

Waters OBD Preparative Columns

SECTION #1: WATERS OBD PREPARATIVE COLUMNS FOR PURIFICATION

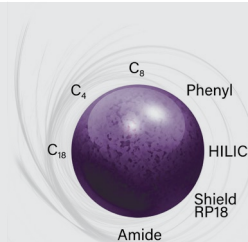
Uniform, optimally packed column beds deliver when ideal outcomes are required in Prep.

For more information on this technology or to view the OBD™ white paper or brochure, visit waters.com/prep.

Waters™ OBD Preparative Columns help bridge the performance gap in Prep LC with uniform, optimum packed bed density throughout the entire length and diameter of the column. Direct scalability from analytical to Prep, excellent column lifetime, and consistent column to column performance result in good resolution, peak shape, and mass loading for unparalleled preparative chromatography results. Trust in on-target results for successful Prep LC purification with OBD Technology.

The gold-standard in lab-scale preparative LC

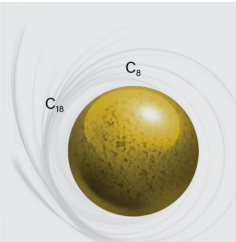
- Realize exceptional column lifetimes
- Achieve uncompromised scale-up from UPLC™ to Prep
- Maximize recoveries with robust packings designed for the demands of isolation of targeted small molecules and biomolecules alike
- Decrease risk of additional Prep method development



Bridge
Columns

BEH Technology™

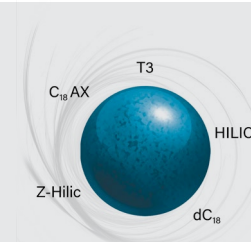
- Good universal column choice for a wide variety of compounds
- Exceptional peak shape for basic analytes at elevated pH
- Stable across a wide pH range
- Stable at high temperatures



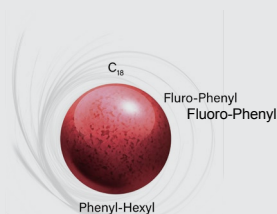
SunFire
Columns

Spherical, Fully Porous Silica

- High-mass loading
- Low-pH stability
- Excellent column life and stability
- Superior peak shapes
- Polar compound retention
- 100% aqueous compatibility
- Long column life at low pH



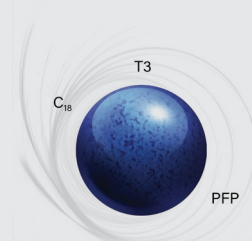
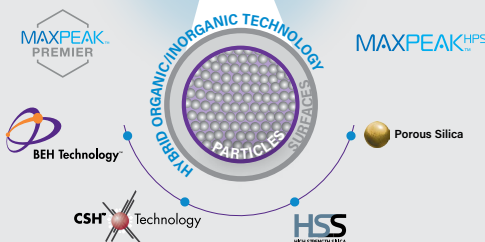
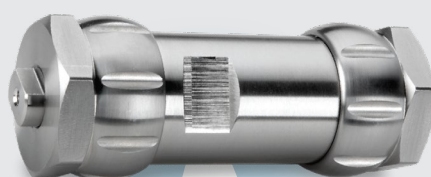
Atlantis
Columns



XSELECT
Columns

CSH™ Technology

- Excellent peak shape for basic compounds under acidic, low ionic strength conditions
- Excellent MS performance with formic acid as a mobile phase modifier
- Fast pH switching and column equilibration



XSELECT
Columns

HSS Technology

- Increased retentivity over hybrid materials
- Widest selectivity space with C₁₈, T3, C₁₈ SB, Cyano, and PFP chemistries
- High strength silica (HSS) for mechanical stability

REVERSED PHASE AND HILIC CHEMISTRIES

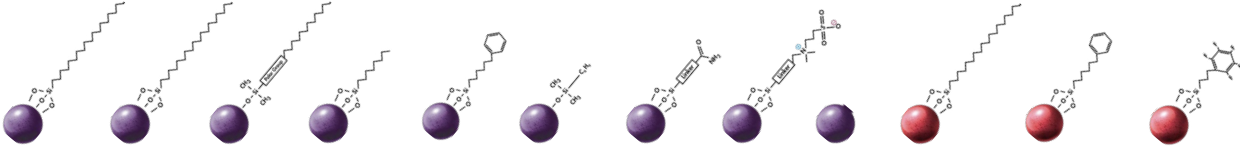
To maximize selectivity, which is critical for analytical methods development, Waters offers a wide range of chemistries to help you separate the most challenging of compounds. For both reversed-phase and HILIC applicators, Waters has the chemistry you need to get the job done. Rugged and robust ligands that ensure long column lifetimes and reproducible separations over the lifetime of your method. Highlighted are some of the Waters chemistries used for reversed-phase and HILIC separations.



