

[xp columns]

eXtended
performance



Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

XP COLUMNS



XSELECT™
Columns

Extending Separation Performance

eXtended Performance [XP] 2.5 μ m Columns are designed to enhance your transition strategy between HPLC and UPLC® Technology. Compatible with any LC system, XP 2.5 μ m Columns provide added flexibility to HPLC, UHPLC and UPLC users to improve productivity at intermediate backpressures. The diverse range of available stationary phases offers separation scientists a choice that is fully and seamlessly scalable between HPLC and UPLC platforms.

Unmatched Selectivity and Flexibility

- 14 stationary phases
- Directly scalable to HPLC and UPLC Columns
- 160+ configurations

Ultra-High Pressure Compatible.
Lower Backpressure. Improved Productivity.

- Work seamlessly with any LC system
- 40% lower backpressure
- Superior performance
- Higher throughput

Rapid Method Optimization

- Transfer methods TODAY
- Future-proof your method

BEH C₁₈

BEH C₈

BEH Shield RP18

BEH Phenyl

BEH HILIC

BEH Amide

HSS T3

HSS C₁₈

HSS C₁₈ SB

HSS PFP

HSS CN

CSH C₁₈

CSH Phenyl-Hexyl

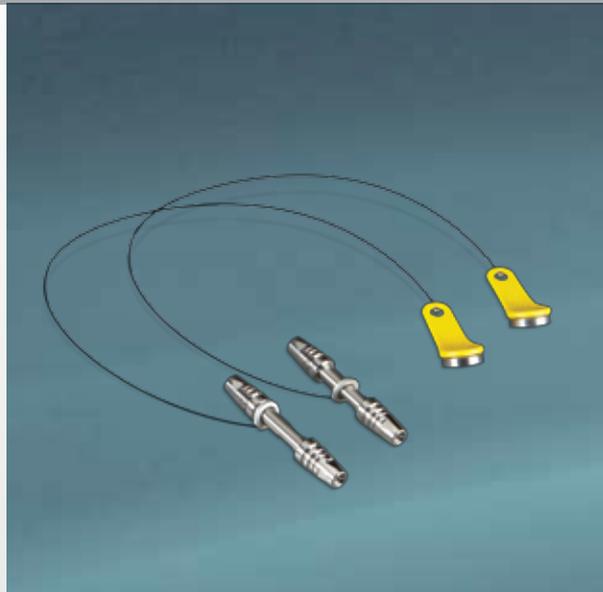
CSH Fluoro-Phenyl



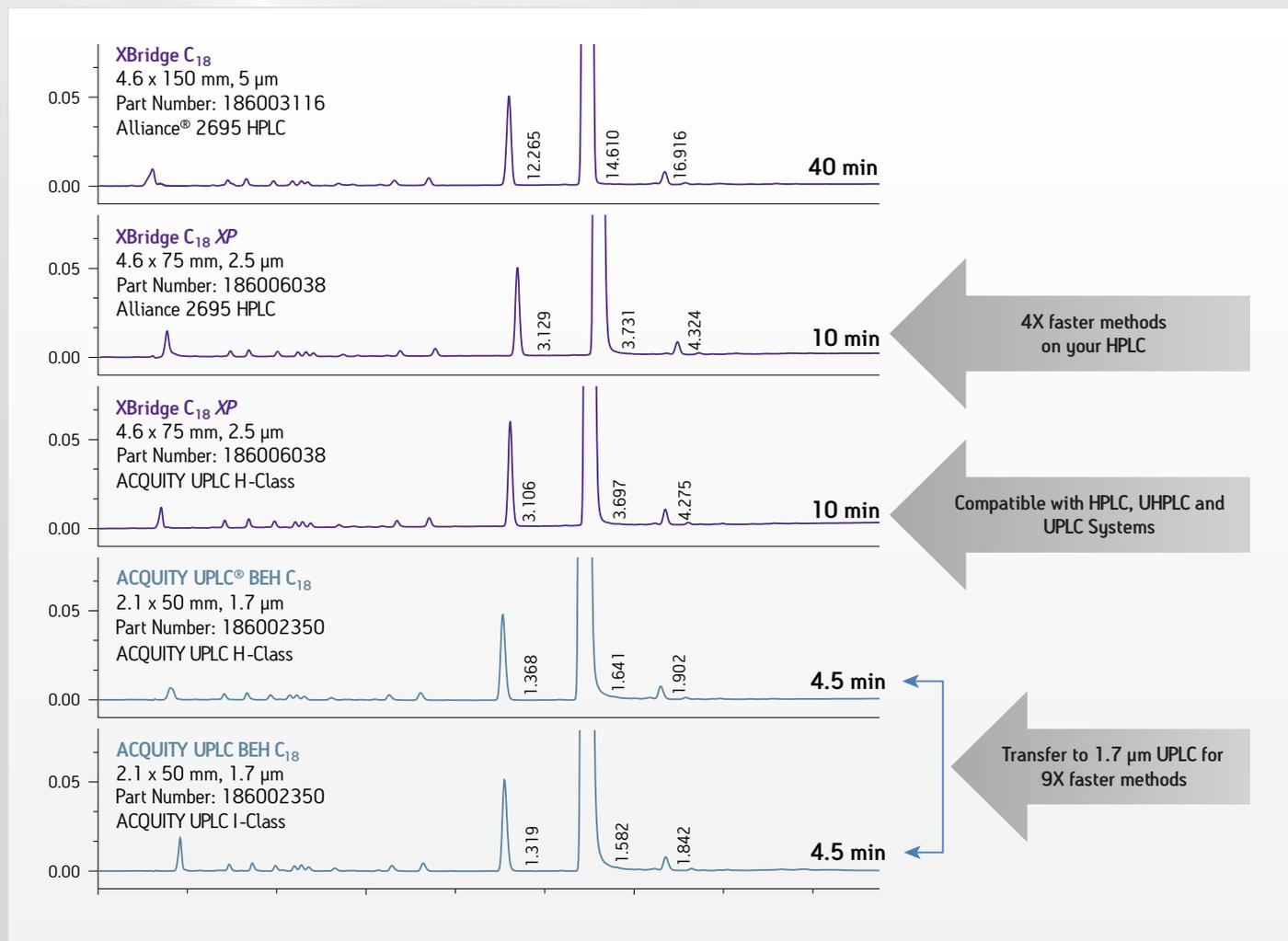
Maximize Your LC Productivity

An increasing number of organizations have realized the benefits of improved productivity, higher data quality, and lower cost per sample as well as faster time-to-market, inherent in assays that utilize UPLC Technology. This technology shift from HPLC to UPLC has led companies to look at new ways to maximize the productivity of their existing HPLC instruments as they continue to invest in, and transition to, newer UPLC Systems. Utilizing smaller particle technologies (i.e., 2.5 μm) is one method of improving productivity.

XBridge™ and XSelect™ eXtended Performance [XP] 2.5 μm Columns bridge the gap between HPLC and UPLC Technology, enabling exceptional separation performance, robustness and throughput for HPLC assays while being fully compatible with all HPLC, UHPLC and UPLC Technology platforms.



Improve HPLC Throughput with XP 2.5 μm Columns



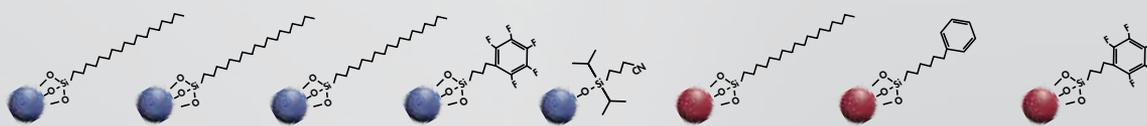
Make your HPLC system more productive with XP 2.5 μm Columns. Unlike core-shell columns, methods developed on eXtended Performance 2.5 μm Columns can be scaled and transferred to larger 3.5 and 5 μm HPLC columns, or to smaller sub-2- μm UPLC Columns, enabling a great deal of flexibility and method consistency when transitioning between laboratories within an organization or to contract partners.

