

VARIAN, INC.

HPLC

- Excellent performance gives you complete confidence in your results
- Many column dimensions and bulk media, so a solution is never far away
- Easy scale-up, from analysis to purification and prep to process



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HPLC from Varian offers a very wide range of column types and packing materials. By controlling the manufacturing process from start to finish, you benefit from guaranteed, reproducible columns and packing materials.

HPLC

HPLC purification of recombinant pharmaceuticals from bacteria helps elucidate their role in the transfer of drug resistance.

HPLC Columns and Media

Application and Phase Selection Guide

Due to the fact that no application is the same or carried out in the same way, a standard choice of phase and/or HPLC column may not lead to the required performance. Varian strongly believes that the best chromatographic performance is a delicate balance that calls for fine tuning of all the elements that participate in the HPLC system. This means that finding the best chromatographic phase and column dimensions for your application is a serious task. Varian's technical staff will help you in finding the right solution for your application, as well as providing advice on your operating system. Our aim is to deliver a total customer solution that creates the highest value possible for you.

The tables in this section will help you make the first phase selection based on the characteristics of your sample.

Small Molecules

Analyte specific analysis

Compound Class	Separation Mechanism	Sorbent
Lipids	Silver Ion	ChromSpher™ Lipids
Polycyclic Aromatic Hydrocarbons		Pursuit™ PAH
Organic Acids	Ligand Interaction	Hi-Plex H
	Ion Pair Reverse Phase	PLRP-S 100Å
Monosaccharides and Disaccharides	Ligand Interaction	Hi-Plex Ca (Duo)
		Hi-Plex Pb
	Normal Phase Amino	Polaris NH2
	Ion Suppression	PLRP-S 100Å
Oligosaccharides	Ligand Interaction	Hi-Plex Ca
		Hi-Plex Na
Sugar Alcohols	Ligand Interaction	Hi-Plex Ca
		Hi-Plex Ca USP
		Hi-Plex H
		Hi-Plex K
		Hi-Plex Pb
Normal Phase	Normal Phase Amino	Polaris NH2
Polar	Reverse Phase – C18	Pursuit XRs C18
Basic, Polar	Reverse Phase – C18	Pursuit C18
	Ion Suppression	PLRP-S 100Å

Small Molecules

Water soluble

Compound Class	Separation Mechanism	Sorbent
Polar	Reverse Phase – C18	Polaris C18-A
H-bonding	Reverse Phase – C18	Polaris C18-Amide
		Polaris C18-Ether
Positional Isomers	Reverse Phase – C8	Pursuit XRs C8
		Pursuit C8
Polar	Reverse Phase – C8	Polaris C8-A
H-bonding	Reverse Phase – C8	Polaris C8-Ether
Aromatic	Reverse Phase – Diphenyl	Pursuit XRs DP
Structurally Similar	Reverse Phase – Diphenyl	Pursuit DP
Extremely Polar	Reverse Phase – Other	Pursuit PFP
Extreme Conditions	Reverse Phase – Polymeric	PLRP-S 100Å
		PLRP-S 300Å

Organic soluble

Compound Class	Separation Mechanism	Sorbent
Non-polar	Normal Phase Si	Pursuit XRs Si
		Polaris™ Si
Polar	Normal Phase Amino	Polaris NH2

Large Molecules

Organic soluble

Compound Class	Separation Mechanism	Sorbent
Synthetic – Polydisperse	Gel Permeation Chromatography	PLgel MIXED-A
		PLgel MIXED-B
		PLgel MIXED-C
		PLgel MIXED-D
		PLgel MIXED-E
Synthetic – Limited MW Range	Gel Permeation Chromatography	PLgel 50Å
		PLgel 100Å
		PLgel 500Å
		PLgel 10 ³ Å
		PLgel 10 ⁴ Å
		PLgel 10 ⁵ Å
Oligomers	Reverse Phase	PLRP-S 100Å
		PLRP-S 300Å

HPLC Columns and Media

Large Molecules

Water soluble

Compound Class	Separation Mechanism	Sorbent
Synthetic - Polydisperse	Size Exclusion Chromatography	PL aquagel-OH MIXED
Synthetic - Limited MW Range	Size Exclusion Chromatography	PL aquagel-OH 20
		PL aquagel-OH 30
		PL aquagel-OH 40
		PL aquagel-OH 50
		PL aquagel-OH 60
Synthetic Peptides	Reverse Phase	VariTide™ RPC
		PLRP-S 100Å
		PLRP-S 300Å
Synthetic Oligonucleotides DNA/RNA	Ion Pair Reverse Phase	PLRP-S 100Å
		PLRP-S 300Å
		PLRP-S 1000Å
		PLRP-S 4000Å
	Anion Exchange	PL-SAX 1000Å
Polymers	Compositional Analysis	PLRP-S 300Å
		PLRP-S 1000Å
		PLRP-S 4000Å

Large Molecules

Water soluble continued

Compound Class	Separation Mechanism	Sorbent
Recombinant Peptides and Proteins	Reverse Phase	PLRP-S 100Å
		PLRP-S 300Å
		PLRP-S 1000Å
		PLRP-S 4000Å
	Anion Exchange	PL-SAX 1000Å
		PL-SAX 4000Å
Macromolecular Plasmids	Cation Exchange	PL-SCX 1000Å
		PL-SCX 4000Å
	Reverse Phase	PLRP-S 4000Å
		Anion Exchange
		PL-SAX 4000Å

Purification of Small Molecules and Pharmaceuticals

High performance, high resolution - shown with relevant instrumentation

Separation Mechanism	Sorbent	Particle Size (µm)		
		PrepStar™ SD-1/940-LC	PrepStar SD-2	SepTech Skid
		High Performance	High Throughput	High Yield
Normal Phase Si	Pursuit™ XRs	5	10	
Normal Phase Amino	Polaris™ NH2	5	10	
Reverse Phase - C18	Pursuit XRs C18	5	10	
	Pursuit C18	5	10	
	Polaris C18-A	5	10	
	Polaris C18-Amide	5	10	
	Polaris C18-Ether	5	10	
	SepTech™ ST60 C18	10	10	
Reverse Phase - C8	Pursuit XRs C8	5	10	10
	Pursuit C8	5	10	
	Polaris C8-A	5	10	
	Polaris C8-Ether	5	10	
Reverse Phase - Diphenyl	Pursuit XRs DP	5	10	
	Pursuit DP	5	10	
Reverse Phase - Polymeric	PLRP-S 100Å	5, 8	10	10-15, 15-20, 50

HPLC Columns and Media

Purification of Larger Biomolecules

Synthetic peptides - shown with relevant instrumentation

Separation Mechanism	Sorbent	Particle Size (μm)		
		PrepStar™ SD-1/940-LC	PrepStar SD-2	SepTech Skid
		High Performance	High Throughput	High Yield
Reverse Phase	VariTide™ RPC	6		
	SepTech™ ST150 10-C18	10	10	10
	PLRP-S 100Å	8	10	10-15, 15-20, 50
	PLRP-S 300Å	8	10	10-15, 15-20, 50

Synthetic oligonucleotides - shown with relevant instrumentation

Separation Mechanism	Sorbent	Particle Size (μm)		
		PrepStar SD-1/940-LC	PrepStar SD-2	SepTech Skid
		High Performance	High Throughput	High Yield
Ion Pair Reverse Phase	PLRP-S 100Å	8	10	10-15, 15-20, 50
	PLRP-S 300Å	8	10	10-15, 15-20, 50
	PLRP-S 1000Å	8	10	30, 50
	PLRP-S 4000Å	8	10	30
Anion Exchange	PL-SAX 1000Å	8	10	30
Trityl-on/Trityl-off	PLRP-S 100Å	50	50	50
	PLRP-S 300Å	50	50	50

Recombinant peptides and proteins - shown with relevant instrumentation

Separation Mechanism	Sorbent	Particle Size (μm)		
		PrepStar SD-1/940-LC	PrepStar SD-2	SepTech Skid
		High Performance	High Throughput	High Yield
Reverse Phase	PLRP-S 100Å	8	10	10-15, 15-20, 50
	PLRP-S 300Å	8	10	10-15, 15-20, 50
	PLRP-S 1000Å	8	10	30
	PLRP-S 4000Å	8	10	30
Anion Exchange	PL-SAX 1000Å	8	10	30
	PL-SAX 4000Å	8	10	30
Cation Exchange	PL-SCX 1000Å	8	10	30
	PL-SAX 4000Å	8	10	30

Macromolecular plasmids - shown with relevant instrumentation

Separation Mechanism	Sorbent	Particle Size (μm)		
		PrepStar SD-1/940-LC	PrepStar SD-2	SepTech Skid
		High Performance	High Throughput	High Yield
Reverse Phase	PLRP-S 4000Å	8	10, 30	
Anion Exchange	PL-SAX 4000Å	8	10, 30	

As a global leader in preparative and process chromatography, Varian Inc. provides both silica-based and polymeric, high performance media to meet the needs of discovery, research and production. Options for linear scale-up from μg/mg level through to multi kg cGMP production scale are provided.

USP Methods

Varian HPLC Columns Recommended for USP Methods

The following chart is a guide to selecting Varian HPLC columns that meet the specifications set by the USP.

In most categories several different types of columns are listed which differ in particle size, particle shape, and carbon load or surface area. In these cases, the USP column specifications are quite broad and several column types meet the basic specifications. For example, an L1 specification calls for a column containing silica or ceramic packing material, 5 μm to 10 μm in diameter, bonded with octadecyl (C18) silane. Many commercially available columns meet the basic specifications. However, not all C18 columns are alike, and only a limited number of the available C18 columns from any vendor will actually perform the desired separation.

For increased efficiency and resolution, we recommend spherical particles of 3 to 5 μm diameter. Packings with higher surface areas typically provide increased capacity.

Varian offers a variety of columns for every category that is representative of the wide range of selectivities for each bonded phase. Materials vary in particle size, pore size, surface area, carbon loading, hydrophobicity, bonded phase coverage, pore morphology, and other characteristics.

Selection of the most appropriate column for the intended separation is best done after consultation with a Varian HPLC column specialist. We can often provide chromatographic examples of the separation you are working on.

The USP specifically gives chemists the flexibility to determine the best column for their particular need. Column manufacturers and/or suppliers listed in the USP are recommendations; equivalent or alternative columns, which give equal or better resolution and quantitation, are also acceptable. Analysts should choose the particular column that gives the best results for their analysis.

Technical Help

To achieve the best possible results for your separation, contact one of our Technical Help Desks for a specific column recommendation.

For North and South America:

helpdesk.us@varianinc.com

For Europe, Asia, Africa, and Australia:

helpdesk.eu@varianinc.com

USP Methods

Varian HPLC Columns Recommended for USP Methods

Method	Column	Refer to
L1 - Octadecyl silane chemically bonded to porous silica or ceramic micro-particles, 1.5 to 10 µm diameter, or a monolithic silica rod	Pursuit™ XRs C18	page 220
	Pursuit C18	page 229
	Polaris™ C18-A	page 235
	Polaris C18-Ether	page 237
	OmniSpher™ C18	www.varianinc.com/products
	MetaSil™ AQ C18	www.varianinc.com/products
	MetaSil ODS	www.varianinc.com/products
	Microsorb™ 100 C18	www.varianinc.com/products
	MicroSpher™ C18	www.varianinc.com/products
	MonoChrom C18	www.varianinc.com/products
	SepTech™ ST60 10 µm C18	page 270
	SepTech ST150 10 µm C18	page 270
L3 - Porous silica microparticles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Pursuit XRs Si	page 224
	Polaris Si-A	www.varianinc.com/products
	MicroSpher Si	www.varianinc.com/products
	Microsorb 100 Si	www.varianinc.com/products
	MetaSil Basic Silica	www.varianinc.com/products
	MetaSil Silica	www.varianinc.com/products
	MetaSil AQ Si	www.varianinc.com/products
	MonoChrom Silica	www.varianinc.com/products
L4 - Silica gel of controlled surface porosity bonded to a solid spherical core, 30 to 50 µm in diameter	Guard Si	www.varianinc.com/products
L7 - Octylsilane chemically bonded to totally porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Pursuit XRs C8	page 222
	Pursuit C8	page 230
	Polaris C8-A	page 235
	Polaris C8-Ether	page 237
	MetaSil C8	www.varianinc.com/products
	Microsorb 100 C8	www.varianinc.com/products
	MonoChrom C8	www.varianinc.com/products
L8 - An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 3 to 10 µm in diameter	Polaris NH2	www.varianinc.com/products
	MetaSil NH2	www.varianinc.com/products
	Microsorb 100 Amino	www.varianinc.com/products
L9 - Irregular or spherical, totally porous silica gel having a chemically bonded, strongly acidic cation exchange coating, 3 to 10 µm in diameter	MetaSil SCX	www.varianinc.com/products
L10 - Nitrile groups chemically bonded to porous silica particles, 3 to 10 µm in diameter	MetaSil CN	www.varianinc.com/products
	Microsorb 100 Cyano	www.varianinc.com/products
	MonoChrom CN	www.varianinc.com/products
L11 - Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter	Pursuit XRs Diphenyl	page 223
	Pursuit Diphenyl	www.varianinc.com/products
	MetaSil Phenyl	www.varianinc.com/products
	Microsorb 100 Phenyl	www.varianinc.com/products

USP Methods

Varian HPLC Columns Recommended for USP Methods Continued

Method	Column	Refer to
L12 - A strong anion exchange packing made by chemically bonding a quaternary amine to a solid silica spherical core, 30 to 50 μm in diameter	Guard SAX	www.varianinc.com/products
L13 - Trimethylsilane chemically bonded to porous silica particles, 3 to 10 μm in diameter	MetaSil™ C1	www.varianinc.com/products
L14 - Silica gel having a chemically bonded, strongly basic quaternary ammonium anion exchange coating, 5 to 10 μm in diameter	IonoSpher™ A	www.varianinc.com/products
	MetaSil SAX	www.varianinc.com/products
L15 - Hexylsilane chemically bonded to totally porous silica particles, 3 to 10 μm in diameter	MetaSil C6	www.varianinc.com/products
L17 - Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the hydrogen form, 7 to 11 μm in diameter	Hi-Plex H	page 253
L19 - Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the calcium form, about 9 μm in diameter	Hi-Plex Ca	page 253
	Hi-Plex Ca (Duo)	
L20 - Dihydroxypropane groups chemically bonded to porous silica particles, 5 to 10 μm in diameter	MonoChrom Diol	www.varianinc.com/products
L21 - A rigid, spherical styrene-divinylbenzene copolymer, 5 to 10 μm in diameter	PLgel	page 288
	PLRP-S 100Å	page 241
	PLRP-S 300Å	page 241
	PLRP-S 1000Å	page 241
	PLRP-S 4000Å	page 241
L22 - A cation exchange resin made of porous polystyrene gel with sulfonic acid groups, about 10 μm in size	Hi-Plex H	page 253
L26 - Butyl silane chemically bonded to totally porous silica particles, 3 to 10 μm in diameter	MicroSorb™ C4	www.varianinc.com/products
L27 - Porous silica particles, 30 to 50 μm in diameter	Bondesil™ Silica	page 62
L34 - Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the lead form, about 9 μm in diameter.	Hi-Plex Pb	page 253
L43 - Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10 μm in diameter	Pursuit™ PFP	page 232
L52 - A strong cation exchange resin made of porous silica with sulfopropyl groups, 5 to 10 μm in diameter	IonoSpher C	www.varianinc.com/products
L57 - A chiral-recognition protein, ovomucoid, chemically bonded to silica particles, about 5 μm in diameter, with a pore size of 120Å	Ultron ES-OVM	www.varianinc.com/products
L58 - Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the sodium form, about 6 to 30 μm diameter	Hi-Plex Na	page 253
	Hi-Plex Na (Octo)	page 253
L60 - Spherical, porous silica gel, 10 μm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and end capped	Polaris™ Amide-C18	www.varianinc.com/products

Please visit our Web site for details of all available phases

Pursuit™ HPLC Columns

Fast Separations with High Resolution for High Throughput

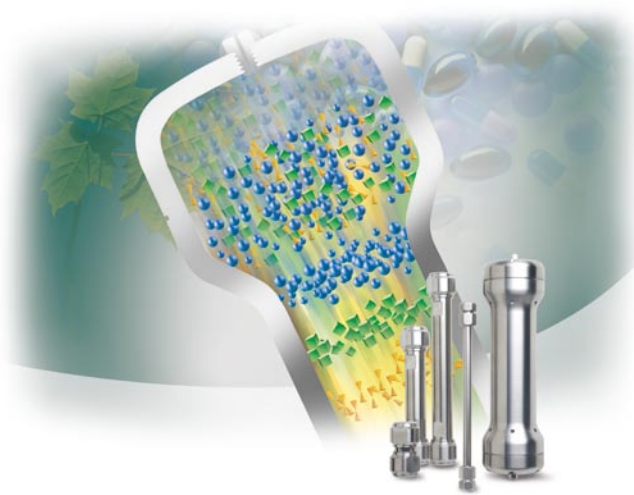
With the Pursuit family of particle sizes and selectivities, any application can be carried out with the most ideal chromatographic conditions and with the best chromatographic results.

Beginning in drug discovery and drug metabolism, Pursuit columns are ideal for analyzing lead compounds and biological samples. The column's performance is due to the unique combination of advanced bonding chemistry and ultra-high purity silica. These factors combine to provide rapid separations with excellent first time resolution and symmetrical peaks for polar compounds, whether at pH 1.5 or 10. Additionally, the need for ion pairing agents such as TFA is often eliminated, thus maximizing the performance of single and parallel multi-channel LC/MS systems.

Culminating in QC, Pursuit is ideal for implementing dependable trouble-free analysis of raw materials and approved drugs. Rigorous control and validation of each step in the manufacturing process ensures column reproducibility. With Pursuit your laboratory can spend its energy on producing results.

Special selectivities such as Pursuit PFP (for very polar compounds) and Pursuit PAH (environmental) give you the extra selectivities you need for your most challenging applications.

From analytical development to full production, Pursuit materials meet all your requirements for the resolution of critical analytical methods and high quality preparative chromatography. Pursuit columns have excellent stability, selectivity and column efficiency - all prerequisites for developing robust methods at any scale.



Pursuit

For LC/MS and high throughput applications. Built on the larger 200Å pore size silica, high ligand density delivers up to 40% faster separations without sacrificing resolution. This is accomplished by optimizing mass transfer with the larger pore size.

Pursuit XRs

For performance in analytical R&D, QC and preparative applications. Combining high ligand density with a 100Å high surface area silica, Pursuit XRs columns are designed to increase productivity, as they offer maximum loadability, excellent stability and easy scalability while maintaining superior resolution.

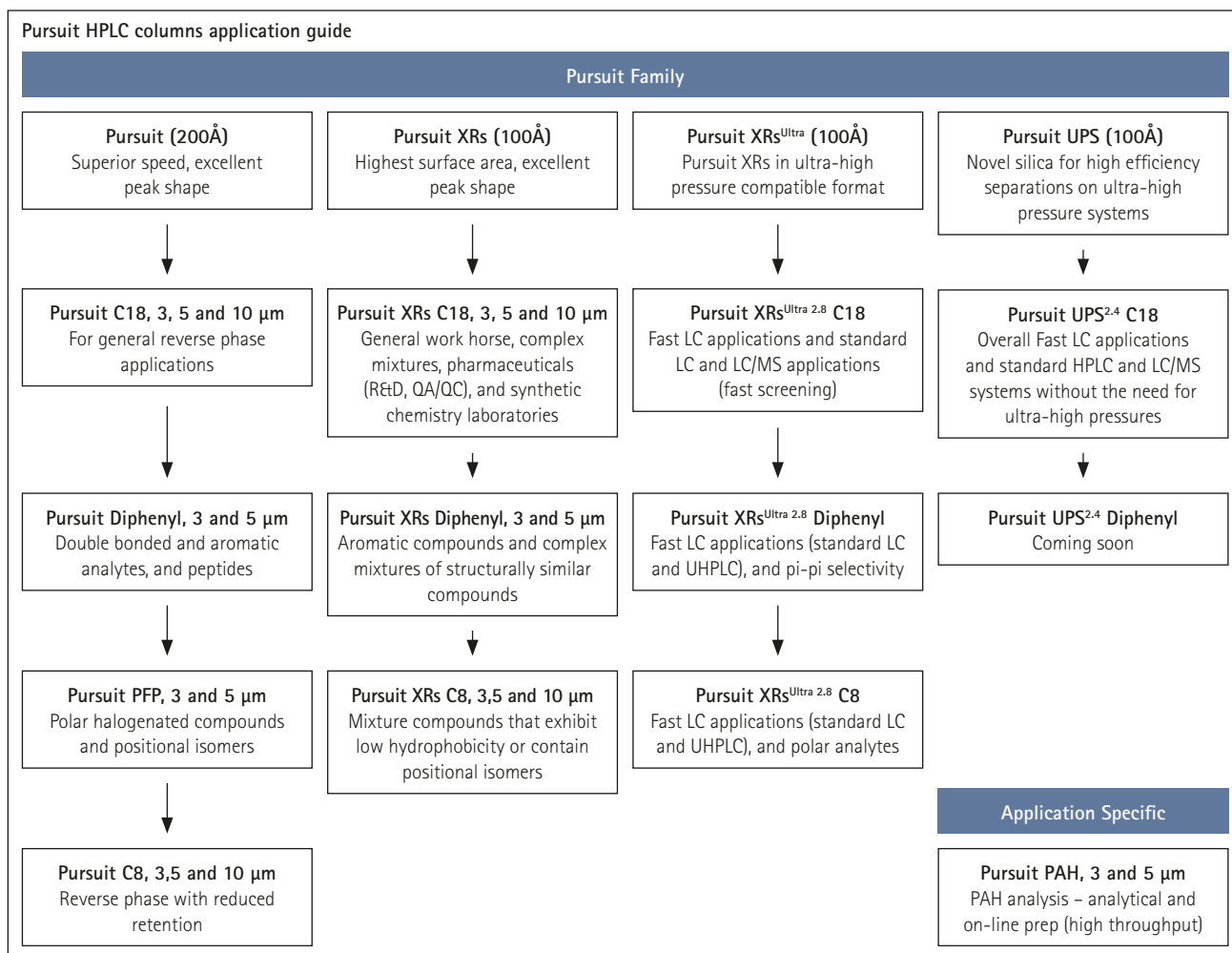
Pursuit XRs^{Ultra}

For the ultimate in speed, and good resolution on any instrument. Varian has designed the Pursuit XRs^{Ultra 2.8} around an optimized 2.8 µm particle and an advanced packing procedure. Now you can decrease your runtime while maintaining resolution. Lower back pressure allows high flow rates to be used, and the 2.8 µm particles of ultra-pure silica delivers 10-15% higher efficiency than 3 µm columns.

Pursuit UPS

For maximum efficiency particularly in high viscosity solvent separations. With an optimized 2.4 µm particle, Pursuit UPS columns offer approximately 50% lower back pressure compared to sub 2 µm columns, delivering higher speed and resolution without the need for ultra-high pressure equipment.

Pursuit™ HPLC Columns



Technical Specifications

All particles spherical, all columns end capped

Description	Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (mL/g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
Pursuit C18	3, 5, 10	200	200	1.1	12.9	3.5	1.5 - 10
Pursuit C8	3, 5, 10	200	200	1.1	7.4	3.8	1.5 - 10
Pursuit Diphenyl	3, 5, 10	200	200	1.1	7.3	2.8	1.5 - 8
Pursuit PFP	3, 5	200	200	1.1	6.3	3.4	1.5 - 10
Pursuit PAH	3, 5	200	200	1.1			1.5 - 10
Pursuit XRs C18	3, 5, 10	100	440	1.1	22.0	2.9	1.5 - 10
Pursuit XRs C8	3, 5, 10	100	440	1.1	15.0	3.7	1.5 - 10
Pursuit XRs Diphenyl	3, 5	100	440	1.1	14.6	2.6	1.5 - 8
Pursuit XRs Si	3, 5, 10	100	440	1.1			1.5 - 10
Pursuit XRs ^{Ultra 2.8} C18	2.8	100	440	1.1	23.2	3.2	1.5 - 10
Pursuit XRs ^{Ultra 2.8} C8	2.8	100	440	1.1	15.0	3.7	1.5 - 10
Pursuit XRs ^{Ultra 2.8} Diphenyl	2.8	100	440	1.1	14.6	2.6	1.5 - 8
Pursuit UPS ^{2.4} C18	2.4	100	350	0.9	21.0	2.5	1.5 - 10



Pursuit™ HPLC Columns

Pursuit XRs C18: Developed for Maximum Resolution

- Ideal "all round" column for analytical uses
- Excellent resolution of complex mixtures
- Optimal retention

Develop your analytical methods faster with Pursuit XRs C18, the HPLC column that provides first time resolution of complex mixtures. Based on high surface area 100Å silica, Pursuit XRs is ideally suited for pharmaceutical analytical R&D, QA/QC, and synthetic chemistry laboratories. The high surface area and high phase density gives maximum resolution, excellent peak shape and optimal retention for complex samples. Pursuit XRs C18 is based on ultra-high purity silica with virtually no metal contaminants, and is manufactured using a propriety state of the art bonding technique. This results in maximum coverage and excellent end capping of residual silanol groups.

Technical Specifications

All particles spherical; all columns end capped

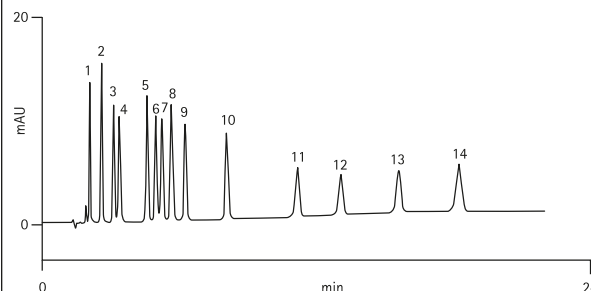
Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5, 10	100	440	1.1	22.0	2.9	1.5 – 10

Typical Applications

Antidepressants, sulfa drugs

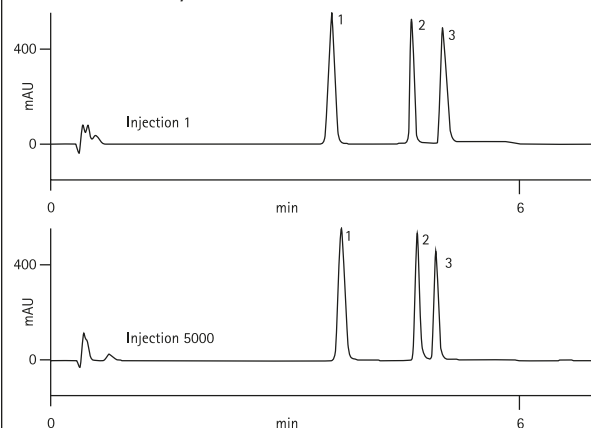
Tricyclic antidepressants and benzodiazepines

1. 7-Aminoclozapem	6. Imipramine	11. Nordiazepam
2. 7-Aminoflunitrazepam	7. Nortriptyline	12. Clonazepam
3. Nordoxepin	8. Amitriptyline	13. Flunitrazepam
4. Doxepin	9. Trimipramine	14. Diazepam
5. Desipramine	10. Clomipramine	



Column: Pursuit XRs C18 5 μm, 150 x 4.6 mm
 Eluent: A: Water+0.1% HCOOH
 B: MeCN+0.1% HCOOH
 Gradient: 30-40% B in 15 min, hold at 40% B for 15 min
 Flow Rate: 1.0 mL/min
 Temp: Ambient
 Detector: UV, 254 nm

Mechanical stability of Pursuit XRs



1. 4-Methoxybenzenesulfonamide	3. Trimipramine
2. Methyl 3-aminothiophene-2-carboxylate	

Sample: DMSO mix
 Column: Pursuit XRs C18 5 μm, 50 x 2.0 mm
 Eluent: A: MeOH:water, 10:90 + 0.1% HCOOH
 B: MeOH:water, 90:10 + 0.1% HCOOH
 Gradient: 0-100% B in 3 min, back to 0% B in 0.5 min, hold at 0% B for 3.5 min
 Flow Rate: 0.4 mL/min
 Temp: Ambient
 Detector: UV, 254 nm

Pursuit™ HPLC Columns

Ordering Information

Pursuit XRs C18 Columns

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
1.0	10	3	A6001100X010
	15	3	A6001150X010
2.0	2	3	A6001020X020
	3	5	A6000030X020
	5	3	A6001050X020
	5	5	A6000050X020
	10	3	A6001100X020
	10	5	A6000100X020
	15	3	A6001150X020
	15	5	A6000150X020
	25	3	A6001250X020
	25	5	A6000250X020
3.0	3	3	A6001030X030
	5	3	A6001050X030
	10	3	A6001100X030
	10	5	A6000100X030
	15	3	A6001150X030
	15	5	A6000150X030
	25	5	A6000250X030
4.0	15	5	A6000150X040
	25	5	A6000250X040
4.6	3	3	A6001030X046
	5	3	A6001050X046
	5	5	A6000050X046
	5	10	A6002050X046S
	10	3	A6001100X046
	10	5	A6000100X046
	15	3	A6001150X046
	15	5	A6000150X046
	25	3	A6001250X046
	25	5	A6000250X046
	25	10	A6002250X046
10.0	5	5	A6000050X100
	15	5	A6000150X100
	25	5	A6000250X100
	25	10	A6002250X100

Ordering Information

Pursuit XRs C18 Columns continued

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
21.2	3	5	A6000030X212
	5	5	A6000050X212
	10	5	A6000100X212
	15	5	A6000150X212
	25	5	A6000250X212
30.0	25	10	A6002250X212
	5	5	A6000050X300
	10	5	A6000100X300
	15	5	A6000150X300
	25	5	A6000250X300
50.0	25	10	A6002250X500

For guard columns and ChromSep cartridges please visit www.varianinc.com

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit XR8 C8: Reduced Hydrophobicity Meets Extreme Resolution

- Improved resolution for difficult separations
- Shorter run times compared to C18 boosts productivity
- High stability for low cost per analysis

Pursuit XR8 C8 is an excellent choice for separations that require a slightly more polar phase than C18. The high surface area of our 100Å Pursuit XR8 C8 gives added resolution to this subtly polar phase. This column is ideal for the analytical R&D laboratory where extra selectivity and speed over C18 are required. The superior resolution of Pursuit XR8 C8 delivers the right separation first time, speeding up method development and validation. As with all our Pursuit and Polaris™ chemistries, the high carbon load and ligand density make Pursuit XR8 C8 extremely pH stable for long column lifetimes and low cost per analysis.