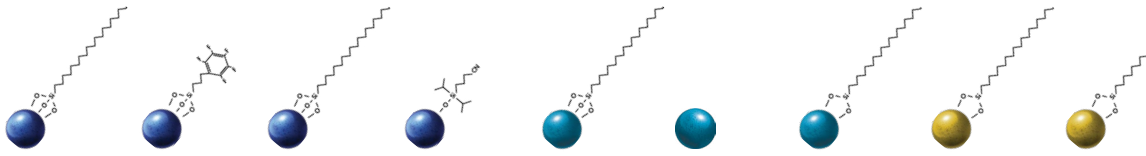
	→ Full Coverage C₁₈ - General purpose, balanced non-polar retention for acids, bases, and neutrals. Excellent loading. BEH™ particle option provides maximum pH stability (C₁₈, BEH C₁₈, CSH C₁₈, HSS C₁₈ and dC₁₈).	✓	✓	✓	✓
	→ Mid Coverage C₁₈ - Designed for enhanced polar compound retention, offering superior stability under low pH conditions and is compatible with 100% aqueous mobile phase (HSS T3, T3). An additional mid-coverage chemistry is available in a non-encapped C₁₈ that provides unique selectivity for bases when operating under low pH conditions (HSS C₁₈ SB).		✓		✓
	→ Low ligand density C₁₈ - Retention of polar compounds or when high aqueous conditions are needed for retention (dC₁₈).	✓		✓	
	→ C₁-C₈ - Shorter alkyl chain provides less retentivity than a typical C₁₈. For the retention of strongly hydrophobic compounds (C₄, C₈, BEH C₈).	✓		✓	
	→ Embedded Polar C₁₈ - Embedded polar C₁₈ providing different selectivity with improved peak shape for basic compounds (BEH Shield RP18).	✓	✓		
	→ Phenyl Hexyl - Provides alternate selectivity for polyaromatic compounds (Phenyl, CSH Phenyl-hexyl).		✓		
	→ Fluoro-Phenyl - Intended to maximize selectivity differences between Lewis bases via pi-pi interactions. The rigid aromatic ring provides additional selectivity based on shape, dipole moment, and hydrogen bonding interactions (HSS PFP).		✓		
	→ HSS CN - Contrasting selectivity when compared to C₁₈ phases, less hydrophobicity and opportunity for pi and/or dipole-dipole interactions. The column can be used for both reversed- and normal-phase separations.		✓		
	→ Amide - Alternate selectivity compared to straight-chain C₁₈ for polar basic/polar acidic molecules (BEH Amide).		✓		
	→ C₁₈ AX - Excellent retention of polar acids, and an alternate selectivity when compared to C₁₈, especially for ionizable targets. Excellent low- and high-pH stability and low MS bleed (BEH C₁₈ AX).				✓
	→ Z-HILIC - Excellent retention and complementary selectivity for a wide range of polar compounds using HILIC. Excellent low- and high-pH stability of organic solvent. Excellent low- and high-pH stability and low MS bleed (BEH Z-HILIC)				✓
	→ HILIC - Excellent retention for very polar, basic, water soluble analytes. Designed and tested for HILIC separations using mobile phases containing high concentration of organic solvent (BEH HILIC, Silica HILIC)	✓			✓

Leverage various ligand options for better selectivity. The powerful online [Column Coach](#) tool is great help in quickly comparing reversed-phase column stationary phases to one another among Waters brands and others.

For a complete preparative column selection, access the [Waters Chromatography Column and Supplies Catalog](#).



	C ₁₈	C ₁₈ AX	Shield RP18	C ₈	Phenyl	C ₄	Amide	Z-HILIC	HILIC	CSH C ₁₈	CSH Phenyl-Hexyl	CSH Fluoro-Phenyl
Ligand density	3.1 µmol/m ²	1.6 µmol/m ²	3.3 µmol/m ²	3.2 µmol/m ²	3.0 µmol/m ²	2.4 µmol/m ²	7.5 µmol/m ²	3.0 µmol/m ²	n/a	2.3 µmol/m ²	2.3 µmol/m ²	2.3 µmol/m ²
Pore diameter	130 Å, 300 Å	95 Å	130 Å	130 Å	130 Å	300 Å	130 Å	95 Å	130 Å	130 Å	130 Å	—
Carbon load	18%	17%	17%	13%	15%	8%	12%	17%	unbonded	15%	14%	10%
Endcap style	proprietary	proprietary	TMS	proprietary	proprietary	none	none	none	none	proprietary	proprietary	proprietary
pH range	1–12	2–10	2–11	1–12	1–12	2–10	2–11	2–10	1–9	1–11	1–11	1–8
Low pH temp. limit	80 °C	60 °C	50 °C	60 °C	80 °C	80 °C	90 °C	60 °C	45 °C	80 °C	80 °C	60 °C
High pH temp. limit	60 °C	60 °C	45 °C	60 °C	60 °C	50 °C	90 °C	60 °C	45 °C	45 °C	45 °C	45 °C
Surface area	185 m ² /g	270 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g	90 m ² /g	185 m ² /g	270 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g
USP classification	L1	L78	L1	L7	L11	L26	L68	L122	L3	L1	L11	L43



	HSS C ₁₈	HSS PFP	HSS T3	HSS CN	Silica T3	Silica HILIC	SILICA dC ₁₈	Silica C ₁₈	Silica C ₈
Ligand density	3.2 µmol/m ²	3.2 µmol/m ²	1.6 µmol/m ²	2.0 µmol/m ²	—	—	—	3.5 µmol/m	3.5 µmol/m
Pore diameter	100 Å	100 Å	100 Å	—	100 Å	100 Å	100 Å	100 Å	100 Å
Carbon load	15%	7%	11%	5%	14%	unbonded	12%	16%	12%
Endcap style	proprietary	none	proprietary	none	none	proprietary	proprietary	proprietary	proprietary
pH range	1–8	2–8	2–8	2–8	2–8	1–5	3–7	2–8	2–8
Low pH temp. limit	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	50 °C	40 °C
High pH temp. limit	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	40 °C	40 °C
Surface area	230 m ² /g	230 m ² /g	230 m ² /g	230 m ² /g	330 m ² /g	330 m ² /g	330 m ² /g	340 m ² /g	340 m ² /g
USP classification	L1	L43	L1	L10	L1	L3	L1	L1	L7

SECTION #2: WATERS OBD PREPARATIVE COLUMNS FOR BIOSEPARATIONS

PEPTIDE ISOLATIONS

XBridge™ Peptide BEH 130 Å C₁₈ and BEH 300 Å, C₁₈

- Trifunctional C₁₈ ligand, fully end-capped, and bonded to the Ethylene-Bridged Hybrid (BEH) particles.
- Outstanding peak capacity and superior peak shape in trifluoroacetic acid (TFA) or formic acid (FA) ion pair eluents when compared to use of 100% silica based C₁₈ Columns
- Two pore sizes (130 Å and 300 Å) provide different separation selectivities for a wide range of peptides and small proteins.
- Each synthesized batch specifically QC tested with a complex protein digest to help ensure reproducible Prep Column Performance.

XSelect™ Peptide CSH C₁₈ 130 Å

- Trifunctional C₁₈ ligand, fully end-capped, bonded to Charged Surface Hybrid (CSH) particles.
- Provides greater peptide mass loads in either TFA or FA than many competitive RP technologies.
- The 130 Å pore size is best suited for compounds less than 10,000 Daltons.
- Each synthesized batch specifically QC tested with a complex protein digest to help ensure reproducible Prep Column Performance.