Unmatched Selectivity and Flexibility

Available in 2.1, 3.0 and 4.6 mm ID in various column lengths (30, 50, 75 and 100 mm), **XP 2.5 µm** Columns provide a great deal of flexibility to operate on any HPLC, UHPLC or UPLC System platform. Additionally, **XP 2.5 µm** Columns are available in 3 different particle substrates and 14 chemistries to provide a diverse selectivity range to address specific analytical challenges while having direct compatibility and scalability with smaller sub-2-µm UPLC Columns and larger 3.5 and 5 µm HPLC columns.



XBridge	BEH C ₁₈ XP 2.5 µm	BEH Shield RP18 XP 2.5 µm	BEH C ₈ XP 2.5 µm	BEH Phenyl XP 2.5 µm	BEH HILIC XP 2.5 µm	BEH Amide XP 2.5 µm
Ligand Type	Trifunctional C ₁₈	Monofunctional Embedded Polar	Trifunctional C ₈	Trifunctional Phenyl-Hexyl	Unbonded BEH Particle	Trifunctional Carbamoyl
Ligand Density*	3.1 µmol/m ²	3.3 µmol/m ²	3.2 µmol/m ²	3.0 µmol/m ²	n/a	7.5 µmol/m ²
Carbon Load*	18%	17%	13%	15%	unbonded	12%
Endcap Style	proprietary	TMS	proprietary	proprietary	n/a	none
USP Classification	L1	L1	L7	L11	L3	-
pH Range	1 - 12	2 - 11	1 - 12	1 - 12	1 - 9	2 - 11
Low pH Temp. Limit	80 °C	50 °C	60 °C	80 °C	45 °C	90 °C
High pH Temp. Limit	60 °C	45 °C	60 °C	60 °C	45 °C	90 °C
Pore Diameter*	130 Å	130 Å	130 Å	130 Å	130 Å	130 Å
Surface Area ^a	185 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g
UPLC Column Equivalent	ACQUITY UPLC BEH C ₁₈ , 1.7 µm	ACQUITY UPLC BEH Shield RP18, 1.7 µm	ACQUITY UPLC BEH C ₈ , 1.7 µm	ACQUITY UPLC BEH Phenyl, 1.7 µm	ACQUITY UPLC BEH HILIC, 1.7 µm	ACQUITY UPLC BEH Amide, 1.7 µm
Additional HPLC Particle Sizes	3.5, 5, 10 µm	3.5, 5, 10 µm	3.5, 5, 10 µm	3.5, 5 µm	3.5, 5 µm	3.5 µm



XSelect	HSS T3 XP 2.5 µm	HSS C ₁₈ XP 2.5 µm	HSS C ₁₈ SB XP 2.5 µm	HSS PFP XP 2.5 µm	HSS CN XP 2.5 µm	CSH C ₁₈ XP 2.5 µm	CSH Phenyl-Hexyl XP 2.5 µm	CSH Fluoro-Phenyl XP 2.5 µm
Ligand Type	Trifunctional C ₁₈	Trifunctional C ₁₈	Trifunctional C ₁₈	Trifunctional Pentafluoro-phenyl	Monofunctional Cyano-Propyl	Trifunctional C ₁₈	Trifunctional C ₆ Phenyl	Trifunctional Propylfluoro-phenyl
Ligand Density*	1.6 µmol/m ²	3.2 µmol/m ²	1.6 µmol/m ²	3.2 µmol/m ²	2.0 µmol/m ²	2.3 µmol/m ²	2.3 µmol/m ²	2.3 µmol/m ²
Carbon Load*	11%	15%	8%	7%	5%	15%	14%	10%
Endcap Style	proprietary	proprietary	none	none	none	proprietary	proprietary	none
USP Classification	L1	L1	L1	L43	L10	L1	L11	L43
pH Range	2-8	1-8	2-8	2-8	2-8	1 - 11	1 - 11	1 - 8
Low pH Temp. Limit	45 °C	45 °C	45 °C	45 °C	45 °C	80 °C	80 °C	60 °C
High pH Temp. Limit	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
Pore Diameter*	100 Å	100 Å	100 Å	100 Å	100 Å	130 Å	130 Å	130 Å
Surface Area ^a	230 m ² /g	230 m ² /g	230 m ² /g	230 m ² /g	230 m ² /g	185 m ² /g	185 m ² /g	185 m ² /g
UPLC Column Equivalent	ACQUITY UPLC HSS T3, 1.8 µm	ACQUITY UPLC HSS C ₁₈ , 1.8 µm	ACQUITY UPLC HSS C ₁₈ SB, 1.8 µm	ACQUITY UPLC HSS PFP, 1.8 µm	ACQUITY UPLC HSS CN, 1.8 µm	ACQUITY UPLC CSH C ₁₈ , 1.7 µm	ACQUITY UPLC CSH Phenyl-Hexyl, 1.7 µm	ACQUITY UPLC CSH Fluoro-Phenyl, 1.7 µm
Additional HPLC Particle Sizes	3.5, 5 µm	3.5, 5 µm	3.5, 5 µm	3.5, 5 µm	3.5, 5 µm	3.5, 5 µm	3.5, 5 µm	3.5, 5 µm

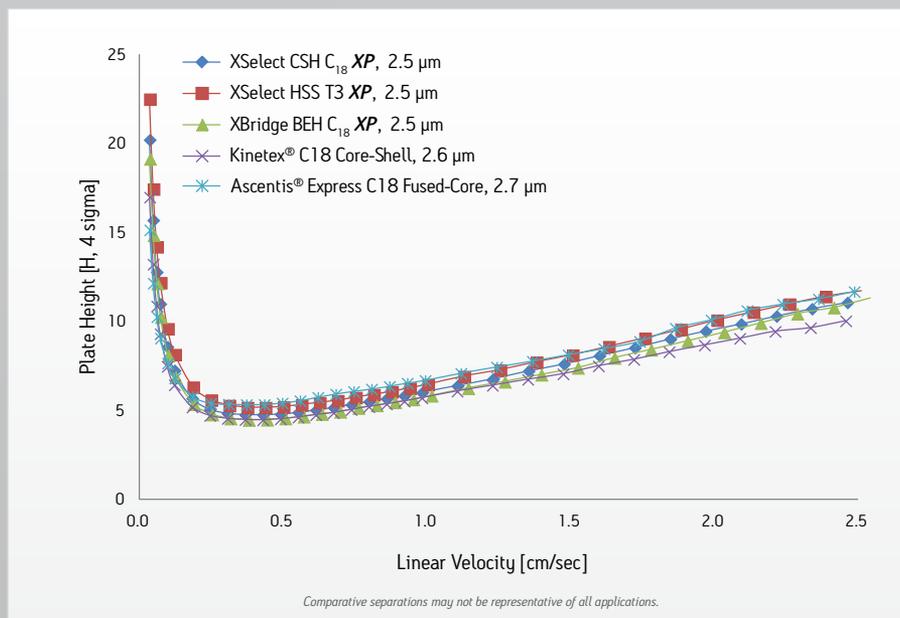
*Expected or approximate values.

Exceptional Performance at Intermediate Backpressures

Despite being in the marketplace for over 40 years*, core-shell columns (i.e., superficially-porous, pellicular, fused-core...etc.) have seen a recent resurgence due to the improvement in performance of this technology, primarily due to the reduction of particle size (sub-3 μm).

