

Waters™

Increase speed, sensitivity, and resolution with UPLC Column technology

PRODUCT BROCHURE

Speed.
Sensitivity.
Resolution.

And still setting the standard.



Since its introduction in 2004, each addition to the **ACQUITY™ UPLC™** Performance LC System and Column family has continuously pushed science forward to enable faster, higher quality data to support the work that you do.



SPEED



SENSITIVITY



RESOLUTION

WHAT DOES OVER 20 YEARS OF IMPACT LOOK LIKE?

~300
million hours of runtime saved[1]

~27
million liters of mobile phase saved[2]

23
selectivities available

25k+
publications and growing[3]

All stats based on 1000 injections/column
[1] Based on a 30-minute HPLC run vs. 10-minute UPLC run
[2] HPLC 1.0 mL/min vs. UPLC 0.3 mL/min
[3] Scopus search for ACQUITY or UPLC, Dec 2023

Column Stationary Phase Options

UPLC IS ALL ABOUT PERFORMANCE

The **ACQUITY UPLC Performance LC** family has changed the industry's expectations for runtime, resolution, peak shape, and peak capacity.

Acquity H-Class PLUS UPLC™
Flexibility of quaternary or binary solvent blending for routine UHPLC/UPLC analysis

Acquity I-Class PLUS UPLC™
Highly efficient, rapid separations from ultra-low dispersion and delay volume

Acquity M-Class UPLC™
Performance you expect from nano-to microscale separations.

Acquity PREMIER
Minimize metal-sensitive analyte loss and improve recovery

Performance Matters

UltraPerformance Liquid Chromatography (UPLC™) combines the advances made in both instrumentation and column technology that enables you, the analytical scientist, to achieve dramatic increases in resolution, speed, and sensitivity. This holistic approach, which involves simultaneous innovations in both particle technology and instrument design, allows you to meet and overcome the challenges in your analytical laboratory in order to make you more successful and productive.

HSS
HIGH STRENGTH SILICA

CORTECS™
COLUMNS

BEH Technology™

CSH™ Technology

MAXPEAK™
PREMIER



Small Molecule Separations

BEH™ C_{18}
BEH C_8
BEH Shield RP18
BEH Phenyl
BEH Biphenyl
BEH HILIC
BEH Amide

HSS™ T3
HSS C_{18}
HSS C_{18} SB
HSS PFP
HSS Cyano
CSH™ C_{18}
CSH Fluoro-Phenyl
CSH Phenyl-Hexyl

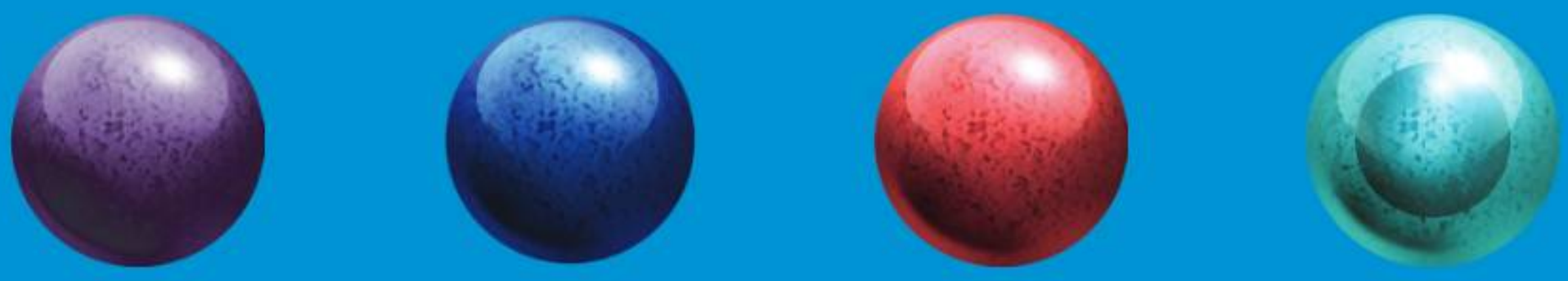
CORTECS™ C_{18}+
CORTECS C_{18}
CORTECS T3
CORTECS Shield RP18
CORTECS C_8
CORTECS Phenyl
CORTECS HILIC

MaxPeak Premier Columns:

ACQUITY Premier BEH C_{18}
ACQUITY Premier BEH Shield RP18
ACQUITY Premier BEH C_8
ACQUITY Premier BEH Phenyl
ACQUITY Premier BEH Amide
ACQUITY Premier BEH HILIC
ACQUITY Premier CSH C_{18}
ACQUITY Premier CSH Phenyl-Hexyl
ACQUITY Biphenyl RP

ACQUITY Premier HSS T3
ACQUITY Premier HSS C_{18}
ACQUITY Premier HSS PFP
CORTECS Premier C_{18}
CORTECS Premier C_{18}+
CORTECS Premier T3
Atlantis Premier BEH C_{18} AX
Atlantis Premier BEH Z-HILIC

*For information on our Bioseparations line of columns, please see Waters Biomolecule Purification, Characterization, and Analyses Catalog 720002148EN.



Bridged Ethylene Hybrid (BEH)

Hybrid Particle Gives Stability at:

- **pH range of 1–12**
- Increased Temperatures
- In harsher Mobile Phase

AND

- Less secondary interactions

1.7 [UPLC], 2.5 XP, 2.5, 5 and 10 µm

High Strength Silica (HSS)

Pure Silica Particle Gives:

- Secondary interactions with Silica Surface
- **Best Retention of Polar Analytes (T3)**

1.8 [UPLC], 2.5 XP, 3.5 and 5 µm

Charged Surface Hybrid (CSH)

Charged Hybrid Particle:

- Highest loading capacity
- Best basic peak shape
- **Ideal for LC/MS**
- Rapidly equilibrates high/low pH

1.7 [UPLC], 2.5 XP, 3.5, 5 and 10 µm

Solid-Core coated with porous Silica

Solid-Core Particle:

- Has highest efficiency
- Lower backpressure
- High peak capacity
- **Ideal UHPLC Column**
- Lower load-ability

1.6 [UPLC] and 2.7 µm

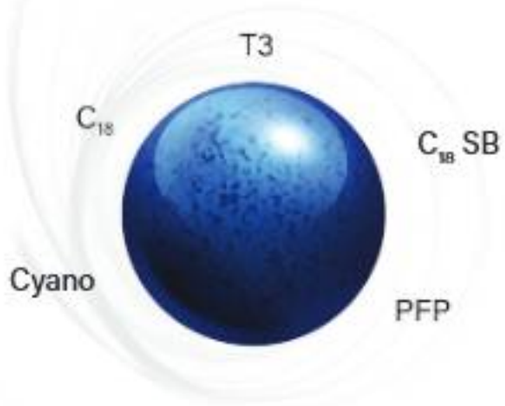
UPLC Particle Technologies

When choosing a UPLC column for your application, understanding the attributes of the base particle will help narrow down your column selection choices. Waters offers four premium sub-2 µm particle technologies that provide their own unique chromatographic benefits. Whether you are looking for superior pH stability, maximum retentivity, improved peak shape, or ultimate efficiency, there is a UPLC particle technology engineered to suit your needs. Combining these unique base particles with a wide range of bonded phases maximizes selectivity choices which is crucial for fast, efficient method development. No matter what your separation challenge, there is a UPLC column that is fit-for-purpose in your laboratory.



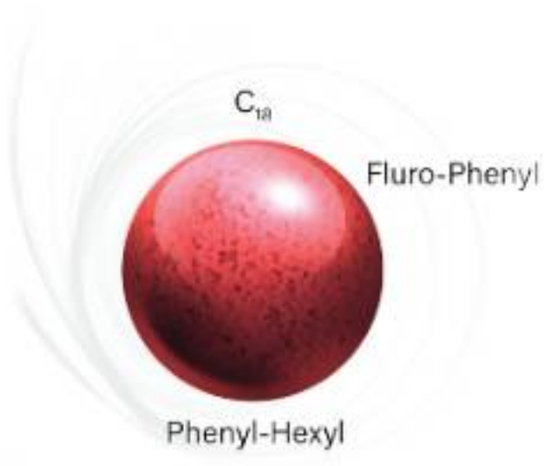
BEH Technology

- 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



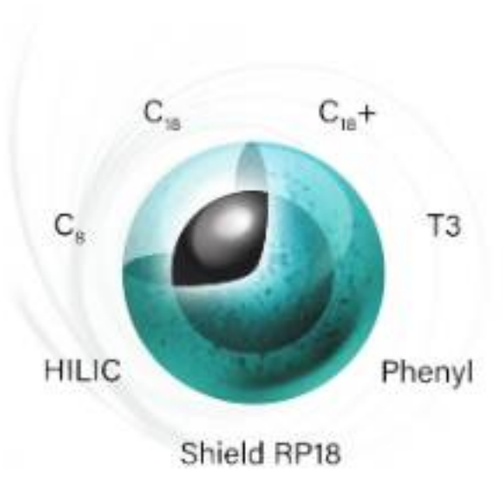
HSS Technology

- Increased retentivity over hybrid materials
- Widest selectivity space with C_{18}, T3, C_{18} SB, Cyano, and PFP chemistries
- High strength silica (HSS) for mechanical stability



