

# HPLC Column Selection

## A Comparison of Reversed-Phase Columns

Based on the widely accepted work and data of Drs. Lloyd Snyder and John Dolan<sup>1,2</sup> Grace has developed this column selection tool for choosing reversed phase HPLC columns based on peak capacities and column selectivity of polar and nonpolar compounds. Typically, chromatographers choose HPLC columns by comparing physical characteristics, such as surface area and carbon load. Often, this does not provide enough information about selectivity or capacity for adequate column selection. This chart provides a reliable means of choosing HPLC columns based on acidic, basic, and hydrophobic character.

The Snyder/Dolan column test procedure has been described in a series of publications. Based on retention data for a series of standard mixtures and the same separation conditions (50% acetonitrile/buffer; pH 2.8 and 7.0; 35°C), reversed-phase columns are characterized by five column-selectivity parameters: hydrophobicity (H), steric interaction (S\*), hydrogen-bond acidity (A), basicity (B), and relative silanol ionization or cation-exchange capacity (C). Here we have chosen to graphically highlight data for H (H), A, and C, with C results at pH 7.0. Hydrophobicity (H) is often the primary analyte interaction with reversed phase columns and indicates overall capacity. Secondary interactions are often polar interactions with basic analytes. The degree of unprotonated base interaction (A) and protonated base interaction (C) with the packing material is measured and represented here.

### Directions for Using the Column Chart

The chart lists the columns in descending order of hydrophobic capacity (H). To find similar HPLC columns to test as back-up columns, follow these steps.

- 1) Find the column you are currently using and note neighboring columns which have similar (H) capacity factors.
- 2) Compare the values for interaction of polar compounds (A and C).

If there is more than one choice for a back-up column, then compare your actual sample to the test probes. If your sample is nonpolar, then place more emphasis on hydrophobic values. If your sample is basic (polar), then pay special attention to A and C and determine if your sample will be protonated (A) or unprotonated (C) and place greater emphasis on one of these values.

### Key to Chart

- Hydrophobic Indicator
- Hydrogen bonding Indicator—pH 2.8 (Protonated under acidic conditions)
- Cation Exchange Indicator—pH 7.0 (Unprotonated under neutral conditions)

Manufacturer	Column	Selectivity Parameters	
ZirChrom	ZirChrom®-PBD C18	H, A, C	1.284
YMC	J'Sphere® H80 C18	H, A, C	1.132
Restek	Allure® C18	H, A, C	1.116
Phenomenex	Ultrasorb® ODS (30)	H, A, C	1.114
YMC	YMC® Pack Pro C18 RS	H, A, C	1.114
Grace (Alltech)	Adsorbosphere™ UHS C18	H, A, C	1.103
Thermo/Hypersil	Hypersil® BetamaxNeutral C18	H, A, C	1.098
Agilent	Zorbax Extend C18	H, A, C	1.098
Agilent	Zorbax C18	H, A, C	1.089
Beckman	Ultrasphere® ODS	H, A, C	1.085
Grace (Alltech)	Alltima™ HP C18 High Load	H, A, C	1.080
Agilent	Zorbax Rx-18	H, A, C	1.077
Agilent	Zorbax Eclipse XDB-C18	H, A, C	1.077
Supelco	Ascentis® C18	H, A, C	1.077
Macherey Nagel	Nucleodur® C18 Gravity	H, A, C	1.056
Grace (Grom)	Grom™ Sapphire 110 C18	H, A, C	1.055
Restek	Restek® Ultra C18	H, A, C	1.055
Varian	OmniSpher™ 5 C18	H, A, C	1.055
Grace (Vydac)	Denali® 120 C18	H, A, C	1.052
Waters	Symmetry® C18	H, A, C	1.052
Akzo Nobel	Kromasil® 100-5C18	H, A, C	1.051
Waters	Nova-Pak® C18	H, A, C	1.049
Thermo/Hypersil	Hypersil® 100 C18	H, A, C	1.048
MacMod/ACT	ACE® 5 C18-HL	H, A, C	1.045
ZirChrom	ZirChrom®-EZ C18	H, A, C	1.040
Grace (Grom)	Grom™ Sil 120 ODS-5 ST	H, A, C	1.035
Dionex	Acclaim® 120 C18	H, A, C	1.032
Waters	Sunfire™ C18	H, A, C	1.031
Agilent	Zorbax Eclipse Plus C18	H, A, C	1.030
Merck	Supspher® 100 RP-18e	H, A, C	1.030
Shiseido	CAPCELL™ C18 AG120	H, A, C	1.030
Grace (Grom)	Grom™ Sil 120 ODS-3 CP	H, A, C	1.029
Waters	Delta-Pak™ C18 100A	H, A, C	1.028
Macherey Nagel	Nucleodur® Isis	H, A, C	1.023
Phenomenex	Prodigy™ ODS (3)	H, A, C	1.023
Phenomenex	Synergi™ Hydro-RP C18	H, A, C	1.022
Phenomenex	Luna™ C18	H, A, C	1.018
Supelco	Supelcosil™ LC-18	H, A, C	1.018
YMC	YMC® Pro C18	H, A, C	1.015
Phenomenex	Onyx™ Monolithic C18	H, A, C	1.012
Bischoff	ProntoSIL™ SphenBOND 80-5-ODS2	H, A, C	1.010
Grace (Jones)	Apex™ II C18	H, A, C	1.008
Shiseido	CAPCELL™ C18 UG120	H, A, C	1.007
GL Sciences	Inertsil® ODS-2	H, A, C	1.007

