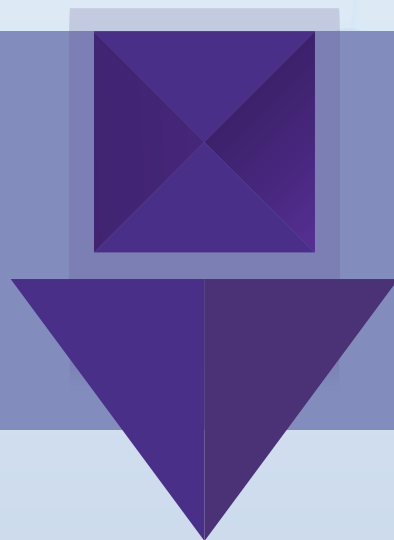




CHROMATOGRAPHY

PRODUCTS CATALOG

- ◆ **Ghost-Buster Column**
- ◆ **HPLC Column**
- ◆ **UHPLC Column**
- ◆ **Core-Shell Column**



welch 浙江月旭材料科技有限公司
Welch Materials (Zhejiang) Inc.

Quality, Innovation, Competitive Price

Welch Materials is a multinational company that develops and manufactures chromatography consumables including HPLC column, Solid Phase Extraction (SPE) column, GC column, Prep column, Flash column and packing materials.

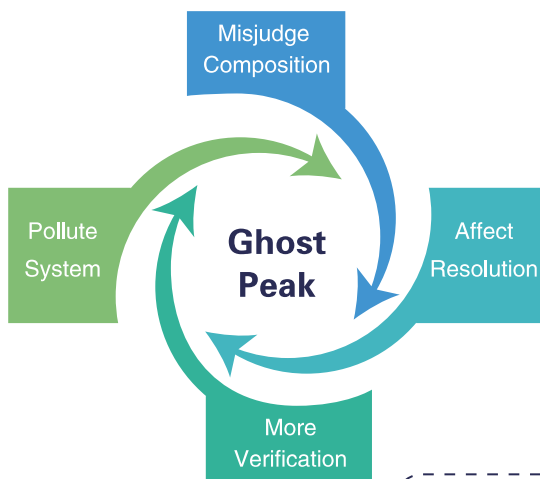
Welch Materials (Shanghai), Inc. was established in 2003 at Shanghai, China and Welch Materials (Zhejiang) was set in 2011 at Jinhua, Zhejiang, China. We also have set Welch Materials, Inc. at Hurst and Welch Materials India Pvt. Ltd. at Gurgaon. Our initial strength was our extensive experience on particle surface modification science and techniques. We are experts on bonding chemistry and innovative packing materials for chromatography applications. Through the optimal utilization of our resources, we have developed many innovative LC and GC consumable products, in particular, our five series HPLC columns, Ultisil™, Welchrom®, Xtimate®, Topsil® and Boltimate™.



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Ghost-Buster Column



What is Ghost Peak?

The peak appears erratically like ghost in chromatographic separation, especially during gradient elution or long-period operation.

Where is Ghost Peak from?

- Water, with impurities
- Purification System, polluted or poorly functioning
- Storage Containers, polluted or breeding bacteria
- Mobile Phase Additives, like salts, acids and alkalis
- Instrument, polluted after long-period use
- Other organic pollutants

Welch Ghost-Buster Column can effectively remove impurities with low polarity and thus prevents the interference from all kinds of ghost peaks. It is installed between gradient mixer and injector, which helps remove not only the impurities in mobile phase, but impurities in mixer and pipelines as well.

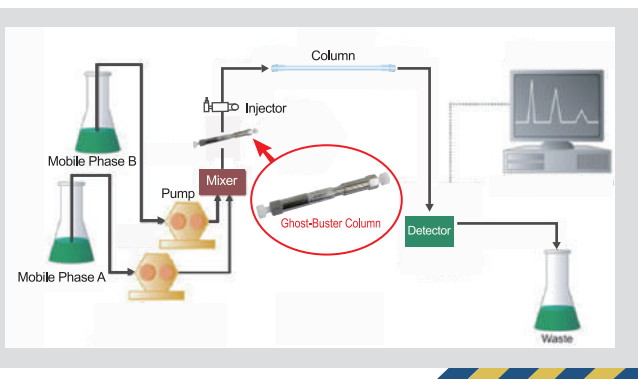
○ Operation Principles

Unlike in-line filters which removes only solid particles but not organic pollutants, Welch Ghost-Buster column provides strong adsorption to weak-polar and non-polar organic impurities, without changing the composition of mobile phase, thus to purify both mobile phase and system, remove most ghost peaks and extend lifetime of column and system.

○ Precautions

1. Install the column between Mixer and Injector. Being installed after injector would cause strong adsorption to samples and affect analysis.
2. For new analytical columns, flush Ghost-Buster column with 80% methanol solution at 1 mL/min for 20 min before new column switching to the system.
3. Not all impurities can be adsorbed by Ghost-Buster column.
4. Ion-pair solvents in mobile phase, would be adsorbed by Ghost-Buster column and affect retention and peak shape. Please use with caution under such mobile phases.
5. Column lifetime depends on analytical conditions, mobile phase and solvent purity. Routine change of Ghost-Buster column is suggested to ensure performance.
6. Ghost-Buster column is rather a purification part to the system, to filtrate impurities and protect column and system.
7. Before and after using buffer salt mobile phase, flush column with high-ratio water to transit, thus to avoid buffer salting out and blocking the column.
8. When Ghost-Buster column shows unsatisfying performance, try disconnect the outlet of the column and flush with 100% acetonitrile.

Install the Ghost-Buster column between Mixer and Injector. Sample solution must not flow through the column.