Technical Specifications

All particles spherical; all columns end capped

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5, 10	100	440	1.1	15	3.7	1.5 – 10

Ordering Information

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2.0	5	3	A6011050X020
	5	5	A6010050X020
	10	3	A6011100X020
	10	5	A6010100X020
	15	3	A6011150X020
	15	5	A6010150X020
4.0	15	5	A6010150X040
	25	5	A6010250X040
4.6	5	3	A6011050X046
	10	3	A6011100X046
	10	5	A6010100X046
	15	3	A6011150X046
	15	5	A6010150X046
	25	5	A6010250X046
21.2	25	10	A6012250X212

For guard columns and ChromSep cartridges please visit www.varianinc.com

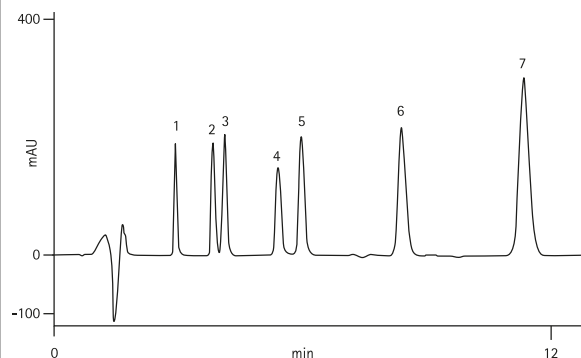
Typical Applications

Phenoxyacid herbicides, local anesthetics

Phenoxyacid herbicides

Peak Identification

1. Phenoxyacetic acid
2. o-Chlorophenoxyacetic acid
3. p-Chlorophenoxyacetic acid
4. 2,3-Dichlorophenoxyacetic acid
5. 2,4-Dichlorophenoxyacetic acid.
6. 2,4,5-Trichlorophenoxyacetic acid
7. 2,4,5-Trichlorophenoxypropionic acid (Silvex)



Column: Pursuit XR8 C8 5 μm, 150 x 4.6 mm

Eluent: MeCN:water+0.1% HCOOH, 50:50

Flow Rate: 1.0 mL/min

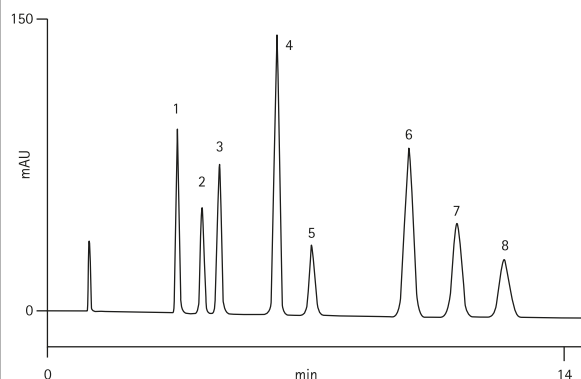
Temp: Ambient

Detector: UV, 220 nm

Local anesthetics

Peak Identification

1. Benzocaine
2. Procaine
3. Chlorocaine
4. Mepivacaine
5. 4-Hydroxypropivacaine
6. Cocaine
7. Lidocaine
8. Ropivacaine



Column: Pursuit XR8 C8 5 μm, 150 x 4.6 mm

Eluent: MeOH:5mM NH₄CO₃ 65:35, pH 10

Flow Rate: 1.0 mL/min

Temp: Ambient

Detector: UV, 210 nm

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit XRs Diphenyl: For Extra Resolution of Aromatic Compounds

- Enhanced resolution
- Unique pi-pi selectivity
- Superior selectivity of structurally similar compounds

Pursuit XRs Diphenyl delivers the unique pi-pi selectivity of our diphenyl phase with the added resolution of 100Å, high surface area silica. The lack of a hydrophobic spacer gives Diphenyl very unique shape selectivity.

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260

Ordering Information

ID (mm)	Length (cm)	Particle Size (spherical) (μm)	Part No.
1.0	10	3	A6021100X010
2.0	3	3	A6021030X020
	5	3	A6021050X020
	5	5	A6020050X020
	10	3	A6021100X020
	15	3	A6021150X020
	15	5	A6020150X020
	25	3	A6021250X020
	25	5	A6020250X020
3.0	5	3	A6021050X030
	10	3	A6021100X030
	15	3	A6021150X030
4.6	3	3	A6021030X046
	5	3	A6021050X046
	5	5	A6020050X046
	10	3	A6021100X046
	10	5	A6020100X046
	15	3	A6021150X046
	15	5	A6020150X046
	25	3	A6021250X046
10.0	25	5	A6020250X046
	15	3	A6021150X100
21.2	25	5	A6020250X100
	10	5	A6020100X212
30.0	15	5	A6020150X300
50.0	25	10	A6022250X500

For guard columns and ChromSep cartridges please visit www.varianinc.com

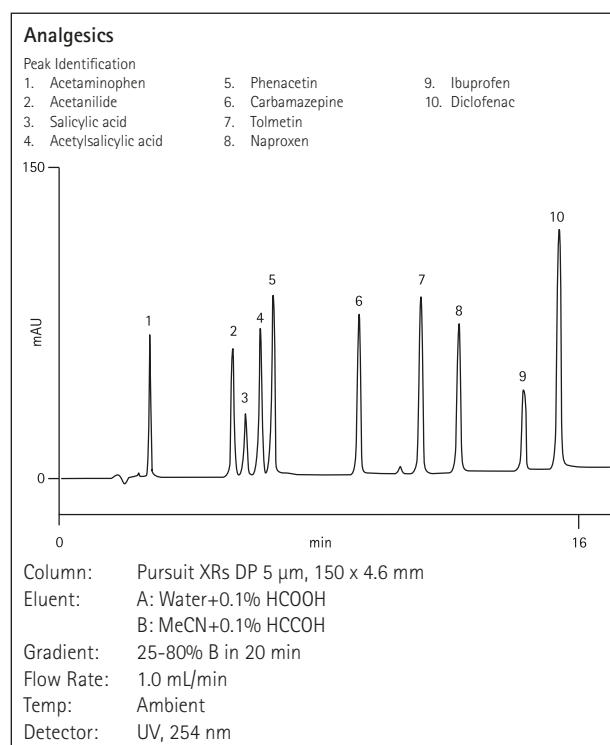
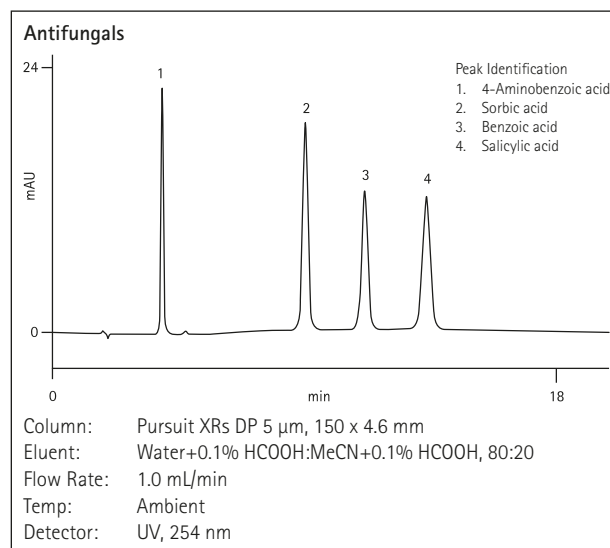
Technical Specifications

All particles spherical; all columns end capped

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5, 10	100	440	1.1	14.6	2.6	1.5 – 8

Typical Applications

Antifungals, analgesics





Pursuit™ HPLC Columns

Pursuit XRs Si: For Maximum Loadability

- High surface area maximizes loadability
- Outstanding resolution of analytes improves efficiency
- Excellent column lifetime reduces costs

Pursuit XRs Si analytical and preparative columns have high specific surface area so you can maximize sample loading, while maintaining excellent analyte resolution. Pursuit XRs Si enhances the productivity of normal phase preparative HPLC processes and provides easy, linear scale-up.

Technical Specifications

Endcapped

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
2.8	100	440	1.1	14.6	3.7	1.5 – 10

Typical Applications

Hydrocone, lycopene

Ordering Information

ID (mm)	Length (cm)	Particle Size (spherical) (μm)	Part No.
1.0	5	3	A6005050X010
2.0	5	3	A6005050X020
2.1	10	5	A6006100X021
4.6	5	3	A6005050X046
	5	5	A6006050X046
	10	3	A6005100X046
	10	5	A6006100X046
	25	10	A6004250X046
10.0	25	10	A6004250X100
21.2	25	10	A6004250X212
30.0	25	10	A6004250X300
50.0	25	10	A6004250X500

For guard columns please visit www.varianinc.com

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit XRs^{Ultra 2.8} C18: Fast LC on any System

- Decrease runtime while maintaining resolution
- Optimized particle size for higher efficiency
- Low backpressure for unrivaled ease-of-use

Pursuit XRs^{Ultra 2.8} C18 is designed around optimized particles and an advanced packing procedure. The result is ultimate speed and excellent resolution on any instrument. For traditional systems, the optimized particle size of the Pursuit XRs^{Ultra 2.8} delivers higher plate counts than 3 µm columns. Its high surface area and high phase density allow you to perform Fast LC on your existing HPLC system.

Pursuit XRs^{Ultra 2.8} is packed at extreme pressures making the column suitable for use on ultra-high pressure systems as well. The 2.8 µm particle avoids the backpressure limitations common to smaller particle size columns and allows for faster flow rates, and a wider range of solvents.

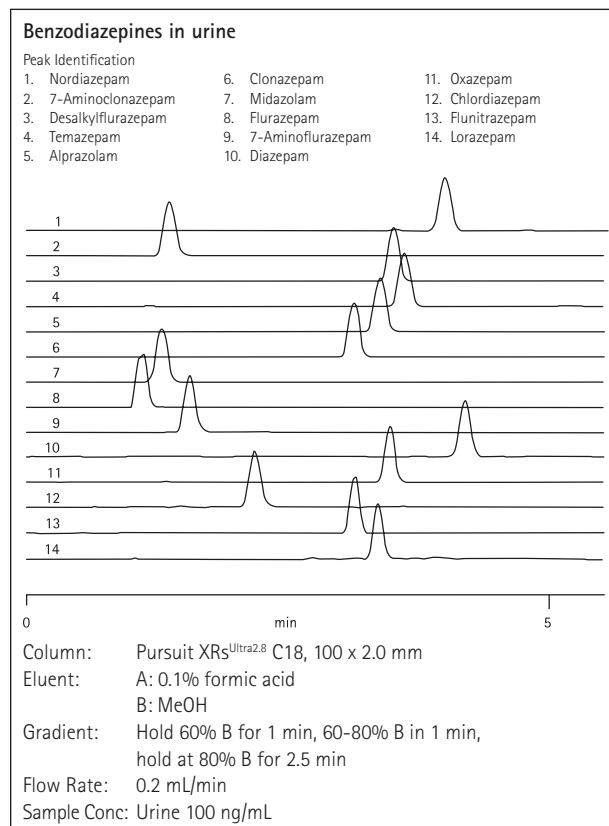
Technical Specifications

All particles spherical; all columns end capped

Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)	pH Range
2.8	100	440	1.1	23.2	3.2	1.5 – 10

Typical Applications

Benzodiazepines in urine



"I had to finally change the column last week. I've done a rough calculation, and the number of injections on the column is approx 9000 – 10,000, which is pretty impressive. I started running a test mixture every week, and the retention times and peak shape have certainly not changed during the ten weeks I have been doing this. Needless to say, I've replaced it with more of the same." Adrian Moore, Arrow Therapeutics Ltd.

Ordering Information

ID (mm)	Length (cm)	Part No.
2	3	A7501030X020
	5	A7501050X020
	10	A7501100X020
	15	A7501150X020
3	10	A7501100X030
	15	A7501150X030

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit XRS^{Ultra 2.8} C8: Low Hydrophobicity in a Fast LC Format

- Exceptional ease-of-use
- High efficiency 2.8 µm particles
- Selectivity for polar compounds

Pursuit XRS^{Ultra 2.8} C8 benefits from minimal backpressure in UPLC. The column is highly efficient even on standard HPLC systems. Pursuit XRS^{Ultra 2.8} C8 is your best choice for analyzing mixtures of compounds that exhibit low hydrophobicity or contain positional isomers. It provides excellent resolution for challenging analytes and is the ideal C8 phase for any analytical R&D laboratory. The C8 phase provides shorter run times compared to C18 columns and can take Fast LC one step further.

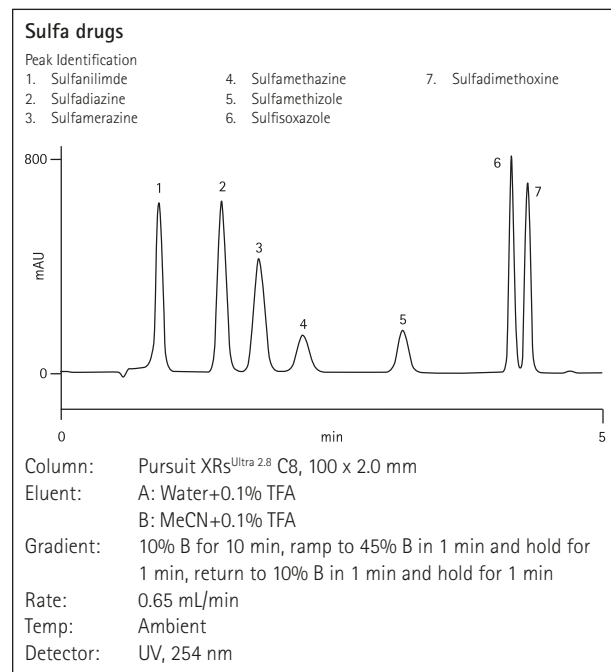
Technical Specifications

All particles spherical; all columns end capped

Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)	pH Range
2.8	100	440	1.1	15.0	3.7	1.5 – 10

Typical Applications

Antibiotics, sulfa drugs, sudan dyes



Ordering Information

ID (mm)	Length (cm)	Part No.
2	3	A7511030X020
	5	A7511050X020
	10	A7511100X020
3	15	A7511150X030

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit XR^{Ultra 2.8} Diphenyl: Optimized for Fast Pi-pi Selectivity

- Unique pi-pi selectivity in a UPLC compatible format
- Easy to use 2.8 µm particle
- Enhanced resolution

For the analysis of aromatic compounds, Pursuit XR^{Ultra 2.8} Diphenyl links the high performance benefits of our 2.8 µm particle technology with the unique selectivity of the diphenyl phase.

As with other members of the Pursuit XR^{Ultra 2.8} line, Pursuit XR^{Ultra 2.8} Diphenyl delivers high efficiency and minimal backpressure for enhanced resolution and unrivaled ease-of-use.

As one of our most unique phases, Pursuit XR^{Ultra 2.8} Diphenyl is ideal for separating compounds containing double bonds or aromatic functional groups. Unlike C18 and C8 phases that rely on a hydrophobic retention mechanism, the diphenyl phase separates analytes based primarily on differences in their pi-electron structure.

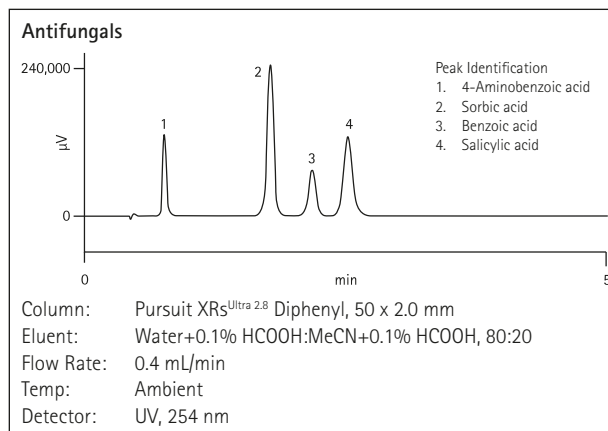
Technical Specifications

All particles spherical; all columns end capped

Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)	pH Range
2.8	100	440	1.1	14.6	2.6	1.5 – 8

Typical Applications

Antifungal compounds



Ordering Information

ID (mm)	Length (cm)	Part No.
2	3	A7521030X020
	5	A7521050X020
	10	A7521100X020

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit UPS^{2.4} C18: For High Viscosity Solvent Applications

- Maximum resolution for demanding applications
- Faster separations for high throughput
- Reduced backpressure for superior ease-of-use

Pursuit UPS^{2.4} columns are designed to provide maximum resolution for high viscosity solvent separations. The 2.4 μm particles deliver heightened efficiency and speed nearing that of sub 2 μm particles while avoiding the troublesome backpressure limitations. Method migration to greener, higher viscosity solvents on today's ultra-high pressure systems is facilitated by the 2.4 μm particle. The resulting ease-of-use means improved column lifetime, lower instrument downtime and higher productivity.

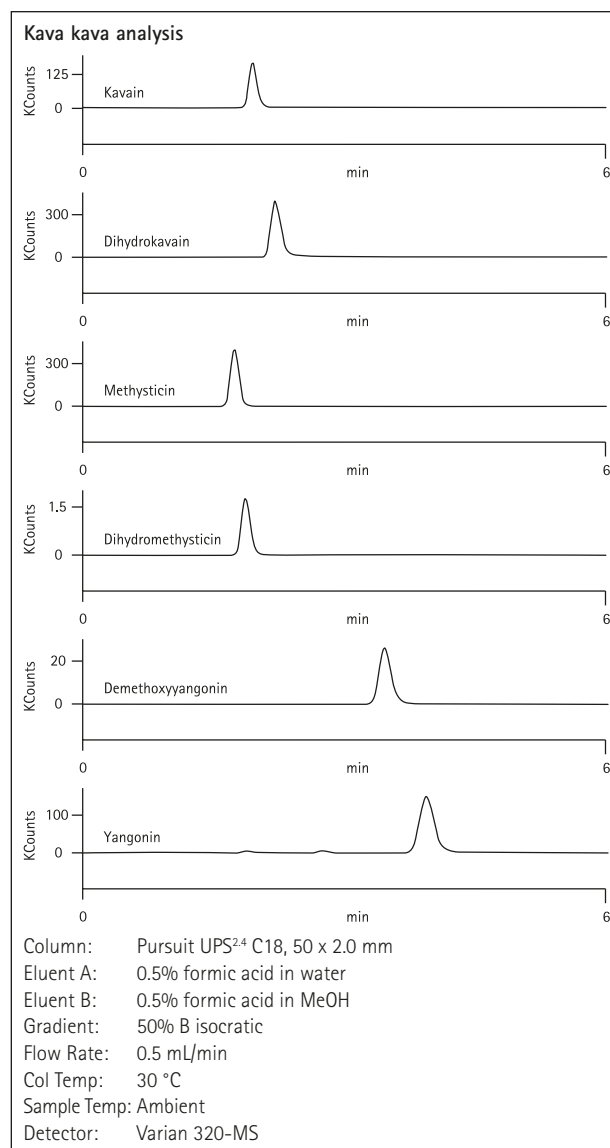
Technical Specifications

End capped

Particle Size (μm)	Pore Size (\AA)	Surface Area (m^2/g)	Pore Volume (cm^3/g)	Carbon Load (%)	Ligand Coverage ($\mu\text{mol}/\text{m}^2$)	pH Range
2.4	100	350	0.9	21.0	2.5	1.5 – 10

Typical Applications

Trace level confirmation by tandem LC/MS, anthocyanidins, coumarins, explosives, diuretics



Ordering Information

ID (mm)	Length (cm)	Part No.
2	3	A8100030X020H
	5	A8100050X020H
	10	A8100100X020H
3	5	A8100050X030H
	10	A8100100X030H

Check our Web site for additional chemistries and column dimensions as they become available.

See Also

- Pursuit XRs^{Ultra}, page 220



Pursuit™ HPLC Columns

Pursuit C18: Excellent Chromatographic Performance Under any Conditions

- Universal applicability reduces costs
- Low secondary activity improves chromatography
- Fast separations save time

The ultra-high purity silica, extensive end capping, and high bonded phase density of Pursuit C18 are key to its unsurpassed performance in reverse phase separations. From the fundamental particle to the bonding technology, Pursuit C18 was designed to show minimal metal and silanol activity. The resulting 'symmetrical' peak shapes and wide pH range make Pursuit C18 ideal for the majority of reverse phase applications.

The 200Å Pursuit pore structure combined with the high phase density of the Pursuit C18 bonding allows for fast separations, while maintaining outstanding hydrophobic selectivity.

Technical Specifications

All particles spherical; all columns end capped

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5, 10	200	200	1.1	12.9	3.5	1.5 – 10

Ordering Information

Pursuit C18

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2	2	3	A3001020X020
	2	5	A3000020X020
	3	3	A3001030X020
	3	5	A3000030X020
	5	3	A3001050X020
	5	5	A3000050X020
	10	3	A3001100X020
	10	5	A3000100X020
	15	3	A3001150X020
	15	5	A3000150X020
	25	3	A3001250X020
	25	5	A3000250X020
3	5	3	A3001050X030
	10	3	A3001100X030
	10	5	A3000100X030
	15	3	A3001150X030
	15	5	A3000150X030
	25	3	A3001250X030
	25	5	A3000250X030

Typical Applications

Vitamins, acidic compounds, β-blockers

Ordering Information

Pursuit C18 continued

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
3.9/4	12.5	5	A3000125X040
	15	5	A3000150X039
	25	5	A3000250X040
	30	5	A3000300X039
	30	10	A3002300X039
4.6	3	3	A3001030X046
	3	5	A3000030X046
	5	3	A3001050X046
	5	5	A3000050X046
	10	3	A3001100X046
	10	5	A3000100X046
	10	10	A3002100X046
	15	3	A3001150X046
	15	5	A3000150X046
	15	10	A3002150X046
	25	3	A3001250X046
	25	5	A3000250X046
	25	10	A3002250X046
10	15	5	A3000150X100
	15	10	A3002150X100
	25	5	A3000250X100
	25	10	A3002250X100
21.2	15	5	A3000150X212
	15	10	A3002150X212
	25	5	A3000250X212
	25	10	A3002250X212
50	25	10	A3002250X500

For additional dimensions, and appropriate guard columns please visit www.varianinc.com

Pursuit C18 is also available in narrow bore capillary columns, ChromSep modular hardware and Dynamax™ axial compression hardware.

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260



Pursuit™ HPLC Columns

Pursuit C8: Reduced Retention for Faster Separations

- Faster separations to increase productivity
- Enhanced selectivity
- Improved peak symmetry for better resolution

Pursuit C8 is designed to be less hydrophobic than Pursuit C18 and allow for faster separations of the majority of compounds. When the general selectivity of a C18 phase is desired, but the resolution of a critical pair needs improving, often C8 with its subtle polar characteristics can provide additional selectivity and enhance separations. As with all Pursuit phases, through the combination of high purity silica with a high ligand density approach, Pursuit C8 delivers exceptional peak shape for reproducible quantitation.

Pursuit C8 is also available in narrow bore capillary columns, ChromSep modular hardware and Dynamax™ axial compression hardware.

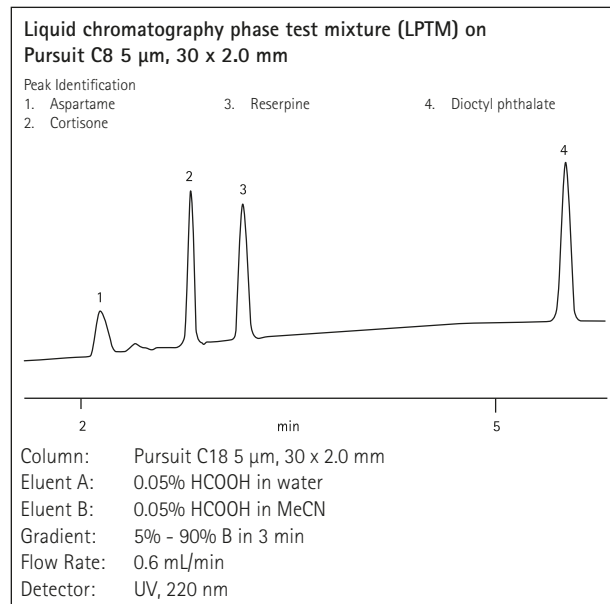
Technical Specifications

All particles spherical; all columns end capped

Particle Size (μm)	Pore Size (Å)	Surface Area (m²/g)	Pore Volume (cm³/g)	Carbon Load (%)	Ligand Coverage (μmol/m²)	pH Range
3, 5, 10	200	200	1.1	7.4	3.8	1.5 – 10

Typical Applications

Melamine



Ordering Information

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2.0	3	3	A3031030X020
	5	3	A3031050X020
	5	5	A3030050X020
	10	3	A3031100X020
	10	5	A3030100X020
	15	3	A3031150X020
	15	5	A3030150X020
	15	5	A3030050X046
4.6	10	3	A3031100X046
	10	5	A3030100X046
	10	10	A3032100X046
	15	3	A3031150X046
	15	5	A3030150X046
	15	10	A3032150X046
	25	3	A3031250X046
	25	5	A3030250X046
10.0	25	10	A3032250X046
	25	5	A3030250X100
	25	10	A3032250X100
21.2	25	10	A3032250X212
50.0	25	10	A3032250X500

For additional dimensions, and appropriate guard columns please visit www.varianinc.com



Pursuit™ HPLC Columns

Pursuit Diphenyl: Superior Selectivity and Resolution for Unsaturated Compounds

- Unique pi-pi separation mechanism enhances selectivity
- Fast separations improve productivity
- Improved peak symmetry delivers accurate quantification

Pursuit Diphenyl is ideal for separating compounds containing double bonds or aromatic functional groups. Unlike C18 based phases, which rely primarily on a hydrophobic retention mechanism, Pursuit Diphenyl separates analytes based on differences in their pi-electron structure. The result is a column with complementary selectivity to C18; one which should be the first choice for separations difficult to achieve on straight chain reverse phase columns.

Because of its unique bonded ligand, Pursuit Diphenyl shows significant reduction in the retention of unsaturated compounds. This leads to faster separations, higher throughput, reduced solvent use, and higher productivity, making the Pursuit Diphenyl phase ideal for the high throughput environment.

Additionally, the high bonded phase density and surface coverage of Pursuit Diphenyl provides improved peak shape and exceptional stability from pH 1.5 to 8.0.

Pursuit Diphenyl is also available in narrow bore capillary columns, ChromSep modular hardware and Dynamax™ axial compression hardware.

Technical Specifications

All particles spherical; all columns end capped

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5, 10	200	200	1.1	7.3	2.8	1.5 – 8

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260

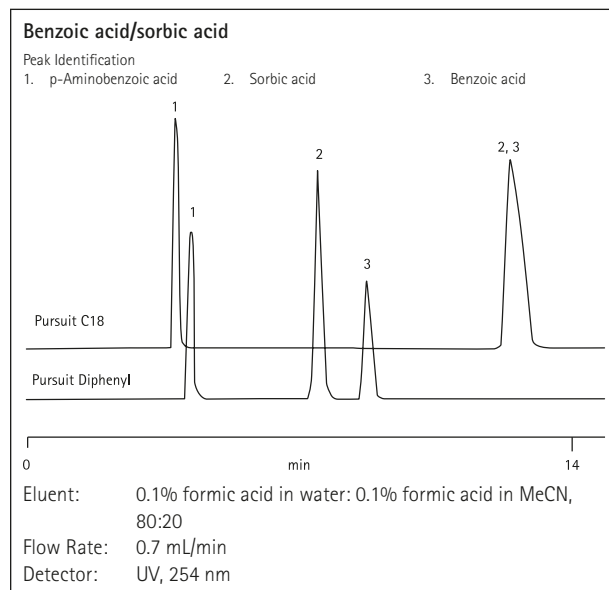
Ordering Information

Pursuit Diphenyl

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2	2	3	A3041020X020
	3	3	A3041030X020
	3	5	A3040030X020
	5	3	A3041050X020
	5	5	A3040050X020
	10	3	A3041100X020

Typical Applications

Antibacterials, analgesics



Ordering Information

Pursuit Diphenyl continued

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2.0	10	5	A3040100X020
	15	3	A3041150X020
	15	5	A3040150X020
	20	3	A3041200X020
	25	3	A3041250X020
	25	5	A3040250X020
3.0	5	3	A3041050X030
	10	3	A3041100X030
	15	3	A3041150X030
	15	5	A3040150X030
	25	5	A3040250X030
	25	5	A3040250X030
4.6	5	3	A3041050X046
	5	5	A3040050X046
	10	3	A3041100X046
	10	5	A3040100X046
	15	3	A3041150X046
	15	5	A3040150X046
	25	3	A3041250X046
	25	5	A3040250X046
	25	5	A3040250X046
	25	5	A3040250X046
21.2	10	5	A3040100X212

For additional dimensions, and appropriate guard columns please visit www.varianinc.com



Pursuit™ HPLC Columns

Pursuit PFP: For Dipole Based Polar Separations

- Unique fluorine based selectivity
- Powerful resolution of positional isomers and halogenated compounds
- High aqueous compatibility

The pentafluorophenyl ligand of Pursuit PFP provides an orthogonal separation mechanism to traditional reverse phase columns. By specifically targeting many polar retention mechanisms, Pursuit PFP can separate analytes based on small differences in structure, substitution, and steric access to polar moieties. The resulting selectivity for positional isomers, halogenated compounds, and polar analytes is particularly useful in the analysis of complex mixtures, and small molecule pharmaceuticals.

The 200Å pore structure of Pursuit PFP is particularly resistant to de-wetting phenomena or phase collapse. This, together with the polar retention mechanisms of PFP, allows the column to be used in high aqueous conditions, conditions ideal for the retention of highly polar analytes.

