



HICHROM

Chromatography Columns and Supplies

LC COLUMNS
Vydac

Catalogue 9



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Vydac®

Vydac® columns, manufactured by Grace Materials Technologies / Discovery Sciences, were developed for bioseparations and became the benchmark for the reversed-phase separation of proteins and peptides. Vydac 300Å wide pore phases are available in a wide range of dimensions from nano and capillary, to micro and analytical, to preparative and process scale.

Vydac Phases

Vydac Phase	Functional Group	Bonding	Particle Size (µm)	Pore Size (Å)	Carbon Load (%)	Endcapped
208MS	C8	Polymeric	3, 5, 10	300	5	Yes
214MS	C4	Polymeric	3, 5, 10	300	3	Yes
218MS	C18	Polymeric	3, 5, 10	300	8	Yes
238MS	C18	Monomeric	3, 5	300	4	Yes
219MS	Diphenyl	Polymeric	5	300	4	Yes
201TP	C18	Polymeric	3, 5, 10	300	8	No
202TP	C18	Polymeric	3, 5, 10	300	9	No
208TP	C8	Polymeric	3, 5, 10	300	5	Yes
214TP	C4	Polymeric	3, 5, 10	300	3	Yes
218TP	C18	Polymeric	3, 5, 10	300	8	Yes
219TP	Diphenyl	Polymeric	5, 10	300	4	Yes
238TP	C18	Monomeric	3, 5, 10	300	4	Yes
238EV (Everest)	C18	Monomeric	5, 10	300	6	Yes
238DE (Denali)	C18	Monomeric	3, 5, 10	120	20	Yes

Vydac MS Phases

- Five reversed-phase chemistries
- Reduced TFA requirement
- High protein recovery

Vydac MS phases were developed from the original Vydac TP phases, by incorporating a surface treatment and proprietary bonding process. A variety of reversed-phase materials makes this product line suitable for the LC-MS analysis of small peptides to large intact, undenatured proteins.

Trifluoroacetic acid (TFA) is frequently used for improving peak shape and symmetry in reversed-phase separations of peptides and proteins. Although its volatility permits easy removal from preparative fractions, it does contribute to the background signal at low UV wavelengths and also has a suppression effect on electrospray MS ion generation.

Although a TFA concentration of 0.1% is commonly used, changing the TFA concentration can change reversed-phase selectivity of peptides. The Vydac MS phases have undergone proprietary modifications that reduce the dependence on TFA and other ion-pairing reagents. In selected cases, these columns also perform well without the addition of TFA, acetic or formic acid.

Figure 1 shows the separation of four peptides on a 218MS column. Peak shapes are maintained down to 0.01% TFA, although selectivity changes.

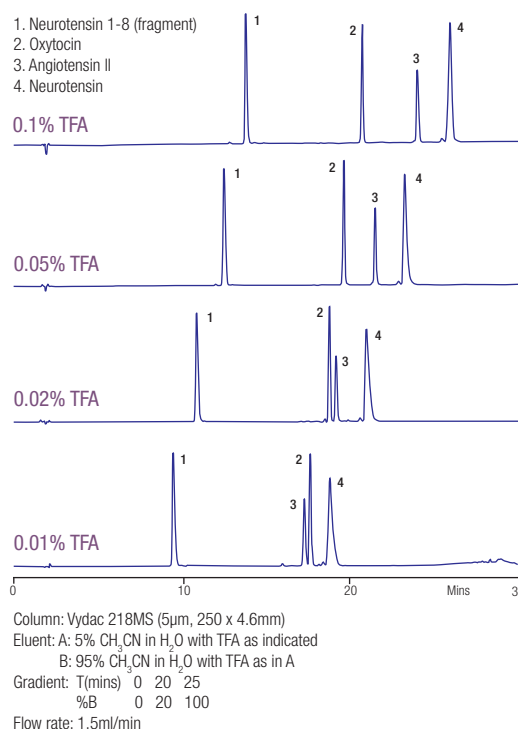


Figure 1. Separation of peptides on Vydac 218MS

Everest® Columns

- High resolution for complex peptide digests
- Unique selectivity for hydrophilic and hydrophobic peptides

The Everest® phase is a monomerically bonded 300Å phase. A novel, proprietary silica treatment and unique bonding chemistry result in unique selectivity and increased sensitivity for hydrophilic and hydrophobic peptides from complex digests. This improved bonding also leads to increased recovery and the ability to detect trace level peptides. Everest columns are available from nano/capillary to preparative and process scale. Figure 2 (see page 120) shows the analysis of a peptone on Everest C18 (238EV).