Application and Results

Column: Ultisil™ XB-C18, 4.6×250 mm, 5 μm

Flow Rate: 1.0 mL/min

Injection Volume: 10 μL

Detection: 210 nm

Temperature: 40 C

Sample Preparation: Ultra-pure water

Mobile Phase A: Ultra-pure water

Mobile Phase B: Acetonitrile

Time (min)	Mobile Phase A (%)	Mobile Phase B (%)
0	90	10
20	10	90
30	10	90
30.1	90	10
38	90	10

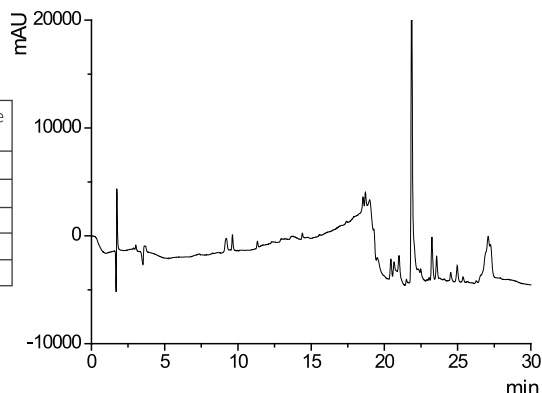


Figure 1: without Ghost-Buster column

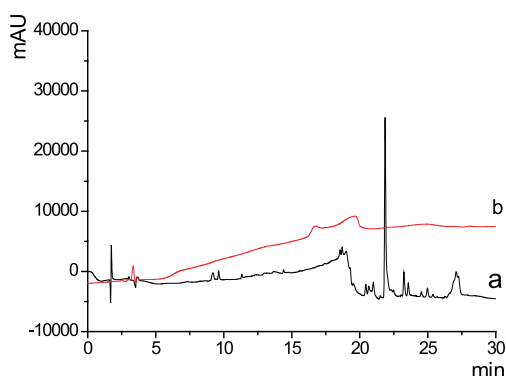


Figure 3: without Ghost-Buster column(a) and with Ghost-Buster column(b)

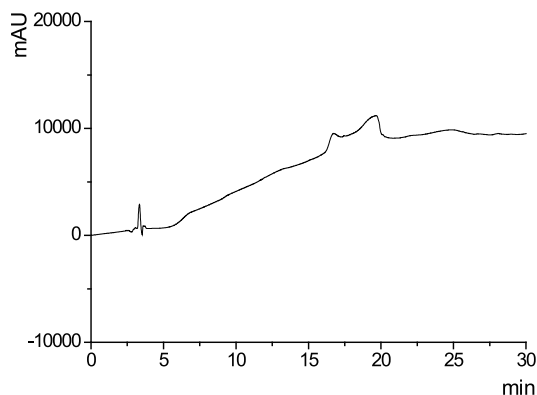


Figure 2: with Ghost-Buster column

Ordering Information

Name	P/N	Dimension	Pressure
Ghost-Buster Column	06100-31000	4.6×50 mm	40MPa
Ghost-Buster Column	06100-31001	7.8×50 mm	40MPa
Ghost-Buster HP Column	06100-31021	2.1×33 mm	100MPa
Ghost-Buster HP Column	06100-31025	2.1×50 mm	100MPa
Ghost-Buster Column Kit	GBKIT-01	4.6×50 mm, With 4 connectors and 2 pipelines	40MPa
Ghost-Buster Column Kit	GBKIT-02	7.8×50 mm, With 4 connectors and 2 pipelines	40MPa

Q&A

Q: For different samples and gradient conditions, should the Ghost-Buster column be removed or changed?

A: Not necessary. But it needs to be removed only for special circumstances like changing of peak position or ion-pair solvents mobile phase.

Q: When gradient elution changed to isocratic, should the Ghost-Buster column be removed?

A: No need to take the Ghost-Buster column if it did not affect the separation, as the elution of mobile phase stays same under isocratic condition. But impurities in mobile phase shall be taken into consideration.

Q: In gradient system, Ghost-Buster column increases the mixed dwell volume. Will this affect the separation?

A: The packing volume of a 4.6×50mm column is ~400 μL and the column is installed before the injector, which would cause little influence on the analysis. If it does, connect Ghost-Buster column to the water phase path before the mixer or switching valve.

Q: Any requirements for the connecting of Ghost-Buster column?

A: No special requirements for the connection. Common PEEK tube and connectors for HPLC system is recommended, as metal connectors may have the possibility of being stuck at column ends.

Ultisil™ Series HPLC Column

Ultisil™ Series HPLC Columns are based on ultra-pure (purity > 99.999%) spherical and totally porous silica, unique bonding chemistry and proprietary surface modification techniques, producing excellent peak shape, column efficiency and exceptional lot-to-lot reproducibility. Ultisil™ column is the best choice for method development, owing to complete bonding chemistries and stable performance.

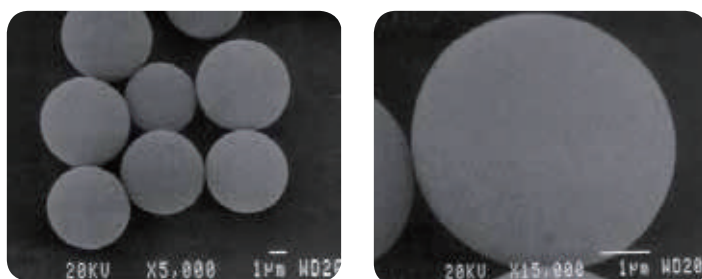
Features:

- Ultra-pure spherical porous silica, purity > 99.999%
- Unique bonding chemistry and endcapping technology
- High efficiency: theoretical plate > 80000/m
- Excellent peak symmetry: tailing factor=0.95~1.05
- Wide pH range: 1.5-10
- Long column lifetime
- Exceptional lot-to-lot reproducibility
- Complete bonding chemistries with different selectivities

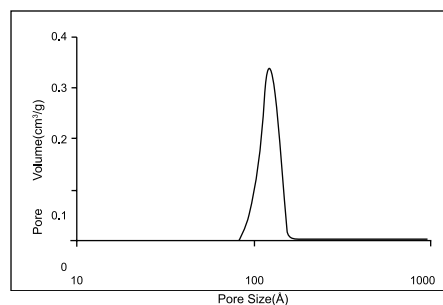
Ultisil™ HPLC Column Packing Materials

Pictures below show size uniformity and surface smoothness of the packing particles, characteristics that enable more uniform packing with less channeling effect, resulting in lower back pressure and higher column efficiency.

