

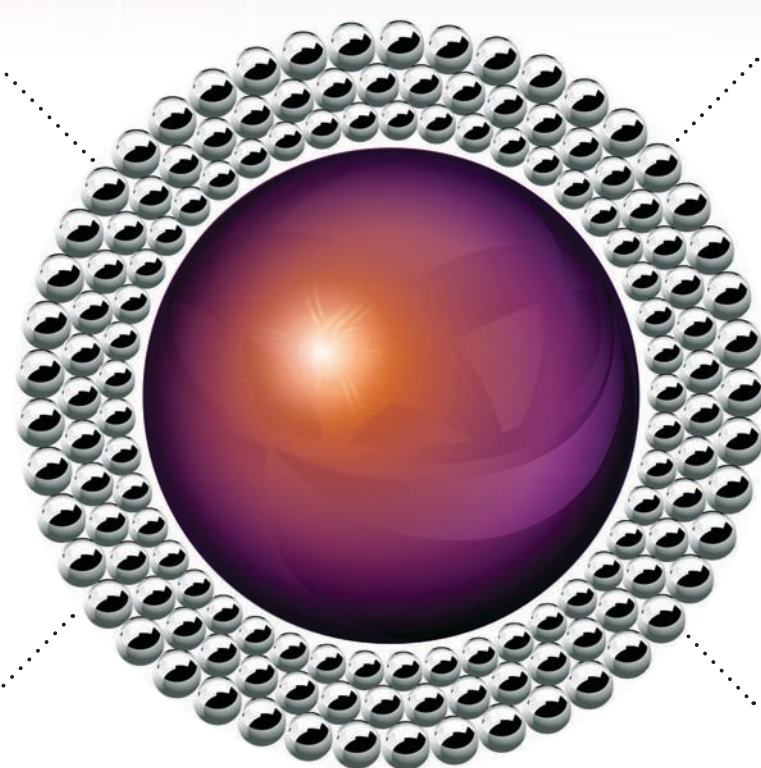
The key components of Core Enhanced Technology

Solid Core Particles

2.6µm diameter particles with a solid core generate high speed, high resolution separations without excessive backpressure

Automated Packing Process

Enhanced automated procedures ensure that all columns are packed with the highest quality



Tight Control of Particle Diameter

Enhanced selection process keeps particle size distribution to a minimum and produces high efficiency columns

Advanced Bonding Technology

Optimized phase bonding creates a series of high coverage, robust phases

Core Enhanced Technology

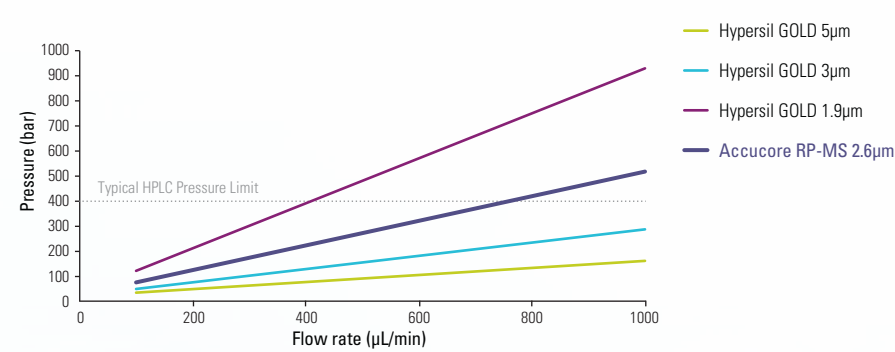
Core Enhanced Technology offers the advantages associated with sub-2µm packing materials – fast, high-resolution separations – without the high backpressures required to work with the smaller particles.