XSelect Peptide HSS T3 100 Å

- Trifunctional C₁₈ ligand, fully end-capped, bonded to High Strength Silica (HSS) particles.
- This 100 Å pore size RP offering is an ideal choice for the separation of small, hydrophilic peptides since retentivity is greater than that obtained using Waters Peptide BEH or Peptide CSH C₁₈ offerings.
- Each synthesized batch specifically QC tested with a complex protein digest to help ensure reproducible Prep Column Performance.

PROTEIN ISOLATIONS

XBridge Protein BEH C₄ 300 Å

- Trifunctional C₄ ligand, fully end-capped, and bonded to the Ethylene-Bridged Hybrid (BEH) particles.
- Compared to use of traditional silica-based C₁₈ phases, this BEH-based, C₄ ligand is less retentive and will minimize protein carryover, increase protein recovery, and improve peak capacity.
- Each synthesized batch specifically QC tested with a complex mixture of protein standards to help ensure reproducible Prep Column Performance.

OLIGONUCLEOTIDE ISOLATIONS

XBridge Oligonucleotide BEH 130 Å C₁₈ and BEH 300 Å C₁₈

- Oligo batch tested and QC certified columns for reproducible purification process performance & consistency across a range of column ID's.
- Trifunctional C₁₈ ligand, fully end-capped, and bonded to the Ethylene-Bridged Hybrid (BEH) particles.
- Available in different particle sizes and a wide range of column IDs.
- Two pore sizes (130 & 300 Å) to support emerging purification needs for new chemically diverse siRNAs, ASOs, CRISPR sgRNA and oligonucleotide reagents.
- Outstanding peak capacity and superior peak shape in hexafluoroisopropanol (HFIP), triethyl ammonium acetate (TEA), hexylammonium acetate (HAA) and other mobile phases selected depending on the length of the Oligonucleotide.
- Good mass loading capacity and scalability while maintaining outstanding separation performance resolving impurities & sequence failures such as n-1, n-2 from target peak for high purity yield.
- Remarkable column longevity under demanding separation conditions when compared to use of 100% silica based C₁₈ columns.

SECTION #3: SELECTING COLUMN DIMENSIONS WHEN PARTICLE SIZES ARE DIFFERENT

To convert a method using a column of one particle size to a column with a different particle size, the ratio of the length to particle size (L/d_p) must be similar.

This ratio compares the resolving power of columns. If you keep the L/d_p ratio the same for two columns, you will obtain the same resolution. Therefore, for two columns with the same L/d_p ratio, the more efficient, shorter column (packed with smaller particles) will provide the same resolution in less time.

$$\text{EXAMPLE: } \frac{150 \text{ mm}}{5 \mu\text{m}} = \frac{150,000 \text{ mm}}{5 \mu\text{m}} = 30,000$$

L/d_p COMPARISON CHART FOR LC COLUMNS

L/d_p			Column length (mm)						
			20	30	50	75	100	150	250
Particle size (μm)	Fully porous	1.7	—	17,600	29,400	44,100	58,800	88,200	—
		2.5	8,000	12,000	20,000	30,000	40,000	60,000	—
		3.5	5,700	8,600	14,300	21,400	28,600	42,900	71,400
		5.0	4,000	6,000	10,000	15,000	20,000	30,000	50,000

SECTION #4: PREPARATIVE STANDARDS

How do you know your chromatographic system is in proper working order?

Quality Control Reference Materials (QC Reference Materials) contain mixtures of standards specifically chosen to provide an easy and reliable way to monitor the performance of any chromatographic system. Using a QC Reference Material, you can be assured that your column and system are ready to analyze your samples. Regular use of QC Reference Materials also provides an opportunity to benchmark your chromatographic systems and trend performance over time, making it easier to proactively identify problems and resolve them faster.

Ordering Information

Quality Control Reference Materials

Product Name	Intended Use	Chromatographic Mode	Systems	Contents	P/N
Preparative Chromatography Mix Standard	Provides chromatographic performance information (inclusive of mobile phase pH) using one void marker, one acidic, one basic, and one neutral probes.	Reversed-phase	All Purification Systems	5 mg/mL each: Diclofenac sodium salt, diphenhydramine hydrochloride, flavone in a 1 mL solution of DMSO. Store at room temperature.	186006703
AutoPurification System Standard	Tests the performance of fraction collectors, both UV and MS directed, using three dyes.	Reversed-phase	All Purification Systems with Fraction Collectors	3 ampoules of test mix containing: 2500 $\mu\text{g/mL}$ thionin, 3000 $\mu\text{g/mL}$ thioflavin, 2500 $\mu\text{g/mL}$ crystal violet in a 10 mL solution of 25/75 water/methanol. Store at room temperature.	716000765

MaxPeak™ PREMIER OBD PREPARATIVE COLUMNS

Waters MaxPeak Premier Preparative Columns with MaxPeak High Performance Surfaces enable scientists to purify compounds with confidence by minimizing component/column surface interactions that can lead to target sample loss. Non-specific adsorption (NSA) of metal sensitive compounds is characteristic of certain compound classes such as lipids, organic acids, acidic peptides, oligonucleotides. However, compounds containing phosphate or carboxylate functionalities can exhibit NSA leading to poor peak shape, sensitivity, and reproducibility. Although column conditioning and passivation may alleviate these problems, extra sample, solvent, and time is required to prepare the column for use. MaxPeak High Performance Surfaces are designed to reduce NSA and mitigate the loss of metal sensitive components (targets or impurities) which improves peak shape and resolution for better compound detection and fraction collection.

The benefits of employing MaxPeak Premier OBD Preparative Columns are many and can include:

- Improved sensitivity for better compound detection and reduced risk of sample loss
- Enhanced resolution for improved column loading and target compound purity
- Better peak shapes that reduce number of collected fractions and their volume
- Reduced column conditioning/passivation times, saving sample, solvent, and time
- Improved recovery which reduces the number of runs necessary to isolate the required target compound

MaxPeak Premier OBD Preparative Columns are available in different particle sizes and chemistries for the reversed-phase purification of drug compounds, peptides, oligonucleotides, or other small molecules found in materials, biological samples (*i.e.*, metabolites), or natural product sources.