Vydac® (continued)

Vydac TP Phases

- Referenced in a large number of patents and publications
- Polymeric bonded phases have long column lifetimes

The Vydac® TP range of phases was the first generation of wide pore media phases developed in the Vydac range and became the industry standard for peptide and protein separations. The large pores of the 300Å TP silica give polypeptide molecules complete access to the interior of the silica pores.

Column Selection for Polypeptides

The appropriate reversed-phase column for a polypeptide separation should be selected based primarily on the hydrophobicity of the polypeptide and secondly on its molecular weight. Subtle differences in selectivity can be observed between analyses using 218MS or 218TP polymeric and 238MS or 238TP monomeric bonded C18 phases. Figure 3 shows a comparison between the selectivity of the polymeric 218TP and monomeric 238TP phases for a mixture of peptides. Applications for Vydac MS and TP columns are summarised below.

208MS and 208TP

- Ideal for biomolecules 5-10,000 Da
- Enzymatic digest fragments
- Natural and synthetic peptides

214MS and 214TP

- Polypeptides larger than 4-5,000 Da
- Hydrophobic polypeptides
- Glycoproteins
- Haemoglobin variants
- Histones
- Human growth hormone
- Insulin variants
- Membrane proteins

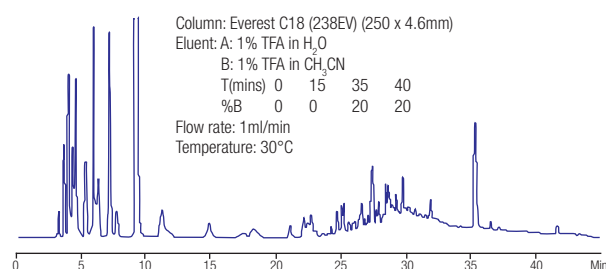


Figure 2. Peptone analysis on Everest C18 (see page 119)

218MS, 218TP, 238MS and 238TP

- Small polypeptides less than 4-5,000 Da
- Enzymatic digest fragments (<12 proteins)
- Natural and synthetic peptides
- Multi-ring compounds

219MS and 219TP

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

238EV

- Complex peptide mixtures
- Tryptic protein digests (>12 proteins)
- Peptones

Nano/Capillary Columns

- Ideal for small samples and low flow rates
- Direct flow to MS without stream splitting
- Maximise sensitivity

For low flow applications, the Vydac 3 and 5µm MS phases are available in prepacked capillary columns of 75µm (0.075mm), 150µm (0.15mm), 300µm (0.3mm) and 500µm (0.5mm) i.d. and lengths of 50, 100, 150 and 250mm.

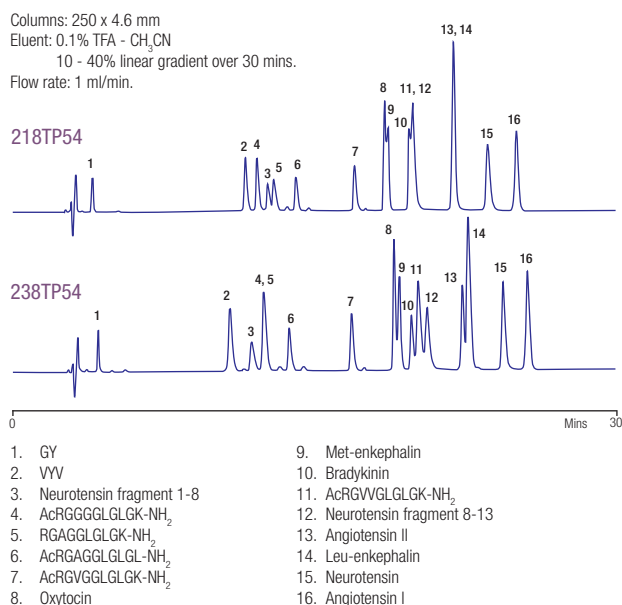


Figure 3. Separation of synthetic peptides on Vydac 218TP and 238TP phases

Vydac® (continued)