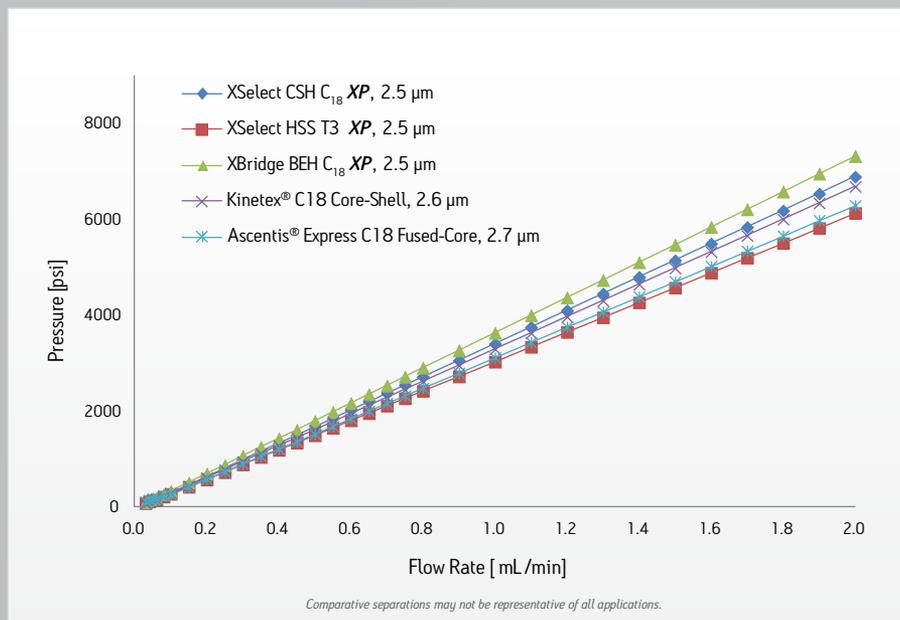
XP 2.5 μm Columns utilize advanced packing technology to provide exceptional performance and equivalent backpressure compared to core-shell columns, while exhibiting improved loading capacity and particle size scalability inherent of fully-porous particle columns.

Exceptional Efficiency and Mass Transfer



Reducing particle size with either core-shell or fully-porous particles are valid approaches towards improving separation power and throughput on an HPLC. As shown in the van Deemter plot, we compare two core-shell columns (2.6 μm Kinetex C₁₈ and 2.7 μm Ascentis Express C18) to three eXtended Performance Columns (2.5 μm BEH C₁₈, HSS T3 and CSH C18). Both core-shell and fully-porous columns yield similar results.

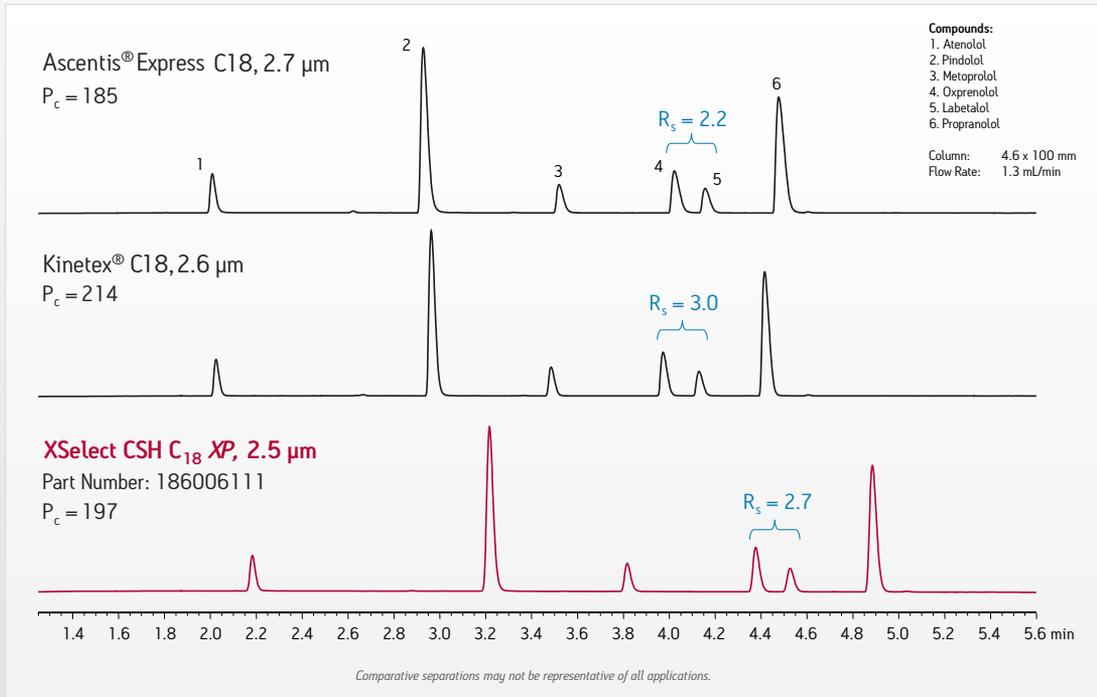
Backpressures Compatible with HPLC, UHPLC and UPLC Systems



The consequence of improved throughput and chromatographic resolution produced by reducing particle size is increased backpressure. As observed in the adjacent plot, we compare two core-shell columns (2.6 μm Kinetex C18 and 2.7 μm Ascentis Express C18) to three eXtended Performance Columns (2.5 μm BEH C₁₈, HSS T3 and CSH C₁₈). Both core-shell and XP Columns produce similar backpressures, independent of the flow rate. This indicates that the particle size dictates the observed backpressure, not the particle type (core-shell vs. fully-porous).

