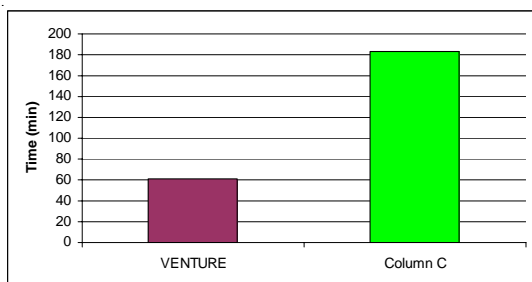


Vydac HPLC VENTURE™ A Columns

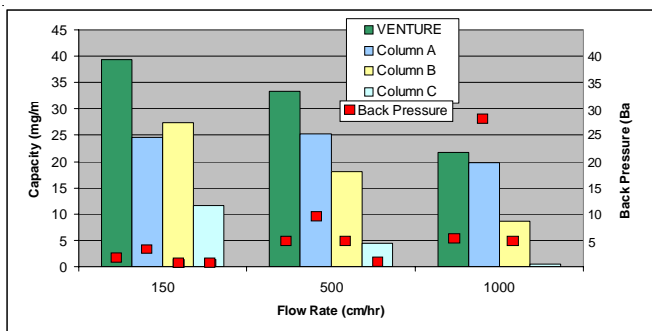


VENTUREA Saves 2 Hours

Time to purify 30 mg of IgG with a 4.6 x 50mm column



Dynamic Capacity and Back Pressure Measured at Different Flow Rates



System: Akta Explorer 100

Feed: 1% human g-Globulin in Phosphate Buffer, pH 7.4

Elution: 0.1M Na3Citrate, pH 3.2

Static capacity of VENTURE A affinity columns

Polyclonal

Species	Capacity
human	40 mg/mL
bovine	23 mg/mL
mouse	38 mg/mL
rabbit	37 mg/mL
sheep	13 mg/mL

Monoclonal

Subclass	Capacity
IgG1 Kappa	15 mg/mL
IgG2a	29 mg/mL
IgG2b	23 mg/mL

• Protein-A affinity chromatography columns for antibody purification

Grace Vydac introduces the VENTURE A column, the first in the VENTURE line of affinity chromatography columns utilizing the ICE™ (inert coating enhancement) technology to eliminate non-specific binding on the silica surface. ICE technology enables the VENTURE A columns to be the first affinity column to take advantage of silica's rigid porous structure, providing greater capacity and purity to users than other supports. VENTURE A columns use a recombinant protein-A ligand for binding antibodies. They are designed to perform both as an analytical tool for fast, accurate, measurement and characterization of antibody titers; or as an easy and quick way to highly purify antibodies from cell culture supernatant, serum, or other feedstocks.

VENTURE A columns have the following clear advantages over other protein-A affinity columns:

- **High binding capacity for polyclonal and monoclonal antibodies**
- **No non-specific binding – patent pending ICE technology completely passivates the silica surface to ensure highly purified antibodies**
- **Increased productivity – superior capacity at high flow rates, without high backpressures**
- **Low ligand leakage**
- **Standard HPLC column format – uses biocompatible PEEK hardware for use with HPLC or FPLC instruments**

Venture A Characteristics

Composition:	Wide porous spherical silica gel treated with ICE surface passivation technology
Particle size:	15-20µm
Ligand:	Recombinant Protein A
pH range:	pH 1 to 8 (long term) pH 1 to 9 (short term)
Maximum pressure:	3,000 psi (200 bar)
Delivery conditions:	20% Ethanol
Flow rate:	Recommended: 500mL/hour Range: 150 to 5,000mL/hour
Storage:	at +4 to +8° C in 20% Ethanol
Chemical stability:	stable in all aqueous buffers with pH 1 to 8 commonly used in Protein A chromatography

Venture A Ordering Information

Cat. No.	ID	Length	Column Volume
RAVE1520205	2.1mm	50mm	0.16mL
RAVE1520405	4.6mm	50mm	0.83mL
RAVE1520410	4.6mm	100mm	1.66mL
RAVE1520710	7.5mm	100mm	4.42mL
RAVE15201010	10mm	100mm	7.85mL



- **High resolution**
- **Unique selectivity for both hydrophilic and hydrophobic peptides**
- **Excellent lot-to-lot reproducibility**

Produced using a unique monomeric-C18 bonding method developed by Grace Vydac on 300Å pore size silica base material, EVEREST columns have been demonstrated to provide high peak counts (indicative of high resolution) for tryptic digests of bovine serum albumin, β-lactoglobulin A, and fetuin under high sample loads.

EVEREST columns benefit from a novel C18 chemistry that provides improved bonding and peptide recoveries: hence the ability to detect trace level peptides. They are available in sizes for applications from nano/capillary LC/MS to preparative. They are especially valuable for peptide mapping, purification of synthetic peptides, and high peptide load runs.

In the chromatograms below, separations obtained with an EVEREST column were compared to those obtained with other commercially available columns of the same hardware dimensions. All columns had monomeric C18 bonding on silica with pore and particle sizes of the same classification (ie: 300Å, 5µm). Mobile phases and gradient conditions are described in the figure. Peak count for a given trypsin digest sample were the average of three to five individual injections.

Separation of a tryptic digest of BSA on an EVEREST column and four commercial columns is presented in Figure 1. All five columns provide different selectivity and resolving power. Repeat injections of a high 174µg peptide load were performed on all columns. An excellent peak count (110 peaks) is observed for the EVEREST column, with 15% better resolution than commercial column D.

There are 77 trypsin cleavage sites in BSA based on the Swiss Protein Data Bank sequence. Our experimental peak counts exceed the theoretical cleavages. The discrepancy is most likely due to

integration parameters that allowed our data system to detect trace-level peaks and small amounts of contaminating proteases in the commercial trypsin preparation, the BSA standard, or from bacterial contamination.

Vydac Everest HPLC Columns

Cat. No.	ID	Length
238EV507505	75µm	50mm
238EV507510	75µm	100mm
238EV507515	75µm	150mm
238EV507525	75µm	250mm
238EV51505	150µm	50mm
238EV51510	150µm	100mm
238EV51515	150µm	150mm
238EV51525	150µm	250mm
238EV5305	300µm	50mm
238EV53510	300µm	100mm
238EV53515	300µm	150mm
238EV53525	300µm	250mm
238EV5505	500µm	50mm
238EV55510	500µm	100mm
238EV55515	500µm	150mm
238EV55525	500µm	250mm
238EV5105	1.0mm	50mm
238EV5110	1.0mm	100mm
238EV5115	1.0mm	150mm
238EV51	1.0mm	250mm
238EV5215	2.1mm	150mm
238EV52	2.1mm	250mm
238EV5415	4.6mm	150mm
238EV54	4.6mm	250mm