Ordering Information

Capillary Columns

5µm Vydac Phase	Column Dimensions (mm)							
	50 x 0.075	100 x 0.075	150 x 0.075	250 x 0.075	50 x 0.15	100 x 0.15	150 x 0.15	250 x 0.15
	£611	£611	£611	£638	£611	£611	£611	£638
208MS	208MS5.07505	208MS5.07510	208MS5.07515	208MS5.07525	208MS5.1505	208MS5.1510	208MS5.1515	208MS5.1525
214MS	214MS5.07505	214MS5.07510	214MS5.07515	214MS5.07525	214MS5.1505	214MS5.1510	214MS5.1515	214MS5.1525
218MS	218MS5.07505	218MS5.07510	218MS5.07515 ¹	218MS5.07525	218MS5.1505	218MS5.1510	218MS5.1515 ²	218MS5.1525
238MS	238MS5.07505	238MS5.07510	238MS5.07515	238MS5.07525	238MS5.1505	238MS5.1510	238MS5.1515	238MS5.1525
	£669	£669	£683	-	-	£669	£683	£698
238EV	238EV5.07505	238EV5.07510	238EV5.07515	-	-	238EV5.1510	238EV5.1515	238EV5.1525

5µm Vydac Phase	Column Dimensions (mm)							
	50 x 0.3	100 x 0.3	150 x 0.3	250 x 0.3	50 x 0.5	100 x 0.5	150 x 0.5	250 x 0.5
	£553	£553	£581	£581	£553	£553	£581	£581
208MS	208MS5.305	208MS5.310	208MS5.315	208MS5.325	208MS5.505	208MS5.510	208MS5.515	208MS5.525
214MS	214MS5.305	214MS5.310 ³	214MS5.315	214MS5.325	214MS5.505	214MS5.510	214MS5.515	214MS5.525
218MS	218MS5.305	218MS5.310 ³	218MS5.315 ³	218MS5.325 ³	218MS5.505	218MS5.510 ³	218MS5.515 ³	218MS5.525
238MS	238MS5.305	238MS5.310	238MS5.315 ³	238MS5.325	238MS5.505	238MS5.510	238MS5.515	238MS5.525
	£608	£608	£636	£636	£605	-	£636	-
238EV	238EV5.305	238EV5.310	238EV5.315	238EV5.325	238EV5.505	-	238EV5.515	-

¹ £620² £614³ Prices for these part numbers may vary

Microbore, Analytical and Semi-Preparative Columns

3µm Vydac Phase	Analytical Column Dimensions ¹ (mm)						Guard Cartridges ² (For 4.6mm i.d. Columns)	
	50 x 4.6		100 x 4.6		150 x 4.6			
214MS	-	-	214MS3410	£614	-	-	214GD34MS	POA
218MS	-	-	-	-	218MS3415	£611	218GD34MS	£151
208TP	208TP3405	£430	208TP3410	£475	-	-	208GD34	£153
214TP	214TP3405	£440	214TP3410	£489	-	-	214GD34	£152
218TP	218TP3405	POA	218TP3410	£482	218TP3415	£540	218GD34	£152
238TP	238TP3405	£430	238TP3410	£475	238TP3415	£538	238GD34	£152