SEM Pictures of Ultisil™ Particles

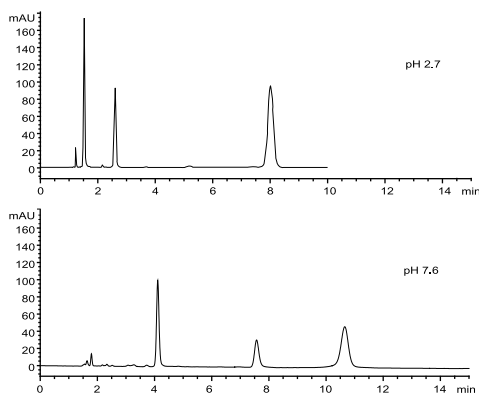


Ultisil™ Pore Size Distribution



Trace Amount Metal Contents Test

A useful chromatographic test of trace amount of metal contents in the column is to compare the peak symmetry of one pair of positional isomers, 4,4'-dipyridyl and 2,2'-dipyridyl, and a neutral chelating reagent, 1,2-dihydroxynaphthalene. 4,4'-dipyridyl, which cannot form chelating complex with metal, is used as a reference. 2,2'-dipyridyl and 1,2-dihydroxynaphthalene, which are chelating reagents, are sensitive to trace amount metal in silica. When a C18 column based on type A silica or other so-called type B silica with higher metal content is used, the peaks of 2,2'-dipyridyl and 1,2-dihydroxynaphthalene would tail or even totally disappear.



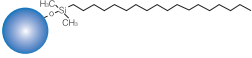
Column:	Ultisil™ XB-C18, 4.6 × 150 mm, 5 µm
Mobile Phase:	20 mM phosphate(pH 7.6) / methanol=55/45
Flow rate:	1.0 mL/min
Detector:	215 nm
Temperature:	25°C
Injection Volume:	1 µL
Samples:	1) 4,4'-Dipyridyl 2) 2,2'-Dipyridyl 3) 1,2-Dihydroxynaphthalene

Ultisil™ XB-C18 provides good peak shapes in the separation of these three compounds under pH 7.6, which indicates Ultisil silica contains hardly any metals.

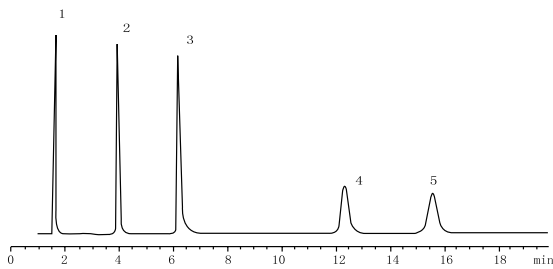
Ultisil™ XB-C18—Universal HPLC Analytical Column

Ultisil™ XB-C18 is the most commonly used column in the market. It can substitute Waters Symmetry C18, Agilent Zorbax XDB C18, Phenomenex Luna C18, Supelcosil LC-18-DB, YMC ODS-AM, Alltima C18, GL, Inertsil ODS-2 etc. XB-C18 has high theoretical plates and peak capacity, so it's suitable for analysis of complex samples.

Ultisil™ XB-C18

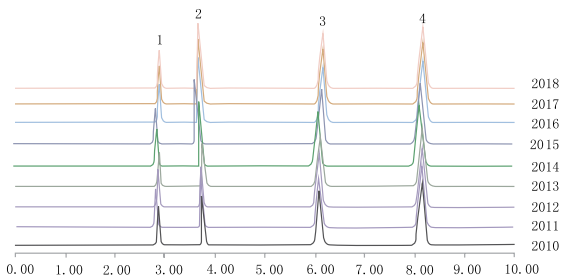
Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å), 90(300 Å)
Carbon Loading(%)	17(120 Å), 8(300 Å)
USP List	L1
Endcapped	Yes

Separation of Basic Compounds Antidepressant at pH 7.0



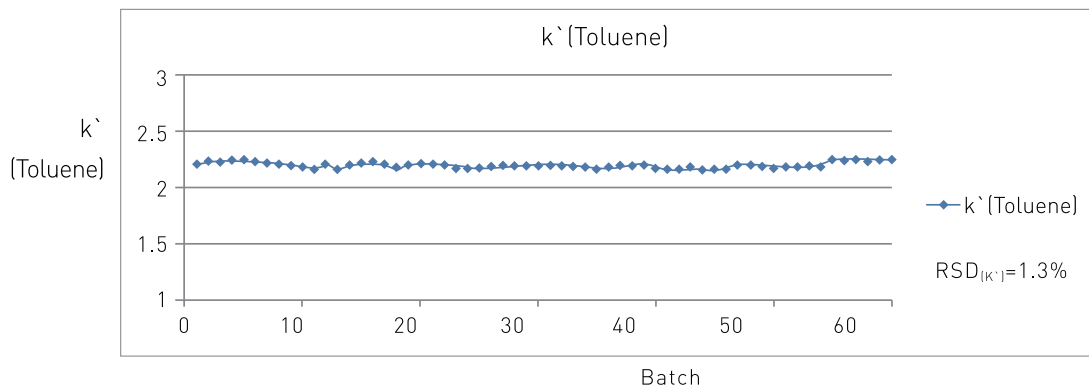
Column:	Ultisil™ XB-C18, 4.6 × 150 mm, 5 μm	
Mobile Phase:	20 mM phosphate(pH 7.0) / methanol=20 / 80	
Flow rate:	1.0 mL/min	
Detector:	215 nm	
Temperature:	25°C	
Samples:	1) Uracil 3) Ortriptyline 5) Trimipramine	2) Ropranolol 4) Amitriptyline

Comparison of Peak Shape between Batch to Batch

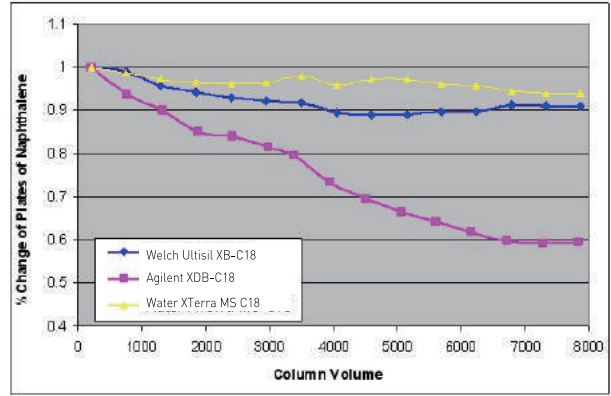
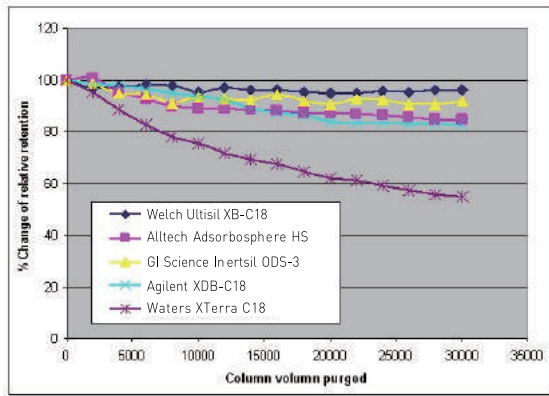