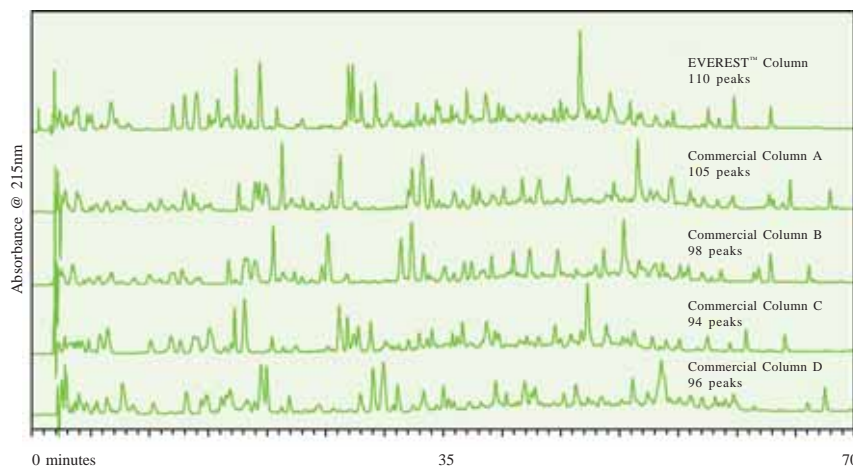
Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

238EV Guard Cartridges

Particle Size	ID	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pkg)
5µm	1.0mm	238GK51EV	238GD51EV
5µm	2.1mm	238GK52EV	238GD52EV
5µm	4.6mm	238GK54EV	238GD54EV

*Guard kits include one holder and one cartridge.

Everest Columns Outperform Many Commercial Columns for High Peptide Loads



Tryptic digest of bovine serum albumin on an Everest C18 column and four commercial C18 columns (all 300Å pore size, 5µm particle size, 4.6mm ID x 150mm).

Mobile phase: A: 0.1% v/v TFA in water; B: 0.085% v/v TFA in acetonitrile. Gradient: 4% B for 5 min, 4-40% B in 75 minutes, 40-90% B in 10 minutes, 90% B for 10 minutes, equilibrate at 4% B for 20 minutes.

Flow rate: 1.0mL/min.

Detector: UV at 215nm.

Temperature: 22° C.

Peptide load: 20µL of a 5.8µg/µL digest (174µg total peptide load). Peak numbers shown are the average of five replicate separations on each column.

Vydac HPLC DENALI™ Columns

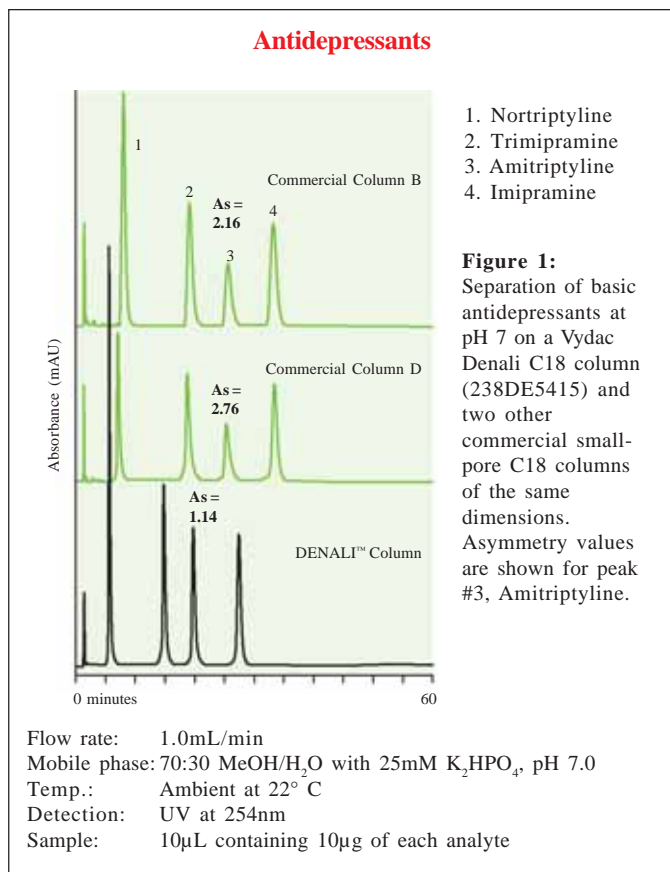


- High retentivity
- High efficiency
- Excellent peak symmetry for both acidic and basic small molecule analytes

Resolution of small hydrophilic molecules on silica based reversed phase (RP) adsorbents is favored by high retentivity. In addition, complete carbon coverage and high purity of the surface of silica base particles are important factors for reduced tailing to assure good peak symmetry, recovery and sensitivity for chromatography of acidic and basic analytes. By application of combination of new technologies, Grace Vydac has developed the DENALI™ C18 reversed phase adsorbent, a novel, monomerically bonded 120Å C18 silica with high carbon coverage and excellent performance for analysis of acidic and basic compounds.

Antidepressants

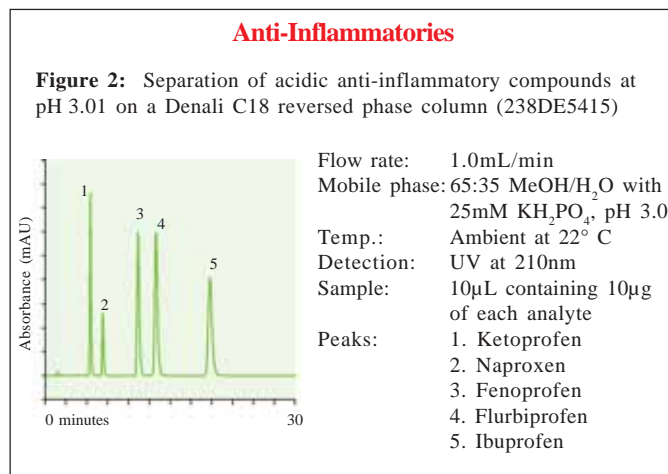
Separation of tricyclic antidepressants is a classic test of reversed phase column performance for basic pharmaceuticals. Reversed phase adsorbents with poor coverage of the polar silica surface will exhibit mixed-mode retention of basic analytes with resultant tailing and production of asymmetric peaks. Figure 1 shows the separation of four basic antidepressants on a DENALI column in comparison to two competitive commercial columns. The DENALI column provides good retention, excellent resolution, and also markedly



superior peak symmetry as shown by the values calculated for amitriptyline.

Anti-Inflammatories

Figure 2 shows the separation of five acidic anti-inflammatory compounds on a DENALI C18 column using a phosphate buffered mobile phase at pH 3.0. Peaks are well resolved, sharp, and symmetrical for all analytes.