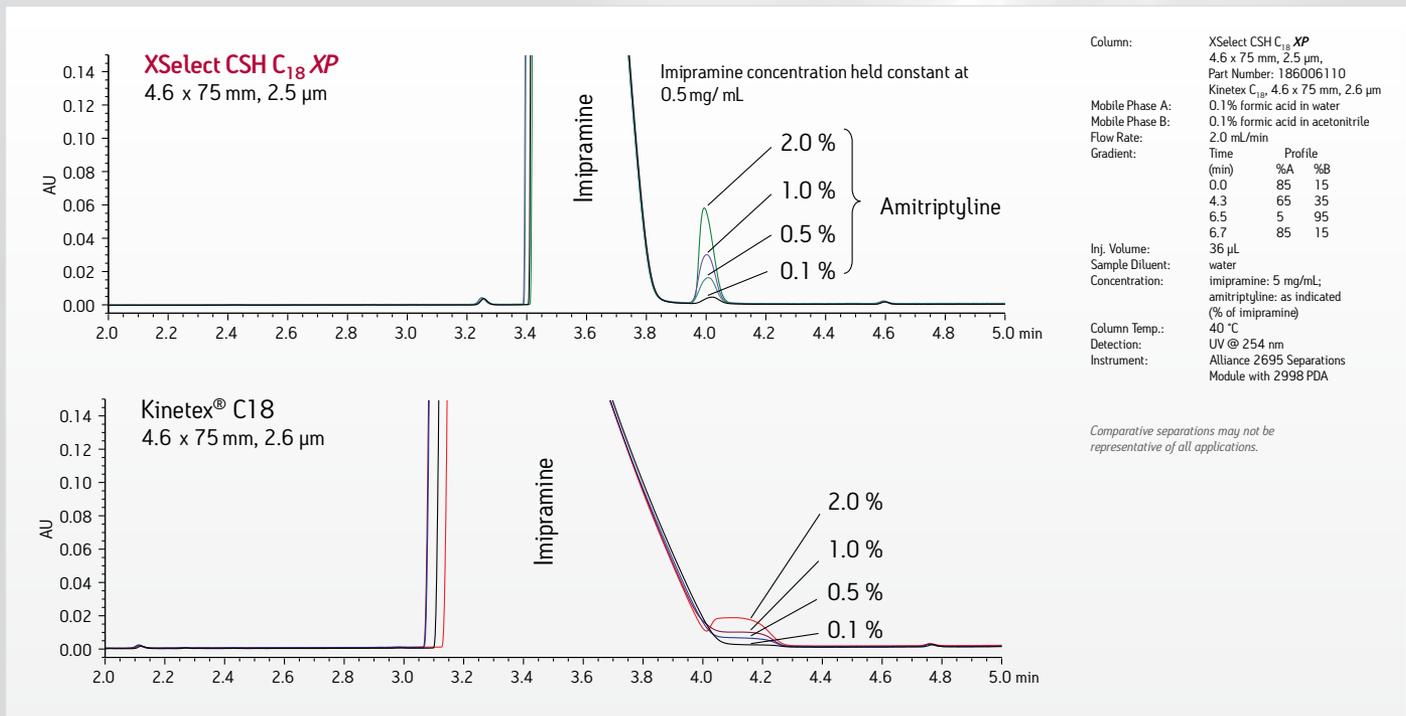
*<http://tinyurl.com/6orbchf>

Fast Gradient Separations on Your HPLC



A separation of beta-blocking drugs was compared on two different manufacturers of core-shell columns to an XSelect CSH C₁₈ XP 2.5 μm Column. As observed in the chromatographic comparison, both core-shell and XP 2.5 μm Columns produced similar peak capacities and resolution under normal sample loading conditions.

Superior Loading Capacity for Complex Mixtures

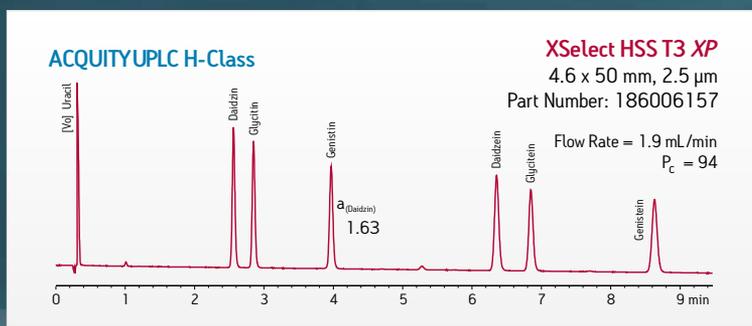
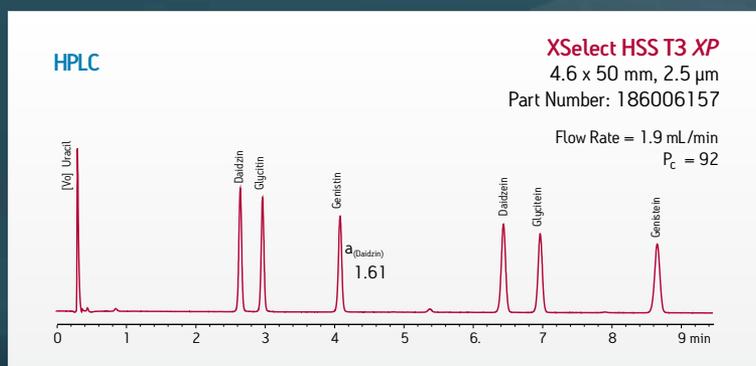


The sample loading capacity of a column is an important attribute to consider for applications that monitor trace level components amongst a diverse sample loading range. This is particularly important in application areas such as impurity profiling, metabolite ID and stability-indicating assays where improved resolution will result a more accurate characterization of the sample. With eXtended Performance [XP] 2.5 μm Columns, exceptional sample loading capacity is demonstrated in comparison to an equivalent core-shell particle column.

XP 2.5 μ m Columns Work Seamlessly on Any LC System

Due to a larger system dispersion and limited pressure range, a majority of conventional HPLC systems cannot take advantage of the performance benefits produced by sub-2- μ m particles. **eXtended Performance [XP]** 2.5 μ m Columns produce an intermediate backpressure and are available in a number of configurations, enabling you to select the appropriate ID and column length to match your LC systems performance range.

COMPATIBLE WITH ANY LC PLATFORM

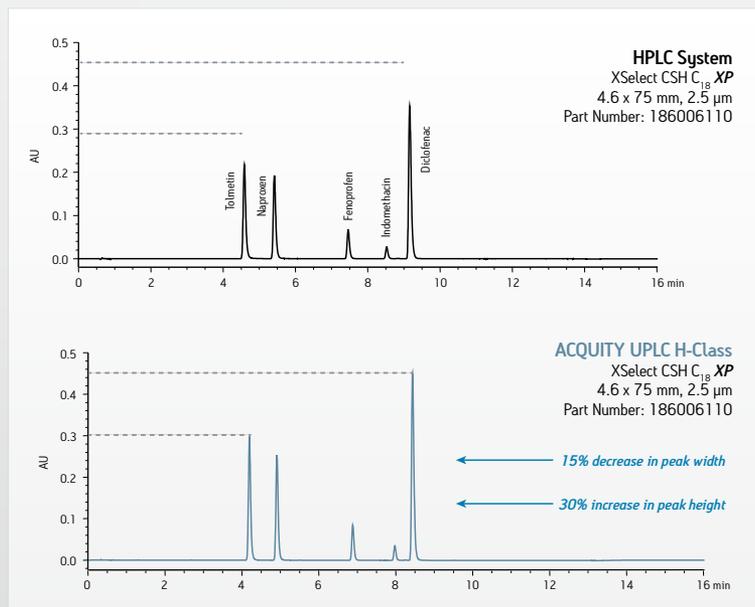


eXtended Performance [XP] 2.5 μ m Columns are compatible with HPLC, UHPLC and UPLC pressures, providing a great deal of flexibility when transferring methods between laboratories.

Future-Proof Your Laboratory with UPLC Technology

Although **XP** 2.5 μ m Columns will provide improvements in productivity on traditional HPLC systems (vs. conventional 3.5 - 5 μ m HPLC columns), a low-dispersion UPLC System is essential to fully maximize the performance of any column technology, even for conventional HPLC separations.

Maximize Column Performance with a Low-Dispersion UPLC System

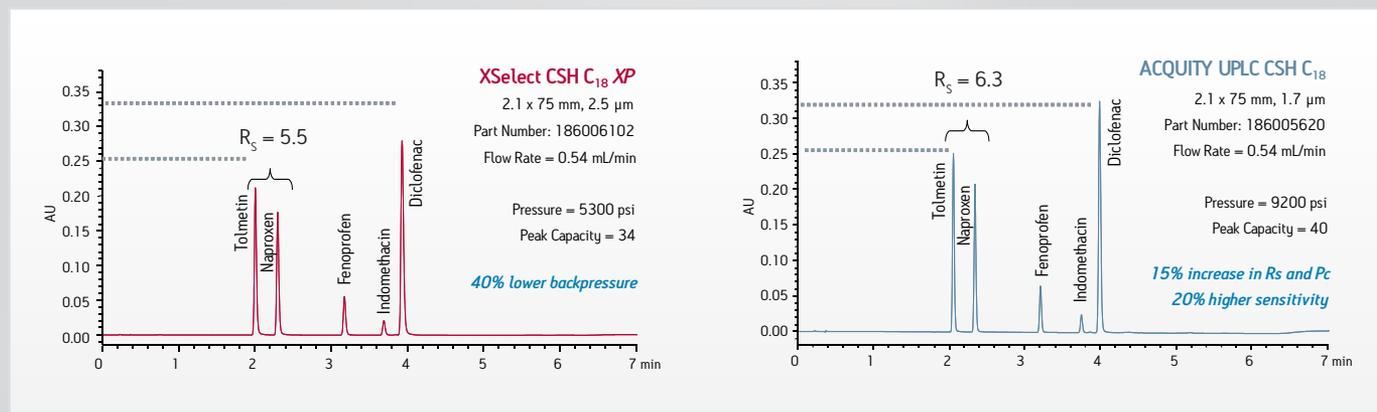


Although this larger-bore 4.6 mm ID **XP** 2.5 μ m Column should be able to overcome the larger system dispersion of this HPLC system, by simply utilizing the same column on a low-dispersion UPLC System, a 15% decrease in peak width and 30% increase in peak height are observed. This clearly demonstrates that although **XP** 2.5 μ m Columns may improve productivity on an HPLC system, ultimately the transition to a low-dispersion UPLC System is beneficial, even for running conventional HPLC analyses.