XSelect Preparative Columns										
Dimension	Type	Particle size	CSH C ₁₈	CSH Fluoro-Phenyl	CSH Phenyl-Hexyl	HSS C ₁₈	HSS C ₁₈ SB	HSS Cyano	HSS T3	HSS PFP
10 x 10 mm	Guard	5 µm	186005491 ¹	186005498 ¹	186005505 ¹	186004776 ¹	186004758 ¹	—	186004795 ¹	186011034
10 x 50 mm	OBD Column	5 µm	186008236	186008240	186008244	186008222	186008219	—	186008225	—
10 x 100 mm	OBD Column	5 µm	186008237	186008241	186008245	186008223	186008220	—	186008226	186011036
10 x 150 mm	OBD Column	5 µm	186008238	186008242	186008246	186008224	186008221	—	186008227	—
10 x 250 mm	OBD Column	5 µm	186008239	186008243	186008247	—	—	—	186008280	186011038
19 x 10 mm	Guard	5 µm	186005418 ²	186005431 ²	186005444 ²	186011260	—	186011077	186011023	—
19 x 50 mm	OBD Column	5 µm	186005420	186005433	186005446	—	—	186011078	186011024	186011040
19 x 100 mm	OBD Column	5 µm	186005421	186005434	186005447	186011052	—	186011079	186011025	186011041
19 x 150 mm	OBD Column	5 µm	186005422	186005435	186005448	186011053	—	—	186011026	—
19 x 250 mm	OBD Column	5 µm	186005492	186005499	186005506	186011054	—	—	186011031	—
30 x 10 mm	Guard	5 µm	186006899 ³	186006900 ³	186006901 ³	186011055	—	—	186011033	—
30 x 50 mm	OBD Column	5 µm	186005423	186005436	186005520	—	—	—	—	—
30 x 75 mm	OBD Column	5 µm	186005424	186005437	186005450	—	—	—	—	—
30 x 100 mm	OBD Column	5 µm	186005425	186005438	186005451	—	—	—	—	—
30 x 150 mm	OBD Column	5 µm	186005426	186005439	186005452	186011058	—	—	186011031	186011047
30 x 250 mm	OBD Column	5 µm	186005493	186005500	186005507	—	—	—	—	—
50 x 50 mm	OBD Column	5 µm	186005494	186005501	186005508	—	—	—	—	—
50 x 100 mm	OBD Column	5 µm	186005495	186005502	186005509	—	—	—	—	—
50 x 150 mm	OBD Column	5 µm	186005496	186005503	186005510	—	—	—	186011033	186011049
50 x 250 mm	OBD Column	5 µm	186005497	186005504	186005511	—	—	—	—	—

MaxPeak Premier 3.5 and 5 µm Preparative Columns

Dimension	Type	Particle size	BEH 130 Å, C ₁₈	CSH 130 Å, C ₁₈
10 x 10 mm	Guard	3.5 µm	186011309*	186011299*
10 x 50 mm	OBD Column	3.5 µm	186011310	186011300
10 x 100 mm	OBD Column	3.5 µm	186011311	186011301
10 x 150 mm	OBD Column	3.5 µm	186011312	186011302
10 x 250 mm	OBD Column	3.5 µm	186011313	186011303
10 x 10 mm	Guard	5 µm	186011304*	186011294*
10 x 50 mm	OBD Column	5 µm	186011305	186011295
10 x 100 mm	OBD Column	5 µm	186011306	186011296
10 x 150 mm	OBD Column	5 µm	186011307	186011297
10 x 250 mm	OBD Column	5 µm	186011308	186011298
19 x 10 mm	Guard	5 µm	186011806**	186011802**
19 x 50 mm	OBD Column	5 µm	186011807	186011803
19 x 100 mm	OBD Column	5 µm	186011808	186011804
19 x 150 mm	OBD Column	5 µm	186011809	186011805

*Requires 10 x 10mm Guard Cartridge Holder, P/N: 186011548

**Requires 19 x 10 mm Guard Cartridge Holder, P/N: 186011737

MaxPeak Premier 3.5 and 5 µm Preparative Columns for Bioseparations

Dimension	Type	Particle size	Peptide BEH 130 Å, C ₁₈	Peptide BEH 300 Å, C ₁₈	Oligo BEH 130 Å, C ₁₈	Oligo BEH 300 Å, C ₁₈	Peptide CSH 130 Å, C ₁₈
10 x 10 mm	Guard	3.5 µm	186011324*	—	—	—	186011339*
10 x 50 mm	OBD Column	3.5 µm	186011325	—	—	—	186011340
10 x 100 mm	OBD Column	3.5 µm	186011326	—	—	—	186011341
10 x 150 mm	OBD Column	3.5 µm	186011327	—	—	—	186011342
10 x 250 mm	OBD Column	3.5 µm	186011328	—	—	—	186011343
10 x 10 mm	Guard	5 µm	186011319*	186011329*	186011205*	186011216*	186011334*
10 x 50 mm	OBD Column	5 µm	186011320	186011315	186011206	186011217	186011335
10 x 100 mm	OBD Column	5 µm	186011321	186011316	186011207	186011218	186011336
10 x 150 mm	OBD Column	5 µm	186011322	186011317	186011208	186011219	186011337
10 x 250 mm	OBD Column	5 µm	186011323	186011318	—	—	186011338
19 x 10 mm	Guard	5 µm	186011810	186011814	186011822	—	186011818
19 x 50 mm	OBD Column	5 µm	186011811	186011815	186011823	—	186011819
19 x 100 mm	OBD Column	5 µm	186011812	186011816	186011824	—	186011820
19 x 150 mm	OBD Column	5 µm	186011813	186011817	186011825	—	186011821

*Requires 10 x 10mm Guard Cartridge Holder, P/N: 186011548

**Requires 19 x 10 mm Guard Cartridge Holder, P/N: 186011737

Note: The Peptide-branded BEH C₁₈ and CSH C₁₈ are specifically QC tested with a complex peptide mixture to help ensure column-to-column performance consistency. Additionally, the Oligo-branded BEH C₁₈ is specifically QC tested with a synthetic double stranded oligonucleotide standard to help ensure column-to-column performance consistency.

