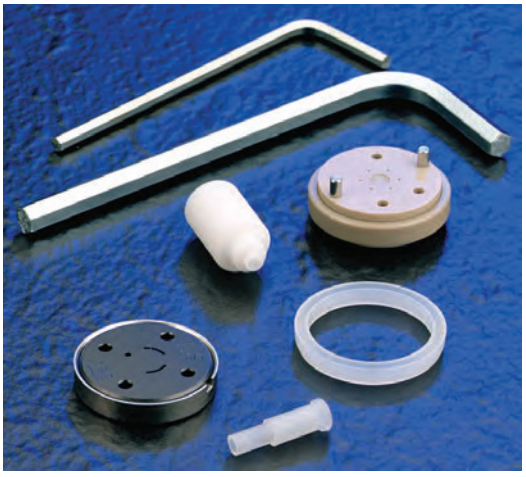
The MXP9900-000 valve should be used when the application requires biocompatability.

Description	Cat. No.	Qty
stainless steel	51354-U	1 ea
PEEK	51356-U	1 ea

Rheodyne® RheBuild® Kits, Fittings, Tools

Rheodyne® Injector RheBuild® Kits

These kits include all of the tools and parts you need to repair your Rheodyne injector. The parts included are those most likely to be damaged, worn, or lost. Kits for front-loading injectors include: rotor seal, stator face assembly, isolation seal, needle guide, needle port cleaner, 2 hex keys, operating instructions, and a mini-manual. Parts may vary, depending on valve model.



For Use With	Cat. No.	Qty
3725/3725I/3725-038/3725I-038	55043	1 ea
7000/7010	55044	1 ea
7010 with Stator	504602	1 ea
7125/7126 series	55045	1 ea
7125-081	55046	1 ea
7520/7526	55048	1 ea
7725/7725i/7726	55049	1 ea
7750 TPMV Series	7750999	1 ea
8125/8126 valves	55050-U	1 ea
9010/9040 Injector	55052	1 ea
9125/9126	55051	1 ea
9725/9725i/9726 Injectors	55053	1 ea
9750 TPMV Series	9750999	1 ea

SupelPRO™ RheBuild® Kits

Features and Benefits

Kits include all of the tools and parts you need to repair your SupelPRO unit. The parts included are those most likely to be damaged, worn, or lost. Parts may vary, depending on valve model.

For Use With	Cat. No.	Qty
2-Position/6-Port	54395-U	1 ea
2-Position/10-Port	54396-U	1 ea

Rheodyne® pH Upgrade Kit

Enables you to use your Rheodyne injector with samples at pH 0-14. Includes Tefzel rotor seal, 2 hex keys, instructions.

operating pH ..... 0 - 14

For Use With	Cat. No.	Qty
Valves 7000/7010/7040	55054	1 ea
Valve 7125/7126	55055	1 ea

HPLC Accessories

Rheodyne® RheBuild® Kits, Fittings, Tools

Rheodyne® Stainless Steel Fittings

The long Rheodyne nut has a longer hex portion for easier wrench access.

from left to right: 58258, 58256, 58257

Description	Cat. No.	Qty
nut, for 1/16 in. tubing	58256	10 ea
long nut, for 1/16 in. tubing	58257	10 ea
ferrule, for 1/16 in. tubing	58258	10 ea
nut and ferrule, for 1/8 in. tubing	57479	1 ea

RheFlex® PEEK Fittings

Features and Benefits

For Rheodyne valves. Hold to 5000 psi (350 kg/cm^2).

Long fitting set (57690-U)

Description	Cat. No.	Qty
Long fitting set, configured for 1/16 in. tubing	57690-U	5 ea
Short fitting set, configured for 1/16 in. tubing	57691	5 ea
Ferrule pack, configured for 1/16 in. tubing	57692	5 ea
Fitting set, configured for 1/8 in. tubing	57477	1 ea

Rheodyne® Port Adapter

Use the Port Adapter for connecting 1/16 in. tubing to a 1/8 in. valve port.

57472	1 ea

ValvTool

The ValvTool is a uniquely designed wrench that provides easy access for changing sample loops or replacing fittings on Rheodyne valves. Its slotted socket can be used for working with 1/4 in. stainless steel HPLC fittings, as well.

5/16 in. socket × 1/4 in. open wrench

55087-U	1 ea

Priming Valves, Gauge Kits, SSI™ Valves, Pulse Damper

OPTI-PRIME™ Priming Valve for Waters Pumps

Makes priming Waters pumps a convenient, one hand operation. Replaces Waters priming system.

Description	Cat. No.	Qty
Safety Syringe	59451	1 ea

SSI™ Prime/Purge Valve

The drain port in this valve is incorporated into the valve stem, eliminating the need for extra tubing and fittings. A luer taper on the valve stem accepts a luer syringe for priming. Valve shutoff is provided by a soft-seal tip that withstands back pressures to 8,000 psi (560 kg/cm^2). Only PTFE, Tefzel, and 316 stainless steel come in contact with the mobile phase. Order 1/16 in. SSI nuts and ferrules separately.

58690-U	1 ea

Upchurch Prime/ Purge Valve

Upchurch Prime/Purge Valve

Automatic valve operation with a simple twist of the Luer-Lock syringe. Easy installation, long seal life.

Description	Cat. No.	Qty
Prime/Purge Valve for Waters Pump	54716-U	1 ea
Includes 2 Tefzel® Ferrules and 2 PEEK nuts for 1/8" Tubing Universal Prime/Purge Valve low pressure	54718-U	1 ea

Pressure Gauge Kits

Components already assembled, ready for easy installation. - Backed by a three-year warranty, these highly accurate (±1.5%), glycerine-filled gauges have a 2-1/2 in./6.4 cm face and 1/4 in. NPT connection. To resist corrosion, the one-piece case and socket and the bourdon tube are made of 316 stainless steel. Stainless steel tee with 1/16 inch fittings is included.

Description	Cat. No.	Qty
0-3000 psi (0-210 bar)	58623-U	1 ea
0-6000 psi (0-420 bar)	58624	1 ea

HPLC Accessories

Priming Valves, Gauge Kits, SSI™ Valves, Pulse Damper

SSI™ Two-Way Shut Off Valve

For 1/16 in. tubing; 1/4-28 (SSI style) fittings included. Rated to 15,000 psi (1054 kg/cm^2).

58789-Left
58793-Right
58794-Not Shown

58789	1 ea

SSI™ Three-Way Stream-Splitting Valve

Each port in this valve can be connected to pressure, as in stream-splitting, or when connecting an in-line pressure gauge (open valve to read pressure, seal off to prevent contamination). The side vent model can replace the injector bypass valve on Altex, LDC, PerkinElmer, Spectra-Physics, or other chromatographs, and is recommended for all general applications. The bottom vent model replaces the bypass valve on a Varian 5000 chromatograph. For 1/16 in. tubing; 1/4-28 (SSI style) fittings included. Rated to 15,000 psi (1,054 kg/cm^2).

number of ports 3
max. pressure ..... 15,000 psi

Description	Cat. No.	Qty
bottom vent	58793	1 ea
side vent	58794	1 ea

SSI™ LO-Pulse™ Damper

A pulse damper controls pump pulsations for a more stable baseline. The LO-Pulse damper is a patented unit compatible
with single piston reciprocating HPLC pumps (Altex 110A, Eldex pumps, LDC Mini-Pump VS, SSI Models 200 and 300,
etc.). At pressures from 500 psi to 6,000 psi (35-420 kg/cm^2), it improves precision of quantitative analyses and detection limits for trace sample components. Fittings and instructions included.

Description	Cat. No.	Qty
with cabinet	58455	1 ea
without cabinet	58442	1 ea

Mobile Phase Degassing/Filtration

Mobile Phase Reservoir System

This convenient system is made entirely of inert parts: glass, Tefzel, PEEK, and PTFE TFE. Includes 10 ft./3 m of 1/8 in. O.D. PTFE tubing, a PEEK bottom-of-the-bottle filter/sparger, a plug, and a 1-liter or 2-liter safety-coated bottle.

Description	Cat. No.	Qty
bottle 1 L	55060-U	1 ea
bottle 2 L	55061	1 ea

Mobile Phase Reservoir System Replacement Parts

Description	Cat. No.	Qty
Luer Plug	54983	1 ea
Tubing Adapter, 1/4-28 male UNF, male Luer	58722	1 ea
Mobile Phase Replacement Reservoir, 1 L	59324	1 ea
Mobile Phase Replacement Reservoir, 2 L	59323	1 ea
Cap for Mobile Phase Reservoir System, bottle cap: GL 45, number of holes: 3	55062	1 ea
Cap for Mobile Phase Reservoir System, GL 45 solid (no holes)	23170-U	12 ea
PTFE Tubing, L 10 ft × O.D. 1/8 in. × I.D. 0.063 in.	58703	1 ea
Tube Fitting, Flangeless, nut and ferrule: 1/4-28 male Upchurch, for tubing 1/8 in. O.D.	58686	5 ea
Shutoff Valve, Low Pressure, natural PEEK, for use with 1/8 in. tubing	56704	1 ea

HPLC Accessories

Mobile Phase Degassing/Filtration: *Solvent Filtration Systems and Membranes*

Solvent Filtration Systems and Membranes

Protect your instrument and columns by removing particles and gases from solvents and other mobile phase components. Nylon 66 membrane filters are compatible with all solvents commonly used in HPLC. For use with sink aspirator.

Supelco® Mobile Phase Filtration Apparatus 1

Connects to 1000 mL sidearm flask

Includes:

- 250 mL glass reservoir
- Funnel base and stopper
- Clamp
- Stainless steel holder and screen
- 10 PTFE gaskets
- 50 Nylon 66 filters (47 mm, 0.45 µm pores).

Flask not included.

58061	1 ea

Filtration Apparatus 1 Replacement Glass Parts

Description	Cat. No.	Qty
Funnel Base and Stopper	58064	1 ea
Reservoir for Filtration Apparatus 1, volume 250 mL	58063	1 ea
Reservoir for Filtration Apparatus 1, volume 500 mL	58074	1 ea

Supelco® Mobile Phase Filtration Apparatus 2

Connects to aspiration line

Includes:

- 250 mL glass reservoir
- S/T 34/45 funnel base
- S/T 34/45 1000 mL flask and glass cap
- Clamp
- Stainless steel holder and screen
- 10 PTFE gaskets
- 50 Nylon 66 filters (47 mm, 0.45 µm pores).

58062-U	1 ea

Filtration Apparatus 2 Replacement Glass Parts

Description	Cat. No.	Qty
Cap for Flask	58071	1 ea
Tapered Funnel Base	58068	1 ea
Tapered Flask for Filtration Apparatus 2, volume 1000 mL	58070-U	1 ea
Tapered Flask for Filtration Apparatus 2, volume 2000 mL	58075	1 ea

Filtration Apparatus 1 and 2 Replacement Filter Parts

Description	Cat. No.	Qty
Clamp, Spring Action	58053	1 ea
Filter Holder and Screen	58065	1 ea
PTFE Gaskets	58066	10 ea

Nylon 66 Filter Membranes

Diam. (mm)	Pore Size (µm)	Cat. No.	Pkg
47	0.20	58060-U	50 ea
47	0.45	58067	50 ea

PTFE Filter Membranes

PTFE filter membrane

Diam. (mm)	Pore Size (µm)	Cat. No.	Pkg
47	1.5	58086	10 ea
47	1.0	58097	10 ea

Cellulose Filter Membrane

Diam. (mm)	Pore Size (µm)	Cat. No.	Pkg
47	0.22	58188	100 ea

HPLC Accessories

Mobile Phase Degassing/Filtration: *Solvent Filtration Systems and Membranes*

Nylon filter membranes

Nylon filters are naturally hydrophilic and no wetting agents are used in manufacture. With an extractable level <0.0015 mg/cm^2, they are ideal for HPLC solvent and sample preparation. Because of high non-specific binding, they are not recommended for protein solutions. Compatible with aqueous and most organic solvents. Autoclavable; unaffected by temperatures up to 180 °C.

Diam. (mm)	Pore Size (µm)	Cat. No.	Pkg
25	0.2	Z290823-100EA	100 ea
47	0.22	Z290807-100EA	100 ea
25	0.45	Z290815-100EA	100 ea
47	0.45	Z290793-100EA	100 ea
90	0.45	Z290785-25EA	25 ea

Solvents and Solutions Compatible with Nylon 66 and Nylon 46 Filters

Recommendations		
Amyl alcohol	Ethanol	Isopropanol
Benzyl alcohol	Ethylene glycol	Methanol
Butyl alcohol	Glycerine (glycerol)	Methyl Cellosolve
Butyl Cellosolve	Isobutyl alcohol	Propanol
Solvents		
Acetone	Dimethylformamide	Methyl ethyl ketone
Acetonitrile	Dimethylsulfoxide	Methyl isobutyl ketone
Amyl acetate	Dioxane	Nitrobenzene
Benzene[1]	Ethyl ether	Methylene chloride[1]
Bromoform	Ethylene dichloride	Pentane
Butyl acetate	Formaldehyde	Perchloroethylene
Carbon tetrachloride[1]	Freon 113	Tetrahydrofuran[1]
Cellosolve (2-ethoxyethanol)	Gasoline	Trichloroethylene
Chloroform[1]	Hexane	Toluene[1]
Cyclohexane	Isopropyl acetate	Trichlorethane
Cyclohexanone	Kerosene	Triethylamine
Diethylacetamide	Methyl acetate	Xylene[1]

Note: Controlled vacuum is recommended to prevent boiling of volatile solvents.

[1]Limited stability in neat solvent

Vacuum filtration assembly flasks

Description	Cat. No.	Qty
Side-arm flask, 125 mL	Z290483-1EA	1 ea
Side-arm flask, 1000 mL	Z290459-1EA	1 ea
Collection flask, 1000 mL	Z290610-1EA	1 ea
Collection flask, 4000 mL	Z290637-1EA	1 ea

Aura Mobile Phase Filter/Degasser Unit

Easy-to-use Aura filter/degasser units simultaneously degas solvents and buffers and remove particles. You can eliminate spurious peaks caused by gas bubbles in your detector, and prevent particle damage to check valves and other system components. A clean mobile phase also prolongs column life.

Each unit includes a PTFE filtering/degassing assembly, ten 1.5 µm PTFE filter membranes, 40 in./1 m × ¼ in. O.D. PTFE tubing, and a heavy wall, graduated, borosilicate glass solvent reservoir. Choose either a 1-liter or a 2-liter reservoir. The standard taper PTFE joint on the filtering assembly fits into Ehrlenmeyer flasks and other containers. The filtering assembly accepts any standard 47 mm filter membrane and is compatible with all solvents used in HPLC. Use with appropriate glassware and any vacuum pump.

The Aura filter/degasser is particularly suitable for use with solid phase extraction disks (SPED). It ensures simple disc placement, large filtration area, small restriction to flow from the disk support element, and the convenience and advantages of the liquid inlet tube (allows sediments to be transferred last).

Attaches to any vacuum line.

Description	Cat. No.	Qty
reservoir 1 L	58094	1 ea
reservoir 2 L	58093	1 ea
no reservoir	55023	1 ea

Mobile Phase Replacement Reservoir

Size (L)	Cat. No.	Qty
1	59324	1 ea
2	59323	1 ea

Inlet Filters, Debubbler

10 µm Slip-On Inlet Filter

We recommend this filter for solvent inlet applications. The 10 µm filter protects the HPLC system from contamination while minimizing pump cavitation problems. Compatible with the 1.5 mm I.D. tubing used with many HPLC pumps. Also fits the 2.2 mm I.D. tubing used with Varian pumps and the 3.0 mm I.D. tubing used with Waters pumps. 316 stainless steel tip and filter element connected by a KEL-F collar.

59277	1 ea

2 µm Stainless Steel Inlet Filter

All stainless steel construction with a 2 µm porous filter element, $^{11}/_{16}$ in./1.7 cm diameter. ⅛ in. pipe.

58267	1 ea

HPLC Accessories

Inlet Filters, Debubbler

Union for 2 µm Inlet Filter

For Connecting	Cat. No.	Qty
1/8 to 1/16 in.	22999	1 ea
1/8 to 1/8 in.	22041	1 ea

Optional PTFE Ferrules for 2 µm Inlet Filter Union

Description	Cat. No.	Qty
PTFE front ferrule, Swagelok for 1/8 in. tubing	22058	10 ea
PTFE back ferrule, Swagelok for 1/8 in. tubing	22059	10 ea
PTFE front ferrule, Swagelok for 1/16 in. tubing	22068	5 ea
PTFE back ferrule, Swagelok for 1/16 in. tubing	22069	5 ea

Mobile Phase Solvent Debubbler with Bracket

Gas bubbles in the mobile phase reduce pump output and cause check valves to malfunction. The mobile phase debubbler removes bubbles from the pump inlet line. Bubbles in the incoming mobile phase rise in the debubbler, displacing an equal volume of liquid from the debubbler reservoir to the pump. When necessary, simply remove the cap and refill the reservoir – the gas-liquid interface is visible through the housing. Compatible with 1.5 mm I.D. and 3.0 mm I.D. PTFE tubing used with Waters and other popular HPLC pumps. KEL-F, PTFE, and 316 stainless steel construction.

58453	1 ea

Biocompatible Inlet Filters

Bottom-of-the-Bottle™ 2 µm Filters-These Upchurch filters have an integrated 2 µm PEEK sparging frit. Connect to 1/8in. tubing through push-on connectors.