Additional Flexibility for UPLC Users

XP 2.5 μ m Columns provide an alternative to 1.7 μ m UPLC Columns for use on an ultra-low-dispersion ACQUITY UPLC instrument. With 40% lower backpressure than 1.7 μ m UPLC Columns, **XP** 2.5 μ m Columns can be utilized for fit-for-purpose analyses at intermediate backpressures. Alternatively, flow rate can be increased to further expedite sample throughput for simple chromatography.

40% Lower Backpressure on Your UPLC



eXtended Performance 2.5 μ m Columns are a useful means of reducing backpressure on your low-dispersion UPLC System. For larger dispersion HPLC and UHPLC systems, 4.6 mm ID **XP** Columns can be used at pressures up to 9000 psi. However, if an ultra-low dispersion UPLC System is being used, 2.1 and 3.0 mm ID **XP** Columns are compatible with pressures up to 18,000 psi while producing 40% lower backpressure than 1.7 μ m UPLC Columns. Although compatible with UPLC pressures, these larger 2.5 μ m particle size columns consequently result in slightly reduced resolution, peak capacity and sensitivity compared to 1.7 μ m UPLC Columns.

Ordering Information

XBridge BEH XP 2.5 µm Columns				
Chemistry	Particle Size	Dimension	Part No. 1 Pack	Part No. 3 Pack
XBridge BEH C ₁₈	2.5 µm	2.1 x 30 mm	186006028	176002546
XBridge BEH C ₁₈	2.5 µm	2.1 x 50 mm	186006029	176002547
XBridge BEH C ₁₈	2.5 µm	2.1 x 75 mm	186006030	176002548
XBridge BEH C ₁₈	2.5 µm	2.1 x 100 mm	186006031	176002549
XBridge BEH C ₁₈	2.5 µm	2.1 x 150 mm	186006709	176002879
XBridge BEH C ₁₈	2.5 µm	3.0 x 30 mm	186006032	176002550
XBridge BEH C ₁₈	2.5 µm	3.0 x 50 mm	186006033	176002551
XBridge BEH C ₁₈	2.5 µm	3.0 x 75 mm	186006034	176002552
XBridge BEH C ₁₈	2.5 µm	3.0 x 100 mm	186006035	176002553
XBridge BEH C ₁₈	2.5 µm	3.0 x 150 mm	186006710	176002880
XBridge BEH C ₁₈	2.5 µm	4.6 x 30 mm	186006036	-
XBridge BEH C ₁₈	2.5 µm	4.6 x 50 mm	186006037	-
XBridge BEH C ₁₈	2.5 µm	4.6 x 75 mm	186006038	-
XBridge BEH C ₁₈	2.5 µm	4.6 x 100 mm	186006039	-
XBridge BEH C ₁₈	2.5 µm	4.6 x 150 mm	186006711	-
XBridge BEH Shield RP18	2.5 µm	2.1 x 30 mm	186006052	176002562
XBridge BEH Shield RP18	2.5 µm	2.1 x 50 mm	186006053	176002563
XBridge BEH Shield RP18	2.5 µm	2.1 x 75 mm	186006054	176002564
XBridge BEH Shield RP18	2.5 µm	2.1 x 100 mm	186006055	176002565
XBridge BEH Shield RP18	2.5 µm	2.1 x 150 mm	186006715	176002883
XBridge BEH Shield RP18	2.5 µm	3.0 x 30 mm	186006056	176002566
XBridge BEH Shield RP18	2.5 µm	3.0 x 50 mm	186006057	176002567
XBridge BEH Shield RP18	2.5 µm	3.0 x 75 mm	186006058	176002568
XBridge BEH Shield RP18	2.5 µm	3.0 x 100 mm	186006059	176002569
XBridge BEH Shield RP18	2.5 µm	3.0 x 150 mm	186006716	176002884
XBridge BEH Shield RP18	2.5 µm	4.6 x 30 mm	186006060	-
XBridge BEH Shield RP18	2.5 µm	4.6 x 50 mm	186006061	-
XBridge BEH Shield RP18	2.5 µm	4.6 x 75 mm	186006062	-
XBridge BEH Shield RP18	2.5 µm	4.6 x 100 mm	186006063	-
XBridge BEH Shield RP18	2.5 µm	4.6 x 150 mm	186006717	-
XBridge BEH C ₈	2.5 µm	2.1 x 30 mm	186006040	176002554
XBridge BEH C ₈	2.5 µm	2.1 x 50 mm	186006041	176002555
XBridge BEH C ₈	2.5 µm	2.1 x 75 mm	186006042	176002556
XBridge BEH C ₈	2.5 µm	2.1 x 100 mm	186006043	176002557
XBridge BEH C ₈	2.5 µm	2.1 x 150 mm	186006712	176002881
XBridge BEH C ₈	2.5 µm	3.0 x 30 mm	186006044	176002558
XBridge BEH C ₈	2.5 µm	3.0 x 50 mm	186006045	176002559
XBridge BEH C ₈	2.5 µm	3.0 x 75 mm	186006046	176002560
XBridge BEH C ₈	2.5 µm	3.0 x 100 mm	186006047	176002561
XBridge BEH C ₈	2.5 µm	3.0 x 150 mm	186006713	176002882
XBridge BEH C ₈	2.5 µm	4.6 x 30 mm	186006048	-
XBridge BEH C ₈	2.5 µm	4.6 x 50 mm	186006049	-
XBridge BEH C ₈	2.5 µm	4.6 x 75 mm	186006050	-
XBridge BEH C ₈	2.5 µm	4.6 x 100 mm	186006051	-
XBridge BEH C ₈	2.5 µm	4.6 x 150 mm	186006714	-
XBridge BEH Phenyl	2.5 µm	2.1 x 30 mm	186006064	176002570
XBridge BEH Phenyl	2.5 µm	2.1 x 50 mm	186006065	176002571
XBridge BEH Phenyl	2.5 µm	2.1 x 75 mm	186006066	176002572
XBridge BEH Phenyl	2.5 µm	2.1 x 100 mm	186006067	176002573
XBridge BEH Phenyl	2.5 µm	2.1 x 150 mm	186006718	176002885
XBridge BEH Phenyl	2.5 µm	3.0 x 30 mm	186006068	176002574
XBridge BEH Phenyl	2.5 µm	3.0 x 50 mm	186006069	176002575
XBridge BEH Phenyl	2.5 µm	3.0 x 75 mm	186006070	176002576
XBridge BEH Phenyl	2.5 µm	3.0 x 100 mm	186006071	176002577
XBridge BEH Phenyl	2.5 µm	3.0 x 150 mm	186006719	176002886
XBridge BEH Phenyl	2.5 µm	4.6 x 30 mm	186006072	-
XBridge BEH Phenyl	2.5 µm	4.6 x 50 mm	186006073	-
XBridge BEH Phenyl	2.5 µm	4.6 x 75 mm	186006074	-
XBridge BEH Phenyl	2.5 µm	4.6 x 100 mm	186006075	-
XBridge BEH Phenyl	2.5 µm	4.6 x 150 mm	186006720	-