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



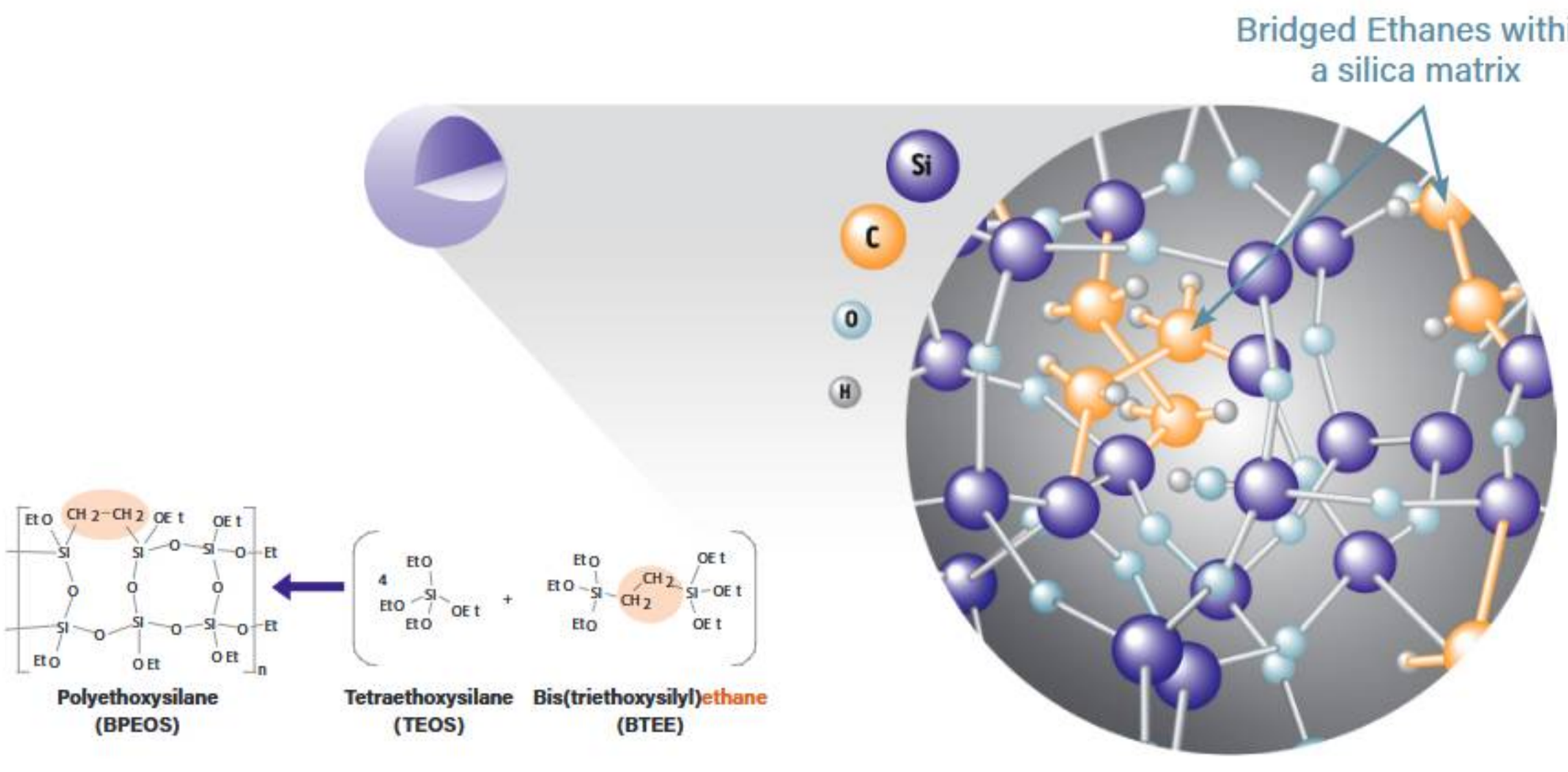
CORTECS Solid-Core Technology

- Maximum efficiency
- Increased sample throughput*
- Lower column backpressure*

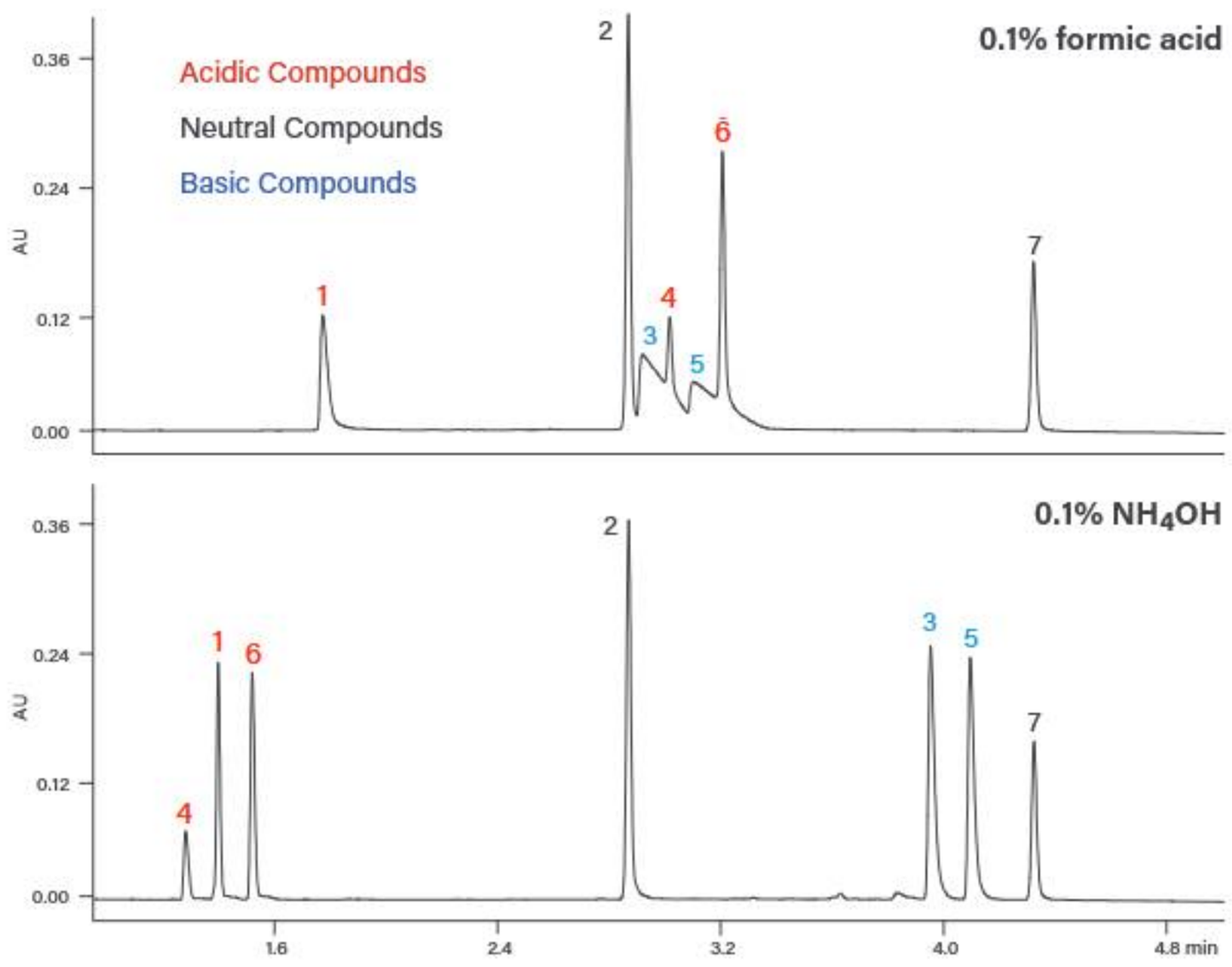
** compared to fully porous particles of equivalent size*

Ethylene Bridged Hybrid (BEH) Particle Technology

ACQUITY UPLC BEH 1.7 µm fully porous columns provide superior analyte peak shape, efficiency, and chemical stability to any separation. ACQUITY UPLC BEH Columns are available in both reversed-phase and HILIC separation modes, with chemistries that provide selectivities for a wide range of compounds. With the ruggedness to operate at extreme pH conditions, ACQUITY UPLC BEH Columns enable the separation scientist to use a wide pH range to influence retention, selectivity, and sensitivity for ionizable compounds.



* US Patents 6,686,035; 7,223,473; 7,250,214



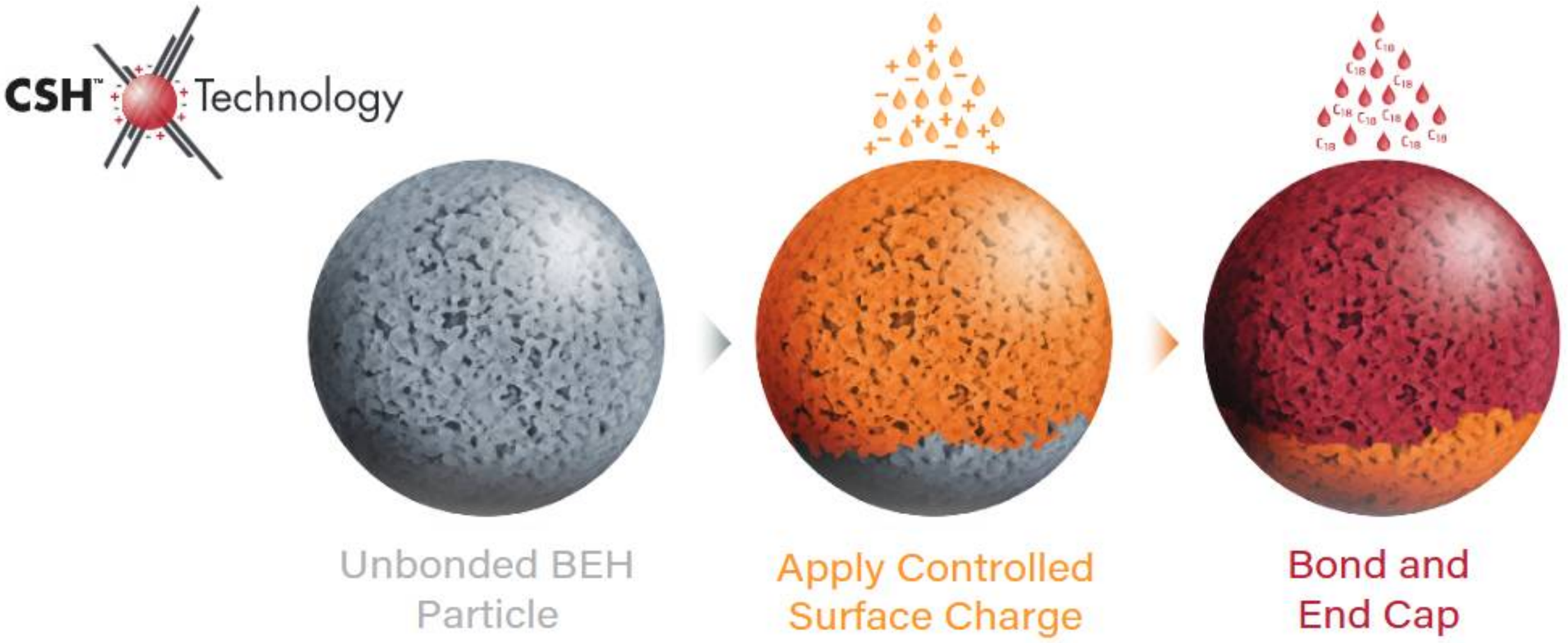
Mobile phase pH is a powerful tool in manipulating separations as well as improving peak shape. At low pH, acidic compounds (red) are more retained, and at high pH, basic compounds (blue) are more retained. Neutral compounds (black) are unaffected by changes in pH. Also notice at high pH, the peak shape for the basic analytes is significantly improved.

ACQUITY UPLC BEH (Ethylene-Bridged Hybrid) Columns are known industry-wide as the standard for rugged and repeatable LC column performance. ACQUITY UPLC BEH Columns offer pH stability that is higher than any other commercially available chromatographic phase. Unlike traditional columns that claim pH resistance, ACQUITY UPLC BEH Columns can be used at the extremes of mobile phase pH (1–12) to enhance retention and specificity for complex samples that include mixtures of acidic, basic, and neutral analytes.

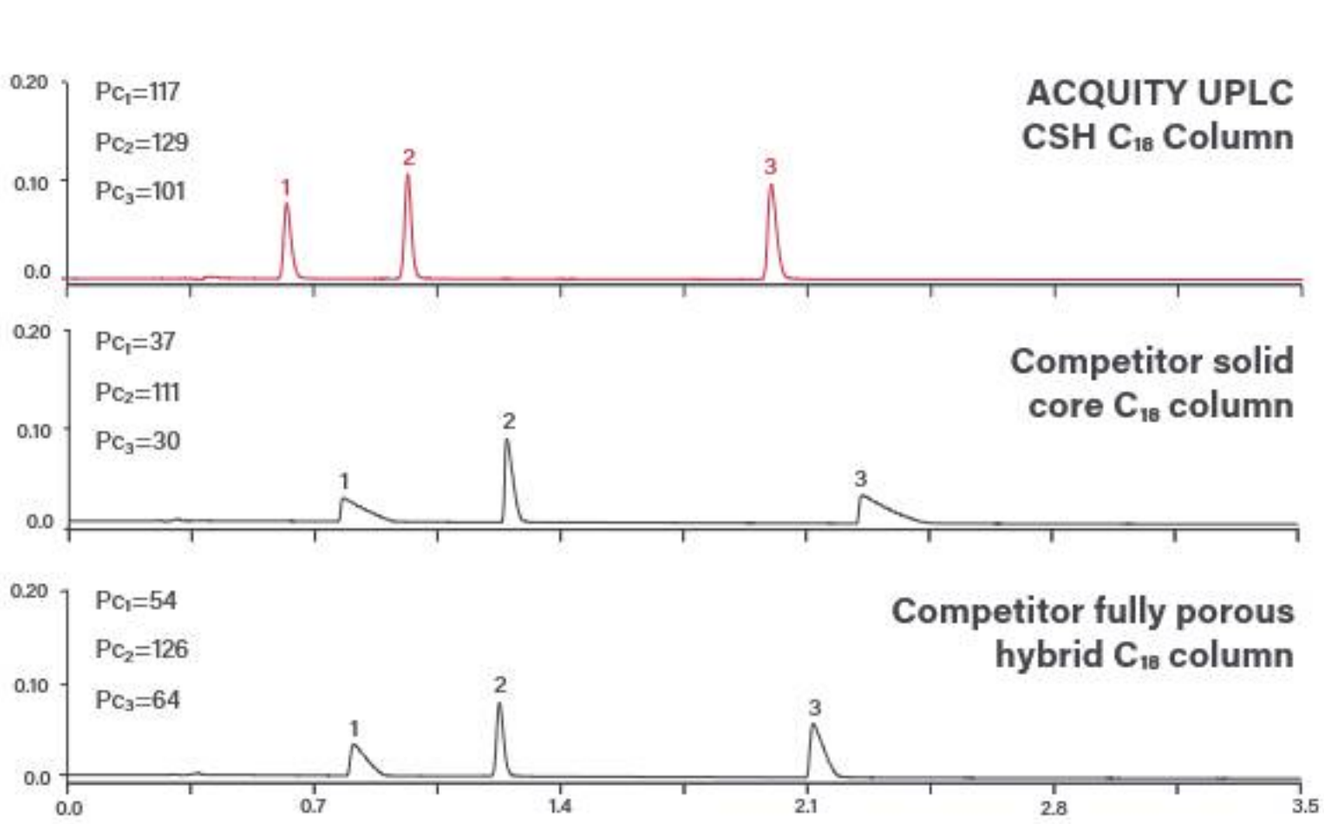
BEH Technology™

Charged Surface Hybrid (CSH) Particle Technology

ACQUITY UPLC CSH™ 1.7 µm fully porous columns provide superior peak shape for basic analytes when using low ionic strength acidic mobile phases (e.g. 0.1% formic acid). With CSH Technology, the controlled low-level positive surface charge provides exceptional peak shape for basic analytes which can be achieved without the use of ion pairing reagents. Typically reversed-phase bonded phases have poor peak shape for basic compounds in formic acid even at analytical mass loads. Built on the rugged Ethylene Bridged Hybrid (BEH) particle, ACQUITY UPLC CSH phases can withstand the toughest operating conditions.