Manufacturer	Column	Selectivity Parameters	
Merck	LiChrospher® 100 RP-18	H, A, C	1.006
Bischoff	ProntoSIL™ 120-5-C18 H	H, A, C	1.005
Shiseido	CAPCELL™ C18 M G	H, A, C	1.005
Grace (Jones)	Genesis® 120 C18	H, A, C	1.005
Bischoff	EU Reference Column C18	H, A, C	1.004
Grace (Alltech)	Allsphere™ ODS2	H, A, C	1.004
Merck	Purospher® STAR RP18e	H, A, C	1.003
Merck	Chromolith® RP18e	H, A, C	1.003
Phenomenex	Luna® C18(2)	H, A, C	1.002
Varian	Pursuit® C18	H, A, C	1.001
MacMod/ACT	ACE® 5 C18	H, A, C	1.000
Tosoh	TSKge® Super-ODS	H, A, C	0.998
Agilent	Zorbax StableBond 80A C18	H, A, C	0.996
Phenomenex	Prodigy™ ODS(2)	H, A, C	0.995
Thermo/Hypersil	Hypersil® BDS C18	H, A, C	0.993
Grace (Alltech)	Alltima™ C18	H, A, C	0.993
Grace (Vydac)	Vydac® Everest® C18	H, A, C	0.993
Thermo/Hypersil	Hypersil® Beta Basic-18	H, A, C	0.993
GL Sciences	Inertsil® ODS-3	H, A, C	0.990
Grace (Alltech)	Adsorbosphere™ C18	H, A, C	0.989
Phenomenex	Synergi™ Max-RP C18	H, A, C	0.989
Shiseido	CAPCELL™ C18 SG120	H, A, C	0.987
Grace (Jones)	Apex™ I C18	H, A, C	0.985
Thermo/Hypersil	Hypersil® ODS-2	H, A, C	0.985
Grace (Alltech)	Alltima™ HP C18	H, A, C	0.985
Waters	Xterra® MS C18	H, A, C	0.984
Waters	Symmetry® 300 C18	H, A, C	0.984
Supelco	Discovery C18	H, A, C	0.984
Supelco	Supelcosil™ LC-18-DB	H, A, C	0.979
Waters	Spherisorb® S5 ODSB	H, A, C	0.975
Thermo/Hypersil	Hypersil® Bio Basic-18	H, A, C	0.974
Thermo/Hypersil	Hypersil® ODS	H, A, C	0.974
Bischoff	ProntoSIL™ 120-5-C18-AQ	H, A, C	0.974
Grace (Jones)	Genesis® 300 C18 C18	H, A, C	0.974
Bischoff	Prontosil™ 200-5-C18 AQ	H, A, C	0.974
Agilent	Zorbax C8	H, A, C	0.974
Tosoh	TSK ge® ODS-80Ts	H, A, C	0.971
Waters	Resolve C18	H, A, C	0.968
Phenomenex	Gemin® C18 110A	H, A, C	0.967
Grace (Alltech)	Econosil™ C18	H, A, C	0.966
Phenomenex	Aqua® C18	H, A, C	0.966
YMC	YMC® ODS-AQ C18	H, A, C	0.965
Waters	Spherisorb® ODS-2	H, A, C	0.962
Macherey Nagel	Nucleosil® 100-5-C18 HD C18	H, A, C	0.961

Grace (Jones)	Genesis® 120 AQ C18		0.960
Macherey Nagel	Nucleodur® Pyramid		0.958
ThermoHypersil	Hypersil® Elite C18		0.958
Dionex	Acclaim® 300 C18		0.957
Bischoff	ProntoSIL™ 300-5-C18 H		0.956
Waters	Delta-Pak™ C18 300A		0.955
Bischoff	ProntoSIL™ HyperSORB 120 ODS		0.951
ThermoHypersil	Hypersil® PAH C18		0.949
Bischoff	ProntoSIL™ 120-5-C18 Agplus		0.947
Phenomenex	Jupiter® 300 C18		0.945
Varian	Polaris® C18-Ether		0.943
Waters	Atlantis™ T3 C18		0.941
Tosoh	TSKgel® 80Ts QA		0.940
Grace (Alltech)	Alltima™ C18-WP		0.938
Waters	YMC® Hydrosphere C18		0.937
Grace (Alltech)	Brava™ BDS C18		0.938
Bischoff	ProntoSIL™ 60-5 C8 SH		0.929
Varian	Polaris® C18-A		0.928
YMC	J'Sphere® M80 C18		0.926
Agilent	Zorbax Eclipse XDB-C8		0.919
Waters	Atlantis® dC18 b		0.917
Supelco	Ascentis® Express C8		0.915
Thermo	Hypersil® GOLD aQ		0.915
Phenomenex	Selectosil™ C18		0.911
Merck	LiChrosorb® RP-18		0.909
Grace (Vydac)	Vydac® 218TP C18		0.909
Waters	Acquity UPLC® BEH Shield RP18 EP		0.907
Macherey Nagel	Nucleosil® C18		0.906
Agilent	Zorbax StableBond 300A C18		0.905
Grace (Alltech)	Prospere™ C18 300		0.903
Grace (Vydac)	Vydac® 201TP C18		0.901
Supelco	Ascentis® C-8		0.899
Waters	Nova-Pak® C8		0.899
Waters	Symmetry® C8		0.893
YMC	YMC® Pro C8		0.890
Agilent	Zorbax Eclipse Plus C8		0.889
Phenomenex	Luna™ C8(2)		0.889
Grace (Alltech)	Prevail™ C18		0.888
Grace (Alltech)	Prospere™ 100 C18		0.883
Grace (Alltech)	Alltima™ AQ EP		0.882
ThermoHypersil	Hypersil® GOLD C18		0.881
Phenomenex	Synergi™ Fusion-RP EP		0.879
Phenomenex	Luna™ C8		0.875
Grace (Grom)	Grom™ Sil 120 Octyl-6 MB C8		0.872
Grace (Jones)	Apex™ I C8		0.869
Shiseido	CAPCELL™ C18 A Q		0.867
Macherey Nagel	Nucleosil® 100-5-C8 HD		0.865
Akzo Nobel	Kromasil® 100-5C8		0.864
Grace (Jones)	Genesis® 120 EC C8		0.863
Grace (Alltech)	Prevail™ Amide EP		0.862
Macherey Nagel	Nucleosil® ODS		0.860
Restek	Ultra AQ C18		0.857
Waters	Sunfire™ C8		0.856
Waters	Acquity UPLC® BEH C8		0.855
Shiseido	CAPCELL™ PAK C8 UG120		0.854
Waters	Symmetry® Shield C18		0.850
Grace (Alltech)	Alphabond™ C18		0.845
Supelco	Ascentis® RP-Amide		0.843
Merck	Purospher® RP-18		0.841
Supelco	Discovery BIO Wide pore C8		0.839
Grace (Grom)	Grom™ Sapphire 110 C8		0.835
ThermoHypersil	Hypersil® Beta Basic-8		0.834
Grace (Alltech)	Alltima™ HP C8		0.834
ThermoHypersil	Hypurity® C8		0.833
Supelco	Discovery C8		0.832
GL Sciences	Inertsil® C8-3 C8		0.830
MacMod/ACT	ACE® 5 C8		0.830
Grace (Jones)	Genesis® 120 C8		0.829
Thermo	Hypersil® GOLD C8		0.825
Phenomenex	Oryx™ Monolithic C8		0.824
Tosoh	TSKgel® Super-Octyl		0.824
Grace (Alltech)	Prevail™ Select C18		0.822
ThermoHypersil	Hypersil® Bio Basic-8		0.821
YMC	YMC® Basic C18		0.821
Grace (Alltech)	Econosphere™ C18		0.818
Tosoh	TSKgel® Octyl-80Ts		0.814
Whatman	Partisil™ ODS(3)		0.810