Technical Specifications

All particles spherical; all columns end capped

Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)	pH Range
3, 5	200	200	1.1	6.3	3.2	3 – 7.5

Ordering Information

Pursuit PFP

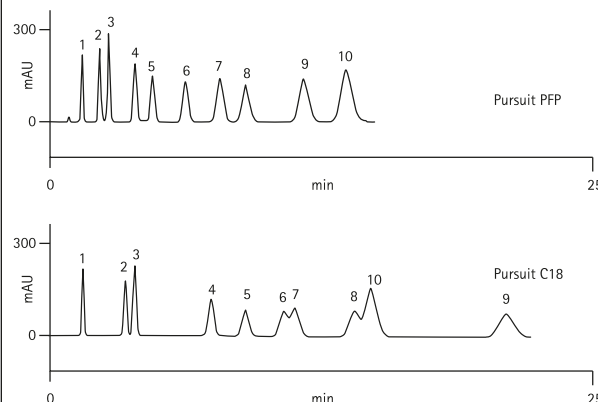
ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2	2	3	A3051020X020
	2	5	A3050020X020
	3	3	A3051030X020
	3	5	A3050030X020
	5	3	A3051050X020
	5	5	A3050050X020
	10	3	A3051100X020
	10	5	A3050100X020
	15	3	A3051150X020
	15	5	A3050150X020

Typical Applications

Small pharmaceutical molecules

Adrenocorticosteroids on Pursuit PFP and Pursuit C18

Peak Identification		
1. Triamcinolone	5. Corticosterone	9. Cortisone acetate
2. Prednisolone	6. Beclomethasone	10. Flucinolone acetonide
3. Cortisone	7. Prednisolone acetate	
4. Methylprednisolone	8. Triamcinolone acetonide	



Column: As indicated above
 Eluent: MeCN:water, 22.5:77.5
 Flow Rate: 1.5 mL/min
 Temp: Ambient
 Detector: UV, 240 nm

Ordering Information

Pursuit PFP continued

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
3.0	5	3	A3051050X030
	10	3	A3051100X030
	10	5	A3050100X030
	15	3	A3051150X030
	15	5	A3050150X030
	25	5	A3050250X030
4.6	5	3	A3051050X046
	5	5	A3050050X046
	10	3	A3051100X046
	10	5	A3050100X046
	15	3	A3051150X046
	15	5	A3050150X046
10.0	25	3	A3051250X046
	25	5	A3050250X046
	25	5	A3050250X100
	25	5	A3050250X100
21.2	15	5	A3050150X212
	25	5	A3050250X212

For additional dimensions, and appropriate guard columns please visit www.varianinc.com



Pursuit™ HPLC Columns

Pursuit PAH: Rapid Resolution of PAHs

- Fast analysis times for higher throughput
- Complete resolution of PAHs for easy integration
- Reproducible columns for rugged method development

The Pursuit PAH line is based on a specially tailored, polymerically bonded C18 phase designed for the complete resolution of polycyclic aromatic hydrocarbons (PAHs). Using the 100 x 4.6 mm Pursuit 3 µm PAH column, all 16 components of the PAH mixture defined by Environmental Protection Agency (EPA) method 610 can be fully resolved in less than ten minutes. Separation of critical pairs is maintained, while run times are reduced by as much as a factor of two.

Technical Specifications

End capped

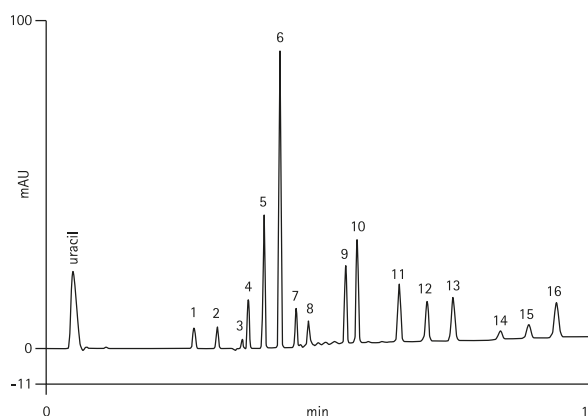
Particle Size (µm)	Pore Size (Å)	Surface Area (m²/g)	Pore Volume (cm³/g)	Carbon Load (%)	Ligand Coverage (µmol/m²)	pH Range
3, 5	200	200	1.1			1.5–10

Typical Applications

PAHs in environmental samples

Polycyclic aromatic hydrocarbons according to EPA Method 610

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



Sample: NIST 16473 Standard
 Column: Pursuit PAH 3 µm, 100 x 4.6 mm
 Eluent: A: ACN:water, 25:75
 B: ACN
 Flow Rate: 2.0 mL/min
 Temp: 25 °C
 Detector: UV, 254 nm

Ordering Information

Pursuit PAH columns

ID (mm)	Length (cm)	Particle Size (spherical) (µm)	Part No.
2.0	10	3	A7001100X020
3.0	10	3	A7001100X030
4.0	10	3	A7001100X046
	15	5	A7000150X046
	25	5	A7000250X046

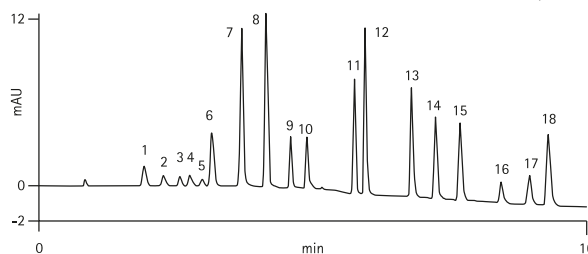
Pursuit PAH ChromSep modular hardware

ID (mm)	Length (cm)	Particle Size (spherical) (µm)	Part No.
3.0	10	5	A7000100C030
4.6	10	3	A7001100C046
	15	3	A7001150C046
	15	5	A7000150C046
	25	5	A7000250C046

For appropriate guard columns and other ChromSep hardware please visit www.varianinc.com

Polycyclic aromatic hydrocarbons according to Florida Administrative Code (Pre 9/97) 62.770

1. Naphthalene	7. Phenanthrene	13. Benzo[b]fluoranthene
2. Acenaphthylene	8. Anthracene	14. Benzo[k]fluoranthene
3. 1-Methylnaphthalene	9. Fluoranthene	15. Benzo[a]pyrene
4. 2-Methylnaphthalene	10. Pyrene	16. Dibenzo[a,h]anthracene
5. Acenaphthene	11. Benzo[a]anthracene	17. Benzo[ghi]perylene
6. Fluorene	12. Chrysene	18. Indeno[1,2,3-cd]pyrene



Sample: PAH test mix
 Column: Pursuit PAH 3 µm, 100 x 4.6 mm
 Temp: 25 °C
 Detector: UV, 254 nm

See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260

Polaris™ HPLC Columns

Advanced Polar Phase Technology for Drug Development

The Polaris line of HPLC columns demonstrates Varian's commitment to solving real-life problems in selectivity and throughput with advanced technology. In areas like drug discovery where target compounds are increasingly polar, it is critical to have a reverse phase column that performs well under aqueous conditions. Retention is critical, but cannot come with troublesome secondary interactions. Likewise, phase collapse and shifting retention times need to be avoided. The answer is our Polaris line of polar modified columns.

From the collapse resistant pore structure of our base silica, to the "wettability" engineered into the bonded phases, Polaris columns have been designed for high aqueous conditions. The combination of Varian's high phase density bonding, ultra pure silica, and silanol shielding leads to excellent peak shape among polar modified columns.

As a family, Polaris offers a variety of polar modifications in both C18 and C8 chemistries.

Technical Specifications

All particles spherical, all columns end capped

Phase	Phase Type	Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)
Polaris C18-A	General polar selectivity	3, 5, 10	180	200	1.1	13.8	3.9
Polaris C18-Ether	H-bond accepting	3, 5	180	200	1.1	12.1	3.3
Polaris Amide C18		3, 5	200	200	1.1	14.7	4.4
Polaris C8-A	General polar selectivity	3, 5	180	200	1.1	7.4	4.8
Polaris C8-Ether	H-bond accepting	3, 5	180	200	1.1	7.1	4.5





Polaris™ HPLC Columns

Polaris C18-A and Polaris C8-A: For all Phases of Drug Development

- Universal stationary phases for maximum flexibility
- Ideal for polar acids, polar bases, and non-polar components
- High aqueous compatibility

Polaris C18-A and C8-A are polar modified phases specially designed for high throughput and LC/MS applications in drug discovery, drug metabolism, and analytical research and development. Based on 200Å ultra-pure silica, these polar modified phases are bonded with a polar group near the silica surface to deactivate residual silanols. The non-polar interaction from the C18 is supplemented by a unique polar modification, offering general polar selectivity and retention for polar compounds in addition to hydrophobic interactions. Polar modification also helps prevent phase collapse under the high aqueous mobile phase conditions that are often required for polar retention.

Polaris C18-A

Polaris C18-A is the best starting place for separations where the benefits of polar modified columns are desired. The polar modifications of C18-A help it avoid poor peak shape and retention issues in low organic conditions.

Polaris C8-A

Polaris C8-A offers an alternative selectivity to standard C8 phases and has a lower hydrophobicity than Polaris C18-A, making it ideal for polar samples, or faster overall analysis times.

Technical Specifications

C18-A (All particles spherical; all columns end capped)

Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)	pH Range
3, 5, 10	180	200	1.1	13.8	3.9	1.5 – 10

C8-A (All particles spherical; all columns end capped)

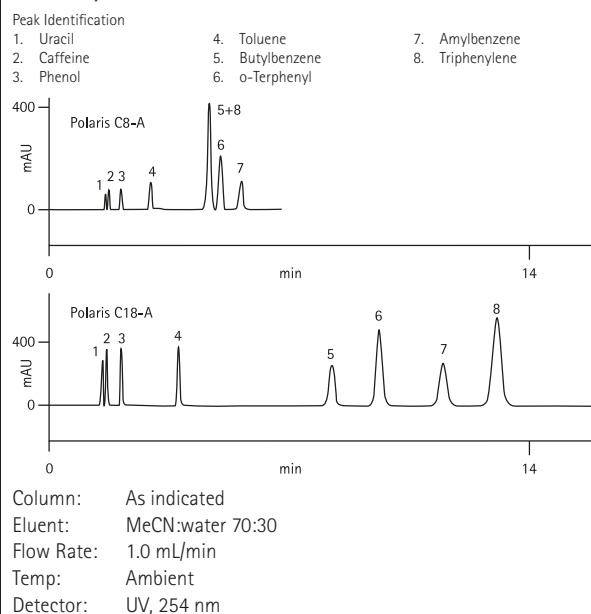
Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (µmol/m ²)	pH Range
3, 5	180	200	1.1	7.4	4.8	1.5 – 10

Typical Applications

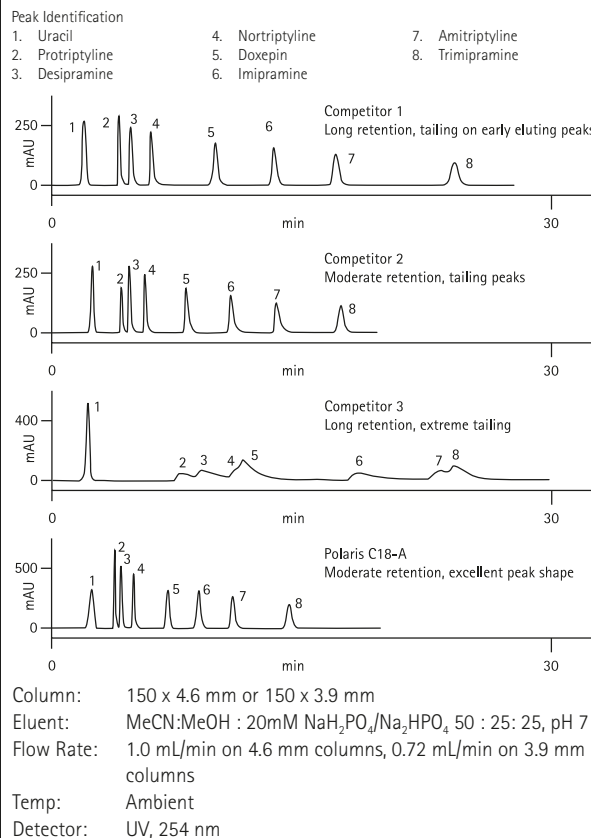
Polaris C18-A: Antidiabetics, sulfa drugs

Polaris C8-A: Fast separation of analgesics

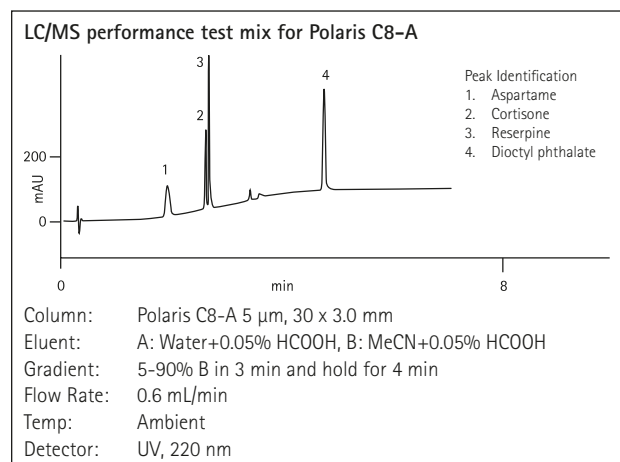
Selectivity test mix for Polaris columns



Polaris balances retention, resolution and base deactivation in the separation of tricyclic antidepressants



Polaris™ HPLC Columns



See Also

- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260

Ordering Information

C18-A

ID (mm)	Length (cm)	Particle size (μ m)	Part No.
2.0	2.0	3	A2001020X020
	2.0	5	A2000020X020
	3.0	3	A2001030X020
	3.0	5	A2000030X020
	5.0	3	A2001050X020
	5.0	5	A2000050X020
	10.0	3	A2001100X020
	10.0	5	A2000100X020
	15.0	3	A2001150X020
	15.0	5	A2000150X020
3.0	25.0	3	A2001250X020
	25.0	5	A2000250X020
	3.0	3	A2001030X030
	5.0	3	A2001050X030
	5.0	5	A2000050X030
	10.0	3	A2001100X030
	10.0	5	A2000100X030
	15.0	3	A2001150X030
	15.0	5	A2000150X030
	20.0	3	A2001200X030
4.0	25.0	3	A2001250X030
	25.0	5	A2000250X030
	15.0	5	A2000150X040
	25.0	5	A2000250X040

Ordering Information

C18-A continued

ID (mm)	Length (cm)	Particle size (μm)	Part No.
4.6	3.0	3	A2001030X046
	3.0	5	A2000030X046
	5.0	3	A2001050X046
	5.0	5	A2000050X046
	7.5	3	A2001075X046
	10.0	3	A2001100X046
	10.0	5	A2000100X046
	15.0	3	A2001150X046
	15.0	5	A2000150X046
	20.0	5	A2000200X046
	25.0	3	A2001250X046
	25.0	5	A2000250X046
	25.0	10	A2002250X046
10.0	25.0	5	A2000250X100
21.2	10.0	5	A2000100X212
	15.0	5	A2000150X212
	25.0	5	A2000250X212
	25.0	10	A2002250X212
30.0	10.0	5	A2000100X300
50.0	25.0	10	A2002250X500
Prospekt Cartridge, 800-series (96/pk)			12281304

For additional dimensions, ChromSep cartridges and appropriate guard columns please visit www.varianinc.com

C8-A

ID (mm)	Length (cm)	Particle Size (μ m)	Part No.
2.0	5.0	3	A2011050X020
	5.0	5	A2010050X020
	15.0	3	A2011150X020
	15.0	5	A2010150X020
	25.0	3	A2011250X020
3.0	3.0	5	A2011030X030
4.0	25.0	3	A2011250X040
4.6	7.5	3	A2011075X046
	10.0	3	A2011100X046
	10.0	5	A2010100X046
	15.0	3	A2011150X046
	15.0	5	A2010150X046
	25.0	5	A2010250X046
	25.0	5	A2010250X212

For additional dimensions please visit www.varianinc.com



Polaris™ HPLC Columns

Polaris C18-Ether and Polaris C8-Ether: For Hydrogen Bond Donating Compounds

- Outstanding peak symmetry
- Increased retention for basic analytes
- Unique selectivity

Polaris Ether modified C18 and C8 columns give additional selectivity for compounds that are hydrogen bond donors. Ether columns offer the same phase collapse resistance and silanol shielding as the rest of the Polaris column line.

Polaris C18-Ether

Polaris C18-Ether offers an alternative selectivity to Polaris C18-A and standard C18 phases, and typically delivers increased retention of polar compounds away from the void volume.

Polaris C8-Ether

Polaris C8-Ether offers an alternative selectivity to Polaris C8-A with particular utility for hydrogen bonding compounds.

Technical Specifications

C18-Ether (All particles spherical; all columns end capped)

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5	200	200	1.1	12.1	3.3	1.5-10

C8-Ether (All particles spherical; all columns end capped)

Particle Size (μm)	Pore Size (Å)	Surface Area (m ² /g)	Pore Volume (cm ³ /g)	Carbon Load (%)	Ligand Coverage (μmol/m ²)	pH Range
3, 5	200	200	1.1	7.1	4.5	1.5 - 10

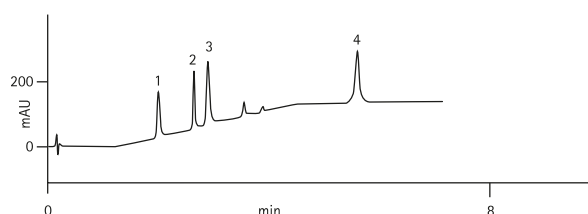
Typical Applications

Polycarboxylic acids, phosphorylated, dephosphorylated peptides

LC/MS performance test mix for Polaris C18-Ether

Peak Identification

1. Aspartame
2. Cortisone
3. Reserpine
4. Dioctyl phthalate

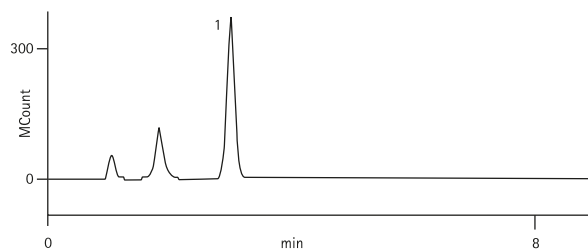


Column: Polaris C18-Ether 5 μm, 30 x 3.0 mm
 Eluent: A: Water+0.05% HCOOH, B: MeCN+0.05% HCOOH
 Gradient: 5-90% B in 3 min and hold for 4 min
 Flow Rate: 0.6 mL/min
 Temp: Ambient
 Detector: UV, 220 nm

Lamotrigine

Peak Identification

1. Lamotrigine



Column: Polaris C18-Ether 5 μm, for LC/MS use 50 or 30 x 2.0 mm
 Eluent: ACN:water, 25 to 90 for 1 min
 Flow Rate: 0.2 mL/min
 Inj Vol: 5 μL, 50% MeOH
 Detector: MS

See Also

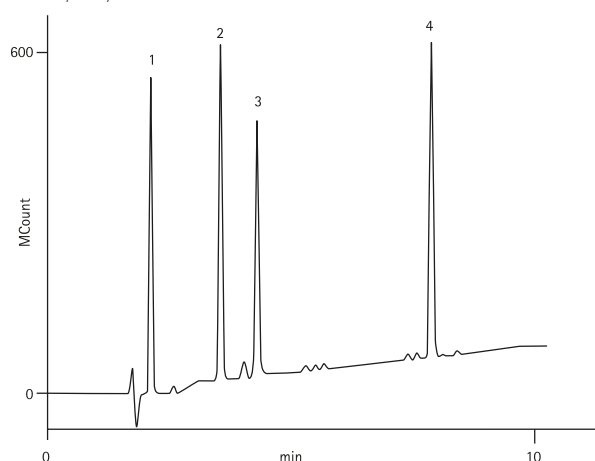
- PEEK™ fittings, reusable and universal, page 279
- Prep columns, scale up with confidence, page 260

Polaris™ HPLC Columns

Analgesics

Peak Identification

1. Acetaminophen
2. Acetyl salicylic acid
3. Salicylic acid
4. Ibuprofen

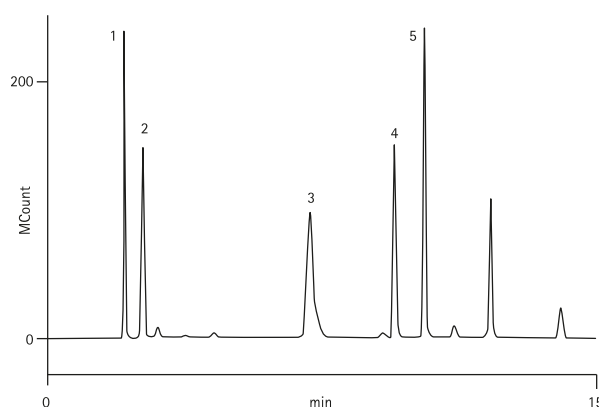


Column: Polaris C8-Ether, 150 x 2.0 mm
 Eluent: Water+0.1% HCOOH:MeCN+0.1% HCOOH
 Gradient: 40 to 90% B in 10 min
 Flow Rate: 1.0 mL/min
 Detector: UV, 220 nm

Water soluble vitamins

Peak Identification

1. Thiamine
2. Niacinamide
3. p-Aminobenzoic acid
4. Folic acid
5. Riboflavin



Column: Polaris C8-Ether, 150 x 2.0 mm
 Eluent: Water+0.1% TFA:MeCN+0.1% TFA
 Gradient: 5% B for 5 min, ramp to 30% B in 7 min and hold for 5 min
 Flow Rate: 1.0 mL/min
 Temp: 40 °C
 Detector: UV, 254 nm

Ordering Information

C18-Ether

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.0	5.0	3	A2021050X020
	5.0	5	A2020050X020
	7.5	3	A2021075X020
	10.0	3	A2021100X020
	15.0	3	A2021150X020
	15.0	5	A2020150X020
	25.0	3	A2021250X020
	25.0	5	A2020250X020
3.0	5.0	3	A2021050X030
	15.0	3	A2021150X030
	15.0	5	A2020150X030
4.0	12.5	3	A2021125X040
4.6	5.0	3	A2021050X046
	5.0	5	A2020050X046
	15.0	5	A2020150X046
	20.0	3	A2021200X046
	25.0	3	A2021250X046
	25.0	5	A2020250X046
	25.0	5	A2020250X100
10.0	5.0	3	A2021050X100
	25.0	5	A2020250X100
21.2	25.0	5	A2020250X212

Ordering Information

C8-Ether

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.0	5.0	3	A2021050X020
	5.0	5	A2020050X020
	7.5	3	A2021075X020
	10.0	3	A2021100X020
	15.0	3	A2021150X020
	15.0	5	A2020150X020
	25.0	3	A2021250X020
	25.0	5	A2020250X020
3.0	5.0	3	A2021050X030
4.0	12.5	3	A2021125X040
4.6	5.0	3	A2021050X046
	15.0	5	A2020150X046
	20.0	3	A2021200X046
	25.0	3	A2021250X046
	25.0	5	A2020250X046
	25.0	5	A2020250X100
10.0	5.0	3	A2021050X100
	25.0	5	A2020250X100
21.2	25.0	5	A2020250X212

For additional dimensions, ChromSep cartridges and appropriate guard columns please visit www.varianinc.com



ChromSep HPLC Column Hardware

ChromSep: Modular Columns, Maximum Flexibility

- Economical format
- Tool-free ease-of-use
- Modular flexibility

The ChromSep system combines simplicity with extraordinary flexibility and considerable savings on column and operating costs. The ChromSep 316 Stainless Steel column-housing hardware is a durable one-time investment. Once you have purchased the complete basic system of a holder, analytical cartridge and guard column, you will only need to replace the cartridges or replacement guard columns, both of which are available in economical packages; 3-pack analytical column replacements and 5-pack guard column replacements for added value.

You can easily replace the column cartridge without the use of tools or the need to re-make the column connections. The ChromSep column's ingenious design allows you to use a guard column without introducing any dead volume. By directly fitting the guard column to the top of the analytical column in the same holder, the analytical performance of the column is fully maintained.

Unlike other modular column systems, ChromSep is extremely flexible. Column housings are available in lengths of 10, 30, 50, 100, 150 and 250 mm, and cartridges are available in various IDs ranging from 2 to 4.6 mm. You can use any combination of cartridge columns to match the column length with the separation you need and minimize your analysis time.

Ordering Information

Pursuit™ C18, Selected Pursuit ChromSep complete cartridge systems

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2.0	5	3	A3001050C020
	10	3	A3001100C020
	10	5	A3000100C020
	15	3	A3001150C020
	15	5	A3000150C020
	25	3	A3001250C020
3.0	25	5	A3000250C020
	10	3	A3001100C030
	10	5	A3000100C030
	15	3	A3001150C030
	15	5	A3000150C030
	25	5	A3000250C030
4.6	5	3	A3001050C046
	10	3	A3001100C046
	10	5	A3000100C046
	15	3	A3001150C046
	15	5	A3000150C046
	25	3	A3001250C046
	25	5	A3000250C046

Pursuit C8, Selected Pursuit ChromSep complete cartridge systems

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
2.0	15	5	A3030150C020
4.6	10	3	A3031100C046
	10	5	A3030100C046
	15	3	A3031150C046
	15	5	A3030150C046
	25	3	A3031250C046
	25	5	A3031250C046

Pursuit PAH, Selected Pursuit ChromSep complete cartridge systems

ID (mm)	Length (cm)	Particle Size (μm)	Part No.
3.0	10	5	A7000100C030
4.6	10	3	A7001100C046
	15	3	A7001150C046
	15	5	A7000150C046
	25	5	A7000250C046



ChromSep HPLC Column Hardware

Ordering Information

Pursuit™ C18, Selected Pursuit ChromSep replacement cartridges

ID (mm)	Length (cm)	Particle Size (µm)	Quantity (pk)	Part No.
3.0	10	3	1	A3001100R030
	10	5	1	A3000100R030
	10	3	3	A3001100T030
	10	5	3	A3000100T030
	15	3	1	A3001150R030
	15	5	1	A3000150R030
	15	3	3	A3001150T030
	15	5	3	A3000150T030
4.6	5	3	1	A3001050R046
	10	3	3	A3001050T046
	15	5	1	A3000150R046
	15	5	3	A3000150T046

Pursuit C8, Selected Pursuit ChromSep replacement cartridges

ID (mm)	Length (cm)	Particle Size (µm)	Quantity (pk)	Part No.
2.0	5	3	1	A3031050R020
	5	3	3	A3031050T020
4.6	15	3	1	A3031150R046
	15	3	3	A3031150T046
	15	5	1	A3030150R046
	15	5	3	A3030150T046

Pursuit PAH, Selected Pursuit ChromSep replacement cartridges

ID (mm)	Length (cm)	Particle Size (µm)	Quantity (pk)	Part No.
3.0	10	3	1	A7001100R030
	10	3	3	A7001100T030
	10	5	1	A7000100R030
	10	5	3	A7000100T030
4.6	10	3	1	A7001100R046
	10	3	3	A7001100T046
	15	3	1	A7001150R046
	15	3	3	A7001150T046
	15	5	1	A7000150R046
	15	5	3	A7000150T046
	25	5	1	A7000250R046
	25	5	3	A7000250T046

Ordering Information

Polaris™ C18, Selected Polaris ChromSep complete cartridge systems

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.0	3	3	A2001030C020
	5	3	A2001050C020
	10	3	A2001100C020
	10	5	A2000100C020
	15	3	A2001150C020
3.0	10	5	A2000100C030
	25	3	A2001250C030
	25	5	A2000250C030
4.6	5	5	A2000050C046
	10	5	A2000100C046
	15	3	A2001150C046
	15	5	A2000150C046
	25	3	A2001250C046
	25	5	A2000250C046

Polaris C18, Selected Polaris ChromSep replacement cartridges

ID (mm)	Length (cm)	Particle Size (µm)	Quantity (pk)	Part No.
2.0	5	3	1	A2001050R020
	5	3	3	A2001050T020
	15	3	1	A2001150R020
	15	3	3	A2001150T020
3.0	10	3	1	A2001100R030
	10	3	3	A2001100T030
	10	5	1	A2000100R030
	10	5	3	A2000100T030
	15	5	1	A2000150R030
	15	5	3	A2000150T030
4.6	10	3	1	A2001100R046
	10	3	3	A2001100T046
	10	5	1	A2000100R046
	10	5	3	A2000100T046
	15	3	1	A2001150R046
	15	3	3	A2001150T046
	15	5	1	A2000150R046
	15	5	3	A2000150T046
	25	5	1	A2000250R046
	25	5	3	A2000250T046

For the full line of ChromSep parts and dimensions, including guard, glass and PEEK™ columns please visit www.varianinc.com or contact helpdesk.us@varianinc.com or helpdesk.eu@varianinc.com.

PLRP-S HPLC Columns

The Most Complete Range of Rigid PS/DVB Materials for HPLC Applications

These advanced columns contain durable and resilient particles that deliver reproducible chromatography over longer column lifetimes. They are the most thermally and chemically stable of all the polymeric HPLC materials. PLRP-S can be used in the bioscience, chemical, clinical research, energy, environmental, food and agriculture, material science, and pharmaceutical industries. It complies with the USP L21 designation.

The PLRP-S family of products consists of a range of pore sizes and particle sizes, all with identical chemistry and fundamental adsorptive characteristics. The particles are inherently hydrophobic so there is no bonded phase, alkyl ligand required for reverse phase separations. This gives a highly reproducible material that is free from silanols and heavy metal ions. Within the extensive product range are columns suitable for nano/capillary separations, including both bottom up and top down proteomics, analytical separations, and preparative purifications. In addition, process columns can be packed with the bulk media.

Technical Specifications

Characteristics	
pH range	1-14
Buffer content	Unlimited
Organic modifier	1-100%
Temperature (max)	200 °C
Pressure (max) 5-8 µm	3000 psi (210 bar)
Pressure (max) 3 µm	4000 psi (300 bar)



Illustration of Extended Column Lifetime

The comparison of column test certificates below shows the continued performance of a PLRP-S 300Å 8 µm column after 5 years' continuous daily use.