XBridge BEH XP 2.5 µm Columns				
Chemistry	Particle Size	Dimension	Part No. 1 Pack	Part No. 3 Pack
XBridge BEH HILIC	2.5 µm	2.1 x 30 mm	186006076	176002578
XBridge BEH HILIC	2.5 µm	2.1 x 50 mm	186006077	176002579
XBridge BEH HILIC	2.5 µm	2.1 x 75 mm	186006078	176002580
XBridge BEH HILIC	2.5 µm	2.1 x 100 mm	186006079	176002581
XBridge BEH HILIC	2.5 µm	2.1 x 150 mm	186006721	176002887
XBridge BEH HILIC	2.5 µm	3.0 x 30 mm	186006080	176002582
XBridge BEH HILIC	2.5 µm	3.0 x 50 mm	186006081	176002583
XBridge BEH HILIC	2.5 µm	3.0 x 75 mm	186006082	176002584
XBridge BEH HILIC	2.5 µm	3.0 x 100 mm	186006083	176002585
XBridge BEH HILIC	2.5 µm	3.0 x 150 mm	186006722	176002888
XBridge BEH HILIC	2.5 µm	4.6 x 30 mm	186006084	-
XBridge BEH HILIC	2.5 µm	4.6 x 50 mm	186006085	-
XBridge BEH HILIC	2.5 µm	4.6 x 75 mm	186006086	-
XBridge BEH HILIC	2.5 µm	4.6 x 100 mm	186006087	-
XBridge BEH HILIC	2.5 µm	4.6 x 150 mm	186006723	-
XBridge BEH Amide	2.5 µm	2.1 x 30 mm	186006088	176002586
XBridge BEH Amide	2.5 µm	2.1 x 50 mm	186006089	176002587
XBridge BEH Amide	2.5 µm	2.1 x 75 mm	186006090	176002588
XBridge BEH Amide	2.5 µm	2.1 x 100 mm	186006091	176002589
XBridge BEH Amide	2.5 µm	2.1 x 150 mm	186006724	176002889
XBridge BEH Amide	2.5 µm	3.0 x 30 mm	186006092	176002590
XBridge BEH Amide	2.5 µm	3.0 x 50 mm	186006093	176002591
XBridge BEH Amide	2.5 µm	3.0 x 75 mm	186006094	176002592
XBridge BEH Amide	2.5 µm	3.0 x 100 mm	186006095	176002593
XBridge BEH Amide	2.5 µm	3.0 x 150 mm	186006725	176002890
XBridge BEH Amide	2.5 µm	4.6 x 30 mm	186006096	-
XBridge BEH Amide	2.5 µm	4.6 x 50 mm	186006097	-
XBridge BEH Amide	2.5 µm	4.6 x 75 mm	186006098	-
XBridge BEH Amide	2.5 µm	4.6 x 100 mm	186006099	-
XBridge BEH Amide	2.5 µm	4.6 x 150 mm	186006726	-

XSelect CSH XP 2.5 µm Columns				
Chemistry	Particle Size	Dimension	Part No. 1 Pack	Part No. 3 Pack
XSelect CSH C ₁₈	2.5 µm	2.1 x 30 mm	186006100	176002594
XSelect CSH C ₁₈	2.5 µm	2.1 x 50 mm	186006101	176002595
XSelect CSH C ₁₈	2.5 µm	2.1 x 75 mm	186006102	176002596
XSelect CSH C ₁₈	2.5 µm	2.1 x 100 mm	186006103	176002597
XSelect CSH C ₁₈	2.5 µm	2.1 x 150 mm	186006727	176002891
XSelect CSH C ₁₈	2.5 µm	3.0 x 30 mm	186006104	176002598
XSelect CSH C ₁₈	2.5 µm	3.0 x 50 mm	186006105	176002599
XSelect CSH C ₁₈	2.5 µm	3.0 x 75 mm	186006106	176002600
XSelect CSH C ₁₈	2.5 µm	3.0 x 100 mm	186006107	176002601
XSelect CSH C ₁₈	2.5 µm	3.0 x 150 mm	186006728	176002892
XSelect CSH C ₁₈	2.5 µm	4.6 x 30 mm	186006108	-
XSelect CSH C ₁₈	2.5 µm	4.6 x 50 mm	186006109	-
XSelect CSH C ₁₈	2.5 µm	4.6 x 75 mm	186006110	-
XSelect CSH C ₁₈	2.5 µm	4.6 x 100 mm	186006111	-
XSelect CSH C ₁₈	2.5 µm	4.6 x 150 mm	186006729	-
XSelect CSH Fluoro-Phenyl	2.5 µm	2.1 x 30 mm	186006112	176002602
XSelect CSH Fluoro-Phenyl	2.5 µm	2.1 x 50 mm	186006113	176002603
XSelect CSH Fluoro-Phenyl	2.5 µm	2.1 x 75 mm	186006114	176002604
XSelect CSH Fluoro-Phenyl	2.5 µm	2.1 x 100 mm	186006115	176002605
XSelect CSH Fluoro-Phenyl	2.5 µm	2.1 x 150 mm	186006730	176002893
XSelect CSH Fluoro-Phenyl	2.5 µm	3.0 x 30 mm	186006116	176002606
XSelect CSH Fluoro-Phenyl	2.5 µm	3.0 x 50 mm	186006117	176002607
XSelect CSH Fluoro-Phenyl	2.5 µm	3.0 x 75 mm	186006118	176002608
XSelect CSH Fluoro-Phenyl	2.5 µm	3.0 x 100 mm	186006119	176002609
XSelect CSH Fluoro-Phenyl	2.5 µm	3.0 x 150 mm	186006731	176002894

XSelect CSH XP 2.5 µm Columns

Chemistry	Particle Size	Dimension	Part No. 1 Pack	Part No. 3 Pack
XSelect CSH Fluoro-Phenyl	2.5 µm	4.6 x 30 mm	186006120	-
XSelect CSH Fluoro-Phenyl	2.5 µm	4.6 x 50 mm	186006121	-
XSelect CSH Fluoro-Phenyl	2.5 µm	4.6 x 75 mm	186006122	-
XSelect CSH Fluoro-Phenyl	2.5 µm	4.6 x 100 mm	186006123	-
XSelect CSH Fluoro-Phenyl	2.5 µm	4.6 x 150 mm	186006732	-
XSelect CSH Phenyl-Hexyl	2.5 µm	2.1 x 30 mm	186006124	176002610
XSelect CSH Phenyl-Hexyl	2.5 µm	2.1 x 50 mm	186006125	176002611
XSelect CSH Phenyl-Hexyl	2.5 µm	2.1 x 75 mm	186006126	176002612
XSelect CSH Phenyl-Hexyl	2.5 µm	2.1 x 100 mm	186006127	176002613
XSelect CSH Phenyl-Hexyl	2.5 µm	2.1 x 150 mm	186006733	176002895
XSelect CSH Phenyl-Hexyl	2.5 µm	3.0 x 30 mm	186006128	176002614
XSelect CSH Phenyl-Hexyl	2.5 µm	3.0 x 50 mm	186006129	176002615
XSelect CSH Phenyl-Hexyl	2.5 µm	3.0 x 75 mm	186006130	176002616
XSelect CSH Phenyl-Hexyl	2.5 µm	3.0 x 100 mm	186006131	176002617
XSelect CSH Phenyl-Hexyl	2.5 µm	3.0 x 150 mm	186006734	176002896
XSelect CSH Phenyl-Hexyl	2.5 µm	4.6 x 30 mm	186006132	-
XSelect CSH Phenyl-Hexyl	2.5 µm	4.6 x 50 mm	186006133	-
XSelect CSH Phenyl-Hexyl	2.5 µm	4.6 x 75 mm	186006134	-
XSelect CSH Phenyl-Hexyl	2.5 µm	4.6 x 100 mm	186006135	-
XSelect CSH Phenyl-Hexyl	2.5 µm	4.6 x 150 mm	186006735	-