Vydac Denali HPLC Columns

Cat. No.	ID	Length
238DE507505	75µm	50mm
238DE507510	75µm	100mm
238DE507515	75µm	150mm
238DE507525	75µm	250mm
238DE51505	150µm	50mm
238DE51510	150µm	100mm
238DE51515	150µm	150mm
238DE51525	150µm	250mm
238DE5305	300µm	50mm
238DE53510	300µm	100mm
238DE53515	300µm	150mm
238DE53525	300µm	250mm
238DE5505	500µm	50mm
238DE55510	500µm	100mm
238DE55515	500µm	150mm
238DE55525	500µm	250mm
238DE5105	1.0mm	50mm
238DE5110	1.0mm	100mm
238DE5115	1.0mm	150mm
238DE51	1.0mm	250mm
238DE5215	2.1mm	150mm
238DE52	2.1mm	250mm
238DE5415	4.6mm	150mm
238DE54	4.6mm	250mm

Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

238DE Guard Cartridges

Particle Size	Cat. No. for ID	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pk)
5µm	1.0mm	238GK51DE	238GD51DE
5µm	2.1mm	238GK52DE	238GD52DE
5µm	4.6mm	238GK54DE	238GD54DE

*Guard kits include one holder and one cartridge.

- Ultra pure silica based HPLC columns
- Extended pH range and column lifetime

Genesis is an ultra pure, highly inert HPLC packing material. This base deactivated material provides superior peak shape and accurate quantitation for a wide range of basic, acidic and neutral analytes. The high purity silica permits maximum surface coverage, uniform density bonded phases, exceptional pH stability and low secondary activity toward basic and acidic analytes.

Genesis is free from acidic silanols that create broad, tailing peaks and the unacceptably strong retention of basic solutes. These

undesirable chromatographic effects significantly compromise accurate quantitation. Genesis effectively minimizes lone silanols through high density bonding and optimum end-capping. It also simplifies method development by providing clean separations and peak shape with simple organic/aqueous mobile phases. No mobile phase modifiers are required.

Surface and internally bound metals cause unwanted retention of bases. These metals can also interact with analytes through chelating mechanisms. Residual metals have been removed from Genesis base silica. The absence of metals in Genesis eliminates tailing peaks for metal sensitive analytes, such as amines and acids.

Genesis 4.6mm ID Columns, 3µm, 120Å

Length	30 mm	50 mm	100 mm	150 mm	250mm
C18	FM3963E	FM5963E	FM10963E	FM15963E	FM25963E
C8	FM3968E	FM5968E	FM10968E	FM15968E	FM25968E
C8 (EC)	FM3969E	FM5969E	FM10969E	FM15969E	FM25969E
NH2	FM3982E	FM5982E	FM10982E	FM15982E	FM25982E

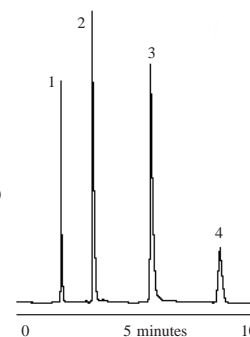
Genesis 4.6mm ID Columns, 4µm, 120Å

C18	FM3960E	FM5960E	FM10960E	FM15960E	FM25960E
C8	FM3962E	FM5962E	FM10962E	FM15962E	FM25962E
C8 (EC)	FM3964E	FM5964E	FM10964E	FM15964E	FM25964E
NH2	FM3981E	FM5981E	FM10981E	FM15981E	FM25981E
CN	FM3965E	FM5965E	FM10965E	FM15965E	FM25965E
SI	FM3961E	FM5961E	FM10961E	FM15961E	FM25961E
PH	FM3980E	FM5980E	FM10980E	FM15980E	FM25980E

Genesis C18: Silanols/Metals

1. Uracil
2. o-Phenanthroline
3. 8-Hydroxyquinoline
4. Methylbenzoate

Column: Genesis® C18,
4µm, 4.6 x 150mm
Mobile Phase: ACN/20mM Disodium
Phosphate, pH 7.5, 40/60
Flow Rate: 0.8mL/min
Detection: UV at 254nm



Genesis 3.0mm ID Columns, 3µm, 120Å

Length	10" mm	20" mm	30 mm	50 mm	100 mm	150 mm	250mm
C18	FL1963-2T	FL2963-2T	FL3963E	FL5963E	FL10963E	FL15963E	FL25963E
C8	FL1968-2T	FL2968-2T	FL3968E	FL5968E	FL10968E	FL15968E	FL25968E
C8 (EC)	FL1969-2T	FL2969-2T	FL3969E	FL5969E	FL10969E	FL15969E	FL25969E
NH2	FL1982-2T	FL2982-2T	FL3982E	FL5982E	FL10982E	FL15982E	FL25982E

Genesis 3.0mm ID Columns, 4µm, 120Å

C18	FL1960-2T	FL2960-2T	FL3960E	FL5960E	FL10960E	FL15960E	FL25960E
C8	FL1962-2T	FL2962-2T	FL3962E	FL5962E	FL10962E	FL15962E	FL25962E
C8 (EC)	FL1964-2T	FL2964-2T	FL3964E	FL5964E	FL10964E	FL15964E	FL25964E
NH2	FL1981-2T	FL2981-2T	FL3981E	FL5981E	FL10981E	FL15981E	FL25981E
CN	FL1965-2T	FL2965-2T	FL3965E	FL5965E	FL10965E	FL15965E	FL25965E
SI	FL1961-2T	FL2961-2T	FL3961E	FL5961E	FL10961E	FL15961E	FL25961E
PH	FL1980-2T	FL2980-2T	FL3980E	FL5980E	FL10980E	FL15980E	FL25980E

Genesis provides maximum pH stability because it does not utilize Trimethylchlorosilane (TMS) end-capping reagents, which have the potential for acid hydrolysis. Instead, a capping agent of enhanced stability was selected for the C18 and C8 end-capped phases. The C8 phase is also available as non end-capped material.

Genesis 2.1mm ID Columns, 3µm, 120Å

Length	10" mm	20" mm	30 mm	50 mm	100 mm	150 mm
C18	FK1963-2T	FK2963-2T	FK3963E	FK5963E	FK10963E	FK15963E
C8	FK1968-2T	FK2968-2T	FK3968E	FK5968E	FK10968E	FK15968E
C8 (EC)	FK1969-2T	FK2969-2T	FK3969E	FK5969E	FK10969E	FK15969E
NH2	FK1982-2T	FK2982-2T	FK3982E	FK5982E	FK10982E	FK15982E

Genesis 2.1mm ID Columns, 4µm, 120Å

C18	FK1960-2T	FK2960-2T	FK3960E	FK5960E	FK10960E	FK15960E
C8	FK1962-2T	FK2962-2T	FK3962E	FK5962E	FK10962E	FK15962E
C8 (EC)	FK1964-2T	FK2964-2T	FK3964E	FK5964E	FK10964E	FK15964E
NH2	FK1981-2T	FK2981-2T	FK3981E	FK5981E	FK10981E	FK15981E
CN	FK1965-2T	FK2965-2T	FK3965E	FK5965E	FK10965E	FK15965E
SI	FK1961-2T	FK2961-2T	FK3961E	FK5961E	FK10961E	FK15961E
PH	FK1980-2T	FK2980-2T	FK3980E	FK5980E	FK10980E	FK15980E