Macherey Nagel	Nucleodur® Sphinx RP		0.805
ThermoHypersil	Aquasil™ C18		0.805
MacMod/ACT	ACE® AQ EP		0.804
Waters	Xterra® MS C8		0.803
Phenomenex	Luna™ C5		0.800
Waters	MicroBondapak C18		0.798
Agilent	Zorbax StableBond 80A C8		0.795
Agilent	Zorbax Rx-C8		0.792
Grace (Alltech)	Platinum™ C18		0.786
Grace	VisionHT™ C18		0.786
Phenomenex	Luna™ Phenyl-Hexyl		0.782
Grace (Alltech)	Alltima™ C18-LL		0.780
Bischoff	ProntoSIL™ 120-5-C18 ace-EPS		0.772
Grace (Vydac)	Vydac® 218MS C18		0.770
Waters	Acquity UPLC® BEH phenyl		0.764
Waters	Spherisorb® C8		0.763
YMC	J'Sphere® L80 C18		0.762
Bischoff	ProntoSIL™ 300-55-C18 ace-EPS		0.762
Dionex	Acclaim® Organic Acid C18		0.761
Waters	Xterra® C18 RP		0.757
Grace (Alltech)	Alltima™ C8		0.756
Whatman	Partisil™ C8		0.749
Merck	LiChrospher® 60 RP-Select B C18		0.747
Bischoff	ProntoSIL™ 120-5 C8 SH		0.739
Grace (Alltech)	Allsphere™ ODS1		0.733
Waters	Symmetry® Shield C8		0.730
ThermoHypersil	Hypurity® C4		0.713
MacMod/ACT	ACE® 5 C4-300		0.710
Varian	Polaris® C8-Ether		0.705
Bischoff	ProntoSIL™ 60-5-Phenyl		0.705
Waters	Nova-Pak® Phenyl		0.704
Macherey Nagel	Nucleosil® 100-5-C18 Nautilus		0.702
Agilent	Zorbax StableBond 300A C8		0.701
Bischoff	ProntoSIL™ SpheriBOND 80-5-ODS1		0.700
ThermoHypersil	Fluophase® RP F		0.698
Phenomenex	Jupiter® 300 C4		0.698
Grace (Alltech)	Prospere™ 300 C4		0.689
Bischoff	Prontosil™ 60-5-C4		0.686
Waters	Xterra® Phenyl		0.683
Waters	Spherisorb® ODS-1		0.682
ThermoHypersil	Hypersil® Prism C18 RPN		0.678
ThermoHypersil	Fluophase® PFP F		0.675
Agilent	Zorbax XDB-Phenyl		0.665
Waters	Symmetry® 300 C4		0.659
Waters	Xterra® C8 RP		0.657
Grace (Alltech)	Alltima™ HP C18 EPS		0.655
Supelco	Discovery BIO Wide pore C5		0.654
Agilent	Zorbax Bonus RP EP		0.654
Phenomenex	Synergi™ Polar-RP C18		0.654
MacMod/ACT	ACE® Phenyl		0.647
Grace (Jones)	Genesis® 120 C4 EC		0.646
ThermoHypersil	Hypersil® Prism C18 RP		0.645
ThermoHypersil	BetaMax® Acid EP		0.635
Supelco	Discovery HS F5 F		0.631
Agilent	Zorbax SB-Phenyl		0.623
Grace (Alltech)	Platinum™ EPS C18		0.619
Grace	VisionHT™ C18-P		0.619
Grace (Alltech)	Prevail™ C8		0.617
Grace (Jones)	Genesis® 300 C4 C4		0.615
Grace (Jones)	Genesis® Phenyl		0.609
Agilent	Zorbax StableBond 80A C3		0.601
MacMod/ACT	ACE® Phenyl-300		0.599
Agilent	Zorbax SB-AQ EP		0.593
ZirChrom	ZirChrom®-PS EP		0.589
Waters	MicroBondapak Phenyl		0.585
Grace (Alltech)	Platinum™ C8		0.584
Grace (Alltech)	Platinum™ EPS C8 300		0.584
ThermoHypersil	BetaBasic® Phenyl		0.582
Macherey Nagel	Nucleosil® C8		0.575
Macherey Nagel	EC Nucleosil® 100-5 Protect 1 EP		0.544
Bischoff	Prontosil™ 120-5-C8 ace-EPS		0.532
Phenomenex	Prodigy™ Phenyl-3		0.529
Agilent	Zorbax StableBond 300A C3		0.526
Grace (Alltech)	Alltima™ HP C18 Amide		0.497
ThermoHypersil	BetaMax® Base EP		0.470
Grace (Alltech)	Platinum™ EPS C8		0.420
ThermoHypersil	Hypurity® Advance		0.412

## References:

1. "The "Hydrophobic-subtraction" Model of Reversed-phase Column Selectivity", L.R. Snyder, J.W. Dolan and P.W. Carr, *J. Chromatogr. A*, 1060 (2004) 77-116.
2. "A New Look at the Selectivity of Reversed-phase HPLC Columns", L.R. Snyder, J.W. Dolan and P.W. Carr, *Anal. Chem.*, 79 (2007) 3255-3262.

