

Preparative Chromatography Introduction

Grace® Key Column Families

Scalable Solutions: Silica and Hardware

Grace, the foremost name in silica material science, manufactures a range of completely scaleable preparative chromatography columns. To help select the appropriate column for your application, we describe key column families and highlight unique phases within these families. Each column family highlighted is also scalable to bulk media and available in ton quantities for process scale applications.

Grace's silica based media is packed in proprietary column hardware that extends media lifetime and ensures high column efficiencies at the preparative scale. An overview of preparative column hardware can be found on pages 150–151.

GraceAlpha™



A New Silica Generation

GraceAlpha™ combines increased column efficiencies and resolution with high loading capacity. A new silica (patent pending) makes this possible by combining a high-porosity surface, with a dense core, increasing mass transfer while yielding a mechanically robust particle.

Applications: Peptides and small molecules (<2000 molecular weight)

Differentiated Phases: C18, C8, and Silica

Specifications: High purity spherical silica, monomerically bonded, endcapped, 120Å pores

Formats: Analytical, Prep, Bulk Media

Vydac® MS



The best Vydac® media from the leader in peptide and protein separations for over twenty-five years

Vydac® MS columns provide unique selectivity and exceptional protein recovery. Higher recoveries and yield under overloaded preparative conditions makes this column the leader in preparative reversed-phase protein purifications.

Applications: Large molecules and proteins (>2000 molecular weight)

Differentiated Phases: C18, C8, and C4

Specifications: Spheroidal silica, polymerically and monomerically bonded, endcapped, 300Å pore size

Formats: Capillary, LC/MS, Expedite™, Rocket™, Solvent-Reducer, Analytical, Prep, Bulk Media

Column Packing and Operation

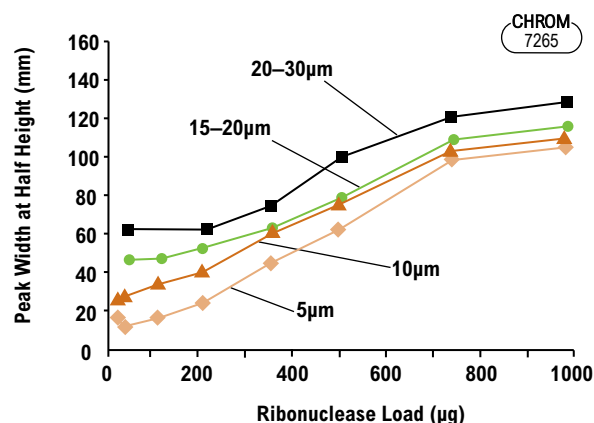
It is generally accepted that the most reliable packing method for high-performance preparative columns involve axial compression of the adsorbent slurry in the column by a sliding piston driven by hydraulic or pneumatic force. However, reliable performance and maximum column life are obtained only if axial compression force is maintained continuously on the column bed during use. The patented MODcol® Spring™ Column and MultiPacker® instrument now make it easy and convenient for scientists to reproducibly pack any media in a completely portable dynamic axial compression column.

Adsorbent Particle Sizes

Because small-diameter narrow-particle-range adsorbents generally are expensive, it is more economical to use less expensive larger diameter materials in preparative columns. This is often possible because the objectives of preparative separations differ from those of analytical separations. Speed and sensitivity may be less important than product purity in preparative chromatography. This allows preparative columns to be operated at lower flow rates with gradient profiles altered in order to compensate for the less efficient mass transfer of larger adsorbent particles. To simplify method development and scale-up, Grace provides a range of adsorbent sizes and grades with identical bonded-phase chemistry.

Protein Loading Capacity of RP-HPLC Materials of Different Particle Size

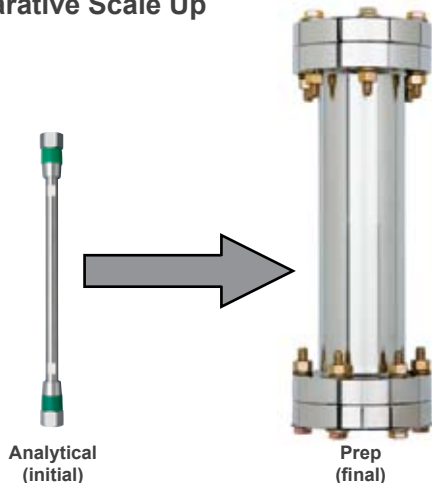
Although peak widths are much narrower with small particle materials at low sample loads, there is little difference in peak widths at high loads, where the column is "overloaded", allowing larger particles to be used with minimal decrease in performance.



Column Materials: Vydac® 214TP, 5µm; Vydac® 214TP, 10µm; Vydac® 214TP, 15–20µm; Vydac® 214TP, 20–30µm
Eluent: 24–95% ACN in 0.1% aqueous TFA over 30min at 1.5mL/min
Protein: Ribonuclease

Preparative Chromatography Introduction

Preparative Scale Up



Step 1: Method Optimization

The analytical method is optimized to increase the alpha and achieve maximum loadability. The most common ways to optimize the method are through altering selectivity by mobile phase manipulation or by altering the stationary phase.

Step 2: Loading Study

Once the analytical method is developed the method loadability should be tested to determine the capacity of the stationary phase. The sample load will be determined by the complexity of the sample mixture as well as the stationary phase being used.

Step 3: Mass Determination

The total mass that is needed from the purification should be determined prior to starting the campaign. The total mass needed can be used to balance the necessary throughput, purity, and yield required from the separation.

Step 4: The Scale-up Factor

The column size needed for the purification can be calculated based on the output requirements.

$$D = \text{diameter} \quad L = \text{length}$$

$$\text{Load}_{\text{final}} = \text{Load}_{\text{initial}} \times \frac{(D_{\text{final}})^2 L_{\text{final}}}{(D_{\text{initial}})^2 L_{\text{initial}}}$$

The sample load scale-up equation determines the loading capacity of the larger preparative column from the loading capacity of the analytical column.