CSH Technology is the next evolution of Hybrid particle technology. CSH Technology dramatically improves virtually all facets of LC column performance in acidic, low ionic strength mobile phases that are commonly used in the chromatographic laboratory. For further details please refer to white paper "Charged Surface Hybrid (CSH) Technology and Its Use in Liquid Chromatography" (720003929EN).



Comparison of peak shape and peak capacity (Pc) for bases on three 2.1 x 50 mm C_{18} columns. Gradient: A: 0.1% formic acid in water; B: acetonitrile; 15–65% B linear in 4.6 minutes. Temperature: 30 °C. Flow rate: 0.4 mL/min. Sample: 2 µL injection. Detection: 260 nm. Analytes: 1) metoprolol tartrate (200 ng/µL), 2) papaverine (10 ng/µL), 3) amitriptyline (50 ng/µL). System: ACQUITY UPLC.

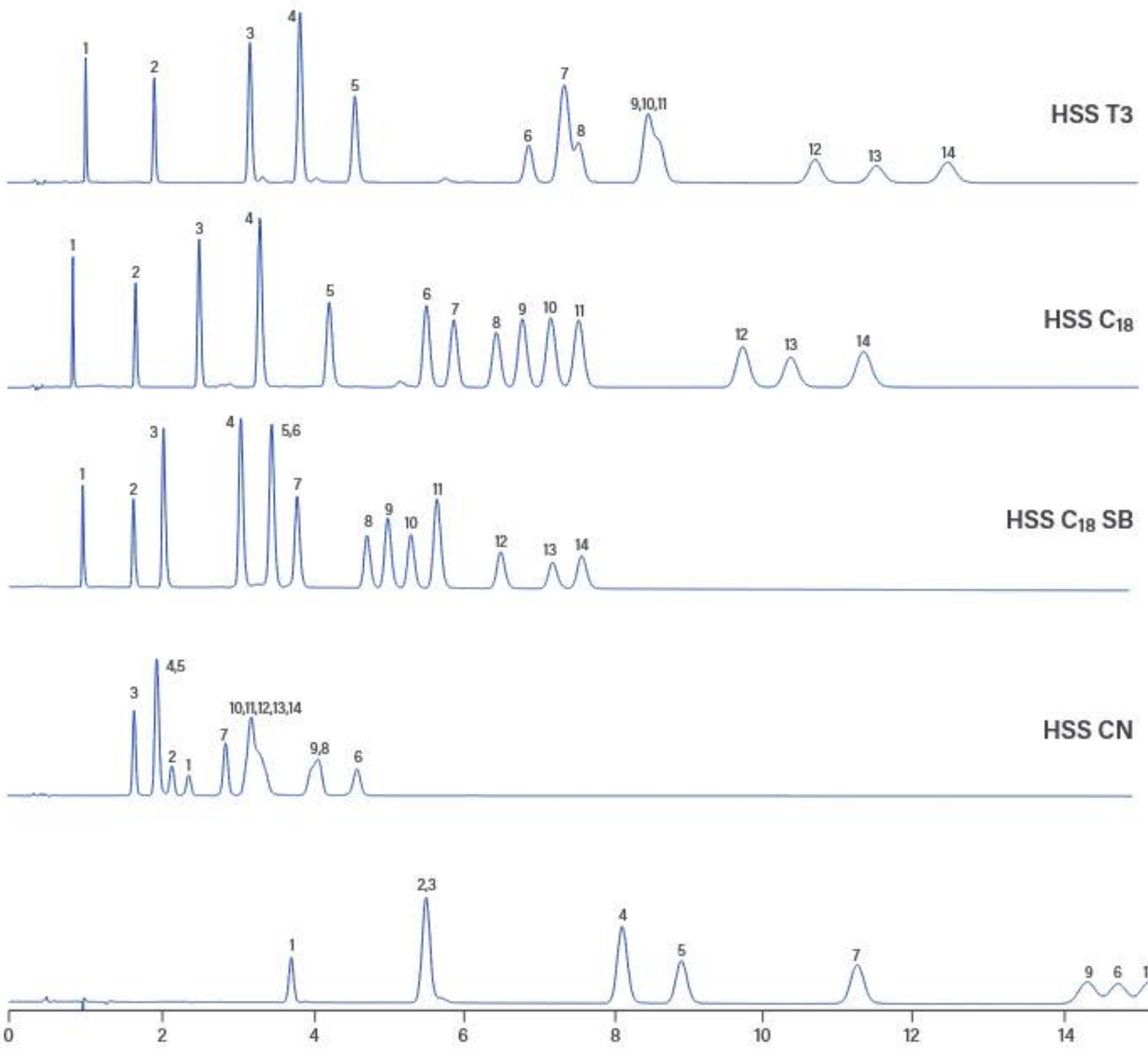
High Strength Silica (HSS) Particle Technology

ACQUITY UPLC HSS 1.8 µm fully porous columns provide expected silica particle-like performance to the UPLC family. The HSS particles' high surface area, and lower pore volume provide increased retentivity over the hybrid particles. This robust particle technology is available in five uniquely different bonded phases, which truly maximize the selectivity space. The wide array of bonded phases associated with ACQUITY UPLC HSS Columns enable traditional hydrophobic reversed-phase interactions along with dipole-dipole interactions, aromatic interactions, and hydrogen bonding interactions.

Columns:	2.1 x 100 mm
Mobile phase:	72% water/28% methanol (v/v)
Flow rate:	0.5 mL/min
Injection vol.:	5.0 µL
Sample conc.:	10 µg/mL
Temperature:	50 °C
Detection:	UV @ 254 nm
Sampling rate:	20 pts/sec
Time constant:	0.1 min
Instrument:	ACQUITY UPLC with PDA Detector

Compounds [EPA 8330 Standard Mixture):

1. HMX
2. RDX
3. 1,3,5-Trinitrobenzene
4. 1,3-Dinitrobenzene
5. Nitrobenzene
6. Tetryl
7. 2,4,6-Trinitrotoluene
8. 2-Amino-4,6-Dinitrotoluene
9. 4-Amino-2,6-Dinitrotoluene
10. 2,4-Dinitrotoluene
11. 2,6-Dinitrotoluene
12. 2-Nitrotoluene
13. 4-Nitrotoluene
14. 3-Nitrotoluene

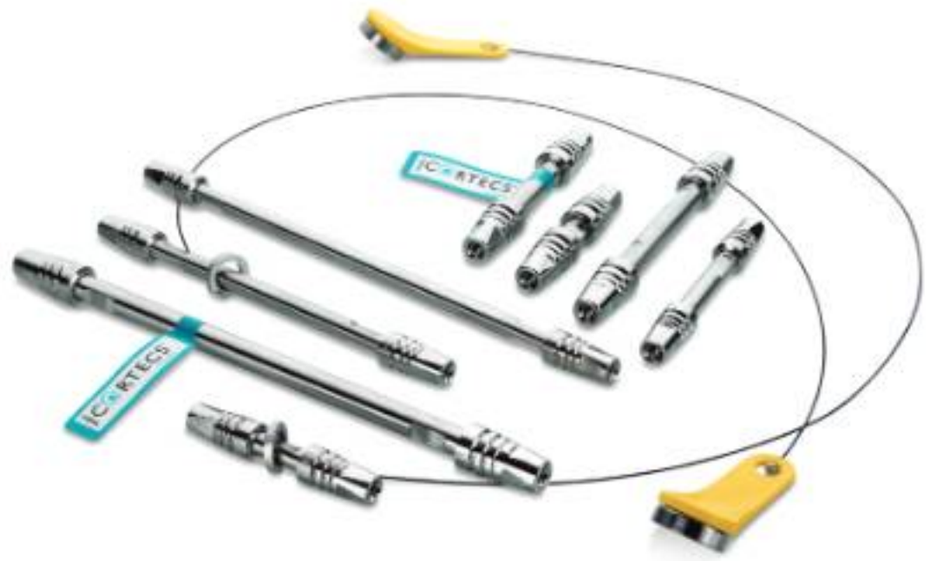


ACQUITY UPLC HSS Columns offer scientists maximum retention and the widest selectivity space with five unique and differentiated bonded phases.

HSS
HIGH STRENGTH SILICA

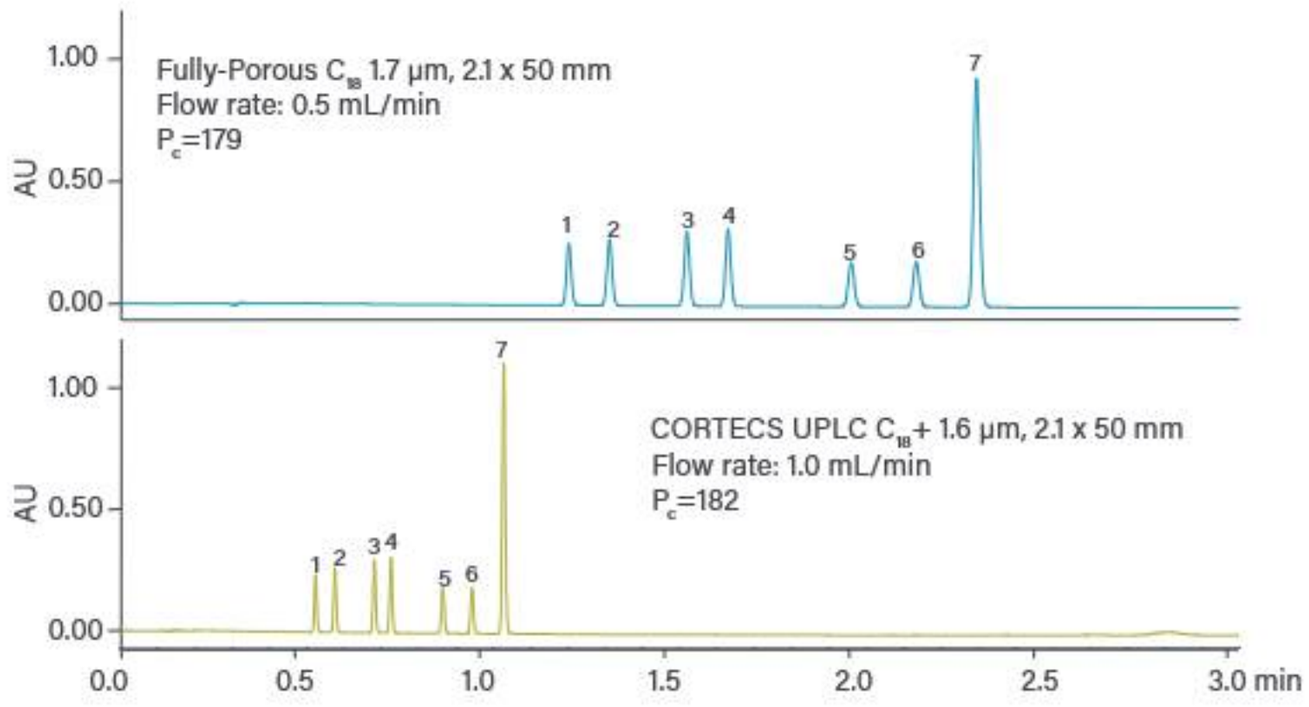
CORTECS Solid-Core Particle Technology

CORTECS UPLC 1.6 µm Solid-Core Columns set the bar for ultimate chromatographic performance. The sub-2-µm solid-core particle technology provides the highest efficiencies when coupled with low dispersion UPLC instrumentation. CORTECS UPLC 1.6 µm Columns are available in both reversed-phase and HILIC, with seven different chemistries to give you the flexibility to rapidly separate a wide range of compounds. These solid-core columns produce sharper, narrower peaks when compared to fully porous particles of similar size; making these columns the best column choice for increased resolution, speed, and sensitivity.