* All 10 and 20mm Lengths are a Package of 2 Cartridges, Requires Cartridge Holder

Cartridge Holders

Cat. No.	Length
F9111P	10mm
F9112P	20mm

Vydac HPLC/MS Columns

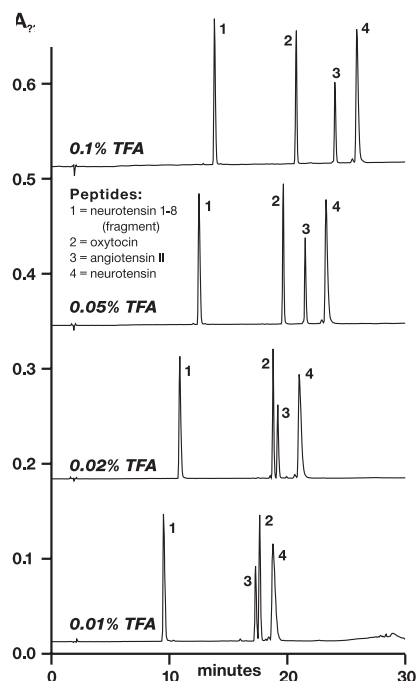
- Low or **NO** TFA requirement for sharp symmetrical peptide peaks
- Retention and selectivity options for a variety of protein and peptide samples

Mobile phases containing TFA have a suppressive effect on ion generation, reducing the sensitivity and analytical reliability of LC/MS techniques (Ref. 1). This suppressive effect can be partially overcome by postcolumn additive techniques that significantly complicate the chromatographic system. Alternatively, a 10-fold reduction in TFA concentration will practically eliminate suppression, but with most columns this produces a significant reduction in chromatogram quality.

Vydac has developed reversed phase adsorbents that produce peptide and protein separations with excellent peak sharpness and symmetry using only a fraction of the TFA concentration previously required. All columns are based on Vydac's high purity synthetic 300Å pore-size silica. A proprietary silica treatment reduces the dependence on TFA and other ion-pair agents. The silica is covalently bonded with different hydrophobic phases – **C4, C8, monomeric C18, polymeric C18, and Diphenyl** – to produce reversed phase adsorbents with distinct retention and selectivities. Each adsorbent is exhaustively end-capped.

The chromatogram in Figure 1 shows a separation of four peptides on the 218MS54 LC/MS polymeric-C18 column. Note that peak shapes and symmetry are maintained over a 10-fold reduction in TFA concentration. Reductions in retention times occur as TFA concentration is decreased, a result of less activity of TFA in bringing polar groups on sample molecules to the bonded C18 phase. The effect is most pronounced for angiotensin II by virtue of its positive-charged arginine side chain. This results in different selectivity, in fact a reversal of elution order with oxytocin at 0.01% TFA.

Figure 1: Peptides on LC/MS C18, 218MS54



Conditions:

Detection: 220nm. **Mobile phase:** A=5% acetonitrile in water with TFA as indicated (v/v). B=95% acetonitrile in water containing same TFA concentration as in A. **Flow:** 1.5mL/min. **Gradient:** Linear from 0-20% B over 20 minutes, then to 100% B in 5 minutes.

Reference:

1. A. Apffel, S. Fischer, G. Goldberg, P.C. Goodley, and F.E. Kuhlmann, "Enhanced sensitivity for peptide mapping with electrospray liquid chromatography – mass spectrometry in the presence of signal suppression due to trifluoroacetic acid-containing mobile phases." *J. Chrom. A*, 712 (1995) 177-190.

ID	Length	C4-Polymeric Cat. No.	C8-Polymeric Cat. No.	C18-Polymeric Cat. No.	C18-Monomeric Cat. No.	Diphenyl Cat. No.
75um	50mm	214MS507505	208MS507505	218MS507505	238MS507505	219MS507505
	100mm	214MS507510	208MS507510	218MS507510	238MS507510	219MS507510
	150mm	214MS507515	208MS507515	218MS507515	238MS507515	219MS507515
	250mm	214MS507525	208MS507525	218MS507525	238MS507525	219MS507525
150um	50mm	214MS51505	208MS51505	218MS51505	238MS51505	219MS51505
	100mm	214MS51510	208MS51510	218MS51510	238MS51510	219MS51510
	150mm	214MS51515	208MS51515	218MS51515	238MS51515	219MS51515
	250mm	214MS51525	208MS51525	218MS51525	238MS51525	219MS51525
300um	50mm	214MS5305	208MS5305	218MS5305	238MS5305	219MS5305
	100mm	214MS5310	208MS5310	218MS5310	238MS5310	219MS5310
	150mm	214MS5315	208MS5315	218MS5315	238MS5315	219MS5315
	250mm	214MS5325	208MS5325	218MS5325	238MS5325	219MS5325
500um	50mm	214MS5505	208MS5505	218MS5505	238MS5505	219MS5505
	100mm	214MS5510	208MS5510	218MS5510	238MS5510	219MS5510
	150mm	214MS5515	208MS5515	218MS5515	238MS5515	219MS5515
	250mm	214MS5525	208MS5525	218MS5525	238MS5525	219MS5525
1.0mm	250mm	214MS51	208MS51	218MS51	238MS51	219MS51
	Guard Kit*	214GK51MS	208GK51MS	218GK51MS	238GK51MS	219GK51MS
	Repl. Guard, 2/pk	214GD51MS	208GD51MS	218GD51MS	238GD51MS	219GD51MS
2.1mm	250mm	214MS52	208MS52	218MS52	238MS52	219MS52
	Guard Kit*	214GK52MS	208GK52MS	218GK52MS	238GK52MS	219GK52MS
	Repl. Guard, 2/pk	214GD52MS	208GD52MS	218GD52MS	238GD52MS	219GD52MS
4.6mm	250mm	214MS54	208MS54	218MS54	238MS54	219MS54
	Guard Kit*	214GK54MS	208GK54MS	218GK54MS	238GK54MS	219GK54MS
	Repl. Guard, 2/pk	214GD54MS	208GD54MS	218GD54MS	238GD54MS	219GD54MS

*Guard kits include one holder and one cartridge.

201TP™ and 202TP™

- 201TP columns separate the EPA sixteen priority pollutants in less than twenty minutes
- 202TP Rapid-analysis columns separate the 16 priority pollutant PAHs in under 10 minutes
- 202TP columns for the analysis of derivatized PAHs

Polyaromatic hydrocarbons (PAHs) are large organic molecules produced during combustion. Many PAHs are carcinogenic. For this reason, the United States Environmental Protection Agency (EPA) and other governmental agencies have formulated regulations for the monitoring and control of PAHs and have developed methods for their measurement in air, water, food, and other components of the human environment. The EPA has designated sixteen PAHs as Priority Pollutants. EPA Methods 610 and 550 deal with the measurement of PAHs in drinking water and Method 8310 deals with the measurement of PAHs in waste water. These EPA methods specify reverse phase High Performance Liquid Chromatography (HPLC) for measurement of the PAHs.