10 µm Inlet Filter - This metal-free Upchurch unit consists of a replaceable 10 µm ultra-high molecular weight polyethylene filter that screws into a Tefzel holder. The unit connects to the inlet tubing through a flangeless Tefzel fitting (included).

Description	Cat. No.	Qty
Bottom-of-the-Bottle™ filter/sparger, 2 µm	55058	1 ea
Bottom-of-the-Bottle™ filter/sparger, 2 µm	A437	1 ea
Inlet Filter Assembly, 10 µm	56705	1 ea
Filter Cup for UHMWPE Bottom-of-the-Bottle™ solvent filter, 10 µm	56706	5 ea

FEP Tubing for Inlet Filters

L × O.D. × I.D.	Cat. No.	Qty
10 ft × 1/8 in. × 0.0625 in.	58694-U	1 ea
10 ft × 0.15 in. × 0.118 in.	58695-U	1 ea

Vacuum Pumps

KNF Laboport® mini-pump

The ideal pump for vacuum and pressure filtration, solid phase extraction, and blotting. High performance diaphragm vacuum/pressure pumps for moderately corrosive applications and any filtration or procedure that requires clean evacuation, transfer and compression of air, gases, and vapors. Pumps are available with gauges and regulators for precise control of vacuum and pressure.

- Portable
- Oil-free
- Quiet operation
- Maintenance-free, Ryton® pump head
- Molded PTFE diaphragm
- Kalrez® multi-port valves
- Single stage

CE compliant
vacuum ~120 torr
max. pressure 35 psig
pumping speed 5.5 L/min
weight 4.2 lb

Description	Cat. No.	Qty
Pump only, 115 V	Z288284-1EA	1 ea
Pump with vacuum gauge and regulator, 115 V	Z288225-1EA	1 ea
Pump with pressure gauge and regulator, 115 V	Z288306-1EA	1 ea
Pump only, 230 V	Z288292-1EA Z288292EU-1EA Z288292GB-1EA	1 ea 1 ea 1 ea
Pump with vacuum gauge and regulator, 230 V	Z288268-1EA	1 ea
Pump with pressure gauge and regulator, 230 V	Z288314EU-1EA Z288314-1EA	1 ea 1 ea

KNF Laboport® solid PTFE vacuum pump

Quiet, high performance diaphragm vacuum pumps can be used alone or as the center of a modular laboratory vacuum system. Replaces noisy rotary-vane pumps for vacuum distillation, drying, filtration, rotary evaporation, degassing of liquids, and applications where water aspirators are used.

- Solid PTFE heads
- Molded PTFE diaphragm
- Kalrez® parts eliminate chemical attack to the pump
- Oil-free operation ensures pumped medium will stay pure
- New multi-port valve system with Kalrez disks improves flow and reliability
- Two stages
- 10 mm I.D. hose barbs on ports

CE compliant

Pumping Speed (L/min)	AC	Cat. No.	Qty
vacuum ≤6 torr			
10	115 V	Z262250-1EA	1 ea
10	230 V	Z262285EU-1EA	1 ea
		Z262285-1EA	1 ea
20	115 V	Z262269-1EA	1 ea
20	230 V	Z262293EU-1EA	1 ea
		Z262293-1EA	1 ea
34	115 V	Z262277-1EA	1 ea
34	230 V	Z262307-1EA	1 ea
vacuum ≤1.5 torr			
34	115 V	Z288209-1EA	1 ea
34	230 V	Z288217-1EA	1 ea

Temperature Control

Jetstream Plus Column Thermostat

Features:

- Full management of temperature
- Enhanced separations
- Improves reproducibility
- Increases performance of analysis
- Reliable results
- Increased chiral resolution

Jetstrem Plus offers full management of temperature enhanced separations, improving the reproducibility and increasing the performance of your analysis. In addition, Jetstream Plus, a multiple Peltier column thermostat with heating/cooling capability, has two-way forced air circulation. The 5-85° C and 0-80°C temperature range is controlled by new dual reference sensor technology and the auto-calibration feature guarantees reliable results. The setting of fixed temperatures, steps and gradients is done with a simple numerical keypad and a two line character display.

The Jetstream Plus Peltier heating/cooling HPLC column thermostat is fully programmable for isothermal, stepwise and linear ramp calculation. Temperature can be input in Celsius or Fahrenheit. The compact unit holds up to 5 columns in lengths up to 40 cm. It includes an integrated leak detector, adjustable sensitivity and acoustic control column protection by temperature lock feature. An RS-232 computer link is included as part of the control circuitry.

Specifications:
Temp. Range: 5-85 °C or 0-85 °C
Temp. Accuracy: ± 0.2 °C
Temp. Stability: ± 0.1 °C
Power: 100-245 VAC 50/60 Hz 100 W
CE Approved
Dimensions: 135(W) x 310(L) x 450(H) mm
Weight: 8 Kg

W × L × H ..... 135 mm × 310 mm × 450 mm
AC input ..... 100-245 V, 50-60 Hz
power consumption ..... 100 W
weight ..... 11 kg

Description	Cat. No.	Qty
5-85 °C	89810AST	1 ea
0-80 °C	89820AST	1 ea

HPLC Accessories

Temperature Control: *Eppendorf® HPLC Temperature Control Systems*

Eppendorf® HPLC Temperature Control Systems

Column temperature control leads to:

- More reproducible retention times
- More stable baselines
- Faster analyses
- Less system wear

Column temperature control is essential to reproducible retention times and detector baseline stability in reversed-phase, normal-phase, ion-exchange, and size exclusion liquid chromatography. The temperature variation in most labs – a 3-4 °C daily fluctuation – is sufficient to cause errors in quantification or peak identification, particularly in automated systems and systems incorporating temperature-sensitive detectors.To enable you to design a temperature control system that best matches your needs, we offer these Eppendorf® heaters and controllers.

Model CH-500 incorporates both heat and control functions; The CH-30 model heater MUST be connected to a separate controller.

Specifications

For Temperature Controllers			
Model:	**CH-500[1]**	**TC-45**	**TC-50**
Temperature Range:	amb.–150 °C	30–65 °C	amb.–150 °C
Readability:	0.1 °C	5 °C	0.1 °C
Setability:	0.1 °C	5 °C	0.1 °C
Set Control:	10 turn potentiometer	8 DIP switches	10 turn potentiometer
Typical Stability:	±0.1 °C	±0.1 °C	±0.1 °C
Absolute Accuracy:	±1 °C (50 °C)	±1 °C (50 °C)	±1 °C (50 °C)
Display:	3 1/2 digit LED	DIP switches	4 digit LED
Power:	120/240 VAC	120/240 VAC	120/240 VAC
For Column Heaters			
Model:	**CH-30, CH-500[1]**		
Temperature Range:	amb.–150 °C		
Length:[2]	≤30 cm		
O.D.:	CH-30: ≤1/2 in. OD CH-500: two 1/2 in. OD plus two 1/8 in. OD		
Injector Heating:	No		
Power:	120/240 VAC		
Sensor:	1,000 ohm RTD		
Element:	125 W		

[1]Heater/controller (combined)
[2]Heating channels for 1/8 in. columns can be used to heat solvent before it enters the injector

CH-500 HPLC Column Heater System

This heater/controller essentially combines the features of the CH-30 heater and the TC-50 controller in a single unit. It includes the Eppendorf innovative reversible heating blocks and remote heater on/off capability. Alternatively, the heating channels for 1/8 in. columns can be used to heat solvent before it enters the injector.

CE/CSA/UL approved.

CH-500 Heating Column Combinations

Two 1/4 in. × ≤30 cm and two 1/8 in. × ≤30 cm columns
One 3/8 in. × <30 cm column and 1/4 in. × <30 cm column and one 1/8 in. × <30 cm column
One 1/2 in. × <30 cm column and 1/4 in. × <30 cm column and one 1/8 in. × <30 cm column

CH-500 Heating Column Combinations

Two 3/8 in. × <30 cm columns
Two 1/2 in. × <30 cm columns
One 3/8 in. × <30 cm column and one 1/2 in. × <30 cm column

Description	Cat. No.	Qty
120 V,	500844	1 ea
240 V, Standard European cord	500852	1 ea
240 V, UK cord provided	500860	1 ea
1 in., replacement heating block	500895	2 ea

HPLC Accessories

Temperature Control: *Eppendorf® HPLC Temperature Control Systems*

Eppendorf® TC-45 temperature controller

This low-cost controller will control a CH-30, CH-430, or CH- 460 Eppendorf heater from 30-65°C. Temperature is set via DIP switches in 5°C increments.

Description	Cat. No.	Qty
120 V	56760-U	1 ea
240 V	500763	1 ea

Eppendorf® TC-50 temperature controller

Controls a CH-30, CH-430, or CH-460 Eppendorf heater from ambient temperature to 150°C. Temperature is set via a 10 turn potentiometer. The set point and actual temperature are displayed on an LED display. Includes remote heater on/off capability and solid state control.

Description	Cat. No.	Qty
120 V	56762	1 ea
240 V	500771	1 ea

Eppendorf® CH-30 column heater

Holds one column up to ½ in. O.D. or two columns up to ⅜ in. OD. Maximum column length is 30 cm (not including end fittings).

Description	Cat. No.	Qty
120 V	56766	1 ea
240 V	500801	1 ea

Eppendorf® column envelopes

Made To Hold	Cat. No.	Qty
½ in. O.D. column	56774-U	1 ea

NEW PRODUCTS

High-Flow Base Plate Purifier Systems for LC-MS Nitrogen

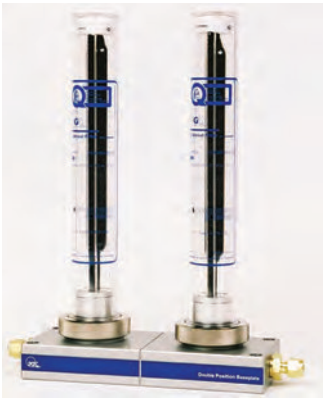
The two cartridge base plate Super Clean™purifier system is specifically designed to meet the high-flow purity requirements of the LC-MS insturment. Two versions are available, one for hydrocarbon removal, and one for moisture removal.

Features:

- Permanent connections
- Continous operation
- Quick cartridge change-out and no tools required
- Vertical design requies very little bench space
- Indicator capability for moisture

Super Clean (High-Flow Base-Plate Design) Kit

Super Clean™ high-flow base-plate design purifiers are a unique point-of use glass/metal, diffusion proof purification system to purifiy nitrogen for LC-MS units. These high-flow purifiers remove hydrocarbons or moisture (color indicated) to better than 6.0 gas (99.9999%) quality at 2 L/min., independent of the original gas quality. These units can be used at up to 20 L/min. flow rates.



Description	Cat. No.	Qty
hydrocarbon removal kit for high-flow purification (includes SU861029 + 28879-U)	SU861046	1 kit
moisture removal kit for high-flow purification (includes SU861028 + 28879-U)	SU861045	1 kit

HPLC Accessories

High-Flow Base Plate Purifier Systems for LC-MS Nitrogen

Super Clean (High-Flow Base-Plate Design) Gas Purifier

Description	Cat. No.	Qty
hydrocarbon, without indicator	SU861029	2 ea
moisture, with indicator	SU861028	2 ea

Super Clean (High-Flow Base-Plate Design) Base Plate

Description	Cat. No.	Qty
two position, for high-flow purification	28879-U	1 ea

Pump Replacement Parts

Optimize Technologies®, Inc. Pump Replacement Parts

A preventive maintenance program that includes routine replacement of pump parts that are subject to wear will help you avoid costly downtime. These Optimize Technologies check valves, seals, and pistons meet or exceed the pump manufacturers specifications.
If you do not see the parts you need, or your instrument model is not listed – just call us.

OPTI-MAX Cartridge Check Valves - An economical and very convenient way to maintain and repair check valves – after initially purchasing the stainless steel inlet or outlet housing (one cartridge is included), simply purchase replacement cartridges in packs of two. We recommend a stainless steel cartridge with a ruby ball/sapphire seat for most applications, but a ceramic ball/seat cartridge offers longer life when you are using high concentrations of acetonitrile. Change every 6 months.

Traditional Check Valves - Direct replacements for the manufacturers original valves, factory assembled in a clean-room environment. Rebuild kits are available. Change every 6 months.

OPTI-SEAL Pump Seals - Made from an inert, ultra-high molecular weight polyethylene material (UHMW-PE). Relative to conventional PTFE seals, these seals show less particle shedding. This reduces the potential for clogged frits, saving you from unscheduled system downtime. We recommend these seals for typical reversed phase mobile phases (aqueous to moderate levels of organic). Not recommended for long-term use with highly organic mobile phases, such as typical normal phase solvents.

UHMW-PE seals are relatively hard, and will not seal well on worn plungers. We recommend that you install a new plunger when you initially switch to using UHMW-PE seals. Change every 3 months.

ITB (PTFE) Seals - Made from PTFE, ITB pump seals are especially recommended for mobile phases with a high organic concentration, such as typical normal phase mobile phases. ITB seals are soft and will not last as long as UHMW-PE seals. Unlike UHMW-PE seals, ITB seals will conform to out-of-round plungers. Change every 3 months.

Plungers (Pistons) - Made to exacting standards, these high quality sapphire plungers reduce seal wear, which means less system down time. Replace once a year, and when you initially switch to using UHMW-PE seals.

Note: Recommendation for general preventive maintenance. Depending on your applications, more frequent replacement could be necessary. Other pump replacement parts are available on request.

Agilent/HP Pump Replacement Parts

Optimize Technologies HPLC Pump Part for Agilent/HP

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with 1050,1100			
Opti-Max® outlet check valve cartridge system	Agilent/HP No.01018-60008	59456	1 ea
OPTI-SEAL pump seal	Agilent/HP No.5062-8516	59409	1 ea
Sapphire plunger	Agilent/HP No.55062-2441	59408	1 ea

Beckman® Pump Replacement Parts

Optimize Technologies HPLC Pump Part for Beckman®

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with 100A, 110A/B, 112, 112M, 114, 114M, 116, 118, 125, 126, 127, 128			
Opti-Max® Inlet Check Valve	Beckman No.240720	59454	1 ea
Opti-Max® outlet check valve	Beckman No.240721	59455	1 ea
for use with 100A, 110A/110B			
OPTI-SEAL pump seal	Beckman No.887138	59405	1 ea

HPLC Accessories

Pump Replacement Parts: *Optimize Technologies®, Inc. Pump Replacement Parts*

Hitachi® Pump Replacement Parts

Optimize Technologies HPLC Pump Part for Hitachi®

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with 655, L6000, L6200, L6200A			
Opti-Max® inlet check valve	Hitachi No.885-1330	59457	1 ea
Opti-Max® outlet check valve	Hitachi No.885-1331	59458	1 ea
OPTI-SEAL pump seal	Hitachi No.655-1080	59407	1 ea
Piston	Hitachi No.810-1033	59406	1 ea

LDC/Milton Roy Pump Replacement Parts

Optimize Technologies HPLC Pump Part for LDC/Milton Roy

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with all analytical pumps			
Opti-Max® inlet check valve	LDC/Milton Roy No.900947001	59490-U	1 ea
Opti-Max® outlet check valve	LDC/Milton Roy No.900947002	59491	1 ea
OPTI-Seal pump seal	LDC/Milton Roy No.206234	59492	1 ea

PerkinElmer® Pump Replacement Parts

Optimize Technologies HPLC Pump Part for PerkinElmer®

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with 250, Series 4, 200, 400, 410, 620, Integral 4000			
Opti-Max® inlet check valve	PerkinElmer No.0254-0177	59459	1 ea
Opti-Max® outlet check valve	PerkinElmer No.0254-0197	59460	1 ea
for use with 250, Series 4, 200, 400, 410, 620, Integral 4000 for use with Series 1, 2, 3, 3B, 10			
OPTI-SEAL pump seal	PerkinElmer No.0990-7324	59461	1 ea

Shimadzu™ Pump Replacement Parts

Optimize Technologies HPLC Pump Part for Shimadzu™

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with LC-6A, LC-10AS			
Opti-Max® inlet check valve	Shimadzu No.228-12353-91	59465-U	1 ea
Opti-Max® outlet check valve	Shimadzu No.228-09054-93	59466	1 ea
OPTI-SEAL pump seal	Shimadzu No.228-11999-00 228-21975-00	59468	1 ea

Varian® Pump Replacement Parts

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with 2010			
Sapphire Piston	Varian No.00-997-261-08	59482	1 ea

Spectra-Physics® Pump Replacement Parts

Optimize Technologies HPLC Pump Part for Spectra-Physics

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with 8700, 8800, 8810, IsoChrom, P-Series			
Opti-Max® inlet check valve	Spectra-Physics No.A3495-010	59475	1 ea
Opti-Max® inlet check valve	Spectra-Physics No.A3990-010	59493	1 ea
for use with 8800, 8810, Isochrom, P-Series			
Optimize Technologies HPLC Pump Part for Spectra-Physics	Spectra-Physics No.A3102-010	59477	1 ea
OPTI-SEAL pump seal	Spectra-Physics No.A2962-010	59478	1 ea

HPLC Accessories

Pump Replacement Parts: *Optimize Technologies®, Inc. Pump Replacement Parts*

Waters Pump Replacement Parts

Optimize Technologies HPLC Pump Part Waters

Description	Replaces Mfr. No.	Cat. No.	Qty
for use with M45, M45G, M501, 510, 515, 590, 600, 600E, 610, 6K, 6KA			
Inlet check valve repair kit	Waters No.60495	59377	1 ea
ITB black piston seal	Waters No.26613	59422	1 ea
Opti-Max® inlet check valve	Waters No.33679	59484	1 ea
Opti-Max® outlet check valve	Waters No.25216	59485-U	1 ea
OPTI-SEAL pump seal	Waters No.22934	59388	1 ea
OPTI-SEAL pump seal		59389	10 ea
for use with M45, M45G, M501			
Plunger	Waters No.26524	59387	1 ea
for use with 510, 590, 600, 600E, 610, 6K, 6KA			
Plunger	Waters No.25656	59386	1 ea

Opti-Max® Replacement Cartridge-All Manufacturers

Size (in.)	Description	Replaces Mfr. No.	Cat. No.	Qty
PEEK				
1/8	ruby ball/sapphire seat	Optimize Tech	59370-U	2 ea
SS cartridge				
1/16	ruby ball/sapphire seat	All Manufacturers	59494	2 ea
3/16	ruby ball/sapphire seat	All Manufacturers	59495	2 ea
1/8	ruby ball/sapphire seat	All Manufacturers	59496	2 ea

ASI Pump Replacement Parts

Analytical Scientific Instruments (ASI) cartridge check valve design offers self-priming convenience, rugged, crush proof construction, rapid response time (ball seats more quickly, for less pulsation and a more stable flow), and replaceable outlet filters (to protect system from particles). If your pump model is not listed, please call us. UHMW PE - ultra-high molecular weight polyethylene.