5µm Vydac Phase	Microbore Column Dimensions ¹ (mm)								Guard Cartridges ² (For 2.1mm i.d. Columns)	
	150 x 1.0		250 x 1.0		150 x 2.1		250 x 2.1			
208MS	208MS5115	£518	208MS51	£557	208MS5215	£513	208MS52	£547	208GD52MS	£152
214MS	214MS5115	£542	214MS51	£588	214MS5215	£519	214MS52	£557	-	-
218MS	218MS5115	£548	218MS51	£557	218MS5215	£515	218MS52	£560	218GD52MS	£151
238MS	238MS5115	£542	238MS51	£586	238MS5215	£511	238MS52	£542	238GD52MS	£151
208TP	208TP5115	£553	208TP51	£597	208TP5215	£527	208TP52	£563	208GD52	£152
214TP	214TP5115	£560	214TP51	£603	214TP5215	£530	214TP52	£568	214GD52	£157
218TP	218TP5115	£585	218TP51	£611	218TP5215	£532	218TP52	£568	218GD52	£155
219TP	219TP5115	£575	219TP51	£597	219TP5215	£518	219TP52	£553	219GD52	£152
238TP	238TP5115	£553	238TP51	£597	238TP5215	£518	238TP52	£553	238GD52	£152
238EV	238EV5115	£623	238EV51	£669	238EV5215	£586	238EV52	£638	238GD52EV	£171

5µm Vydac Phase	Analytical Column Dimensions ¹ (mm)				Guard Cartridges ² (For 3.2 and 4.6mm i.d. Columns)	Semi-Prep Column Dimensions (mm)	Guard Cartridges ³ (For 10mm i.d. Columns)							
	150 x 3.2	250 x 3.2	150 x 4.6	250 x 4.6				250 x 10						
208MS	208MS5315	£508	-	208MS5415	£508	208MS54	£557	208GD54MS	£162	208MS510	£1,216	-		
214MS	-	214MS53	£542	214MS5415	£521	214MS54	£557	214GD54MS	£153	214MS510	£1,236	214GCC510	£153	
218MS	-	218MS53	£542	218MS5415	£511	218MS54	£561	218GD54MS	£155	218MS510	£1,247	218GCC510	£153	
238MS	-	-	238MS5415	£506	238MS54	£557	238GD54MS	£152	-	-	-	-		
208TP	208TP5315	£518	208TP53	£553	208TP5415	£530	208TP54	£568	208GD54	£155	208TP510	£1,247	-	
214TP	214TP5315	£522	214TP53	£563	214TP5415	£532	214TP54	£568	214GD54	£157	214TP510	£1,257	214GCC510	£153
218TP	218TP5315	POA	218TP53	£568	218TP5415	£532	218TP54	£568	218GD54	£157	218TP510	£1,257	218GCC510	£155
219TP	219TP5315	£518	219TP53	£553	219TP5415	£530	219TP54	£566	219GD54	£153	219TP510	£1,216	-	
238TP	238TP5315	£518	238TP53	£553	238TP5415	£518	238TP54	£568	238GD54	£152	238TP510	£1,216	-	
238EV	-	-	238EV5415	£579	238EV54	£636	238GD54EV	£173	238EV510	£1,288	238GCC510EV	£153		

¹ Other dimensions available² 2/pk. Use with All-Guard™ holder 80101 (€89) – includes column coupler³ 1/pk. 10 x 10mm. Use with prep guard holder 2101342 (€356)

Please enquire for Vydac TP preparative and process scale columns and for bulk material.

Vydac® (continued)

Vydac 201TP and 202TP C18

Vydac® 201TP and 202TP columns were developed specifically for the separation and quantification of polyaromatic hydrocarbons (PAHs) required by environmental regulations. Beyond the 16 EPA priority pollutant PAHs, these columns are used to separate many other PAHs, such as methylated naphthalenes. Vydac 201TP columns also have application in the analysis of carotenoids, retinoids and vitamins. The higher carbon-loaded 202TP phase offers alternative selectivity and is also ideal for derivatized PAH samples or high throughput PAH analyses.

Figure 4 shows the analysis of priority pollutant PAHs in accordance with EPA Methods 550, 610 and 8310.