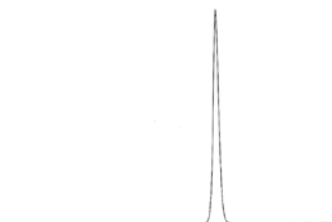
Original test certificate

Serial No: 8M-RPS3-66-27
Particle Size (µm): 8
Pore Type: 300Å
Length/I.D. (mm): 150 x 4.6

Eluent: 7:1 ACN/Water
Flow Rate: (ml/min): 1.0
Col. Pressure (bar): 27
Detector: UV, 254nm
Test Material: Phenol
Inj. Vol. (µl): 0.5

Plates/metre(1/2ht): 43775
Plates/metre (5.σ): 33106
Symmetry (σ 10%): 1.10
Elution Time (sec): 111.2
Width (1/2ht; sec): 3.23
Width (5σ; sec): 7.89

SM



Column: PLRP-S 300Å 8µm
Part No: 1512-3801

Column Test Chromatogram

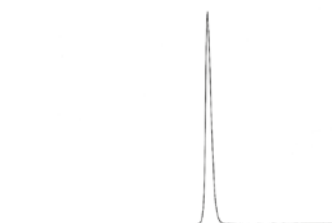
Column Re-test

Serial No: 8M-RPS3-66-27
Particle Size (µm): 8
Pore Type: 300Å
Length/I.D. (mm): 150 x 4.6

Eluent: 7:1 ACN/Water
Flow Rate: (ml/min): 1.0
Col. Pressure (bar): 26
Detector: UV, 254nm
Test Material: Phenol
Inj. Vol. (µl): 0.5

Plates/metre(1/2ht): 41499
Plates/metre (5.σ): 30585
Symmetry (σ 10%): 1.19
Elution Time (sec): 107.6
Width (1/2ht; sec): 3.21
Width (5σ; sec): 7.93

AFC



Column: PLRP-S 300Å 8µm
Part No: 1512-3801

Column Test Chromatogram

Courtesy: Dr G Bloomberg, Department of Biochemistry, Medical School, University of Bristol, UK

PLRP-S HPLC Columns

Scalability

Pore Size (Å)	Nominal Particle Size (µm)							
	3	5	8	10	10-15	15-20	30	50
100 300	Nano Capillary, Micro Analytical	Analytical	Analytical Prep	Prep Process	Prep Process	Prep Process		Low Pressure (also 200Å)
1000 4000		Nano Capillary Micro Analytical	Analytical	Prep Process			Prep Process	1000Å
	Nano (ng)			pH 1-14			Production (kg)	

Ordering Information

PLRP-S 100Å

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.1	5	3	PL1912-1300
	5	5	PL1912-1500
	15	3	PL1912-3300
	15	5	PL1912-3500
	25	5	PL1912-5500
4.6	5	3	PL1512-1300
	5	5	PL1512-1500
	15	3	PL1512-3300
	15	5	PL1111-3500
	15	8	PL1512-3800
	25	5	PL1512-5500
	25	8	PL1512-5800

PLRP-S 300Å

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.1	5	3	PL1912-1301
	5	5	PL1912-1501
	5	8	PL1912-1801
	15	3	PL1912-3301
	15	5	PL1912-3501
	15	8	PL1912-3801
	25	5	PL1912-5501
	25	8	PL1912-5801
4.6	5	3	PL1512-1301
	5	5	PL1512-1501
	5	8	PL1512-1801
	15	3	PL1512-3301
	15	5	PL1512-3501
	15	8	PL1512-3801
	25	5	PL1512-5501
	25	8	PL1512-5801

Ordering Information

PLRP-S 1000Å

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.1	5	5	PL1912-1502
	5	8	PL1912-1802
	15	8	PL1912-3802
4.6	5	5	PL1512-1502
	5	8	PL1512-1802
	15	8	PL1512-3802
	25	8	PL1512-5802

PLRP-S 4000Å

ID (mm)	Length (cm)	Particle Size (µm)	Part No.
2.1	5	5	PL1912-1503
	5	8	PL1912-1803
	15	8	PL1912-3803
4.6	5	5	PL1512-1503
	5	8	PL1512-1803
	15	8	PL1512-3803

Description	Part No.
PLRP-S Guard Cartridges for 5 x 3 mm (2/pk)	PL1612-1801
Guard Cartridge Holder	PL1310-0016

For prep column information please see page 265.

See Also

- Bulk media, high efficiency purification, page 263



PLRP-S HPLC Columns

PLRP-S: For Small Molecules

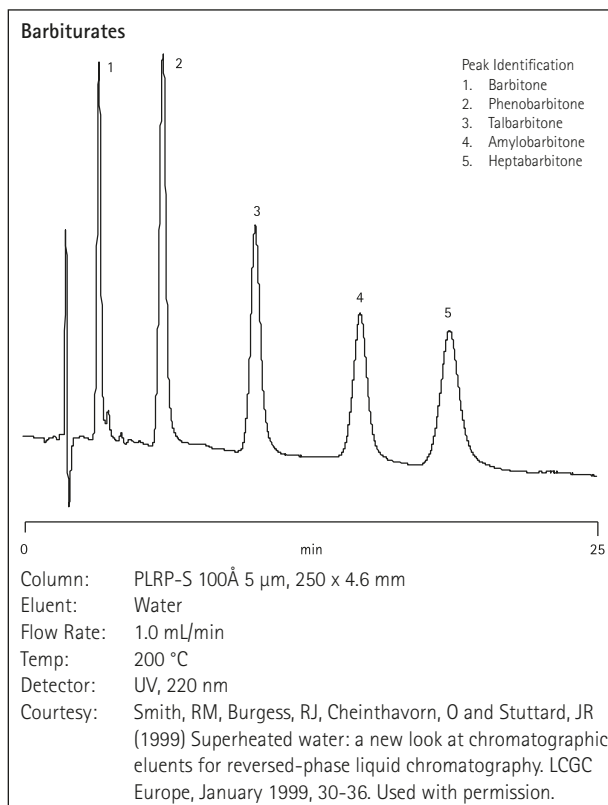
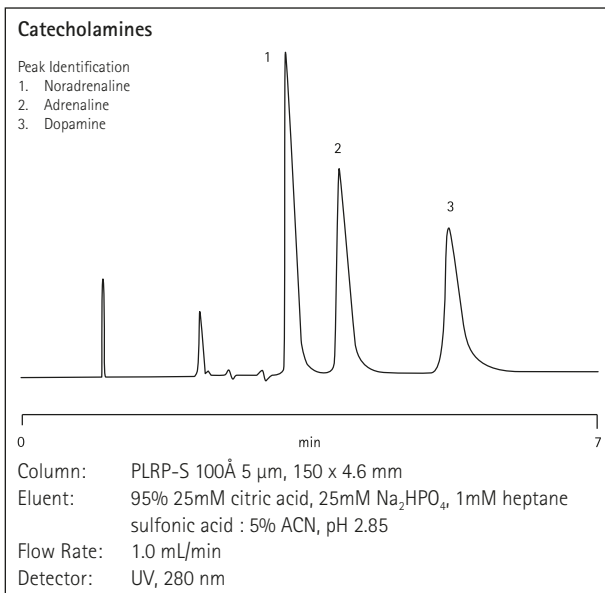
- High thermal stability widens selectivity options
- High pH stability increases productivity
- Covers a wide range of reverse phase methods for maximum utility

The small pore PLRP-S 100Å material has a high surface area of 550 m²/g and is extremely retentive for small molecules. Its hydrophobic surface and high surface area make it an ideal matrix for ion pair reverse phase separations. By exploiting both the hydrophobic nature of the surface and the potential for pi-pi bond interactions, structurally similar compounds can be separated.

Excellent stability across the full pH range enables the use of extremes of pH to optimize resolution and increase loading. As the PLRP-S is a highly cross-linked copolymer of styrene and divinylbenzene, there is no thermal instability up to 200 °C. The column is therefore ideally suited for use at elevated temperature or for temperature gradient analysis, and enables temperature to be used as an additional variable to alter selectivity. There is no change in selectivity due to decomposition of either the particle or stripping of a bonded phase during use. PLRP-S can be used for isocratic, gradient, ion suppression and ion pair RP-HPLC.

References

- Giegold S, Holzhauser M, Kiffmeyer T, Tuerk J, Teutenberg T, Rosenhagen M, Hennies D, Hoppe-Tichy, T and Wenclawiak, B (2008) Influence of the stationary phase on the stability of thalidomide and comparison of different methods for the quantification of thalidomide in tablets using high-temperature liquid chromatography. *J. Pharm. Biomed. Anal.*, 46, 625-630.
- Paeson, J, Roets, E and Hoogmartens, J (1998) Study of the stability of erythromycins in a hydrophilic creme basis by liquid chromatography. *J. Pharma. and Biomed. Anal.*, 17 53-56.
- Pawlowski, TM and Poole, CF (1999) Solvation characteristics of pressurized hot water and its use in chromatography. *Anal. Commun.*, 36 (3), 71-75.
- Truscott, JB, Jones, P, Fairman, BE & Evans, EH (2001) Determination of actinides in environmental and biological samples using high-performance chelation ion chromatography coupled to sector-field inductively coupled plasma mass spectrometry. *J. Chromatog. A*, 928, 91-98.



PLRP-S HPLC Columns

PLRP-S: Pharmaceutical Applications

- High chemical stability extends the useful pH range for wider applicability
- Wide array of pore sizes broadens the application range
- Stringent manufacture to ISO delivers reproducible results

The PLRP-S family has a range of pore sizes with specifications designed to match the USP L21 materials in methods for the analysis of pharmaceuticals. The product range includes both 100Å and 1000Å pore sizes, which are specified in the USP methods, for example the tetracycline class of antibiotics and erythromycin. A range of pore sizes covers different solutes and sample matrix types.

The manufacturing process for the PLRP-S media includes extremely rigorous washing steps to ensure that the media is clean and free of leachables or extractables. More stable baselines and lower levels of detection are therefore achieved.

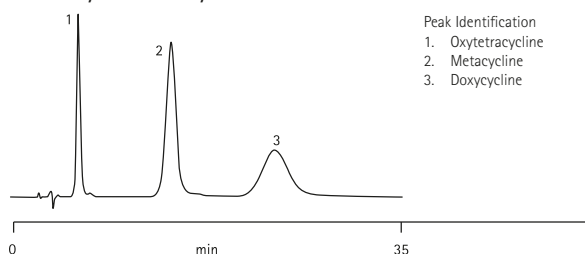
In bioanalysis, pharmacokinetic and bioequivalence studies, compounds may have limited stability and resolution from closely related degradation products, and so internal standards are needed. As the PLRP-S material is polymeric there are no residual silanols or active groups that could reduce solute recovery. The chemical stability increases options for method development to improve resolution.

References

Reyns, T, De Baere, S, Croubles, S and De Backer, P (2006) Determination of clavulanic acid in calf plasma by liquid chromatography tandem mass spectrometry. *J. Mass Spectrom.*, 41, 1414-1420.

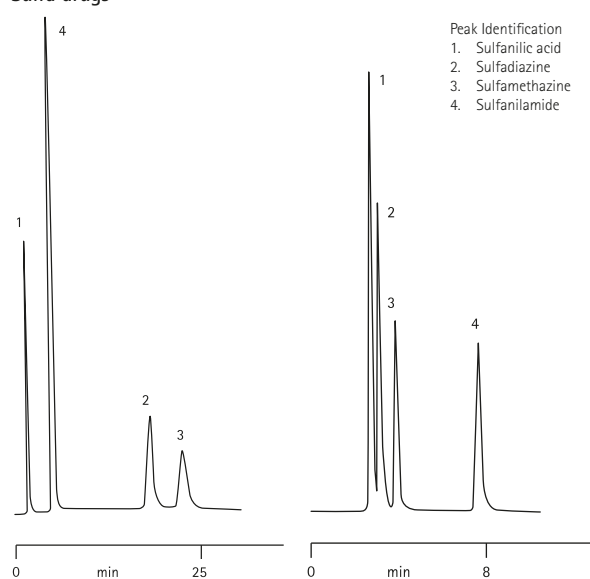
De Baere, S and De Backer, P (2007) Quantitative determination of amoxicillin in animal feeds using liquid chromatography with tandem mass spectrometric detectors. *Analytica Chimica Acta*, 586, 319-325.

USP analysis of tetracyclines



Sample: 20 mg tetracycline in 25 mL 0.01M HCl
 Column: PLRP-S 100Å 5 µm, 250 x 4.6 mm
 Eluent: 60 g 2-Methyl-2-propanol + 200 mL UHP water + 400 mL 0.2M K₂HPO₄ at pH 8 + 50 mL 10 g/L tetrabutylammonium hydrogen sulphate at pH 8 + 10 mL 40 g/L sodium edetate at pH 8, made up to 1000 mL with water (adjust pH with dilute NaOH)
 Flow Rate: 1.0 mL/min
 Temp: 60 °C
 Detection: UV, 254 nm

Sulfa drugs

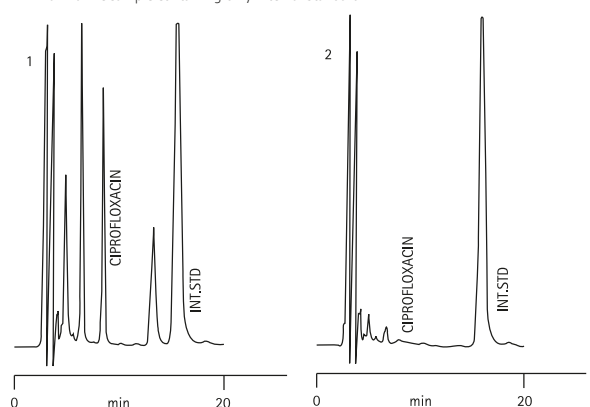


Column: PLRP-S 100Å 5 µm, 150 x 4.6 mm
 Eluent: Potassium sulfate: ACN 7:1, pH 2.2
 Flow Rate: 1.0 mL/min
 Detector: UV, 254 nm

Column: PLRP-S 100Å 5 µm, 150 x 4.6 mm
 Eluent: Disodium tetraborate: ACN 6:1, pH 9.3
 Flow Rate: 1.0 mL/min
 Detector: UV, 254 nm

Analysis of ciprofloxacin and ciprofloxacin metabolites

- Key
1. Blank urine sample containing known concentrations of internal standard, ciprofloxacin and its metabolites
 2. Blank urine sample containing only internal standard.



Column: PLRP-S 100Å 5 µm, 150 x 4.6 mm
 Eluent: 74% 20mM TCA : 22% ACN : 4% MeOH adjusted to pH 3
 Flow Rate: 1.0 mL/min
 Detector: UV, 277 nm
 Courtesy: Krol GJ, Noe, AJ and Beerman, D (1986) Liquid chromatographic analysis of ciprofloxacin and ciprofloxacin metabolites in body fluids. *Journal of Liquid Chromatography*, 9(13), 2897 - 2919. Reprinted with permission of the publisher (Taylor & Francis Group, www.informaworld.com)



PLRP-S HPLC Columns

PLRP-S 100Å: For Foodstuffs

- Minimal sample preparation saves time
- Compatibility with wide range of polarity organic modifiers widens application range
- Extremes of pH can be used to suppress ionization and increase retention

The very high accessible surface area of the PLRP-S 100Å material makes it an ideal choice for the analysis of both polar and non-polar compounds. The compatibility with organic modifiers having a range of solubility parameters, including methanol and tetrahydrofuran, facilitates the analysis of non-polar solutes. These polymeric reverse phase columns are particularly suited to the analysis of many food products. The chemical stability, over the complete pH range and with aggressive cleaning agents, enables column regeneration even after the analysis of complex samples. This often reduces the number of sample preparation steps required prior to analysis. Any strongly retained components of the samples can be effectively removed by rigorous clean-up with no detrimental effect on the column lifetime.

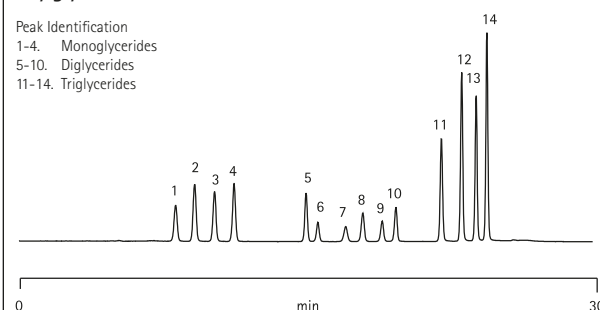
With the PLRP-S column there are no pH or buffer restrictions, other than solubility, and so ion suppression is possible at both low and high pH to increase retention. Many food additives, including antioxidants such as ascorbic acid, are weak acids so by using ion suppression RP-HPLC increased retention is achieved.

References

Lopes, P, Drinkine, J, Saucier, C and Glories, Y (2006) Determination of L-ascorbic acid in wines by direct injection liquid chromatography using a polymeric column. *Analytica Chimica Acta*, 555, 242-245.

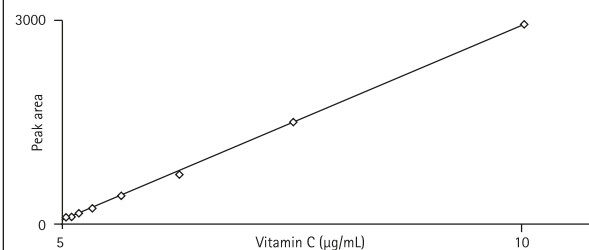
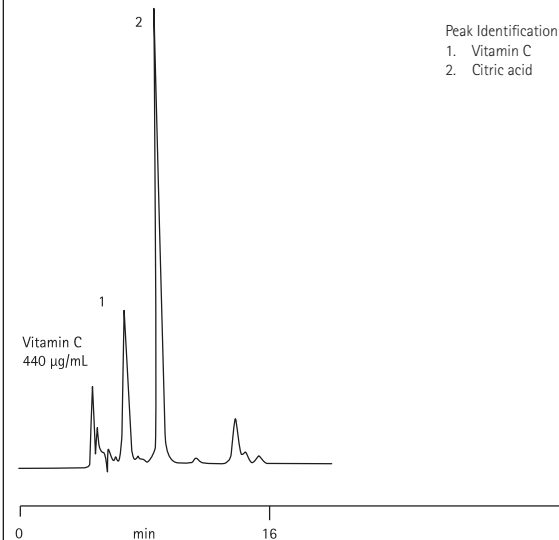
Acylglycerides

Peak Identification
1-4. Monoglycerides
5-10. Diglycerides
11-14. Triglycerides



Column: PLRP-S 100Å 5 µm, 150 x 4.6 mm
Eluent A: 42% water : 10% MeOH : 48% THF
Eluent B: 5% water : 10% MeOH : 85% THF
Gradient: 0-100% B in 20 min
Flow Rate: 0.5 mL/min
Detector: Varian ELS (neb=75 °C, evap=65 °C, gas=1.0 SLM)

Quantification and qualification of vitamin C and citric acid in fresh grapefruit juice



Sample: Diluted 1:50 in eluent
Column: PLRP-S 100Å 5 µm, 250 x 4.6 mm
Eluent: 0.2M NaH₂PO₄, pH 2.14
Flow Rate: 0.5 mL/min
Detector: UV, 220 nm

See Also

- Varian ELSD, for analytes with no chromophore, page 284, 373

PLRP-S HPLC Columns

PLRP-S: For Analysis of Oligomers and Polymers

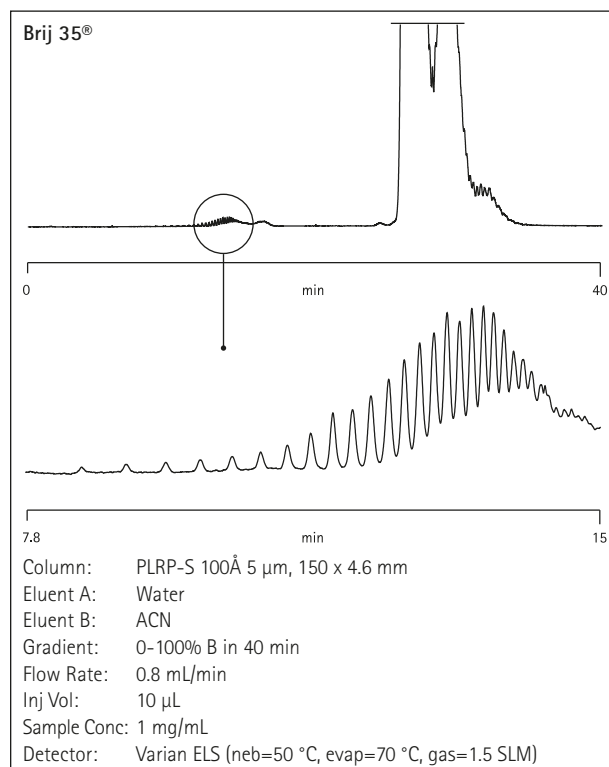
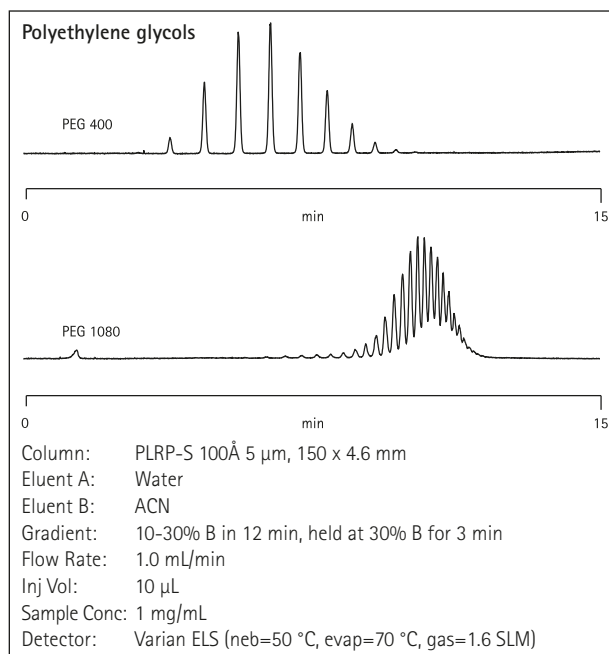
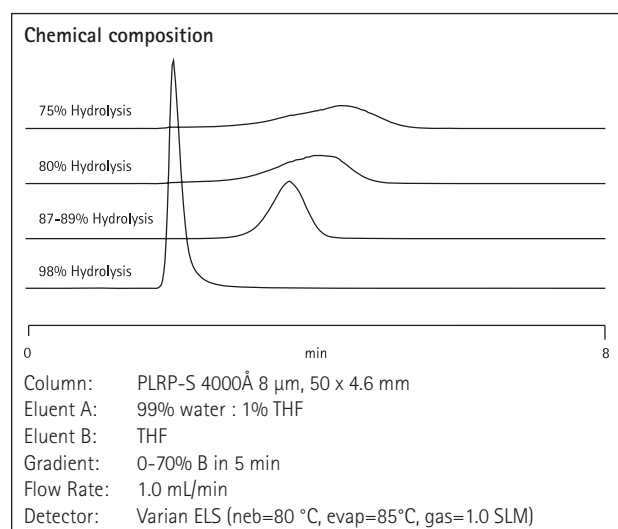
- Wide range of pore sizes delivers efficient separations of oligomers
- Larger pore materials minimize mass transfer effects to improve efficiency
- Exceptionally clean media enables use of evaporative light scattering detection

Gel permeation chromatography (GPC), which employs an isocratic system, has traditionally been used to characterize oligomers and polymers based on their size in solution. However, GPC provides insufficient resolution for the quantitation of individual oligomers or polymer compositional information. An alternative approach is to use RP-HPLC where elution order is determined by relative hydrophobicity. For an homologous series this correlates with degree of polymerization – the longer the oligomer the longer the retention time. With its wide range of pore sizes, PLRP-S is ideal for such separations. To minimize mass transfer effects the larger pore materials are used for higher oligomer and polymer compositional analysis.

Many polymeric materials, such as the polyethylene glycols that are used as excipients and additives in pharmaceutical, cosmetics and home care products, do not have UV chromophores. The stability and cleanliness of the PLRP-S materials enable the use of evaporative light scattering detection for improved sensitivity.

References

Dawkins JV, Nicholson TA, Handley AJ, Meehan, E, Nevin, A and Shaw, PL (1999) Compositional heterogeneity in partially hydrolysed poly(vinyl alcohol) by reversed phase liquid chromatography. *Polymer*, 40(26), 7331-7339.



See Also

- Varian ELSD, for analytes with no chromophore, page 284, 373
- GPC, characterization and separation of polymers, page 286

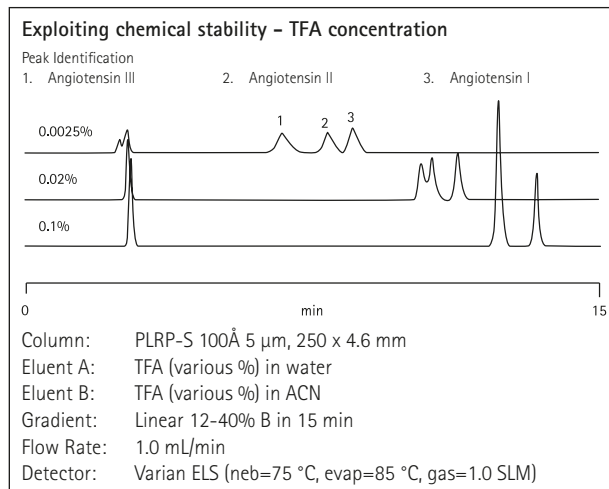
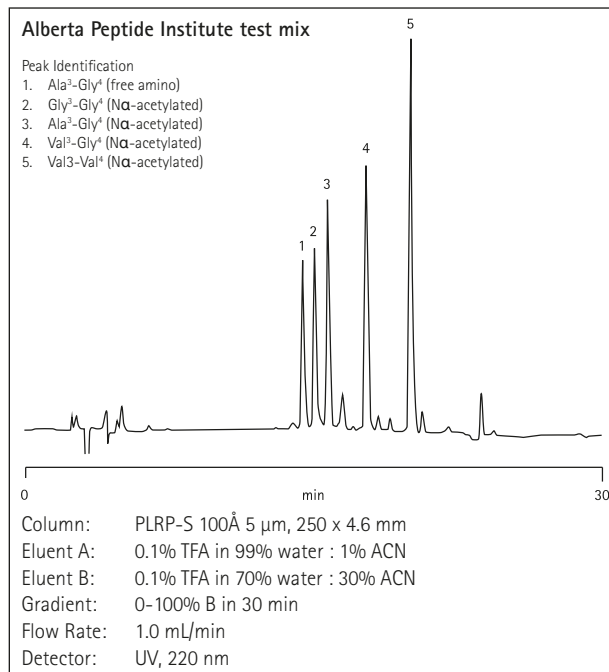
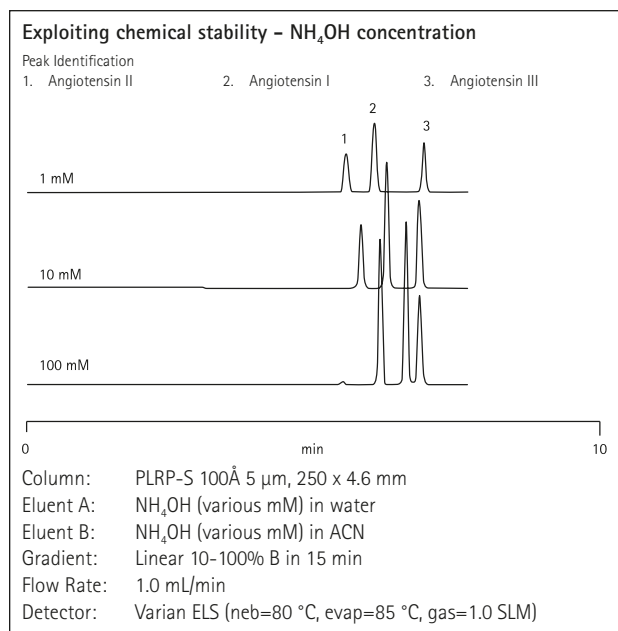
PLRP-S HPLC Columns

PLRP-S: For Peptides

- Separation optimization over the full pH range improves data quality
- Excellent thermal and chemical stability provides more options to maximize resolution
- Scale-up to prep and process reduces costs

For peptide analysis and purification, PLRP-S is the most complete product range, for nano/capillary HPLC through to cGMP production.

Reverse phase HPLC is routinely used for high resolution separations of peptides. The PLRP-S media, with its inherent hydrophobicity, range of pore sizes and unsurpassed chemical stability, is ideal for such separations. The PLRP-S 100Å 3 µm material delivers high efficiency separations for analytical work, including peptide mapping, with larger particles 5 µm and 8 µm for high throughput purification, 8 µm and 10 µm for high efficiency and 10-15, 15-20 and 50 µm for high yield process purifications. Peptides carry a charge, the type and magnitude of which is dependent on the eluent pH. However, optimization of the separation through pH control of the eluent is feasible over the full pH range with PLRP-S. The aromatic structure of the media gives the possibility of additional pi-pi bond interactions, whereas the larger particle sizes, with identical surface chemistry, cover the full operation range for scale-up to prep and process.



References

- Adamczyk, M Gebler, JC and Wu, J (2000) Papain digestion of different mouse IgG subclasses as studied by electrospray mass spectrometry. *J. Immunological Methods*, 237, 95-104.
- Näslund, J, Karlström, AR, Tjernberg, LO, Schierhorn, A, Terenius, L and Nordstedt, C (1996) High-resolution separation of amyloid β-peptides: structural variants present in Alzheimer's disease amyloid. *J. Neurochem.*, 67, 294-301.

See Also

- Prep to Process media, robust high throughput/high yield bulk media, page 265
- StratoSpheres™ synthesis materials, page 284

PLRP-S HPLC Columns

PLRP-S: For Proteins

- High efficiency separations even with large fibrous proteins
- Excellent sample recovery and minimal "ghosting" for improved quantitation
- The gigaporous 4000Å material delivers fast separations

With pore sizes of 300Å, 1000Å and 4000Å there is a PLRP-S column for high performance separations of all sizes of protein.

The PLRP-S materials exhibit very good permeability and accessibility of even the largest proteins to the internal surface of the porous particles, which gives excellent selectivity and capacity. The superior physical stability, even of the gigaporous 4000Å particles, provides extended column lifetimes with rapid gradients. In addition, the chemical stability of PLRP-S enables column clean-up, even with aggressive protein solubilizing agents, including 1M NaOH, urea and SDS; the limit is the salt solubility in the water/organic eluent.

- PLRP-S 300Å for globular proteins
- PLRP-S 1000Å for antibodies
- PLRP-S 4000Å for very large proteins and fast separations

References

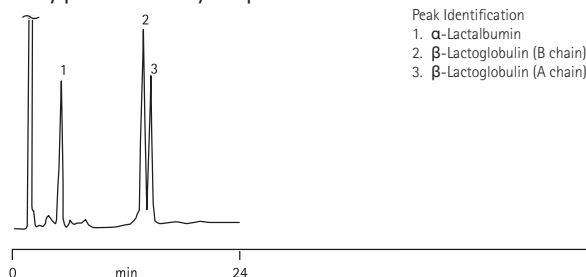
Farmery, MR, Tjenberg, LO, Pursglove, SE, Bergman, A, Winblad, B and Näslund, J (2003) Partial purification and characterization of gamma-secretase from post-mortem human brain. J. Biological Chem., 278, 2477-2482.