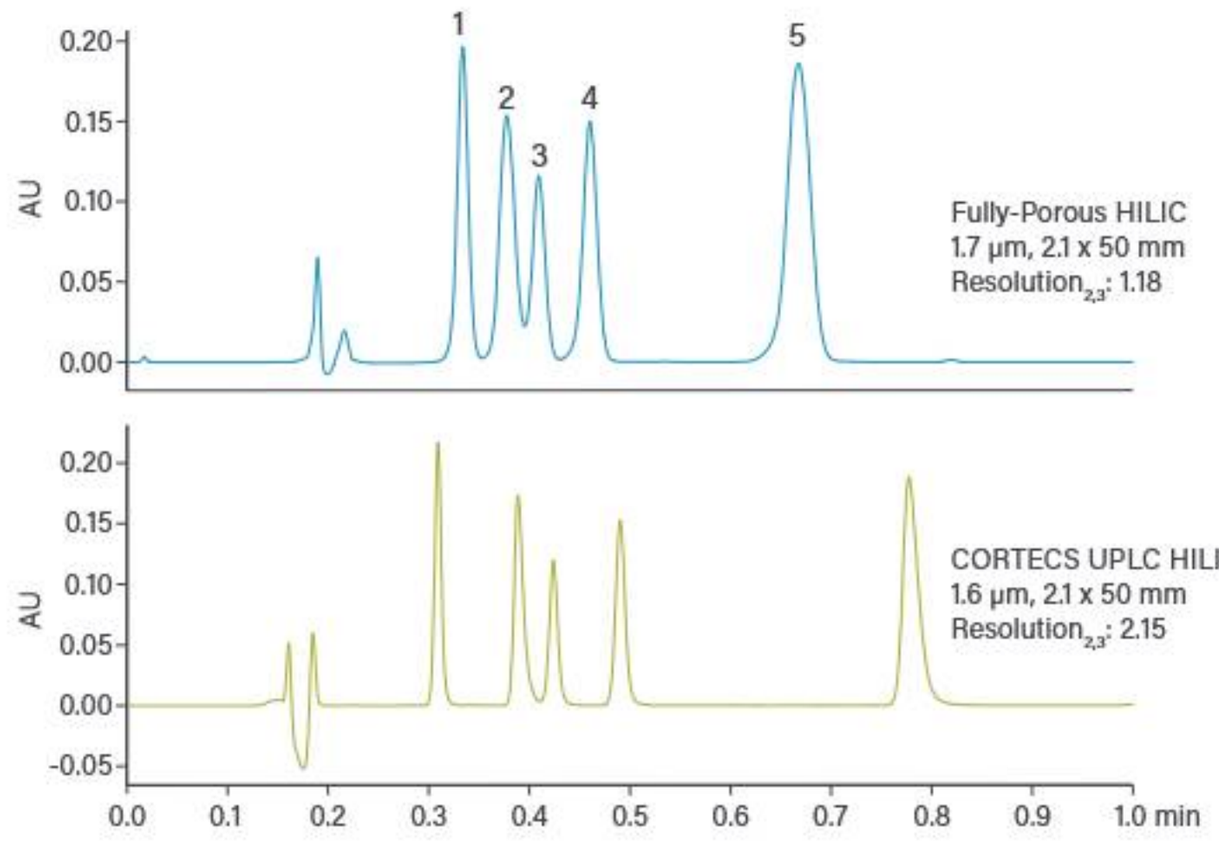
CORTECS™ COLUMNS

Increased sample throughput



Separation of sulfa drugs, demonstrating the higher throughput capabilities of the CORTECS UPLC Columns. Compounds: 1) sulfathiazole, 2) sulfamerazine, 3) sulfamethazine, 4) sulfamethoxypyridazine, 5) sulfachloropyridazine, 6) sulfamethoxazole, and 7) sulfasoxazole. Peak capacity calculated using the equation $P_c = 1 + (tg/P_w)$ where tg equals gradient time, and P_w equals average peak width.

Increased resolution



Separation of local anesthetics by HILIC, demonstrating the improved resolution using a CORTECS UPLC HILIC Column. Compounds: 1) lidocaine, 2) butacaine, 3) tetracaine, 4) procaine, and 5) procainamide.

Atlantis Premier BEH C_{18} AX Columns

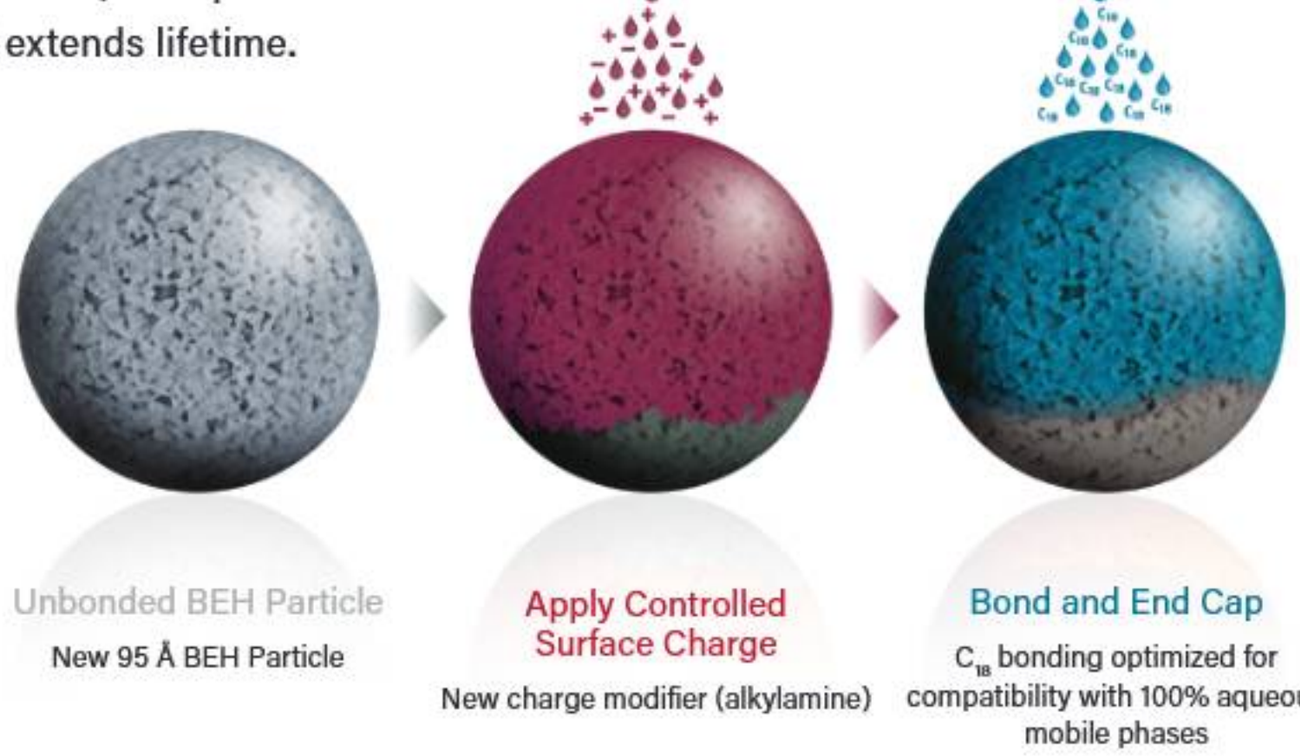


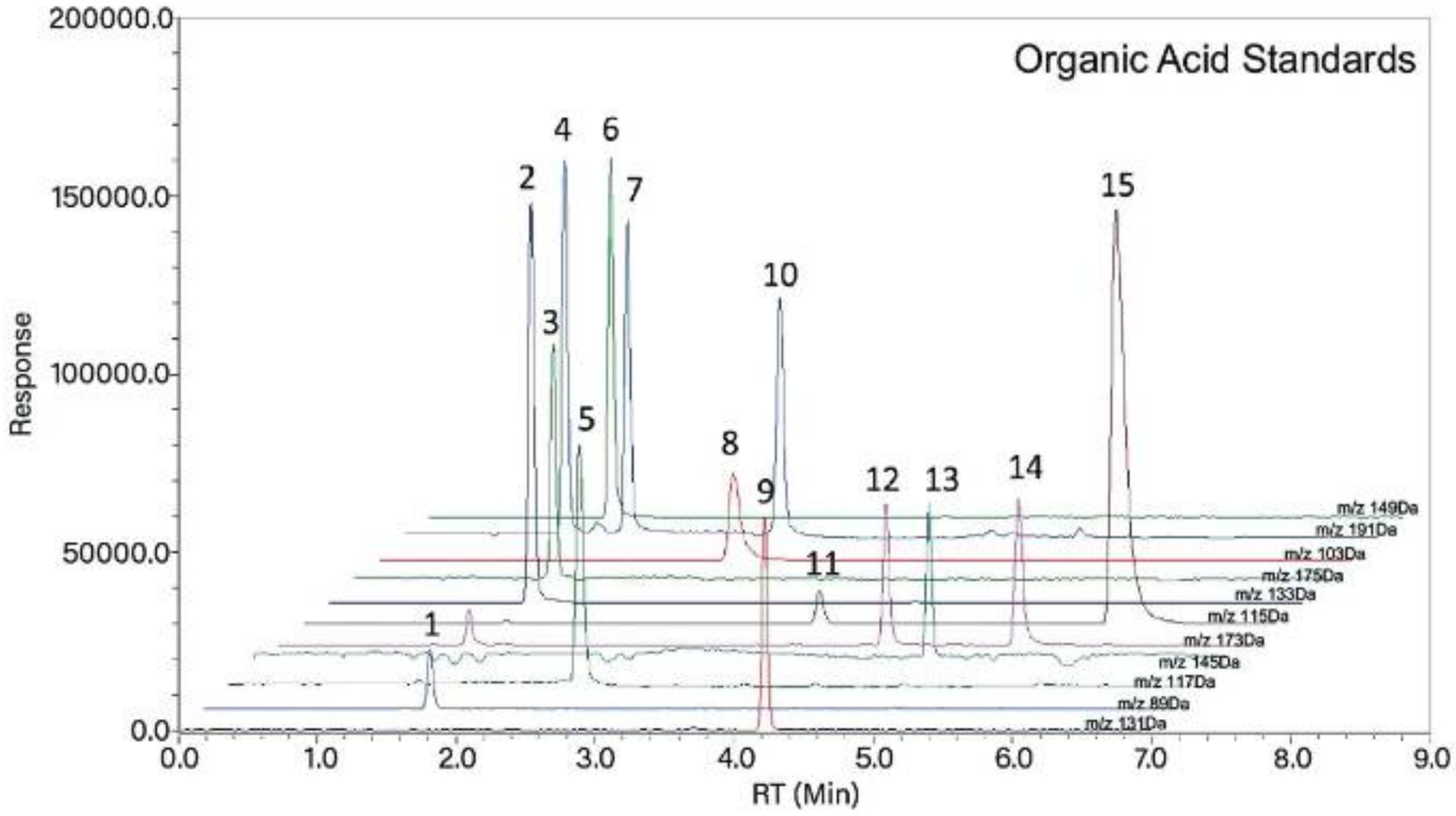
Anatomy of a next-generation hybrid particle column

The Atlantis™ Premier BEH C18 AX Columns are packed with a mixed-mode, reversed-phase/anion-exchange chemistry that retains polar acidic analytes as well as traditional hydrophobic analytes.

The BEH 95 Å particle and the novel mixed-mode chemistry provide increased retention over a wider pH range, orthogonal selectivity to C_{18} columns, and a reduction in MS bleed.

The column hardware utilizes MaxPeak™ High Performance Surfaces (HPS) Technology that reduces analyte surface interactions; the optional VanGuard™ FIT Column format extends lifetime.