Ordering Information

Vydac Phase 3µm	Column Dimensions ¹ (mm)					Guard Cartridges ² (2/pk)
	250 x 2.1	150 x 3.2	250 x 3.2	150 x 4.6	250 x 4.6	
201TP	-	201TP3315 £540	-	-	-	201GD54T £157
5µm						
201TP	201TP52 £568	201TP5315 £518	-	201TP5415 £533	201TP54 £568	201GD54T £157
202TP ³	-	-	-	202TP5415 £520	-	202GD54T £152

¹ Further column dimensions available

² Use with holder 80101 (£89) – includes column coupler

³ 10µm particle size material available

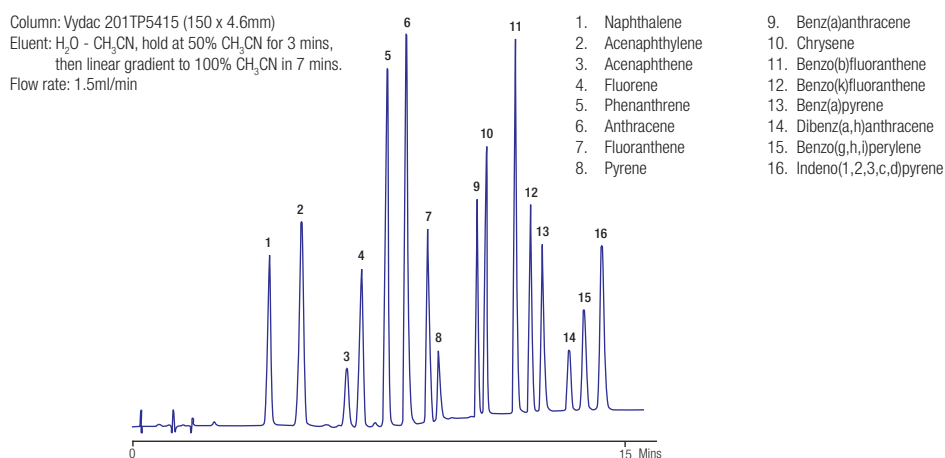


Figure 4. Analysis of priority pollutant PAHs

Denali™ Columns

- High retentivity
- LC-MS of small molecules
- Fully scalable from capillary to process

The Denali™ phase (Vydac 238DE) is a novel, monomerically bonded 120Å C18 silica with high carbon coverage. It shows excellent reproducibility and peak symmetry for the analysis of both acidic and basic analytes. The phase has applications for small molecule analyses of interest to pharmaceutical and environmental laboratories.

Figure 5 shows the separation of five acidic anti-inflammatory compounds on a Denali column. Peaks are well resolved and symmetrical for all analytes.

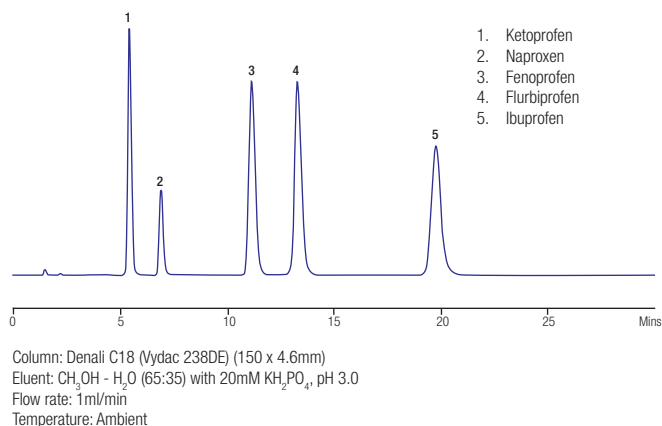


Figure 5. Separation of anti-inflammatories on Denali C18

Ordering Information

5µm Vydac Phase	Column Dimensions ¹ (mm)				Guard Cartridges ²	
	150 x 2.1	250 x 2.1	150 x 4.6	250 x 4.6	For 2.1mm i.d. Columns	For 4.6mm i.d. Columns
	£460	£495	£415	£505	£135	£136
Denali C18	238DE5215	238DE52	238DE5415	238DE54	238GD52DE	238GD54DE

¹ Other dimensions and particle sizes available

² 2/pk. Use with All-Guard™ holder 80101 (£89) – includes column coupler