SECTION #5: PART NUMBERS: TRADITIONAL STAINLESS STEEL OBD COLUMN TECHNOLOGY

In addition to the MaxPeak Premier-based OBD Preparative Columns, we offer reversed-phase chemistry in stainless steel OBD hardware.

XSelect Preparative Columns			
Dimension	Type	Particle size	CSH C ₁₈
10 x 10 mm	Guard	10 µm	186007285 ¹
10 x 50 mm	OBD Column	10 µm	186008268
10 x 100 mm	OBD Column	10 µm	186008269
10 x 150 mm	OBD Column	10 µm	186008270
10 x 250 mm	OBD Column	10 µm	186008271
19 x 10 mm	Guard	10 µm	186007290 ²
19 x 50 mm	OBD Column	10 µm	186007291
19 x 100 mm	OBD Column	10 µm	186007292
19 x 150 mm	OBD Column	10 µm	186007293
19 x 250 mm	OBD Column	10 µm	186007294

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779

² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745

³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

XSelect Preparative Columns			
Dimension	Type	Particle size	CSH C ₁₈
30 x 10 mm	Guard	10 µm	186007295 ³
30 x 50 mm	OBD Column	10 µm	186007296
30 x 75 mm	OBD Column	10 µm	186007297
30 x 100 mm	OBD Column	10 µm	186007298
30 x 150 mm	OBD Column	10 µm	186007299
30 x 250 mm	OBD Column	10 µm	186007300
50 x 50 mm	OBD Column	10 µm	186007301
50 x 100 mm	OBD Column	10 µm	186007302
50 x 150 mm	OBD Column	10 µm	186007303
50 x 250 mm	OBD Column	10 µm	186007304

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779

² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745

³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

XBridge Preparative Columns								
Dimension	Type	Particle size	BEH C ₁₈	BEH C ₈	BEH Shield RP18	BEH Phenyl	BEH HILIC	BEH Amide
10 x 10 mm	Guard	5 µm	186002972 ¹	186002991 ¹	186002983 ¹	186003354 ¹	186004720 ¹	186006597 ¹
10 x 50 mm	OBD Column	5 µm	186008164	186008172	186008168	186008176	186008217	186008260
10 x 100 mm	OBD Column	5 µm	186008165	186008173	186008169	186008177	186008218	186008261
10 x 150 mm	OBD Column	5 µm	186008166	186008174	186008170	186008178	—	186008262
10 x 250 mm	OBD Column	5 µm	186008167	186008175	186008171	186008179	—	186008263
19 x 10 mm	Guard	5 µm	186002975 ²	186002992 ²	186002984 ²	186003355 ²	186004723 ²	186006598 ²
19 x 50 mm	OBD Column	5 µm	186002977	186002993	186002985	186003356	186004724	186006603
19 x 100 mm	OBD Column	5 µm	186002978	186002994	186002986	186003357	186004725	186006604
19 x 150 mm	OBD Column	5 µm	186002979	186002995	186002987	186003358	186004726	186006605
19 x 250 mm	OBD Column	5 µm	186004021	186004023	186004022	186004024	186004730	186006606
30 x 10 mm	Guard	5 µm	186006893 ³	186006895 ³	186006898 ³	186006891 ³	186006896 ³	186006890 ³
30 x 50 mm	OBD Column	5 µm	186002980	186002996	186002988	186003277	186004727	186006607
30 x 75 mm	OBD Column	5 µm	186002981	186003269	186003262	186003278	—	186006608
30 x 100 mm	OBD Column	5 µm	186002982	186002997	186002989	186003279	186004728	186006609
30 x 150 mm	OBD Column	5 µm	186003284	186003083	186002990	186003276	186004729	186006610
30 x 250 mm	OBD Column	5 µm	186004025	—	—	—	186004731	186006611
50 x 50 mm	OBD Column	5 µm	186003933	186003934	186003935	186003936	186004732	—
50 x 100 mm	OBD Column	5 µm	186003937	186003938	186003939	186003940	186004733	—
50 x 150 mm	OBD Column	5 µm	186003929	—	—	—	186004734	—
50 x 250 mm	OBD Column	5 µm	186004107	—	—	—	186004735	—
10 x 10 mm	Guard	10 µm	186003889 ¹	186004003 ¹	186003988 ¹	—	—	—
19 x 10 mm	Guard	10 µm	186003892 ²	186004006 ²	186003991 ²	—	—	—
30 x 10 mm	Guard	10 µm	186006892 ³	186006894 ³	186006897 ³	—	—	—
10 x 150 mm	OBD Column	10 µm	186008210	186008215	186008213	—	—	—
10 x 250 mm	OBD Column	10 µm	186008211	186008216	186008214	—	—	—
19 x 50 mm	OBD Column	10 µm	186003893	186004007	186003992	—	—	—
19 x 100 mm	OBD Column	10 µm	186003901	186004008	186003993	—	—	—
19 x 150 mm	OBD Column	10 µm	186003894	186004009	186003994	—	—	—
19 x 250 mm	OBD Column	10 µm	186003895	186004010	186003995	—	—	—
30 x 75 mm	OBD Column	10 µm	186004711	—	—	—	—	—
30 x 100 mm	OBD Column	10 µm	186003930	—	—	—	—	—
30 x 150 mm	OBD Column	10 µm	186003896	186004011	186003996	—	—	—
30 x 250 mm	OBD Column	10 µm	186003897	186004012	186003997	—	—	—
50 x 50 mm	OBD Column	10 µm	186003898	186004013	186003998	—	—	—
50 x 100 mm	OBD Column	10 µm	186003902	186004014	186003999	—	—	—
50 x 150 mm	OBD Column	10 µm	186003899	186004015	186004001	186011261	—	—
50 x 250 mm	OBD Column	10 µm	186003900	186004016	186004002	—	—	—