Agilent/HP Pump Replacement Parts (ASI)

Description	Cat. No.	Qty
for use with 1090		
Inlet cartridge	504734	1 ea

Bio-Rad® Pump Replacement Parts (ASI)

Description	Cat. No.	Qty
for use with 1330, 1350 Bio-Rad for use with 590,600E,6000 Waters		
Inlet cartridge	501204	1 ea
for use with 1330, 1350 Bio-Rad for use with 200, 220, 222, 300 SSI for use with Extended Flow 510EF, 600EF, 6KEF, 6KAEF Waters for use with M-45, 501, 510, 590, 600E, 6000 Waters		
Outlet cartridge	501905	1 ea
for use with 1330, 1350 Bio-Rad		
UHMW PE pump seal	501921	1 ea

Eldex Pump Replacement Parts (ASI)

Description	Cat. No.	Qty
for use with 5S, 10S, 5SC, 10SC Elder for use with A, B, E Gilson		
ASI HPLC Pump Part for Gilson	502006	1 ea

SSI™ Pump Replacement Parts (ASI)

Description	Cat. No.	Qty
for use with 1330, 1350 Bio-Rad for use with 200, 220, 222, 300 SSI for use with Extended Flow 510EF, 600EF, 6KEF, 6KAEF Waters for use with M-45, 501, 510, 590, 600E, 6000 Waters		
Outlet cartridge	501905	1 ea

Gilson Pump Replacement Parts (ASI)

Description	Cat. No.	Qty
for use with 5S, 10S, 5SC, 10SC Elder for use with A, B, E Gilson		
ASI HPLC Pump Part for Gilson	502006	1 ea
for use with Gilson 5S, 5SC		
UHMW PE Pump Seal	504653	1 ea

Waters Pump Replacement Parts (ASI)

Description	Cat. No.	Qty
for use with M-45, 501, 510, 590, 600E, 6000		
ASI UHMW PE pump seal	505420	1 ea
Inlet check valve (complete assembly)	505277	1 ea
for use with 1330, 1350 Bio-Rad for use with 200, 220, 222, 300 SSI for use with Extended Flow 510EF, 600EF, 6KEF, 6KAEF Waters for use with M-45, 501, 510, 590, 600E, 6000 Waters		
Outlet cartridge	501905	1 ea
for use with M-45, 501, 510, 590, 600E, 6000		
Outlet check valve (complete assembly) all except M501. 600E)	505382	1 ea
for use with M-45, 501 only		
Piston	505439	1 ea

HPLC Accessories

LC-MS Post Column Flow Splitters

LC-MS Post Column Flow Splitters

The LC-MS Post Column Splitter is very elegant in its simplicity. Split ratios are created by two or more fluid resistors that form a parallel flow path. QuickSplit Flow Splitters are available with a fixed or adjustable split ratio. Interchangeable fluid resistors make it easy to change split ratios quickly, eliminating tedious adjustments to capillary tubing. The technology can be applied to all applications where a controlled, reproducible split ratio is required including LC-MS, flow fractionation, pre/post-column flow splitting mass directed fraction collection, and capillary chromatography.

- Ultra low dead volume design
- Easy-to-use interchangeable fluid resistors
- Rugged stainless steel construction

LC-MS Post Column Flow Splitters

Description	Cat. No.	Qty
Fixed, Split Ratio = 20:1	56624-U	1 ea
Fixed, Split Ratio = 10:1	56625-U	1 ea
Fixed, Split Ratio = 5:1	56626-U	1 ea
Fixed, Split Ratio = 3:1	56627-U	1 ea
Adjustable, Split Ratio = 1:1 to 20:1	56629-U	1 ea

LC-MS Post Column Flow Splitter Mounting Bracket

Description	Cat. No.	Qty
Fixed	56630-U	1 ea

LC-MS Post Column Resistor Sets

Set includes one low flow and one high flow cartridge

Description	Cat. No.	Qty
Binary, Split Ratio = 20:1	56631-U	1 ea
Binary, Split Ratio = 10:1	56632-U	1 ea
Binary, Split Ratio = 5:1	56633-U	1 ea
Binary, Split Ratio = 3:1	56634-U	1 ea

Postcolumn Reactors

Postcolumn Reactor Module

Increase detection sensitivity for amino acids, proteins, carbohydrates, pesticides, inorganic ions, other samples.

The heated reactor cartridge in the ASI Model 310 Postcolumn Reactor Module mixes reagent with column effluent efficiently and with minimum peak dispersion. Unlike conventional PTFE tube coil reactors, the rugged reactor cartridge can be used at pressures up to 3000 psi, at 150 °C, without rupturing. We recommend using a low volume static mixer, such as the binary input housing/mixer cartridges listed on this page, with the Model 310 module. Install the mixer in line, prior to the reactor cartridge, to combine the reagent with the column effluent. A pump is required for delivering reagent to the system.

Specifications

Reactor Cartridge Volume:	0.15 mL, 0.50 mL, or 1.0 mL
Sample-Contacting Materials:	PTFE 316 stainless steel
Maximum Pressure:	3,000 psi at 150 °C
Oven Temperature Range:	10 °C above ambient to 150 °C
Temperature Control	solid state controller with LED display
Dimensions:	12 in. × 9 in. × 6 in.
Power:	120 VAC (50–60 Hz), 220 VAC, or 100 VAC

Description	Cat. No.	Qty
120 V, 0.50 mL (Reaktor)	54976	1 ea
120 V, 1.0 mL	54973	1 ea
220 V, module only	54971	1 ea

Postcolumn Reactor Cartridge (fits all heater modules)

Replacement cartridges for all ASI Model 310 postcolumn Reactor Modules.

Description	Cat. No.	Qty
0.15 mL	54978	1 ea
0.50 mL	54979	1 ea
1.0 mL	54980-U	1 ea

ASI Static Mixers

- Reduces baseline noise
- Increases sensitivity
- Increases reaction efficiency in postcolumn derivatization
- Improves accuracy in gradient mixing for microbore analyses

A highly efficient cross-flow shearing mechanism in the ASI static mixer produces vortex mixing over a wide range of flow rates. Use the binary input housing to combine two flowpaths into one, such as in postcolumn or gradient mixing applications. Use the in-line housing when additional mixing is needed in a single flowpath. Within each product series (Micro, Low and High volume) the mixer cartridges are interchangeable. We recommend the 250 µL cartridge for large peak volumes, and the 50 µL or 150 µL sizes for smaller volumes. Use the Micro-Mixer Cartridges only with Micro-Mixer Housings and the Low Volume Mixer Cartridges only with the Low Volume Mixer Housings.

HPLC Accessories

ASI Static Mixers

Component Assemblies:
Choose a Housing and a Cartridge within each volume group. In-Line, Binary or Ternary refers to the number of lines going into the mixer housing.

Micro-Mixer Static Mixers (2 - 25 µL)

stainless steel

Description	Cat. No.	Qty
stainless steel		
housing, In-Line	56665-U	1 ea
housing, Binary	56666-U	1 ea
2 µL cartridge	56661-U	1 ea
5 µL cartridge	56662-U	1 ea
10 µL cartridge	56663-U	1 ea
25 µL cartridge	56664-U	1 ea

Low Volume Static Mixer (50-250 µL)

Description	Cat. No.	Qty
stainless steel		
housing, In-line	57548	1 ea
housing, Binary	57549	1 ea
housing, Ternary	500488	1 ea
50 µL cartridge	57545	1 ea
150 µL cartridge	57546	1 ea
250 µL cartridge	57547	1 ea
PEEK		
housing, In-Line	500496	1 ea
housing, Binary	500518	1 ea
50 µL cartridge	500445	1 ea
150 µL cartridge	500453	1 ea
250 µL cartridge	500461	1 ea

High Volume Static Mixer Complete Assembly

Description	Cat. No.	Qty
stainless steel		
350 µL in-line	500534	1 ea
500 µL in-line	500550	1 ea
500 µL binary	500569	1 ea

ASI mixer cartridge

Description	Cat. No.	Qty
volume 500 µL	54733-U	1 ea

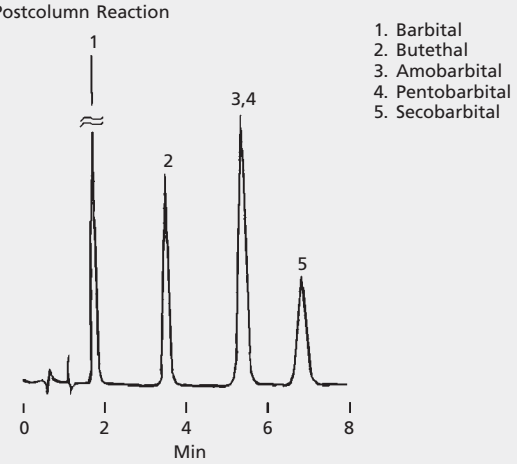
Postcolumn Reactor

Assemble Your Own System and Save!
The equipment needed to perform postcolumn reactions can be relatively simple. These components enable you to easily and economically construct your own system. We recommend using a 5 cm × 4.6 mm column filled with 250 mm beads when peak volumes are large. Our Mixing Column Hardware Kit (Cat. No. 58319), contains a 5 cm × 4.6 mm I.D. column blank, two fittings, two frits, and 2 in./5 cm of $^{1}/_{16}$ in. tubing. For small peak volumes, use a column filled with 75 mm beads, or a single bead string reactor (30 cm of 0.5 mm I.D. PTFE tubing filled with 250 mm beads).

Use our ready-to-use single bead string reactors, or prepare your own from our PTFE tubing, $^{1}/_{16}$ in. internal unions, and silane treated glass wool (for terminating the reactor). The delay tubes (Cat. Nos. 59206 and 59207) are knitted PTFE tubing.

Improve sensitivity for amino acids, proteins, carbohydrates, inorganic ions, pesticides, and other samples. In postcolumn reactions, column effluent is mixed with a reagent before it enters the detector. The reaction can increase detection sensitivity or enable you to use more selective conditions (e.g., a different UV wavelength). The reaction can be as simple as changing the pH of the effluent, but the results often are significant. A postcolumn reaction system can be used to perform derivatizations or other reactions. It can be used with fluorescence, electrochemical, conductivity, and UV/visible detectors.

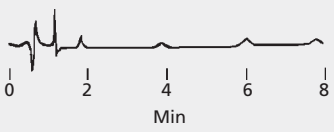
With Postcolumn Reaction



1. Barbital
2. Butethal
3. Amobarbital
4. Pentobarbital
5. Secobarbital

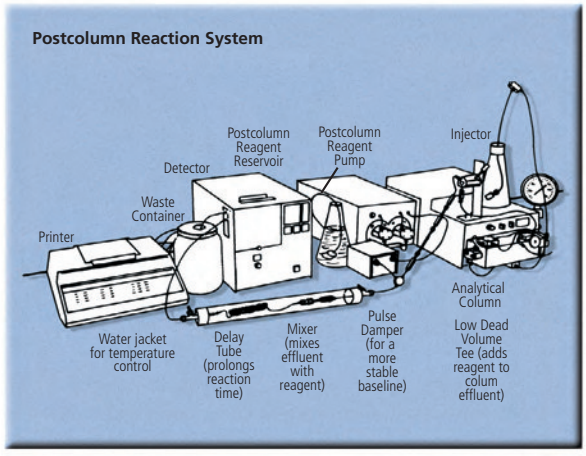
Deprotonization of barbiturates, an instantaneous reaction, gives a twenty-fold increase in sensitivity. The reaction also improves selectivity by shifting the UV absorption maximum from 220 nm to 240 nm.

Without Postcolumn Reaction



1. Barbital
2. Butethal
3. Amobarbital
4. Pentobarbital
5. Secobarbital

Deprotonization of barbiturates, an instantaneous reaction, gives a twenty-fold increase in sensitivity. The reaction also improves selectivity by shifting the UV absorption maximum from 220 nm to 240 nm.



HPLC Accessories

Postcolumn Reactor

Postcolumn Reaction Single Bead String Reactors

Description	Cat. No.	Qty
Acid Washed	59204	1 ea
Acid Washed/Silanized	59205	1 ea

Postcolumn Reaction Glass Beads

Description	Cat. No.	Qty
75 µm, acid-washed	59200-U	25 g
250 µm, acid-washed	59202	25 g
75 µm, acid-washed/silanized	59201	25 g
250 µm, acid-washed/silanized	59203	25 g

Postcolumn Reaction Knitted Capillary Delay Tubes

for use with water jacket, 58450-U

Description	Cat. No.	Qty
10 ft (3 m) × I.D. 0.5 mm	59206	1 ea
10 ft (3 m) × I.D. 0.8 mm	59207	1 ea

Postcolumn Reaction TFE PTFE Tubing

O.D. (in.)	I.D. (in.)	Cat. No.	Pkg
L 10 ft			
1/16	0.031	58700-U	1 ea
1/16	0.023	58701	1 ea
1/16	0.012	58702	1 ea

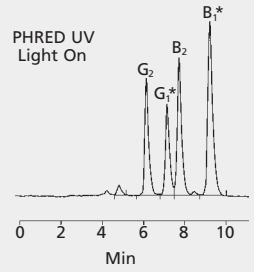
Postcolumn Reaction System Accessories

Description	Cat. No.	Qty
Column Water Jacket	58450-U	1 ea
Union	22997-U	1 ea
Glass Wool	20411	50 g
SSI™ LO-Pulse™ Damper	58455	1 ea
Tee	58283	1 ea
Guard Column Hardware Kit	58319	1 kit

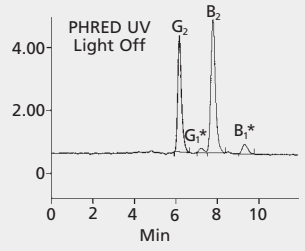
Glass Wool

Description	Cat. No.	Qty
Pesticide Grade (Silanized)	20409	10 g
Pesticide Grade (Silanized)	20409 21688-U	10 g 100 g
Silanized	20411 20410	50 g 250 g
Silanized	20411	50 g
Phosphoric Acid Treated	20383	50 g
Non-Treated	20384	50 g

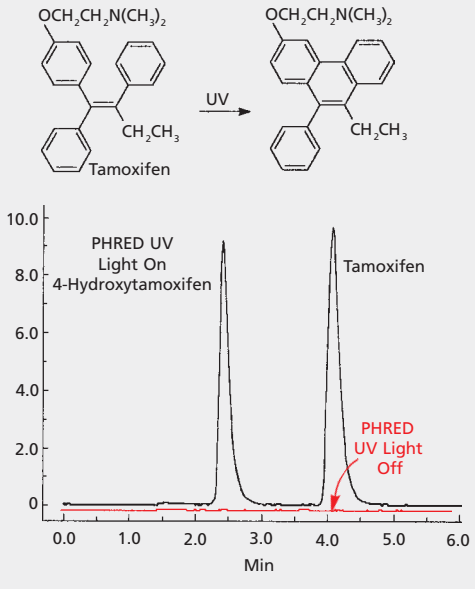
PHRED: Photochemical Reactor Enhanced Detection



*Requires derivatization for fluorescence detection. By replacing chemical derivatization, photochemical derivatization simplifies this procedure.



*Requires derivatization for fluorescence detection. By replacing chemical derivatization, photochemical derivatization simplifies this procedure.



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2. L. Dou, I. S. Krull, *Anal. Chem.* **62**: 2599 (1990).
3. W. J. Bachman, J. Stewart, *LC/GC* **7**: 38 (1989).
4. I. S. Krull, C. M. Selavka, M. Lookabaugh, W. R. Childress, *LC/GC* **7**: 758 (1989).
5. The **Reporter** XII, #4, pp. 6–7.
6. H. Joshua, *American Laboratory* April 1995, p. 36J.
7. The **Reporter** Vol. 16, no 3, p. 9.