**Columns for Small Molecules**

Brand	Phase	Base Material	Particle Shape	Particle Size	Pore Size	Surface Area	Carbon Load	Phase Type	End-capped?	USP L-code	
<b>Adsorbosil®</b> <i>Alltech</i>	C18	Silica	Irregular	5, 10µm	60Å	450m <sup>2</sup> /g	15%	Polymeric	Yes	L1	
	C8	Silica	Irregular	5, 10µm	60Å	450m <sup>2</sup> /g	10%	Polymeric	Yes	L7	
	C2	Silica	Irregular	5, 10µm	60Å	450m <sup>2</sup> /g	No	Polymeric	No	L16	
	CN	Silica	Irregular	5, 10µm	60Å	450m <sup>2</sup> /g	—	Polymeric	Yes	L10	
	NH <sub>2</sub>	Silica	Irregular	5, 10µm	60Å	450m <sup>2</sup> /g	—	Polymeric	No	L8	
	Silica	Silica	Irregular	5, 10µm	60Å	450m <sup>2</sup> /g	—	Polymeric	No	L3	
<b>Adsorbosphere™</b> <i>Alltech</i>	C18	Silica	Spherical	3, 5, 10µm	80Å	200m <sup>2</sup> /g	12%	Monomeric	Yes	L1	
	C18 HS	Silica	Spherical	3, 5µm	60Å	350m <sup>2</sup> /g	20%	Monomeric	Yes	L1	
	C18 UHS	Silica	Spherical	5, 10µm	60Å	500m <sup>2</sup> /g	30%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 5, 10µm	80Å	200m <sup>2</sup> /g	8%	Monomeric	Yes	L7	
	Phenyl	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	5%	Monomeric	Yes	L11	
	Cyano	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	—	Monomeric	Yes	L10	
	Cyano-AQ	Silica	Spherical	5µm	120Å	170m <sup>2</sup> /g	—	Polymeric	No	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	3, 5µm	80Å	200m <sup>2</sup> /g	—	Polymeric	No	L8	
	Silica	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	—	—	No	L3	
	SAX	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	—	Monomeric	No	—	
	SCX	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	—	Monomeric	Yes	—	
	<b>Adsorbosphere™ XL</b> <i>Alltech</i>	C18	Silica	Spherical	3, 5µm	90Å	200m <sup>2</sup> /g	11%	Monomeric	Yes	L1
C18-B		Silica	Spherical	5µm	90Å	200m <sup>2</sup> /g	12%	Monomeric	Yes	L1	
C8		Silica	Spherical	3, 5µm	90Å	200m <sup>2</sup> /g	6%	Monomeric	Yes	L7	
C1 (TMS)		Silica	Spherical	5µm	90Å	200m <sup>2</sup> /g	—	Monomeric	Yes	L13	
Silica		Silica	Spherical	5µm	90Å	200m <sup>2</sup> /g	—	—	No	L3	
SAX		Silica	Spherical	5, 10µm	90Å	200m <sup>2</sup> /g	—	Monomeric	Yes	—	
SCX		Silica	Spherical	5, 10µm	90Å	200m <sup>2</sup> /g	—	Monomeric	Yes	—	
Silica		Silica	Spherical	5µm	90Å	200m <sup>2</sup> /g	—	Monomeric	Yes	—	
<b>Allsphere™</b> <i>Alltech</i>	ODS-1	Silica	Spherical	5µm	80Å	220m <sup>2</sup> /g	7%	Monomeric	Partial	L1	
	ODS-2	Silica	Spherical	3, 5µm	80Å	220m <sup>2</sup> /g	12%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 5µm	80Å	220m <sup>2</sup> /g	6%	Monomeric	Yes	L7	
	C6	Silica	Spherical	5µm	80Å	220m <sup>2</sup> /g	4%	Monomeric	Yes	L15	
	C1 (TMS)	Silica	Spherical	5µm	80Å	220m <sup>2</sup> /g	3%	Monomeric	No	L13	
	Phenyl	Silica	Spherical	5µm	80Å	220m <sup>2</sup> /g	3%	Monomeric	Yes	L11	
	Cyano	Silica	Spherical	5µm	80Å	220m <sup>2</sup> /g	3.5%	Monomeric	No	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	5µm	80Å	220m <sup>2</sup> /g	3%	Monomeric	No	L8	
	Silica	Silica	Spherical	3, 5µm	80Å	220m <sup>2</sup> /g	—	—	No	L3	
	SAX	Silica	Spherical	5µm	100Å	220m <sup>2</sup> /g	4%	Monomeric	No	—	
	SCX	Silica	Spherical	5µm	100Å	220m <sup>2</sup> /g	4%	Monomeric	No	—	
	Silica	Silica	Spherical	5µm	100Å	220m <sup>2</sup> /g	—	—	No	L3	
	<b>Alltima™ HP</b> <i>Alltech</i>	C18	Silica	Spherical	3, 5µm	190Å	200m <sup>2</sup> /g	12%	Monomeric	Yes	L1
C18 EPS		Silica	Spherical	3, 5µm	190Å	200m <sup>2</sup> /g	4%	Monomeric	No	L1	
C18 HiLoad		Silica	Spherical	3, 5µm	100Å	450m <sup>2</sup> /g	24%	Monomeric	Yes	L1	
C18 AQ		Silica	Spherical	3, 5µm	100Å	450m <sup>2</sup> /g	20%	Monomeric	Yes	L1	
C18 Amide		Silica	Spherical	3, 5µm	190Å	200m <sup>2</sup> /g	12%	Monomeric	Yes	L1	
C8		Silica	Spherical	3, 5µm	190Å	200m <sup>2</sup> /g	8%	Monomeric	Yes	L7	
Cyano		Silica	Spherical	3, 5µm	190Å	200m <sup>2</sup> /g	4%	Monomeric	Yes	L10	
Silica		Silica	Spherical	3, 5µm	100Å	450m <sup>2</sup> /g	—	—	No	L3	
HILIC		Silica	Spherical	1.5, 3, 5µm	120Å	230m <sup>2</sup> /g	—	—	No	L3	
Silica		Silica	Spherical	3, 5, 10µm	100Å	340m <sup>2</sup> /g	16%	Polymeric	Yes	L1	
<b>Alltima™</b> <i>Alltech</i>	C18 LL	Silica	Spherical	5µm	100Å	340m <sup>2</sup> /g	9%	Polymeric	Yes	L1	
	C8	Silica	Spherical	3, 5, 10µm	100Å	340m <sup>2</sup> /g	9%	Polymeric	Yes	L7	
	Phenyl	Silica	Spherical	3, 5µm	100Å	340m <sup>2</sup> /g	7.5%	Polymeric	Yes	L11	
	Cyano	Silica	Spherical	3, 5µm	100Å	340m <sup>2</sup> /g	—	Polymeric	Yes	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	3, 5µm	100Å	340m <sup>2</sup> /g	—	Polymeric	No	L8	
	Silica	Silica	Spherical	3, 5, 10µm	100Å	340m <sup>2</sup> /g	—	—	No	L3	
	Silica	Silica	Spherical	3, 5, 10µm	100Å	340m <sup>2</sup> /g	—	—	No	L3	
	Silica	Silica	Spherical	3, 5, 10µm	100Å	340m <sup>2</sup> /g	—	—	No	L3	
<b>AlphaBond™</b> <i>Alltech</i>	C18	Silica	Irregular	5, 10µm	125Å	300m <sup>2</sup> /g	10%	Monomeric	Yes	L1	
	C8	Silica	Irregular	10µm	125Å	300m <sup>2</sup> /g	—	Monomeric	Yes	L7	
	Phenyl	Silica	Irregular	10µm	125Å	300m <sup>2</sup> /g	—	Monomeric	Yes	L11	
	Cyano	Silica	Irregular	10µm	125Å	300m <sup>2</sup> /g	—	Monomeric	Yes	L10	
	Amino (NH <sub>2</sub> )	Silica	Irregular	10µm	125Å	300m <sup>2</sup> /g	—	Polymeric	No	L8	
	Silica	Silica	Irregular	10µm	125Å	300m <sup>2</sup> /g	—	—	No	L3	
<b>Apex™ I</b> <b>JONES</b>	ODS	Silica	Spherical	3, 5, 10µm	100Å	170m <sup>2</sup> /g	10%	Polymeric	Yes	L1	
	C8	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	7%	Monomeric	No	L7	
	C8(EC)	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	7%	Monomeric	Yes	L7	
	C1	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	2.5%	Monomeric	Yes	L13	
	Phe	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	3%	Monomeric	No	L11	
	Basic ODS	Silica	Spherical	5µm	100Å	200m <sup>2</sup> /g	12%	Monomeric	Yes	L1	
	PAH	Silica	Spherical	5µm	100Å	170m <sup>2</sup> /g	—	Monomeric	Yes	—	
	CN	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	4%	Monomeric	No	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	2%	Monomeric	No	L8	
	Carbohydrate	Silica	Spherical	5µm	100Å	170m <sup>2</sup> /g	—	Monomeric	†	—	
	Silica	Silica	Spherical	3, 5, 10µm	100Å	170m <sup>2</sup> /g	—	—	No	L3	
	<b>Apex™ II</b> <b>JONES</b>	ODS	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	10.5%	Monomeric	Yes	L1
		Diol	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	3.5%	Monomeric	No	—
		Amino (NH <sub>2</sub> )	Silica	Spherical	3, 5µm	100Å	170m <sup>2</sup> /g	2%	Monomeric	No	L8
Others—as Apex I		Silica	Spherical	5µm	100Å	170m <sup>2</sup> /g	—	—	No	—	
<b>Apex™ Prepsil</b> <b>JONES</b>	ODS	Silica	Spherical	8, 15µm	130Å	170m <sup>2</sup> /g	10%	Polymeric	Yes	L1	
	C8	Silica	Spherical	8, 15µm	130Å	170m <sup>2</sup> /g	7%	Monomeric	No	L7	
	C8(EC)	Silica	Spherical	8, 15µm	130Å	170m <sup>2</sup> /g	7%	Monomeric	Yes	L7	
	C2	Silica	Spherical	8µm	130Å	170m <sup>2</sup> /g	2.8%	Monomeric	No	L30	
	CN	Silica	Spherical	8µm	130Å	170m <sup>2</sup> /g	4%	Monomeric	Yes	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	8µm	130Å	170m <sup>2</sup> /g	2%	Monomeric	Yes	L8	
	Silica	Silica	Spherical	8, 15µm	130Å	170m <sup>2</sup> /g	—	—	No	L3	
	Diol	Silica	Spherical	8µm	130Å	170m <sup>2</sup> /g	3.	—	—	—	