The Core Enhanced Technology effect in Thermo Scientific Accucore HPLC Columns

Low Pressure

$$\Delta P \sim \frac{250L\eta F}{d_p^2 d_c^2}$$

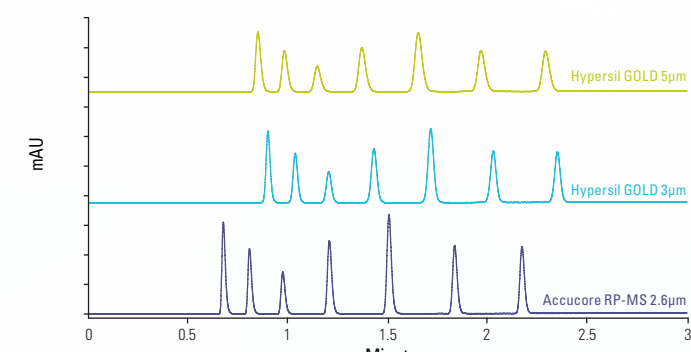
- L Column length (cm)
- η Mobile phase viscosity
- F Flow rate (ml/min)
- d_p^2 Particle diameter (µm)
- d_c^2 Column diameter (cm)



High Peak Capacity

$$n_c = 1 + \left(\frac{t_c}{W}\right)$$

- n_c Peak capacity
- t_c Gradient time
- W Peak width (10% height)



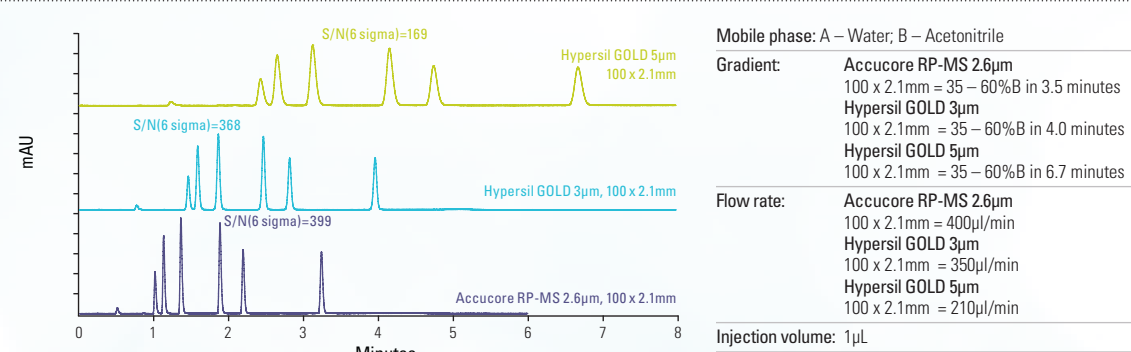
Column	Normalized Peak Capacity
Accucore RP-MS 2.6µm	158
Hypersil GOLD 3µm	132
Hypersil GOLD 5µm	100

Mobile phase: A – Water; B – Acetonitrile
 Gradient: 65 – 95% B in 2.1 minutes, 95% B for 0.4 minute
 Flow rate: 400µl/min
 Injection volume: 1µl
 Temperature: 40°C
 Detection: UV at 247nm (0.1s rise time, 20Hz)
 Analytes: 1. Acetophenone, 2. Propiophenone, 3. Butyrophenone, 4. Valerophenone, 5. Hexanophenone, 6. Heptanophenone, 7. Octanophenone

Increased Sensitivity

$$c_{max} \propto \frac{\sqrt{N} V_i}{L d_c^2 (1 + k)}$$

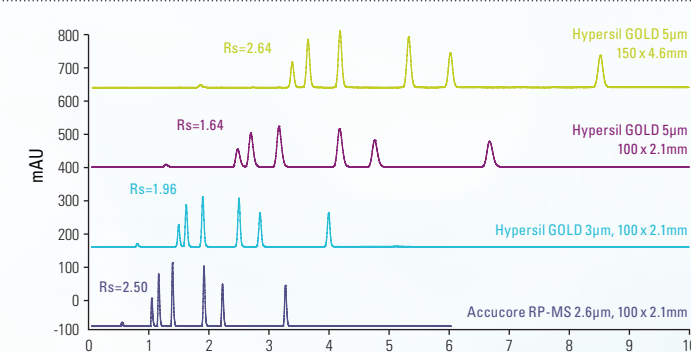
- c_{max} Concentration at peak apex
- N Efficiency
- V_i Injection volume
- L Column length
- d_c Column internal diameter
- k Capacity factor