Stumpe, M, Miller, C, Morton, NS, Bell, G and Watson, DG (2006) High-performance liquid chromatography determination of α 1-acid glycoprotein in small volumes of plasma from neonates. J. Chromatogr. B, 831, 81-84.

Tirelli, A and De Noni, I (2007) Evaluation of lysozyme stability in young red wine and model systems by a validated HPLC method. Food Chemistry, 105(4), 1564-1570.

Yang, J, Wang, S, Liu, J and Raghani, A (2007) Determination of tryptophan oxidation of monoclonal antibody by reversed phase high performance liquid chromatography. J. Chromatogr. A, 1156, 174-182.

Whey proteins in dairy samples - milk

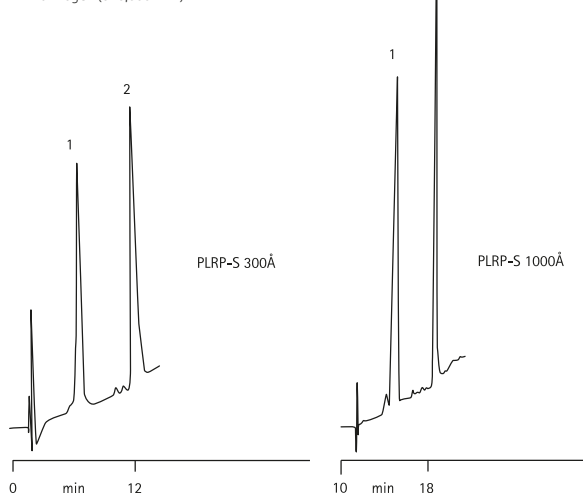


Peak Identification
1. α -Lactalbumin
2. β -Lactoglobulin (B chain)
3. β -Lactoglobulin (A chain)

Column: PLRP-S 300Å 8 μ m, 150 x 4.6 mm
Eluent A: 0.1% TFA in 99% water : 1% ACN
Eluent B: 0.1% TFA in 1% water : 99% ACN
Gradient: 36-48% B, 0-24 min, 48-100% B, 24-30 min
100% B, 30-35 min, 100-36% B, 35-40 min
Inj Vol: 10 μ L
Flow Rate: 1.0 mL/min
Detector: UV, 220 nm

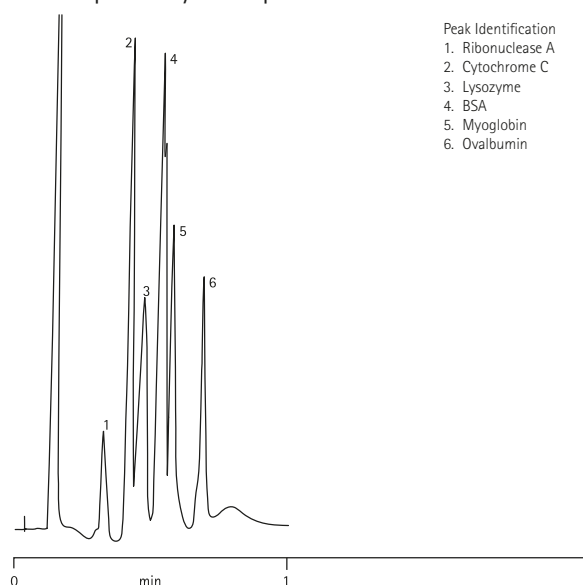
Large fibrous proteins

Peak Identification
1. Collagen (120,000 MW)
2. Fibrinogen (340,000 MW)



Columns: PLRP-S 8 μ m, 150 x 4.6 mm
Eluent A: 0.25% TFA in water
Eluent B: 0.25% TFA in 5% water : 95% ACN
Gradient: 20-60% B in 15 min
Flow Rate: 1.0 mL/min
Detector: UV, 220 nm

Standard proteins by reverse phase



Peak Identification
1. Ribonuclease A
2. Cytochrome C
3. Lysozyme
4. BSA
5. Myoglobin
6. Ovalbumin

Column: PLRP-S 4000Å 8 μ m, 50 x 4.6 mm
Eluent A: 0.1% TFA in 95% water : 5% ACN
Eluent B: 0.1% TFA in 5% water : 95% ACN
Gradient: Linear 18-60% B in 1 min
Flow Rate: 4.0 mL/min
Detector: UV, 280 nm

PLRP-S HPLC Columns

PLRP-S: For Oligonucleotide Analysis

- Excellent thermal stability improves resolution
- Linear scale-up to full production saves method development time
- Robust phases extend column lifetimes

PLRP-S has the chemical and thermal stability needed for high performance separations of oligonucleotides. The requirement for high performance oligonucleotide analysis and purification has expanded rapidly with their potential application as bio-pharmaceuticals. PLRP-S media, with their range of pore sizes and particle sizes, addresses these requirements. In the manufacture of synthetic oligos, PLRP-S can be used to separate the protected product from de-protected failure sequences, and by using ion pairing agents de-protected oligos can be resolved. The high surface area of PLRP-S gives good capacity for trityl-on/trityl-off separations and ion pair RP-HPLC of deprotected oligos.

Small particle, 3 μm and 5 μm , PLRP-S columns are used for analytical separations and the larger particle materials, 8 μm and above, for purification. The bulk media enables linear scale-up to full production with no redevelopment of the method. The range of pore sizes ensures the analysis of small synthetic oligos through to plasmids with the same selectivity.

The robustness of PLRP-S, with excellent reproducibility of separation and long column lifetimes, makes it an ideal choice for high throughput analysis of oligo samples, such as would be found in a bioavailability study. Its thermal stability allows the use of elevated temperature for improved resolution.

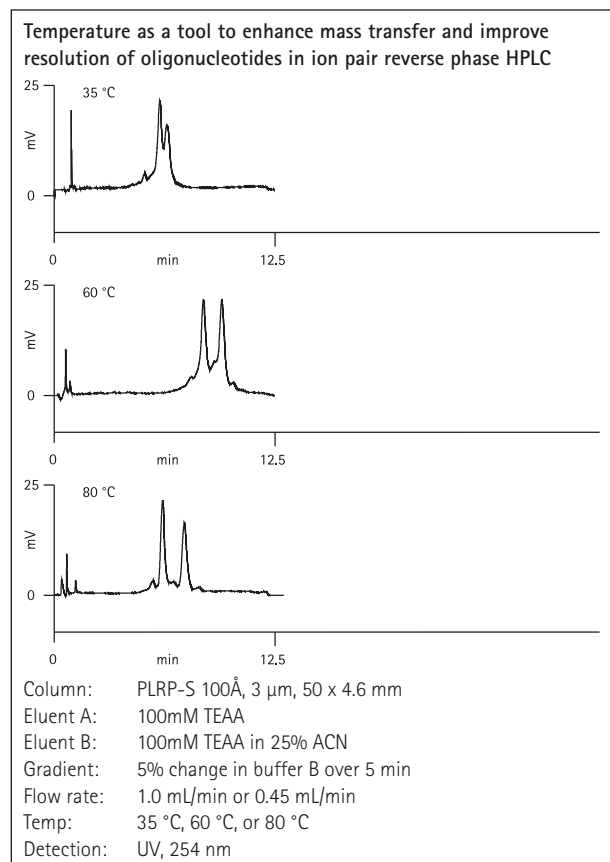
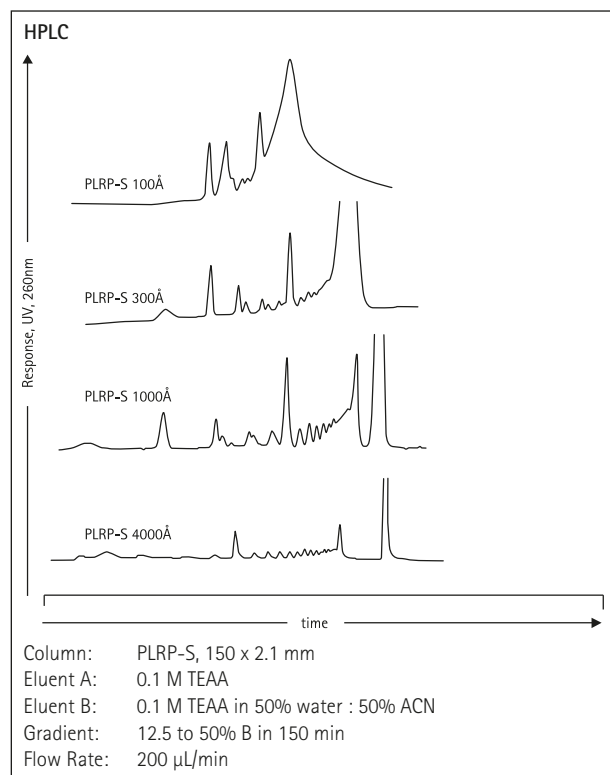
References

Hail, ME (2007) Automated LC/MS strategies for high-throughput and detailed analysis of oligonucleotides TIDES, 20-23 May, Las Vegas, NV, USA.

'HPLC' application reprinted from Journal of Chromatography A, 1009, LL Lloyd, MI Millichip & KJ Mapp, Rigid polymers: the future of oligonucleotide analysis and purification, 223-230, ©2003 with permission from Elsevier.

See also

- TOP™ DNA and RNA cartridges, high throughput oligonucleotide purification, page 77
- PL-SAX, strong anion exchanger ideal for oligonucleotides, page 79
- Prep to Process media, robust high throughput/high yield bulk media, page 265
- StratoSpheres™ DNA, simple, high quality DNA oligonucleotide synthesis, page 76



VariTide™ RPC

Ion Exchange

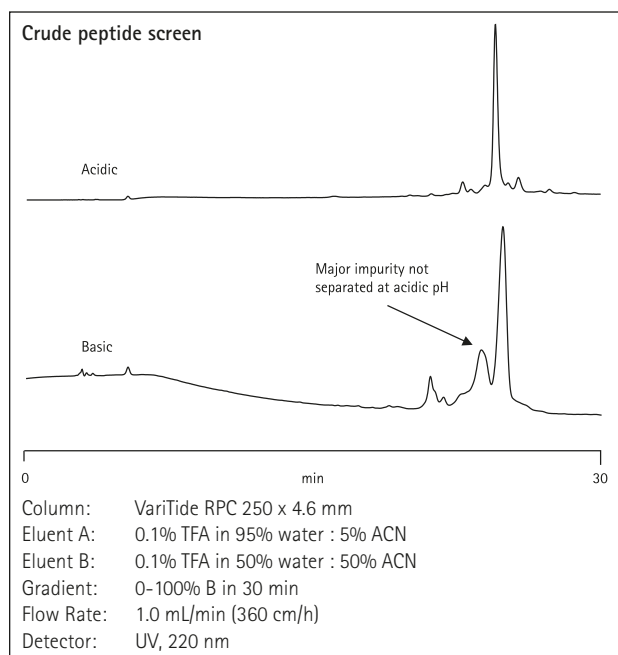
"Universal" Solution for Analysis and Purification of Synthetic Peptides

- A single column to cover the full range of synthetic peptides
- Small particle size for maximum efficiency, even with 1 and 2 in. prep columns
- Bulk media to pack 1 and 2 in. prep columns for the purification of mg to g quantities

The VariTide RPC columns and media are part of the Varian VariPep™ Peptide Solution. This is the recommended option for cost-effective separation and purification of synthetic peptides using generic methods.

Typical Applications

Purification of acid/basic/hydrophilic/hydrophobic peptides with acid/neutral/basic eluents



See Also

- VariPep, for peptide synthesis, analysis and purification, page 80

Ordering Information

Description	Dimensions	Part No.
VariTide RPC Columns	250 x 4.6 mm ID	PL1512-5A05
	250 x 10 mm ID	PL1012-5A05
	250 x 21.2 mm ID	PL1E12-5A05
VariTide RPC Bulk Media	100 g	PL1412-4A05
	1 kg	PL1412-6A05

Resin-based Packings for Biomolecules

PL-SAX and PL-SCX are strong ion exchange packings for the analysis, separation and purification of biomolecules. All media and columns, analytical through to preparative, are manufactured in our ISO 9001 facility to the same high operational specifications, allowing scale-up with confidence. For globular protein analysis and purification, the 1000Å material has the optimum pore size for maximum loading with low band broadening. The more open pore structure of the 4000Å is preferred for high resolution and high speed applications or for the separation of very large biomolecules.

PL-SAX and PL-SCX

Gradient elution is possible from pH 1-14, with buffer/salt concentrations up to 8M (limited only by solubility), polar organics 0 - 100% and pressures to 3000 psi (200 bar). These excellent stability properties allow aggressive clean up, depyrogenation and regeneration procedures, prolonging column lifetimes. PL-WAX and PL-WCX are weak ion exchange materials with the same high performance capabilities.

PL-SAX: Strong Anion Exchange

- Small particles deliver excellent chromatographic performance
- Wide range of particle sizes for flexible analysis to scale-up purification
- Exceptional stability for long column lifetimes

PL-SAX -N(CH₃)₃⁺ is ideal for the anion exchange HPLC separations of proteins and deprotected synthetic oligonucleotides under denaturing conditions. The strong anion exchange functionality, covalently linked to a chemically stable polymer, extends the pH range. In addition, the anion exchange capacity is independent of pH. For synthetic oligonucleotides, separations using denaturing conditions of temperature, organic solvent, and high pH are all possible. PL-SAX delivers improved chromatography for self-complementary or G-rich sequences that may associate to form aggregates or hairpin structures. The 5 µm material provides high efficiency separations of n and n-1 sequences. The wide range of particle sizes and column geometries permit analysis and scale-up to purification. The strong anion exchange functionality provides a material with exceptional chemical and thermal stability, even with sodium hydroxide eluents, leading to long column lifetimes.

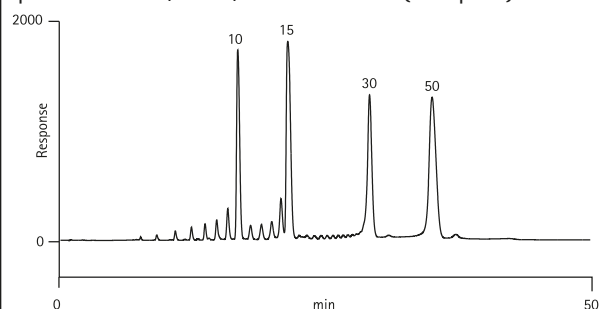


Ion Exchange HPLC Columns

Typical Applications

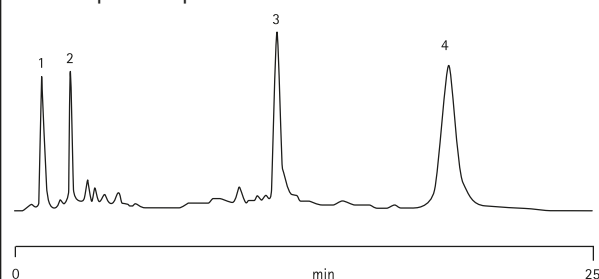
Oligonucleotide analysis and purification

High resolution separation of a Poly-T-Oligonucleotide size standard spiked with 10mer, 15mer, 30mer and 50mer (main peaks)



Column: PL-SAX 1000Å, 8 µm, 50 x 4.6 mm
 Eluent A: 7:93 v/v ACN: 0.1M TEAA, pH 8.5
 Eluent B: 7:93 v/v ACN: 0.1M TEAA, 1M ammonium chloride, pH 8.5
 Gradient: 0-40% B in 10 min, followed by 40-70% B in 14 min and 70-100% B in 25 min
 Flow Rate: 1.5 mL/min
 Temp: 60 °C
 Detector: UV, 220 nm

Standard protein separation



Peak Identification
 1. Myoglobin
 2. Bovine carbonic anhydrase
 3. Ovalbumin
 4. Soybean trypsin inhibitor

Column: PL-SAX 1000Å 5 µm, 50 x 4.6 mm
 Eluent A: 10mM Tris HCl pH 8
 Eluent B: A+0.35M NaCl pH 6
 Gradient: 0-100% B in 20 min
 Flow Rate: 1.0 mL/min
 Detector: UV, 220 nm

References

Colinge, J, Chiappe, D, Lagache, S, Moniatte, M and Bougueleret, L (2005) Differential proteomics via probabilistic peptide identification scores. *Anal. Chem.*, 77(2), 596-606.

Pepaj, M, Holm, A, Fleckenstein, B, Lundanes, E and Greibrokk, T (2006) Fractionation and separation of human salivary proteins by pH-gradient ion exchange and reversed phase chromatography coupled to mass spectrometry. *J. Sep. Sci.*, 29, 519-528.

Ordering Information

PL-SAX Columns

Dimensions (mm)	Particle Size (µm)	Pore Size (Å)	Part No.
50 x 2.1	5	1000	PL1951-1502
	8	1000	PL1951-1802
	5	4000	PL1951-1503
	8	4000	PL1951-1803
150 x 2.1	8	1000	PL1951-3802
	8	4000	PL1951-3803
50 x 4.6	5	1000	PL1551-1502
	8	1000	PL1551-1802
	5	4000	PL1551-1503
	8	4000	PL1551-1803
150 x 4.6	8	1000	PL1551-3802
	8	4000	PL1551-3803
250 x 4.6	10	1000	PL1551-3102
	10	1000	PL1551-5102
	30	1000	PL1551-5702
	8	1000	PL1151-1802
50 x 7.5	8	4000	PL1151-1803
	8	1000	PL1151-3802
150 x 7.5	8	1000	PL1151-3802
	8	4000	PL1151-3803

PL-WAX Columns

Dimensions (mm)	Particle Size (µm)	Pore Size (Å)	Part No.
50 x 2.1	5	1000	PL1952-1502
50 x 4.6	5	1000	PL1552-1502
50 x 2.1	5	4000	PL1952-1503
50 x 4.6	5	4000	PL1552-1503

For prep column information please see page 268.

See Also

- PL-SAX prep to process bulk media, page 268
- Prep columns, for high throughput or high yield, page 262

Ion Exchange HPLC Columns

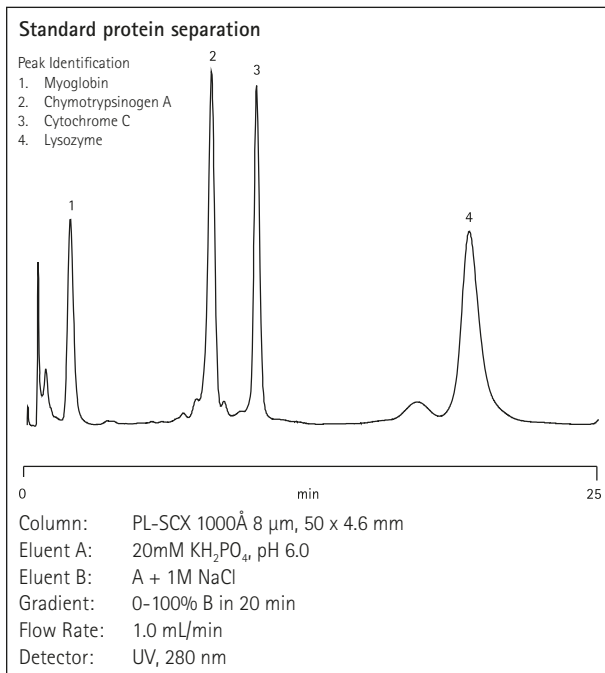
PL-SCX: Strong Cation Exchange

- Optimal design for effective separation of biomolecules
- Pore sizes allow use of a range of solute sizes
- Exceptional stability for long column lifetimes

PL-SCX -SO₃⁻ is a macroporous PS/DVB matrix with a very hydrophilic coating and strong cation exchange functionality. This process is controlled to provide the optimum density of strong cation exchange moieties for the analysis, separation and purification of a wide range of biomolecules, from small peptides to large proteins. Two pore sizes are available, 1000Å and 4000Å, to give good mass transfer characteristics for a range of solute sizes. The 5 µm media delivers separations at higher resolution with the 30 µm media used for medium pressure liquid chromatography.

Typical Applications

Peptide, protein, antibody purification



Ordering Information

PL-SCX Columns

Dimensions (mm)	Particle Size (µm)	Pore Size (Å)	Part No.
50 x 2.1	5	1000	PL1945-1502
	8	1000	PL1945-1802
	5	4000	PL1945-1503
	8	4000	PL1945-1803
150 x 2.1	8	1000	PL1945-3802
	8	4000	PL1945-3803
50 x 4.6	5	1000	PL1545-1502
	8	1000	PL1545-1802
	8	4000	PL1545-1803
150 x 4.6	8	1000	PL1545-3802
	8	4000	PL1545-3803
50 x 7.5	8	1000	PL1145-1802
	8	4000	PL1145-1803
	30	1000	PL1451-6702

PL-WCX Columns

Dimensions (mm)	Particle Size (µm)	Pore Size (Å)	Part No.
50 x 2.1	5	1000	PL1946-1502
50 x 4.6	5	1000	PL1546-1502
50 x 2.1	5	4000	PL1946-1503
50 x 4.6	5	4000	PL1546-1503

For prep column information please see page 268.

See Also

- PL-SCX prep to process bulk media, page 268
- Prep columns, for high throughput or high yield, page 262

Hi-Plex HPLC Columns

Comprehensive Range of Ligand Counter Ions for Optimum Selectivity and Resolution

These HPLC columns deliver improved efficiency, lower operating pressures and longer column lifetimes from monodispersed materials. With a range of ligand counter ions for optimum selectivity, and resolution and materials matched to the USP definitions of media types L17, L19, L34 and L58, the Hi-Plex range is ideal for isocratic separations using water or dilute acid as the eluent. This simplifies your HPLC system requirements and eliminates the use of potentially hazardous organic solvents.

Hi-Plex separates carbohydrates and alcohols through ligand exchange and organic acids via ion exchange. These are the preferred separation mechanisms for the analysis of simple sugars, alcohols, oligosaccharides and organic acids in foodstuffs.

The range comprises a 4% cross-linked resin for the analysis of oligosaccharides and an 8% cross-linked resin, with lower exclusion limit, for mono-, di- and tri-saccharide analysis. For carbohydrate and alcohol investigations, Hi-Plex columns use isocratic conditions with water as the eluent and temperature as the main variable for control of resolution. The exception is the Hi-Plex Na (Octo), which is used with sodium hydroxide eluents when pulsed amperometric detection (PAD) is employed.

Typical Operating Conditions

Description	Temperature Range (°C)	Flow Rate (mL/min)	Eluent
Hi-Plex Ca	80 – 90	0.6	Water
Hi-Plex Ca USP L19	80 – 90	0.3	Water
Hi-Plex Pb	70 – 90	0.6	Water
Hi-Plex H for carbohydrates	60 – 70	0.6	Water
Hi-Plex H for organic acids	40 – 60	0.6	Dilute Acid
Hi-Plex Ca (Duo)	80 – 90	0.6	Water
Hi-Plex K	80 – 90	0.6	Water
Hi-Plex Na (Octo)	80 – 90	0.6	Water, Sodium Hydroxide
Hi-Plex Na	80 – 90	0.3	Water



Hi-Plex HPLC Columns

Hi-Plex Column Selection

USP methods specify the type of HPLC media and column dimensions which should be used for the analysis. The Hi-Plex product range has four materials that comply with USP definitions.

Media Type L17:

Strong cation exchange resin consisting of sulfonated, cross linked styrene-divinylbenzene copolymer in the hydrogen form, 7 to 11 µm in diameter – Hi-Plex H.

Media Type L19:

Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the calcium form, 9 µm in diameter – Hi-Plex Ca and Hi-Plex Ca (Duo).

Media Type L34:

Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the lead form, about 9 µm in diameter – Hi-Plex Pb.

Media Type L58:

Strong cation exchange resin consisting of sulfonated cross linked styrene-divinylbenzene copolymer in the sodium form, 6 to 30 µm in diameter – Hi-Plex Na and Hi-Plex Na (Octo).

In addition to the standard column sizes the media is also packed in specific column dimensions for different USP methods, including sugar alcohol analysis.

For some application areas there are several column options and the choice of the most appropriate Hi-Plex media will depend on sample matrix and exact carbohydrate composition. To assist with the selection of the most appropriate column, retention time information for the individual sugars can be found in the free Data Sheet (SI-1687) available on our Web site.

Typical Operating Conditions

Application Area	Recommended Hi-Plex Column(s)
USP Methods Specifying L17 Media	Hi-Plex H
USP Methods Specifying L19 Media	Hi-Plex Ca and Hi-Plex Ca (Duo)
USP Methods Specifying L34 Media	Hi-Plex Pb
USP Methods Specifying L58 Media	Hi-Plex Na and Hi-Plex Na (Octo)
Mono- and Disaccharides	Hi-Plex Ca
	Hi-Plex Pb
	Hi-Plex H
	Hi-Plex Na (Octo)
Anomer Separations	Hi-Plex Ca
Organic Acids	Hi-Plex H
Alcohols	Hi-Plex Ca
	Hi-Plex K
	Hi-Plex H
	Hi-Plex Pb
Adulteration of Food and Beverages	Hi-Plex Ca and Hi-Plex Pb
Food Additives	Hi-Plex Ca and Hi-Plex Pb
Dairy Products	Hi-Plex Ca and Hi-Plex H
Sweetened Dairy Products	Hi-Plex Pb
Confectionery	Hi-Plex Ca and Hi-Plex Pb
Fruit Juice	Hi-Plex Ca
Wine	Hi-Plex H
Wood Pulp Hydrolysates (cellulose/hemi-cellulose)	Hi-Plex Pb
Fermentation Monitoring	Hi-Plex H
Oligosaccharides	Hi-Plex Na
Samples with High Salt Content (molasses)	Hi-Plex Na (Octo)
Oligosaccharides <Dp5 with Monosaccharides	Hi-Plex Ca (Duo)
Corn Syrups	Hi-Plex Na

Hi-Plex HPLC Columns

Ordering Information

Hi-Plex Columns

Description	ID (mm)	Length (cm)	Crosslink Content (%)	Particle Size (μm)	Counter Ion	Part No.
Hi-Plex Ca USP L19	4.0	25	8	8	Ca2+	PL1570-5810
Hi-Plex Ca (Duo)	6.5	30	8	8	Ca2+	PL1F70-6850
Hi-Plex Ca	7.7	30	8	8	Ca2+	PL1170-6810
Hi-Plex Pb USP L34	7.7	10	8	8	Pb2+	PL1170-2820
Hi-Plex Pb	7.7	30	8	8	Pb2+	PL1170-6820
Hi-Plex K	7.7	30	8	8	K+	PL1170-6860
Hi-Plex H	6.5	30	8	8	H+	PL1F70-6830
Hi-Plex H	7.7	30	8	8	H+	PL1170-6830
Hi-Plex H USP L17	7.7	10	8	8	H+	PL1170-2823
Hi-Plex Na	7.7	30	4	10	Na+	PL1171-6140
Hi-Plex Na (Octo)	7.7	30	8	8	Na+	PL1170-6840

Guard columns

Description	ID (mm)	Length (cm)	Crosslink Content (%)	Particle Size (μm)	Counter Ion	Part No.
Hi-Plex Ca	7.7	5	8	8	Ca2+	PL1170-1810
Hi-Plex Ca (Duo)	7.7	5	8	8	Ca2+	PL1170-1850
Hi-Plex Pb	7.7	5	8	8	Pb2+	PL1170-1820
Hi-Plex K	7.7	5	8	8	K+	PL1170-1860
Hi-Plex H	7.7	5	8	8	H+	PL1170-1830
Hi-Plex Na	7.7	5	4	10	Na+	PL1171-1140
Hi-Plex Na (Octo)	7.7	5	8	8	Na+	PL1170-1840

Guard cartridges (2/pk)

Description	ID (mm)	Length (cm)	Crosslink Content (%)	Particle Size (μm)	Counter Ion	Part No.
Hi-Plex Ca	3.0	0.5	8	8	Ca2+	PL1670-0810
Hi-Plex Ca (Duo)	3.0	0.5	8	8	Ca2+	PL1670-0850
Hi-Plex Pb	3.0	0.5	8	8	Pb2+	PL1670-0820
Hi-Plex K	3.0	0.5	8	8	K+	PL1670-0860
Hi-Plex H	3.0	0.5	8	8	H+	PL1670-0830
Hi-Plex Na	3.0	0.5	4	10	Na+	PL1671-0140
Hi-Plex Na (Octo)	3.0	0.5	8	8	Na+	PL1670-0840

Guard cartridge holder

Description	Part No.
Guard Cartridge Holder, for 5 x 3 mm Cartridges	PL1310-0016

See Also

- Varian 380-LC and 385-LC, universal evaporative light scattering detection, page 284, 373



Hi-Plex HPLC Columns

Hi-Plex Ca, Pb, Na (Octo) and H: For Mono- and Di-saccharides

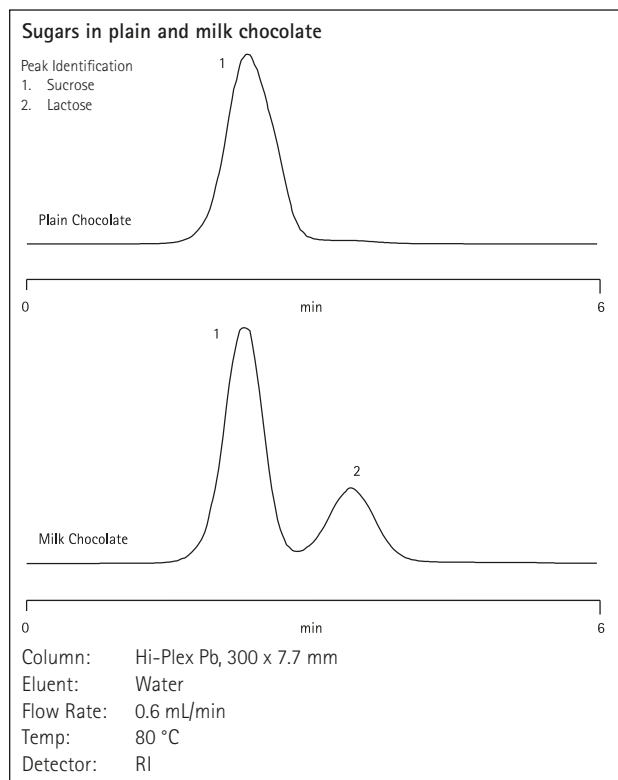
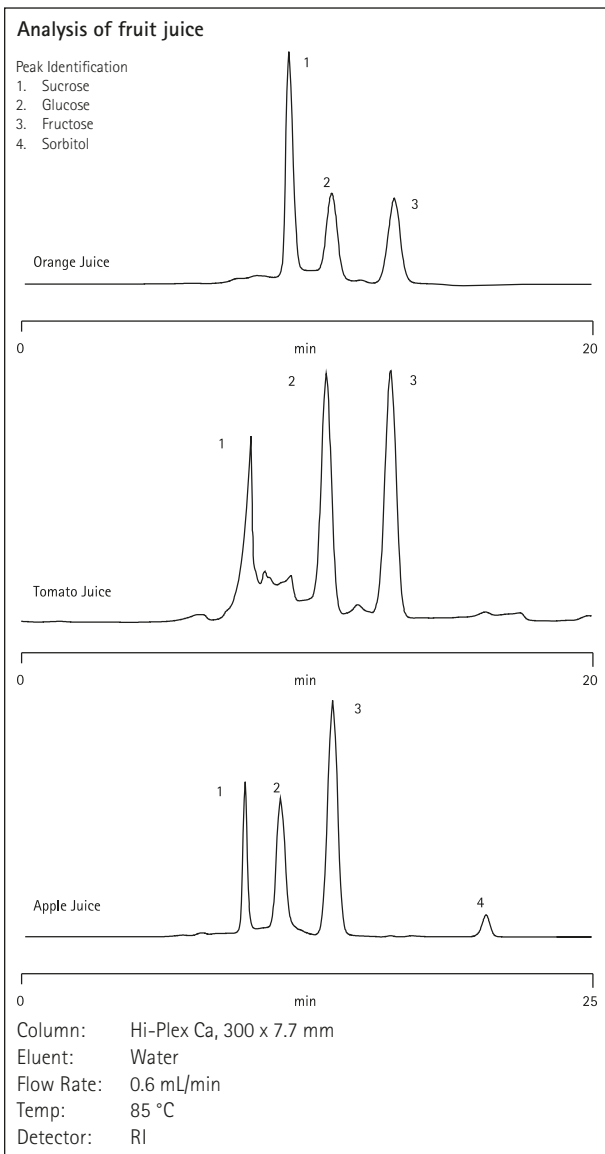
- Smaller pore size, 8% cross link content designed for low MW sugars
- Optimized for high resolution and application-specific retentivity
- Available in USP specified column dimensions

Hi-Plex Ca is recommended for the analysis of samples containing the sweetening sugars, glucose, fructose and sucrose, and the sugar alcohols, mannitol and sorbitol.