Step 5: Linear Velocity

When the column dimensions are changed to optimize a separation, or to scale a separation to a preparative or narrow-bore application, the mobile phase flow rate should be adjusted proportionally to cross-sectional area of the column to maintain consistent linear velocity and retention times. See table below for common flow rate conversions (**Table 1**).

$$\text{Flow Rate}_{\text{final}} = \text{Flow Rate}_{\text{initial}} \times \frac{(D_{\text{final}})^2}{(D_{\text{initial}})^2}$$

Step 6: Run Time and Gradient

$$\text{Run Time (prep)} = \text{Run Time (analytical)} \times L (\text{analytical}) / L (\text{prep})$$

The run time determined by the equation can be used to predict the elution time for the compound of interest. To retain the resolution obtained on an analytical column while increasing column diameter, the gradient shape must be maintained by keeping the ratio of the gradient volume to the column volume constant.

Table 1: Common Linear Scale-up Velocity Equivalencies

Equivalent Linear Velocity Table Relative to 4.6mm i.d. Flow Rates								
Column Diameter (mm i.d.)	1.0	2.1	4.6	10.0	21.5	25	50	100
Equivalent Flows (mL/min)	0.047	0.208	1.0	4.7	21.8	29.5	118	473
Equivalent Flows (mL/min)	0.095	0.416	2.0	9.4	43.6	59.0	236	946
Equivalent Flows (mL/min)	0.142	0.625	3.0	14.1	65.4	88.5	354	1,419

related products

For analytical HPLC columns, see pages 24–110.



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related products

For flash cartridges, see pages 184–187.



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Preparative Column Hardware

Grace offers a variety of column formats to provide the best solution at each stage of scale-up. All of our columns employ radial flow slots to distribute sample and mobile phase evenly over the head of the column for sharp, narrow peaks. Each column is constructed with 316SS, is rated to 2000psig and uses inert PTFE o-rings and seals.



Unique radial flow slot design.

Preparative Column Hardware		
Column Name	Available Inner Diameters	Attributes
Prep Guard Column	7mm	<ul style="list-style-type: none"> • Direct connect to Alltech® brand columns
Prep Guard Cartridge	10, 20, 30mm	<ul style="list-style-type: none"> • Holder and inexpensive replaceable cartridge protects and extends column lifetime
Threaded Column	7, 10, 22mm	<ul style="list-style-type: none"> • Packed under high pressure for high efficiency • Inexpensive and disposable
Flanged Column	25, 30, 50, 100mm	<ul style="list-style-type: none"> • Good flow distribution for excellent peak shape • Robust material of construction to enable repacking
Spring™ Column	25, 50, 100mm	<ul style="list-style-type: none"> • Dynamic axial compression for extended column lifetime • High efficiency axial packing • Easily repacked
Axial SFC Column	25, 50mm	<ul style="list-style-type: none"> • Rated to 5000psig for use with SFC • High efficiency axial packing • Easily repacked

new

best seller

prep | columns

tech tip

30mm i.d. guards can be used with column i.d.s up to 50mm when packed with a larger particle size than the column being protected.

related products

Large process scale columns (DAC and flanged) up to 1 meter i.d. are available. See Peak Biotech columns on page 171 for more information.



Spring™ Column Overview

best seller

Dynamic Axial Compression Column

- Continuous axial compression prevents void formation, assures long column life
- Use anywhere, just like a standard HPLC column
- Packed under axial compression for high efficiency



The World's Most Innovative Preparative Column

Inside every Spring™ Column unit there is a mechanical spring that stores energy, maintaining axial compression force on the packed bed. This patented technology is the only mobile dynamic axial compression column available that prevents void formation. (U.S. Patents No. 5893971, 5951873, 6036855).

Spring™ Columns are available pre-packed with most Grace® adsorbents. Spring™ Column hardware assures the longest column life and the best performance for your prepacked preparative column needs.

Grace® Multipacker® packing stations together with empty Spring™ Column hardware provide the option of packing your own Spring™ Column units in house, with any high-performance preparative adsorbent of your choice. Multipacker® stations are surprisingly affordable when compared to other axial compression packing systems and have the advantage of not requiring a dedicated packing station for each preparative HPLC location.

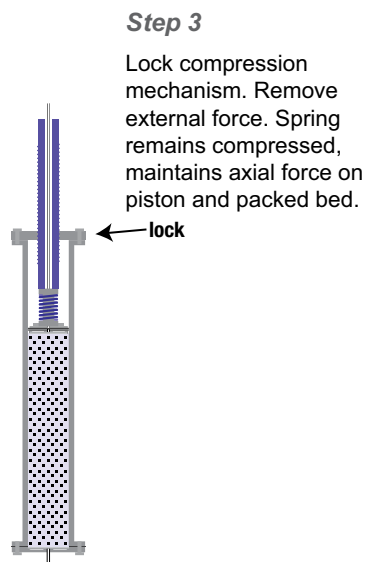
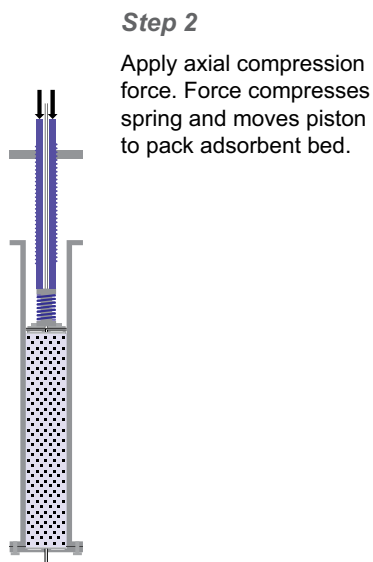
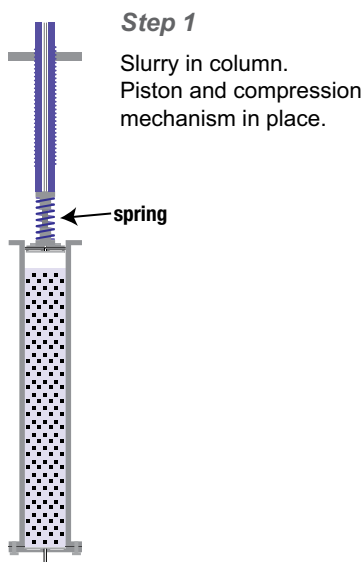
related product

Experience the cost savings and convenience of packing your own Spring™ Columns with the Multipacker® instrument. See pages 172 and 173.

more info

For Spring™ Column ordering information, see pages 162–165.

