



WATERS COLUMNS AND ANALYTICAL STANDARDS AND REAGENTS SELECTION GUIDE

Waters™ comprehensive family of columns offer scientists a diverse range of selectivity and particle size choices that provide exceptional scalability within UPLC, UHPLC, HPLC, and preparative LC applications. In addition, Waters' growing family of QC Reference Materials and application-specific standards help users to effortlessly confirm column and system performance.



Optimum Bed Density (OBD™) Preparative Columns streamline the successful transition from analysis to lab-scale separation. The OBD Column design and packing process results in predictable, uniform density profiles throughout the column (akin to the density of analytical columns). Achieve fast and efficient scale-ups with select, robust particles designed for the challenges of purification. Those options are represented in this guide with the triangle symbol and the available particle sizes designated by *PREP*. Visit waters.com/prep to discover more about Waters OBD Technology, access the column mass loading chart or get scale-up aid with the Preparative OBD Column Calculator.



The MaxPeak™ Premier Columns utilize MaxPeak High Performance Surfaces (HPS) Technology which increases reproducibility, improves peak shape, and enables more accurate recovery by minimizing unwanted analyte/surface interactions. These columns are available in select column configurations and particle sizes. Those options are represented in this guide with the hexagon symbol and the available particle sizes written in bold and blue. Visit waters.com/tothemap to learn more about MaxPeak HPS Technology.

CORTECS™ UPLC™, UHPLC, and HPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
C₁₈+ ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7, 5 µm	2.4 µmol/m ²	5.7%	Yes	L1	2-8	Low pH = 80 °C High pH = 45 °C	100 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
C₁₈ ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7, 5 µm	2.7 µmol/m ²	6.6%	Yes	L1	2-8	Low pH = 80 °C High pH = 45 °C	100 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
T3 ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7, 5 µm	1.6 µmol/m ²	4.7%	Yes	L1	2-8	Low pH = 60 °C High pH = 45 °C	100 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
C₈ ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7 µm	3.4 µmol/m ²	4.5%	Yes	L7	2-8	Low pH = 60 °C High pH = 45 °C	100 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Shield RP18 ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7 µm	3.2 µmol/m ²	6.4%	Yes	L1	2-8	Low pH = 60 °C High pH = 45 °C	100 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Phenyl ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7 µm	3.2 µmol/m ²	5.9%	Yes	L11	2-8	Low pH = 60 °C High pH = 45 °C	100 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
HILIC ▲ UPLC: 1.6 µm UHPLC: 2.7 µm	HPLC: 2.7 µm	N/A	Unbonded	No	L3	1-5	Low pH = 45 °C High pH = 45 °C	100 m ² /g	HILIC QC Reference Material P/N: 186007226	HILIC QC Reference Material P/N: 186007226

ACQUITY UPLC and XBridge HPLC/UHPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
BEH C₁₈ ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5, 10 µm PREP: 3.5, 5, 10 µm	3.1 µmol/m ²	18%	Yes	L1	1-12	Low pH = 80 °C High pH = 60 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
BEH C₈ ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5, 10 µm PREP: 3.5, 5, 10 µm	3.2 µmol/m ²	13%	Yes	L7	1-12	Low pH = 60 °C High pH = 60 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
BEH Shield RP18 ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5, 10 µm PREP: 5, 10 µm	3.3 µmol/m ²	17%	Yes	L1	2-11	Low pH = 50 °C High pH = 45 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
BEH Phenyl ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	3.0 µmol/m ²	15%	Yes	L11	1-12	Low pH = 80 °C High pH = 60 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
BEH HILIC ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	N/A	Unbonded	No	L3	1-9	Low pH = 45 °C High pH = 45 °C	185 m ² /g	HILIC QC Reference Material P/N: 186007226	HILIC QC Reference Material P/N: 186007226
BEH Amide ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	7.5 µmol/m ²	12%	No	L68	2-11	Low pH = 90 °C High pH = 90 °C	185 m ² /g	HILIC QC Reference Material P/N: 186007226	HILIC QC Reference Material P/N: 186007226