Hi-Plex Pb is more retentive than the Hi-Plex Ca and shows improved resolution for the disaccharides lactose and sucrose. It is recommended for the analysis of sweetened dairy-based food products.

Hi-Plex Na (Octo) is used for the analysis of food products that contain high levels of sodium ions and when sodium hydroxide is used as the eluent.

Hi-Plex H is recommended for use when the samples contain high levels of organic acids or for simultaneous analysis of organic acids and sugars.





Hi-Plex HPLC Columns

Hi-Plex H: For Organic Acids

- Water and dilute acid eluents for less hazardous working environments
- Ideal for USP media L17
- Volatile acid eluent permits use of evaporative light scattering detectors

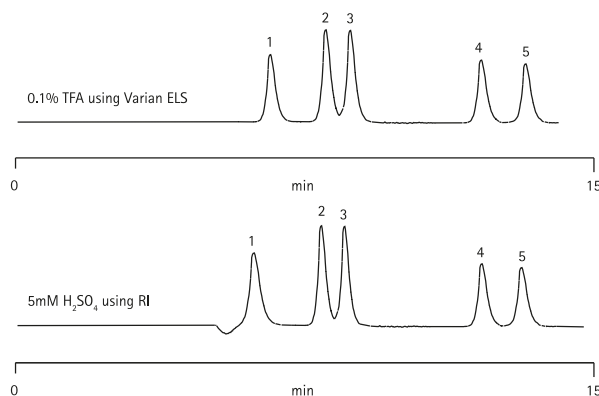
Where samples contain organic acids, whether or not in the presence of neutral mono- and di-saccharides, Hi-Plex H is the preferred option.

The column is run using water as the eluent for the analysis of sugars and organic acids, or more commonly, dilute acid for separation of organic acids.

Organic acid analysis

Peak Identification

- | | | |
|----------------|------------------|----------------|
| 1. Oxalic acid | 3. Tartaric acid | 5. Lactic acid |
| 2. Citric acid | 4. Succinic acid | |

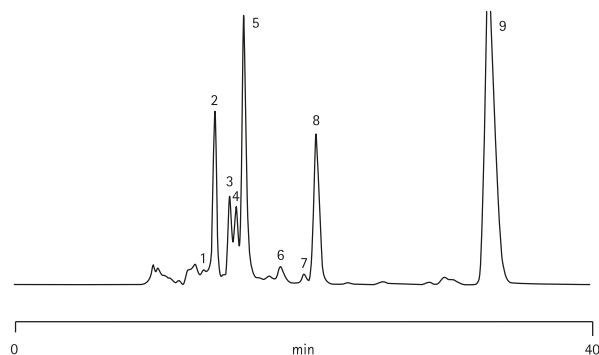


Column: Hi-Plex H, 300 x 7.7 mm
Eluent: Water with acid as specified
Flow Rate: 0.6 mL/min
Temp: 60 °C
Detectors: Varian ELS (neb=80 °C, evap=90 °C, gas=0.7 SLM), RI

Rose wine

Peak Identification

- | | | |
|------------------|------------------|----------------|
| 1. Citric acid | 4. Malic acid | 7. Lactic acid |
| 2. Tartaric acid | 5. Fructose | 8. Glycerol |
| 3. Glucose | 6. Succinic acid | 9. Ethanol |



Column: Hi-Plex H 8 μ m, 300 x 7.7 mm
Eluent: 0.004M H₂SO₄
Flow Rate: 0.4 mL/min
Pressure: 13 bar
Temp: 75 °C
Detector: Varian 356-LC refractive index detector



Hi-Plex HPLC Columns

Hi-Plex Ca, Pb, K and H: For Alcohol Analysis

- Different retentivity to maximize column choice
- Ligand exchange mechanism – ideal for alcohols
- Aqueous eluents reduce operating costs

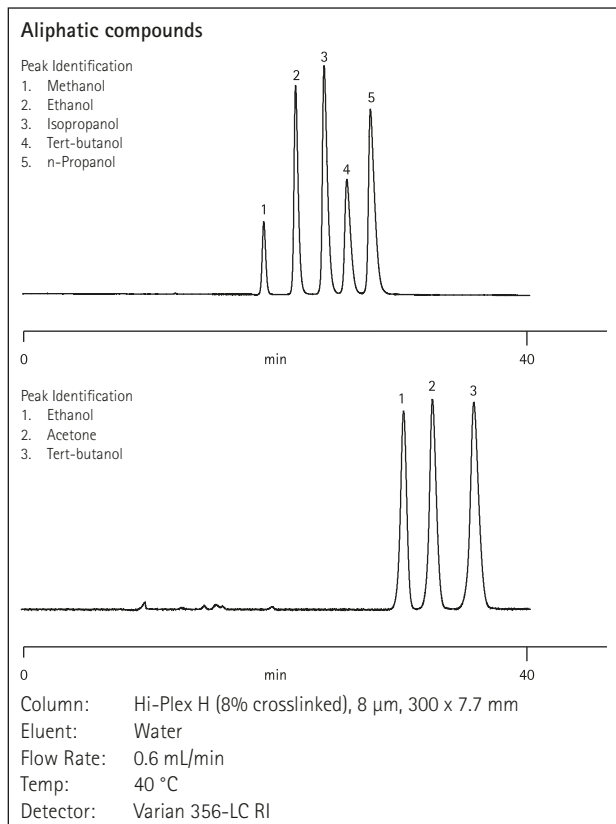
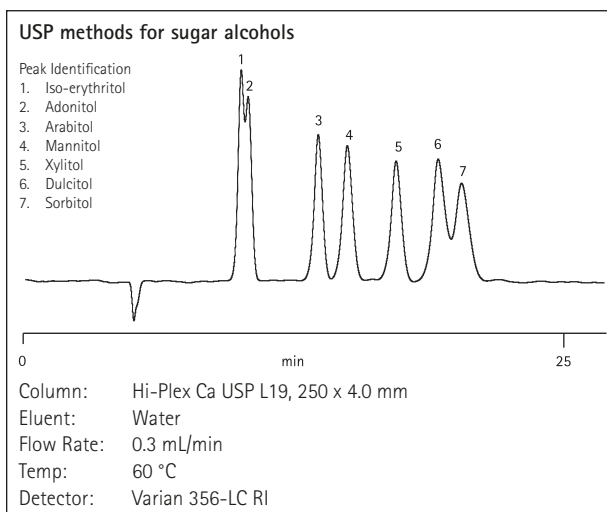
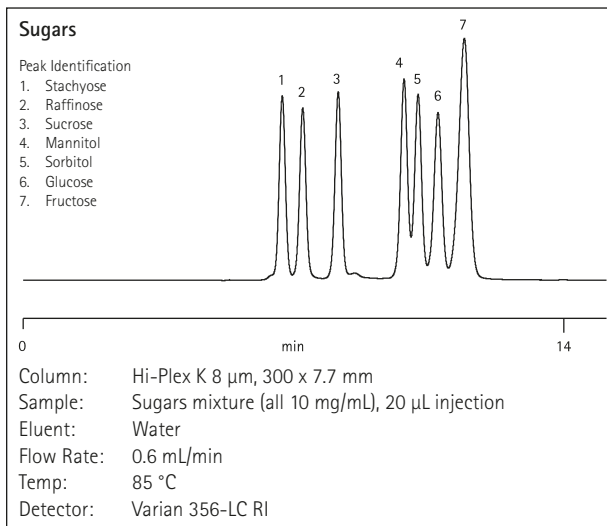
These Hi-Plex columns are used for the analysis of sugar alcohols that are present in many fruits and vegetables, and also added as sweeteners to food products. Aliphatic alcohols, including methanol and ethanol, can also be identified and/or quantified in alcoholic beverages. Four of the Hi-Plex materials are used for alcohol analysis, including two that are used in USP methods.

Hi-Plex Ca is recommended for the analysis of foods that also contain glucose. The 250 x 4.0 mm ID column is referenced in one of the USP methods for sugar alcohols analysis.

Hi-Plex Pb is recommended for samples that also contain glycerol. The 100 x 7.7 mm ID column is specified in the USP method for sorbitol.

Hi-Plex K is less retentive and so is used where shorter run times are required.

Hi-Plex H is the column of choice for aliphatic alcohols.





Hi-Plex HPLC Columns

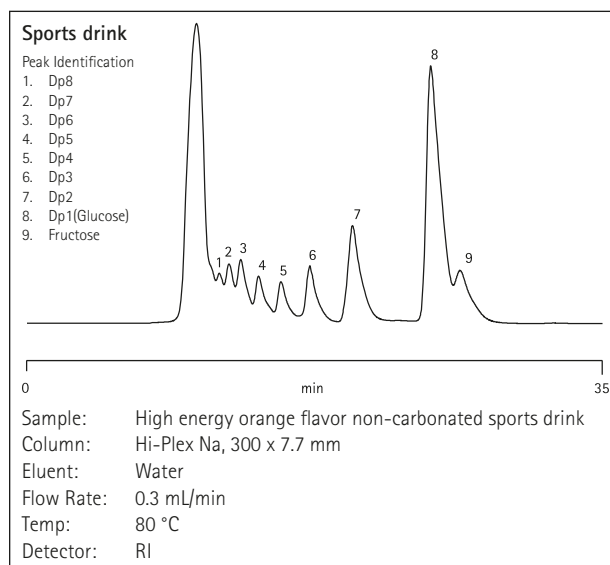
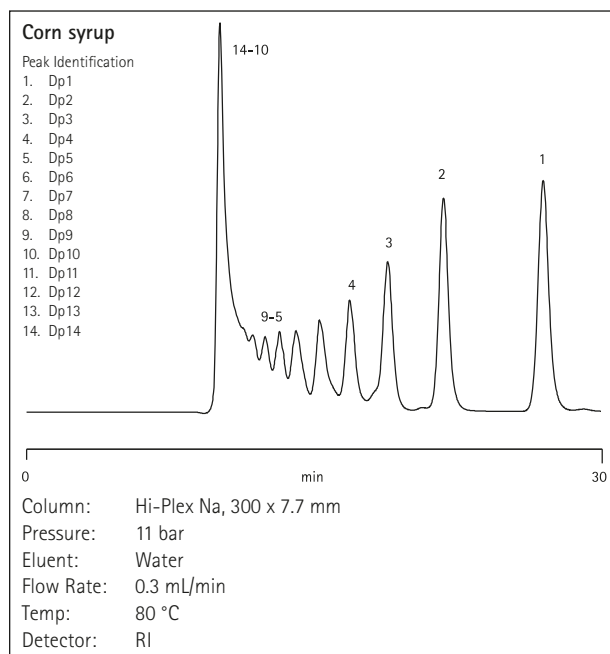
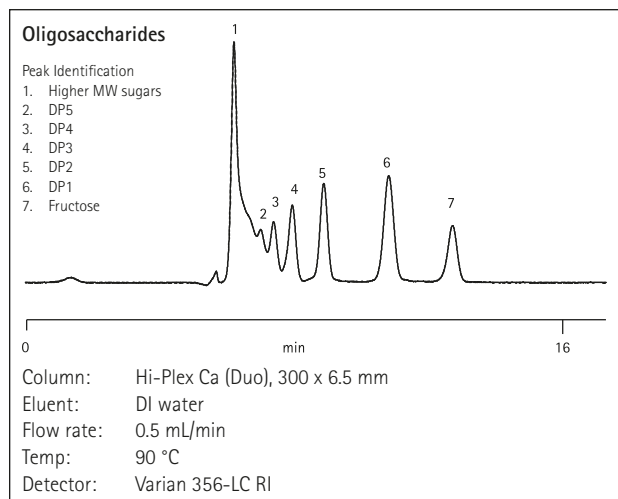
Hi-Plex Na and Ca (Duo): For Oligosaccharides

- 4% cross-linked and larger pore size tailored for oligosaccharides
- Separation based on size and ligand exchange enhances retention
- 8% cross linked for saccharide mixtures to maximize applicability

There are two materials in the Hi-Plex product range which are primarily used for oligosaccharide analysis. For the analysis of the higher oligosaccharides the separation mechanism is primarily size, with some ligand exchange enhancement of the monosaccharide retention.

Hi-Plex Na is a 4% cross linked material and therefore is the largest pore size material in the Hi-Plex product range. It is most suited to the analysis of the larger oligosaccharides.

Hi-Plex Ca (Duo) is an 8% cross linked material and so has a smaller pore size and less resolution for the larger oligomers. However, the Ca counter ion has improved ligand exchange capability for monosaccharides and so it is most suited for the analysis of samples containing both mono- and oligosaccharides.



Prep to Process Solutions

When Flawless Purification is Critical

As a global leader in preparative and process chromatography, Varian, Inc., offers a comprehensive range of high performance HPLC columns and bulk media to meet the needs of discovery, research and production. We provide silica and polymeric HPLC media options for linear scale-up from the $\mu\text{g}/\text{mg}$ level through to multi-kg cGMP production scale. This eliminates the need to re-develop methods at each scale-up step and so reduces the time to purified product.



Columns and media for the full range of Varian prep to process instruments

High Performance
940-LC

PREPARATIVE

High Performance
SD-1 PrepStar™

High Throughput
SD-2 PrepStar

PROCESS

High Yield SepTech™ Skid

- Pursuit™ XRs
- Pursuit
- Polaris™
- VariTide™ RPC

- SepTech

- PLRP-S
- PL-SAX
- PL-SCX



Pre-packed Columns



Laboratory-scale Load & Lock™ Columns



Process-scale Load & Lock Columns

Prep to Process Solutions

Particle Sizes of Varian Prep to Process Media (µm)

Shown with relevant instrumentation

Media	Varian 940-LC	PrepStar™ SD-1	PrepStar SD-2	SepTech™ Skids
	High Performance	High Performance	High Throughput	High Yield
Pursuit™ XRs	5	5	10	
Pursuit	5	5	10	
Polaris™	5	5	10	
SepTech	10	10	10	10
VariTide™ RPC	6	6		
PLRP-S 100Å, 300Å	5, 8	8	10	10 to 15, 15 to 20, 50
PLRP-S 1000Å, 4000Å	5, 8	8	10	30
PL-SAX 1000Å, 4000Å	5, 8	8	10	30
PL-SCX 1000Å, 4000Å	5, 8	8	10	30

Recommended Columns/Media for Prep to Process Applications

Application	Column
Small Molecules	PLRP-S 100Å
	Polaris
	Pursuit XRs
	SepTech ST60 10-C18
Larger Natural Molecules	PLRP-S 100Å
	Polaris
	Pursuit
	SepTech ST150 10-C18
Synthetic Peptides	PLRP-S 100Å
	SepTech ST150 10-C18
	VariTide RPC
Synthetic Oligonucleotides	PLRP-S 100Å, 300Å
	PL-SAX 1000Å, 4000Å
Recombinant Biomolecules	PLRP-S 100Å, 300Å, 1000Å, 4000Å
	PL-SAX 1000Å, 4000Å
	PL-SCX 1000Å, 4000Å

The range of pore sizes provides high performance separations at high capacity to give the most economic purification process for the widest range of target molecule sizes.

See Also

- HPLC analytical columns, page 218
- BioSolutions for peptides, oligonucleotides and proteins, page 74
- Flash chromatography, page 64



Preparative HPLC Columns

Dynamax™ : Dynamic Axial Compression for High Throughput or High Yield

- Modular design with reusable end fittings reduces hardware costs
- Three internal diameters, 10, 21.4 and 41.4 mm, for ease of scale-up
- Integral guard column option for longer column lifetimes with complex samples

The Dynamax preparative column hardware utilizes a patented dynamic axial compression (DAC) design and is the ideal format for the development and optimization of a high throughput or high yield purification. The DAC principle of operation maintains packed bed integrity and improves column performance over an extended period of time with a reduction in operating costs.

Varian offers Dynamax columns as compression modules (cartridges) onto which separate axial compression end fittings are fitted. This provides a means of eliminating voids that may form at the column inlet during use and also enables the end fittings to be reused. When changing the column it is only necessary to replace the compression module with one of a similar internal diameter.

There are three options when configuring a Dynamax column. To simplify choice, end fittings kits are available for each of the configurations. Kit #1 contains the end fittings for using the Dynamax column without a guard module. Kit #2 contains all the parts needed to operate with a protective guard module. There is also a guard coupling assembly parts kit to upgrade Kit #1 to Kit #2. When the guard column is used as a short preparative column only the standalone guard holder is needed.

The Dynamax preparative column modules give you flexibility for developing and optimizing a high throughput or high yield purification.

SepTech™ ST60 10-C18 and SepTech ST150 10-C18 media designed for high performance separations at high capacity are available in the Dynamax format for rapid method development and small scale separations.

Typical Applications

Small molecule purification, peptide purification and natural product purification



Kit #1

Kit #2

Ordering Information

Dynamax column hardware kits

Description	Column ID (mm)	Part No.
End Fittings Kit #1	10.0	R000083810
	21.4	R000083820
	41.4	R000083840
End Fittings Kit #2	10.0	R000083812
	21.4	R000083822
	41.4	R000083842
Guard Coupling Assembly (upgrades Kit #1 to Kit #2)	10.0	R000083811
	21.4	R000083821
	41.4	R000083841
Standalone Guard Holder	10.0	R000083814
	21.4	R000083824
	41.4	R000083844

Dynamax packed cartridge modules

Description	ID (mm)	Length (cm)	Part No.
SepTech ST60 10-C18	10.0	5	A8060050DG100
	10.0	25	A8060250DM100
	21.1	5	A8060050DG214
	21.1	25	A8060250DM214
	41.4	5	A8060050DG414
	41.4	25	A8060250DM414
SepTech ST150 10-C18	10.0	5	A8150050DG100
	10.0	25	A8150250DM100
	21.1	5	A8150050DG214
	21.1	25	A8150250DM214
	41.4	5	A8150050DG414
	41.4	25	A8150250DM414

Dynamax cartridge modules are available packed with a wide range of media – see the Varian Web site for a full list.



High Efficiency Purification

High Efficiency Purification: For Discovery and Development Purifications

- Small column sizes for high-speed media selection, method development and purification
- Comprehensive range of selectivities
- Packed columns and bulk media

Varian offers a range of high efficiency, small particle silica and polymeric HPLC materials. These are pre-packed preparative columns and bulk media for reverse phase, normal phase and ion exchange purification. A range of pore sizes is available that provides maximum capacity for all applications, from small molecules through to biological macromolecules. Packed column and/or bulk media options are available for use with each of the Varian prep to process systems to provide complete, application-based solutions.

For high efficiency separations, we offer prep columns packed with particles between 5 and 10 μm that are ideal for use with the high performance 940-LC and PrepStar™ SD-1 system. This option works in non-overload conditions to provide maximum resolution of complex samples.

Small Molecule Separations

High performance purification

Separation	Media Characterization	940-LC and PrepStar SD-1
Hydrophobic	Highest Mass Loading	Pursuit™ XRs, 100 Å C18 Pursuit XRs, 100 Å C8
	Hydrophobic Work Horse	Pursuit 200 Å C18 Pursuit 200 Å C8
	Aromatic/Double Bonds	Pursuit 200 Å Diphenyl
Hydrophilic	Polar Selectivity	Polaris™ 200 Å C18-A Polaris 200 Å C8-A
	H bond Accepting	Polaris 200 Å C18-Ether Polaris 200 Å C8-Ether
	Reverse or Normal Phase	Polaris 200 Å NH2
	H-bonding	Polaris 200 Å Amide-C18
	Normal Phase Organic Soluble	Pursuit XRs Si Pursuit XRs Diol
Extreme Conditions	pH Extremes/High Temperatures	PLRP-S 100 Å 8 μm

Biomolecule Separations

High performance purification

Sample	Separation	940-LC and PrepStar SD-1
Synthetic Peptides	Reverse Phase	VariTide™ RPC PLRP-S 100 Å 10 μm PLRP-S 300 Å 8 μm
Synthetic Peptides	Anion Exchange	PL-SAX 1000 Å 8 μm
Recombinant Peptides and Proteins	Reverse Phase	PLRP-S 100 Å 8 μm PLRP-S 300 Å 8 μm PLRP-S 1000 Å 8 μm
	Anion Exchange	PL-SAX 1000 Å 8 μm
	Cation Exchange	PL-SCX 1000 Å 8 μm
Macromolecular Plasmids	Reverse Phase	PLRP-S 4000 Å 8 μm
	Anion Exchange	PL-SAX 4000 Å 8 μm

See Also

- HPLC Analytical columns, page 218
- Load & Lock™ columns, page 272
- SepTech™ bulk media, page 270
- PLRP-S, PL-SAX/PL-SCX bulk media, page 265

High Efficiency Columns and Media

Ordering Information

High efficiency columns

Description	ID (mm)	Length (cm)	Particle Size (μm)	Part No.
Pursuit™ XRs C18	10.0	25	5	A6000250X100
	21.2	25	5	A6000250X212
	10.0	25	10	A6002250X100
	21.2	25	10	A6002250X212
Pursuit XRs C8	10.0	25	5	A6010100X212
Pursuit XRs Diphenyl	10.0	25	5	A6020250X100
	21.2	25	5	A6020250X212
Pursuit XRs Diol	21.2	25	5	A6100250X212
Pursuit XRs Si-A	21.2	25	10	A6004250X100
Pursuit C18	10.0	25	5	A3000250X100
	21.2	25	5	A3000250X212
	10.0	25	10	A6002250X100
	21.2	25	10	A6002250X212
Pursuit C8	10.0	25	5	A3030250X100
	21.2	25	5	A3030250X212
	10.0	25	10	A3032250X100
	21.2	25	10	A3032250X212
Pursuit Diphenyl	10.0	25	5	A3040250X100
	21.2	25	5	A3040250X212
	10.0	25	10	A3042250X100
	21.2	25	10	A3042250X212
Pursuit PFP	10.0	25	5	A3050250X100
	21.2	25	5	A3050250X212
Polaris™ C18-A	10.0	25	5	A2000250X100
	21.2	25	5	A2000250X212
	10.0	25	10	A2008250X100
Polaris C18-Ether	10.0	25	5	A2020250X100
	21.2	25	5	A2020250X212
Polaris Amide C18	10.0	25	5	A2006250X100
	21.2	25	5	A2006250X212
	10.0	25	10	A2008250X100
	21.2	25	10	A2008250X212
Polaris C8-A	10.0	25	5	A2010250X100
	21.2	25	5	A2010250X212
Polaris C8-Ether	10.0	25	5	A2030250X100
	21.2	25	5	A2030250X212
Polaris Amide C8	10.0	25	5	A2006250X100
	21.2	25	5	A2006250X212

Ordering Information

High efficiency columns continued

Description	ID (mm)	Length (cm)	Particle Size (μm)	Part No.
Polaris NH2	10.0	25	5	A2013250X100
	21.2	25	5	A2013250X212
Polaris Si-A	21.2	25	5	A2003250X212
	21.2	25	10	A2004250X212
PLRP-S 100Å	7.5	30	8	PL1112-6800
	25.0	30	8	PL1212-6800
	50.0	30	8	PL1712-6800
	100.0	30	8	PL1812-6800
PLRP-S 300Å	7.5	30	8	PL1112-6801
	25.0	30	8	PL1212-6801
	50.0	30	8	PL1712-6801
	100.0	30	8	PL1812-6801
PL-SAX 1000Å	7.5	5	8	PL1112-1802
	7.5	15	8	PL1112-3802
	7.5	30	8	PL1112-6802
	100.0	30	10	PL1851-2102
PL-SAX 4000Å	7.5	5	8	PL1112-1803
	100.0	30	10	PL1851-2103
PL-SCX 1000Å	100.0	30	10	PL1845-2102
PL-SCX 4000Å	100.0	30	10	PL1845-2103
VariTide™ RPC	10.0	25	6	PL1012-5A05
	21.2	25	6	PL1E-5A05

High efficiency bulk media (Quantity 100 g)

Description	Particle Size (μm)	Part No.
Pursuit XRs C18	5	A6000100G
	10	A6002100G
Pursuit XRs C8	5	A60100100GS
	10	A6012100G
Pursuit XRs Diphenyl	5	A60200100G
Pursuit XRs Diol	5	A610000100GM
	10	A610200100GM
Pursuit XRs Si	10	A6004100G
Pursuit C18	5	A30000100GM
Pursuit C8	5	A30100100GM
Pursuit Diphenyl	5	A30200100GM
PLRP-S 100Å	10	PL1412-4100
PLRP-S 300Å	10	PL1412-4101
PL-SAX 1000Å	10	PL1451-4102



Prep to Process

Ordering Information

High efficiency bulk media (Quantity 100 g) continued

Description	Particle Size (μm)	Part No.
PL-SAX 4000Å	10	PL1451-4103
PL-SCX 1000Å	10	PL1445-4102
PL-SCX 4000Å	10	PL1445-4103

Prep to Process PLRP-S Columns

ID (mm)	Length (cm)	Particle Size (μm)	Pore Size (Å)	Part No.
25	5	10	1000	PL1212-1102
	5	10	4000	PL1212-1103
	15	8	100	PL1212-3800
	15	8	300	PL1212-3801
	15	10	100	PL1212-3100
	15	10	300	PL1212-3101
	15	10	1000	PL1212-3102
	15	10	4000	PL1212-3103
	15	30	1000	PL1212-3702
	15	30	4000	PL1212-3703
	30	8	100	PL1212-6800
	30	8	300	PL1212-6801
	30	10	100	PL1212-6100
	30	10	300	PL1212-6101
	30	10-15	100	PL1212-6400
	30	10-15	300	PL1212-6401
	30	15-20	100	PL1212-6200
	30	15-20	300	PL1212-6201
50	15	8	100	PL1712-3800
	15	8	300	PL1712-3801
	15	10	100	PL1712-3100
	15	10	300	PL1712-3101
	15	10	1000	PL1712-3102
	15	10	4000	PL1712-3103
	15	10-15	100	PL1712-3400
	15	10-15	300	PL1712-3401
	15	15-20	100	PL1712-3200
	15	15-20	300	PL1712-3201
	15	30	1000	PL1712-3702
	15	30	4000	PL1712-3703
	30	8	100	PL1712-6800
	30	8	300	PL1712-6801

For other quantities see www.varianinc.com

PLRP-S: Rigid Polymeric Materials for Reverse Phase Prep to Process Separations

- Discovery stage to multi-kg cGMP production reduces method development time
- Chemical stability for separations, sanitation and regeneration increases selectivity and column lifetimes
- Single batch packing of multiple columns reduces system down time and validation costs

The PLRP-S media, rigid poly(styrene/divinylbenzene) particles, are available in a range of pore sizes for small molecule, synthetic biomolecule and macromolecule purification. Their thermal and chemical stability makes them ideal for purifications that require extreme conditions for sample preparation, compound elution and column regeneration.