Spring™ Column Packing





Vydac® MS 300Å Columns

High Protein Recovery

- Unique Selectivity for exceptional resolution of proteins and peptides
- High protein recovery improves yield

A patented surface chemistry reduces adsorption of proteins on the silica surface which means higher recoveries and better resolution.

Improved Resolution and Yield

The Vydac® column provides better separation and recovery for a highly hydrophobic membrane protein (RRV p14) and its fatty acid modified (myristoylated) form, a component of a potentially new vaccine delivery system.

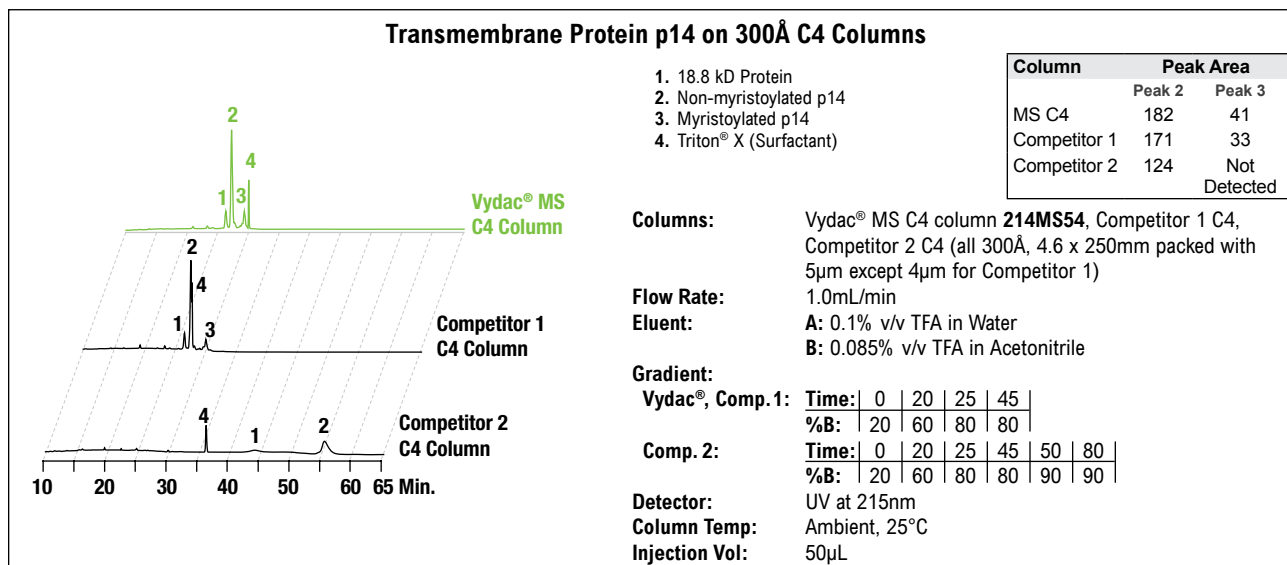
Vydac® MS 300Å Silica Specifications

Pore Size:	300Å
Pore Volume:	0.5mL/g
Surface Area:	90m ² /g

Vydac® MS Phases

Phase	Particle Sizes	Carbon Load	Endcapped
C4	5, 10, 15µm	3%	Yes
C8	5, 10, 15µm	5%	Yes
C18	5, 10, 15µm	8%	Yes

Transmembrane Protein p14 on 300Å C4 Columns



1. 18.8 kD Protein
2. Non-myristoylated p14
3. Myristoylated p14
4. Triton® X (Surfactant)

Columns: Vydac® MS C4 column **214MS54**, Competitor 1 C4, Competitor 2 C4 (all 300Å, 4.6 x 250mm packed with 5µm except 4µm for Competitor 1)

Flow Rate: 1.0mL/min

Eluent: **A:** 0.1% v/v TFA in Water
B: 0.085% v/v TFA in Acetonitrile

Gradient:

Vydac®, Comp. 1: **Time:** 0 | 20 | 25 | 45 |
%B: 20 | 60 | 80 | 80 |

Comp. 2: **Time:** 0 | 20 | 25 | 45 | 50 | 80 |
%B: 20 | 60 | 80 | 80 | 90 | 90 |

Detector: UV at 215nm

Column Temp: Ambient, 25°C

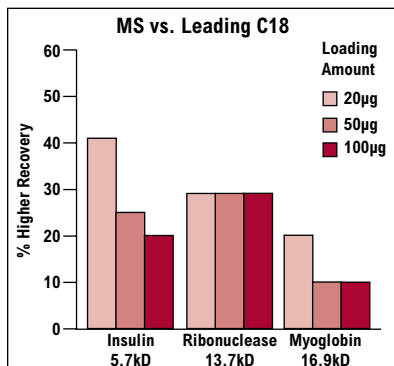
Injection Vol: 50µL

Reptilian reovirus RRV p14 sample courtesy of Drs. Roberto J. de Antueno and Roy Duncan, Dalhousie University, Halifax, Nova Scotia.

Recovery of Proteins: MS vs. Leading Columns

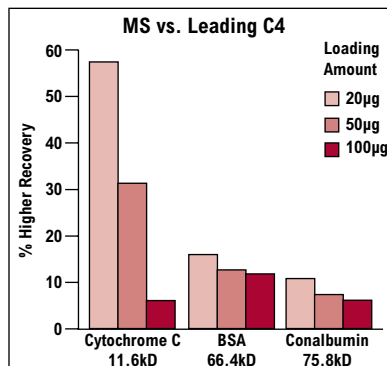
MS C18 recovery:

- Up to 41% higher at low sample load
- Up to 29% higher at high sample load



MS C4 recovery:

- Up to 57% higher at low sample load
- Up to 12% higher at high sample load



Column: C18 Columns (300Å, 5µm, 4.6 x 150mm): Vydac® **238MS** vs. leading protein/peptide C18
C4 Columns (300Å, 5µm, 4.6 x 150mm): Vydac® **214MS** vs. leading protein/peptide C4

Flow Rate: 1.0mL/min.