XSelect HSS XP 2.5 µm Columns

Chemistry	Particle Size	Dimension	Part No. 1 Pack	Part No. 3 Pack
XSelect HSS T3	2.5 µm	2.1 x 30 mm	186006148	176002626
XSelect HSS T3	2.5 µm	2.1 x 50 mm	186006149	176002627
XSelect HSS T3	2.5 µm	2.1 x 75 mm	186006150	176002628
XSelect HSS T3	2.5 µm	2.1 x 100 mm	186006151	176002629
XSelect HSS T3	2.5 µm	2.1 x 150 mm	186006739	176002899
XSelect HSS T3	2.5 µm	3.0 x 30 mm	186006152	176002630
XSelect HSS T3	2.5 µm	3.0 x 50 mm	186006153	176002631
XSelect HSS T3	2.5 µm	3.0 x 75 mm	186006154	176002632
XSelect HSS T3	2.5 µm	3.0 x 100 mm	186006155	176002633
XSelect HSS T3	2.5 µm	3.0 x 150 mm	186006740	176002900
XSelect HSS T3	2.5 µm	4.6 x 30 mm	186006156	-
XSelect HSS T3	2.5 µm	4.6 x 50 mm	186006157	-
XSelect HSS T3	2.5 µm	4.6 x 75 mm	186006158	-
XSelect HSS T3	2.5 µm	4.6 x 100 mm	186006159	-
XSelect HSS T3	2.5 µm	4.6 x 150 mm	186006741	-
XSelect HSS C ₁₈	2.5 µm	2.1 x 30 mm	186006136	176002618
XSelect HSS C ₁₈	2.5 µm	2.1 x 50 mm	186006137	176002619
XSelect HSS C ₁₈	2.5 µm	2.1 x 75 mm	186006138	176002620
XSelect HSS C ₁₈	2.5 µm	2.1 x 100 mm	186006139	176002621
XSelect HSS C ₁₈	2.5 µm	2.1 x 150 mm	186006736	176002897
XSelect HSS C ₁₈	2.5 µm	3.0 x 30 mm	186006140	176002622
XSelect HSS C ₁₈	2.5 µm	3.0 x 50 mm	186006141	176002623
XSelect HSS C ₁₈	2.5 µm	3.0 x 75 mm	186006142	176002624
XSelect HSS C ₁₈	2.5 µm	3.0 x 100 mm	186006143	176002625
XSelect HSS C ₁₈	2.5 µm	3.0 x 150 mm	186006737	176002898
XSelect HSS C ₁₈	2.5 µm	4.6 x 30 mm	186006144	-
XSelect HSS C ₁₈	2.5 µm	4.6 x 50 mm	186006145	-
XSelect HSS C ₁₈	2.5 µm	4.6 x 75 mm	186006146	-
XSelect HSS C ₁₈	2.5 µm	4.6 x 100 mm	186006147	-
XSelect HSS C ₁₈	2.5 µm	4.6 x 150 mm	186006738	-
XSelect HSS C ₁₈ SB	2.5 µm	2.1 x 30 mm	186006160	176002634
XSelect HSS C ₁₈ SB	2.5 µm	2.1 x 50 mm	186006161	176002635
XSelect HSS C ₁₈ SB	2.5 µm	2.1 x 75 mm	186006162	176002636
XSelect HSS C ₁₈ SB	2.5 µm	2.1 x 100 mm	186006163	176002637
XSelect HSS C ₁₈ SB	2.5 µm	2.1 x 150 mm	186006742	176002901
XSelect HSS C ₁₈ SB	2.5 µm	3.0 x 30 mm	186006164	176002638
XSelect HSS C ₁₈ SB	2.5 µm	3.0 x 50 mm	186006165	176002639
XSelect HSS C ₁₈ SB	2.5 µm	3.0 x 75 mm	186006166	176002640
XSelect HSS C ₁₈ SB	2.5 µm	3.0 x 100 mm	186006167	176002641
XSelect HSS C ₁₈ SB	2.5 µm	3.0 x 150 mm	186006743	176002902

XSelect HSS XP 2.5 µm Columns

Chemistry	Particle Size	Dimension	Part No. 1 Pack	Part No. 3 Pack
XSelect HSS C ₁₈ SB	2.5 µm	4.6 x 30 mm	186006168	-
XSelect HSS C ₁₈ SB	2.5 µm	4.6 x 50 mm	186006169	-
XSelect HSS C ₁₈ SB	2.5 µm	4.6 x 75 mm	186006170	-
XSelect HSS C ₁₈ SB	2.5 µm	4.6 x 100 mm	186006171	-
XSelect HSS C ₁₈ SB	2.5 µm	4.6 x 150 mm	186006744	-
XSelect HSS Cyano	2.5 µm	2.1 x 30 mm	186006184	176002650
XSelect HSS Cyano	2.5 µm	2.1 x 50 mm	186006185	176002651
XSelect HSS Cyano	2.5 µm	2.1 x 75 mm	186006186	176002652
XSelect HSS Cyano	2.5 µm	2.1 x 100 mm	186006187	176002653
XSelect HSS Cyano	2.5 µm	2.1 x 150 mm	186006748	176002905
XSelect HSS Cyano	2.5 µm	3.0 x 30 mm	186006188	176002654
XSelect HSS Cyano	2.5 µm	3.0 x 50 mm	186006189	176002655
XSelect HSS Cyano	2.5 µm	3.0 x 75 mm	186006190	176002656
XSelect HSS Cyano	2.5 µm	3.0 x 100 mm	186006191	176002657
XSelect HSS Cyano	2.5 µm	3.0 x 150 mm	186006749	176002906
XSelect HSS Cyano	2.5 µm	4.6 x 30 mm	186006192	-
XSelect HSS Cyano	2.5 µm	4.6 x 50 mm	186006193	-
XSelect HSS Cyano	2.5 µm	4.6 x 75 mm	186006194	-
XSelect HSS Cyano	2.5 µm	4.6 x 100 mm	186006195	-
XSelect HSS Cyano	2.5 µm	4.6 x 150 mm	186006750	-
XSelect HSS PFP	2.5 µm	2.1 x 30 mm	186006172	176002642
XSelect HSS PFP	2.5 µm	2.1 x 50 mm	186006173	176002643
XSelect HSS PFP	2.5 µm	2.1 x 75 mm	186006174	176002644
XSelect HSS PFP	2.5 µm	2.1 x 100 mm	186006175	176002645
XSelect HSS PFP	2.5 µm	2.1 x 150 mm	186006745	176002903
XSelect HSS PFP	2.5 µm	3.0 x 30 mm	186006176	176002646
XSelect HSS PFP	2.5 µm	3.0 x 50 mm	186006177	176002647
XSelect HSS PFP	2.5 µm	3.0 x 75 mm	186006178	176002648
XSelect HSS PFP	2.5 µm	3.0 x 100 mm	186006179	176002649
XSelect HSS PFP	2.5 µm	3.0 x 150 mm	186006746	176002904
XSelect HSS PFP	2.5 µm	4.6 x 30 mm	186006180	-
XSelect HSS PFP	2.5 µm	4.6 x 50 mm	186006181	-
XSelect HSS PFP	2.5 µm	4.6 x 75 mm	186006182	-
XSelect HSS PFP	2.5 µm	4.6 x 100 mm	186006183	-
XSelect HSS PFP	2.5 µm	4.6 x 150 mm	186006747	-