Atlantis Premier BEH Z-HILIC Columns



Anatomy of a next-generation zwitterionic HILIC column

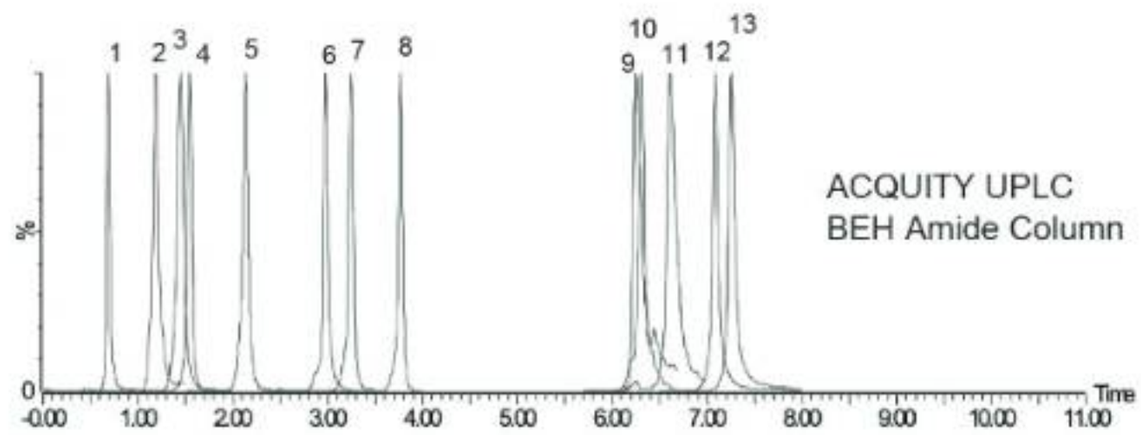
The Atlantis™ Premier BEH Z-HILIC Columns are packed with a sulfobetaine zwitterionic chemistry that provides high retention for polar neutral compounds as well as a different selectivity for polar acidic and basic compounds when compared to columns packed with unbonded silica/hybrid particles and amide HILIC chemistries.

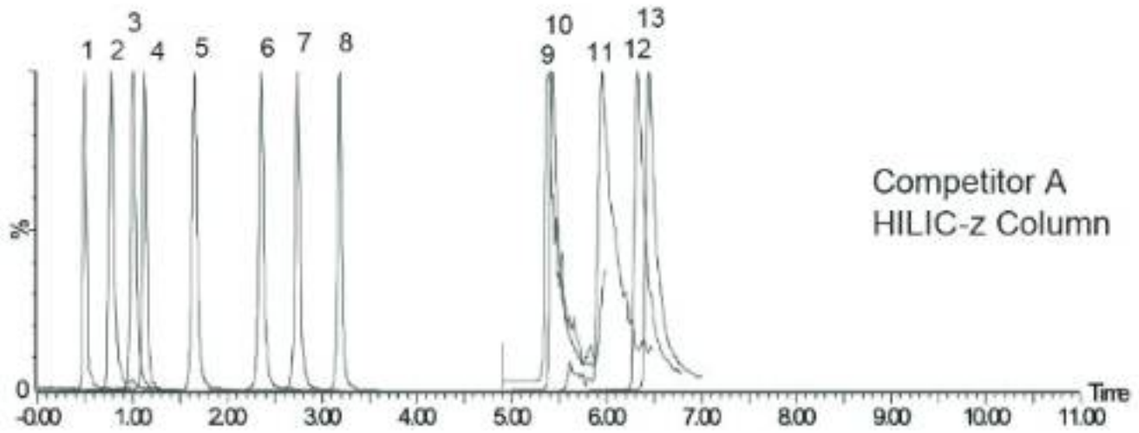
The BEH 95 Å particle and zwitterionic bonding are stable across a wide pH range, enabling both high and low pH methods with low MS-detectable bleed.

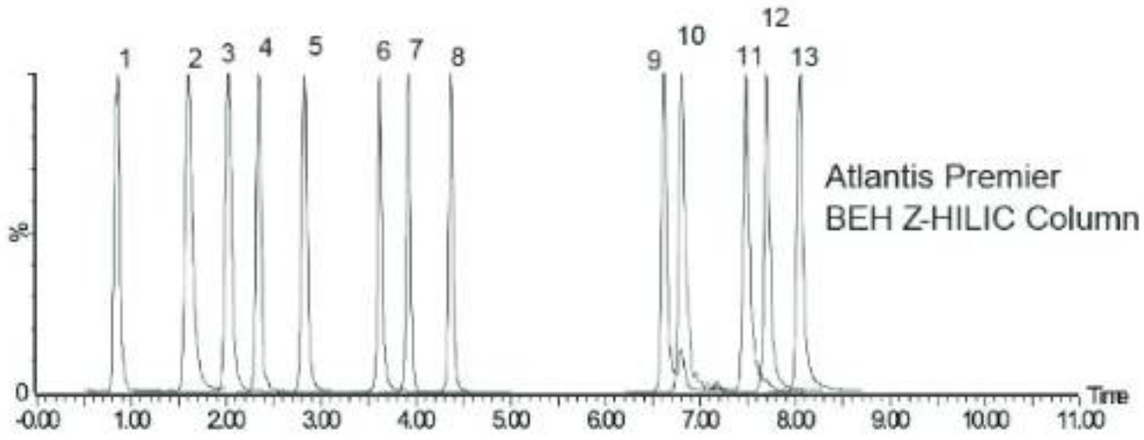
The column hardware utilizes MaxPeak™ High Performance Surfaces (HPS) to mitigate interactions of analytes with metal surfaces; the optional VanGuard™ FIT Column format incorporates a replaceable guard cartridge to extend column lifetime.

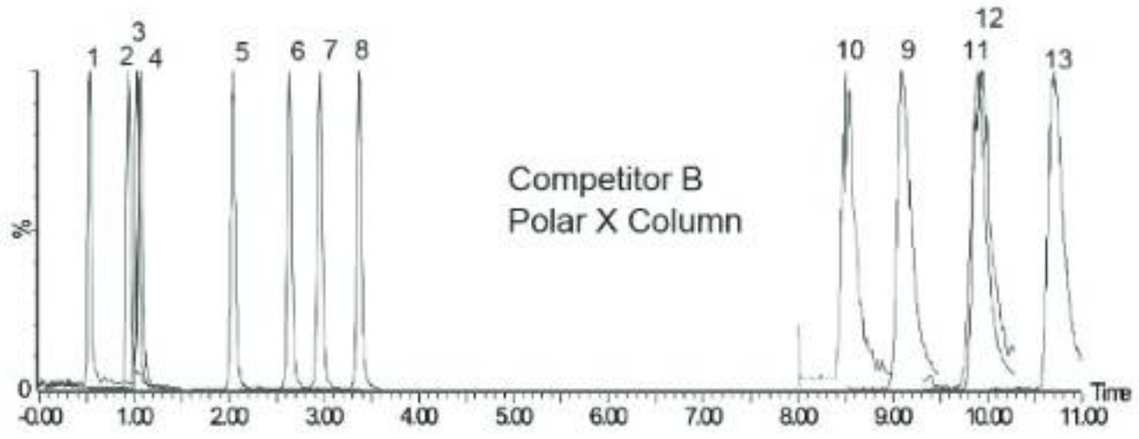
The zwitterionic **sulfobetaine** ligand has both positively and negatively charged groups, in a one-to-one ratio, making them net neutral. The sulfobetaine bonding provides a unique selectivity and creates a very hydrophilic surface, allowing for a dense/thick water rich layer on the surface to further increase polar analyte retention.









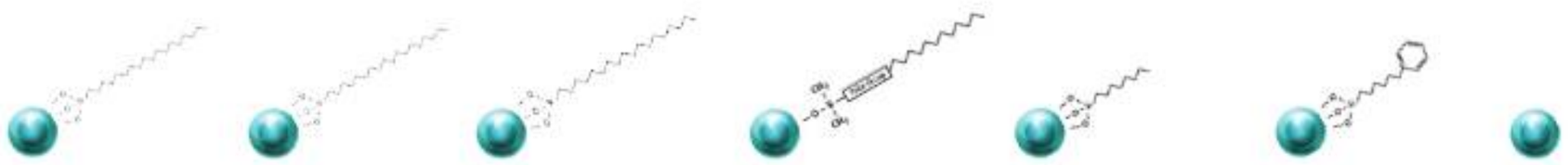




ACQUITY	C_{18}	C_8	Shield RP18	Phenyl	Biphenyl	HILIC	Amide
Ligand density	3.1 µmol/m²	3.2 µmol/m²	3.3 µmol/m²	3.0 µmol/m²	3.3 µmol/m²	N/A	7.5 µmol/m²
Carbon load	18%	13%	17%	15%	16.2%	Unbonded	12%
Endcap	Proprietary	Proprietary	TMS	Proprietary	proprietary	N/A	None
pH	1–12	1–12	2–11	1–12	1.5–10	1–9	2–11
Low pH	80 °C	60 °C	50 °C	80 °C	60 °C	45 °C	90 °C
High pH	60 °C	60 °C	45 °C	60 °C	45 °C	45 °C	90 °C
Surface area	185 m2/g	185 m2/g	185 m2/g	185 m2/g	185 m2/g	185 m2/g	270 m2/g
USP	L1	L7	L1	L11	L11	L3	L68



ACQUITY	CSH C_{18}	CSH Phenyl-Hexyl	CSH Fluoro-Phenyl	HSS T3	HSS C_{18}	HSS C_{18} SB	HSS PFP	HSS CN
Ligand density*	2.3 µmol/m²	2.3 µmol/m²	2.3 µmol/m²	1.6 µmol/m²	3.2 µmol/m²	1.6 µmol/m²	3.2 µmol/m²	2.0 µmol/m²
Carbon load*	15%	14%	10%	11%	15%	8%	7%	5%
Endcap style	proprietary	proprietary	none	proprietary	proprietary	none	none	none
pH range	1–11	1–11	1–8	2–8	1–8	2–8	2–8	2–8
Low pH temp. limit	80 °C	80 °C	60 °C	45 °C	45 °C	45 °C	45 °C	45 °C
High pH temp. limit	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
Surface area*	185 m²/g	185 m²/g	185 m²/g	230 m²/g	230 m²/g	230 m²/g	230 m²/g	230 m²/g
USP classification	L1	L11	L43	L1	L1	L1	L43	L10



CORTECS	C_{18}+	C_{18}	T3	Shield RP18	C_8	Phenyl	HILIC
Ligand density*	2.4 µmol/m²	2.7 µmol/m²	1.6 µmol/m²	3.2 µmol/m²	3.4 µmol/m²	3.2 µmol/m²	n/a
Carbon load*	5.7%	6.6%	4.7%	6.4%	4.5%	5.9%	unbonded
Endcap style	proprietary	proprietary	proprietary	TMS	proprietary	proprietary	n/a
pH range	2–8	2–8	2–8	2–8	2–8	2–8	1–5
Low pH temp. limit	60 °C	60 °C	60 °C	60 °C	60 °C	60 °C	45 °C
High pH temp. limit	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
Surface area	100 m²/g	100 m²/g	100 m²/g	100 m²/g	100 m²/g	100 m²/g	100 m²/g
USP classification	L1	L1	L1	L1	L7	L11	L3



Atlantis Premier	C_{18} AX	Z-HILIC
Ligand density	1.6 µmol/m²	3.0 µmol/m²
Carbon load	17%	17%
Endcap	Proprietary	None
pH	2-10	2-10
Low pH	60 °C	60 °C
High pH	60 °C	60 °C
Surface area	270 m2/g	270 m2/g
USP	L78	L122

Innovative Column Technology

Although directly influenced by the dispersion [bandspread] of the LC instrumentation, the heart of the chromatographic separation lies within the column. **I**n addition to a wide variety of available column selectivities to accommodate different sample types, a significant degree of manufacturing innovation is necessary to yield the performance expected from UPLC Column Technology: impactful resolution and sensitivity, improved productivity, unmatched reproducibility, as well as exceptional mechanical and chemical stability.

In efforts to achieve these performance attributes, ground-breaking manufacturing procedures for particle synthesis, mechanical engineering, software development, and column manufacturing were devized.

Engineering

- Ultra-low dispersion hardware
- Innovative frit technology

Bulk synthesis

- Mechanically tolerant particles
- Advanced particle sizing technology
- Sustained batch-to-batch selectivity
- Sustained selectivity across UPLC, UHPLC, and HPLC particle sizes
- High efficiency, sub-2-µm particles



Column manufacturing

- Mechanically stable beds at pressures up to 18,000 psi [1241 bar]
- Advanced column packing methodologies and equipment
- Ultra-low dispersion column test stations

Traceability

- Electronic column usage management via eCord™ Intelligent Chip Technology
- Tracks history of column's performance and usage over lifetime of the column
- Tethered to the column to ensure permanent accessibility to column history

Take your separations

To the MAX

HPLC method development is not without its challenges. What happens when your favorite column struggles to acheive your peak shape, sensitivity, or reproducibility goals?