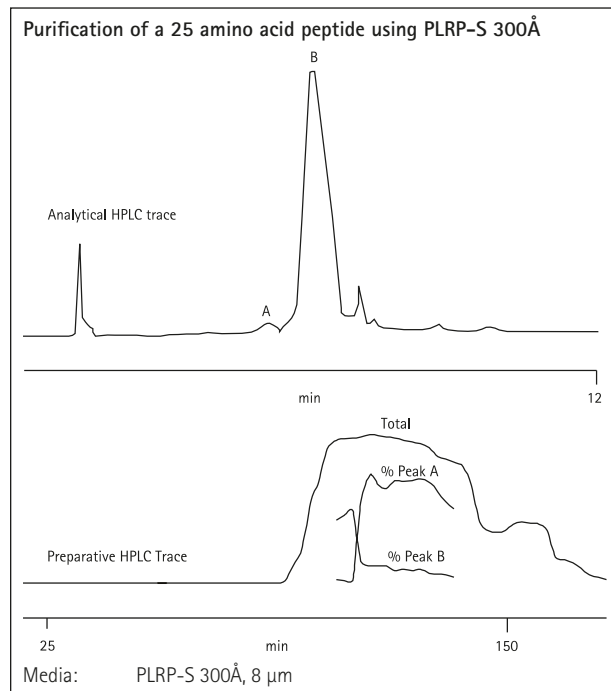
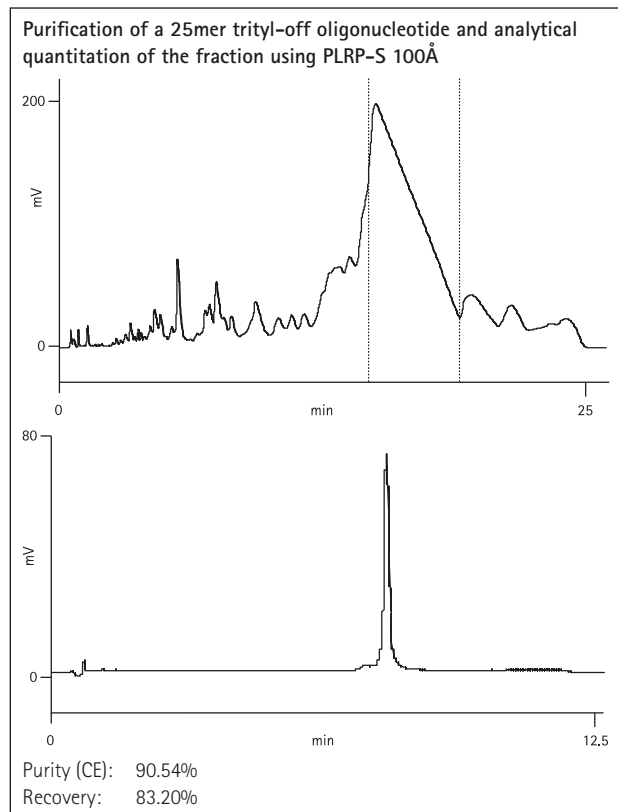
Capacity and resolution are two key parameters for maximizing the throughput of a purification. With the wide choice of pore sizes and extended range of operating conditions, PLRP-S provides more options to achieve the optimum process. Particle sizes range from 3 μm to 50 μm for scale-up from the μg/mg discovery stage to multi-kg cGMP production. Excellent chemical stability, including to 1M NaOH, permits sanitation and regeneration that increase column lifetimes. Finished product batch sizes of up to 600 L are available providing single batch packing of multiple columns.

As part of our commitment to quality and continuity of supply, all manufacturing is carried out under a fully documented manufacturing process. A Type II Drug Master File and regulatory support files are available for the process materials and facility audits are routinely conducted.

PLRP-S Prep to Process Application Guide

Application	PLRP-S Media Pore Size			
	100Å	300Å	1000Å	4000Å
Synthetic biomolecules, peptides and oligonucleotides	•	•		
Recombinant biomolecules, peptides and proteins	•	•		
Large biomolecules, antibodies, DNA fragments			•	•
Small molecules, unstable compounds including metal sensitivity	•			

Prep to Process: PLRP-S



References

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Näslund, J, Karlström, AR, Tjernberg, LO, Schierhorn, A, Terenius, L and Nordstedt, C (1996) High-resolution separation of amyloid β -peptides: structural variants present in Alzheimer's disease amyloid. *J. Neurochem*, 67, 294-301.

Nielsen, D, Millichip, M and Josefsen, K (2003) High-performance liquid chromatography purification of 26-bp serial analysis of gene expression ditags results in higher yields, longer concatemers, and substantial time savings. *Anal. Biochem.*, 313, 128-132.

Orwa, JA, Govaerts, C, Busson, R, Roets, E, Van Schepdael, A, and Hoogmartens, J (2001) Isolation and structural characterization of colistin components. *J. Antibiotics* (Tokyo), 54, 594-599.

Shiba, Y, Masuda, H, Watanabe, N, Ego, T, Takagaki, K, Ishiyama, K, Ohgi, T and Yano, J (2007) Chemical synthesis of a very long oligoribonucleotide with 2-cyanoethoxymethyl (CEM) as the 2'-O-protecting group: structural identification and biological activity of a synthetic 110mer precursor-microRNA candidate. *Nucleic Acids Res.*, 35, 3287-3296.



Prep to Process: PLRP-S

Ordering Information

Prep to Process Evaluation PLRP-S Columns

ID (mm)	Length (cm)	Particle Size (μm)	Pore Size (Å)	Part No.
4.6	15	8	100	PL1512-3800
	15	8	300	PL1512-3801
	15	10	100	PL1512-3100
	15	10	300	PL1512-3101
	15	10	1000	PL1512-3102
	15	10	4000	PL1512-3103
	15	10-15	300	PL1512-3401
	15	15-20	100	PL1512-3200
	15	15-20	300	PL1512-3201
	15	30	1000	PL1512-3702
	15	30	4000	PL1512-3703
	25	8	100	PL1512-5800
	25	8	300	PL1512-5801
	25	10	100	PL1512-5100
	25	10	300	PL1512-5101
	25	10	1000	PL1512-5102
	25	10	4000	PL1512-5103
	25	10-15	100	PL1512-5400
	25	10-15	300	PL1512-5401
	25	15-20	100	PL1512-5200
	25	15-20	300	PL1512-5201
	25	30	1000	PL1512-5702
	25	30	4000	PL1512-5703

Ordering Information

PLRP-S bulk media

Quantity	Particle Size (μm)	Pore Size (Å)	Part No.
1 kg	8	100	PL1412-6800
	8	300	PL1412-6801
100 g	10	100	PL1412-4100
	10	300	PL1412-4101
	10	1000	PL1412-4102
	10	4000	PL1412-4103
1 kg	10	100	PL1412-6100
	10	300	PL1412-6101
	10	1000	PL1412-6102
	10	4000	PL1412-6103
100 g	10-15	100	PL1412-4400
	10-15	300	PL1412-4401
1 kg	10-15	100	PL1412-6400
	10-15	300	PL1412-6401
100	15-20	100	PL1412-4200
	15-20	300	PL1412-4201
1 kg	15-20	100	PL1412-6200
	15-20	300	PL1412-6201
100	30	1000	PL1412-4702
	30	4000	PL1412-4703
1 kg	30	1000	PL1412-6702
	30	4000	PL1412-6703
100 g	50	100	PL1412-4K00
	50	200	PL1412-4K05
	50	300	PL1412-4K01
	50	1000	PL1412-4K02
1 kg	50	100	PL1412-6K00
	50	200	PL1412-6K05
	50	300	PL1412-6K01
	50	1000	PL1412-6K02

For information on larger quantities of bulk media, please contact your local sales office

See Also

- Load & Lock™ Packing Station, the ultimate in prep to process columns, page 272

Prep to Process: PL-SAX and PL-SCX

PL-SAX and PL-SCX: Specifically Designed for Biomolecule Purifications

- Ion exchange purifications over a wider pH range extend applications
- HPLC flow rates and rapid equilibration reduce purification cycle times
- Large pore size for improved mass transfer delivers high speed, high resolution purifications

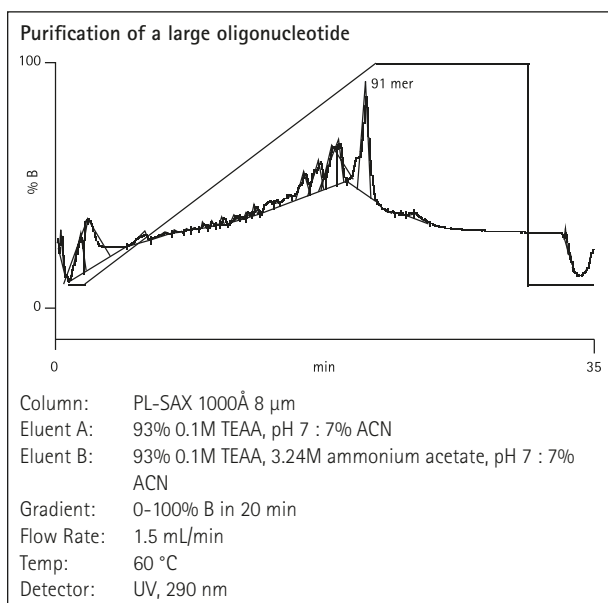
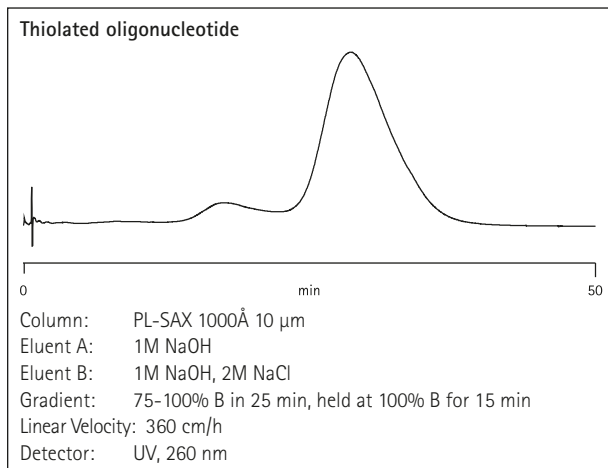
These rigid, strong ion exchange materials are extremely hydrophilic and are designed for purification of biomolecules. The PL-SAX and PL-SCX materials are totally polymeric and are chemically and thermally stable over the full range of HPLC conditions. The strong ion exchange functionalities, covalently linked to a chemically stable polymer, facilitate ion exchange purifications over a wider pH range. This stability can be exploited not only for column sanitation and clean-up but also enables the use of denaturing conditions and stabilizing/solubilizing agents for the purification of target compounds that may associate or degrade under the purification conditions, for example in the purification of synthetic oligonucleotides with self complementary sequences.

Both the 1000Å and 4000Å wide pore materials are mechanically stable and robust and can be operated over a wide range of linear velocities, with fast loading of dilute solutions and wash cycles. HPLC flow rates and rapid equilibration reduces the purification cycle times.

Packing in dynamic axial compression (DAC) column hardware is straightforward and high efficiency columns are achieved with excellent reproducibility and lifetimes. The 1000Å pore size is for high capacity purifications and the 4000Å gigaporous particles with improved mass transfer are intended for large biomolecules and high speed, high resolution purifications.

See Also

- PLRP-S, ideal for small molecule separations, page 243
- PL-SAX, strong anion exchange analytical material, page 250
- PL-SCX, strong cation exchange analytical material, page 252
- Load & Lock™ Packing Station, the ultimate in prep to process columns, page 272



Technical Specifications

Characteristics	PL-SAX	PL-SCX
Matrix	Fully polymeric	Fully polymeric
Pore Sizes	1000Å, 4000Å	1000Å, 4000Å
Particle Sizes (1000Å, 4000Å)	10 µm, 30 µm	10 µm, 30 µm
Bead Form	Rigid, spherical	Rigid, spherical
Functionality	Quaternary amine	Sulfonic acid
Pressure Stability	3000 psi	3000 psi
Temperature Stability	80 °C	80 °C
pH Range	1 to 14	1 to 14
Eluent Compatibility	All anion exchange buffers	All cation exchange buffers
Packed Bed Density	0.39 g/mL	0.39 g/mL



Prep to Process: PL-SAX and PL-SCX

Ordering Information

PL-SAX, Prep to Process Columns

ID (mm)	Length (cm)	Particle Size (μm)	Pore Size (Å)	Part No.
4.6	15	10	1000	PL1551-3102
	15	10	4000	PL1551-3103
	15	30	1000	PL1551-3702
	15	30	4000	PL1551-3703
	25	10	1000	PL1551-5102
	25	10	4000	PL1551-5103
	25	30	1000	PL1551-5702
	25	30	4000	PL1551-5703
7.5	5	8	1000	PL1151-1802
	5	8	4000	PL1151-1803
	15	8	1000	PL1151-3802
	15	8	4000	PL1151-3803
25.0	5	10	1000	PL1251-1102
	5	10	4000	PL1251-1103
	15	10	1000	PL1251-3102
	15	10	4000	PL1251-3103
	15	30	1000	PL1251-3702
	15	30	4000	PL1251-3703
50.0	15	10	1000	PL1751-3102
	15	10	4000	PL1751-3103
	15	30	1000	PL1751-3702
	15	30	4000	PL1751-3703
100.0	30	10	1000	PL1851-2102
	30	10	4000	PL1851-2103
	30	30	1000	PL1851-3102
	30	30	4000	PL1851-3103

PL-SAX, bulk media

Weight	Particle Size (μm)	Pore Size (Å)	Part No.
100 g	10	1000	PL1451-4102
	10	4000	PL1451-4103
	30	1000	PL1451-4702
	30	4000	PL1451-4703
	30	4000	PL1451-4703
1 kg	10	1000	PL1451-6102
	10	4000	PL1451-6103
	30	1000	PL1451-6702
	30	4000	PL1451-6703
	30	4000	PL1451-6703

Ordering Information

PL-SCX, Prep to Process Columns

ID (mm)	Length (cm)	Particle Size (μm)	Pore Size (Å)	Part No.
4.6	15	10	1000	PL1545-3102
	15	10	4000	PL1545-3103
	15	30	1000	PL1545-3702
	15	30	4000	PL1545-3703
	25	10	1000	PL1545-5102
	25	10	4000	PL1545-5103
	25	30	1000	PL1545-5702
	25	30	4000	PL1545-5703
7.5	5	8	1000	PL1145-1802
	5	8	4000	PL1145-1803
	5	30	1000	PL1451-670
25.0	5	10	1000	PL1245-1102
	5	10	4000	PL1245-1103
	15	10	1000	PL1245-3102
	15	10	4000	PL1245-3103
	15	30	1000	PL1245-3702
	15	30	4000	PL1245-3703
50.0	15	10	1000	PL1745-3102
	15	10	4000	PL1745-3103
	15	30	1000	PL1745-3702
	15	30	4000	PL1745-3703
100.0	30	10	1000	PL1845-2102
	30	10	4000	PL1845-2103
	30	30	1000	PL1845-3102
	30	30	4000	PL1845-3103

PL-SCX, bulk media

Weight	Particle Size (μm)	Pore Size (Å)	Part No.
100 g	10	1000	PL1445-4102
	10	4000	PL1445-4103
	30	1000	PL1445-4702
	30	4000	PL1445-4703
1 kg	10	1000	PL1445-6102
	10	4000	PL1445-6103
	30	1000	PL1445-6702
	30	4000	PL1445-6703

For information on larger quantities of bulk media, please contact your local sales office.



Prep to Process: SepTech™

SepTech C18 Reverse Phase Media: Designed for Prep to Process HPLC

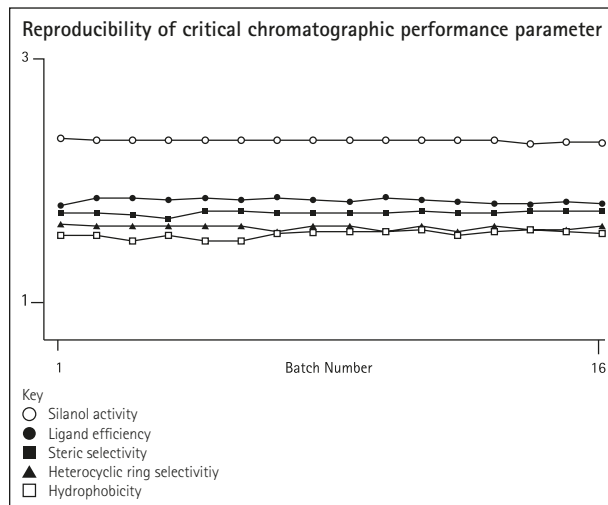
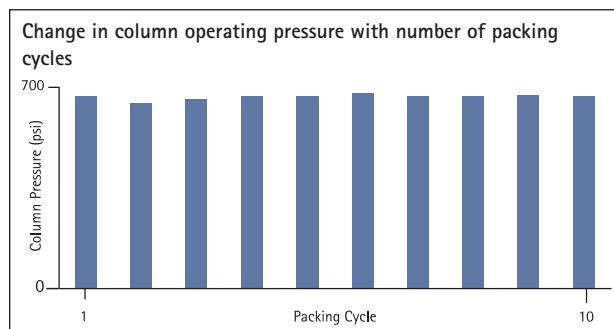
- Symmetrical peaks improve yield of high purity product
- High capacity delivers maximum throughput
- Narrow particle size distribution improves packed bed stability

SepTech media has been developed specifically for prep to process HPLC, from the definition of the base silica particle, pore sizes, pore volume, specific surface area, mechanical strength and particle size distribution through to the bonding chemistry, ligand density and end capping. The result is two products; SepTech ST60 10-C18 - optimized for small molecule purifications, and SepTech ST150 10-C18 - the preferred option for larger, natural molecules and biomolecules.

The high level of batch-to-batch reproducibility and particle integrity give consistent performance and ease of column packing which are essential for minimizing production downtime. SepTech media helps you meet the demands of a robust and economical process by purifying the maximum amount of product at the required purity in the shortest period of time.

Technical Specifications

Characteristics	SepTech ST60 10-C18	SepTech ST150 10-C18
Nominal Particle Size	10 µm	10 µm
Nominal Pore Size	60Å	150Å
Nominal Distribution	<2 d90/d10	<2 d90/d10
Shape	Spherical	Spherical
Silica Purity	99.999%	99.999%
Chemistry	Octadecyl	Octadecyl
End Capping	Yes	Yes
Carbon Load	25%	15%
Ligand Coverage	3.5 µmol/m ²	3.8 µmol/m ²
Working pH Range	1.5 - 10	1.5 - 10



Ordering Information

SepTech ST60 10-C18

Description	ID (mm)	Length (cm)	Part No.
Method Development Column	4.6	25	A8060250X046
Dynamax™ Packed Cartridge Modules	10.0	50	A8060050DG100
	10.0	250	A8060250DM100
	21.2	50	A8060050DG214
	21.2	250	A8060250DM214
	41.4	50	A8060050DG414
Bulk Media	41.4	250	A8060250DM414
	100 g		A80600100G
	1 kg		A8060001KG

SepTech ST150 10-C18

Description	ID (mm)	Length (cm)	Part No.
Method Development Column	4.6	25	A8150250X046
Dynamax Packed Cartridge Modules	10.0	50	A8150050DG100
	10.0	250	A8150250DM100
	21.2	50	A8150050DG214
	21.2	250	A8150250DM214
	41.4	50	A8150050DG414
Bulk Media	41.4	250	A8150250DM414
	100 g		A81500100G
	1 kg		A8150001KG

For information on larger quantities of bulk media please contact your local sales office.



FlowTrap™

FlowTrap Accelerated Compound Enrichment: Revolutionary Compound Isolation from Prep Fractions

- Reduced dry down times improve productivity
- Desalting *in situ* preserves compound integrity
- Retentive sorbent handles a wide range of sample pH and pK_a

FlowTrap is a groundbreaking technology that revolutionizes the way in which compounds can be isolated from preparative HPLC fractions and other highly aqueous solutions.

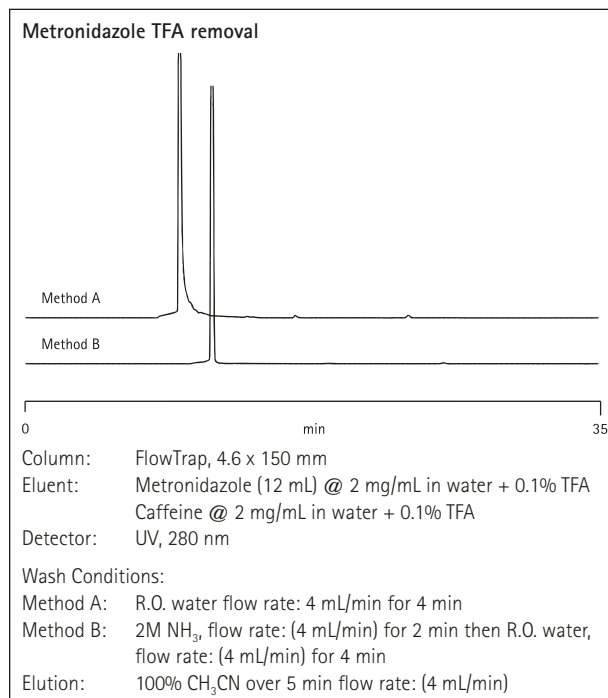
FlowTrap columns contain ultra retentive, high capacity, and hydrophobic polymeric material that captures and concentrates small molecules. Once trapped, the desired analyte can be back eluted using a small volume of volatile organic solvent, affording simple compound isolation. FlowTrap columns give you excellent retention and easy elution. The efficiency of the packed bed delivers superior reproducibility and can be used for up to 500 flow-trapping cycles when run under optimized conditions.

With FlowTrap you can solvent switch from a high volume of water-based HPLC eluent to a low volume of volatile solvent, dramatically reducing the evaporation times needed for compound isolation. Ion pairing reagents such as TFA can be removed from the compound during trapping, allowing the isolation of freebase compounds and reducing the risk of potential compound hydrolysis.

FlowTrap is available in standard HPLC column hardware covering a range of column sizes that handle seamless scale-up as compound batch sizes increase. Using FlowTrap columns will help you dramatically reduce dry-down times, increasing throughput for compound recovery.

Typical Applications

Removal of ion pairing reagents



Ordering Information

FlowTrap

Dimensions (mm)	Capacity Range* (mg)	Part No.
150 x 4.6 (pair)	50	PL1560-3M07
150 x 7.5 (pair)	50-150	PL1160-3M07
150 x 10.0 (pair)	150-200	PL1060-3M07
150 x 21.2 (pair)	200-400	PL1E60-3M07

* Recommendation only, based on representative loading studies. Capacity will vary according to compound type and eluent constitution.

Load & Lock™ Preparative HPLC Systems

Load & Lock Columns and Packing Station: The Ultimate in Prep to Process Columns

Varian offers a complete range of Load & Lock column systems for laboratory and process preparative LC. They are designed to enable users to easily and quickly pack their own preparative high efficiency columns. This is the right solution for applications ranging in scale from discovery (milligrams) to production (multi-kilos) of pharmaceutical compounds, peptides, and natural products. Our Load & Lock columns have a unique fluid/sample distribution system to maximize productivity. It is the only system that provides dynamic axial compression (DAC) and static "locked" axial compression (SAC) and is designed for easy operation to deliver greater convenience.

Laboratory Load & Lock Columns: High Quality Purification

- Mobile packing station supports three different column sizes
- Runs on compressed air with no need for a power supply
- Quick and easy packing and unpacking within minutes

Varian's laboratory scale Load & Lock columns combine excellent packed bed stability with enhanced flow distribution to deliver the highest quality purification possible with maximum speed, flexibility and ease of operation. Three different column sizes are supported, 1 in., 2 in. and 3 in. ID. Because the station is powered by compressed air it is the perfect solution for hazardous environments. The quick release single bolt clamp offers speedy and easy packing and unpacking within minutes.



Process Load & Lock Columns: High Volume and High Quality Purification

- Integrated, mobile, easy-to-handle hydraulic packing station
- Scalable up to 24 in. ID in many column lengths and pressure ratios
- Customized column sizes are also available

Our Load & Lock process column systems have increased column ID for producing gram to multi-kilogram quantities with the SepTech™ Skid process solvent delivery systems. An integrated stand ensures safe and convenient movement of the system. The process packing station and column are built as one sturdy integrated unit for ease-of-use and long lifetimes. Depending on the design, the process columns have a hydraulic mechanism to tilt the column 90° for ease of unpacking, using the plunger to push out the used sorbent.

Ordering Information

Load & Lock Columns

Description ¹	Water Jacket	ID (mm)	Length (cm)	Part No.
LEL 4001 Column	No	25	50	PCG93LL500X25
	Yes	25	50	PCG93LL500X25WJ
	Column Spare Parts Kit			PCG931AAKIT
LEL 4002 Column ²	No	50	50	PCG93LL500X50
	Yes	50	50	PCG93LL500X50WJ
	Column Spare Parts Kit			PCG932AAKIT
LEL 4003 Column ²	No	75	50	PCG93LL500X75
	Yes	75	50	PCG93LL500X75WJ
	Column Spare Parts Kit			PCG933AAKIT
Mobile Packing Station (air driven hydraulic)				PCG93LLSTAND123

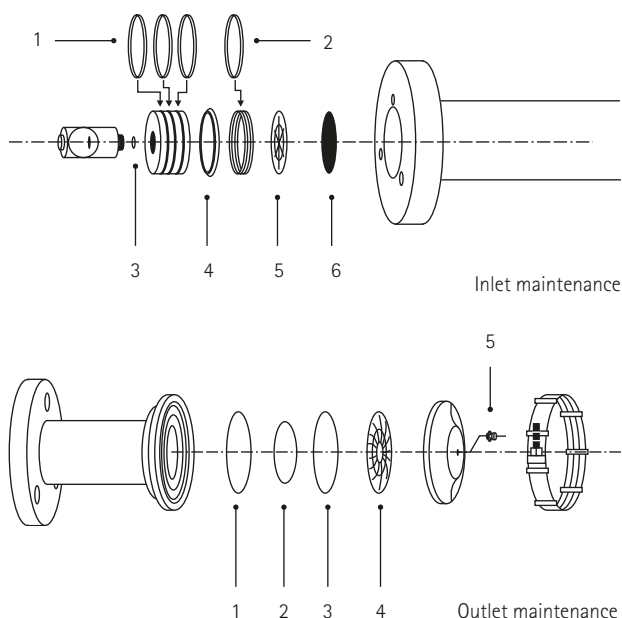
1. Every Load & Lock column is supplied with a tripod stand, a plastic packing reservoir, pressure seals, o-rings, and gaskets.

The 1 in., 2 in., and 3 in. ID columns do not include the required packing devices.

2. A shorter version is available



Load & Lock™ Preparative HPLC Systems



Ordering Information

Inlet maintenance

Item	Description	ID (in.)	Part No.
1	Compression Head O-ring, TFE	1	PCG60136088112
	Compression Head O-ring, TFE	2	PCG60136175194
	Compression Head O-ring, TFE	3	PCG60136269294
	Compression Head O-ring, PEEK™	3	PCG933A2LL3GR
2	Frit O-ring Seal, TFE	1	PCG60136094106
	Frit O-ring Seal, TFE	2	PCG60136174188
	Frit O-ring Seal, TFE	3	PCG60136274288
3	Inlet Distribution Plate, 316 SS	2	PCG60136025038
	Inlet Distribution Plate, 316 SS	3	PCG60130EN050069
4	Spring Seal PTFE	1	PCG60160069096
	Spring Seal PTFE	2	PCG60160171196
	Spring Seal PTFE	3	PCG60169269294
5	Inlet Distribution Plate, 316 SS	1	PCG931A12102
	Inlet Distribution Plate, 316 SS	2	PCG932A12102
	Inlet Distribution Plate, 316 SS	3	PCG933A12102
6	Inlet Frit, 316 SS	1	PCG931A2LL11F
	Inlet Frit, 316 SS	2	PCG932A2LL21F
	Inlet Frit, 316 SS	3	PCG933A2LL31F

Ordering Information

Outlet maintenance

Item	Description	Material	ID (in.)	Part No.
1	Cap O-ring Seal	EDPM	2	PCG60130250263
	Cap O-ring Seal	EDPM	3	PCG60130375400
	Cap O-ring Seal	TFE	1	PCG60136125138
	Cap O-ring Seal	TFE	2	PCG60136250263
	Cap O-ring Seal	TFE	3	PCG60136375400
2	Frit O-ring Seal	EDPM	2	PCG60130213225
	Frit O-ring Seal	EDPM	3	PCG60130313338
	Frit O-ring Seal	TFE	1	PCG60136113125
	Frit O-ring Seal	TFE	2	PCG60136213225
	Frit O-ring Seal	TFE	3	PCG60136313338
3	Outlet Frit	316 SS	1	PCG931A2LL10F
	Outlet Frit	316 SS	2	PCG932A2LL20F
	Outlet Frit	316 SS	3	PCG933A2LL30F
4	Outlet Distribution Plate	316 SS	1	PCG931A12202
	Outlet Distribution Plate	316 SS	2	PCG932A12202
	Outlet Distribution Plate	316 SS	3	PCG933A12202
5	Tube Ftg. O-ring Seal 316SS / BUNA	316 SS	1	PCG361420101
	Tube Ftg. O-ring Seal 316SS / BUNA	316 SS	2, 3	PCG361420202

For large scale purification, we manufacture customized process columns in a variety of inner diameters, lengths, and pressure ranges.

Please contact your local Varian, Inc. office or distributor for Process Load & Lock Column configurations and ordering information.

See Also

- HPLC bulk packing materials, page 265

HPLC Supplies – Mobile Phase Handling

Degassit™ On-line Solvent Degassers: Automated Solvent Degassing

- Enhances sensitivity for more consistent results
- Stabilizes baselines for improved chromatography
- Eliminates helium sparging and sonication to reduce costs

Degassit units are placed in-line between the solvent reservoir(s) and the pump. The HPLC pump draws solvent through the Degassit gas-permeable tubing that snakes through a vacuum chamber encased within the unit. As the eluent moves through the Degassit unit, the vacuum generated by the built-in vacuum pump selectively removes dissolved gases from the eluent through the semi-permeable tubing and into the vacuum chamber.

Degassit units can be used with a single HPLC system, or with several HPLC systems in relatively close proximity. Also, a single solvent can be run through two or more input lines in series to provide extremely thorough degassing for ultra-sensitive applications such as micro-LC. The units are available for a wide range of solvent flow rates for micro, analytical, and preparative applications. These instruments are compatible with a wide variety of solvents including buffered mobile phases, low and high pH solutions, and organics such as THF, methylene chloride, etc.

Ordering Information

4 channels

mL/min	Part No.
1	A6313
3	A6414
50	A6342

Solvent Filtration/Degassing System: Filters, Degasses, Stores and Delivers Solvents

- Eliminates pour-and-wait funnel filtration to save time
- Conical reservoir ensures complete delivery to improve efficiency
- Fifth valve on the cap allows for solvent recycling to reduce costs

Ordering Information

Description	Part No.
Solvent Filtration Kit. Use with Solvent Reservoir	R00038400
Conical Reservoir, 2 L	R000S90102

Hastelloy® C Mobile Phase Inlet Filter: Slip Fit with 1/16 in. or 1/8 in. Tubing

The Hastelloy C filter has a porosity of 2 µm and operates up to 500 °C. It is compatible with halogenated solvents.