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779

² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745

³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

Section #5: Part Numbers - continued

SunFire™ Preparative Columns					
Dimension	Type	Particle size	C ₁₈	C ₈	Silica
10 x 10 mm	Guard	5 µm	186002565 ¹	186002750 ¹	186003429 ¹
10 x 50 mm	OBD Column	5 µm	186008152	186008158	186008180
10 x 100 mm	OBD Column	5 µm	186008153	186008159	186008181
10 x 150 mm	OBD Column	5 µm	186008154	186008160	186008182
10 x 250 mm	OBD Column	5 µm	186008155	186008161	186008183
19 x 10 mm	Guard	5 µm	186002569 ²	186002754 ²	186003434 ²
19 x 50 mm	OBD Column	5 µm	186002566	186002751	186003431
19 x 100 mm	OBD Column	5 µm	186002567	186002752	186003432
19 x 150 mm	OBD Column	5 µm	186002568	186002753	186003433
19 x 250 mm	OBD Column	5 µm	186004027	186004028	186004029
30 x 10 mm	Guard	5 µm	186006885 ³	186006887 ³	186006889 ³
30 x 50 mm	OBD Column	5 µm	186002570	186002755	186003435
30 x 75 mm	OBD Column	5 µm	186002571	186002756	186003436
30 x 100 mm	OBD Column	5 µm	186002572	186002757	186003437
30 x 150 mm	OBD Column	5 µm	186002797	186002795	186003438
30 x 250 mm	OBD Column	5 µm	186003969	—	—
50 x 50 mm	OBD Column	5 µm	186002867	186002868	186003439
50 x 100 mm	OBD Column	5 µm	186002869	186002870	186003440
50 x 150 mm	OBD Column	5 µm	186003941	—	—
50 x 250 mm	OBD Column	5 µm	186003970	—	—
10 x 10 mm	Guard	10 µm	186002663 ¹	186002758 ¹	186003441 ¹
10 x 50 mm	OBD Column	10 µm	186008208	186008209	—
10 x 150 mm	OBD Column	10 µm	186008156	186008162	186008184
10 x 250 mm	OBD Column	10 µm	186008157	186008163	186008185
19 x 10 mm	Guard	10 µm	186002666 ²	186002761 ²	186003444 ²
19 x 50 mm	OBD Column	10 µm	186002667	—	186003445
19 x 150 mm	OBD Column	10 µm	186002668	186002763	186003446
19 x 250 mm	OBD Column	10 µm	186002669	186002764	186003447
30 x 10 mm	Guard	10 µm	186006884 ³	186006886 ³	186006888 ³
30 x 50 mm	OBD Column	10 µm	186003854	186003853	186003855
30 x 100 mm	OBD Column	10 µm	186003971	—	—
30 x 150 mm	OBD Column	10 µm	186002670	186002765	186003448
30 x 250 mm	OBD Column	10 µm	186002671	186002766	186003449
50 x 50 mm	OBD Column	10 µm	186002871	186002872	186003450
50 x 100 mm	OBD Column	10 µm	186003972	—	—
50 x 150 mm	OBD Column	10 µm	186002672	186002767	186003451
50 x 250 mm	OBD Column	10 µm	186002673	186002768	186003452

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

Atlantis™ Preparative Columns					
Dimension	Type	Particle size	T3	HILIC	dC18
10 x 10 mm	Guard	5 µm	186003695 ¹	—	186002300 ¹
10 x 50 mm	OBD Column	5 µm	186008202	—	186008146
10 x 100 mm	OBD Column	5 µm	186008203	—	186008148
10 x 150 mm	OBD Column	5 µm	186008204	—	—
10 x 250 mm	OBD Column	5 µm	186008205	—	—
19 x 10 mm	Guard	5 µm	186003699 ²	186003956 ²	186001361 ²
19 x 50 mm	OBD Column	5 µm	186003696	186003957	186001365
19 x 100 mm	OBD Column	5 µm	186003697	186003958	186001367
19 x 150 mm	OBD Column	5 µm	186003698	186003959	186002800
19 x 250 mm	OBD Column	5 µm	186004026	—	186004030
30 x 10 mm	Guard	5 µm	186006879 ³	186006877 ³	186006876 ³
30 x 50 mm	OBD Column	5 µm	186003700	186003960	186001373
30 x 75 mm	OBD Column	5 µm	186003701	—	186002455
30 x 100 mm	OBD Column	5 µm	186003702	186003961	—
30 x 150 mm	OBD Column	5 µm	186003703	186003962	186002801
50 x 50 mm	OBD Column	5 µm	186004080	—	—
50 x 100 mm	OBD Column	5 µm	186004081	—	—
50 x 150 mm	OBD Column	5 µm	186004082	—	—
10 x 10 mm	Guard	10 µm	186003706 ¹	—	186002452 ¹
10 x 150 mm	OBD Column	10 µm	186008206	—	186008149
10 x 250 mm	OBD Column	10 µm	186008207	—	186008151
19 x 10 mm	Guard	10 µm	186003710 ²	—	186001363 ²
19 x 50 mm	OBD Column	10 µm	186003707	—	—
19 x 150 mm	OBD Column	10 µm	186003708	—	186001369
19 x 250 mm	OBD Column	10 µm	186003709	—	186001371
30 x 10 mm	Guard	10 µm	186006878 ³	—	186006875 ³
30 x 75 mm	OBD Column	10 µm	186004712	—	—
30 x 150 mm	OBD Column	10 µm	186003711	—	—
30 x 250 mm	OBD Column	10 µm	186003712	—	186002418
50 x 50 mm	OBD Column	10 µm	186004083	—	—
50 x 100 mm	OBD Column	10 µm	186004084	—	—
50 x 150 mm	OBD Column	10 µm	186004085	—	—
50 x 250 mm	OBD Column	10 µm	186004086	—	—

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

Atlantis BEH columns are available in 5 µm C₁₈ AX and Z-HILIC bonding chemistries and are available as a requested custom in preparative dimensions.