Whether you're developing or transferring methods, quickly acheive consistent results with MaxPeak Premier Columns. Available from sub-2 µm to 5 µm HPLC particle sizes, fully porous and solid-core, you can choose the column configuration that meets your needs and eliminate doubt from your chromotographic separations.

Working with doubt.

When it comes to selecting an analytical column for your method, **uncontrolled interactions** between your analytes and the column hardware can cast **doubt** of the accuracy of the results.

Eliminate doubt.
MaxPeak Premier Columns.

Achieve accurate results from your chromotography separations with MaxPeak Premier Columns.

It's the family of columns with the technology you can rely on to not only hit your targets with absolute precision, but do it faster, with complete control, reproducibility, and confidence.

Eliminate doubt with faster results, have full control over your analyses, realize separations, and get reliable results from the start.

It's the reason more and more chromotographers are making the switch.



Trusted Particle Technology.

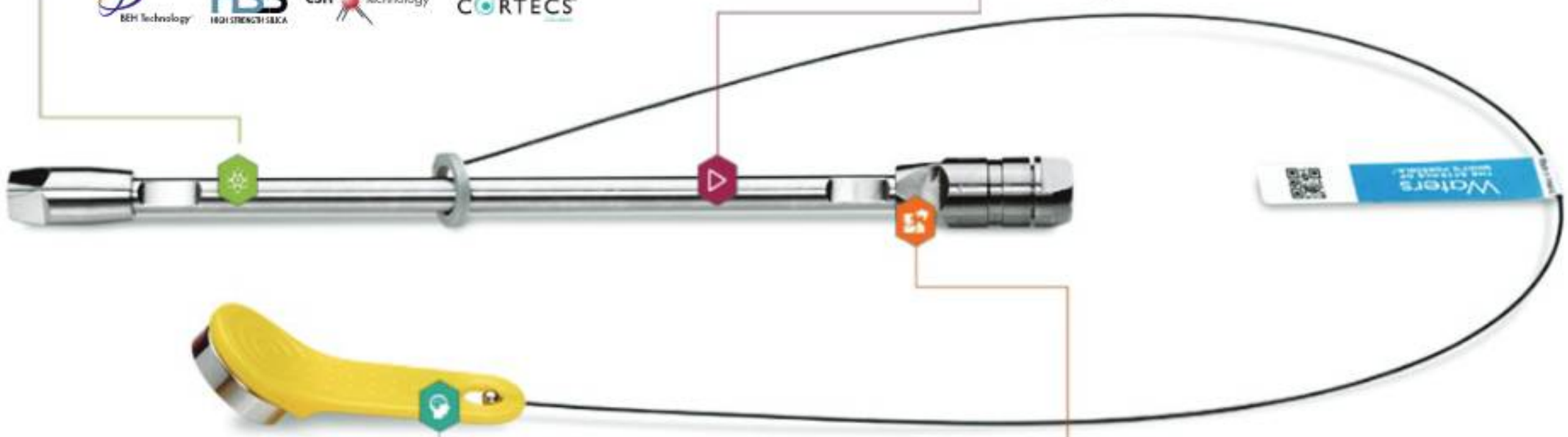
- Flexible options for ALL applications, continually growing
- Best chemistries available

BEH Technology™ HSS HIGH STRENGTH SILICA CSH™ Technology CORTECS™

High Performance Surfaces.

- See everything in your sample
- Confidence in your results

MAXPEAK™ PREMIER



Next Generation Smart Technology.

- Product authenticity
- Smart connectivity
- Reduce your risk

Integrated Column Protection.

- Protection for your investment
- Increase your column lifetime

VANGUARD™ FIT



MAXPEAK™ PREMIER

HYBRID ORGANIC/INORGANIC TECHNOLOGY PARTICLES SURFACES

MAXPEAK™ HPS

BEH Technology™

Ethlyene-Bridged Hybrid (BEH) particles

- Unparalleled pH stability, 1-12 for BEH C_{18}, 2-11 for Shield RP18.
- Increased temperature range, up to 90 °C.

CORTECS™ COLUMNS

- Increased efficiency for more resolution
- Lower back pressure for higher throughput

CSH™ Technology

Charged Surface Hybrid (CSH™) particles

- Improved basic analyte peak shape when using low ionic strength acidic mobile phase.
- Increased basic analyte loading capacity under low pH conditions.

HSS HIGH STRENGTH SILICA

High Strength Silica (HSS) particles

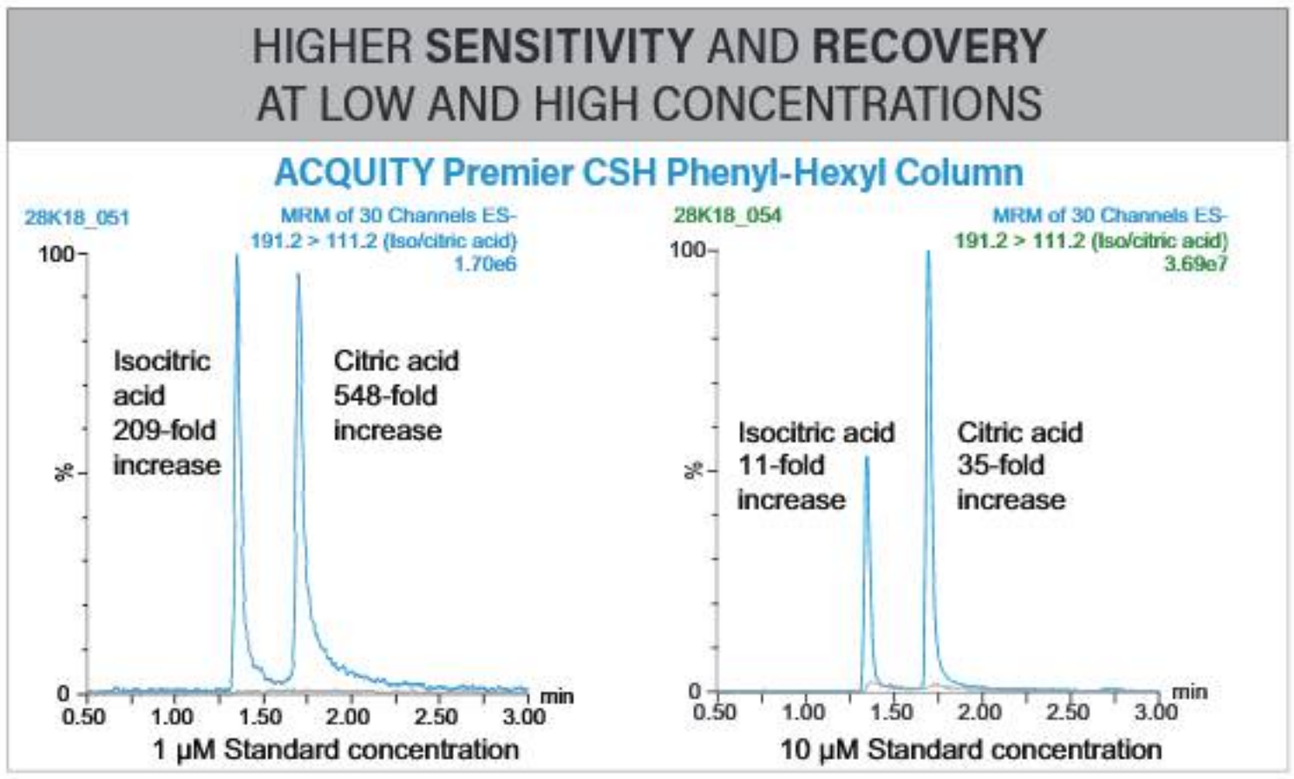
- Increased retention for both moderately polar and non-polar analytes under reversed-phase conditions.

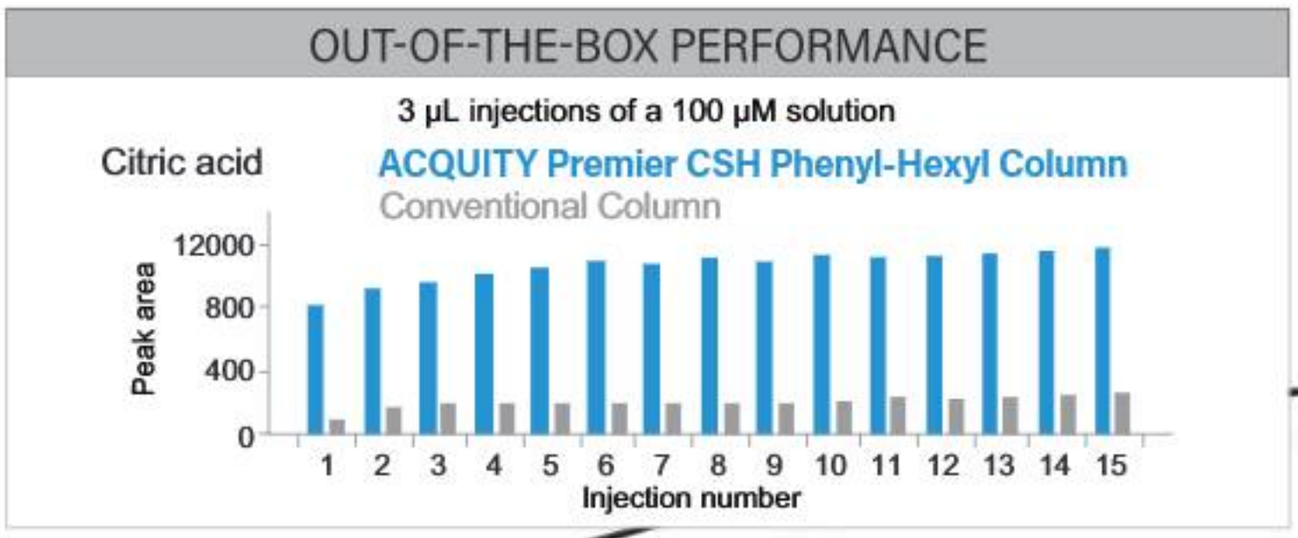
What can MaxPeak Premier Columns do for your small molecule analysis?