Eluent: **A:** 0.1% v/v TFA in Water, **B:** 0.085% v/v TFA in Acetonitrile

Temperature: 25°C

Detector: UV at 280nm

Gradient: C18 Columns = **Time:** 0 | 15 | 20 | **%B:** 20 | 80 | 80 | C4 Columns = **Time:** 0 | 12 | 15 | 20 | **%B:** 20 | 60 | 80 | 80 |



Vydac® MS 300Å Columns

Vydac® MS 300Å Columns

Packing	Format	i.d. x Length	Part No.	
C4, 5µm	Analytical	4.6 x 250mm	214MS54	
	Prep—Threaded	10 x 150mm	214MS51015	
	Prep—Threaded	10 x 250mm	214MS510	
	Prep—Threaded	22 x 50mm	214MS52205	
	Prep—Threaded	22 x 100mm	214MS52205	
C4, 10µm	Analytical	4.6 x 250mm	214MS104	
	Prep—Threaded	10 x 150mm	214MS101015	
	Prep—Threaded	10 x 250mm	214MS1010	
	Prep—Threaded	22 x 150mm	214MS102215	
	Prep—Threaded	22 x 250mm	214MS1022	
	Prep—Flanged	30 x 150mm	214MS103015	
	Prep—Flanged	30 x 250mm	214MS1030	
	C4, 15µm	Analytical	4.6 x 250mm	214MS154
		Prep—Threaded	10 x 150mm	214MS151015
Prep—Threaded		10 x 250mm	214MS1510	
Prep—Threaded		22 x 150mm	214MS152215	
Prep—Threaded		22 x 250mm	214MS1522	
Prep—Flanged		30 x 150mm	214MS153015	
Prep—Flanged		30 x 250mm	214MS1530	
Prep—Flanged		50 x 150mm	214MS155015	
Prep—Flanged		50 x 250mm	214MS1550	
Prep—Flanged		100 x 150mm	214MS1510015	
Prep—Flanged		100 x 250mm	214MS15100	
C8, 5µm	Analytical	4.6 x 250mm	208MS54	
	Prep—Threaded	10 x 150mm	208MS51015	
	Prep—Threaded	10 x 250mm	208MS510	
	Prep—Threaded	22 x 50mm	208MS52205	
	Prep—Threaded	22 x 100mm	208MS52205	
C8, 10µm	Analytical	4.6 x 250mm	208MS104	
	Prep—Threaded	10 x 150mm	208MS101015	
	Prep—Threaded	10 x 250mm	208MS1010	
	Prep—Threaded	22 x 150mm	208MS102215	
	Prep—Threaded	22 x 250mm	208MS1022	
	Prep—Flanged	30 x 150mm	208MS103015	
	Prep—Flanged	30 x 250mm	208MS1030	
	C8, 15µm	Analytical	4.6 x 250mm	208MS154
		Prep—Threaded	10 x 150mm	208MS151015
Prep—Threaded		10 x 250mm	208MS1510	
Prep—Threaded		22 x 150mm	208MS152215	
Prep—Threaded		22 x 250mm	208MS1522	
Prep—Flanged		30 x 150mm	208MS153015	
Prep—Flanged		30 x 250mm	208MS1530	
Prep—Flanged		50 x 150mm	208MS155015	
Prep—Flanged		50 x 250mm	208MS1550	
Prep—Flanged		100 x 150mm	208MS1510015	
Prep—Flanged		100 x 250mm	208MS15100	
C18, 5µm	Analytical	4.6 x 250mm	218MS54	
	Prep—Threaded	10 x 150mm	218MS51015	
	Prep—Threaded	10 x 250mm	218MS510	
	Prep—Threaded	22 x 50mm	218MS52205	
	Prep—Threaded	22 x 100mm	218MS52205	
C18, 10µm	Analytical	4.6 x 250mm	218MS104	
	Prep—Threaded	10 x 150mm	218MS101015	
	Prep—Threaded	10 x 250mm	218MS1010	
	Prep—Threaded	22 x 150mm	218MS102215	
	Prep—Threaded	22 x 250mm	218MS1022	
	Prep—Flanged	30 x 150mm	218MS103015	
	Prep—Flanged	30 x 250mm	218MS1030	

Vydac® MS 300Å Columns (continued)

Packing	Format	i.d. x Length	Part No.
C18, 15µm	Analytical	4.6 x 250mm	218MS154
	Prep—Threaded	10 x 150mm	218MS151015
	Prep—Threaded	10 x 250mm	218MS1510
	Prep—Threaded	22 x 150mm	218MS152215
	Prep—Threaded	22 x 250mm	218MS1522
	Prep—Flanged	30 x 150mm	218MS153015
	Prep—Flanged	30 x 250mm	218MS1530
	Prep—Flanged	50 x 150mm	218MS155015
	Prep—Flanged	50 x 250mm	218MS155015
	Prep—Flanged	100 x 150mm	218MS1510015
	Prep—Flanged	100 x 250mm	218MS15100

Guard Cartridges and Holder

Format	i.d. x Length	Qty.	Part No.
Prep—Guard Holder	10 x 10mm	ea	2101342
Prep—Guard Holder	20 x 10mm	ea	3110650
Prep—Guard Holder	30 x 30mm	ea	3117320
C4, 5µm			
Prep—Guard Cartridge	10 x 10mm	ea	214GCC510
Prep—Guard Cartridge	20 x 10mm	2/pk	214GCC520
C4, 10µm–15µm			
Prep—Guard Cartridge	10 x 10mm	ea	214GCC1010
Prep—Guard Cartridge	20 x 10mm	2/pk	214GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	214GCC1530
C8, 5µm			
Prep—Guard Cartridge	10 x 10mm	ea	208GCC510
Prep—Guard Cartridge	20 x 10mm	2/pk	208GCC520
C8, 10µm–15µm			
Prep—Guard Cartridge	10 x 10mm	ea	208GCC1010
Prep—Guard Cartridge	20 x 10mm	2/pk	208GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	208GCC1530
C18, 5µm			
Prep—Guard Cartridge	10 x 10mm	ea	218GCC510
Prep—Guard Cartridge	20 x 10mm	2/pk	218GCC520
C18, 10µm–15µm			
Prep—Guard Cartridge	10 x 10mm	ea	218GCC1010
Prep—Guard Cartridge	20 x 10mm	2/pk	218GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	218GCC1530

related products

Analytical columns and bulk media also available, please refer to pages 85–87 and 177, respectively.