Section #5: Part Numbers - continued

Peptide Preparative Columns					
Dimension	Type	Particle size	XBridge Peptide BEH C ₁₈ , 300 Å	XBridge Peptide BEH C ₁₈ , 300 Å	XSelect Peptide CSH C ₁₈ , 130 Å
10 x 10 mm	Guard	5 µm	186004469 ¹	186004471 ¹	186007015 ¹
10 x 50 mm	OBD Column	5 µm	186008186	186008190	186008264
10 x 100 mm	OBD Column	5 µm	186008187	186008191	186008265
10 x 150 mm	OBD Column	5 µm	186008188	186008192	186008266
10 x 250 mm	OBD Column	5 µm	186008189	186008193	186008267
19 x 10 mm	Guard	5 µm	186004468 ²	186004470 ²	186007019 ²
19 x 50 mm	OBD Column	5 µm	186003586	186003630	186007022
19 x 100 mm	OBD Column	5 µm	186003587	186003631	186007020
19 x 150 mm	OBD Column	5 µm	186003945	186003946	186007021
19 x 250 mm	OBD Column	5 µm	—	—	186007031
30 x 10 mm	Guard	5 µm	—	—	186007206 ³
30 x 50 mm	OBD Column	5 µm	—	—	186007026
30 x 100 mm	OBD Column	5 µm	—	—	186007025
30 x 150 mm	OBD Column	5 µm	—	—	186007023
30 x 250 mm	OBD Column	5 µm	—	—	186007024
50 x 50 mm	OBD Column	5 µm	—	—	186007030
50 x 100 mm	OBD Column	5 µm	—	—	186007027
50 x 150 mm	OBD Column	5 µm	—	—	186007028
50 x 250 mm	OBD Column	5 µm	—	—	186007029
10 x 10 mm	Guard	10 µm	186004465 ¹	186004467 ¹	—
10 x 50 mm	OBD Column	10 µm	186008194	186008198	—
10 x 100 mm	OBD Column	10 µm	186008195	186008199	—
10 x 150 mm	OBD Column	10 µm	186008196	186008200	—
10 x 250 mm	OBD Column	10 µm	186008197	186008201	—
19 x 10 mm	Guard	10 µm	186004464 ²	186004466 ²	—
19 x 50 mm	OBD Column	10 µm	186003656	186003671	—
19 x 150 mm	OBD Column	10 µm	186003657	186003672	—
19 x 250 mm	OBD Column	10 µm	186003658	186003673	—
30 x 10 mm	Guard	10 µm	186006880 ³	186006882 ³	—
30 x 50 mm	OBD Column	10 µm	186003659	186003674	—
30 x 100 mm	OBD Column	10 µm	186003660	186003675	—
30 x 150 mm	OBD Column	10 µm	186003661	186003676	—
30 x 250 mm	OBD Column	10 µm	186003662	186003677	—

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

Note: The Peptide-branded BEH C₁₈ and CSH C₁₈ are specifically QC tested with a complex peptide mixture to help ensure column-to-column performance consistency.

Protein Preparative Columns			
Dimension	Type	XBridge Protein BEH C ₄ , 300 Å, 5 µm	XBridge Protein BEH C ₄ , 300 Å, 10 µm
10 x 10 mm	Guard	186007305 ¹	186007325 ¹
10 x 50 mm	OBD Column	186008272	186008276
10 x 100 mm	OBD Column	186008273	186008277
10 x 150 mm	OBD Column	186008274	186008278
10 x 250 mm	OBD Column	186008275	186008279
19 x 10 mm	Guard	186007310 ²	186007330 ²
19 x 50 mm	OBD Column	186007311	186007331
19 x 100 mm	OBD Column	186007312	186007332
19 x 150 mm	OBD Column	186007313	186007333
19 x 250 mm	OBD Column	186007314	186007334
30 x 10 mm	Guard	186007315 ³	186007335 ³
30 x 50 mm	OBD Column	186007316	186007336
30 x 75 mm	OBD Column	186007317	186007337
30 x 100 mm	OBD Column	186007318	186007338
30 x 150 mm	OBD Column	186007319	186007339
30 x 250 mm	OBD Column	186007320	186007340

¹ Requires 10 x 10 mm Prep Guard Holder, P/N: 289000779² Requires 19 x 10 mm Prep Guard Holder, P/N: 186008745³ Requires 30 x 10 mm Prep Guard Holder, P/N: 186006912

Note: The Protein-branded BEH 300A, C₄ columns are specifically QC tested with a complex protein standard mixture to help ensure column-to-column performance consistency.

Section #5: Part Numbers - continued

Oligonucleotide Preparative Columns				
Dimension	Type	XBridge Oligonucleotide BEH C ₁₈ , 130 Å, 2.5 µm	XBridge Oligonucleotide BEH C ₁₈ , 130 Å, 5 µm	XBridge Oligonucleotide BEH C ₁₈ , 300 Å, 5 µm
10 x 10 mm	Guard	—	186011150 ¹	186011168 ¹
10 x 50 mm	OBD Column	186008212	186011151	186011169
10 x 100 mm	OBD Column	—	186011152	186011170
10 x 150 mm	OBD Column	—	186011153	186011171
19 x 10 mm	Guard	—	186011154 ²	186011172 ²
19 x 50 mm	OBD Column	186008962	186011155	186011173
19 x 100 mm	OBD Column	—	186011156	186011174
19 x 150 mm	OBD Column	—	186011157	186011175
30 x 10 mm	Guard	—	186011158 ³	—
30 x 50 mm	OBD Column	186008963	186011159	—
30 x 100 mm	OBD Column	—	186011160	—
30 x 150 mm	OBD Column	—	186011161	—
50 x 50 mm	OBD Column	186008964	186011162	—
50 x 100 mm	OBD Column	—	186011163	—
50 x 150 mm	OBD Column	—	186011164	—

¹ Requires 10 x 10 mm Guard Cartridge Holder, P/N: 289000779

² Requires 10 x 10 mm Guard Cartridge Holder, P/N: 186008745

³ Requires 10 x 10 mm Guard Cartridge Holder, P/N: 186006912

Note: The Oligo-branded BEH C₁₈ is specifically QC tested with a synthetic double stranded oligonucleotide standard to help ensure column-to-column performance consistency.