Column:	Ultisil™ XB-C18, 4.6 × 250 mm, 5 μm	
Mobile Phase:	Methanol / water=75 / 25	
Flow rate:	1.0 mL/min	
Detector:	254 nm	
Temperature:	25°C	
Samples:	1) Uracil 3) 4-chloronitrobenzen	2) Phenol 4) Methylbenzene

Capacity Factor(K') of Batch to Batch Reproducibility

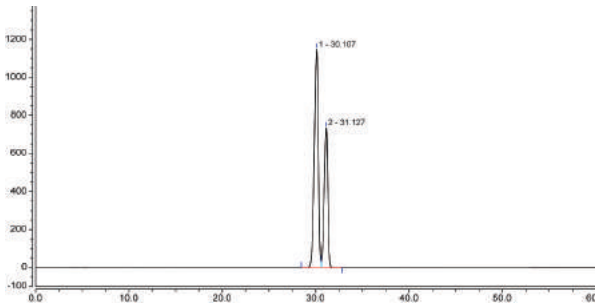


Excellent Stability at Low pH and High pH



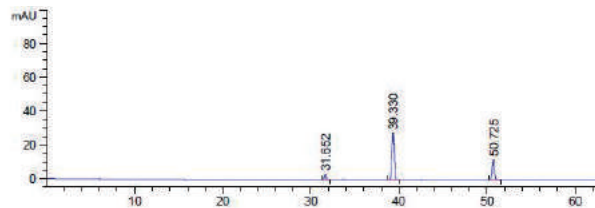
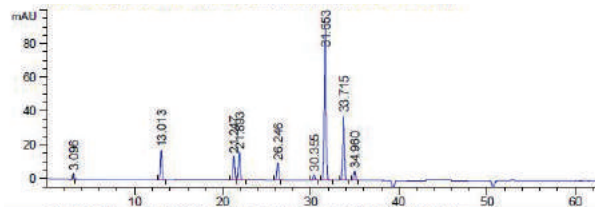
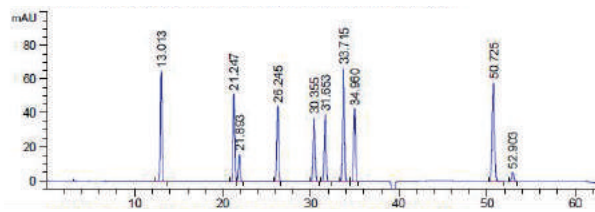
The stability of XB-C18 is better than other brand columns under pH 1.3 or under pH 10.

Argatroban



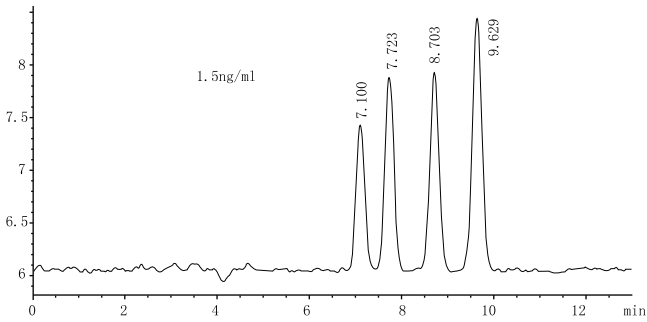
Column:	Ultisil™ XB-C18, 4.6 ×250 mm, 3 μm		
Mobile Phase:	Mobile Phase A: 10 mmol/L ammonium acetate Mobile Phase B: acetonitrile/methanol=50/30		
Gradient Program:	Time(min)	A	B
	0	60	40
	20	60	40
	35	50	50
	50	20	80
	60	20	80
	60.1	60	40
	80	60	40
Flow Rate:	0.6 mL/min		
Detector:	259 nm		
Temperature:	50 °C		
Injection Volume:	10 μL		
Reference Sample:	S-argatroban, R-argatroban,		

Paracetamol Injection USP 36



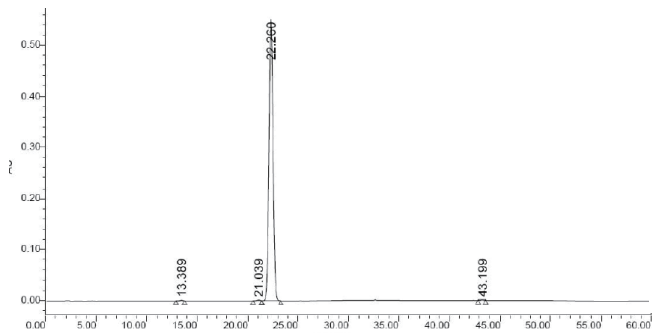
Column:	Ultisil™ XB-C18, 4.6 ×250 mm, 5 μm		
Mobile Phase:	A: methanol / water / acetic acid =50/950/1 B: methanol / water / acetic acid =50/500/1		
Gradient Program:	Time(min)	A	B
	0	82	18
	8	82	18
	53	0	100
	58	0	100
	59	82	18
	73	82	18
Flow Rate:	0.9 mL/min		
Detector:	254 nm, 275 nm, 317 nm		
Temperature:	40°C		
Injection Volume:	20 μL		
Reference Sample:	L-hydroxyproline, glycine, alanine, L-proline		

Aflatoxin



Column:	Ultisil™ XB-C18, 4.6 × 250 mm, 5 μm
Mobile Phase:	Water / methanol / acetonitrile=46/40/14
Flow Rate:	1.0 mL/min
Detector:	Excitation wavelength: 360 nm Emission wavelength: 450 nm Gain:17
Temperature:	30°C
Injection Volume:	Post-column photo chemical derivation (254 nm)
Aflatoxin B1, B2, G1, G2 mixed standards, meets separation requirements	

Progesterone(EP 5.0)