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more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



Vydac® TP Columns

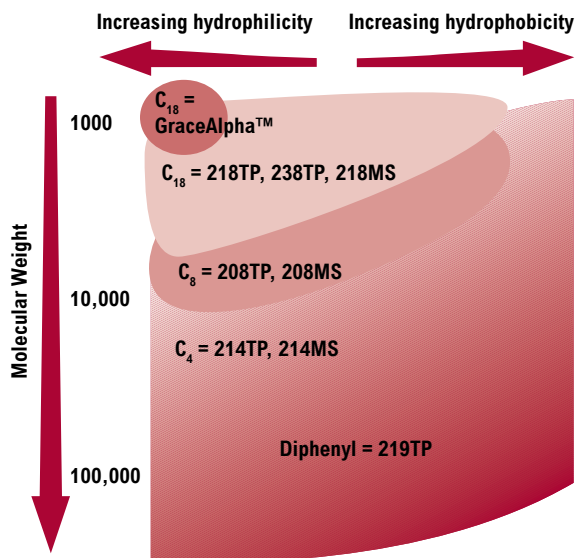
300Å RP Protein Purification Pioneer

- Trusted for over 25 years, Vydac® TP provides reliable, high resolution of proteins and large peptides
- Available in a wide range of bonding chemistries for alternative selectivity

Referenced in over 9000 patents, Vydac® TP is the 300Å phase to which all others are compared. It is relied upon in numerous commercial scale protein purifications and, like other Grace® prep columns, is completely scalable to ton quantities.

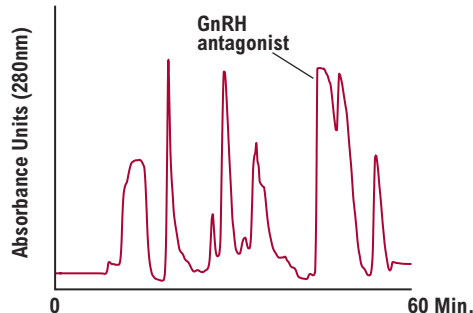
Column Selection for Polypeptides

The reversed-phase column for a polypeptide separation should be selected based on the hydrophobicity of the polypeptide being chromatographed and molecular weight as a secondary consideration.



Purification of Synthetic Peptide

128mg of a synthetic peptide, GnRH antagonist, was purified to 99.7% purity by combining the optimum fractions. 1.2g of synthesis mixture was loaded onto a 5 x 30cm column packed with Vydac® C-18 (218TP), 15–20µm and eluted with a gradient of acetonitrile in water containing triethylammonium phosphate.



Vydac® TP 300Å Silica	
Pore Size:	300Å
Pore Volume:	0.6mL/g
Surface Area:	90m ² /g

Vydac® TP Phases			
Phase	Particle Sizes	Carbon Load	Endcapped
C4	5, 10, 10–15, 15–20µm	3%	Yes
C8	5, 10, 10–15, 15–20µm	5%	Yes
C18	5, 10, 10–15, 15–20µm	8%	Yes
Diphenyl	5, 10, 10–15, 15–20µm	4%	Yes

Diphenyl columns (219TP, 219MS) are recommended for the separation of:

- Polypeptides with aromatic side chains
- Large, hydrophobic proteins
- Lipid peptides
- Membrane-spanning peptides
- Fusion proteins from inclusion bodies

C4 columns (214TP, 214MS) are recommended for the separation of:

- Polypeptides larger than 4000–5000 MW
- Very hydrophobic polypeptides of any size

C8 columns (208TP, 208MS) are recommended for the separation of:

- Polypeptides up to 10,000–20,000 MW
- Enzymatic digest fragments
- Natural and synthetic peptides

C18 columns (218TP, 218MS, 238TP) are recommended for the separation of:

- Peptides less than 4000–5000 MW
- Enzymatic digest fragments
- Natural and synthetic peptides

more info

For more protein and peptide chromatograms, see our applications section.

related products

Analytical columns and bulk media also available, please refer to pages 70–71 and 177, respectively.

more applications

To view our complete searchable chromatogram database visit www.discoverysciences.com/chromdb/



Vydac® TP Columns

Vydac® TP Columns

Packing	Format	i.d. x Length	Part No.
<i>C4 (214TP), 5µm</i>	Analytical	4.6 x 250mm	214TP54
	Prep—Threaded	10 x 50mm	214TP51005
	Prep—Threaded	10 x 100mm	214TP51010
	Prep—Threaded	10 x 150mm	214TP51015
	Prep—Threaded	10 x 250mm	214TP510
	Prep—Threaded	22 x 50mm	214TP52205
<i>C4 (214TP), 10µm</i>	Prep—Threaded	22 x 100mm	214TP52205
	Analytical	4.6 x 250mm	214TP104
	Prep—Threaded	10 x 150mm	214TP101015
	Prep—Threaded	10 x 250mm	214TP1010
	Prep—Threaded	22 x 150mm	214TP102215
	Prep—Threaded	22 x 250mm	214TP1022
<i>C4 (214TP), 10–15µm</i>	Prep—Flanged	25 x 250mm	214TP1025
	Prep—Flanged	30 x 250mm	214TP1030
	Prep—Flanged	50 x 250mm	214TP1050
	Analytical	4.6 x 250mm	214TP10154
	Prep—Threaded	10 x 150mm	214TP10151015
	Prep—Threaded	10 x 250mm	214TP101510
<i>C4 (214TP), 15–20µm</i>	Prep—Threaded	22 x 150mm	214TP10152215
	Prep—Threaded	22 x 250mm	214TP101522
	Prep—Flanged	25 x 250mm	214TP101525
	Prep—Flanged	30 x 250mm	214TP101530
	Prep—Flanged	50 x 250mm	214TP101550
	Prep—Flanged	100 x 250mm	214TP1015100
<i>C4 (214TP), 15–20µm</i>	Prep—Flanged	100 x 500mm	214TP101510050
	Analytical	4.6 x 250mm	214TP15204
	Prep—Threaded	10 x 150mm	214TP15201520
	Prep—Threaded	10 x 250mm	214TP152010
	Prep—Threaded	22 x 150mm	214TP15202215
	Prep—Threaded	22 x 250mm	214TP152022
<i>C8 (208TP), 5µm</i>	Prep—Flanged	25 x 250mm	214TP152025
	Prep—Flanged	30 x 250mm	214TP152030
	Prep—Flanged	50 x 250mm	214TP152050
	Prep—Flanged	100 x 250mm	214TP1520100
	Prep—Flanged	100 x 500mm	214TP152010050
	Analytical	4.6 x 250mm	208TP54
<i>C8 (208TP), 5µm</i>	Prep—Threaded	10 x 250mm	208TP510
	Prep—Threaded	22 x 100mm	208TP52205
	Analytical	4.6 x 250mm	208TP104
<i>C8 (208TP), 10µm</i>	Prep—Threaded	10 x 250mm	208TP1010
	Prep—Threaded	22 x 250mm	208TP1022
	Prep—Flanged	25 x 250mm	208TP1025
	Prep—Flanged	30 x 250mm	208TP1030
	Prep—Flanged	50 x 250mm	208TP1050
	Analytical	4.6 x 250mm	208TP10154
<i>C8 (208TP), 10–15µm</i>	Prep—Threaded	10 x 250mm	208TP101510
	Prep—Threaded	22 x 250mm	208TP101522
	Prep—Flanged	25 x 250mm	208TP101525
	Prep—Flanged	30 x 250mm	208TP101530
	Prep—Flanged	50 x 250mm	208TP101550
	Prep—Flanged	100 x 250mm	208TP1015100
<i>C8 (208TP), 15–20µm</i>	Prep—Flanged	100 x 250mm	208TP1015100
	Analytical	4.6 x 250mm	208TP15204
	Prep—Threaded	10 x 250mm	208TP152010
	Prep—Threaded	22 x 250mm	208TP152022
	Prep—Flanged	30 x 250mm	208TP152030
	Prep—Flanged	50 x 250mm	208TP152050
<i>C18 (218TP), 5µm</i>	Prep—Flanged	100 x 250mm	208TP1520100
	Analytical	4.6 x 250mm	218TP54
	Prep—Threaded	10 x 50mm	218TP51005
	Prep—Threaded	10 x 100mm	218TP51010
	Prep—Threaded	10 x 150mm	218TP51015
	Prep—Threaded	10 x 250mm	218TP510