†Proprietary.

**Columns for Small Molecules (continued)**

Brand	Phase	Base Material	Particle Shape	Particle Size	Pore Size	Surface Area	Carbon Load	Phase Type	End-capped?	USP L-code	
<b>Apollo™</b> <i>Alltech</i>	C18	Silica	Spherical	5µm	100Å	340m <sup>2</sup> /g	15%	Monomeric	Yes	L1	
	C8	Silica	Spherical	5µm	100Å	340m <sup>2</sup> /g	9%	Monomeric	Yes	L7	
	Phenyl	Silica	Spherical	5µm	100Å	340m <sup>2</sup> /g	8%	Monomeric	Yes	L11	
	Silica	Silica	Spherical	5µm	100Å	340m <sup>2</sup> /g	—	—	No	L3	
<b>Brava™</b> <i>Alltech</i>	C18 BDS	Silica	Spherical	3, 5µm	145Å	185m <sup>2</sup> /g	8.5%	Monomeric	Yes	L1	
	C18 ODS	Silica	Spherical	3, 5µm	130Å	195m <sup>2</sup> /g	8.5%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 5µm	130Å	195m <sup>2</sup> /g	6%	Monomeric	Yes	L7	
	C8 BDS	Silica	Spherical	3, 5µm	145Å	185m <sup>2</sup> /g	5.5%	Monomeric	Yes	L7	
	Phenyl	Silica	Spherical	5µm	130Å	195m <sup>2</sup> /g	—	Monomeric	No	L11	
	Cyano	Silica	Spherical	5µm	130Å	195m <sup>2</sup> /g	—	Monomeric	No	L10	
	Cyano BDS	Silica	Spherical	5µm	145Å	185m <sup>2</sup> /g	—	Monomeric	No	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	5µm	130Å	195m <sup>2</sup> /g	—	Monomeric	No	L8	
	Silica	Silica	Spherical	5µm	130Å	195m <sup>2</sup> /g	—	—	No	L3	
	<b>Carbohydrate</b> <i>Alltech</i>	Amino	Silica	Irregular	10µm	80Å	550m <sup>2</sup> /g	—	Polymeric	No	—
Cation		Polymer	Spherical	10µm	—	—	—	—	No	—	
<b>Denali®</b> <i>VDAC</i>	238DE C18	Silica	Spherical	3, 5, 10, 15, 20µm	120Å	280-340m <sup>2</sup> /g	20%	Monomeric	Yes	L1	
<b>Econosil™**</b> <i>Alltech</i>	C18	Silica	Irregular	3, 5, 10µm	80Å	200m <sup>2</sup> /g	10%	Monomeric	Yes	L1	
	C8	Silica	Irregular	3, 5, 10µm	80Å	200m <sup>2</sup> /g	5%	Monomeric	Yes	L7	
	CN	Silica	Irregular	5, 10µm	80Å	200m <sup>2</sup> /g	—	Monomeric	Yes	L10	
	NH <sub>2</sub>	Silica	Irregular	5, 10µm	80Å	200m <sup>2</sup> /g	—	Polymeric	No	L8	
	Silica	Silica	Irregular	3, 5, 10µm	80Å	200m <sup>2</sup> /g	—	—	No	L3	
<b>Econosphere™**</b> <i>Alltech</i>	C18	Silica	Spherical	3, 5, 10µm	80Å	200m <sup>2</sup> /g	10%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 5, 10µm	80Å	200m <sup>2</sup> /g	5%	Monomeric	Yes	L7	
	Cyano	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	—	Monomeric	Yes	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	5µm	80Å	200m <sup>2</sup> /g	—	Polymeric	No	L8	
	Silica	Silica	Spherical	3, 5, 10µm	80Å	200m <sup>2</sup> /g	—	—	No	L3	
<b>Genesis® 120</b> <b>JONES</b>	C18	Silica	Spherical	3, 4, 7, 15µm	120Å	300m <sup>2</sup> /g	18%	Monomeric	Yes	L1	
	C18 AQ	Silica	Spherical	4, 7µm	120Å	300m <sup>2</sup> /g	15%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 4, 7, 15µm	120Å	300m <sup>2</sup> /g	11%	Monomeric	No	L7	
	C8(EC)	Silica	Spherical	3, 4, 7, 15µm	120Å	300m <sup>2</sup> /g	11%	Monomeric	Yes	L7	
	C4	Silica	Spherical	4µm	120Å	300m <sup>2</sup> /g	6%	Monomeric	Yes	L26	
	Phenyl	Silica	Spherical	4µm	120Å	300m <sup>2</sup> /g	9%	Monomeric	Yes	L11	
	CN	Silica	Spherical	3, 4µm	120Å	300m <sup>2</sup> /g	7%	Monomeric	Yes	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	3, 4µm	120Å	300m <sup>2</sup> /g	3.5%	Polymeric	No	L8	
	Carbohydrate	Silica	Spherical	4µm	120Å	300m <sup>2</sup> /g	—	Monomeric	No	—	
	CN-TCA	Silica	Spherical	4µm	120Å	300m <sup>2</sup> /g	7%	Monomeric	Yes	—	
	Petro-XP	Silica	Spherical	4µm	120Å	300m <sup>2</sup> /g	—	Monomeric	No	—	
	Silica	Silica	Spherical	3, 4, 7, 15µm	120Å	300m <sup>2</sup> /g	—	—	No	L3	
	<b>Grace Alpha®</b> <b>GRACE</b>	C18	Silica	Spherical	5, 10, 15, 20µm	120Å	325m <sup>2</sup> /g	15%	Monomeric	Yes	L1
		C8	Silica	Spherical	5, 10, 15, 20µm	120Å	325m <sup>2</sup> /g	10%	Monomeric	No	L7
Silica		Silica	Spherical	5, 10, 15, 20µm	120Å	325m <sup>2</sup> /g	—	—	No	L3	
<b>GraceSmart™</b> <i>GRACE</i>	C18	Silica	Spherical	3, 5µm	120Å	220m <sup>2</sup> /g	10%	Monomeric	Yes	L1	
<b>Grom™ Sil</b> <b>GROM</b>	ODS-0 AB (acid/base deactivated)	Silica	Spherical	1.5, 3, 5, 10µm	100Å	200m <sup>2</sup> /g	11%	Monomeric	Yes	L1	