Vydac 201TP HPLC columns have long been the standard in the analysis of PAHs by HPLC. Vydac 201TP and 202TP HPLC columns have been specifically developed to perform the separation and quantitation of PAHs required by environmental regulations – not only regulations presently in force but also new regulations on the horizon.

201 TP Specialty Reversed Phase Column, C18 300Å

Cat. No.	Description
201TP54	5µm, 4.6mm x 250mm
201TP5415	5µm, 4.6mm x 150mm
201TP53	5µm, 3.2mm x 250mm
201TP5315	5µm, 3.2mm x 150mm
201TP52	5µm, 2.1mm x 250mm
201TP5215	5µm, 2.1mm x 150mm
201TP51	5µm, 1.0mm x 250mm
201TP5115	5µm, 1.0mm x 150mm
201TP510	5µm, 10mm x 250mm

202TP High Carbon Load Reversed Phase Column, C18 300Å

202TP54	5µm, 4.6mm x 250mm
202TP5415	5µm, 4.6mm x 150mm
202TP3410	3µm, 4.6mm x 100mm
202TP3405	3µm, 4.6mm x 50mm

Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

201TP Guard Cartridges

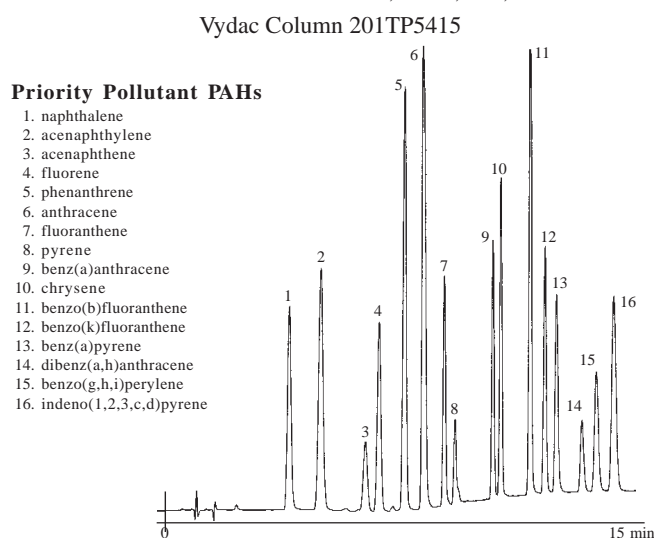
Particle Size	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pk)
5µm 2.1mm	201GK52T	201GD52T
5µm 4.6mm	201GK54T	201GD54T
10µm 4.6mm	201GK104T	201GD104T

202TP Guard Cartridges

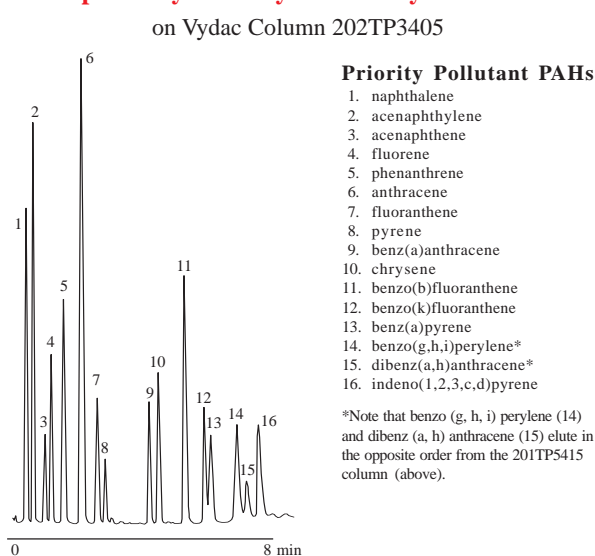
5µm 4.6mm	202GK54T	202GD54T
10µm 4.6mm	202GK104T	202GD104T

*Guard kits include one holder and one cartridge.

Analysis of Priority Pollutant Polyaromatic Hydrocarbons in accordance with EPA Methods 550, 550.1, 610, and 8310 on Vydac Column 201TP5415

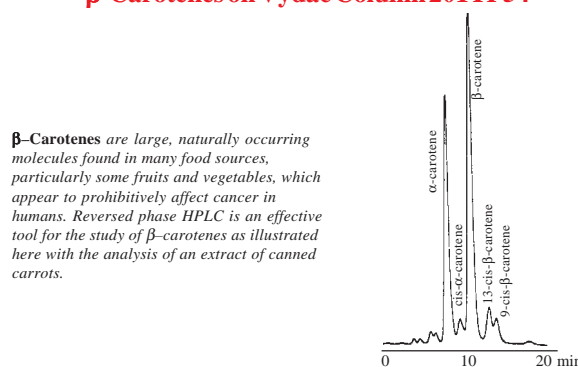


Rapid Analysis of Polyaromatic Hydrocarbons on Vydac Column 202TP3405



Vydac's 202TP3405 Rapid Analysis PAH column was developed to increase PAH analytical sample throughput. This column separates the 16 EPA PAHs in about ten minutes including column equilibration time, permitting the analysis of up to six samples per hour. A ten centimeter Rapid Analysis column – the 202TP3410 – is also available with slightly longer retention times and slightly better resolution. Sample pretreatment to remove insoluble or strongly retained sample components is recommended to extend the lifetime of three micron columns.

β-Carotenes on Vydac Column 201TP54



Vydac HPLC Columns

208TP™

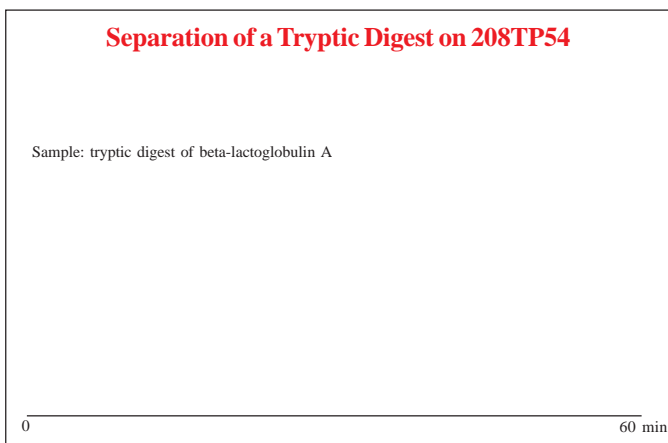
- Peptides up to 10,000-20,000 MW
- Enzymatic digest fragments
- Natural and synthetic peptides

Vydac C8 208TP reversed phase material consists of n-octyl groups bonded to Vydac's high purity 300Å TP silica which allows peptide molecules full access to the silica surface.