References 1–4, 6 not available from Supelco

HPLC Accessories

PHRED: Photochemical Reactor Enhanced Detection

PHRED: Photochemical Reactor and Accessories

Description	Cat. No.	Qty
PHRED Photochemical Reactor, 110 V	57400-U	1 ea
Knitted reactor coil, L 5 m × I.D. 0.25 mm, volume 0.25 mL	57402	1 ea
Knitted reactor coil, L 10 m × I.D. 0.25 mm, volume 0.5 mL	57403	1 ea
Knitted reactor coil, L 15 m × I.D. 0.25 mm, volume 0.75 mL	57404	1 ea
Knitted reactor coil, L 5 m × I.D. 0.50 mm, volume 1.0 mL	57405	1 ea
Knitted reactor coil, L 10 m × I.D. 0.50 mm, volume 2.0 mL	57406	1 ea
Knitted reactor coil, L 20 m × I.D. 0.25 mm, volume 1.0 mL	57410-U	1 ea
Knitted reactor coil, L 20 m × I.D. 0.5 mm, volume 4.0 mL	57411	1 ea
Replacement bulb, for use with PHRED Reactor	57401	1 ea
Knitted reactor coil, volume 3.0 mL, L 15 m × I.D. 0.50 mm	57407	1 ea
Reflective support plate, stainless steel, for use with PHRED Reactor	57408	1 ea

Solvents and Reagents

CHROMASOLV® Solvents

In high performance liquid chromatography the speed, quality and reproducibility of the separation depends not only on the properties of the stationary phase, but decisively on the quality of the solvents used. The CHROMASOLV solvent line offers guaranteed quality specially tailored to chromatographic requirements, in conjunction with batch consistency.

The CHROMASOLV solvents are characterized by high UV-transmittance, consistent gradient testing for interfering peaks and baseline drift, guranteed suitability for fluorescence detection, low non-volatile components, free acid and free alkali, and an exactly defined low water content.

LC-MS Ultra CHROMASOLV® Grade Solvents and Additives for UHPLC

The ultra high performance/pressure liquid chromatography (UHPLC) systems with high speed, efficiency and sensitivity require high purity solvents and additives for mobile phases, sample preparation, and sample dissolution. Fluka's new Ultra Grade CHROMASOLV solvents and additives help in providing reliable data and high performance, and eliminate system down-time. These solvents are carefully developed, prepared and tested for demanding UHPLC conditions under various detection modes.

CAS No.	Compound	Cat. No.	Qty
75-05-8	Acetonitrile, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14261-1L 14261-2L	1 L 2 L
-	Acetonitrile with 0.1% acetic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14273-2L	2 L
148642-19-7	Acetonitrile with 0.1% ammonium acetate, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14274-2L	2 L
-	Acetonitrile with 0.1% formic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14272-2L	2 L
-	Acetonitrile with 0.1% trifluoroacetic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14271-2L	2 L
631-61-8	Ammonium acetate, LC-MS Ultra; eluent additive for UHPLC-MS	14267-25G	25 g
540-69-2	Ammonium formate, LC-MS Ultra; eluent additive for UHPLC-MS	14266-25G	25 g
64-18-6	Formic acid, LC-MS Ultra, eluent additive for UHPLC-MS	14265-1ML 14265-2ML	1 mL 2 mL
67-56-1	Methanol, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14262-1L 14262-2L	1 L 2 L
-	Methanol with 0.1% formic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14276-2L	2 L
-	Methanol with 0.1% trifluoroacetic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14275-2L	2 L
76-05-1	Trifluoroacetic acid, LC-MS Ultra, eluent additive for UHPLC-MS	14264-1ML 14264-2ML	1 mL 2 mL

Solvents and Reagents

LC-MS Ultra CHROMASOLV® Grade Solvents and Additives for UHPLC

CAS No.	Compound	Cat. No.	Qty
7732-18-5	Water, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14263-1L	1 L
		14263-2L	2 L
-	Water with 0.05% acetic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14287-2L	2 L
-	Water with 0.05% formic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14291-2L	2 L
-	Water with 0.1% acetic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14282-2L	2 L
-	Water with 0.1% ammonium acetate, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14283-2L	2 L
-	Water with 0.1% formic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14281-2L	2 L
-	Water with 0.1% trifluoroacetic acid, LC-MS Ultra CHROMASOLV®, tested for UHPLC-MS	14279-2L	2 L

LC-MS CHROMASOLV® Solvents

These are high-purity, multipurpose solvents, tested for suitability in: HPLC with gradient analysis, spectroscopy, environmental testing and some LC-MS applications.

CAS No.	Compound	Cat. No.	Qty
75-05-8	Acetonitrile, LC-MS CHROMASOLV®	34967-250ML	250 mL
		34967-1L	1 L
		34967-6X1L	6 × 1 L
		34967-144X1L	144 × 1 L
		34967-2.5L	2.5 L
		34967-4X2.5L	4 × 2.5 L
		34967-72X2.5L	72 × 2.5 L
		34967-4L	4 L
		34967-4X4L	4 × 4 L
		34967-18L-RC	18 L
		34967-20L	20 L
		34967-45L	45 L
141-78-6	Ethyl acetate, LC-MS CHROMASOLV®	34972-1L-R	1 L
		34972-2.5L-R	2.5 L
142-82-5	Heptane, LC-MS CHROMASOLV®	34999-1L	1 L
		34999-2.5L	2.5 L
110-54-3	Hexane, LC-MS CHROMASOLV®	34986-1L	1 L
		34986-2.5L	2.5 L
67-56-1	Methanol, LC-MS CHROMASOLV®	34966-1L	1 L
		34966-6X1L	6 × 1 L
		34966-144X1L	144 × 1 L
		34966-2.5L	2.5 L
		34966-4X2.5L	4 × 2.5 L
		34966-72X2.5L	72 × 2.5 L
		34966-4L	4 L
		34966-4X4L	4 × 4 L
		34966S-400L-RC	400 L
67-63-0	2-Propanol, LC-MS CHROMASOLV®	34965-1L	1 L
		34965-6X1L	6 × 1 L
		34965-2.5L	2.5 L
		34965-4X2.5L	4 × 2.5 L
7732-18-5	Water, LC-MS CHROMASOLV®	39253-1L-R	1 L
		39253-4X4L-R	4 × 4 L
		39253-20L-R	20 L

Solvents and Reagents

CHROMASOLV® Gradient Solvents

CHROMASOLV® Gradient Solvents

These solvents are suitable for sensitive gradient elutions at short wavelengths and with very high requirements on UV-transmittance and fluorescence detection.

CAS No.	Compound	Cat. No.	Qty
75-05-8	Acetonitrile, CHROMASOLV® gradient grade, for HPLC, ≥99.9%	34851-100ML	100 mL
		34851-1L	1 L
		34851-6X1L	6 × 1 L
		34851-2L	2 L
		34851-4X2L	4 × 2 L
		34851-2.5L-PC	2.5 L
		34851-2.5L	2.5 L
		34851-4X2.5L	4 × 2.5 L
		34851-72X2.5L	72 × 2.5 L
		34851-4L	4 L
		34851-4X4L	4 × 4 L
		34851-7L	7 L
		34851-18L	18 L
		34851-20L	20 L
		34851-20L-P2	20 L
		34851-20L-N1	20 L
		34851-45L	45 L
		34851-50L-P2-LS	50 L
		34851-50L-P2	50 L
		34851-56L-P1-LS	56 L
		34851-200L-P2	200 L
		34851-200L-LS-NB	200 L
		34851-200L	200 L
		34851-200L-LS	200 L
		34851S-400L-RC	400 L
		34851-50L-P2-4B	1 pkg
		34851-50L-P2-4B-LS	1 pkg
75-05-8	Acetonitrile, CHROMASOLV® gradient grade, for HPLC, ≥99.9%	439134-1L	1 L
		439134-4L	4 L
		439134-4X4L	4 × 4 L
		439134-2X10L	2 × 10 L
		439134-18L	18 L
		439134-20L	20 L
		439134-50L	50 L
75-05-8	Acetonitrile, CHROMASOLV® (gradient grade +), suitable for PAH analysis, ≥99.9% (GC)	00683-2.5L	2.5 L
67-56-1	Methanol, CHROMASOLV®, gradient grade, for HPLC, ≥99.9%	34885-100ML-R	100 mL
		34885-1L-R	1 L
		34885-6X1L-R	6 × 1 L
		34885-2L-R	2 L
		34885-2.5L-R	2.5 L
		34885-4X2.5L-R	4 × 2.5 L
		34885-4L-R	4 L
		34885-4X4L-R	4 × 4 L
		34885-7L-R	7 L
		34885-18L-R	18 L
		34885-45L-R	45 L
		34885-50L-P2-4A-R	1 pkg
		34885-50LP24A-LS-R	1 pkg
67-56-1	Methanol, CHROMASOLV®, gradient grade, for HPLC, suitable as ACS-grade LC reagent, ≥99.9%	439193-4L	4 L
		439193-4X4L	4 × 4 L
		439193-18L	18 L
		439193-20L-P2	20 L
		439193-20L-N2	20 L
		439193-20L	20 L
		439193-200L-P2	200 L
		439193-200L	200 L
7732-18-5	Water, CHROMASOLV® Plus, for HPLC	34877-1L	1 L
		34877-2.5L	2.5 L
		34877-4X2.5L	4 × 2.5 L
		34877-4L	4 L
		34877-4X4L	4 × 4 L

LC-MS CHROMASOLV® Pre-Blended Mobile Phase Solvents

LC-MS allows the detection and quantification of many analytes. The minimization of artifacts requires very well specified solvents spiked with ultra pure salts and acids. These additives are used to improve the chromatographic peak shape and to optimize ionization in the MS interface. The most commonly used solvents in LC-MS technique are acetonitrile, methanol and water. Additives can include trifluoracetic acid, formic acid, acetic acid and ammonium acetate.

CAS No.	Compound	Cat. No.	Qty
75-05-8	Acetonitrile solution, contains 0.1 % (v/v) formic acid, for HPLC	576956-4X4L 576956-18L 576956-200L-LS	4 × 4 L 18 L 200 L
75-05-8	Acetonitrile solution, contains 0.1 % (v/v) trifluoroacetic acid, for HPLC	574732-4L 574732-4X4L 574732-18L 574732-20L 574732-200L-LS	4 L 4 × 4 L 18 L 20 L 200 L
75-05-8	Acetonitrile solution, contains 0.05 % (v/v) trifluoroacetic acid	574724-4L 574724-4X4L 574724-18L 574724-200L	4 L 4 × 4 L 18 L 200 L
75-05-8	Acetonitrile solution, contains 0.035 % (v/v) trifluoroacetic acid, for HPLC	565423-18L	18 L
-	Acetonitrile with 0.1% acetic acid, LC-MS CHROMASOLV®	34678-2.5L-R	2.5 L
148642-19-7	Acetonitrile with 0.1% ammonium acetate, LC-MS CHROMASOLV®	34669-2.5L-R	2.5 L
-	Acetonitrile with 0.1% formic acid, LC-MS CHROMASOLV®	34668-2.5L-R	2.5 L
-	Acetonitrile with 0.1% formic acid and 0.01% trifluoroacetic acid, LC-MS CHROMASOLV®	34676-2.5L-R	2.5 L
-	Acetonitrile with 0.1% trifluoroacetic acid, LC-MS CHROMASOLV®	34976-2.5L-R	2.5 L
67-56-1	Methanol solution, (Methanol:Dimethyl sulfoxide 1:1 (v/v))	650188-4X4L	4 × 4 L
67-56-1	Methanol solution, contains 0.10 % (v/v) formic acid	632546-4X4L 632546-18L	4 × 4 L 18 L
-	Methanol with 0.1% acetic acid, LC-MS CHROMASOLV®	34672-2.5L-R	2.5 L
-	Methanol with 0.1% ammonium acetate, LC-MS CHROMASOLV®	34670-2.5L-R	2.5 L
-	Methanol with 0.1% formic acid, LC-MS CHROMASOLV®	34671-2.5L-R	2.5 L
-	Methanol with 0.1% trifluoroacetic acid, LC-MS CHROMASOLV®	34974-2.5L-R	2.5 L
6100-05-6	Potassium citrate tribasic monohydrate, eluent additive for LC-MS	77843-50G	50 g
67-63-0	Rinsing Solution I, rinsing agent for LC-MS, CHROMASOLV® (rinsing agent for LC-MS)	34689-1L-R	1 L
-	Water solution, for HPLC, contains 0.1 % (v/v) formic acid	576913-4L 576913-4X4L 576913-200L-LS	4 L 4 × 4 L 200 L
-	Water solution, contains 0.1 % (v/v) trifluoroacetic acid, for HPLC	576905-4X4L 576905-18L 576905-20L 576905-200L-LS	4 × 4 L 18 L 20 L 200 L
-	Water with 0.1% acetic acid, LC-MS CHROMASOLV®	34675-2.5L-R	2.5 L
-	Water with 0.1% ammonium acetate, LC-MS CHROMASOLV®	34674-2.5L-R	2.5 L
-	Water with 0.1% formic acid, LC-MS CHROMASOLV®	34673-2.5L-R	2.5 L
-	Water with 0.1% formic acid and 0.01% trifluoroacetic acid, LC-MS CHROMASOLV®, contains 0.093-0.107 % (w/w) formic acid as additive	34677-2.5L-R	2.5 L
-	Water with 0.1% trifluoroacetic acid, LC-MS CHROMASOLV®	34978-2.5L-R	2.5 L
-	Water with 8% formic acid, rinsing agent for LC-MS, formic acid 7.7%	34692-1L	1 L

LC-MS Mobile Phase Additives

It is common practice in LC-MS to add certain chemicals to the mobile phase or introduce them post-column prior to the interface to influence analyte ionization. Most often, an improvement of the analyte signal is the goal. However, some additives may be used to suppress unwanted signals or selectively enhance the signal of particular compounds in a mixture, for example glycosidic species in a mixture of peptides.

Sigma-Aldrich offers a wide range of high purity additives for LC-MS applications in addition to our pure CHROMASOLV solvents and ready-to-use blends. Our offering includes the most commonly used acids, bases, volatile salts and a sodium source. All are of high purity, usually puriss p.a., and are tested for LC-MS application.

CAS No.	Compound	Cat. No.	Qty
64-19-7	Acetic acid, eluent additive for LC-MS	49199-50ML-F	50 mL
631-61-8	Ammonium acetate, for mass spectrometry, eluent additive for LC-MS	73594-25G-F 73594-100G-F	25 g 100 g
1066-33-7	Ammonium bicarbonate, eluent additive for LC-MS	40867-50G-F	50 g
12125-01-8	Ammonium fluoride, eluent additive for LC-MS	52481-50G	50 g
540-69-2	Ammonium formate, eluent additive for LC-MS	55674-50G-F	50 g
1336-21-6	Ammonium hydroxide solution, ≥25% in H_2O, eluent additive for LC-MS	44273-10X1ML-F 44273-100ML-F	10 × 1 mL 100 mL
7789-17-5	Cesium iodide, analytical standard for high-resolution mass spectroscopy	21004-1G	1 g

Solvents and Reagents

LC-MS Mobile Phase Additives

CAS No.	Compound	Cat. No.	Qty
64-18-6	Formic acid, eluent additive for LC-MS	56302-10X1ML	10 × 1 mL
		56302-10X1ML-F	10 × 1 mL
		56302-50ML-F	50 mL
		56302-1L-GL-F	1 L
		56302-1L-F	1 L
		56302-1L-GL	1 L
920-66-1	1,1,1,3,3,3-Hexafluoro-2-propanol, eluent additive for LC-MS	42060-10X1ML	10 × 1 mL
		42060-50ML	50 mL
556-63-8	Lithium formate solution, suitable for LC-MS, 10 mM LiOH in isopropanol/water 1:1 (+0.2% HCOOH)	01886-100ML	100 mL
6100-05-6	Potassium citrate tribasic monohydrate, eluent additive for LC-MS	77843-50G	50 g
79-09-4	Propionic acid, eluent additive for LC-MS	49916-50ML-F	50 mL
50-55-5	Reserpine Standard for LC-MS, analytical standard, for LC-MS	43530-4.5ML-F	4.5 mL
121-44-8	Triethylamine, eluent additive for LC-MS	65897-50ML-F	50 mL
76-05-1	Trifluoroacetic acid, eluent additive for LC-MS	40967-10X1ML-F	10 × 1 mL
		40967-10ML-F	10 mL
		40967-5X10ML-F	5 × 10 mL
		40967-1L-F	1 L
75-89-8	2,2,2-Trifluoroethanol, eluent additive for LC-MS	05841-10X1ML	10 × 1 mL
		05841-50ML	50 mL

Rinsing Solutions

Rinsing Solution I

2-Propanol solution

CAS No.	Compound	Cat. No.	Qty
67-63-0	Rinsing Solution I, rinsing agent for LC-MS, CHROMASOLV® (rinsing agent for LC-MS)	34689-1L-R	1 L

CHROMASOLV® Plus Solvents

These are high-purity, multipurpose solvents, tested for suitability in: HPLC with gradient analysis, spectrophotometry, environmental testing and some LC-MS applications.