AccQ-Tag Ultra BEH C₁₈, 130 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 2.5 µm	3.1 µmol/m ²	18%	Yes	L1	1-12	Low pH = 80 °C High pH = 60 °C	185 m ² /g	Amino Acids Standard P/N: WAT088122	Amino Acids Standard P/N: WAT088122
Peptide BEH C₁₈, 130 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5, 10 µm PREP: 3.5, 5, 10 µm	3.1 µmol/m ²	18%	Yes	L1	1-12	Low pH = 80 °C High pH = 60 °C	185 m ² /g	Amino Acid Cell Culture Std. P/N: 1860093300	Amino Acid Cell Culture Std. P/N: 1860093300
Peptide BEH C₁₈, 300 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	PREP: 5, 10 µm	3.1 µmol/m ²	12%	Yes	L1	1-12	Low pH = 80 °C High pH = 60 °C	90 m ² /g	Cytochrome c Digestion Standard P/N: 186006371	Peptide Retention Standard P/N: 186006555
Protein BEH C₄, 300 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5, 10 µm PREP: 5, 10 µm	2.4 µmol/m ²	8%	No	L26	2-10	Low pH = 80 °C High pH = 50 °C	90 m ² /g	Protein Standard P/N: 186004900	Protein Standard P/N: 186004900
Protein BEH SEC, 125 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5 µm	4.9 µmol/m ²	15%	No	L33	2.5-8	Low pH = 60 °C High pH = 60 °C	395 m ² /g	BEH125 Protein Standard Mix P/N: 186006519	BEH125 Protein Standard Mix P/N: 186006519
Protein BEH SEC, 200 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5 µm	5.5 µmol/m ²	12%	No	L33	2.5-8	Low pH = 60 °C High pH = 60 °C	220 m ² /g	BEH200 SEC Protein Standard Mix P/N: 186006518	BEH200 SEC Protein Standard Mix P/N: 186006518

Protein BEH SEC, 250 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 2.5 µm	1.5 µmol/m ²	12%	No	L33	2.5-8	Low pH = 60 °C High pH = 60 °C	174 m ² /g	mAb Size Variant Standard P/N: 186009429	mAb Size Variant Standard P/N: 186009429
Protein BEH SEC, 450 Å ▲ UPLC: 2.5 µm UHPLC: 3.5 µm		4.8 µmol/m ²	9%	No	L33	2.5-8	Low pH = 60 °C High pH = 60 °C	80 m ² /g	BEH450 SEC Protein Standard Mix P/N: 186006842	BEH450 SEC Protein Standard Mix P/N: 186006842
Oligonucleotide BEH C₁₈, 130 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	PREP: 2.5, 5 µm	3.1 µmol/m ²	18%	Yes	L1	1-12	Low pH = 80 °C High pH = 60 °C	185 m ² /g	MassPREP Oligonucleotide Standard P/N: 186004135	ssDNA 10 to 60 Ladder P/N: 186009449
Oligonucleotide BEH C₁₈, 300 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	PREP: 2.5 µm (upon request) 5 µm (available)	3.1 µmol/m ²	18%	Yes	L1	1-12	Low pH = 80 °C High pH = 60 °C	185 m ² /g	MassPREP Oligonucleotide Standard P/N: 186004135	MassPREP OST Standard P/N: 186004135
Glycan BEH Amide, 130 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5 µm	7.15 µmol/m ²	N/A	No	L68	2-11	Low pH = 90 °C High pH = 90 °C	194 m ² /g	Glycan Performance Test Standard P/N: 186006349	Glycan Performance Test Standard P/N: 186006349
Glycoprotein BEH Amide, 300 Å ▲ UPLC: 1.7 µm		7.15 µmol/m ²	N/A	No	L68	2-11	Low pH = 90 °C High pH = 90 °C	93 m ² /g	Glycoprotein Performance Test Standard P/N: 186008010	Glycoprotein Performance Test Standard P/N: 186008010
Glycan BEH C₁₈ AX, 95 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 2.5 µm	1.6 µmol/m ²	17%	Yes	L78	2-10	Low pH = 60 °C High pH = 60 °C	270 m ² /g	Sialylated Glycan Performance Test Standard P/N: 186007983	Sialylated Glycan Performance Test Standard P/N: 186007983