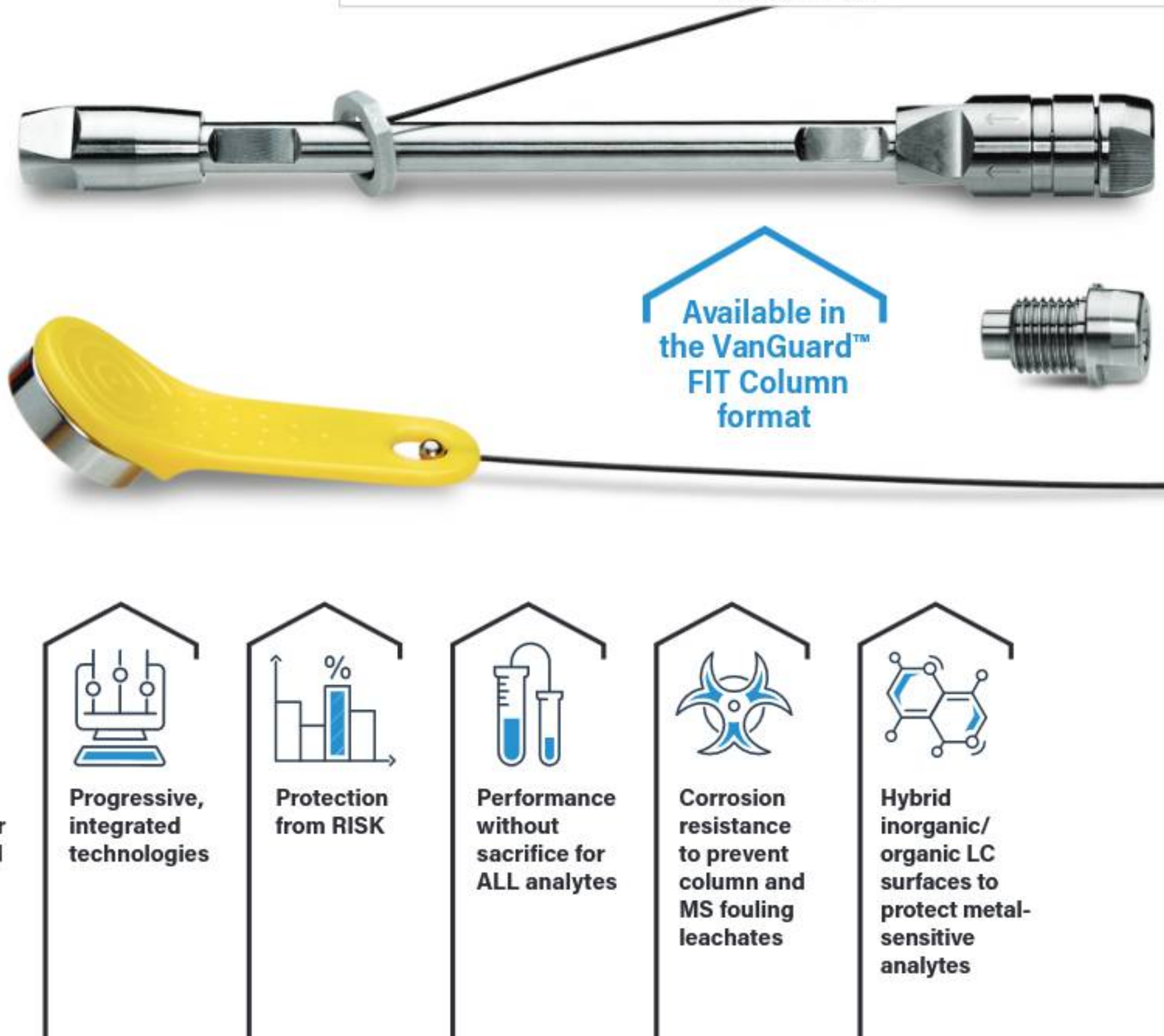
MAXPEAK™ PREMIER

Ensure MaxPeak Premier performance for ALL separations

MaxPeak™ Premier Columns utilize MaxPeak High Performance Surfaces (HPS) Technology that is designed to increase analyte recovery, sensitivity, and reproducibility by minimizing analyte/surface interactions that can lead to sample losses.







- **Precision chemistry for particles and surfaces**
- **Progressive, integrated technologies**
- **Protection from RISK**
- **Performance without sacrifice for ALL analytes**
- **Corrosion resistance to prevent column and MS fouling leachates**
- **Hybrid inorganic/ organic LC surfaces to protect metal-sensitive analytes**

UPLC Column Protection – VanGuard Pre-Columns

Contamination resulting from the analysis of samples present within complex matrices, or that are particulate-laden, may result in reduced column lifetime if not properly addressed. VanGuard™ Pre-Columns are ideally suited for the physical and chemical protection of ACQUITY UPLC Columns.

Directly compatible with UPLC pressures up to 18,000 psi [1241 bar], this ultra-low dispersion direct connect guard column is specifically engineered to preserve the lifetime of an ACQUITY UPLC Column without negatively impacting its separation performance.

** US Patents 9,724,621; 8,449,769*



Key features and benefits of VanGuard Pre-Columns

FEATURE	BENEFIT
First pre-column for UPLC applications	Guaranteed compatibility with pressures up to 18,000 psi
Ultra-low volume design	Minimal chromatography effects
Manufactured using UPLC Column hardware, particles, and chemistries	Superior UPLC Column protection and performance
Connects directly to UPLC Column	Leaks and connection voids are eliminated

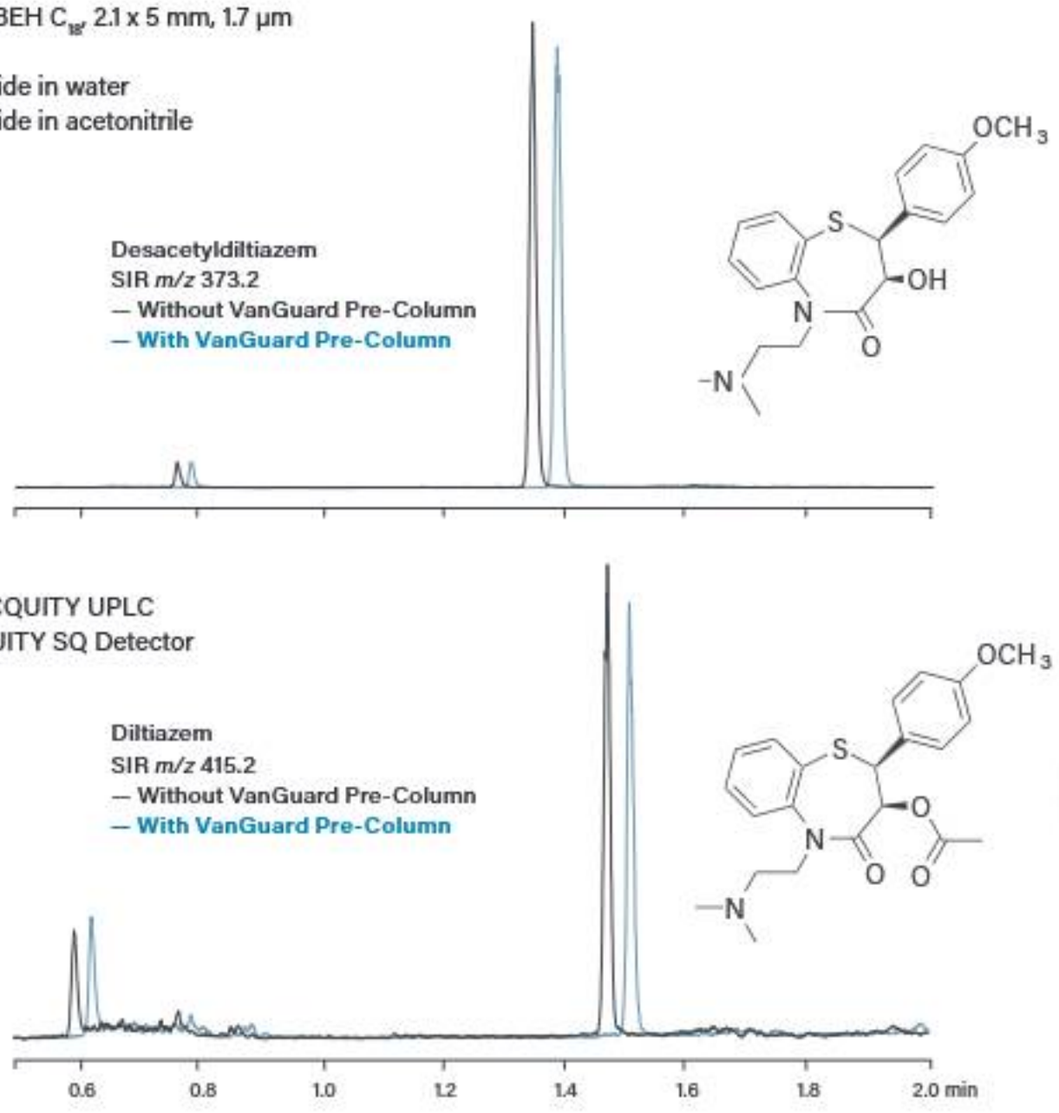
Minimal chromatographic effects with VanGuard Pre-Columns

LC conditions:
Column: ACQUITY UPLC BEH C_{18}, 2.1 x 50 mm, 1.7 µm
Part number: 186002350
Pre-Column: VanGuard Pre-Column, BEH C_{18}, 2.1 x 5 mm, 1.7 µm
Part number: 186003975
Mobile phase A: 0.2% ammonium hydroxide in water
Mobile phase B: 0.2% ammonium hydroxide in acetonitrile
Flow rate: 0.8 mL/min
Gradient:

Time (min)	%A	%B
0.0	95	5
2.0	5	95
2.5	5	95
2.6	95	5
3.0	95	5

Injection volume: 2 µL
Column temp.: 40 °C
Detection: UV @ 254 nm
Sampling rate: 40 pts/sec
Time constant: 0.05
Instrument: ACQUITY UPLC with ACQUITY UPLC TUV Detector and ACQUITY SQ Detector

ACQUITY SQ Detector
ES+
Capillary: 3.5 kV
Cone: 35 V
Source temp.: 150 °C
Desolvation temp.: 500 °C
Cone gas flow: 50 L/Hr
Desolvation gas flow: 850 L/Hr
SIR: 373.2 m/z, 415.2 m/z
MS interscan delay: 0.005 sec
Dwell: 0.005 sec



Protein precipitation procedure

Spike plasma with 500 ng/mL of diltiazem and desacetyldiltiazem

Take 200 µL of spiked plasma and add to 1.5 mL centrifuge tube

Add 600 µL of acetonitrile to the centrifuge tube containing the spiked plasma

Centrifuge for 10 minutes at 13,000 RPM

Take 650 µL of supernatant and evaporate to dryness with nitrogen

Reconstitute with 400 µL of a 50:50 MeOH:H_2O solution (results in a 203.1 ng/mL conc.)

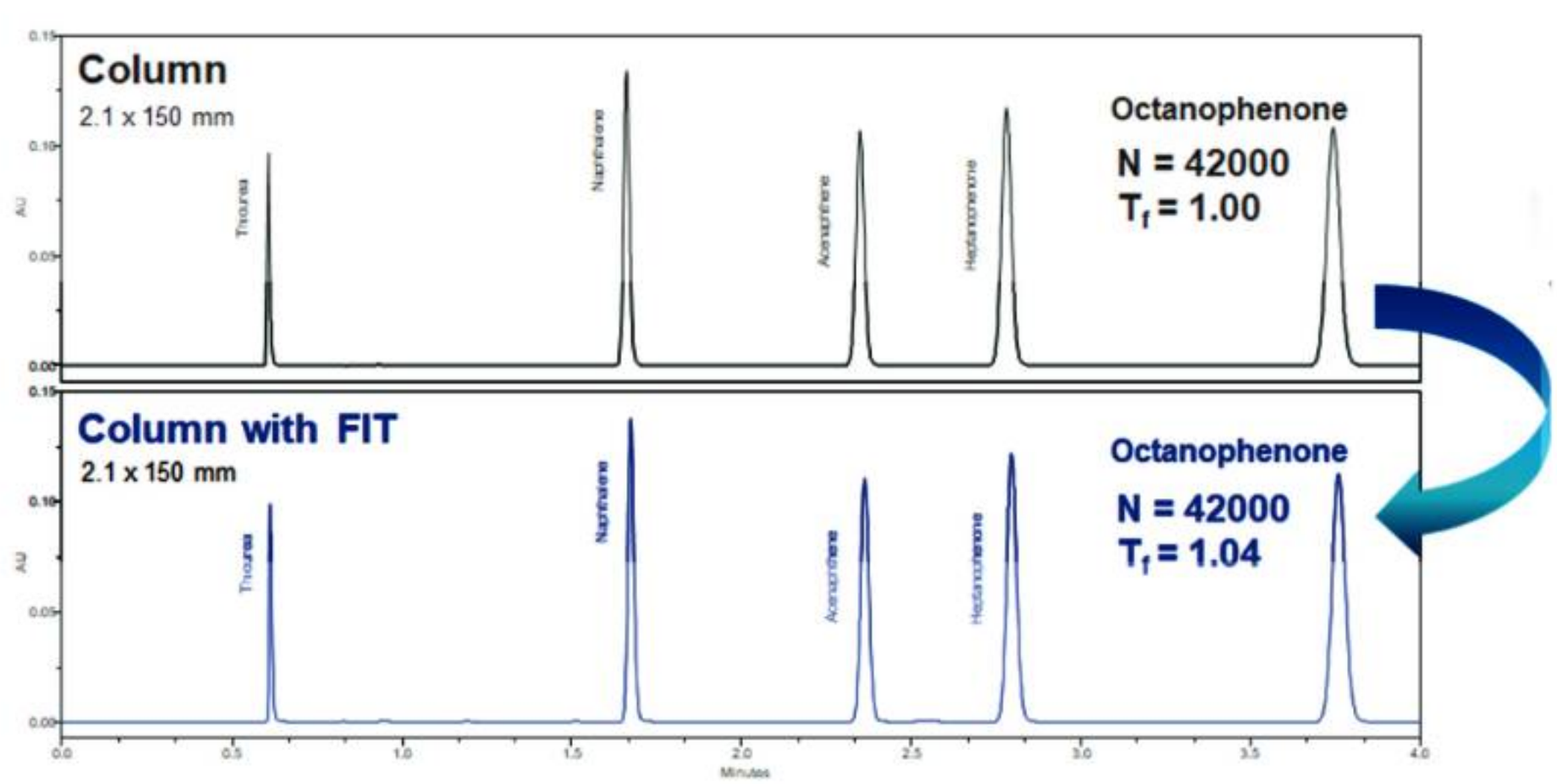


VanGuard Pre-Columns are uniquely designed to protect and prolong ACQUITY UPLC Column performance while contributing minimal chromatographic effects.