CAS No.	Compound	Cat. No.	Qty
67-64-1	Acetone, CHROMASOLV® Plus, for HPLC, ≥99.9%	650501-1L	1 L
		650501-6X1L	6 × 1 L
		650501-4L	4 L
		650501-4X4L	4 × 4 L
75-05-8	Acetonitrile, CHROMASOLV® Plus, for HPLC, ≥99.9%	34998-1L	1 L
		34998-6X1L	6 × 1 L
		34998-2.5L	2.5 L
		34998-4X2.5L	4 × 2.5 L
		34998-4L	4 L
		34998-4X4L	4 × 4 L
		34998-7L	7 L
		34998-18L	18 L
		34998-20L	20 L
		34998-20L-P2	20 L
		34998-45L	45 L
		34998-50L-P2	50 L
		34998-200L-LS-NB	200 L
		34998-200L-P2	200 L
		34998-200L	200 L
71-43-2	Benzene, CHROMASOLV® Plus, for HPLC, ≥99.9%	270709-100ML	100 mL
		270709-1L	1 L
		270709-6X1L	6 × 1 L
		270709-2L	2 L
		270709-2.5L	2.5 L
		270709-4X2.5L	4 × 2.5 L
		270709-4X4L	4 × 4 L
71-36-3	1-Butanol, CHROMASOLV® Plus, for HPLC, ≥99.7%	34867-100ML	100 mL
		34867-1L	1 L
		34867-2L	2 L
		34867-2.5L	2.5 L
		34867-4X2.5L	4 × 2.5 L
		34867-4L	4 L
		34867-4X4L	4 × 4 L
123-86-4	Butyl acetate, CHROMASOLV® Plus, for HPLC, 99.7%	270687-100ML	100 mL
		270687-1L	1 L
		270687-4X4L	4 × 4 L

Solvents and Reagents

CHROMASOLV® Plus Solvents

CAS No.	Compound	Cat. No.	Qty
1634-04-4	*tert*-Butyl methyl ether, CHROMASOLV® Plus, for HPLC, 99.9%	650560-1L	1 L
		650560-6X1L	6 × 1 L
		650560-4L	4 L
		650560-4X4L	4 × 4 L
		650560-20L	20 L
		650560-50L-P2-LS	50 L
		650560-56L-P1-LS	56 L
67-66-3	Chloroform, CHROMASOLV® Plus, for HPLC, ≥99.9%, contains amylenes as stabilizer	650498-1L	1 L
		650498-6X1L	6 × 1 L
		650498-4L	4 L
		650498-4X4L	4 × 4 L
67-66-3	Chloroform, CHROMASOLV® Plus, for HPLC, ≥99.9%, contains 0.5-1.0% ethanol as stabilizer	650471-1L	1 L
		650471-6X1L	6 × 1 L
		650471-4L	4 L
		650471-4X4L	4 × 4 L
110-82-7	Cyclohexane, CHROMASOLV® Plus, for HPLC, ≥99.9%	650455-1L	1 L
		650455-6X1L	6 × 1 L
		650455-4L	4 L
		650455-4X4L	4 × 4 L
75-09-2	Dichloromethane, CHROMASOLV® Plus, for HPLC, ≥99.9%, contains 50-150 ppm amylene as stabilizer	650463-1L	1 L
		650463-6X1L	6 × 1 L
		650463-4L	4 L
		650463-4X4L	4 × 4 L
		650463-20L-P2	20 L
		650463-20L-N2	20 L
127-19-5	*N,N*-Dimethylacetamide, CHROMASOLV® Plus, for HPLC, ≥99.9%	270555-100ML	100 mL
		270555-1L	1 L
		270555-2L	2 L
		270555-2.5L	2.5 L
		270555-4X2.5L	4 × 2.5 L
		270555-4X4L	4 × 4 L
		270555-18L	18 L
68-12-2	*N,N*-Dimethylformamide, CHROMASOLV® Plus, for HPLC, ≥99.9%	270547-100ML	100 mL
		270547-1L	1 L
		270547-6X1L	6 × 1 L
		270547-2L	2 L
		270547-4X2L	4 × 2 L
		270547-2.5L	2.5 L
		270547-4X2.5L	4 × 2.5 L
		270547-4X4L	4 × 4 L
		270547-10L	10 L
68-12-2	*N,N*-Dimethylformamide, CHROMASOLV® Plus, for HPLC, ≥99.9%	648531-4X4L	4 × 4 L
67-68-5	Dimethyl sulfoxide, CHROMASOLV® Plus, for HPLC, ≥99.7%	34869-100ML	100 mL
		34869-12X100ML	12 × 100 mL
		34869-500ML	500 mL
		34869-1L	1 L
		34869-6X1L	6 × 1 L
		34869-2L	2 L
		34869-4X2L	4 × 2 L
		34869-2.5L	2.5 L
		34869-4L	4 L
		34869-4X4L	4 × 4 L
		34869-20L	20 L
		34869-50L	50 L
123-91-1	1,4-Dioxane, CHROMASOLV® Plus, for HPLC, ≥99.5%, contains ~1.5 mg/L 2,6-di-*tert*.-butyl-4-methylphenol as stabilizer (Europe only)	34857-100ML	100 mL
		34857-500ML	500 mL
		34857-1L	1 L
		34857-6X1L	6 × 1 L
		34857-2L	2 L
		34857-2.5L	2.5 L
		34857-4X2.5L	4 × 2.5 L
141-78-6	Ethyl acetate, CHROMASOLV® Plus, for HPLC, 99.9%	650528-1L	1 L
		650528-6X1L	6 × 1 L
		650528-4L	4 L
		650528-4X4L	4 × 4 L
142-82-5	Heptane, CHROMASOLV® Plus, for HPLC, 99%	650536-1L	1 L
		650536-6X1L	6 × 1 L
		650536-4L	4 L
		650536-4X4L	4 × 4 L
		650536-50L-P2	50 L
		650536-200L	200 L
110-54-3	Hexane, CHROMASOLV® Plus, for HPLC, ≥95%	650552-1L	1 L
		650552-6X1L	6 × 1 L
		650552-4L	4 L
		650552-4X4L	4 × 4 L
-	Hexane, mixture of isomers, CHROMASOLV® Plus, for HPLC, ≥98.5%	650544-1L	1 L
		650544-6X1L	6 × 1 L
		650544-4L	4 L
		650544-4X4L	4 × 4 L
		650544-200L-LS-NB	200 L

Solvents and Reagents

CHROMASOLV® Plus Solvents

CAS No.	Compound	Cat. No.	Qty
-	Hexane, mixture of isomers, CHROMASOLV® Plus, for HPLC, ≥98.5%	650420-1L	1 L
		650420-6X1L	6 × 1 L
		650420-4L	4 L
		650420-4X4L	4 × 4 L
67-56-1	Methanol, CHROMASOLV® Plus, for HPLC	646377-1L	1 L
		646377-6X1L	6 × 1 L
		646377-4X2L	4 × 2 L
		646377-4L	4 L
		646377-4X4L	4 × 4 L
		646377-20L-N2	20 L
		646377-20L-P2	20 L
		646377-50L-P2	50 L
		646377-50L-P2-LS	50 L
		646377-56L-P1-LS	56 L
		646377-200L-P1-NB	200 L
		646377-200L-LS-NB	200 L
		646377-200L-P2	200 L
67-56-1	Methanol, CHROMASOLV® Plus, for HPLC, ≥99.9%, poly-coated bottles	650609-4L	4 L
		650609-4X4L	4 × 4 L
872-50-4	1-Methyl-2-pyrrolidinone, CHROMASOLV® Plus, for HPLC, ≥99%	270458-100ML	100 mL
		270458-1L	1 L
		270458-2L	2 L
		270458-2.5L	2.5 L
		270458-4X4L	4 × 4 L
		270458-20L	20 L
67-63-0	2-Propanol, CHROMASOLV® Plus, for HPLC, 99.9%	650447-1L	1 L
		650447-6X1L	6 × 1 L
		650447-4X2L	4 × 2 L
		650447-4L	4 L
		650447-4X4L	4 × 4 L
		650447-20L-N2	20 L
		650447-50L-P2	50 L
		650447-56L-P1-LS	56 L
110-86-1	Pyridine, CHROMASOLV® Plus, for HPLC, ≥99.9%	270407-100ML	100 mL
		270407-12X100ML	12 × 100 mL
		270407-1L	1 L
		270407-2L	2 L
		270407-4X4L	4 × 4 L
109-99-9	Tetrahydrofuran, inhibitor-free, CHROMASOLV® Plus, for HPLC, ≥99.9%	34865-100ML	100 mL
		34865-12X100ML	12 × 100 mL
		34865-1L	1 L
		34865-6X1L	6 × 1 L
		34865-144X1L	144 × 1 L
		34865-2L	2 L
		34865-2.5L	2.5 L
		34865-4X2.5L	4 × 2.5 L
		34865-4L	4 L
		34865-4X4L	4 × 4 L
		34865-7L	7 L
		34865-18L	18 L
		34865-20L	20 L
		34865-45L	45 L
		34865-200L	200 L
109-99-9	Tetrahydrofuran, CHROMASOLV® Plus, for HPLC, ≥99.9%, inhibitor-free	439215-4X4L	4 × 4 L
108-88-3	Toluene, CHROMASOLV® Plus, for HPLC, ≥99.9%	650579-1L	1 L
		650579-6X1L	6 × 1 L
		650579-4L	4 L
		650579-4X4L	4 × 4 L
540-84-1	2,2,4-Trimethylpentane, CHROMASOLV® Plus, for HPLC, ≥99.5%	650439-1L	1 L
		650439-6X1L	6 × 1 L
		650439-4L	4 L
		650439-4X4L	4 × 4 L
		650439-20L	20 L
7732-18-5	Water, CHROMASOLV® Plus, for HPLC	34877-1L	1 L
		34877-2.5L	2.5 L
		34877-4X2.5L	4 × 2.5 L
		34877-4L	4 L
		34877-4X4L	4 × 4 L
95-47-6	*o*-Xylene, CHROMASOLV® Plus, for HPLC, 98%	295884-100ML	100 mL
		295884-1L	1 L
		295884-2L	2 L

Gradient Grade Solvents

CAS No.	Compound	Cat. No.	Qty
75-05-8	Acetonitrile, CHROMASOLV® gradient grade, for HPLC, ≥99.9%	34851-100ML	100 mL
		34851-1L	1 L
		34851-6X1L	6 × 1 L
		34851-2L	2 L
		34851-4X2L	4 × 2 L
		34851-2.5L-PC	2.5 L
		34851-2.5L	2.5 L
		34851-4X2.5L	4 × 2.5 L
		34851-72X2.5L	72 × 2.5 L
		34851-4L	4 L
		34851-4X4L	4 × 4 L
		34851-7L	7 L
		34851-18L	18 L
		34851-20L	20 L
		34851-20L-P2	20 L
		34851-20L-N1	20 L
		34851-45L	45 L
		34851-50L-P2-LS	50 L
		34851-50L-P2	50 L
		34851-56L-P1-LS	56 L
		34851-200L-P2	200 L
		34851-200L-LS-NB	200 L
		34851-200L	200 L
		34851-200L-LS	200 L
		34851S-400L-RC	400 L
		34851-50L-P2-4B	1 pkg
		34851-50L-P2-4B-LS	1 pkg
75-05-8	Acetonitrile, CHROMASOLV® (gradient grade +), suitable for PAH analysis, ≥99.9% (GC)	00683-2.5L	2.5 L
67-56-1	Methanol, CHROMASOLV®, gradient grade, for HPLC, ≥99.9%	34885-100ML-R	100 mL
		34885-1L-R	1 L
		34885-6X1L-R	6 × 1 L
		34885-2L-R	2 L
		34885-2.5L-R	2.5 L
		34885-4X2.5L-R	4 × 2.5 L
		34885-4L-R	4 L
		34885-4X4L-R	4 × 4 L
		34885-7L-R	7 L
		34885-18L-R	18 L
		34885-45L-R	45 L
		34885-50L-P2-4A-R	1 pkg
		34885-50LP24A-LS-R	1 pkg
67-56-1	Methanol, CHROMASOLV®, gradient grade, for HPLC, suitable as ACS-grade LC reagent, ≥99.9%	439193-4L	4 L
		439193-4X4L	4 × 4 L
		439193-18L	18 L
		439193-20L-P2	20 L
		439193-20L-N2	20 L
		439193-20L	20 L
		439193-200L-P2	200 L
		439193-200L	200 L

Other CHROMASOLV® Solvents

CAS No.	Compound	Cat. No.	Qty
67-64-1	Acetone, CHROMASOLV®, for HPLC, ≥99.9%	270725-100ML	100 mL
		270725-1L	1 L
		270725-6X1L	6 × 1 L
		270725-2L	2 L
		270725-4X2L	4 × 2 L
		270725-4X2.5L	4 × 2.5 L
		270725-4L	4 L
		270725-4X4L	4 × 4 L
		270725-18L-P1	18 L
		270725-20L-P2	20 L
		270725-50L-P2	50 L
		270725-50LP2-3A-LS	50 L
		270725-50L-P2-3A	50 L
		270725-56L-P1-LS	56 L
		270725-200L	200 L
67-64-1	Acetone, CHROMASOLV®, for HPLC, ≥99.8%	34850-1L	1 L
		34850-6X1L	6 × 1 L
		34850-144X1L	144 × 1 L
		34850-2.5L	2.5 L
		34850-4X2.5L	4 × 2.5 L
		34850-72X2.5L	72 × 2.5 L
		34850-18L	18 L
		34850-45L	45 L

Solvents and Reagents

Other CHROMASOLV® Solvents

CAS No.	Compound	Cat. No.	Qty
75-05-8	Acetonitrile, E CHROMASOLV®, for HPLC, for UV, ≥99.9% (GC)	34888-1L	1 L
		34888-6X1L	6 × 1 L
		34888-2.5L	2.5 L
		34888-4X2.5L	4 × 2.5 L
		34888-7L	7 L
		34888-18L	18 L
		34888-45L	45 L
75-05-8	Acetonitrile, R CHROMASOLV®, for liquid chromatography, ≥99.8% (GC)	34881-1L	1 L
		34881-6X1L	6 × 1 L
		34881-2.5L	2.5 L
		34881-4X2.5L	4 × 2.5 L
		34881-7L	7 L
		34881-18L	18 L
		34881-45L	45 L
		34881-200L	200 L
75-05-8	Acetonitrile, AMD CHROMASOLV®, ≥99.9%	34896-1L	1 L
		34896-6X1L	6 × 1 L
75-05-8	Acetonitrile solution, contains 0.1 % (v/v) trifluoroacetic acid, for HPLC	574732-4L	4 L
		574732-4X4L	4 × 4 L
		574732-18L	18 L
		574732-20L	20 L
		574732-200L-LS	200 L
75-05-8	Acetonitrile solution, contains 0.05 % (v/v) trifluoroacetic acid	574724-4L	4 L
		574724-4X4L	4 × 4 L
		574724-18L	18 L
		574724-200L	200 L
75-05-8	Acetonitrile solution, contains 0.035 % (v/v) trifluoroacetic acid, for HPLC	565423-18L	18 L
-	Acetonitrile 50%, Water 47.5 % and Trifluoroacetic acid 2.5%, LC-MS CHROMASOLV®	19182-250ML	250 mL
100-47-0	Benzonitrile, CHROMASOLV®, for HPLC, 99.9%	270318-100ML	100 mL
		270318-1L	1 L
71-36-3	1-Butanol, CHROMASOLV® Plus, for HPLC, ≥99.7%	34867-100ML	100 mL
		34867-1L	1 L
		34867-2L	2 L
		34867-2.5L	2.5 L
		34867-4X2.5L	4 × 2.5 L
		34867-4L	4 L
		34867-4X4L	4 × 4 L
78-93-3	2-Butanone, CHROMASOLV®, for HPLC, ≥99.7%	34861-100ML	100 mL
		34861-1L	1 L
		34861-6X1L	6 × 1 L
		34861-2L	2 L
		34861-4X2L	4 × 2 L
		34861-2.5L	2.5 L
		34861-4X2.5L	4 × 2.5 L
		34861-4L	4 L
		34861-4X4L	4 × 4 L
		34861-50L-P2-LS	50 L
		34861-50L-P2	50 L
1634-04-4	*tert*-Butyl methyl ether, CHROMASOLV®, for HPLC, ≥99.8%	34875-100ML	100 mL
		34875-1L	1 L
		34875-6X1L	6 × 1 L
		34875-2L	2 L
		34875-4X2L	4 × 2 L
		34875-2.5L	2.5 L
		34875P-2.5L-R	2.5 L
		34875-4X2.5L	4 × 2.5 L
		34875-72X2.5L	72 × 2.5 L
		34875-4L	4 L
		34875-4X4L	4 × 4 L
		34875-7L	7 L
		34875-200L	200 L
75-15-0	Carbon disulfide, CHROMASOLV®, for HPLC, ≥99.9%	270660-100ML	100 mL
		270660-1L	1 L
		270660-2L	2 L
56-23-5	Carbon tetrachloride, CHROMASOLV®, for HPLC, ≥99.9%	270652-100ML	100 mL
		270652-1L	1 L
109-69-3	1-Chlorobutane, CHROMASOLV®, for HPLC, ≥99.8%	34958-1L	1 L
		34958-2L	2 L
		34958-4X4L	4 × 4 L
67-66-3	Chloroform, CHROMASOLV®, for HPLC, ≥99.8%, contains 0.5-1.0% ethanol as stabilizer	366927-100ML	100 mL
		366927-1L	1 L
		366927-6X1L	6 × 1 L
		366927-4L	4 L
		366927-4X4L	4 × 4 L