	ODS-2 FE (fully endcapped)	Silica	Spherical	1.5, 3, 5, 10µm	80, 100, 300Å	220, 200, 100m <sup>2</sup> /g	12, 11, 6%	Monomeric	Yes	L1	
	ODS-3 CP (encapsulated)	Silica	Spherical	3, 5, 7, 10µm	120, 300Å	320, 170m <sup>2</sup> /g	15, 6%	Polymeric	No	L1	
	ODS-4 HE (hydrophilic endcapping)	Silica	Spherical	3, 4, 5, 7, 10µm	120, 200Å	300, 200m <sup>2</sup> /g	16, 11%	Monomeric	Yes	L1	
	ODS-5 ST (standard)	Silica	Spherical	3, 4, 5, 7, 10µm	60, 120, 200, 300Å	580, 300, 200, 150m <sup>2</sup> /g	22, 17, 12, 7%	Monomeric	Yes	L1	
	ODS-6 NE (non endcapped)	Silica	Irregular	3, 5µm	120Å	300m <sup>2</sup> /g	17%	Monomeric	No	L1	
	ODS-7 pH (pH-stable)	Silica	Irregular	4µm	80Å	510m <sup>2</sup> /g	22%	Polymeric	No	L1	
	Octyl-1 B (base deactivated)	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	6.5%	Monomeric	Yes	L7	
	Octyl-2 AB (acid/base deactivated)	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	5%	Monomeric	Yes	L7	
	Octyl-3 BA (for bases)	Silica	Spherical	3, 5µm	120Å	300m <sup>2</sup> /g	9%	Monomeric	Yes	L7	
	Octyl-4 FE (fully endcapped)	Silica	Spherical	3, 5, 10µm	80, 100, 300Å	220, 200, 100m <sup>2</sup> /g	6.6, 6, 3%	Monomeric	Yes	L7	
	Octyl-5 CP (encapsulated)	Silica	Spherical	3, 5, 7, 10µm	120, 300Å	320, 170m <sup>2</sup> /g	10, 5.5%	Polymeric	No	L7	
	Octyl-6 MB (monomer binding)	Silica	Spherical	3, 5, 10µm	120, 200, 300Å	300, 200, 150m <sup>2</sup> /g	10, 7, 4%	Monomeric	Yes	L7	
	Hexyl-1 MB (monomeric bonding)	Silica	Spherical	5µm	80, 100Å	220, 200m <sup>2</sup> /g	4, 4%	Monomeric	Yes	—	
	Phenyl-1 FE (fully endcapped)	Silica	Spherical	3, 5, 10µm	120, 300Å	300, 150m <sup>2</sup> /g	9, 5%	Monomeric	Yes	L11	
	Phenyl-2 CP (encapsulated)	Silica	Irregular	5µm	120, 300Å	320, 170m <sup>2</sup> /g	7, 4%	Polymeric	No	L11	
	Phenyl-3 PE (partially endcapped)	Silica	Spherical	3, 5, 10µm	80, 100Å	220, 200m <sup>2</sup> /g	6.6, 6%	Monomeric	Yes	L11	
	Butyl-1 ST (standard)	Silica	Spherical	3, 5µm	120, 300Å	300, 150m <sup>2</sup> /g	7, 2.5%	Monomeric	No	L26	
	Butyl-2 FE (fully endcapped)	Silica	Spherical	3, 5µm	300Å	100m <sup>2</sup> /g	1, 5%	Monomeric	No	L26	
	TMS-1 ST (standard)	Silica	Spherical	3, 5µm	120, 300Å	300, 150m <sup>2</sup> /g	4%	Monomeric	Yes	L13	
	TMS-2 CP (encapsulated)	Silica	Spherical	3, 5µm	120, 300Å	320, 170m <sup>2</sup> /g	3%	Polymeric	No	L13	
	Cyan-1 ST (standard)	Silica	Spherical	3, 5µm	120, 300Å	300, 150m <sup>2</sup> /g	4.8%	Monomeric	Yes	—	
	Cyan-2 PR (cyanopropyl)	Silica	Spherical	3, 5µm	80, 100Å	220, 200m <sup>2</sup> /g	3.5%	Monomeric	Yes	—	
	Cyan-3 CP (encapsulated)	Silica	Spherical	5µm	120Å	320m <sup>2</sup> /g	4%	Polymeric	No	—	
	Amino-1 PR (NH-propyl)	Silica	Spherical	3, 5, 10µm	80, 100Å	220, 200m <sup>2</sup> /g	2%	Monomeric	Yes	L8	
	Amino-2 PA (cross linked Poly-NH <sub>2</sub> )	Silica	Spherical	5µm	120Å	300m <sup>2</sup> /g	—	Polymeric	No	L8	
	Amino-3 CP (encapsulated NH-residues)	Silica	Irregular	5µm	80Å	420m <sup>2</sup> /g	—	Monomeric	Yes	L8	
	Amino-4 PR (propylamine bonded to silica)	Silica	Irregular	3, 7µm	300Å	100m <sup>2</sup> /g	—	Monomeric	No	L8	
	Diol	Silica	Spherical	5, 10µm	60, 120, 200, 300Å	580, 300, 200, 150m <sup>2</sup> /g	—	Monomeric	No	L20	
	Normal Phase-1 ST (standard silica)	Silica	Spherical	3, 5, 10µm	80, 100, 1000Å	220, 200m <sup>2</sup> /g	—	—	No	L3	
	Normal Phase-2 SP (spherical silica)	Silica	Spherical	3, 5, 10µm	60, 120, 200, 1000Å	580, 300, 200m <sup>2</sup> /g	—	—	No	L3	
	Normal Phase-3 PV (polyvinylalcohol)	Silica	Spherical	5µm	120Å	300m <sup>2</sup> /g	—	Polymeric	No	L3	
	SEC (size exclusion chromatography)	Silica	Spherical	5, 10µm	60, 120, 200, 300Å	580, 300, 200, 150m <sup>2</sup> /g	—	—	No	—	
Strong Anion-1	Silica	Spherical	5, 10µm	80, 100Å	220, 200m <sup>2</sup> /g	—	—	No	—		
Weak Anion-2 (ion exchange)	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	—	No	—		
Strong Cation-1 (ion exchange)	Silica	Spherical	5, 10µm	80, 100Å	220, 200m <sup>2</sup> /g	—	—	No	—		