SECTION #6: PREPARATIVE GUARD COLUMNS

Guard columns are essential for protecting both the prep system and column from contaminants which impact chromatographic resolution and column lifetime or cause LC system issues. Guard columns are steel cartridge inserts packed with the same stationary phase as the preparative column and fit in a specialized Guard Holder. Guard columns, plumbed just before the preparative column, can be replaced easily once contaminated, thereby preserving the prep column.

There are two types of guard holders available, one which can be tightened by hand, and one which can be tightened with the use of a wrench. The guard holders come with a rigid connector and transfer tubing, and are available in 7.8 mm – 30 mm internal diameters. Select the internal diameter of the guard assembly (column plus required holder) that best matches the prep column diameter for best performance.

Ordering Information

Purification and Isolation Cartridge Holders

Description		
	(hand-tighten)	(wrench-tighten)
7.8 × 10 mm Cartridge Holder	186000708	—
10 × 10 mm Cartridge Holder	289000779	—
10 × 10 mm MaxPeak Premier Cartridge Holder	186011548	—
19 × 10 mm Cartridge Holder	186000709	186008745
30 × 10 mm Prep Guard Holder	—	186006912
Replacement O-ring 7.8 mm, 2/pk	700001019	—
Replacement O-ring 10 mm, 2/pk	700001436	—
Replacement O-ring 19 mm, 2/pk	700001020	—
Replacement O-ring 30 mm, 2/pk	186007012	—



Rigid Connector

SECTION #7: ESTIMATED MASS LOADING BY COLUMN DIMENSION

MASS LOADING

Many factors affect the mass capacity of preparative columns. The listed capacities represent an "average" estimate of the total amount of mass per injection to be loaded on to the column. Mass loading is dependent upon the quality of the chromatographic separation.

Approximate Peptide & Oligonucleotide (up to 150nt) Mass Loading Capacities (mg) for OBD Preparative Columns (Gradient mode)

Length (mm)	Diameter (mm)				
	4.6	10	19	30	50
50	0.3–0.6 mg	1.5–3.0 mg	4–9 mg	11–22 mg	31–62 mg
100	0.5–1.0 mg	2.5–5.0 mg	9–18 mg	22–45 mg	62–125 mg
150	0.8–1.6 mg	4.0–8.0 mg	13–27 mg	34–68 mg	93–186 mg
250	1.3–2.6 mg	6.0–12.0 mg	22–45 mg	56–112 mg	155–310 mg
Reasonable flow rate (mL/min)	0.9–1.8	4.5–9.0	16–32	40–80	111–222 mg
Reasonable injection volume (μL)	20	100	350	880	2450

Approximate Small Molecule Mass Loading Capacities (mg) for OBD Preparative Columns (Gradient Mode)

Length (mm)	Diameter (mm)				
	4.6	10	19	30	50
50	3 mg	15 mg	45 mg	110 mg	310 mg
75	—	—	—	165 mg	—
100	5 mg	25 mg	90 mg	225 mg	620 mg
150	8 mg	40 mg	135 mg	335 mg	930 mg
250	13 mg	60 mg	225 mg	560 mg	1550 mg
Reasonable flow rate (mL/min)	1.4	6.6	24	60	164
Reasonable injection volume (μL)	20	100	350	880	2450

SECTION #8: CALCULATIONS FOR PREDICTABLE SCALE-UP

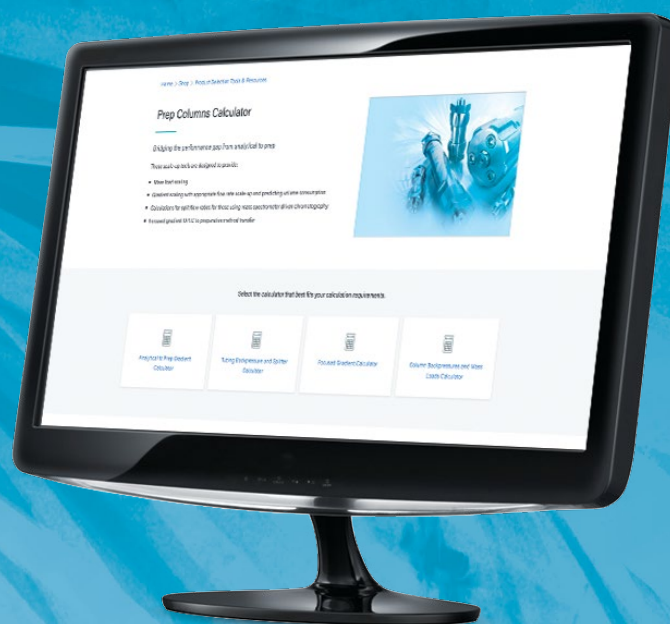
With this simple-to-use online calculator, all the guesswork in scale-up is removed. The calculator performs all the calculations necessary to properly scale-up analytical separation to prep.

- Simplify the math with built in geometric scaling calculations
- Increase productivity with useful information for method optimization and focused gradients
- Discover how much crude you can load on a given column dimension
- Learn about system dwell volume and required isocratic hold times for direct scaling
- Understand the estimated solvent usage per gradient at various flow rates
- Explore the predicted column backpressures for various mobile phase options
- Learn what tubing diameter and lengths are needed to achieve your desired ratio for making a flow split from the Prep collection stream to your detectors

WATERS ONLINE PREPARATIVE COLUMNS CALCULATOR

All the calculations necessary to properly scale-up analytical separation to PREP and more.

- Simplifies the math for you with built in geometric scaling calculations
- Increase productivity with useful information for method optimization and focused gradients
- Discover how much crude you can load on a given column dimension
- Learn about system dwell volume and required isocratic hold times for direct scaling
- Understand the estimated solvent usage per gradient at various flow rates
- Explore the predicted column backpressures for various mobile phase options
- Learn what tubing diameter and lengths are needed to achieve your desired ratio for making a flow split from the prep collection stream to your detectors



To try this tool, visit waters.com/prepcalculator

Go to waters.com/prep to learn more about Waters solutions for preparative separations.

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