Column:	Ultisil™ XB-C18, 4.6 × 150 mm, 5 μm															
Mobile Phase:	A: water B: acetonitrile															
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>0-20</td> <td>50</td> <td>50</td> </tr> <tr> <td>20-27</td> <td>50-20</td> <td>50-80</td> </tr> <tr> <td>27-45</td> <td>20</td> <td>80</td> </tr> <tr> <td>45-50</td> <td>50</td> <td>50</td> </tr> </tbody> </table>	Time(min)	A	B	0-20	50	50	20-27	50-20	50-80	27-45	20	80	45-50	50	50
Time(min)	A	B														
0-20	50	50														
20-27	50-20	50-80														
27-45	20	80														
45-50	50	50														
Flow Rate:	0.9 mL/min															
Detector:	254 nm, 275 nm, 317 nm															
Temperature:	40°C															
Injection Volume:	20 μL															
Reference Sample:	L-hydroxyproline, glycine, alanine, L-proline															

Ordering Information

Ultisil™ XB-C18

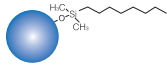
Particle size	Column ID (mm)	Column Length (mm)											Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300	10mm length		
3 μm 120 Å	2.1	00201-21009	09201-21009	00201-21010	00201-21011	00201-21012	00201-21013	00201-21014	00201-21015	00201-21016	-	00808-23001	00808-01107	
	3.0	00201-21018	-	00201-21019	00201-21020	00201-21021	00201-21022	00201-21023	00201-21024	00201-21025	-	00808-23001	00808-01107	
	4.0	00201-21027	-	00201-21028	00201-21029	00201-21030	00201-21031	00201-21032	00201-21033	00201-21034	-	00808-03001	00808-01101	
	4.6	00201-21036	11201-21036	00201-21037	00201-21038	00201-21039	00201-21040	00201-21041	00201-21042	00201-21043	-	00808-03001	00808-01101	
5 μm 120 Å	2.1	00201-31009	09201-31009	00201-31010	00201-31011	00201-31012	00201-31013	00201-31014	00201-31015	00201-31016	-	00808-24001	00808-01107	
	3.0	00201-31018	-	00201-31019	00201-31020	00201-31021	00201-31022	00201-31023	00201-31024	00201-31025	-	00808-24001	00808-01107	
	4.0	00201-31027	-	00201-31028	00201-31029	00201-31030	00201-31031	00201-31032	00201-31033	00201-31034	00201-31035	00808-04001	00808-01101	
	4.6	00201-31036	11201-31036	00201-31037	00201-31038	00201-31039	00201-31040	00201-31041	00201-31042	00201-31043	00201-31044	00808-04001	00808-01101	
10 μm 120 Å	4.0	-	-	-	-	-	-	00201-41032	00201-41033	00201-41034	00201-41035	00808-05001	00808-01101	
	4.6	-	-	-	-	-	-	00201-41041	00201-41042	00201-41043	00201-41044	00808-05001	00808-01101	

300 Å pore size column provided. Please contact welch or your local distributor for other dimensions.

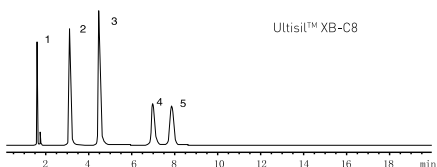
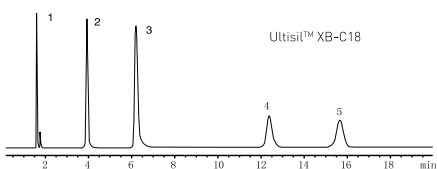
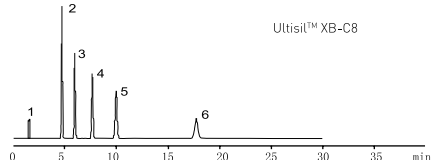
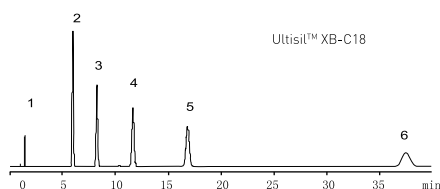
Ultisil™ XB-C8--Less retentive than XB-C18

The XB-C8 phase is less retentive than XB-C18 phase, useful for strong hydrophobic compounds that are too strongly retained on C18 phase, and for LC/MS applications, where long retention is not desired. When separating neutral or other highly retained compounds, XB-C8 can save analytical time. However, when separating polar compounds, XB-C8 column provides different selectivity than does XB-C18 column.

Ultisil™ XB-C8

Structural Formula	
pH Range	1.5-10.0
Particle Size	3 µm, 5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å), 90(300 Å)
Carbon Loading[%]	12(120 Å), 4(300 Å)
USP List	L7
Endcapped	Yes

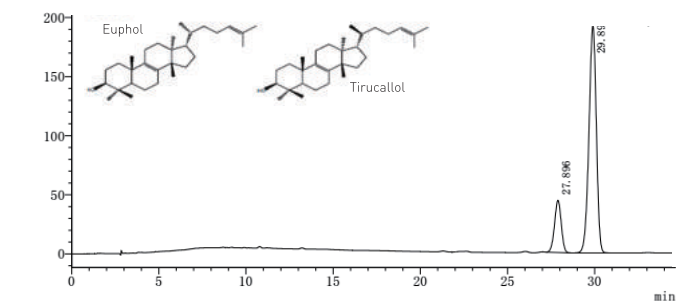
Comparison of Retention of XB-C18 and XB-C8



Column:	4.6 ×150 mm, 5 µm	
Mobile Phase:	Water / acetonitrile=30/70	
Flow rate:	1.0 mL/min	
Detector:	344 nm	
Temperature:	25°C	
Samples:	1) Uracil 2) Ethylbenzene 3) Propylbenzene	4) Butylbenzene 5) Amylbenzene 6) Heptylbenzene

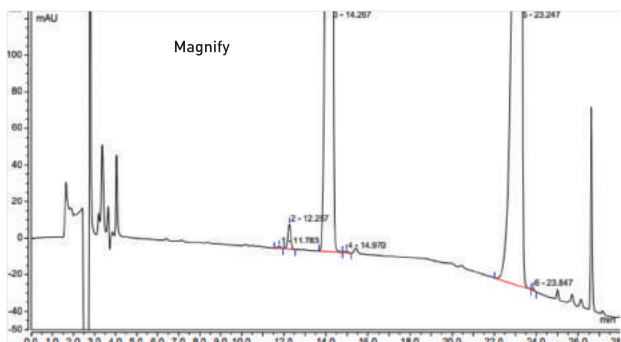
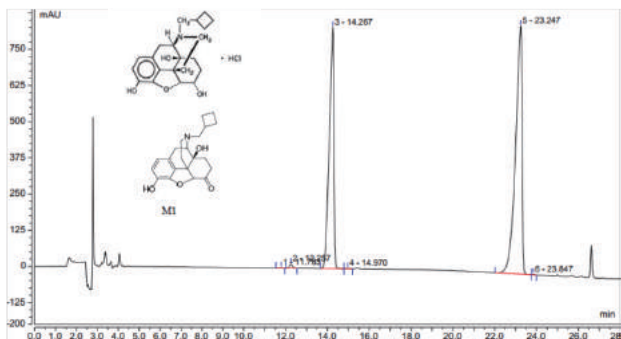
Column:	4.6 ×150 mm, 5 µm	
Mobile Phase:	20 mM phosphate(pH 7.0) / methanol=20 / 80	
Flow rate:	1.0 mL/min	
Detector:	215 nm	
Temperature:	25°C	
Samples:	1) Uracil 2) Ropranolol 3) Ortripryline	4) Amitriptyline 5) Trimipramine