Solvents and Reagents

Other CHROMASOLV® Solvents

CAS No.	Compound	Cat. No.	Qty
67-66-3	Chloroform, CHROMASOLV®, for HPLC, ≥99.8%, amylene stabilized	34854-2ML	2 mL
		34854-100ML	100 mL
		34854-1L	1 L
		34854-6X1L	6 × 1 L
		34854-2L	2 L
		34854-4X2L	4 × 2 L
		34854-2.5L	2.5 L
		34854-4X2.5L	4 × 2.5 L
		34854-4X4L	4 × 4 L
110-82-7	Cyclohexane, CHROMASOLV®, for HPLC, ≥99.7%	34855-100ML	100 mL
		34855-1L	1 L
		34855-6X1L	6 × 1 L
		34855-2L	2 L
		34855-2.5L	2.5 L
		34855-4X2.5L	4 × 2.5 L
		34855-72X2.5L	72 × 2.5 L
		34855-4X4L	4 × 4 L
		34855-7L	7 L
95-50-1	1,2-Dichlorobenzene, CHROMASOLV®, 99%	270598-100ML	100 mL
		270598-1L	1 L
		270598-2L	2 L
		270598-4L	4 L
		270598-4X4L	4 × 4 L
75-09-2	Dichloromethane, CHROMASOLV®, for HPLC, ≥99.8%, contains amylene as stabilizer	34856-100ML	100 mL
		34856-1L	1 L
		34856-6X1L	6 × 1 L
		34856-2L	2 L
		34856-2.5L	2.5 L
		34856-4X2.5L	4 × 2.5 L
		34856-4L	4 L
		34856-4X4L	4 × 4 L
		34856-7L	7 L
		34856-18L	18 L
		34856-18L-P1	18 L
		34856-45L	45 L
		34856-50L-P2	50 L
		34856-50L-P2-LS	50 L
		34856-200L	200 L
60-29-7	Diethyl ether, CHROMASOLV®, for HPLC, ≥99.9%, inhibitor-free	309966-100ML	100 mL
		309966-1L	1 L
		309966-6X1L	6 × 1 L
		309966-25L	25 L
110-71-4	1,2-Dimethoxyethane, CHROMASOLV®, for HPLC, 99.9%	307432-100ML	100 mL
		307432-1L	1 L
		307432-2L	2 L
		307432-2.5L	2.5 L
		307432-4X2.5L	4 × 2.5 L
67-68-5	Dimethyl sulfoxide, CHROMASOLV® Plus, for HPLC, ≥99.7%	34869-100ML	100 mL
		34869-12X100ML	12 × 100 mL
		34869-500ML	500 mL
		34869-1L	1 L
		34869-6X1L	6 × 1 L
		34869-2L	2 L
		34869-4X2L	4 × 2 L
		34869-2.5L	2.5 L
		34869-4L	4 L
		34869-4X4L	4 × 4 L
		34869-20L	20 L
		34869-50L	50 L
141-78-6	Ethyl acetate, CHROMASOLV®, for HPLC, ≥99.7%	34858-100ML	100 mL
		34858-1L	1 L
		34858-6X1L	6 × 1 L
		34858-2L	2 L
		34858-4X2L	4 × 2 L
		34858-2.5L	2.5 L
		34858-4X2.5L	4 × 2.5 L
		34858-4L	4 L
		34858-4X4L	4 × 4 L
		34858-7L	7 L
		34858-18L-P1	18 L
		34858-18L	18 L
		34858-20L-P2	20 L
		34858-45L	45 L
		34858-50L-P2	50 L
		34858-185L	185 L
		34858-200L	200 L
		34858-200L-LS	200 L
		34858-50L-P2-3F	1 pkg
		34858-200L-P2-3F	1 pkg
		34858-200LP2-3F-LS	1 pkg
		34858-50L-P2-3F-LS	1 pkg

Solvents and Reagents

Other CHROMASOLV® Solvents

CAS No.	Compound	Cat. No.	Qty
142-82-5	Heptane, CHROMASOLV®, for HPLC, ≥99%	34873-100ML	100 mL
		34873-1L	1 L
		34873-6X1L	6 × 1 L
		34873-2L	2 L
		34873-4X2L	4 × 2 L
		34873-2.5L	2.5 L
		34873-4X2.5L	4 × 2.5 L
		34873-72X2.5L	72 × 2.5 L
		34873-4X4L	4 × 4 L
		34873-7L	7 L
		34873-18L	18 L
		34873-20L	20 L
		34873-45L	45 L
		34873-50L-P2	50 L
		34873-56L-P1	56 L
110-54-3	Hexane, CHROMASOLV®, for HPLC, ≥97.0% (GC)	34859-1L	1 L
		34859-6X1L	6 × 1 L
		34859-2.5L	2.5 L
		34859-4X2.5L	4 × 2.5 L
		34859-4L	4 L
		34859-7L	7 L
		34859-18L	18 L
		34859-45L	45 L
67-56-1	Methanol, CHROMASOLV®, for HPLC, ≥99.9%	34860-100ML-R	100 mL
		34860-1L-R	1 L
		34860-6X1L-R	6 × 1 L
		34860-2L-R	2 L
		34860-4X2L-R	4 × 2 L
		34860-2.5L-R-PC	2.5 L
		34860-2.5L-R	2.5 L
		34860-4X2.5L-R	4 × 2.5 L
		34860-72X2.5L-R	72 × 2.5 L
		34860-4L-R	4 L
		34860-4X4L-R	4 × 4 L
		34860-7L-R	7 L
		34860-18L-R	18 L
		34860-18L-P1-R	18 L
		34860-20L-P2-R	20 L
		34860-45L-R	45 L
		34860-50L-P2-R	50 L
		34860-200L-P2-R	200 L
67-56-1	Methanol solution, (Methanol:Dimethyl sulfoxide 1:1 (v/v))	650188-4X4L	4 × 4 L
67-56-1	Methanol solution, contains 0.10 % (v/v) formic acid	632546-4X4L	4 × 4 L
		632546-18L	18 L
109-86-4	2-Methoxyethanol, CHROMASOLV®, for HPLC, ≥99.9%	270482-100ML	100 mL
		270482-1L	1 L
		270482-2L	2 L
110-49-6	2-Methoxyethyl acetate, CHROMASOLV®, for HPLC, ≥99%	308269-1L	1 L
		308269-2L	2 L
78-78-4	2-Methylbutane, for HPLC, CHROMASOLV®, ≥99.5%	270342-100ML	100 mL
		270342-1L	1 L
		270342-6X1L	6 × 1 L
		270342-2L	2 L
		270342-2.5L	2.5 L
108-10-1	4-Methyl-2-pentanone, CHROMASOLV®, for HPLC, ≥99.5%	293261-100ML	100 mL
		293261-1L	1 L
		293261-2L	2 L
		293261-4X4L	4 × 4 L
78-83-1	2-Methyl-1-propanol, CHROMASOLV®, for HPLC, 99.5%	270466-100ML	100 mL
		270466-1L	1 L
		270466-2L	2 L
75-52-5	Nitromethane, for HPLC, CHROMASOLV®, ≥96%	270423-100ML	100 mL
		270423-1L	1 L
		270423-2L	2 L
111-87-5	1-Octanol, CHROMASOLV®, for HPLC, ≥99%	293245-100ML	100 mL
		293245-1L	1 L
		293245-2L	2 L
		293245-2.5L	2.5 L
109-66-0	Pentane, CHROMASOLV®, for HPLC, ≥99.0%	34956-1L	1 L
		34956-6X1L	6 × 1 L
		34956-2L	2 L
		34956-2.5L	2.5 L
		34956-4X2.5L	4 × 2.5 L
		34956-4L	4 L
		34956-4X4L	4 × 4 L
		34956-18L	18 L
		34956-200L-LS-NB	200 L
109-66-0	Pentane, AMD CHROMASOLV®, ≥99%	34894-2.5L	2.5 L
		34894-4X2.5L	4 × 2.5 L

Solvents and Reagents

Other CHROMASOLV® Solvents

CAS No.	Compound	Cat. No.	Qty
107-87-9	2-Pentanone, CHROMASOLV®, for HPLC, 99.5%	471194-100ML	100 mL
		471194-1L	1 L
96-22-0	3-Pentanone, CHROMASOLV®, for HPLC, 96%	270334-1L	1 L
		270334-2L	2 L
71-23-8	1-Propanol, CHROMASOLV®, for HPLC, ≥99.9%	34871-100ML	100 mL
		34871-1L	1 L
		34871-6X1L	6 × 1 L
		34871-2L	2 L
		34871-2.5L	2.5 L
		34871-4X2.5L	4 × 2.5 L
67-63-0	2-Propanol, CHROMASOLV®, for HPLC, 99.9%	34863-100ML	100 mL
		34863-1L	1 L
		34863-6X1L	6 × 1 L
		34863-144X1L	144 × 1 L
		34863-2L	2 L
		34863-2.5L	2.5 L
		34863-2.5L-PC	2.5 L
		34863-4X2.5L	4 × 2.5 L
		34863-72X2.5L	72 × 2.5 L
		34863-4L	4 L
		34863-4X4L	4 × 4 L
		34863-7L	7 L
		34863-45L	45 L
		34863-50L-P2-LS	50 L
		34863-50L-P2	50 L
		34863-185L	185 L
108-32-7	Propylene carbonate, CHROMASOLV®, for HPLC, 99.7%	414220-1L	1 L
		414220-2L	2 L
127-18-4	Tetrachloroethylene, CHROMASOLV®, for HPLC, ≥99.9%	270393-100ML	100 mL
		270393-1L	1 L
		270393-2L	2 L
108-88-3	Toluene, CHROMASOLV®, for HPLC, 99.9%	34866-100ML	100 mL
		34866-1L	1 L
		34866-6X1L	6 × 1 L
		34866-2L	2 L
		34866-4X2L	4 × 2 L
		34866-2.5L	2.5 L
		34866-4X2.5L	4 × 2.5 L
		34866-72X2.5L	72 × 2.5 L
		34866-4X4L	4 × 4 L
		34866-10L	10 L
		34866-18L	18 L
		34866-20L	20 L
540-84-1	2,2,4-Trimethylpentane, CHROMASOLV®, for HPLC, ≥99%	34862-100ML	100 mL
		34862-1L	1 L
		34862-6X1L	6 × 1 L
		34862-2L	2 L
		34862-4X2L	4 × 2 L
		34862-2.5L	2.5 L
		34862-4X2.5L	4 × 2.5 L
		34862-72X2.5L	72 × 2.5 L
		34862-4L	4 L
		34862-4X4L	4 × 4 L
7732-18-5	Water, for HPLC	95304-1L	1 L
		95304-6X1L	6 × 1 L
		95304-2.5L	2.5 L
		95304-4X2.5L	4 × 2.5 L
-	Water solution, contains 20 % (v/v) acetonitrile, 0.1 % (v/v) formic acid	633321-4X4L	4 × 4 L
-	Water solution, contains 0.1 % (v/v) ammonium hydroxide	639141-20L	20 L
-	Water solution, for HPLC, contains 0.1 % (v/v) formic acid	576913-4L	4 L
		576913-4X4L	4 × 4 L
		576913-200L-LS	200 L
-	Water solution, contains 0.1 % (v/v) trifluoroacetic acid, for HPLC	576905-4X4L	4 × 4 L
		576905-18L	18 L
		576905-20L	20 L
		576905-200L-LS	200 L
-	Water solution, contains 0.05 % (v/v) trifluoroacetic acid	590142-4X4L	4 × 4 L
		590142-18L	18 L
106-42-3	*p*-Xylene, CHROMASOLV®, for HPLC, ≥99%	317195-100ML	100 mL
		317195-1L	1 L
		317195-2L	2 L
		317195-2.5L	2.5 L
		317195-4X2.5L	4 × 2.5 L

Solvents and Reagents

HPLC Derivatization Reagents

HPLC Derivatization Reagents

Derivatization is often required to alter retention characteristics, increase response to various detection techniques and/or provide selective response for analytes in complex matrices. Pre-column derivatization is often used to promote improved chromatographic response of the analyte(s) under investigation. The post-column technique is typically utilized for compounds with low or no response to the desired detection scheme or when a particular analyte or set of analytes can be made to selectively respond through chemical alteration. Post-column derivatization often improves sensitivity and selectivity in HPLC analyses.

No.	Title
T196909	*Derivatization Reagents*

Derivatization Reagents for UV/VIS Detection

UV detection is the most commonly used technique in HPLC but it sometimes lacks sensitivity or selectivity for trace analysis of compounds. Chemical derivatization modifies substances with a low UV absorption into highly sensitive products. Colored and UV absorbing derivatives are prepared for chromatography to improve the detectivity of compounds which do not possess a chromophore or fluorophores. Derivatization can also improve chromatographic retention of polar compounds and resolution of closely eluted compounds because the derivatives are typically more hydrophobic than the underivatized analyte.

CAS No.	Compound	Cat. No.	Qty
108-24-7	Acetic anhydride, puriss. p.a., ACS reagent, ≥99.0% (NT)	45830-250ML-F 45830-1L-F 45830-2.5L-F	250 mL 1 L 2.5 L
108-24-7	Acetic anhydride, puriss. p.a., ACS reagent, reag. ISO, reag. Ph. Eur., ≥99% (GC)	33214-500ML 33214-1L 33214-6X1L 33214-2.5L 33214-4X2.5L	500 mL 1 L 6 × 1 L 2.5 L 4 × 2.5 L
15537-71-0	N-Acetyl-D-penicillamine, for HPLC derivatization, ≥99.0% (T)	01423-1G 01423-5G	1 g 5 g
70402-14-1	6-Amino-1-phenalenone, for HPLC derivatization, ≥97.0%	09117-100MG	100 mg
98-09-9	Benzenesulfonyl chloride, 99%	108138-5G 108138-100G 108138-500G 108138-1KG	5 g 100 g 500 g 1 kg
119-53-9	Benzoin, 98%	B8681-5G B8681-100G B8681-500G B8681-2KG	5 g 100 g 500 g 2 kg
100-46-9	Benzylamine, for GC derivatization, ≥99.0%	13180-100ML 13180-500ML	100 mL 500 mL
70-11-1	2-Bromoacetophenone, for GC derivatization, ≥99.0%	77450-10G 77450-50G	10 g 50 g
35963-20-3	(1*R*)-(−)-10-Camphorsulfonic acid, 98%	282146-25G 282146-100G	25 g 100 g
3144-16-9	(1*S*)-(+)-10-Camphorsulfonic acid, 99%	C2107-5G C2107-100G C2107-500G	5 g 100 g 500 g
21286-54-4	(1*S*)-(+)-10-Camphorsulfonyl chloride, 97%	219576-5G 219576-25G 219576-100G	5 g 25 g 100 g
39262-22-1	(1*R*)-(−)-10-Camphorsulfonyl chloride, for chiral derivatization	21382-5G	5 g
524-80-1	9-Carbazoleacetic acid, ≥99.0% (T)	17925-500MG	500 mg
5913-13-3	(*R*)-(−)-1-Cyclohexylethylamine, 98%	336505-5G	5 g
56512-49-3	Dabsyl chloride, for HPLC derivatization	502219	500 mg
6283-74-5	(+)-*O*,*O*′-Diacetyl-L-tartaric anhydride, 97%	358924-50G	50 g
80-11-5	Diazald®, 99%	D28000-25G D28000-100G D28000-250G D28000-4X250G D28000-500G D28000-1KG	25 g 100 g 250 g 4 × 250 g 500 g 1 kg
2978-11-2	*N*,*N*′-Diisopropyl-*O*-(4-nitrobenzyl)isourea, for HPLC derivatization	38434-500MG	500 mg
56512-49-3	4-(Dimethylamino)azobenzene-4′-sulfonyl chloride, ≥97.5% (AT)	39068-250MG 39068-1G 39068-5G	250 mg 1 g 5 g