Column	S/N (6-sigma) for Monuron	Increase in Sensitivity
Accucore 2.6 µm 100 x 2.1mm	399	136%
Hypersil GOLD 3 µm 100 x 2.1mm	368	117%
Hypersil GOLD 5 µm 100 x 2.1mm	169	–

Mobile phase: A – Water; B – Acetonitrile
 Gradient: Accucore RP-MS 2.6µm 100 x 2.1mm = 35 – 60%B in 3.5 minutes
 Hypersil GOLD 3µm 100 x 2.1mm = 35 – 60%B in 4.0 minutes
 Hypersil GOLD 5µm 100 x 2.1mm = 35 – 60%B in 6.7 minutes
 Flow rate: Accucore RP-MS 2.6µm 100 x 2.1mm = 400µl/min
 Hypersil GOLD 3µm 100 x 2.1mm = 350µl/min
 Hypersil GOLD 5µm 100 x 2.1mm = 210µl/min
 Injection volume: 1µl
 Temperature: 30°C
 Detection: UV at 247nm (0.1s rise time, 20Hz)
 Analytes: 1. Tebutiuron, 2. Metoxuron, 3. Monuron, 4. Chlorotoluron, 5. Diuron, 6. Linuron

Fast Separations

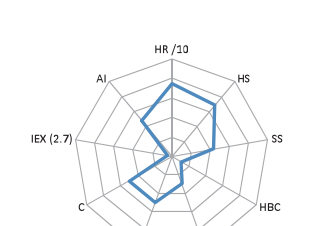


	Accucore RP-MS 2.6µm, 100 x 2.1mm	Hypersil GOLD 3µm, 100 x 2.1mm	Hypersil GOLD 5µm, 100 x 2.1mm	Hypersil GOLD 5µm, 150 x 4.6mm
Resolution (critical pair)	2.50	1.96	1.64	2.64
Run time (min) including gradient re-equilibration	6.00	7.00	11.50	17.00

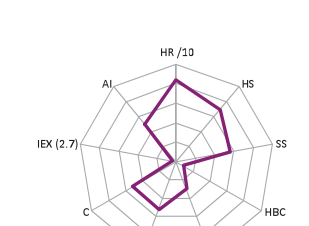
Mobile phase: A – Water; B – Acetonitrile
 Gradient: Accucore RP-MS 2.6µm 100 x 2.1mm = 35 – 60%B in 3.5 minutes
 Hypersil GOLD 3µm 100 x 2.1mm = 35 – 60%B in 4.0 minutes
 Hypersil GOLD 5µm 100 x 2.1mm = 35 – 60%B in 6.7 minutes
 Hypersil GOLD 5µm 150 x 4.6mm = 35 – 60%B in 10.0 minutes
 Flow rate: Accucore RP-MS 2.6µm 100 x 2.1mm = 400µl/min
 Hypersil GOLD 3µm 100 x 2.1mm = 350µl/min
 Hypersil GOLD 5µm 100 x 2.1mm = 210µl/min
 Hypersil GOLD 5µm 150 x 4.6mm = 100µl/min
 Injection volume: 1µl (Hypersil GOLD 5µm 150 x 4.6mm = 5µl)
 Temperature: 30°C
 Detection: UV at 247nm (0.1s rise time, 20Hz)
 Analytes: 1. Tebutiuron, 2. Metoxuron, 3. Monuron, 4. Chlorotoluron, 5. Diuron, 6. Linuron

Rugged Columns with Very Long Lifetimes

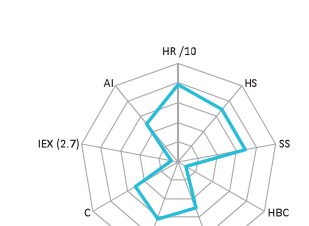
Accucore Phase Characterization



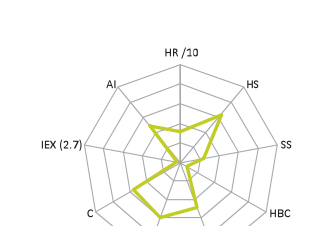
Accucore RP-MS
 Optimized for MS detection, excellent combination of speed and quality of separation