VanGuard FIT represents a more purposeful approach to guard column design and functionality, providing unprecedented ease-of-use in an ultra-low dispersion format



Integrated VanGuard FIT Column design uses replaceable cartridges that screw into the column inlet. Optimal installation has never been easier! The FIT design gives the same efficiency as running with no guard.



VANGUARD™ FIT

To protect your investment, select columns are available with VanGuard™ FIT integrated guard Column technology. With a FIT Column design created specifically to integrate a guard column, separation efficiency is maintained, along with column lifetime.



Ordering Information

CSH™ Technology

ACQUITY UPLC CSH Columns				
Dimension	Particle size	C_{18}	Fluoro-Phenyl	Phenyl-Hexyl
1.0 x 50 mm	1.7 µm	186005292	186005349	186005404
1.0 x 100 mm	1.7 µm	186005293	186005347	186005402
1.0 x 150 mm	1.7 µm	186005294	186005348	186005403
2.1 x 30 mm	1.7 µm	186005295	186005350	186005405
2.1 x 50 mm	1.7 µm	186005296	186005351	186005406
2.1 x 75 mm	1.7 µm	186005620	186005622	186005621
2.1 x 100 mm	1.7 µm	186005297	186005352	186005407
2.1 x 150 mm	1.7 µm	186005298	186005353	186005408
3.0 x 30 mm	1.7 µm	186005299	186005354	186005409
3.0 x 50 mm	1.7 µm	186005300	186005355	186005410
3.0 x 75 mm	1.7 µm	186005623	186005625	186005624
3.0 x 100 mm	1.7 µm	186005301	186005356	186005411
3.0 x 150 mm	1.7 µm	186005302	186005357	186005412

BEH Technology™

ACQUITY UPLC BEH Columns							
Dimension	Particle size	C_{18}	Shield RP18	C_8	Phenyl	HILIC	Amide
1.0 x 50 mm	1.7 µm	186002344	186002851	186002875	186002882	186003457	186004848
1.0 x 100 mm	1.7 µm	186002346	186002852	186002876	186002883	186003458	186004849
1.0 x 150 mm	1.7 µm	186002347	186003373	186003374	186003375	186003459	186004850
2.1 x 30 mm	1.7 µm	186002349	186003909	186003910	186003911	—	186004839
2.1 x 50 mm	1.7 µm	186002350	186002853	186002877	186002884	186003460	186004800
2.1 x 75 mm	1.7 µm	186005604	186005605	186005606	186005607	186005608	186005657
2.1 x 100 mm	1.7 µm	186002352	186002854	186002878	186002885	186003461	186004801
2.1 x 150 mm	1.7 µm	186002353	186003376	186003377	186003378	186003462	186004802
3.0 x 30 mm	1.7 µm	186004659	186004667	186004663	186004671	—	186004803
3.0 x 50 mm	1.7 µm	186004660	186004668	186004664	186004672	186004675	186004804
3.0 x 75 mm	1.7 µm	186005609	186005610	186005661	186005612	186005613	186005658
3.0 x 100 mm	1.7 µm	186004661	186004669	186004665	186004673	186004676	186004805
3.0 x 150 mm	1.7 µm	186004690	186004670	186004666	186004674	186004677	186004806

HSS
HIGH STRENGTH SILICA

ACQUITY UPLC HSS Columns						
Dimension	Particle size	T3	C_{18}	C_{18} SB	Cyano	PFP
1.0 x 50 mm	1.8 µm	186003535	186003529	186004114	186005982	186005961
1.0 x 100 mm	1.8 µm	186003536	186003530	186004115	186005983	186005962
1.0 x 150 mm	1.8 µm	186003537	186003531	186004116	186005984	186005963
2.1 x 30 mm	1.8 µm	186003944	186003987	186004117	186005985	186005964
2.1 x 50 mm	1.8 µm	186003538	186003532	186004118	186005986	186005965
2.1 x 75 mm	1.8 µm	186005614	186005615	186005616	186005987	186005966
2.1 x 100 mm	1.8 µm	186003539	186003533	186004119	186005988	186005967
2.1 x 150 mm	1.8 µm	186003540	186003534	186004120	186005989	186005968
3.0 x 30 mm	1.8 µm	186004678	186004682	186004686	186005990	186005969
3.0 x 50 mm	1.8 µm	186004679	186004683	186004687	186005991	186005970
3.0 x 75 mm	1.8 µm	186005617	186005618	186005619	186005992	186005971
3.0 x 100 mm	1.8 µm	186004680	186004684	186004826	186005993	186005972
3.0 x 150 mm	1.8 µm	186004681	186004685	186004689	186005994	186005973

CORTECS™
COLUMNS

CORTECS UPLC Columns								
Dimension	Particle size	C_{18}+	C_{18}	T3	Shield RP18	C_8	Phenyl	HILIC
2.1 x 30 mm	1.6 µm	186007113	186007092	186008496	186008691	186008398	186008378	186007103
2.1 x 50 mm	1.6 µm	186007114	186007093	186008497	186008692	186008399	186008379	186007104
2.1 x 75 mm	1.6 µm	186007115	186007094	186008498	186008693	186008400	186008380	186007105
2.1 x 100 mm	1.6 µm	186007116	186007095	186008499	186008694	186008401	186008381	186007106
2.1 x 150 mm	1.6 µm	186007117	186007096	186008500	186008695	186008402	186008382	186007107
3.0 x 30 mm	1.6 µm	186007118	186007097	186008501	186008701	186008408	186008388	186007108
3.0 x 50 mm	1.6 µm	186007119	186007098	186008502	186008702	186008409	186008389	186007109
3.0 x 75 mm	1.6 µm	186007120	186007099	186008503	186008703	186008410	186008390	186007110
3.0 x 100 mm	1.6 µm	186007121	186007100	186008504	186008704	186008411	186008391	186007111
3.0 x 150 mm	1.6 µm	186007122	186007102	186008505	186008705	186008412	186008392	186007112

VANGUARD™
COLUMN PROTECTION

ACQUITY UPLC CSH VanGuard Pre-Columns				
Dimension	Particle size	C_{18}	Fluoro-Phenyl	Phenyl-Hexyl
2.1 x 5 mm	1.7 µm	186005303	186005358	186005413



ACQUITY UPLC BEH VanGuard Pre-Columns							
Dimension	Particle size	C_{18}	Shield RP18	C_8	Phenyl	HILIC	Amide
2.1 x 5 mm	1.7 µm	186003975	186003977	186003978	186003979	186003980	186004799

ACQUITY UPLC HSS VanGuard Pre-Columns						
Dimension	Particle size	T3	C_{18}	C_{18} SB	Cyano	PFP
2.1 x 5 mm	1.8 µm	186003976	186003981	186004136	186005995	186005974

CORTECS UPLC VanGuard Pre-Columns						
Dimension	Particle size	C_{18}+	C_{18}	C_8	HILIC	Phenyl
2.1 x 5 mm	1.6 µm	186007125	186007123	186008423	186007124	186008420

MaxPeak Premier Column Ordering Information

ACQUITY Premier BEH Columns								
Dimension	Particle Size	BEH C_{18}	BEH Shield RP18	BEH C8	BEH Phenyl	BEH Biphenyl	BEH Amide	BEH HILIC
2.1 x 50 mm	1.7 µm	186009452	186009497	186010356	186010336	186011744	186009504	186010377
2.1 x 100 mm	1.7 µm	186009453	186009498	186010357	186010337	186011745	186009505	186010378
2.1 x 150 mm	1.7 µm	186009454	186009499	186010358	186010294	186011746	186009506	186010379

ACQUITY Premier BEH VanGuard FIT Columns								
Dimension	Particle Size	BEH C_{18}	BEH Shield RP18	BEH C8	BEH Phenyl	BEH Biphenyl	BEH Amide	BEH HILIC
2.1 x 50 mm	1.7 µm	186009455	186009500	186010359	186010338	186011747	186009507	186010380
2.1 x 100 mm	1.7 µm	186009457	186009501	186010360	186010339	186011748	186009508	186010381
2.1 x 150 mm	1.7 µm	186009458	186009502	186010361	186010340	186011749	186009509	186010382

ACQUITY Premier BEH VanGuard FIT Cartridges								
Dimension	Particle Size	BEH C_{18}	BEH Shield RP18	BEH C8	BEH Phenyl	BEH Biphenyl	BEH Amide	BEH HILIC
2.1 x 5 mm	1.7 µm	186009459	186009503	186010362	186010341	186011762	186009510	186010383

ACQUITY Premier CSH & HSS Columns					
Dimension	CSH C_{18} 1.7 µm	CSH Phenyl Hexyl 1.7 µm	HSS C_{18} 1.8 µm	HSS PFP 1.8 µm	HSS T3 1.8 µm
2.1 x 50 mm	186009460	186009474	186010015	186010036	186009467
2.1 x 100 mm	186009461	186009475	186010016	186010037	186009468
2.1 x 150 mm	186009462	186009476	186010017	186010038	186009469

ACQUITY Premier VanGuard FIT Columns					
Dimension	CSH C_{18} 1.7 µm	CSH Phenyl Hexyl 1.7 µm	HSS C_{18} 1.8 µm	HSS PFP 1.8 µm	HSS T3 1.8 µm
2.1 x 50 mm	186009463	186009477	186010018	186010039	186009470
2.1 x 100 mm	186009464	186009478	186010019	186010040	186009471
2.1 x 150 mm	186009465	186009479	186010020	186010041	186009472

ACQUITY Premier VanGuard FIT Cartridges					
Dimension	CSH C_{18} 1.7 µm	CSH Phenyl Hexyl 1.7 µm	HSS C_{18} 1.8 µm	HSS PFP 1.8 µm	HSS T3 1.8 µm
2.1 x 5 mm	186009466	186009480	186010021	186010042	186009473

Atlantis Premier BEH Columns			
Dimension	Particle size	C_{18} AX	Z-HILIC
2.1 x 30 mm	1.7 µm	186009365	—
2.1 x 50 mm	1.7 µm	186009366	186009978
2.1 x 75 mm	1.7 µm	186009367	—
2.1 x 100 mm	1.7 µm	186009368	186009979
2.1 x 150 mm	1.7 µm	186009369	186009980
Atlantis Premier BEH VanGuard FIT Columns			
Dimension	Particle size	C_{18} AX	Z-HILIC
2.1 x 30 mm	1.7 µm	186009357	—
2.1 x 50 mm	1.7 µm	186009358	186009981
2.1 x 75 mm	1.7 µm	186009359	—
2.1 x 100 mm	1.7 µm	186009360	186009982
2.1 x 150 mm	1.7 µm	186009361	186009983
Atlantis Premier BEH VanGuard FIT Cartridges			
Dimension	Particle size	C_{18} AX	Z-HILIC
2.1 x 5 mm	1.7 µm	186009373	186009984

CORTECS Premier Columns				
Dimension	Particle Size	C_{18}	C_{18}+	T3
2.1 x 50 mm	1.6 µm	186009511	186010427	186010434
2.1 x 100 mm	1.6 µm	186009512	186010428	186010435
2.1 x 150 mm	1.6 µm	186009513	186010429	186010436

CORTECS Premier VanGuard FIT Columns				
Dimension	Particle Size	C_{18}	C_{18}+	T3
2.1 x 50 mm	1.6 µm	186009514	186010430	186010437
2.1 x 100 mm	1.6 µm	186009515	186010431	186010438
2.1 x 150 mm	1.6 µm	186009516	186010432	186010439

CORTECS Premier VanGuard FIT Cartridges				
Dimension	Particle Size	C_{18}	C_{18}+	T3
2.1 x 5 mm	1.6 µm	186009517	186010433	186010440

For MaxPeak Premier Column information please visit waters.com/tothemax.

waters.com/MaxUPLC

For your local sales office, please visit
waters.com/contact

Waters Corporation
34 Maple Street
Milford, MA 01757 U.S.A.
T: 1 508 478 2000
F: 1 508 872 1990
waters.com

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