\*Available only online.

Columns for Small Molecules (continued)											
Brand	Phase	Base Material	Particle Shape	Particle Size	Pore Size	Surface Area	Carbon Load	Phase Type	End-capped?	USP L-code	
<b>Grom™ Sil (cont.)</b> <b>CROM</b>	Weak Cation-2 (ion exchange)	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	—	No	—	
	HIC (hydrophobic interaction chrom.)	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	—	No	—	
<b>Grom™ Sapphire</b> <b>CROM</b>	C18	Silica	Spherical	3, 5, 10µm	65, 110Å	500, 270m <sup>2</sup> /g	23, 16%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 5, 10µm	65, 110Å	500, 270m <sup>2</sup> /g	15, 10%	Monomeric	Yes	L7	
	C4	Silica	Spherical	3, 5, 10µm	65, 110Å	500, 270m <sup>2</sup> /g	10.5, 7%	Monomeric	Yes	L26	
	Silica	Silica	Spherical	3, 5, 10µm	65, 110Å	500, 270m <sup>2</sup> /g	—	—	No	L3	
<b>Mixed Mode</b> <b>Alltech</b>	C18/Cation	Silica	Spherical	5, 7µm	100Å	350m <sup>2</sup> /g	—	Polymeric	No	—	
	C8/Anion	Silica	Spherical	7µm	100Å	350m <sup>2</sup> /g	—	Polymeric	No	—	
	C8/Cation	Silica	Spherical	5µm	100Å	350m <sup>2</sup> /g	—	Polymeric	No	—	
<b>Platinum™</b> <b>Alltech</b>	C18	Silica	Spherical	1.5, 3, 5µm	100Å	200m <sup>2</sup> /g	6%	Monomeric	Yes	L1	
	C18 EPS	Silica	Spherical	1.5, 3, 5µm	100Å	200m <sup>2</sup> /g	5%	Monomeric	No	L1	
	C8	Silica	Spherical	1.5, 3, 5µm	100Å	200m <sup>2</sup> /g	4%	Monomeric	Yes	L7	
	C8 EPS	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	2.5%	Monomeric	No	L7	
	Phenyl	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	—	Monomeric	Yes	L11	
	Cyano	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	—	Monomeric	No	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	—	Monomeric	No	L8	
	Silica	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	—	—	No	L3	
	SAX	Silica	Spherical	3, 5µm	100Å	200m <sup>2</sup> /g	—	Monomeric	No	—	
<b>Prevail™</b> <b>Alltech</b>	C18 Select	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	17%	Monomeric	Yes	L1	
	C18	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	15%	Monomeric	Yes	L1	
	C8	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	8%	Monomeric	Yes	L7	
	Phenyl	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	7%	Monomeric	Yes	L11	
	Cyano	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	—	Monomeric	Yes	L10	
	Amino (NH <sub>2</sub> )	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	—	Monomeric	No	L8	
	Silica	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	—	—	No	L3	
	Organic Acid	Silica	Spherical	3, 5µm	110Å	350m <sup>2</sup> /g	—	Monomeric	Yes	—	
	Carbohydrate ES	Polymer	Spherical	5µm	—	—	—	—	No	—	
<b>Vydac® SP</b> <b>VYDAC</b>	101SP Sil	Silica	Spheroidal	5, 10µm	100Å	250–350m <sup>2</sup> /g	—	unbonded	No	L3	
	201SP C18	Silica	Spheroidal	3, 5, 10, 15µm	90Å	250–350m <sup>2</sup> /g	13%	Monomeric	Yes	L1	
	208SP C8	Silica	Spheroidal	5, 10, 15µm	90Å	250–350m <sup>2</sup> /g	9%	Monomeric	Yes	L7	
<b>VisionHT™</b> <b>GRACE</b>	C18	Silica	Spherical	1.5µm	100Å	200m <sup>2</sup> /g	6%	Monomeric	Yes	L1	
	C-18-B	Silica	Spherical	1.5µm	120Å	220m <sup>2</sup> /g	5.5%	Monomeric	†	L1	
	C18-P	Silica	Spherical	1.5µm	100Å	200m <sup>2</sup> /g	5%	Monomeric	No	L1	
	C18-HL	Silica	Spherical	1.5µm	120Å	220m <sup>2</sup> /g	11%	Polymeric	†	L1	
	HILIC, Silica	Silica	Spherical	1.5µm	120Å	220m <sup>2</sup> /g	—	—	No	L3	