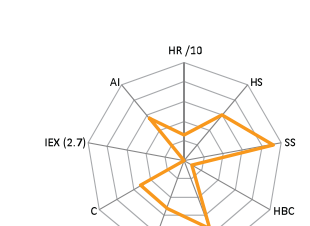
Accucore C18
 Optimum retention for non-polar analytes



Accucore aQ
 Compatible with 100% aqueous mobile phases, special selectivity for polar analytes



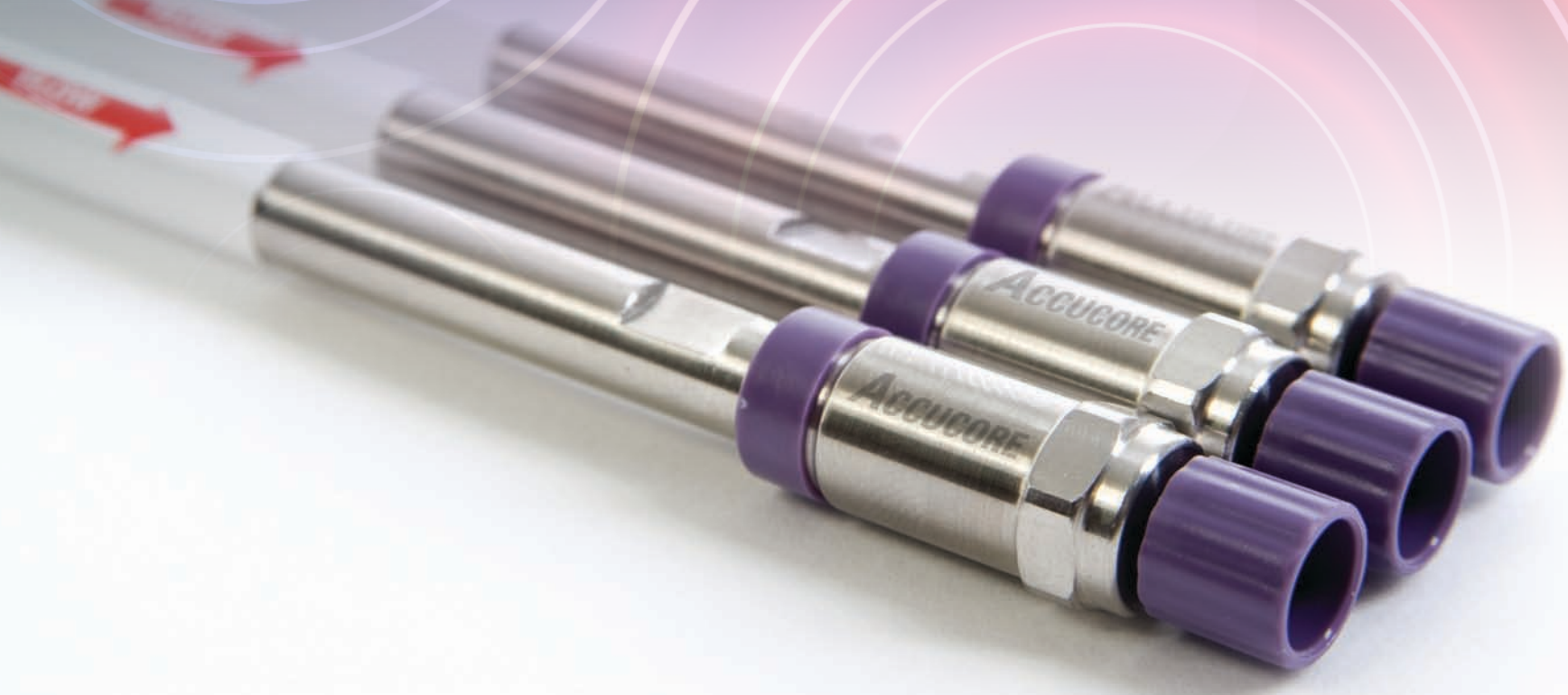
Accucore Phenyl-Hexyl
 Unique selectivity for aromatic and moderately polar analytes