The silica is bonded with polyfunctional silanes leading to polymerization of the hydrophobic phase, giving these columns very long column lifetime and no measurable phase leaching. The C8 reversed phase is closely monitored by applications-focused quality control tests of the separation of selected peptides which are sensitive to phase coverage and endcapping.

Separation of a Tryptic Digest on 208TP54

Sample: tryptic digest of beta-lactoglobulin A

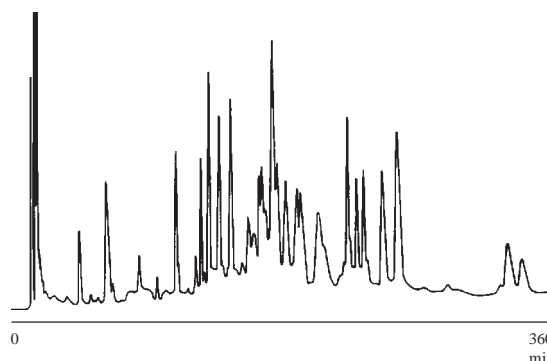


214TP™

- Glycoproteins
- Hemoglobin variants
- Histones
- Human growth hormone
- Insulin variants
- Membrane proteins

Vydac C4 (214TP) reversed phase material consists of butyl aliphatic groups bonded to the surface of 300Å pore diameter silica. The large pores of the 300Å TP silica allow polypeptide molecules complete access to the interior of the silica pores. The unique process by which we manufacture Vydac TP silica results in a very high purity synthetic silica with carefully controlled characteristics.

Ribosomal Proteins on 214TP54



Large, hydrophobic proteins are best separated on C4 reversed phase columns. While suitable for peptides as small as 10-20 residues, the short, mildly hydrophobic C4 phase gives especially good recovery and resolution for large or hydrophobic proteins.

C8 300Å

Cat. No.	Description
208TP54	5µm, 4.6mm x 250mm
208TP5415	5µm, 4.6mm x 150mm
208TP5405	5µm, 4.6mm x 50mm
208TP53	5µm, 3.2mm x 250mm
208TP5315	5µm, 3.2mm x 150mm
208TP52	5µm, 2.1mm x 250mm
208TP5215	5µm, 2.1mm x 150mm
208TP5205	5µm, 2.1mm x 50mm
208TP51	5µm, 1.0mm x 250mm
208TP5115	5µm, 1.0mm x 150mm
208TP5105	5µm, 1.0mm x 50mm
208TP3410	3µm, 4.6mm x 100mm
208TP3405	3µm, 4.6mm x 50mm
208TP510	5µm, 10mm x 250mm

Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

208TP Guard Cartridges

Particle Size	ID	Cat. No. for Guard Kit*	Price	Cat. No. for Repl. Cart. (2/pk)
5µm	1.0mm	208GK51		208GD51
5µm	2.1mm	208GK52		208GD52
5µm	4.6mm	208GK54		208GD54
10µm	4.6mm	208GK104		208GD104
12µm	10mm	208FSK1210		208GCC1210

*Guard kits include one holder and one cartridge.

C4 300Å

Cat. No.	Description
214ATP54*	5µm, 4.6mm x 250mm
214TP54	5µm, 4.6mm x 250mm
214TP5415	5µm, 4.6mm x 150mm
214TP5405	5µm, 4.6mm x 50mm
214TP53	5µm, 3.2mm x 250mm
214TP5315	5µm, 3.2mm x 150mm
214TP52	5µm, 2.1mm x 250mm
214TP5215	5µm, 2.1mm x 150mm
214TP5205	5µm, 2.1mm x 50mm
214TP51	5µm, 1.0mm x 250mm
214TP5115	5µm, 1.0mm x 150mm
214TP5105	5µm, 1.0mm x 50mm
214TP3410	3µm, 4.6mm x 100mm
214TP3405	3µm, 4.6mm x 50mm
214TP510	5µm, 10mm x 250mm

*214ATP54 is optimized for use in stability analysis of human growth hormone.

214TP Guard Cartridges

Particle Size	ID	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pk)
5µm	1.0mm	214GK51	214GD51
5µm	2.1mm	214GK52	214GD52
5µm	4.6mm	214GK54	214GD54
10µm	4.6mm	214GK104	214GD104
12µm	10mm	214FSK1210	214GCC1210

*Guard kits include one holder and one cartridge.

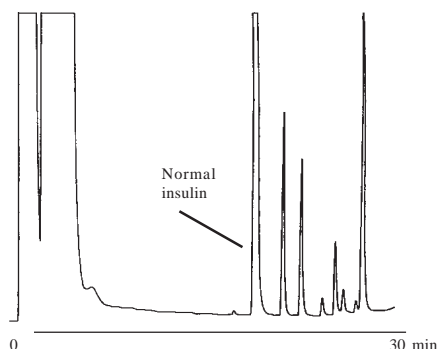
218TP™

- Small polypeptides less than 4,000-5,000 MW
- Enzymatic digest fragments
- Natural and synthetic peptides

Vydac C18 (218TP) reversed phase material consists of octadecyl aliphatic groups bonded to the surface of 300Å pore diameter silica. The large pores of the 300Å TP silica allow polypeptide molecules complete access to the interior of the silica pores. The unique process by which we manufacture Vydac TP silica results in a very high purity synthetic silica with carefully controlled characteristics.

The hydrophobic (reversed) phase is attached to the silica using polyfunctional octadecylchlorosilanes resulting in cross-linking, or polymerization of the hydrophobic phase.

Separation of Insulin and Partial Reduction Products



In a study of bridged peptides, disulfide bonds were reduced and the reduction products were separated from normal insulin by C18 reversed phase HPLC.

Polymeric C18 300Å

Cat. No.	Description
218TP54	5µm, 4.6mm x 250mm
218TP5415	5µm, 4.6mm x 150mm
218TP5405	5µm, 4.6mm x 50mm
218TP53	5µm, 3.2mm x 250mm
218TP5315	5µm, 3.2mm x 150mm
218TP52	5µm, 2.1mm x 250mm
218TP5215	5µm, 2.1mm x 150mm
218TP5205	5µm, 2.1mm x 50mm
218TP51	5µm, 1.0mm x 250mm
218TP5115	5µm, 1.0mm x 150mm
218TP5105	5µm, 1.0mm x 50mm
218TP3410	3µm, 4.6mm x 100mm
218TP3405	3µm, 4.6mm x 50mm
218TP510	5µm, 10mm x 250mm

Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

218TP Guard Cartridges

Particle Size	Particle ID	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pk)
5µm	1.0mm	218GK51	218GD51
5µm	2.1mm	218GK52	218GD52
5µm	4.6mm	218GK54	218GD54
10µm	4.6mm	218GK104	218GD104
12µm	10mm	218FSK1210	218GCC1210

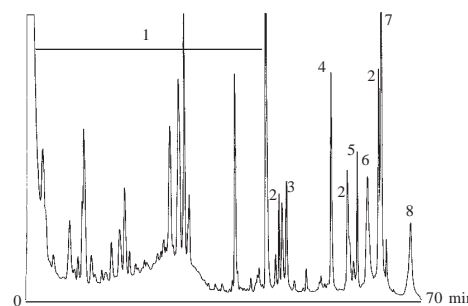
*Guard kits include one holder and one cartridge.