Solvents and Reagents

HPLC Derivatization Reagents: *Derivatization Reagents for UV/VIS Detection*

CAS No.	Compound	Cat. No.	Qty
100-10-7	4-(Dimethylamino)benzaldehyde, for the determination of hydroxyproline, ≥99.0% (HPLC)	39070-50G 39070-250G	50 g 250 g
4755-50-4	4-(Dimethylamino)benzoyl chloride, for HPLC derivatization, ≥99.0% (HPLC)	67954-1G	1 g
-	'Dimethylaminopyridine' on polystyrene, loading: ~3.0 mmol/g "DMAP", matrix crosslinked with 2% DVB	39410-5G 39410-25G	5 g 25 g
163927-31-9	(*R*)-(–)-1-[7-(Dimethylaminosulfonyl)benzofurazan-4-yl]pyrrolidin-3-yl isothiocyanate, for fluorescence, ≥98.0% (HPLC, sum of enantiomers)	60252-10MG	10 mg
99-33-2	3,5-Dinitrobenzoyl chloride, purum, for fluorescence, ≥98.0% (AT)	42030-10G 42030-50G 42030-250G	10 g 50 g 250 g
74927-72-3	(*R*)-(–)-*N*-(3,5-Dinitrobenzoyl)-α-phenylglycine, 99%	250031-1G 250031-5G	1 g 5 g
95713-52-3	N_α-(2,4-Dinitro-5-fluorophenyl)-L-alaninamide, powder	D7906-25MG D7906-100MG	25 mg 100 mg
119-26-6	2,4-Dinitrophenylhydrazine, puriss. p.a., moistened with water, ≥99.0% (HPLC)	42210-25G-F 42210-100G-F 42210-6X100G-F 42210-500G-F	25 g 100 g 6 × 100 g 500 g
74124-79-1	*N,N'*-Disuccinimidyl carbonate, ≥95%	225827-1G 225827-5G 225827-25G	1 g 5 g 25 g
35661-51-9	9-Fluorenylmethyl carbazate, for HPLC derivatization, ≥99.0%	46917-250MG-F	250 mg
70-34-8	1-Fluoro-2,4-dinitrobenzene, purum p.a., ≥98.0% (GC)	42085-50G 42085-250G	50 g 250 g
28920-43-6	Fmoc chloride, ≥99.0% (HPLC), for HPLC derivatization	23186-1G 23186-5G	1 g 5 g
29169-64-0	(*R*)-(–)-*O*-Formylmandeloyl chloride, 97%	479284-5G	5 g
5950-69-6	Hydrindantin dihydrate, for Stein-Moore-Chromatography	53940-10G 53940-50G	10 g 50 g
5470-11-1	Hydroxylamine hydrochloride, for AAS, ≥99.0%	55459-50G 55459-250G	50 g 250 g
7612-98-8	4-(4-Isothiocyanatophenylazo)-N,N-dimethylaniline, 97%	317802-250MG 317802-1G	250 mg 1 g
36410-81-8	4-Isothiocyanato-TEMPO, for ESR-spectroscopy, ≥97.0%	76381-250MG-F	250 mg
14602-86-9	(1*R*)-(–)-Menthyl chloroformate, ee (GLC): 99%	245305-25G 245305-100G	25 g 100 g
7635-54-3	(1*S*)-(+)-Menthyl chloroformate, ee (GLC): 97%	378712-5ML 378712-25ML	5 mL 25 mL
100-07-2	4-Methoxybenzoyl chloride, 99%	A88476-5G A88476-25G A88476-100G	5 g 25 g 100 g
89-25-8	3-Methyl-1-phenyl-2-pyrazoline-5-one, 99%	M70800-5G M70800-100G M70800-500G	5 g 100 g 500 g
1691-93-6	3-Methyl-1-phenyl-4-trifluoroacetyl-2-pyrazolin-5-one, for HPLC derivatization, ≥98.0%	68752-1G 68752-5G	1 g 5 g
550-44-7	*N*-Methylphthalimide, 98%	407992-5G	5 g
86-84-0	1-Naphthyl isocyanate, 98%	170518-5G	5 g
551-06-4	1-Naphthyl isothiocyanate, 95%	N4525-10G	10 g
485-47-2	Ninhydrin, ACS reagent	151173-10G 151173-25G 151173-100G	10 g 25 g 100 g
122-04-3	4-Nitrobenzoyl chloride, for HPLC derivatization	73120-25G 73120-100G 73120-500G	25 g 100 g 500 g
100-11-8	4-Nitrobenzyl bromide, 99%	N13054-25G N13054-100G	25 g 100 g
2086-26-2	*O*-(4-Nitrobenzyl)hydroxylamine hydrochloride, ≥98.5% (AT)	73200-1G 73200-5G	1 g 5 g
100-16-3	4-Nitrophenylhydrazine, 96%	642983-5G 642983-25G	5 g 25 g
108031-79-4	(–)-Noe's reagent, for chiral derivatization	74153-1G	1 g
38609-97-1	9-Oxo-10(9*H*)-acridineacetic acid, for HPLC derivatization, ≥99.0% (T)	17927-250MG	250 mg
53558-93-3	(*R*)-(–)-5-Oxo-2-tetrahydrofurancarboxylic acid, 98%	310476-1G 310476-5G	1 g 5 g
21461-84-7	(*S*)-(+)-5-Oxo-2-tetrahydrofurancarboxylic acid, 98%	301469-1G 301469-5G	1 g 5 g
103-71-9	Phenyl isocyanate, puriss. p.a., for the detection of alcohols and amines, ≥99.0% (GC)	78750-25ML 78750-100ML	25 mL 100 mL
103-72-0	Phenyl isothiocyanate, Sigma Grade, 8.36 M, suitable for solid phase protein sequencing analysis, ≥99% (GC), liquid	P1034-1ML P1034-10X1ML P1034-10ML	1 mL 10 × 1 mL 10 mL

Solvents and Reagents

HPLC Derivatization Reagents: *Derivatization Reagents for UV/VIS Detection*

CAS No.	Compound	Cat. No.	Qty
1565-74-8	(*R*)-(+)-1-Phenyl-1-propanol, 99%	256331-1ML	1 mL
613-87-6	(*S*)-(−)-1-Phenyl-1-propanol, 99%	256323-1ML	1 mL
2508-19-2	Picrylsulfonic acid solution, 1 M in H_2O	92822-1ML 92822-5ML	1 mL 5 mL
55486-13-0	1-Pyrenebutyric hydrazide, for fluorescence, ≥97.0% (T)	82669-100MG 82669-500MG	100 mg 500 mg
98-59-9	*p*-Toluenesulfonyl chloride, puriss., ≥99.0% (AT)	89730-100G 89730-500G	100 g 500 g
98-59-9	*p*-Toluenesulfonyl chloride, *ReagentPlus*®, ≥99%	240877-5G 240877-100G 240877-500G	5 g 100 g 500 g
1711-06-4	*m*-Toluoyl chloride, 99%	122254-5G 122254-100G 122254-500G	5 g 100 g 500 g

Derivatization Reagents for Fluorometric Detection

Fluorescence of an analyte, whether natural or induced by derivatization, can be leveraged to increase the sensitivity (detect lower levels) of the analysis. In addition, the uniqueness of fluorescent character can allow for the selective identification of a molecule in a complex mixture. Fluorescence is quantifiable at lower concentrations and usually has a wider linear range of response vs. concentration compared to optical (UV-VIS) absorbance.

CAS No.	Compound	Cat. No.	Qty
24257-93-0	2-Acetylbenzaldehyde, 95%	562912-1G	1 g
189373-41-9	4-(2-Aminoethylamino)-7-(*N*,*N*-dimethylsulfamoyl)benzofurazan, for HPLC derivatization	93088-25MG-F	25 mg
504-29-0	2-Aminopyridine, 99%	A77997-5G A77997-100G A77997-500G	5 g 100 g 500 g
861881-76-7	1,2-Benzo-3,4-dihydrocarbazole-9-ethyl-*p*-toluenesulfonate, for HPLC derivatization, ≥98.0% (HPLC)	75821-100MG	100 mg
119-53-9	Benzoin, 98%	B8681-5G B8681-100G B8681-500G B8681-2KG	5 g 100 g 500 g 2 kg
100-46-9	Benzylamine, for GC derivatization, ≥99.0%	13180-100ML 13180-500ML	100 mL 500 mL
70-11-1	2-Bromoacetophenone, for GC derivatization, ≥99.0%	77450-10G 77450-50G	10 g 50 g
88404-25-5	4-Bromomethyl-6,7-dimethoxycoumarin, 97%	301450-1G	1 g
124522-09-4	3-Bromomethyl-7-methoxy-1,4-benzoxazin-2-one, BioReagent, suitable for fluorescence, ≥97.0%	17631-25MG	25 mg
10199-89-0	4-Chloro-7-nitrobenzofurazan, BioReagent, suitable for fluorescence, ≥97.0% (HPLC)	25455-1G 25455-5G 25455-25G	1 g 5 g 25 g
107-91-5	Cyanoacetamide, 99%	108448-100G 108448-500G	100 g 500 g
605-65-2	Dansyl chloride, BioReagent, suitable for fluorescence, ≥99.0% (HPLC)	39220-1G-F 39220-5G-F 39220-50G-F	1 g 5 g 50 g
33008-06-9	Dansylhydrazine, BioReagent, suitable for fluorescence, ≥90% (HPLC)	30434-250MG 30434-1G 30434-5G	250 mg 1 g 5 g
258516-84-6	Dibenzyl chloromethyl phosphate, for HPLC derivatisation, ≥97.0%	86546-1G 86546-5G	1 g 5 g
99-73-0	2,4′-Dibromoacetophenone, for HPLC derivatization	68082-5G	5 g
99-73-0	2,4′-Dibromoacetophenone, >98%	D38308-10G D38308-50G D38308-100G	10 g 50 g 100 g
21811-74-5	5-([4,6-Dichlorotriazin-2-yl]amino)fluorescein hydrochloride, suitable for fluorescence, BioReagent, ≥99.0% (TLC)	36565-100MG-F	100 mg
913253-56-2	4-[2-(*N*,*N*-Dimethylamino)ethylaminosulfonyl]-7-(2-aminoethylamino)-2,1,3-benzoxadiazole, for HPLC derivatisation, ≥95.0% (HPLC)	79291-100MG	100 mg
163927-32-0	(*S*)-(+)-1-[7-(Dimethylaminosulfonyl)benzofurazan-4-yl]pyrrolidin-3-yl isothiocyanate, for fluorescence, ≥98.0% (HPLC, sum of enantiomers)	91609-10MG	10 mg
569355-30-2	2,6-Dimethyl-4-quinolinecarboxylic acid *N*-hydroxysuccinimide ester, ≥98.0% (HPLC)	49558-100MG	100 mg
139332-64-2	4-(*N*,*N*-Dimethylsulfamoyl)-7-piperazino-benzofurazan, for fluorescence, ≥99.0%	93087-50MG-F	50 mg
99-33-2	3,5-Dinitrobenzoyl chloride, purum, for fluorescence, ≥98.0% (AT)	42030-10G 42030-50G 42030-250G	10 g 50 g 250 g
29841-69-8	(1*S*,2*S*)-(−)-1,2-Diphenylethylenediamine, 97%	364002-500MG	500 mg
102-54-5	Ferrocene, 98%	F408-5G F408-100G F408-500G	5 g 100 g 500 g

Solvents and Reagents

HPLC Derivatization Reagents: *Derivatization Reagents for Fluorometric Detection*

CAS No.	Compound	Cat. No.	Qty
12152-94-2	Ferroceneboronic acid, for HPLC derivatisation, ≥97.0% (HPLC)	56257-100MG	100 mg
12093-10-6	Ferrocenecarboxaldehyde, for HPLC derivatisation, ≥98.0% (HPLC)	95159-100MG	100 mg
1273-85-4	Ferrocenoyl azide, for HPLC derivatization, ≥98.0% (HPLC)	50203-100MG	100 mg
96483-68-0	*N*-Ferrocenyl-maleimide, for HPLC derivatisation, ≥97.0% (HPLC)	89111-100MG	100 mg
132098-76-1	3-Ferrocenylpropionic anhydride, for HPLC derivatisation, ≥98.0% (C)	76737-100MG	100 mg
30084-90-3	Fluorene-2-carboxaldehyde, 99%	150142-5G	5 g
38183-12-9	Fluorescamine, ≥98% (TLC), powder, used for detection of primary amines	F9015-100MG F9015-250MG F9015-1G	100 mg 250 mg 1 g
27072-45-3	Fluorescein 5(6)-isothiocyanate, BioReagent, suitable for fluorescence, mixture of 2 components, ≥90% (HPLC)	46950-50MG-F 46950-250MG-F 46950-1G-F	50 mg 250 mg 1 g
84806-27-9	7-Fluorobenzofurazan-4-sulfonic acid ammonium salt, for HPLC derivatization, ≥98.5% (HPLC)	46640-5MG-F 46640-25MG-F	5 mg 25 mg
70-34-8	1-Fluoro-2,4-dinitrobenzene, ≥99%	D1529-10ML D1529-25ML D1529-100ML	10 mL 25 mL 100 mL
29270-56-2	4-Fluoro-7-nitrobenzofurazan, suitable for fluorescence, BioReagent, ≥98.0% (HPLC)	47140-10MG 47140-50MG	10 mg 50 mg
91366-65-3	4-Fluoro-7-sulfamoylbenzofurazan	F3639-10MG F3639-50MG	10 mg 50 mg
38183-12-9	Fluram, BioReagent, suitable for fluorescence, ≥99.0% (UV)	47614-25MG-F 47614-100MG-F 47614-1G-F	25 mg 100 mg 1 g
28920-43-6	Fmoc chloride, ≥99.0% (HPLC), for HPLC derivatization	23186-1G 23186-5G	1 g 5 g
22265-37-8	4-Methoxybenzamidine, suitable for fluorescence, ≥96.0% (NT)	64785-100MG-F	100 mg
50632-57-0	2-Methoxy-2,4-diphenyl-3(2*H*)-furanone, suitable for fluorescence, ≥98.0% (HPLC)	64958-25MG 64958-100MG	25 mg 100 mg
126565-42-2	2-Methoxy-5-(*N*-phthalimidinyl)benzenesulfonyl chloride, suitable for fluorescence, ≥97.0% (CHN)	91587-50MG-F 91587-250MG-F	50 mg 250 mg
67229-93-0	4-(6-Methyl-2-benzothiazolyl)phenyl isocyanate, suitable for fluorescence, ≥98.0% (HPLC)	65877-100MG 65877-500MG	100 mg 500 mg
81864-15-5	4,5-Methylenedioxy-1,2-phenylenediamine dihydrochloride, suitable for fluorescence, BioReagent, ≥99.0% (HPLC)	66807-10MG 66807-50MG	10 mg 50 mg
214147-22-5	4-(1-Methylhydrazino)-7-nitrobenzofurazan, for HPLC derivatization, ≥97.0%	93524-50MG	50 mg
945623-67-6	*N*-Methyl-*N*-(trimethyl-d_9-silyl)trifluoroacetamide, for GC derivatization, ≥94.0% (GC)	68768-500UL	500 µL
5415-58-7	1-Naphthaleneacetic anhydride, 96%	438952-1G	1 g
7149-49-7	2,3-Naphthalenedicarboxaldehyde, suitable for fluorescence	70215-100MG 70215-500MG	100 mg 500 mg
521-24-4	1,2-Naphthoquinone-4-sulfonic acid sodium salt, 97%	226017-10G	10 g
141903-34-6	1-(2-Naphthoyl)imidazole, suitable for fluorescence, ≥95.0% (N)	70684-500MG	500 mg
152111-91-6	NIR-797 isothiocyanate, suitable for fluorescence, ≥70% (coupling to amines)	15167-25MG	25 mg
221263-97-4	2-[*N*-(7-Nitro-4-benzofurazanyl)methylamino]acethydrazide, for fluorescence, ≥97.0% (CHN)	89464-50MG-F	50 mg
159717-69-8	*N*-(7-Nitro-4-benzofurazanyl)-D-prolyl chloride, for fluorescence	88823-50MG-F	50 mg
159717-68-7	*N*-(7-Nitro-4-benzofurazanyl)-L-prolyl chloride, for fluorescence	84999-50MG-F	50 mg
139332-66-4	4-Nitro-7-piperazinobenzofurazan, for HPLC derivatization, ≥99.0%	92614-100MG-F	100 mg
95-54-5	*o*-Phenylenediamine, Peroxidase substrate, ≥98.0%, powder	P9029-50G P9029-100G	50 g 100 g
643-79-8	Phthaldialdehyde, for fluorescence, ≥99.0% (HPLC)	79760-1G 79760-5G 79760-6X5G 79760-50G	1 g 5 g 6 × 5 g 50 g
3029-19-4	1-Pyrenecarboxaldehyde, 99%	144037-10G 144037-50G	10 g 50 g
65-22-5	Pyridoxal hydrochloride, ≥99.5% (T)	93759-5G 93759-25G 93759-100G	5 g 25 g 100 g
41468-25-1	Pyridoxal 5′-phosphate monohydrate, ≥97.0% (NT)	82870-1G 82870-5G 82870-25G	1 g 5 g 25 g
36877-69-7	Rhodamine B isothiocyanate, mixed isomers, BioReagent, suitable for protein labeling	R1755-100MG R1755-500MG R1755-1G	100 mg 500 mg 1 g
57-56-7	Semicarbazide, : 6 wt. %	363634-25G 363634-100G	25 g 100 g
95197-95-8	Tetramethylrhodamine isothiocyanate mixed isomers, suitable for fluorescence, mixture of isomers	87918-10MG 87918-50MG	10 mg 50 mg

Solvents and Reagents

HPLC Buffers

HPLC Buffers

Selection of a suitable buffer ensures that the ionizable functional group is in a predictable state -whether fully neutralized or fully ionized - to maximize retention reproducibility. The right buffer system to choose depends on the desired pH and the pK_a values of all ionizable species in the analysis, including the mobile phase components. The pK_a is the pH at which the concentrations of the ionized and free forms are equal. When a compound has more than one ionizable functional group, it has more than one pK_a value. It is also important that the buffer has a pK_a close to the desired pH since buffers control pH best at their pK_a. A rule of thumb is to choose a buffer with a pK_a value within 2 units of the desired mobile phase pH (see Table below).