Tirucallol and Euphol



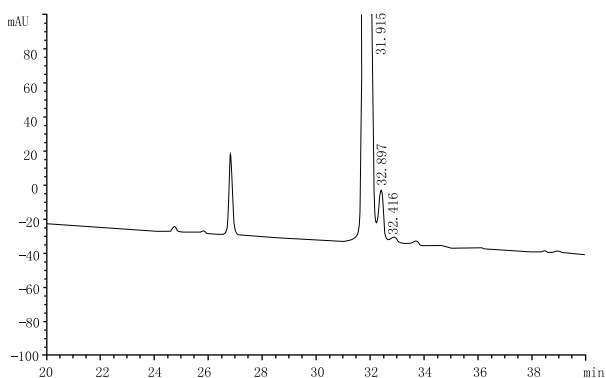
Column:	Ultisil™ XB-C8, 4.6 ×250 mm, 5 µm
Mobile Phase:	Acetonitrile/water=90/10
Flow Rate:	1.0 mL/min
Detector:	210 nm
Temperature:	30°C
Injection Volume:	10 µL

Nalbuphine HCl



Column:	Ultisil™ XB-C8, 4.6 ×250 mm, 5 μm		
Mobile Phase:	A: 0.02 mol/L KH ₂ PO ₄ buffer(pH 6.5)(%) B: acetonitrile		
Gradient Program:	Time(min)	A	B
	0	80	20
	15	70	30
	25	40	60
	28	40	60
	30	80	20
	45	80	20
Flow Rate:	1.0 mL/min		
Detector:	220 nm		
Temperature:	30°C		
Injection Volume:	10 μL		

Analysis of Insulin Detemir



Column:	Ultisil™ XB-C8, 4.6 ×150 mm, 5 μm		
Mobile Phase:	A: 20g (NH ₄) ₂ SO ₄ , 900mL water, 100 mL acetonitrile, adjust pH 2.3 B: acetonitrile/water=80/20; %B=0(0 min) , 30(9 min), 60(40 min)		
Flow Rate:	1.0 mL/min		
Detector:	214 nm		
Temperature:	30 °C		
Injection Volume:	20 μL		

Ordering Information

Ultisil™ XB-C8

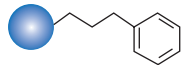
Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00202-21009	09202-21009	00202-21010	00202-21011	00202-21012	00202-21013	00202-21014	00202-21015	00202-21016	-	00808-23002	00808-01107
	3.0	00202-21018	-	00202-21019	00202-21020	00202-21021	00202-21022	00202-21023	00202-21024	00202-21025	-	00808-23002	00808-01107
	4.0	00202-21027	-	00202-21028	00202-21029	00202-21030	00202-21031	00202-21032	00202-21033	00202-21034	-	00808-03002	00808-01101
	4.6	00202-21036	11202-21036	00202-21037	00202-21038	00202-21039	00202-21040	00202-21041	00202-21042	00202-21043	-	00808-03002	00808-01101
5 μm 120 Å	2.1	00202-31009	09202-31009	00202-31010	00202-31011	00202-31012	00202-31013	00202-31014	00202-31015	00202-31016	-	00808-24002	00808-01107
	3.0	00202-31018	-	00202-31019	00202-31020	00202-31021	00202-31022	00202-31023	00202-31024	00202-31025	-	00808-24002	00808-01107
	4.0	00202-31027	-	00202-31028	00202-31029	00202-31030	00202-31031	00202-31032	00202-31033	00202-31034	00202-31035	00808-04002	00808-01101
	4.6	00202-31036	11202-31036	00202-31037	00202-31038	00202-31039	00202-31040	00202-31041	00202-31042	00202-31043	00202-31044	00808-04002	00808-01101
10 μm 120 Å	4.0	-	-	-	-	-	-	00202-41032	00202-41033	00202-41034	00202-41035	00808-05002	00808-01101
	4.6	-	-	-	-	-	-	00202-41041	00202-41042	00202-41043	00202-41044	00808-05002	00808-01101

300 Å HPLC column provided. Please contact Welch or your local distributor for other dimensions.

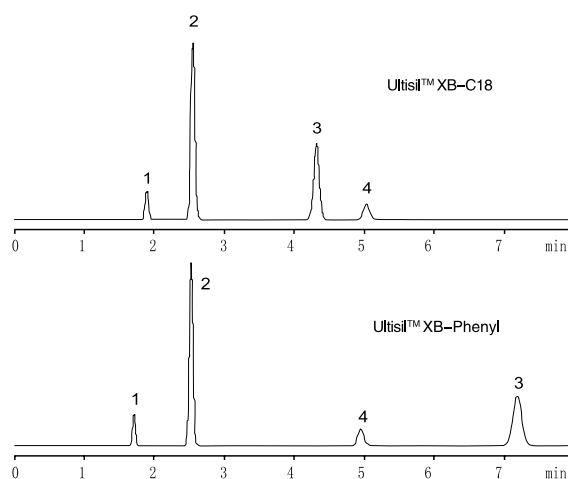
Ultisil™ XB-Phenyl--Different Selectivity to Alkyl Phase

Ultisil™ XB-Phenyl phase is less retentive than conventional C18 or C8 phases, but more retentive than standard cyano phase. Due to their ability to participate in π - π interactions, XB-Phenyl columns may actually be more retentive than C18 or C8 columns towards certain polar aromatic compounds, depending on running conditions. The selectivity for highly polar aromatics, which are poorly retained on alkyl-bonded phases, together with reduced retentivity towards non-polar compounds, make XB-Phenyl an excellent choice for the analysis of complex mixtures of polar and non-polar analytes. Additionally, this bonding phase boasts high surface coverage and exhaustive double end-capping, leading to better performance.