219TP™

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

Vydac diphenyl (219TP) reversed phase material consists of phenyl groups bonded to Vydac's high purity synthetic 300Å TP silica, which allows polypeptide molecules full access to the silica surface. The silica is bonded with polyfunctional silanes resulting in polymerization of the hydrophobic phase, long column lifetime and no measurable phase leaching. The phenyl reversed phase is closely monitored by applications-focused quality control tests consisting of the separation of several proteins.

Separation of Protein/Peptide Mixture on 219TP54



Sample: 1. horse cytochrome c tryptic digest fragments; 2. whale myoglobin CNBr digest fragments; 3. ribonuclease; 4. cytochrome c; 5. lysozyme; 6. BSA; 7. myoglobin; and 8. ovalbumin
Data from P. Tempst, L.E. Hood, and S.B.H. Kent, Modern Methods of Plant Analysis, Vol. 5, 170-208 (Springer-Verlag, Publishers).

Diphenyl, 300Å

Cat. No.	Description
219TP54	5µm, 4.6mm x 250mm
219TP5415	5µm, 4.6mm x 150mm
219TP5405	5µm, 4.6mm x 50mm
219TP53	5µm, 3.2mm x 250mm
219TP5315	5µm, 3.2mm x 150mm
219TP52	5µm, 2.1mm x 250mm
219TP5215	5µm, 2.1mm x 150mm
219TP5205	5µm, 2.1mm x 50mm
219TP51	5µm, 1.0mm x 250mm
219TP5115	5µm, 1.0mm x 150mm
219TP5105	5µm, 1.0mm x 50mm
219TP3410	3µm, 4.6mm x 100mm
219TP3405	3µm, 4.6mm x 50mm
219TP510	5µm, 10mm x 250mm

Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

219TP Guard Cartridges

Particle Size	Particle ID	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pk)
5µm	1.0mm	219GK51	219GD51
5µm	2.1mm	219GK52	219GD52
5µm	4.6mm	219GK54	219GD54
10µm	4.6mm	219GK104	219GD104
12µm	10mm	219FSK1210	219GCC1210

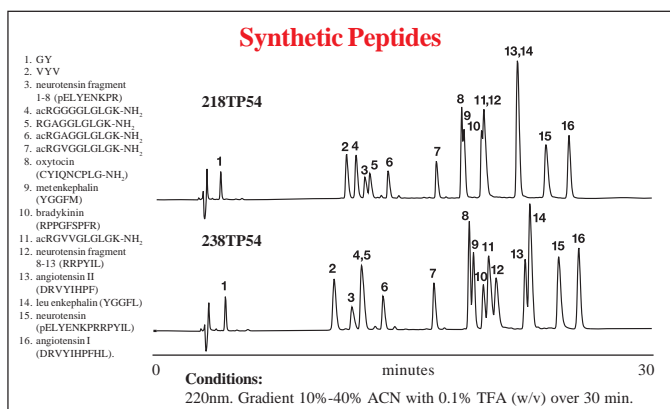
*Guard kits include one holder and one cartridge.

Vydac HPLC Columns

238TP™

- Small polypeptides less than 4,000-5,000 MW
- Enzymatic digest fragments
- Natural and synthetic peptides
- Complex carbohydrates

For Vydac's 238TP adsorbent, the hydrophobic (reversed) phase is attached using monofunctional octadecylchlorosilanes, resulting in a uniform monomeric layer of C18 groups. After end-capping, the resulting reversed phase material has excellent stability and reproducibility and provides subtle differences in selectivity compared to the 218TP polymeric C18 adsorbent. These selectivity differences can be exploited to separate compounds that are difficult to resolve on one C18 column alone and to aid in identification of more components in complex mixtures, ie: partial digests of proteins and polysaccharides.



Monomeric C18 300Å

Cat. No.	Description
238TP54	5µm, 4.6mm x 250mm
238TP5415	5µm, 4.6mm x 150mm
238TP5405	5µm, 4.6mm x 50mm
238TP53	5µm, 3.2mm x 250mm
238TP5315	5µm, 3.2mm x 150mm
238TP52	5µm, 2.1mm x 250mm
238TP5215	5µm, 2.1mm x 150mm
238TP5205	5µm, 2.1mm x 50mm
238TP51	5µm, 1.0mm x 250mm
238TP5115	5µm, 1.0mm x 150mm
238TP5105	5µm, 1.0mm x 50mm
238TP3410	3µm, 4.6mm x 100mm
238TP3405	3µm, 4.6mm x 50mm
238TP510	5µm, 10mm x 250mm

Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

238TP Guard Cartridges

Particle Size	Cat. No. for ID	Cat. No. for Guard Kit*	Cat. No. for Repl. Cart. (2/pk)
5µm	1.0mm	238GK51	238GD51
5µm	2.1mm	238GK52	238GD52
5µm	4.6mm	238GK54	238GD54
10µm	4.6mm	238GK104	238GD104
12µm	10mm	238FSK1210	238GCC1210

*Guard kits include one holder and one cartridge.

259VHP™

Vydac 259VHP columns are acid and alkali stable from pH 0 to 14. They are also heat stable up to 80° C and can be operated at pressures up to 3000 psi. These characteristics make them ideal for applications requiring extreme conditions, including separation of difficult proteins:

- membrane proteins
- structural proteins
- viral coat proteins
- crude inclusion bodies

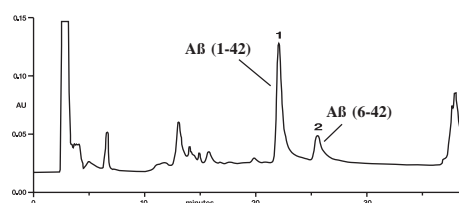
all of which nature has designed to be insoluble. Such proteins can be eluted using harsh conditions, for example gradients from 10% isopropanol (IPA) to 50% IPA with 3M guanidine HCl at 60° C. (Elevated temperature reduces viscosity, allowing reasonable flow rates.)

Vydac polymer (259VHP) reversed phase material consists of a highly cross-linked polystyrene-divinylbenzene polymer in the form of rigid, porous (300Å pore diameter) spheres. Because of its high cross-linkage, this adsorbent gives high mechanical stability with a minimum of shrinking in aqueous or swelling in organic solvents. A proprietary surface modification enhances the separation performance. The 300Å pores accommodate both small peptide and large protein separations.

The 259VHP polymer matrix is chemically resistant. Columns can operate in a variety of mobile phases and can be cleaned and chemically sanitized with alkali and other aggressive agents.