GTxResolve HPLC/UHPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
GTxResolve™ Premier BEH SEC 450 Å ▲ UPLC: 2.5 µm	HPLC: 2.5 µm	4.8 µmol/m ²	9%	No	L33	2.5-8	Low pH = 60 °C High pH = 60 °C	80 m ² /g	Waters Protein Standard Mixture P/N: 186006842	ssDNA 50 to 1350 Ladder P/N: 1860010778
GTxResolve™ Premier SEC 1000 Å ▲ UPLC: 3 µm	HPLC: 3 µm	1.9 µmol/m ²	1.25%	No	L33	2.5-8	Low pH = 60 °C High pH = 60 °C	24 m ² /g	Waters Protein Standard Mixture P/N: 186006842	ssDNA 50 to 1350 Ladder P/N: 1860010778

ACQUITY UPLC™ and XSelect™ HPLC/UHPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
CSH C₁₈ ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5, 10 µm PREP: 3.5, 5, 10 µm	2.3 µmol/m ²	15%	Yes	L1	1-11	Low pH = 80 °C High pH = 45 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
CSH Phenyl-Hexyl ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	2.3 µmol/m ²	14%	Yes	L11	1-11	Low pH = 80 °C High pH = 45 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
CSH Fluoro-Phenyl ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	2.3 µmol/m ²	10%	No	L43	1-8	Low pH = 60 °C High pH = 45 °C	185 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Peptide CSH C₁₈, 130 Å ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 3.5, 5 µm	2.3 µmol/m ²	15%	Yes	L1	1-11	Low pH = 80 °C High pH = 45 °C	185 m ² /g	Cytochrome c Digestion Standard P/N: 186006371	Peptide Retention Standard P/N: 186006555
HSS C₁₈ ▲ UPLC: 1.8 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	3.2 µmol/m ²	15%	Yes	L1	1-8	Low pH = 45 °C High pH = 45 °C	230 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
HSS C₁₈ SB ▲ UPLC: 1.8 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	1.6 µmol/m ²	8%	No	L1	2-8	Low pH = 45 °C High pH = 45 °C	230 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
HSS T3 ▲ UPLC: 1.8 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	1.6 µmol/m ²	11%	Yes	L1	2-8	Low pH = 60 °C High pH = 45 °C	230 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Peptide HSS T3, 100 Å ▲ UPLC: 1.8 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	1.6 µmol/m ²	11%	Yes	L1	2-8	Low pH = 45 °C High pH = 45 °C	230 m ² /g	Cytochrome c Digestion Standard P/N: 186006371	Peptide Retention Standard P/N: 186006555
HSS PFP ▲ UPLC: 1.8 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	3.2 µmol/m ²	7%	No	L43	2-8	Low pH = 45 °C High pH = 45 °C	230 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
HSS CN ▲ UPLC: 1.8 µm UHPLC: 2.5 µm	HPLC: 3.5, 5 µm PREP: 5 µm	2.0 µmol/m ²	5%	No	L10	2-8	Low pH = 45 °C High pH = 45 °C	230 m ² /g	Neutrals QC Reference Material P/N: 186006360	-