Ultisil™ XB-Phenyl

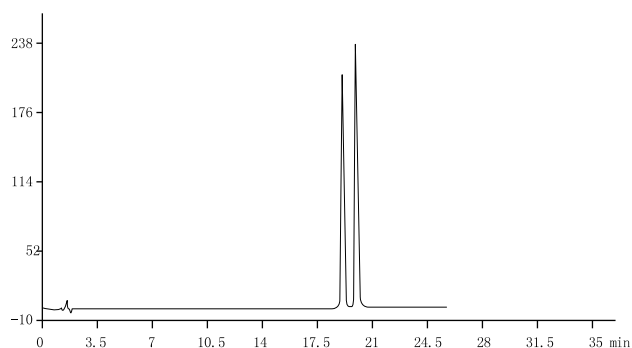
Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm , 5 μm , 10 μm
Surface Area(m^2/g)	320(120 \AA), 90(300 \AA)
Carbon Loading(%)	12(120 \AA), 4(300 \AA)
USP List	L11
Endcapped	Yes

Unique Selectivity for Aromatic Compounds of Ultisil™ XB-Phenyl Phase



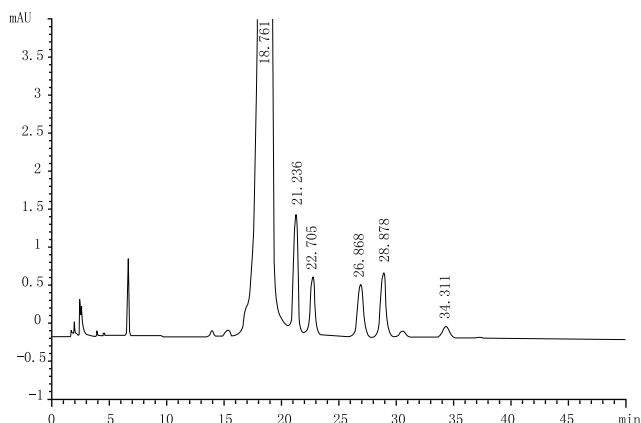
Column:	4.6 \times 150 mm, 5 μm
Mobile Phase:	Methanol / water=70/30
Flow Rate:	1.0 mL/min
Detector:	254 nm
Temperature:	24°C
Samples:	1. Uracil 2. Phenol 3. Paranitrotoluene 4. Toluene

Montelukast Sodium Isomers



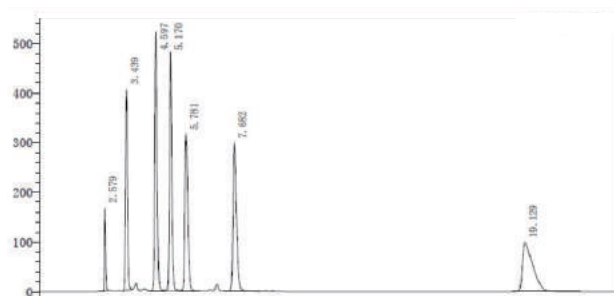
Column:	Ultisil™ XB-Phenyl, 4.6 \times 150 mm, 3 μm																								
Mobile Phase:	A: 0.2% TFA B: methanol / acetonitrile=60/40																								
	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A[%]</th> <th>B[%]</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>48</td> <td>52</td> </tr> <tr> <td>5</td> <td>45</td> <td>55</td> </tr> <tr> <td>12</td> <td>45</td> <td>55</td> </tr> <tr> <td>22</td> <td>25</td> <td>75</td> </tr> <tr> <td>23</td> <td>25</td> <td>75</td> </tr> <tr> <td>25</td> <td>48</td> <td>52</td> </tr> <tr> <td>30</td> <td>48</td> <td>52</td> </tr> </tbody> </table>	Time(min)	A[%]	B[%]	0	48	52	5	45	55	12	45	55	22	25	75	23	25	75	25	48	52	30	48	52
Time(min)	A[%]	B[%]																							
0	48	52																							
5	45	55																							
12	45	55																							
22	25	75																							
23	25	75																							
25	48	52																							
30	48	52																							
Flow Rate:	1.0 mL/min																								
Detector:	255 nm																								
Temperature:	30°C																								
Injection Volume:	10 μL																								

Moxifloxacin Hydrochloride



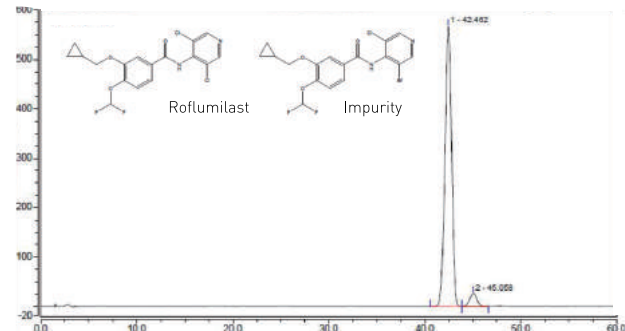
Column:	Ultisil™ XB-Phenyl, 4.6 ×250 mm, 5 μm
Mobile Phase:	(0.5g TBAHS, 1g KH ₂ PO ₄ , 3.4 g(2 mL) H ₃ PO ₄ , 1000 mL water) / methanol=72/28
Flow Rate:	1.3 mL/min
Detector:	293 nm
Temperature:	45°C
Samples:	10 μL

Fenticonazole Nitrate



Column:	Ultisil™ XB-Phenyl, 4.6 ×250 mm, 5 μm
Mobile Phase:	KH ₂ PO ₄ buffer solution*/acetonitrile=30/70 *Dissolve 3.4 g of KH ₂ PO ₄ in 900 mL water, adjust pH 3.3 with H ₃ PO ₄ , then add water to 1000 mL.
Flow Rate:	1.0 mL/min
Detector:	229nm
Temperature:	30°C
Injection Volume:	20 μL

Roflumilast



Column:	Ultisil™ XB-Phenyl, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/water=40/60
Flow Rate:	1.0 mL/min
Detector:	215 nm
Temperature:	30 °C
Samples:	10 μL