Purification of Recombinant β-Amyloid Peptide (1-42) from Fusion Cleavage

Purification of β-amyloid protein is challenging due to its tendency to aggregate and inherent low solubility.



Conditions:

Column: Vydac 259VHP54. 1mL/min. 60° C. A = 5% ACN, 5mM NH₄OAc, pH 7.0. B = 10% IPA, 80% ACN, 5mM NH₄OAc, pH 7.0. 0-24% B in 5 min., 24-27% B in 25 min., then 27-100% B in 5 min.

Courtesy of N.K. Menon, A.E. Przybyla, E.B. Neuhaus, and R.A. Makula, Fermentation Research Facility, Department of Biochemistry, University of Georgia.

259VHP 300Å

Cat. No.	Description
259VHP5205	5µm, 2.1mm x 50mm
259VHP5215	5µm, 2.1mm x 150mm
259VHP52	5µm, 2.1mm x 250mm
259VHP5405	5µm, 4.6mm x 50mm
259VHP5415	5µm, 4.6mm x 150mm
259VHP54	5µm, 4.6mm x 250mm
259VHP810	8µm, 10mm x 250mm
259VHP822	8µm, 22mm x 250mm
259VHP1522	15µm, 22mm x 250mm

VHP Series Ion Exchange Columns

- Optimized for the separation of proteins, polypeptides
- Resistant to eluents from pH 0-14, most organic solvents, and can be used up to 3,000 psi
- Show negligible non-specific protein binding

Vydac VHP series ion-exchange columns consist of spherical polystyrene-divinylbenzene (PS-DVB) beads with a chemically attached hydrophilic surface. The modified resin is derivatized to quaternary amine (Q) (300VHP) or tertiary amine (DEAE) (301VHP) ion-exchange groups. The 400VHP modified resin is derivatized to form sulphonic acid strong cation exchange groups.

300VHP, Anion Exchange, Quaternary

Cat. No.	Description
300VHP552	5µm, 5.0mm x 25mm
300VHP575	5µm, 7.5mm x 50mm
300VHP575P	5µm, 7.5mm x 50mm, PEEK with titanium frits. Includes M6 adapter for attachment to FPLC system.
300VHP81010	8µm, 10.0mm x 100mm

301VHP, Anion Exchange, DEAE

301VHP552	5µm, 5.0mm x 25mm
301VHP575	5µm, 7.5mm x 50mm
301VHP575P	5µm, 7.5mm x 50mm, PEEK with titanium frits. Includes M6 adapter for attachment to FPLC system.
301VHP81010	8µm, 10.0mm x 100mm L

400VHP Protein Cation-Exchange

400VHP552	5µm, 5.0mm x 25mm
400VHP575	5µm, 7.5mm x 50mm
400VHP575P	5µm, 7.5mm x 50mm, PEEK with titanium frits. Includes M6 adapter for attachment to FPLC system.
400VHP81010	8µm, 10.0mm x 100mm

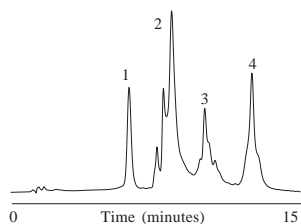
VHP Columns Compatible with FPLC with M6 Adapter P-650

M6 Internal to 10-32 external adapter
Other column sizes and particle diameters are available for both analytical and preparative applications. Please call for pricing.

Separation of Proteins by Anion Exchange

1. bovine carbonic anhydrase (pI: 7.3)
2. conalbumin (pI: 6, 6.3, 6.6)
3. ovalbumin (pI: 4.7)
4. soybean trypsin inhibitor (pI: 4.5)

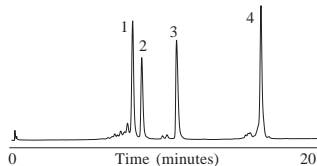
Conditions:
Column: Vydac 300VHP575
(Q anion exchange, 5µm, 7.5mm ID x 50mm)
Eluent: 10mM CHES/TEA, pH 9.53
with a gradient 0-0.5M NaCl in 20 min.



Separation of Proteins by Cation Exchange

1. α-chymotrypsinogen A
2. ribonuclease
3. cytochrome c
4. lysozyme

Conditions:
Column: Vydac 400VHP575
(cation exchange, 5µm, 7.5mm ID x 50mm)
Eluent: 10mM phosphate, pH 6.5 with a gradient 0-0.5M NaCl in 50 min.



302IC™ Anion Exchange

- Nucleotide analysis and Environmental analysis

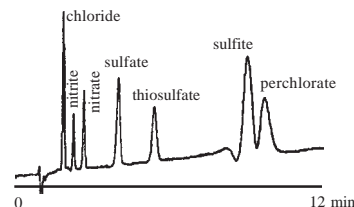
Vydac 302IC is a low capacity anion-exchange (quarternary amine) material based on a high purity ten micron, large-pore silica.

Cat. No.	Description
302IC4.6	10µm, 4.6mm x 250mm
302GK4	Guard kit (holder & cartridge)
302DG4	Replacement cartridges, 2/pk

Common Anions

Analysis of common anions in different oxidation states on Vydac Column 302IC4.6

Eluent: 4mM phthalate, pH 4.6, at 1mL/min.



BioSelect™ SPE Cartridges

Vydac BioSelect Solid Phase Extraction (SPE) cartridges are disposable sample cleanup cartridges. Used in the extraction, concentration or cleanup of proteins, peptides or other biological samples, BioSelect SPE cartridges have similar selectivity and recovery as Vydac HPLC columns. Vydac BioSelect SPE cartridges are filled with Vydac 13µm C4 and C18 reversed phase materials. They are available in two sizes: 1mL volume with 50mg of extraction material (polypeptide capacity: 0.5-0.75mg) or 3mL volume with 100mg of extraction material (polypeptide capacity: 1-1.5mg).

BioSelect SPE Cartridges

Cat. No.	Description
214SPE1000	1mL, 214TP, 300Å, 13µm, 50/pk
214SPE3000	3mL, 214TP, 300Å, 13µm, 50/pk
218SPE1000	1mL, 218TP, 300Å, 13µm, 50/pk
218SPE3000	3mL, 218TP, 300Å, 13µm, 50/pk

In-Line Column Prefilter

The PEEK filter body contains a high-flow filter element and is designed for maximum removal of particulate matter with minimal dead volume or backpressure. As soon as an increase in backpressure is noticed, simply remove, dispose, and replace with a new filter unit. The direct-connect design is compatible with all 1/16" 10-32 columns.

Cat. No.	Description
CPF10	Disposable pre-column filters, 10/pk

Vydac Bulk Media

Bulk media is available in the following phases and particle sizes.

- 10-15µm, 15-20µm, or 20-30µm particle sizes:
201TP, 208TP, 214TP, 218TP, 219TP, 238TP and 238EV
- 10, 15µm or 20µm particle sizes: **238DE**
- 15µm particle sizes: **208SP, and 259VHP**

Please call Chrom Tech for pricing and availability.