Accucore PFP
 Alternative selectivity to C18, particularly for halogenated analytes

HILIC

Accucore HILIC
 Enhanced Retention of polar and hydrophilic analytes



Phase Characterization Based on Tanaka Test

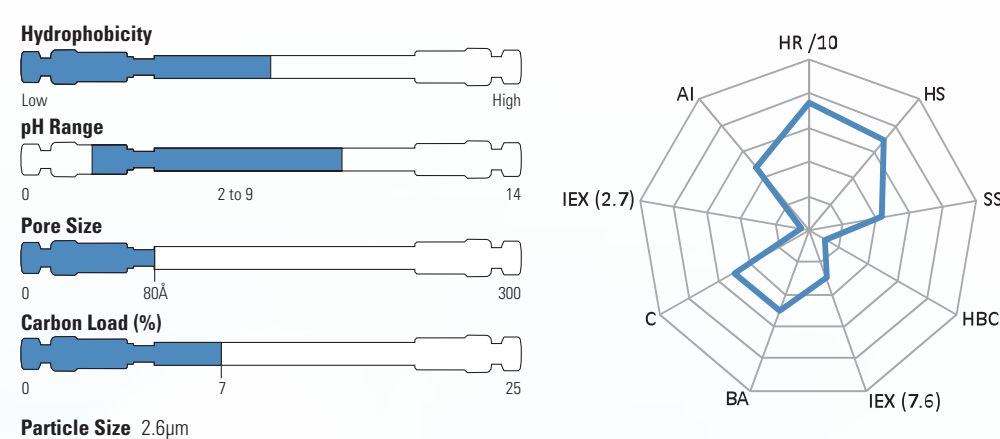
Silica Support Properties	Bonded Phase Properties	Hydrophobic Interactions	Secondary Interactions	Acidic Interactions	HILIC Interactions
Surface Area 	Carbon Load 	Hydrophobic retention 	Base activity 	Acid interaction 	HILIC retention & selectivity
Pore Size 		Hydrophobic selectivity 	Chelation 	Ion exchange capacity pH 2.6 	
Particle Size 		Steric selectivity 	Ion exchange capacity (pH 7.6) 		
Particle Size Distribution 		Hydrogen bonding capacity 			

Thermo Scientific Accucore HPLC Columns Selectivity

Phase Properties and Characterization

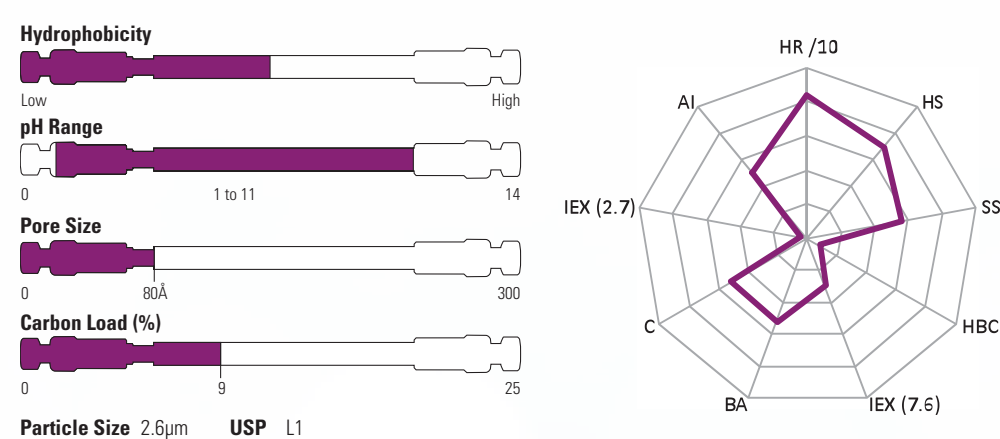
Radar plots show the results of the Accucore phase characterization and allow for quick and easy comparison of the phase selectivities.