Atlantis™ UPLC, UHPLC, and HPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
BEH C₁₈ AX ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 3.5 µm PREP: 5 µm (upon request)	1.6 µmol/m ²	17%	Yes	L78	2-10	Low pH = 60 °C High pH = 45 °C	270 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
BEH Z-HILIC ▲ UPLC: 1.7 µm UHPLC: 2.5 µm	HPLC: 5 µm PREP: 5 µm (upon request)	3.0 µmol/m ²	17%	No	L122	2-10	Low pH = 60 °C High pH = 60 °C	270 m ² /g	HILIC QC Reference Material P/N: 186007226	HILIC QC Reference Material P/N: 186007226
Silica T3 ▲ UPLC: 3, 5, 10 µm PREP: 5, 10 µm		1.6 µmol/m ²	14%	Yes	L1	2-8	Low pH = 45 °C High pH = 45 °C	330 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Silica HILIC ▲ UPLC: 3, 5 µm PREP: 5, 10 µm		No	Unbonded	No	L3	1-5	Low pH = 45 °C High pH = 45 °C	330 m ² /g	HILIC QC Reference Material P/N: 186007226	HILIC QC Reference Material P/N: 186007226
Silica dC₁₈ ▲ UPLC: 3, 5, 10 µm PREP: 5, 10 µm		1.6 µmol/m ²	12%	Yes	L1	3-7	Low pH = 45 °C High pH = 45 °C	330 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363

SunFire™ HPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
Silica C₁₈ ▲ HPLC: 2.5, 3.5, 5, 10 µm PREP: 5, 10 µm		3.5 µmol/m ²	16%	Yes	L1	2-8	Low pH = 50 °C High pH = 40 °C	340 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Silica C₈ ▲ HPLC: 3.5, 5, 10 µm PREP: 5, 10 µm		3.5 µmol/m ²	12%	Yes	L7	2-8	Low pH = 40 °C High pH = 40 °C	340 m ² /g	Neutrals QC Reference Material P/N: 186006360	Reversed-Phase QC Reference Material P/N: 186006363
Silica ▲ HPLC: 5, 10 µm PREP: 5, 10 µm		No	Unbonded	No	L3	2-8	45 °C	340 m ² /g	Neutrals QC Reference Material P/N: 186006360	HILIC QC Reference Material P/N: 186006363

BioResolve™ UPLC, UHPLC and HPLC Columns	Particle/Ligand	Ligand Density	Carbon Load	Endcapped	USP Class No.	pH Range	Temperature Limits	Surface Area	Performance Standards	Application Standards
RP mAb Polyphenyl ▲ UPLC: 2.7 µm UHPLC: 2.7 µm	HPLC: 2.7 µm	5.5 µmol/m ²	0.95%	Yes	L11	2-7	Low pH = 90 °C High pH = 50 °C	22.2 m ² /g	mAb Subunit Standard P/N: 186008927	mAb Subunit Standard P/N: 186008927
SCX mAb ▲ UPLC: 3 µm UHPLC: 3 µm	HPLC: 3 µm	N/A	N/A	N/A	N/A	2-12	Recommended to maintain at 30 °C	2-3 m ² /g	mAb Charge Variant Standard P/N: 186009057	mAb Charge Variant Standard P/N: 186009057
SEC mAb, 200 Å ▲ UPLC: 2.5 µm UHPLC: 2.5 µm	HPLC: 2.5 µm	5.5 µmol/m ²	12%	No	L33	1-8	Low pH = 60 °C High pH = 60 °C	220 m ² /g	mAb Size Variant Standard P/N: 186009429	mAb Size Variant Standard P/N: 186009429
Protein A Affinity ▲ UPLC: 3.5 µm UHPLC: 3.5 µm	HPLC: 3.5 µm	N/A	N/A	N/A	N/A	40 °C		2-3 m ² /g	Humanized mAb Mass Check Standard P/N: 186009125	Humanized mAb Mass Check Standard P/N: 186009125

►► Waters Analytical Standards and Reagents asr.waters.com

Primary Manufacturer of Chromatographic Media

- Waters maintains a Quality Management System in compliance with ISO 9001.
- Waters owns and controls every step of the process, from raw materials to final product (few suppliers are capable of doing this). Understanding and controlling our processes makes the difference in product performance in your laboratory.

Waters™

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