Key to Abbreviations

AT — Argentometric (Silver) Titration*
GC — Gas Chromatography
HPLC - High Performance Liquid Chromatography
KT — Complexometric Titration*
NT — Nonaqueous Titration*
RT — Redox-Titration*
T — Acidimetric Titration*

* Assay indicated in mass % (weight/weight)

HPLC Buffers, pKa Values and Useful pH Range

Buffer	pKa	Useful pH Range
Trifluoroacetic acide (TFA)	0.5	<1.5
Chloroacetate	2.9	1.9–3.9
Sulfonate	1.8 and 6.9	<1–2.8, 5.9–7.9
Phosphate	2.1	1.1–3.1
Formate	3.8	2.8–4.8
Acetate	4.8	3.8–5.8
Phosphate	7.1	6.2–8.2
Ammonia	9.2	8.2–10.2
Phosphate	12.3	11.3–13.3

HPLC Buffers - Solution

CAS No.	Compound	Cat. No.	Qty
64-19-7	Acetic acid solution, for HPLC	45754-100ML-F 45754-500ML-F	100 mL 500 mL
1336-21-6	Ammonium hydroxide solution, ~10% in H_2O, for HPLC	17837-100ML 17837-1L	100 mL 1 L
366793-17-1	Dihexylamine acetate solution, for ion chromatography, concentrate, ampule	92467-6X1EA-F 92467-6X25ML-F	6 × 1 ea 6 × 25 mL
114389-69-4	Dipropylamine acetate salt solution, for ion pair chromatography, for HPLC/MS, concentrate	89789-6X1AMP-F 89789-6X25ML-F	6 × 1 amp 6 × 25 mL
64-18-6	Formic acid solution, puriss. p.a., for HPLC, 50% in water, 49-51% (T)	09676-100ML 09676-500ML	100 mL 500 mL
75-75-2	Methanesulfonic acid solution, ~1 M in H_2O, for ion chromatography	17834-10ML-F 17834-100ML-F 17834-1L-F	10 mL 100 mL 1 L
7664-38-2	Phosphoric acid, for HPLC, 85-90%	79606-100ML 79606-500ML	100 mL 500 mL
7664-38-2	Phosphoric acid solution, 49-51%, for HPLC	79607-500ML	500 mL
1310-58-3	Potassium hydroxide solution, ~45%, for HPLC	03564-4X25ML 03564-100ML 03564-500ML	4 × 25 mL 100 mL 500 mL
7664-93-9	Sulfuric acid solution, 49-51%, for HPLC	84733-100ML 84733-500ML	100 mL 500 mL
121-44-8	Triethylamine, for HPLC, ≥99.5%	17924-1EA 17924-10X2ML	10 × 2 mL 10 × 2 mL
554-68-7	Triethylamine hydrochloride, for HPLC, ≥99.0%	96249-50G-F 96249-250G-F	50 g 250 g
76-05-1	Trifluoroacetic acid, puriss. p.a., for HPLC, ≥99.0% (GC)	91707-10X1ML 91707-250ML	10 × 1 mL 250 mL
58828-90-3	Trimethylammonium bicarbonate buffer, volatile buffer, for HPLC	17899-100ML	100 mL

HPLC Buffer - Solid

CAS No.	Compound	Cat. No.	Qty
631-61-8	Ammonium acetate, for HPLC, ≥99.0%	17836-50G 17836-250G	50 g 250 g
506-87-6	Ammonium carbonate, for HPLC, 30-33% NH_3 basis (T)	74415-250G-F	250 g
540-69-2	Ammonium formate, for HPLC, ≥99.0%	17843-50G 17843-250G	50 g 250 g
7722-76-1	Ammonium phosphate monobasic, for HPLC, ≥99.0% (T)	17842-250G	250 g
3336-58-1	Ammonium trifluoroacetate, for HPLC, ≥99.0% (NT)	17839-10G 17839-50G	10 g 50 g
6381-92-6	Ethylenediaminetetraacetic acid disodium salt dihydrate, for HPLC, ≥99.0%	03682-10G 03682-50G	10 g 50 g
7758-11-4	Potassium phosphate dibasic, for HPLC, ≥99.0%	17835-250G	250 g

Solvents and Reagents

HPLC Buffers

CAS No.	Compound	Cat. No.	Qty
7778-77-0	Potassium phosphate monobasic, for HPLC, ≥99.5%	60221-50G 60221-250G 60221-1KG	50 g 250 g 1 kg
877-24-7	Potassium phthalate monobasic, for HPLC, ≥99.5%	96148-50G-F 96148-250G-F	50 g 250 g
15066-28-1	Pyridinium formate buffer, for HPLC	17903-100ML-F	100 mL
127-09-3	Sodium acetate, for HPLC, ≥99.0%	71185-50G 71185-250G	50 g 250 g
144-55-8	Sodium bicarbonate, for HPLC, ≥99.0%	88208-250G-F	250 g
7647-14-5	Sodium chloride, for HPLC, ≥99.5%	73575-250G-F	250 g
141-53-7	Sodium formate, for HPLC, ≥99.0% (NT)	17841-50G 17841-250G	50 g 250 g
7791-07-3	Sodium perchlorate monohydrate, for HPLC, ≥99.0%	89152-50G-F 89152-250G-F	50 g 250 g
10028-24-7	Sodium phosphate dibasic dihydrate, for HPLC, ≥98.5%	71633-250G	250 g
7558-80-7	Sodium phosphate monobasic, for HPLC, ≥99.0%	17844-50G 17844-250G	50 g 250 g
7757-82-6	Sodium sulfate, for HPLC, ≥99.0%	71958	
2923-18-4	Sodium trifluoroacetate, for HPLC, ≥99.0%	17840-10G	10 g
15715-58-9	Triethylammonium bicarbonate buffer, volatile buffer, for HPLC, 1 M	17902-100ML 17902-500ML	100 mL 500 mL
585-29-5	Triethylammonium formate solution, volatile buffer, 1 M pH 6.0, for HPLC	17901-100ML 17901-500ML	100 mL 500 mL
77-86-1	Trizma® base, puriss. p.a., ≥99.7% (T)	93350-100G 93350-500G 93350-1KG	100 g 500 g 1 kg

HPLC Buffer - Concentrate

CAS No.	Compound	Cat. No.	Qty
5204-74-0	Acetic acid – triethylamine solution 1:1, for HPLC, 2M:2M concentrate, in H_2O	09748-100ML 09748-500ML	100 mL 500 mL
-	Acetic acid – triethylamine solution 2:1, puriss. p.a., for HPLC, 2M:1M concentrate, in H_2O	09749-100ML	100 mL
585-29-5	Formic acid : Triethylamine 1:1 solution, for HPLC, 2M:2M concentrate	09752-100ML	100 mL
7664-38-2	Phosphoric acid solution, for HPLC, ~0.66 M, concentrate	40779-6X10MMOL	6 × 10 mmol
35365-94-7	Phosphoric acid – triethylamine 1:1 solution, for HPLC, 2M:2M concentrate, in H_2O	03388-100ML 03388-500ML	100 mL 500 mL
10138-93-9	Phosphoric acid – triethylamine 2:1 solution, for HPLC, 2M:1M concentrate, water, in H_2O	03387-100ML 03387-500ML	100 mL 500 mL
-	Potassium phosphate buffer solution, puriss. p.a., for HPLC, concentrate, ampule, pH 1.9	79628-6X15ML 79628-1EA	6 × 15 mL 1 set
-	Sodium phosphate buffer solution, puriss. p.a., for HPLC, concentrate, ampule, pH 4.3	79629-6X1EA 79629-1EA	6 × 1 ea 1 set
7558-79-4	Sodium phosphate dibasic solution, puriss. p.a., for HPLC, concentrate I, ampule	71648-1EA	1 set
7558-79-4	Sodium phosphate dibasic solution, puriss. p.a., for HPLC, concentrate II, ampule	71651-6X1AMP 71651-1EA	6 × 1 amp 1 set
-	Sodium phosphate dibasic – potassium phosphate monobasic solution, puriss. p.a., for HPLC, concentrate, ampule	71653-6X1EA 71653-1EA	6 × 1 ea 1 set
19070-91-8	Dibutylamine acetate Concentrate, ~0.5 M, for ion pair chromatography	73345-6EA	6 ea
-	Trifluoroacetic acid – triethylamine 2M:1M solution, puriss. p.a., for HPLC, concentrate	09746-500ML	500 mL
454-49-9	Trifluoroacetic acid - Triethylamine 2M:2M solution, for HPLC, 2M:2M concentrate, in H_2O	09747-100ML	100 mL

Solvents and Reagents

Ion Pair Reagents

Ion Pair Reagents

How to select the right IPC reagent

If you have a mixture of ionic and non-ionic analytes, start by optimizing the method for non-ionic components. Then select the appropriate IPC reagent to provide the necessary counter ion. Alkyl sulfonates are a good first choice for basic solutes, whereas quaternary amines are useful for the acidic analytes. Halogenated IPC reagents are only suitable for isocratic applications and should not be used for gradient systems.

After selecting the appropriate IPC reagent, the method can be further optimized by adjusting the pH and concentration. For short or medium chain length IPC reagents, a 0.005 M solution is suitable for most separations. The optimum concentration of long chain IPC reagents varies from 0.0005 M to 0.002 M. All buffers are tested for suitability for chromatography.

Ion Pair Reagents - Cationic

corresponds to standard for filter test

CAS No.	Compound	Cat. No.	Qty
13419-61-9	Sodium 1-decanesulfonate, for ion pair chromatography, ≥99.0%	30631-10G-F 30631-50G-F	10 g 50 g
142-87-0	Sodium decyl sulfate, for ion pair chromatography, ≥99.0% (T)	71443-10G	10 g
151-21-3	Sodium dodecyl sulfate, for ion pair chromatography, ≥99.0%	71726-10G-F 71726-50G-F	10 g 50 g
5325-43-9	Sodium 1,2-ethanedisulfonate, for ion pair chromatography, ≥99.0% (T)	02374-5G	5 g
207300-90-1	Sodium 1-heptanesulfonate monohydrate, for ion pair chromatography, ≥99.0% (T)	51832-10G-F 51832-50G-F	10 g 50 g
22767-50-6	Sodium 1-heptanesulfonate solution, for ion pair chromatography, concentrate, ampule	51834-6X1AMP-F 51834-1EA-F	6 × 1 amp 1 set
207300-91-2	Sodium 1-hexanesulfonate monohydrate, for ion pair chromatography, ≥99.0% (T)	52862-2.5G-F 52862-10G-F 52862-50G-F	2.5 g 10 g 50 g
2832-45-3	Sodium 1-hexanesulfonate solution, for ion pair chromatography, concentrate, ampule	52864-6X1AMP-F 52864-1EA-F	6 × 1 amp 1 set
532-02-5	Sodium 2-naphthalenesulfonate, for ion pair chromatography, ≥99.0% (HPLC)	70289-10G	10 g
35192-74-6	Sodium 1-nonanesulfonate, for ion pair chromatography, ≥99.0% (T)	74316-10G-F	10 g
13893-34-0	Sodium 1-octadecanesulfonate, for ion pair chromatography, ≥99.0% (T)	74734	
207596-29-0	Sodium 1-octanesulfonate monohydrate, for ion pair chromatography, ≥99.0% (T)	74882-10G-F 74882-50G-F	10 g 50 g
5324-84-5	Sodium 1-octanesulfonate solution, for ion pair chromatography, concentrate, ampule	74886-6EA-F 74886-1EA-F	6 ea 1 set
142-31-4	Sodium octyl sulfate, for ion pair chromatography, ≥99.0% (T)	75073-10G	10 g
207605-40-1	Sodium 1-pentanesulfonate monohydrate, for ion pair chromatography, ≥99.0% (T)	76952-2.5G-F 76952-10G-F 76952-25G-F 76952-50G-F	2.5 g 10 g 25 g 50 g
304672-01-3	Sodium 1-propanesulfonate monohydrate, for ion pair chromatography, ≥99.0% (T)	81806-10G-F 81806-50G-F	10 g 50 g
304851-99-8	Sodium 2-propanesulfonate monohydrate, for ion pair chromatography, ≥99.0% (T)	81808-10G-F	10 g
6994-45-2	Sodium 1-tetradecanesulfonate, for ion pair chromatography, ≥99.0% (T)	87191-10G	10 g
22767-49-3	Sodium 1-pentanesulfonate solution, for ion pair chromatography, concentrate, ampule	76954-6AMP-F	6 amp

Set of concentrates available in packages with 6 ampules. Dilute to 1 liter with HPLC grade water (Cat. No. 95304) to obtain a 0.005 M eluent solution.

Ion Pair Reagents - Anionic

CAS No.	Compound	Cat. No.	Qty
541-22-0	Decamethonium bromide, for ion pair chromatography, ≥99.0% (AT)	30518-5G-F	5 g
1119-94-4	Dodecyltrimethylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	44239-10G	10 g
103999-25-3	Dodecyltrimethylammonium hydrogen sulfate, for ion pair chromatography, ≥99.0% (T)	44243-10G	10 g
68214-07-3	Hexadecyltrimethylammonium bisulfate, for ion pair chromatography, ≥99.0% (T)	52371-5G-F	5 g
57-09-0	Hexadecyltrimethylammonium bromide, for ion pair chromatography, ≥99.0%	52367-10G-F 52367-50G-F	10 g 50 g
111412-68-1	Hexadecyltrimethylammonium phosphate monobasic concentrate, concentrate, for ion pair chromatography	52363	
32503-27-8	Tetrabutylammonium bisulfate, for ion pair chromatography, ≥99.0%	86853-10G-F 86853-50G-F	10 g 50 g
1643-19-2	Tetrabutylammonium bromide, for ion pair chromatography, ≥99.0%	86857-10G-F 86857-50G-F	10 g 50 g
1112-67-0	Tetrabutylammonium chloride, for ion pair chromatography, ≥99.0%	86852-10G-F 86852-50G-F	10 g 50 g
2052-49-5	Tetrabutylammonium hydroxide solution, ~40% in H_2O, for ion chromatography	86854-100ML 86854-500ML 86854-2.5L	100 mL 500 mL 2.5 L
311-28-4	Tetrabutylammonium iodide, for ion pair chromatography, ≥99.0%	86903-2.5G-F 86903-10G-F	2.5 g 10 g
5574-97-0	Tetrabutylammonium phosphate monobasic solution, for ion pair chromatography, concentrate, ampule	86899-6X1AMP-F 86899-1EA-F	6 × 1 amp 1 set
71-91-0	Tetraethylammonium bromide, for ion pair chromatography, ≥99.0%	86608-10G	10 g
16873-13-5	Tetraethylammonium hydrogen sulfate, for ion pair chromatography, ≥99.0%	86626-5G-F 86626-10G-F 86626-50G-F	5 g 10 g 50 g
4368-51-8	Tetraheptylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87296-10G-F 87296-50G-F	10 g 50 g
4328-13-6	Tetrahexylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87297-10G-F	10 g
87700-05-8	Tetrahexylammonium dihydrogen phosphate solution, concentrate, for ion pair chromatography	87313-1EA	1 set
32503-34-7	Tetrahexylammonium hydrogensulfate, for ion pair chromatography, ≥99.0% (T)	87299-5G-F 87299-25G-F	5 g 25 g
14937-42-9	Tetrakis(decyl)ammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87578-10G-F 87578-50G-F	10 g 50 g
80526-82-5	Tetramethylammonium bisulfate, for ion pair chromatography, ≥99.0% (T)	87724-10G-F 87724-50G-F	10 g 50 g
64-20-0	Tetramethylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87708-10G	10 g
75-57-0	Tetramethylammonium chloride, for ion pair chromatography, ≥99.0% (AT)	74202-50G-F 74202-250G-F	50 g 250 g
14190-16-0	Tetramethylammonium sulfate, for ion pair chromatography, ≥99.0% (T)	02799-2.5G 02799-10G	2.5 g 10 g
14866-33-2	Tetraoctylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87996-2.5G-F 87996-10G-F 87996-50G-F	2.5 g 10 g 50 g
866-97-7	Tetrapentylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87997-10G-F	10 g
56211-70-2	Tetrapropylammonium bisulfate, for ion pair chromatography, ≥99.0%	88106-10G	10 g
1941-30-6	Tetrapropylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	88103-10G	10 g
1119-97-7	Myristyltrimethylammonium bromide, for ion pair chromatography, ≥99.0% (AT)	87208-10G	10 g
104903-23-3	Trimethyltetradecylammonium hydrogen sulfate, for ion pair chromatography, ≥99.0% (T)	87215-10G	10 g

Set of concentrates available in packages with 6 ampules. Dilute to 1 liter with HPLC grade water (Cat. No. 95304) to obtain a 0.005 M eluent solution.

Solvents and Reagents

Ion Pair Reagents

Ion Pair Reagents - Anionic Concentrate

CAS No.	Compound	Cat. No.	Qty
1112-67-0	Tetrabutylammonium chloride solution, for ion pair chromatography, concentrate, ampule	86862-6X1AMP	6 × 1 amp
		86862-1EA	1 set
32503-27-8	Tetrabutylammonium bisulfate solution, for ion pair chromatography, concentrate, ampule	86847-1EA-F	1 set
2052-49-5	Tetrabutylammonium hydroxide solution, ~40% in H_2O, for ion chromatography	86854-100ML	100 mL
		86854-500ML	500 mL
		86854-2.5L	2.5 L

Set of concentrates available in packages with 6 ampules. Dilute to 1 liter with HPLC grade water (Cat. No. 95304) to obtain a 0.005 M eluent solution.