Accucore RP-MS



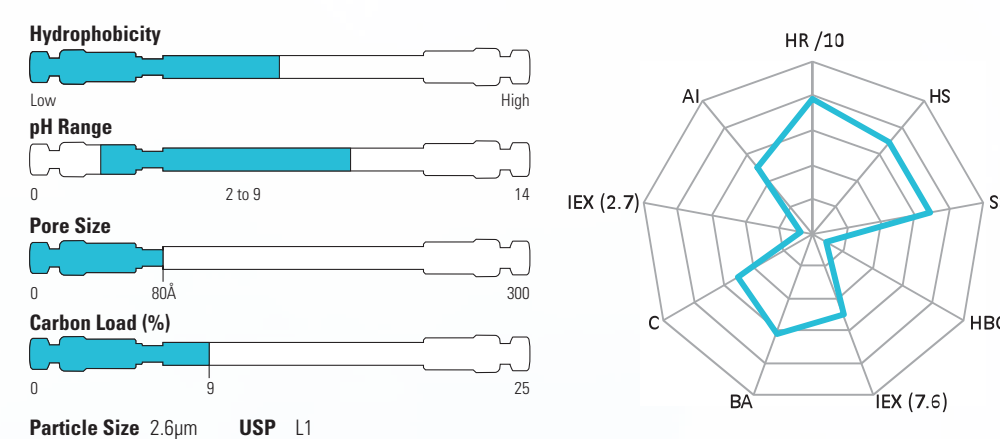
- Optimized for MS detection, excellent combination of speed and quality of separation**
- Optimized for MS detection
 - Excellent Peak Shapes
 - Excellent Combination of Speed and Efficiency

Accucore C18



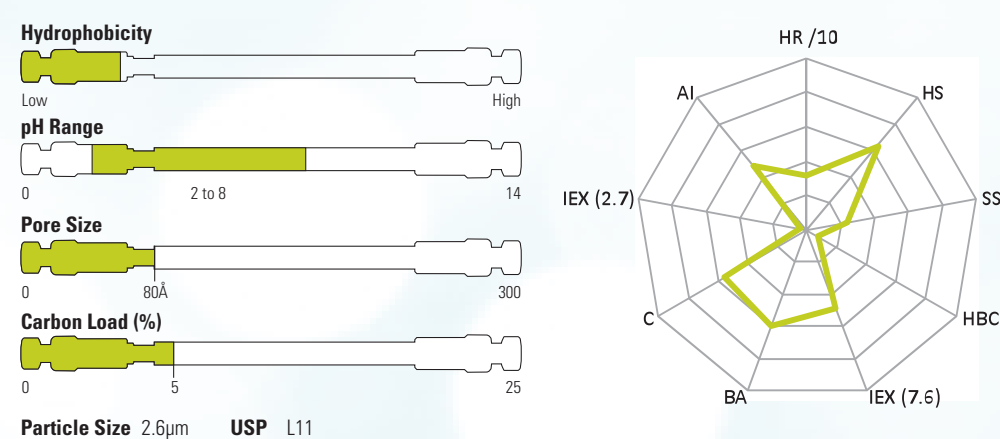
- Optimum retention for non-polar analytes**
- Optimum retention of non-polar compounds
 - Hydrophobic interaction mechanism
 - Separate a broad range of analytes