Vydac® TP Columns (continued)

Packing	Format	i.d. x Length	Part No.	
<i>C18 (218TP), 10µm</i>	Analytical	4.6 x 250mm	218TP104	
	Prep—Threaded	10 x 150mm	218TP101015	
	Prep—Threaded	10 x 250mm	218TP1010	
	Prep—Threaded	22 x 150mm	218TP102215	
	Prep—Threaded	22 x 250mm	218TP1022	
	Prep—Flanged	25 x 250mm	218TP1025	
<i>C18 (218TP), 10–15µm</i>	Prep—Flanged	30 x 250mm	218TP1030	
	Prep—Flanged	50 x 250mm	218TP1050	
	Analytical	4.6 x 250mm	218TP10154	
	Prep—Threaded	10 x 150mm	218TP10151015	
	Prep—Threaded	10 x 250mm	218TP101510	
	Prep—Threaded	22 x 150mm	218TP10152215	
<i>C18 (218TP), 15–20µm</i>	Prep—Threaded	22 x 250mm	218TP101522	
	Prep—Threaded	22 x 250mm	218TP101522	
	Prep—Flanged	25 x 250mm	218TP101525	
	Prep—Flanged	25 x 250mm	218TP101525	
	Prep—Flanged	30 x 250mm	218TP101530	
	Prep—Flanged	50 x 250mm	218TP101550	
<i>C18 (218TP), 15–20µm</i>	Prep—Flanged	100 x 250mm	218TP1015100	
	Prep—Flanged	100 x 500mm	218TP101510050	
	Analytical	4.6 x 250mm	218TP15204	
	Prep—Threaded	10 x 150mm	218TP15201520	
	Prep—Threaded	10 x 250mm	218TP152010	
	Prep—Threaded	22 x 150mm	218TP15202215	
<i>C18 (238TP), 5µm</i>	Prep—Threaded	22 x 250mm	218TP152022	
	Prep—Flanged	25 x 250mm	218TP152025	
	Prep—Flanged	30 x 250mm	218TP152030	
	Prep—Flanged	50 x 250mm	218TP152050	
	Prep—Flanged	100 x 250mm	218TP1520100	
	Prep—Flanged	100 x 500mm	218TP152010050	
<i>C18 (238TP), 5µm</i>	Analytical	4.6 x 250mm	238TP54	
	Prep—Threaded	10 x 250mm	238TP510	
	Analytical	4.6 x 250mm	238TP104	
<i>C18 (238TP), 10µm</i>	Prep—Threaded	10 x 250mm	238TP1010	
	Prep—Threaded	22 x 250mm	238TP1022	
	Prep—Flanged	25 x 250mm	238TP1025	
	Prep—Flanged	30 x 250mm	238TP1030	
	Prep—Flanged	50 x 250mm	238TP1050	
	Analytical	4.6 x 250mm	238TP10154	
<i>C18 (238TP), 10–15µm</i>	Prep—Threaded	10 x 250mm	238TP101510	
	Prep—Threaded	22 x 250mm	238TP101522	
	Prep—Flanged	25 x 250mm	238TP101525	
	Prep—Flanged	30 x 250mm	238TP101530	
	Prep—Flanged	50 x 250mm	238TP101550	
	Prep—Flanged	100 x 250mm	238TP1015100	
<i>C18 (238TP), 15–20µm</i>	Prep—Flanged	100 x 250mm	238TP1015100	
	Analytical	4.6 x 250mm	238TP15204	
	Prep—Threaded	10 x 250mm	238TP152010	
	Prep—Threaded	22 x 250mm	238TP152022	
	Prep—Flanged	25 x 250mm	238TP152025	
	Prep—Flanged	30 x 250mm	238TP152030	
<i>Diphenyl (219TP), 5µm</i>	Prep—Flanged	50 x 250mm	238TP152050	
	Prep—Flanged	100 x 250mm	238TP1520100	
	Analytical	4.6 x 250mm	219TP54	
	Prep—Threaded	10 x 250mm	219TP510	
	<i>Diphenyl (219TP), 10µm</i>	Prep—Threaded	10 x 250mm	219TP1010
	Prep—Threaded	22 x 250mm	219TP1022	
<i>Diphenyl (219TP), 10µm</i>	Prep—Guard Col.	25 x 30mm	219TP102503	
	Prep—Flanged	25 x 250mm	219TP1025	
	Prep—Flanged	30 x 250mm	219TP1030	
	Prep—Flanged	50 x 250mm	219TP1050	