Ordering Information

Description	Part No.
1/8 in. Tubing	AL9402

Slip-on SS Mobile Phase Inlet Filter: Slip fit ID of Tubing

This filter is constructed from 316 SS and has a porosity of 2 µm or 10 µm. Maximum temperature is 500 °C.



Ordering Information

Description	Part No.
For 0.062 in., 1.5 mm ID Tubing. 10 µm	AL28863
For 0.120 in., 3.0 mm ID Tubing. 2 µm	AL28869

HPLC Supplies – Pump Accessories

Solvent Filter Holder: The Best Choice for HPLC Solvent and Mobile Phase Filtration

- Particulate contamination worries are eliminated
- No extractables or wetting agents avoids contamination
- For use with 47 mm membrane filters to prevent system damage

Ordering Information

Description	Part No.
Complete Solvent Filter Apparatus	R000038140

Upchurch Mobile Phase Inlet Filter

Ordering Information

Description	Part No.
10 µm SS Filter Kit with 1/8 in. x 3 ft. PTFE Tubing, 100 mL/min max, 5 kit	UCA200
10 µm SS Filter for 1/16 in. ID Tubing, Prep, 100 mL/min max.	UCA311
10 µm UHMWPE Filter for 1/16 in. Tubing, 5 mL/min max	UCA426
10 µm UHMWPE Bottom-of-the-Bottle Filter for 1/8 in. Tubing	UCA446

SSI Pulse Damper: Constant Flow for Flow Sensitive Detectors

- Rated to 6000 psi
- Low dead volume, only 900 µL at 6000 psi
- Connections for standard 1/4–28 SSI fittings

Ordering Information

Description	Part No.
LO-Pulse Pulse Damper, PEEK, with Cabinet	R000200220

ASI Low Volume PEEK™ Static Mixers: Avoid Contamination from Metal Ions

- PEEK construction avoids risk of metal contamination
- Used in Helix (dHPLC) system
- Max. pressure 5000 psi (4000 psi for binary/tertiary)



Ordering Information

Description	Part No.
PEEK Binary Tee Mixer Assembly, 50 µL	AS4120050B
PEEK Binary Tee Mixer Assembly, 150 µL	AS4120150B
PEEK Binary Tee Mixer Assembly, 250 µL	AS4120250B

ASI Low Volume Static Mixers: Improve Gradient Accuracy

- Suitable for flow rates 10 µL/min or above
- Reduced baseline noise for trace analysis
- Increased sensitivity

These low volume mixers are constructed from 316 stainless steel and withstand up to 10,000 psi.



Ordering Information

Description	Part No.
In-Line Mixer Assembly, 250 µL	AS4110250
Ternary Tee Mixer Assembly, 250 µL	AS4130250
Mixer Cartridges, 50 µL	AS4100050
Mixer Cartridges, 150 µL	AS4100150
Binary Tee Mixer Assembly, 50 µL	AS4120050

HPLC Supplies – Pump Accessories

Varian Back-Pressure Regulators: Stop Bubbles from Forming in the Flow Cell

- Easily adjusts by hand with no cartridges to change
- Constant backpressure, even with changing flow, prevents bubble formation
- Ultra-low dead volume, under 0.6 μL , preserves sample integrity



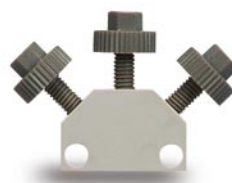
Ordering Information

Description	Part No.
100-600 psi	AL39023
15-1500 psi	AL39024

All pressure ranges available on our Web site

PEEK™ Mixing Tee: Better Mixing Than a Conventional Tee

- Inert, metal-free construction prevents contamination
- Ideal for high-pressure gradient mixing
- Withstands pressure in excess of 6000 psi

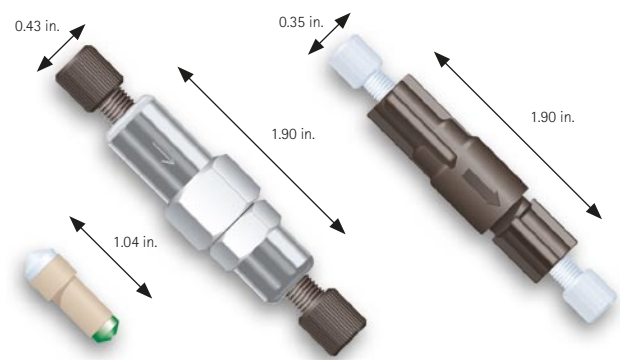


Ordering Information

Description	Part No.
Mixing Tee w/Fittings	AL32157

Upchurch Back-Pressure Regulators: Cartridge System with a Variety of Pre-set Pressures

The regulators are made from SS and biocompatible PEEK.



Ordering Information

With Cartridge

Description	Part No.
40 psi Cartridge	UCP785

ASI High Flow Static Mixers: In-line Static Mixer for 100 $\mu\text{L}/\text{min}$ or Above

- Reduced baseline noise for better quantification
- Increased sensitivity
- Improved gradient accuracy

Made from 316 stainless steel and able to withstand up to 10,000 psi, these mixers are designed for high flow rates. Always select the highest volume that will still provide an acceptable delay time.



Ordering Information

Description	Part No.
In-Line Mixer Assembly, 350 μL	AS4210350
In-Line Mixer Assembly, 500 μL	AS4210500
Binary Tee Mixer Assembly, 350 μL	AS4220350

HPLC Supplies – Sample Injection

Rheodyne Sample Injection Valves – 7725 and 7725i: Most Advanced Injectors for Analytical HPLC

- Continuous flow during switching (Make-Before-Break) extends column lifetimes
- Stainless steel and PEEK™ for wide sample compatibility
- Wide port angles make for easy access

With easy seal replacement and maintenance, 7000 psi maximum pressure and a 20 µL sample loop, the Model 7725 and 7725i injection valves are the most highly developed injectors for HPLC.

Ordering Information

Injection valves

Description	Part No.
7725 No Position Sensing Switch, SS	RE7725
7725i with Built-in Position Sensing Switch, SS	RE7725I
7725i with Built-in Position Sensing Switch, Titanium	RE7725I005

Rheodyne Sample Injection Valves – Model 9725 and 9725i PEEK: Biocompatible Versions of the 7725, 7725i

- Make-Before-Break architecture virtually eliminates transient pressure shocks
- Zero sample loss preserves sample integrity
- Small diameter internal flow paths assure minimal dispersion

Ordering Information

PEEK injection valves

Description	Part No.
9725 No Position Sensing Switch, PEEK	RE9725
9725i with Built-in Position Sensing Switch, PEEK	RE9725I

Rheodyne PEEK Sample Loops: Rheodyne Fittings and Ferrules Included



Ordering Information

PEEK loops

For Valve Model	Volume	Part No.
All Except 3725i	10 µL	RE9055021
	20 µL	RE9055022
	50 µL	RE9055023
	5 mL	RE9055029

Rheodyne RheBuild™ Kits for Injection Valves

Genuine Rheodyne parts for your specific valve, including standard rotor seal, stator face assembly (front-loading valves), isolation seal, needle guide, needle port cleaner, operating instructions, mini manual and two hex keys.

Ordering Information

Front-loading valves

Description	Part No.
For 7725, 7725i, 7726	RE7725999

Replacement rotor seals

Description	Part No.
For 7125/7126, 7725/7725I Valves	RE7125047
	RE7125079*

* Tefzel™, pH range 1-14

Replacement stators

Description	Part No.
For 7725, 7725I Valves	RE7725010

HPLC Supplies – Syringes

Hamilton 700 Series MICROLITER HPLC Syringes with Cemented Needles (N): High Precision Delivery of Gas and Liquids

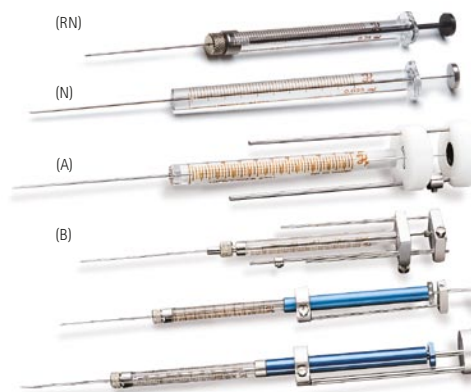
- Needles are cemented into the glass barrel precisely at zero
- Dead volume is limited to the internal diameter of the needle
- For standard syringes the needle diameter is determined by the syringe volume



Hamilton 1700 Series GASTIGHT HPLC Syringes with Cemented (N) or Removable Needles (RN)

- Gas-tight fit prevents leakage
- Chemically inert fluid path stops interferences
- Needles seat precisely at the zero graduation mark for exceptional accuracy

The PTFE tip creates a gas-tight fit against the interior of the glass barrel. This makes the syringe ideal for gas and liquids. The fluid path of the gastight syringes is designed to be chemically inert with stainless steel, borosilicate glass and a PTFE tip. The plunger on GASTIGHT syringes has a PTFE tip and its replaceable RN needles are interchangeable. The design allows the needles to seat precisely at the zero graduation mark of the syringe. You can select the needle gauge, length, and point style to optimize the syringe for your own applications.



Ordering Information

Cemented needle syringes (N) (blunt tip, 2 in. needles)

Description	Part No.
50 μ L, 1705, 22s/2/3	HM80975
100 μ L, 1710, 22s/2/3	HM81075

Removable needle syringes (RN) (blunt tip, 2 in. needles)

Description	Part No.
50 μ L, 1705RNR, 22s/2/3	HM80965
100 μ L, 1710RNR, 22s/2/3	HM81065
500 μ L, 1750RNR, 22/2/3	HM81265

Hamilton guides and Chaney adapters

Description	Part No.
(A): Guide for 701	HM14806
(A): Guide for 702-750	HM14906
(B): Chaney Adapter for 701, 75	HM14700

Ordering Information

Blunt tip, 2 in. needles

Description	Part No.
10 μ L, 701SN, 26s/2/3	HM80383
25 μ L 702SN, 22s/2/3	HM80465
50 μ L, 705SN, 22s/2/3	HM80565
250 μ L, 725SN, 22/2/3	HM80765
500 μ L, 750SN, 22/2/3	HM80865

The plungers and syringe barrels are not interchangeable or replaceable on these syringes.

HPLC Supplies – High Pressure Fittings

Varian Fittings Kits: The Most Useful Fittings and Tubing

- Comprehensive kits of Varian, SSI, Rheodyne and Valco parts
- Contains only the most useful fittings to reduce costs
- All-in-one kit improves productivity

Conveniently stored in one place, you will always find what you need to keep your system running. These kits include selections from our Universal and Flange-Free fittings, as well as genuine SSI, Rheodyne and Valco fittings. The kits also include precut, stainless steel tubing and a pair of tweezers for small, hard-to-handle parts, such as ferrules.

Fittings Kit for Varian Rheodyne Valve Contains:

Nuts: 5 Universal SS Male Nuts, 2 Two-Piece Fingertights, 5 Univ. Wrench/Fingertights, 6 1/16 in. Flange-Frees

Ferrules: 10 Universal SS Ferrules, 4 Ferrules for Two-Piece Fingertights, 10 Double-Sided Ferrules, 6 1/16 in. Flange-Free Ferrules

Plugs: 2 10-32 Plugs, Rheodyne

Products: 4 Bushings, 2 Long Bushings, 2 Extra-long Bushings, 10 Ferrules

Unions: 1 PEEK™ Female Union

Ordering Information

Description	Part No.
Fittings Kit for Varian, Rheodyne Valve	AL97153

Fittings Kit for Varian Valco Valve Contains:

Nuts: 5 Universal SS Male Nuts, 2 Two-Piece Fingertights, 5 Univ. Wrench/Fingertights, 6 1/16 in. Flange-Frees

Ferrules: 10 Universal SS Ferrules, 4 Ferrules for Two-Piece Fingertights, 10 Double-Sided Ferrules, 6 1/16 in. Flange-Free Ferrules

Plugs: 2 10-32 Plugs; Valco

Products: 6 Male Nuts, 6 Ferrules

Unions: 1 PEEK Female Union

Ordering Information

Description	Part No.
Fittings Kit for Varian, Valco Valve	AL97154

PEEK Fittings Kit Contains:

3 PEEK Unions, 10 Knurl-Lok One-Piece Fittings, 2 Knurl-Lok II Finger-Tight Fittings, 5 Standard Wrench/Finger-Tight Fittings, 5 Male-Female Wrench/Finger-Tight Fittings, 2 Knurl-Lok II Ferrules, 25 Double-Sided Ferrules, 10 1/16 in. OD x 0.01 in. ID PEEK Tubing, 10 1/16 in. OD x 0.02 in. ID PEEK Tubing, 2 0.01 in. ID x 1-5cm long Flex-Connect Tubing, 1 0.02 in. ID x 3-15cm long Flex-Connect Tubing

Ordering Information

Description	Part No.
PEEK Fittings Kit	AL97160

Varian Universal Fittings Kit Contains:

Nuts: 2 One-Piece Fittings, 15 Univ. Wrench/Fingertights

Ferrules: 30 Double-Sided Ferrules

Unions: 1 SS Male Union, 3 PEEK Female Unions

Adapters: 1 Universal Column Adapter

PEEK Tubing: Straight: 1 0.01 in. ID x 10 Feet, 1 0.02 in. ID x 10 Feet

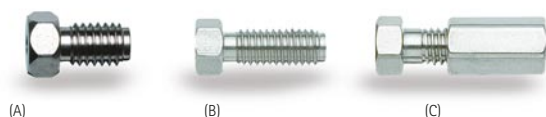
Ordering Information

Description	Part No.
Varian Universal Fittings Kit	AL97145

HPLC Supplies – High Pressure Fittings

Varian Stainless Steel HPLC Fittings: High Pressure Tubing Connections

Made from 300 Series stainless steel and capable of withstanding 500 °C and pressures up to 10,000 psi (7,000 psi for standard pressure caps and plugs). The thread type is 10-32 UNF.



Ordering Information

Caps, standard format (7000 psi)

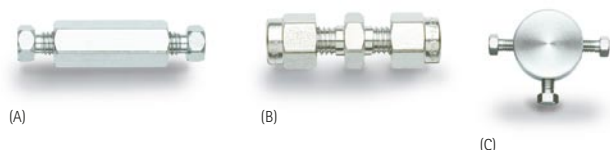
Description	Part No.
(C): 1/16 in. Cap	AL30606

Internal nuts (10,000 psi)

Description	Part No.
(A): 1/16 in. Nut (5/pk)	AL206085
(B): 1/16 in. Nut (5/pk)	AL286335

Varian Stainless Steel Connectors: For 1/16 in. OD Tubing

Made from 300 Series stainless steel and capable of withstanding 500 °C with SS ferrules and 100 °C with PEEK™ ferrules. Maximum pressures are 10,000 psi with SS ferrules and 8000 psi with PEEK ferrules. The thread type is 10-32 UNF.



Ordering Information

Tee

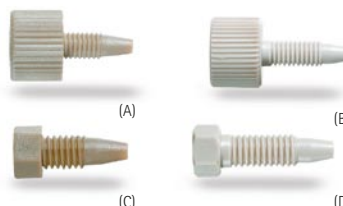
Description	Part No.
(C): SS 1/16 in. Tee	AL28629

Unions (6000 psi)

Description	Part No.
(B): SS 1/16 in. Male Union	AL10061
(A): SS 1/16 in. Female Union	AL28627
(A): SS Waters Union	AL97332

Varian One Piece Fingertight Fittings: For 1/16 in. OD Tubing

Manufactured from PEEK with a maximum temperature of 100 °C, and maximum pressures of 5000 psi (one piece) or 6000 psi (two piece). The thread type is 10-32 UNF.



Ordering Information

Description	Part No.
(A): Short Finger-Tight, Color Assorted (10/pk)	AL32070
(B): Long Finger-Tight, Color Natural (10/pk)	AL32235
(C): Short Hex Head, Color Black, Graph-Tite (10/pk)	AL32347
(C): Short Hex Head, Color Natural (10/pk)	AL32236
(D): Long Hex Head, Color Black, Graph-Tite (10/pk)	AL32349
(D): Long Hex Head, Color Natural (10/pk)	AL32238

Varian Two Piece Fingertight Fittings: Wingnut Design for Finger Tight Use to 6000 psi

Fits all conventional 10-32 port configurations and is made from 100% chemically inert PEEK.

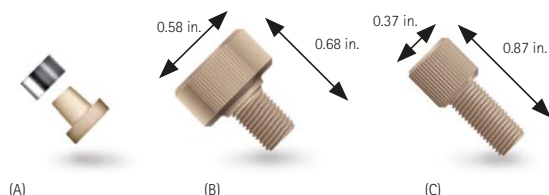


Ordering Information

Description	Part No.
(A): Natural (10/pk)	AL32326
(B): Replacement Ferrules (10/pk)	AL32335

HPLC Supplies – High Pressure Fittings

Upchurch Super-Flangeless Fittings: Holds to 5000 psi (or Tubing Burst Point, if Lower)



Ordering Information

Description	Part No.
Ferrule/Ring Set 1/8 in. (10/pk)	UCP350X

Upchurch Unions and Tees: Use for 1/16 in. and 1/8 in. OD Tubing

Made from PEEK™ and supplied with PEEK Fingertight III Fittings. The maximum temperature is 100 °C, with thread type 10-32 UNF and 1/4-28.

Ordering Information

Tee

Description	Part No.
10-32, 0.02 in., 0.51 mm Bore	UCP727

Unions (6000 psi)

Description	Part No.
10-32, 0.010 in., 0.25 mm Bore	UCP742
10-32, 0.020 in., 0.51 mm Bore	UCP704

Upchurch Adapters: 1/16 and 1/8 in. OD Tubing

Manufactured from 316 Stainless Steel or PEEK, with maximum pressure capability of 10,000 psi. The thread type is 10-32 UNF to 1/4-28.

Ordering Information

1/4-28 biocompatible adapters

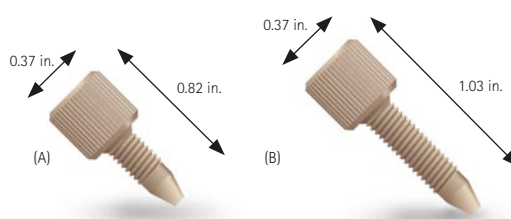
Description	Part No.
Luer Adapter, Female Luer to 1/4-28 Male, Tefzel™	UCP624

Connectors and adapters (high pressure)

Description	Part No.
(D): 1/8 in. to 1/16 in. OD Tubing (Includes 1/16 and 1/8 in. bushings and ferrules)	UC1592

Upchurch Fingertight Fittings: For 1/16 in. OD Tubing

The maximum temperature is 150 °C and maximum pressure 4000 psi (one piece) and 6000 psi (two piece).



Ordering Information

Upchurch one piece fingertight fittings

Description	Part No.
(A): Standard Fingertight, PEEK, 10-32 Thread (10/pk)	UCF120X
(B): Extra Long Fingertight, PEEK, 10-32 Thread (10/pk)	UCF130X

Upchurch two piece fingertight fittings

Description	Part No.
Replacement Ferrules for 1/4-28 Fittings (10/pk)	UCF162X

Upchurch Flangeless Fittings Kits: Compatible with all 1/4-28 Fitting Systems

Maximum pressure is 1000 psi for 1/16 in. and 500 psi for 1/8 in.

Ordering Information

Fittings Kits (For 1/16 and 1/8 in. OD tubing)

Description	Part No.
1/16 in. OD Tubing (12 nuts and ferrules)	ROPTF20KIT
1/8 in. OD Tubing (12 nuts and ferrules)	ROPTF30KIT

Upchurch LiteTouch® Fittings: High Pressure with Fingertight Convenience

These fittings prevent twisting of the polymer tubing as they are tightened. They should be used only on hard tubing, such as stainless steel, PEEK polymer, and titanium.

Ordering Information

Description	Part No.
LiteTouch Ferrules Set for 1/16 in. OD Tubing (10/pk)	UCLT100X

HPLC Supplies – Tubing

Color-Coded PEEK™ Tubing: For High-pressure HPLC Plumbing

The maximum temperature of this tubing is 100 °C. It is color-coded to ensure easy identification.



Ordering Information

1/16 in. OD

ID (in.)	Pressure Rating (psi)	Color	Part No.	
			10 ft	50 ft
0.005	7000	Red	AL35720	AL35721
		Red Striped		AL35715
0.007		Yellow	AL35722	AL35723
		Yellow Striped	AL35712	
0.01	5000	Blue	AL35728	AL35729
		Blue Striped	AL35702	
0.02		Orange	AL35726	AL35727
		Orange Striped	AL35708	
0.03	4000	Green	AL35724	AL35725
		Green Striped	AL35710	

1/8 in. OD

ID (in.)	Pressure Rating (psi)	Color	Part No.	
			10 ft	50 ft
0.062	5000	Natural	AL35716	AL35717
0.082	3000	Natural	AL35718	

Deluxe HPLC SS Tubing Kit: Comprehensive Kit Limits Downtime

- 'Insurance' against lost production
- 56 items specially chosen for maximum usefulness
- One kit serves several instruments to maximize value

Our Deluxe HPLC Stainless Steel Tubing Kit eliminates those times when you don't have that one piece of 1/16 in. tubing you really need. Every lab should have one of these kits as insurance against instrument down time caused by unexpected tubing problems.

No. of Pieces	Dimensions (cm x in. (mm))
10	5 x 0.01 (0.25)
10	10 x 0.01
5	20 x 0.01
10	5 x 0.02 (0.51)
10	10 x 0.02
5	20 x 0.02
2	5 x 0.03 (0.76)
2	10 x 0.03
2	20 x 0.03

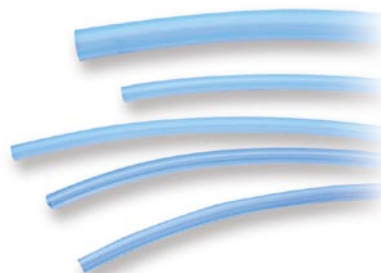
Ordering Information

1/16 in. SS tubing

Description	Part No.
Deluxe HPLC SS Tubing Kit	AL97131

Teflon® Tubing: For Low Pressure Plumbing

Made from highly inert Teflon with a maximum operating temperature of 100 °C.



Ordering Information

OD (in.)	ID (in.)	Pressure Rating (psi)	Part No.	
			10 ft	50 ft
1/16	0.020	1500		AL35668
1/8	0.063	300	AL20063	AL35671

Tubing

Standard Stainless Steel Tubing: Corrosion Resistant for HPLC Applications

Type 316 SS provides a maximum temperature capability of 500 °C and maximum pressure of 10,000 psi. It is supplied in economical 50 ft coils.



Ordering Information

(50 ft)

OD (in.)	ID (in.)	Part No.
1/16	0.010	AL3005
	0.020	AL3002
	0.030	AL3000
	0.040	AL3003
	0.050	AL3004
1/32	0.007	AL81951

SSI Tubing Cutters: For Smooth, Burr-free Cuts

This power cutter handles 1/16 in., 1/18 in. and 1/4 in. OD metal tubing. The finishing tool removes burrs and opens the ID of tubing as small as 0.008 in. With compact dimensions (8 in. x 6.25 in. x 4.25 in.; 20.3 cm x 15.8 cm x 10.8 cm), light weight (11 lb; 4.9 kg) and low power consumption (55 W), it is a valuable tool for any HPLC installation.

Ordering Information

Description	Part No.
SSI TC-20 SS Tubing Cutter, 115 VAC	A6212

Plastic Tubing Cutter: Cuts all Types of Plastic Tubing up to 1/8 in. OD

This compact (only 3 in. long) cutter is ideal for PEEK™, Tefzel™ and Teflon® tubing. It has a stainless steel blade that makes clean, right-angle cuts.

Ordering Information

Description	Part No.
Plastic Tubing Cutter	AL3206

Fraction Collector

Varian 440-LC Fraction Collector: Characterize Unknown Compounds After Collection

- Maximum flexibility with multiple collection modes
- Fast tray change saves time
- Compact and easy to use

The 440-LC fraction collector accommodates 7 to 50 mL capacity containers and a variety of racks, including Varian 940-LC autosampler racks, to suit your every requirement. Autosampler rack compatibility provides practical collect and re-inject capabilities.



Ordering Information

Description	Part No.
440-LC Fraction Collector	10089900
Polypropylene Tubes 16 mm OD x 125 mm high (125/pk)	37-100511-00
Spill tray (SPS3) 440 FC	66-100251-00

Collection Racks

Description	Part No.
Type 21 Rack for 21 x 30 mm OD Containers	66-100266-00
Type 24 Rack for 24 x 25 mm OD Containers	66-100265-00
Type 40 Rack for 40 x 20 mm OD Containers	66-100255-00
Type 60 Rack for 60 x 16 mm OD Containers	66-100254-00
Type 90 Rack for 90 x 13 mm OD Containers	66-100264-00
Rack Autosampler 4 mL x 128	79-100560-00
Rack Autosampler 2 mL x 200	79-100601-00
Fuse 3.15 A 440 FC	19-100107-00
Fuse 5 A 440 FC	19-100091-00

LC Detectors

Varian 356-LC Refractive Index Detector: Ideal for Non-absorbing Compounds

- Maximum sensitivity from low drift baseline delivers outstanding detection limits
- "Flow-efficient" cell ideal for separations that demand high resolution
- Easy performance check aids troubleshooting and reduces maintenance costs

The Varian 356-LC Refractive Index (RI) Detector has been designed to meet the most demanding analytical applications. The 356-LC low dead-volume cell guarantees superior peak shape and state-of-the-art temperature control, ensuring excellent sensitivity and baseline stability. Full control, digital data acquisition and automation is possible using Varian Galaxie™ Software. This universal detector is ideal for the analysis of non-absorbing compounds, such as polymers, carbohydrates, alcohols, and fatty acids.



Varian Evaporative Light Scattering Detectors: For Compounds with no UV Chromophore

- Unique operation down to 10 °C maximizes detection of thermally labile compounds
- Real-time gas control eliminates solvent gradient effects for accurate quantification
- Low dispersion design and high-speed data output rates ideal for Fast LC

Varian ELS detectors are a powerful alternative to RI and low-wavelength UV – you can inject and detect, right down to low nanogram levels. ELSD is a universal detector that is compatible with gradient elution. The Varian ELSDs have patented evaporator gas technology that delivers efficient removal of solvent at low temperatures, to provide more accurate mass balance.

The sub-ambient evaporation technology of the Varian 385-LC pushes the boundaries of what can be detected by ELSD by providing maximum sensitivity to thermally-labile compounds. In contrast, the Varian 380-LC operates up to 120 °C to facilitate evaporation of high boiling point solvents and better response to non-volatile compounds. The Varian ELSDs are used for a very wide range of analytical techniques, including HPLC (analytical and preparative), LC/MS, SFC, high throughput screening, GPC/SEC, temperature rising elution fractionation (TREF), and gradient polymer elution chromatography (GPEC). The range of application areas is equally broad, encompassing pharmaceuticals, nutraceuticals, combinatorial libraries, carbohydrates, lipids, phospholipids, triglycerides, fatty acids, amino acids, polymers and surfactants.



Ordering Information

Description	Part No.
Varian 356-LC Refractive Index Detector	PL0880-0000
RI Test Sample (requires special handling) (6/pk)	8200504806

Ordering Information

Description	Part No.
Varian 385-LC, 110 V (240 V)	PL0890-1110 (PL0890-1240)
Varian 380-LC, 110 V (240 V)	PL0890-0110 (PL0890-0240)

LC Detectors

ProStar™ 335 HPLC Diode Array Detector: For all UV-Vis Absorbance Applications

- Automatic peak identification made easy
- Complete results with information-rich data
- Tool-free maintenance for ease-of-use

The ProStar 335 Diode Array Detector offers built-in versatility for microbore to preparative HPLC, with programmable slit widths that deliver the highest sensitivity and spectral resolution from 190 to 950 nm. From microbore to preparative flow rates, the ProStar 335 is quickly configured with flow cells for scale-up work. Interchangeable, cartridge-style flow cells handle microliter per minute flow rates to hundreds of milliliters per minute.

Along with programmable slit widths, Seamless Spectral Coverage Technology (SSCT) further supports greater sensitivity and spectral resolution. SSCT eliminates second order light to give the most accurate spectral information. With superb optical and spectral resolution, the ProStar 335 routinely provides detailed information with even trace amounts of analyte.



Ordering Information

Description	Part No.
ProStar 335 Diode Array Detector, Single Array, Microbore to Analytical*	10083800
Semi-Micro Flow Cell (4 mm single path length)	210182100
Analytical Flow Cell (9 mm single path length)	210181800
Preparative Flow Cell (9 x 1 mm dual path lengths)	210181900
Super Preparative Flow Cell (4 x 0.15 mm dual path lengths)	210182000
D2 Lamp (pre-aligned)	110715400
Quartz Halogen Lamp	5610136500

*Dual array version available

ProStar 325 Dual Wavelength UV-Vis Detector: Superb Sensitivity and Wide Absorbance Range

- Dual path length for increased productivity
- Fast scale-up for maximum flexibility
- Remote computer control for ease-of-use

The 325 UV-Vis detector delivers superb sensitivity and a wide, dynamic absorbance range. A highly versatile instrument, the ProStar 325 fits easily into an existing HPLC system or operates as a stand-alone detector.

The dual path length flow cells, coupled with extended absorbance range, dramatically reduce the need for sample dilutions. From analytical to preparative flow rates, the ProStar 325 is quickly configured with flow cells for scale-up work. Interchangeable, cartridge-style flow cells handle microliter per minute flow rates to hundreds of milliliters per minute.

Detection parameters are easily downloaded to the detector with the cordless, handheld computer. You can make wavelength changes, turn the lamp on and off, or view chromatograms without leaving your seat.



Ordering Information

Description	Part No.
ProStar 325 Detector, UV Single Wavelength	10080100
ProStar 325 Detector, UV-Vis Single Wavelength	10081300
ProStar 325 Detector, UV Dual Wavelength	10081400
ProStar 325 Detector, UV-Vis Dual Wavelength	10081500
Handheld Computer	7891084900
Semi-Micro Flow Cell (4 mm single path length)	210182100
Analytical Flow Cell (9 mm single path length)	210181800
Preparative Flow Cell (9 x 1 mm dual path lengths)	210181900
Super Preparative Flow Cell (4 x 0.15 mm dual path lengths)	210182000
D2 Lamp (prealigned)	110715400
Quartz Halogen Lamp	5610136500