Accucore aQ



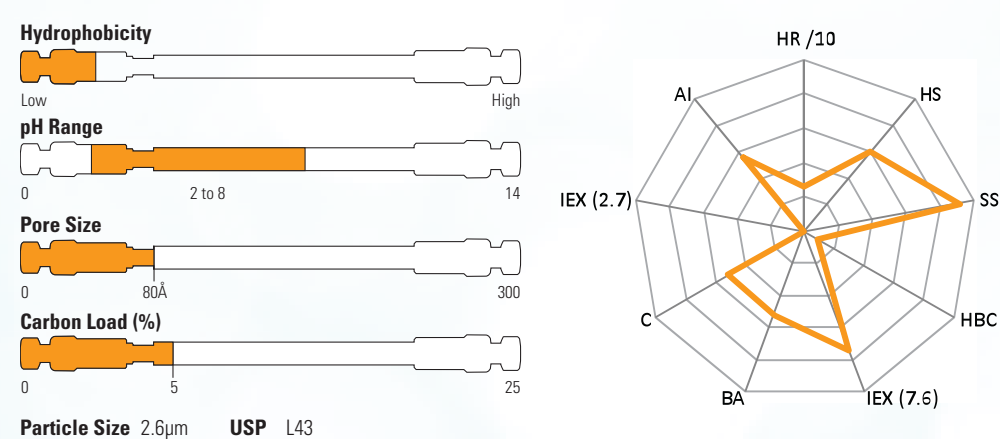
- Compatible with 100% aqueous mobile phases, special selectivity for polar analytes**
- Retention and Resolution of Polar Analytes
 - Polar Endcapped C18 Stationary Phase for Alternative Selectivity
 - Ideal for Highly Aqueous Mobile Phases

Accucore Phenyl-Hexyl



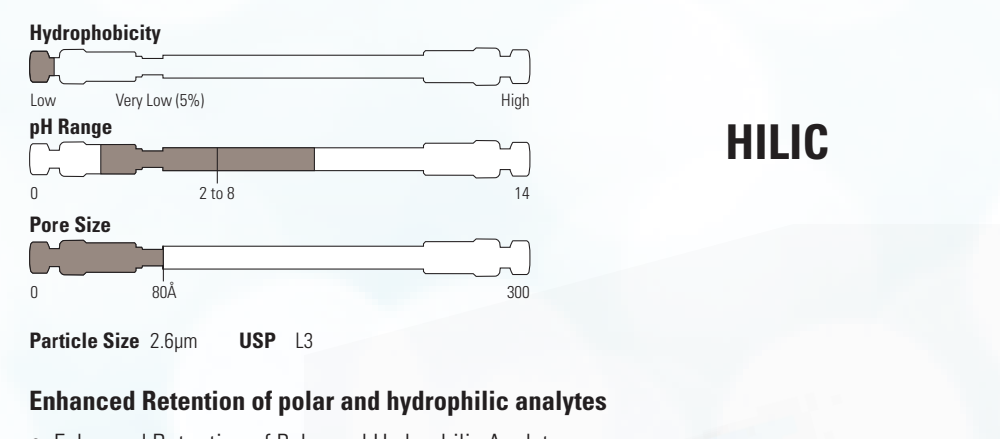
- Unique selectivity for aromatic and moderately polar analytes**
- Mixed-Mode Selectivity for Aromatic and Moderately Polar Analytes
 - Enhanced Pi-pi Interactions with Aromatics
 - Moderate Hydrophobicity

Accucore PFP



- Alternative selectivity to C18, particularly for halogenated analytes**
- Alternative Selectivity to C18
 - Extra Retention for Halogenated Species
 - Unique Selectivity for Non-halogenated Polar Compounds

Accucore HILIC



- Enhanced Retention of polar and hydrophilic analytes**
- Enhanced Retention of Polar and Hydrophilic Analytes
 - Alternative Selectivity to C18 without non-pair or Derivatization
 - Improved Sensitivity for MS detection

HILIC

Features of Accucore HPLC Columns Related to Core Enhanced Technology

	Solid Core Particles	Tight Control of Particle Diameter	Advanced Bonding Technology	Automated Packing Process
Fast Separations	•	•	•	•
High Peak Capacity	•	•	•	•
Increased Sensitivity	•	•	•	•
Lower Pressure	•	•	•	•
Loading Capacity	•	•	•	•
Reproducible Chromatography	•	•	•	•
Long Lifetime	•	•	•	•
Wide Selectivity	•	•	•	•