prep | columns

Vydac® TP Columns

Vydac® TP Columns

Packing	Format	i.d. x Length	Part No.
Diphenyl (219TP), 10–15µm	Analytical	4.6 x 250mm	219TP10154
	Prep—Threaded	10 x 250mm	219TP101510
	Prep—Threaded	22 x 250mm	219TP101522
	Prep—Guard Col.	25 x 30mm	219TP10152503
	Prep—Flanged	25 x 250mm	219TP101525
	Prep—Flanged	30 x 250mm	219TP101530
	Prep—Flanged	50 x 250mm	219TP101550
Diphenyl (219TP), 15–20µm	Analytical	4.6 x 250mm	219TP15204
	Prep—Threaded	10 x 250mm	219TP152010
	Prep—Threaded	22 x 250mm	219TP152022
	Prep—Guard Col.	25 x 30mm	219TP15202503
	Prep—Flanged	25 x 250mm	219TP152025
	Prep—Flanged	30 x 250mm	219TP152030
	Prep—Flanged	50 x 250mm	219TP152050
	Prep—Flanged	100 x 250mm	219TP1520100

Guard Cartridges and Holder

Format	i.d. x Length	Qty.	Part No.
Prep—Guard Holder	10 x 10mm	ea	2101342
Prep—Guard Holder	20 x 10mm	ea	3110650
Prep—Guard Holder	30 x 30mm	ea	3117320
<i>C4 (214TP), 5µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	214GCC510
Prep—Guard Cartridge	20 x 10mm	2/pk	214GCC520
<i>C4 (214TP), 10µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	214GCC1010
Prep—Guard Cartridge	20 x 10mm	2/pk	214GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	214GCC1530
<i>C4 (214TP), 10–15µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	214GCC101510
Prep—Guard Cartridge	20 x 10mm	2/pk	214GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	214GCC1530
<i>C4 (214TP), 15–20µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	214GCC152010
Prep—Guard Cartridge	20 x 10mm	2/pk	214GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	214GCC1530
<i>C8 (208TP), 5µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	208GCC510
Prep—Guard Cartridge	20 x 10mm	2/pk	208GCC520

Guard Cartridges and Holder (continued)

Format	i.d. x Length	Qty.	Part No.
<i>C8 (208TP), 10µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	208GCC1010
Prep—Guard Cartridge	20 x 10mm	2/pk	208GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	208GCC1530
<i>C8 (208TP), 10–15µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	208GCC101510
Prep—Guard Cartridge	20 x 10mm	2/pk	208GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	208GCC1530
<i>C8 (208TP), 15–20µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	208GCC152010
Prep—Guard Cartridge	20 x 10mm	2/pk	208GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	208GCC1530
<i>C18 (218TP), 5µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	218GCC510
Prep—Guard Cartridge	20 x 10mm	2/pk	218GCC520
<i>C18 (218TP), 10µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	218GCC1010
Prep—Guard Cartridge	20 x 10mm	2/pk	218GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	218GCC1530
<i>C18 (218TP), 10–15µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	218GCC101510
Prep—Guard Cartridge	20 x 10mm	2/pk	218GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	218GCC1530
<i>C18 (218TP), 15–20µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	218GCC152010
Prep—Guard Cartridge	20 x 10mm	2/pk	218GCC1520
Prep—Guard Cartridge	30 x 30mm	ea	218GCC1530
<i>C18 (238TP), 5µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	238GCC510
<i>C18 (238TP), 10µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	238GCC1010
<i>C18 (238TP), 10–15µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	238GCC101510
<i>C18 (238TP), 15–20µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	238GCC152010
<i>Diphenyl (219TP), 5µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	219GCC510
<i>Diphenyl (219TP), 10µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	219GCC1010
<i>Diphenyl (219TP), 10–15µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	219GCC101510
<i>Diphenyl (219TP), 15–20µm</i>			
Prep—Guard Cartridge	10 x 10mm	ea	219GCC152010

Purification of a Lipid Peptide

A synthetic peptide containing 25 amino acid residues and two attached fatty acids was difficult to purify because of its limited solubility and tendency to aggregate. The lower retentivity of the Vydac® 219TP54 diphenyl reversed-phase column was useful for purification of this peptide after it was found to be retained so strongly that it could not be eluted from a C4 reversed phase.

Column: Vydac® 219TP54 (diphenyl, 5µm, 4.6mm i.d. x 250mm)
Flow: 0.75mL/min
Detector: UV at 280nm

Trial Chromatogram

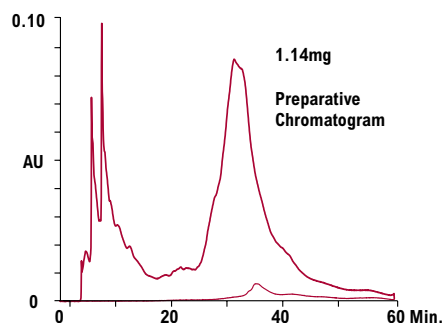
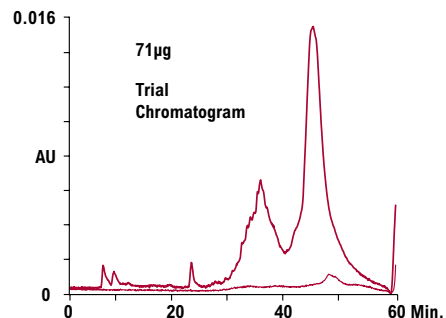
Sample: 250µL of 8:1 diluted peptide solution = 71µg
Eluent: A: 5% n-propanol/0.5% HOAc/94.5% water
 B: 85% n-propanol/0.5% HOAc/14.5% water
Gradient: 0 to 100% B in 30min

Preparative Chromatogram

Sample: 1.5mL of 3:1 diluted peptide solution = 1.14mg (applied as three 500µL injections at 1.5min intervals)
Eluent: A: 29% n-propanol/0.5% HOAc/70.5% water
 B: 61% n-propanol/0.5% HOAc/38.5% water
Gradient: Hold 100% A for 6min, then 0 to 100% B in 30min

In each chromatogram the fine trace is a post-run blank.