VanGuard™ Pre-Column 3 Pack (Guard Columns)

Chemistry	Particle Size	Dimension	Part No. 3 Pack
XBridge BEH C ₁₈	2.5 µm	2.1 x 5 mm	186006291
XBridge BEH Shield RP18	2.5 µm	2.1 x 5 mm	186006293
XBridge BEH C ₈	2.5 µm	2.1 x 5 mm	186006292
XBridge BEH Phenyl	2.5 µm	2.1 x 5 mm	186006294
XBridge BEH HILIC	2.5 µm	2.1 x 5 mm	186006295
XBridge BEH Amide	2.5 µm	2.1 x 5 mm	186006296
XSelect CSH C ₁₈	2.5 µm	2.1 x 5 mm	186006297
XSelect CSH Fluoro-Phenyl	2.5 µm	2.1 x 5 mm	186006298
XSelect CSH Phenyl-Hexyl	2.5 µm	2.1 x 5 mm	186006299
XSelect HSS T3	2.5 µm	2.1 x 5 mm	186006301
XSelect HSS C ₁₈	2.5 µm	2.1 x 5 mm	186006300
XSelect HSS C ₁₈ SB	2.5 µm	2.1 x 5 mm	186006302
XSelect HSS Cyano	2.5 µm	2.1 x 5 mm	186006304
XSelect HSS PFP	2.5 µm	2.1 x 5 mm	186006303

XBridge Columns Method Validation Kits [MVK]*

Chemistry	Particle Size	Column Length	Part No. 2.1 mm ID	Part No. 3.0 mm ID	Part No. 4.6 mm ID
XBridge BEH C ₁₈	2.5 µm	50 mm	186006197	186006199	186006201
XBridge BEH C ₁₈	2.5 µm	100 mm	186006198	186006200	186006202
XBridge BEH C ₁₈	2.5 µm	150 mm	186006757	186006758	186006759
XBridge BEH Shield RP18	2.5 µm	50 mm	186006209	186006211	186006213
XBridge BEH Shield RP18	2.5 µm	100 mm	186006210	186006212	186006214
XBridge BEH Shield RP18	2.5 µm	150 mm	186006763	186006774	186006775
XBridge BEH C ₈	2.5 µm	50 mm	186006203	186006205	186006207
XBridge BEH C ₈	2.5 µm	100 mm	186006204	186006206	186006208
XBridge BEH C ₈	2.5 µm	150 mm	186006760	186006761	186006762
XBridge BEH Phenyl	2.5 µm	50 mm	186006215	186006217	186006219
XBridge BEH Phenyl	2.5 µm	100 mm	186006216	186006218	186006220
XBridge BEH Phenyl	2.5 µm	150 mm	186006776	186006777	186006778
XBridge BEH HILIC	2.5 µm	50 mm	186006221	186006223	186006225
XBridge BEH HILIC	2.5 µm	100 mm	186006222	186006224	186006226
XBridge BEH HILIC	2.5 µm	150 mm	186006779	186006780	186006781
XBridge BEH Amide	2.5 µm	50 mm	186006227	186006229	186006231
XBridge BEH Amide	2.5 µm	100 mm	186006228	186006230	186006232
XBridge BEH Amide	2.5 µm	150 mm	186006782	186006783	186006784

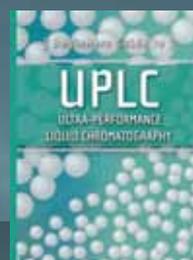
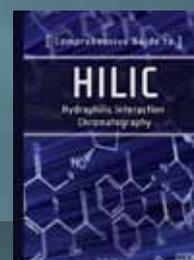
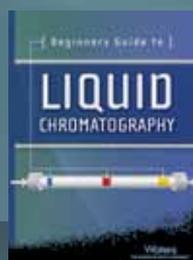
XSelect Columns Method Validation Kits [MVK]*

Chemistry	Particle Size	Column Length	Part No. 2.1 mm ID	Part No. 3.0 mm ID	Part No. 4.6 mm ID
XSelect CSH C ₁₈	2.5 µm	50 mm	186006233	186006235	186006237
XSelect CSH C ₁₈	2.5 µm	100 mm	186006234	186006236	186006238
XSelect CSH C ₁₈	2.5 µm	150 mm	186006785	186006786	186006787
XSelect CSH Fluoro-Phenyl	2.5 µm	50 mm	186006239	186006241	186006243
XSelect CSH Fluoro-Phenyl	2.5 µm	100 mm	186006240	186006242	186006244
XSelect CSH Fluoro-Phenyl	2.5 µm	150 mm	186006788	186006789	186006790
XSelect CSH Phenyl-Hexyl	2.5 µm	50 mm	186006245	186006247	186006249
XSelect CSH Phenyl-Hexyl	2.5 µm	100 mm	186006246	186006248	186006250
XSelect CSH Phenyl-Hexyl	2.5 µm	150 mm	186006791	186006792	186006793
XSelect HSS T3	2.5 µm	50 mm	186006257	186006259	186006261
XSelect HSS T3	2.5 µm	100 mm	186006258	186006260	186006262
XSelect HSS T3	2.5 µm	150 mm	186006797	186006798	186006799
XSelect HSS C ₁₈	2.5 µm	50 mm	186006251	186006253	186006255
XSelect HSS C ₁₈	2.5 µm	100 mm	186006252	186006254	186006256
XSelect HSS C ₁₈	2.5 µm	150 mm	186006794	186006795	186006796
XSelect HSS C ₁₈ SB	2.5 µm	50 mm	186006263	186006265	186006267
XSelect HSS C ₁₈ SB	2.5 µm	100 mm	186006264	186006266	186006268
XSelect HSS C ₁₈ SB	2.5 µm	150 mm	186006800	186006801	186006802
XSelect HSS Cyano	2.5 µm	50 mm	186006275	186006277	186006279
XSelect HSS Cyano	2.5 µm	100 mm	186006276	186006278	186006280
XSelect HSS Cyano	2.5 µm	150 mm	186006806	186006807	186006808
XSelect HSS PFP	2.5 µm	50 mm	186006815	186006817	186006273
XSelect HSS PFP	2.5 µm	100 mm	186006816	186006818	186006274
XSelect HSS PFP	2.5 µm	150 mm	186006803	186006804	186006805

*Each kit contains 3 columns from 3 different batches of material.

LITERATURE REFERENCES

Description	Part Number
Analytical Columns Wall Chart	720002241EN
A Review of Waters Hybrid Particle Technology. Part 2. Ethylene-Bridged (BEH Technology) Hybrids and Their Use in Liquid Chromatography White Paper	720001159EN
A Review of Waters Hybrid Particle Technology. Part 3. Charged Surface Hybrid (CSH) Technology and Its Use in Liquid Chromatography	720003929EN
ACQUITY UPLC Columns Brochure	720001140EN
Beginner's Guide to Liquid Chromatography	715001531
Beginner's Guide to Ultra-Performance Liquid Chromatography (UPLC)	715002099
Comprehensive Guide to HILIC	715002531
Optimum Bed Density (OBD) Columns: Enabling Technology for Laboratory-Scale Isolation and Purification White Paper	720001939EN
Preparative OBD Columns Wall Chart	720002117EN
Preparative Optimum Bed Density (OBD) Columns Brochure	720002336EN
XBridge Columns Brochure	720001255EN
XSelect Columns Brochure	720004178EN



Electronic Tools



Waters Reversed-Phase Column Selectivity Chart

www.waters.com/selectivitychart



Waters Column Advisor

www.waters.com/columnadvisor



Waters Part Selector & Selectivity Chart for iPad®

www.waters.com/apps

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