Columns for Large Molecules											
Brand	Phase	Base Material	Particle Shape	Particle Size	Pore Size	Surface Area	Carbon Load	Phase Type	End-capped?	USP L-code	
<b>Genesis® 300</b> <b>JONES</b>	C18	Silica	Spherical	4, 7µm	300Å	120m <sup>2</sup> /g	10%	Monomeric	Yes	L1	
	C4	Silica	Spherical	4, 7µm	300Å	120m <sup>2</sup> /g	3%	Monomeric	Yes	L26	
	CN	Silica	Spherical	4µm	300Å	120m <sup>2</sup> /g	3.3%	Monomeric	Yes	L11	
<b>Macrosphere™ 300</b> <b>Alltech</b>	C18	Silica	Spherical	5, 7µm	300Å	100m <sup>2</sup> /g	10%	Monomeric	Yes	L1	
	C8	Silica	Spherical	5, 7µm	300Å	100m <sup>2</sup> /g	2.2%	Monomeric	Yes	L7	
	C4	Silica	Spherical	5, 7µm	300Å	100m <sup>2</sup> /g	—	Monomeric	Yes	L26	
	SAX	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	Monomeric	No	—	
	WAX	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	Monomeric	No	—	
	SCX	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	Polymeric	No	—	
	WCX	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	Polymeric	No	—	
<b>Macrosphere™ GPC</b> <b>Alltech</b>	GPC 60	Silica	Spherical	7µm	60Å	450m <sup>2</sup> /g	—	Polymeric	No	L25	
	GPC 100	Silica	Spherical	7µm	100Å	350m <sup>2</sup> /g	—	Polymeric	No	—	
	GPC 150	Silica	Spherical	7µm	150Å	200m <sup>2</sup> /g	—	Polymeric	No	—	
	GPC 300	Silica	Spherical	7µm	300Å	100m <sup>2</sup> /g	—	Polymeric	No	—	
<b>ProSphere™</b> <b>Alltech</b>	C18	Silica	Spherical	3, 5, 10µm	300Å	120m <sup>2</sup> /g	9%	Monomeric	Yes	L1	
	C18-AQ	Silica	Spherical	3, 5µm	100Å	450m <sup>2</sup> /g	18%	Monomeric	Yes	L1	
	C4	Silica	Spherical	3, 5, 10µm	300Å	120m <sup>2</sup> /g	3%	Monomeric	Yes	L26	
	Size-Exclusion 125	Silica	Spherical	4, 5µm	125Å	—	—	—	No	—	
	Size-Exclusion 250	Silica	Spherical	4, 5µm	250Å	—	—	—	No	—	
	Size-Exclusion 450	Silica	Spherical	8µm	450Å	—	—	—	No	—	
	P-HR (reversed phase)	Polymer	Spherical	4µm	140Å	—	—	—	No	—	
<b>ProZap™</b> <b>VYDAC</b> <b>Vydac® ATP</b> <b>VYDAC</b> <b>Vydac® TP</b> <b>VYDAC</b>	C18 ProZap™	Silica	Spherical	1.5µm	500Å	59m <sup>2</sup> /g	3%	Monomeric	Yes	L1	
	214ATP C4	Silica	Spheroidal	5, 10–15µm	300Å	70–110m <sup>2</sup> /g	3%	Polymeric	Yes	L26	
	101TP Sil	Silica	Spheroidal	5, 10, 10–15, 15–20µm	300Å	70–110m <sup>2</sup> /g	—	unbonded	No	L3	
	201TP C18	Silica	Spheroidal	5, 7, 10, 10–15, 15–20µm	300Å	70–90m <sup>2</sup> /g	8%	Polymeric	No	L1	
	202TP C18	Silica	Spheroidal	3, 5, 10µm	300Å	60–90m <sup>2</sup> /g	9%	Polymeric	No	L1	
	208TP C8	Silica	Spheroidal	3, 5, 7, 10, 10–15, 15–20µm	300Å	60–110m <sup>2</sup> /g	5%	Polymeric	Yes	L7	
	214TP C4	Silica	Spheroidal	3, 5, 7, 10, 10–15, 15–20µm	300Å	60–110m <sup>2</sup> /g	3%	Polymeric	Yes	L26	
	218TP C18	Silica	Spheroidal	3, 5, 7, 10, 10–15, 15–20µm	300Å	60–110m <sup>2</sup> /g	8%	Polymeric	Yes	L1	
	219TP Di-Phe	Silica	Spheroidal	3, 5, 7, 10, 10–15, 15–20µm	300Å	60–110m <sup>2</sup> /g	4%	Polymeric	Yes	—	
	238TP C18	Silica	Spheroidal	3, 5, 7, 10, 10–15, 15–20µm	300Å	60–110m <sup>2</sup> /g	4%	Monomeric	Yes	L1	
<b>Everest®</b> <b>VYDAC</b> <b>Vydac® MS</b> <b>VYDAC</b>	238EV C18	Silica	Spherical	5, 10, 10–15, 15–20µm	300Å	70–110m <sup>2</sup> /g	6%	Monomeric	Yes	L1	
	208MS C8	Silica	Spheroidal	5µm	300Å	70m <sup>2</sup> /g	5%	Polymeric	Yes	L7	
	214MS C4	Silica	Spheroidal	5µm	300Å	70–110m <sup>2</sup> /g	3%	Polymeric	Yes	L26	
	218MS C18	Silica	Spheroidal	3, 5, 10, 10–15µm	300Å	60–110m <sup>2</sup> /g	8%	Polymeric	Yes	L1	
	238MS C18	Silica	Spheroidal	5µm	300Å	70m <sup>2</sup> /g	4%	Monomeric	Yes	L1	
219MS Di-Phe	Silica	Spheroidal	5µm	300Å	70m <sup>2</sup> /g	4%	Polymeric	Yes	—		

\*Product information is available at [www.discoverysciences.com](http://www.discoverysciences.com). †Proprietary.