Sample courtesy of Dr. Don Diamond (City of Hope National Medical Center, Duarte, Calif.). For a complete description of this method development, request Vydac® Application Note #9802.



Alltech® Prep Columns

- Packed with identical media to analytical columns
- Additional dimensions may be custom ordered

Econosphere™ Columns

Packing	Format	i.d. x Length	Part No.
C18, 10µm	Prep—Threaded	10 x 100mm	28157
	Prep—Threaded	10 x 250mm	28085
	Prep—Threaded	22 x 250mm	28001
C8, 10µm	Prep—Threaded	10 x 100mm	28159
	Prep—Threaded	10 x 250mm	28087
	Prep—Threaded	22 x 250mm	28003
Silica, 10µm	Prep—Threaded	10 x 100mm	28167
	Prep—Threaded	10 x 250mm	28095
	Prep—Threaded	22 x 250mm	28057

Macrosphere™ Columns

Packing	Format	i.d. x Length	Part No.
GPC 60Å	Prep—Threaded	7.5 x 300mm	88175
GPC 100Å	Prep—Threaded	7.5 x 300mm	88177
GPC 150Å	Prep—Threaded	7.5 x 300mm	88179
GPC 300Å	Prep—Threaded	7.5 x 300mm	88181

Alltima™ Columns

Packing	Format	i.d. x Length	Part No.
C18, 5µm	Prep—Threaded	10 x 150mm	81102
	Prep—Threaded	10 x 250mm	88063
	Prep—Threaded	22 x 150mm	81106
	Prep—Threaded	22 x 250mm	81105
	Prep—Threaded	22 x 250mm	81107
C18, 10µm	Prep—Threaded	10 x 150mm	81107
	Prep—Threaded	10 x 250mm	88334
	Prep—Threaded	22 x 150mm	81108
	Prep—Threaded	22 x 250mm	88335
C8, 5µm	Prep—Threaded	10 x 150mm	81109
	Prep—Threaded	10 x 250mm	88081
	Prep—Threaded	22 x 150mm	81112
C8, 10µm	Prep—Threaded	22 x 250mm	81110
	Prep—Threaded	10 x 150mm	81114
	Prep—Threaded	10 x 250mm	88336
Silica, 5µm	Prep—Threaded	22 x 150mm	81115
	Prep—Threaded	22 x 250mm	81110
	Prep—Threaded	10 x 150mm	81117
	Prep—Threaded	10 x 250mm	81116
Silica, 10µm	Prep—Threaded	22 x 150mm	81119
	Prep—Threaded	22 x 250mm	81118
	Prep—Threaded	10 x 150mm	81121
	Prep—Threaded	10 x 250mm	88338
Silica, 10µm	Prep—Threaded	10 x 250mm	88338
	Prep—Threaded	22 x 150mm	81125
	Prep—Threaded	22 x 250mm	88339

Platinum™ Columns

Packing	Format	i.d. x Length	Part No.
EPS C18, 5µm	Prep—Threaded	10 x 150mm	82083
	Prep—Threaded	22 x 150mm	82093
	Prep—Threaded	22 x 250mm	82095

Prosphere™ HP

Packing	Format	i.d. x Length	Part No.
C18-AQ, 5µm	Prep—Threaded	10 x 100mm	35572
	Prep—Threaded	22 x 100mm	35573

Apollo™ Columns

Packing	Format	i.d. x Length	Part No.
C18, 5µm	Prep—Threaded	7 x 150mm	36530
	Prep—Threaded	10 x 150mm	36531
	Prep—Threaded	10 x 250mm	36543
	Prep—Threaded	22 x 150mm	36526
	Prep—Threaded	22 x 250mm	36537
C8, 5µm	Prep—Threaded	7 x 150mm	36546
	Prep—Threaded	10 x 150mm	36548
	Prep—Threaded	10 x 250mm	36549
	Prep—Threaded	22 x 150mm	36550
	Prep—Threaded	22 x 250mm	36551
Phenyl, 5µm	Prep—Threaded	7 x 150mm	36525
	Prep—Threaded	10 x 150mm	36527
	Prep—Threaded	10 x 250mm	36532
	Prep—Threaded	22 x 150mm	36535
Silica, 5µm	Prep—Threaded	22 x 250mm	36528
	Prep—Threaded	7 x 150mm	36542
	Prep—Threaded	10 x 150mm	36533
	Prep—Threaded	10 x 250mm	36540
Silica, 5µm	Prep—Threaded	22 x 150mm	36534
	Prep—Threaded	22 x 250mm	36524

Prevail™ Columns

Packing	Format	i.d. x Length	Part No.
Carbohydrate ES, 5µm	Prep—Threaded	10 x 250mm	35115
	Prep—Threaded	20 x 300mm	35215
C18, 5µm	Prep—Threaded	10 x 150mm	99293
	Prep—Threaded	10 x 250mm	99294
	Prep—Threaded	22 x 150mm	99296
	Prep—Threaded	22 x 250mm	99297



Connect with Direct-Connect™ Coupler.



Connect In-Line with Fittings and Tubing.

Prep-Guard™ Accessories

Description	Part No.
Direct-Connect™ Column Coupler	28195
In-Line Connector	9549

Alltech® Prep Guards™

Packing	Format	i.d. x Length	Part No.
<i>Econosphere™ Guards</i>			
C18, 10µm	Prep—Guard™	7 x 33mm	970209
Silica, 10µm	Prep—Guard™	7 x 33mm	970210
<i>Alltima™ Guards</i>			
C18, 10µm	Prep—Guard™	7 x 33mm	970203
C8, 10µm	Prep—Guard™	7 x 33mm	970227
Silica, 10µm	Prep—Guard™	7 x 33mm	970204
<i>Platinum™ Guard</i>			
EPS C18, 5µm	Prep—Guard™	7 x 33mm	970216
<i>Apollo™ Guards</i>			
C18, 5µm	Prep—Guard™	7 x 33mm	970205
C8, 5µm	Prep—Guard™	7 x 33mm	96463
Phenyl, 5µm	Prep—Guard™	7 x 33mm	96430
Silica, 5µm	Prep—Guard™	7 x 33mm	970206
<i>Prevail™ Guards</i>			
C18, 5µm	Prep—Guard™	7 x 33mm	970211

related products

Please refer to pages 44–49, 54–57, and 96–97 for more information on media characteristics and analytical column offerings.