Ordering Information

Ultisil™ XB-Phenyl

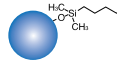
Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00203-21009	09203-21009	00203-21010	00203-21011	00203-21012	00203-21013	00203-21014	00203-21015	00203-21016	-	00808-23006	00808-01107
	3.0	00203-21018	-	00203-21019	00203-21020	00203-21021	00203-21022	00203-21023	00203-21024	00203-21025	-	00808-23006	00808-01107
	4.0	00203-21027	-	00203-21028	00203-21029	00203-21030	00203-21031	00203-21032	00203-21033	00203-21034	-	00808-03006	00808-01101
	4.6	00203-21036	11203-21036	00203-21037	00203-21038	00203-21039	00203-21040	00203-21041	00203-21042	00203-21043	-	00808-03006	00808-01101
5 μm 120 Å	2.1	00203-31009	09203-31009	00203-31010	00203-31011	00203-31012	00203-31013	00203-31014	00203-31015	00203-31016	-	00808-24006	00808-01107
	3.0	00203-31018	-	00203-31019	00203-31020	00203-31021	00203-31022	00203-31023	00203-31024	00203-31025	-	00808-24006	00808-01107
	4.0	00203-31027	-	00203-31028	00203-31029	00203-31030	00203-31031	00203-31032	00203-31033	00203-31034	00203-31035	00808-04006	00808-01101
	4.6	00203-31036	11203-31036	00203-31037	00203-31038	00203-31039	00203-31040	00203-31041	00203-31042	00203-31043	00203-31044	00808-04006	00808-01101
10 μm 120 Å	4.0	-	-	-	-	-	-	00203-41032	00203-41033	00203-41034	00203-41035	00808-05006	00808-01101
	4.6	-	-	-	-	-	-	00203-41041	00203-41042	00203-41043	00203-41044	00808-05006	00808-01101

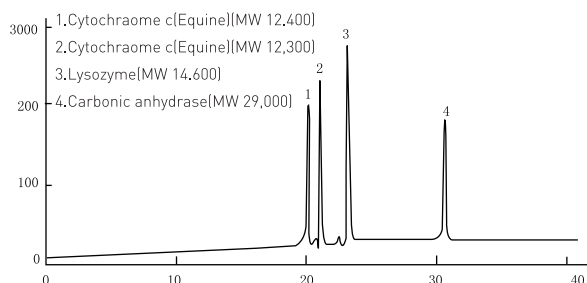
300Å HPLC column provided. Please contact Welch or your local distributor for other dimensions.

Ultisil™ XB-C4--suitable for separation of bio-samples

- Strong retention for hydrophobic and polar compounds
- Column packing of 300Å big pore size particles is appropriate for separation of peptide and protein samples with sharp peak shape
- Minibore column can be used for LC/MS(/MS)

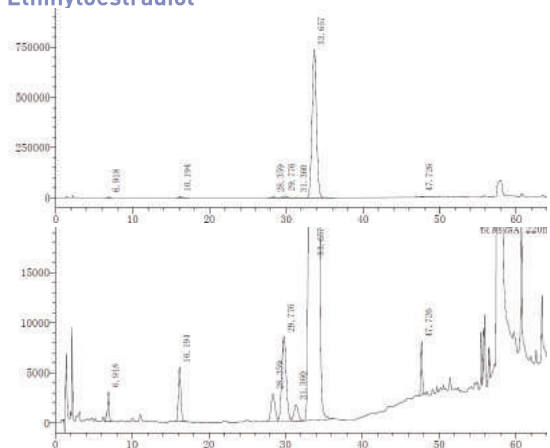
Ultisil™ XB-C4

Structural Formula			
pH Range	1.5-10.0	Carbon Loading[%]	8(120 Å), 3(300 Å)
Particle Size	3 µm, 5 µm, 10 µm	USP List	L26
Surface Area(m ² /g)	320(120 Å), 90(300 Å)	Endcapped	Yes



Column:	Ultisil™ XB-C4(300Å), 4.6 ×250 mm, 5 µm
Mobile Phase:	A: water / acetonitrile / TFA=90/10/0.05 B: water / acetonitrile / TFA=20/80/0.05 0%-100%B(0-15 min)
Flow Rate:	1.0 mL/min
Temperature:	45°C
Injection Volume:	10 µL

Ethinylestradiol



Column:	Ultisil™ XB-C4, 4.6 ×250 mm, 5 µm												
Mobile Phase:	Mobile phase A: acetonitrile/water=30/70 Mobile Phase B: acetonitrile/water=75/25												
	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>100</td> <td>0</td> </tr> <tr> <td>35</td> <td>100</td> <td>0</td> </tr> <tr> <td>65</td> <td>0</td> <td>100</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	100	0	35	100	0	65	0	100
Time(min)	A(%)	B(%)											
0	100	0											
35	100	0											
65	0	100											
Flow Rate:	1.5 mL/min												
Detector:	220 nm												
Temperature:	30°C												
Injection Volume:	30 µL												

Ordering Information

Ultisil™ XB-C4


Particle size	Column ID (mm)	Column Length (mm)									Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250		
3 µm 120 Å	2.1	00216-21009	09216-21009	00216-21010	00216-21011	00216-21012	00216-21013	00216-21014	00216-21015	00216-21016	00808-23011	00808-01107
	3.0	00216-21018	-	00216-21019	00216-21020	00216-21021	00216-21022	00216-21023	00216-21024	00216-21025	00808-23011	00808-01107
	4.0	00216-21027	-	00216-21028	00216-21029	00216-21030	00216-21031	00216-21032	00216-21033	00216-21034	00808-03030	00808-01101
	4.6	00216-21036	11216-21036	00216-21037	00216-21038	00216-21039	00216-21040	00216-21041	00216-21042	00216-21043	00808-03030	00808-01101
5 µm 120 Å	2.1	00216-31009	09216-31009	00216-31010	00216-31011	00216-31012	00216-31013	00216-31014	00216-31015	00216-31016	00808-24008	00808-01107
	3.0	00216-31018	-	00216-31019	00216-31020	00216-31021	00216-31022	00216-31023	00216-31024	00216-31025	00808-24008	00808-01107
	4.0	00216-31027	-	00216-31028	00216-31029	00216-31030	00216-31031	00216-31032	00216-31033	00216-31034	00808-04008	00808-01101
	4.6	00216-31036	11216-31036	00216-31037	00216-31038	00216-31039	00216-31040	00216-31041	00216-31042	00216-31043	00808-04008	00808-01101
10 µm 120 Å	4.0	-	-	-	-	-	-	00216-41032	00216-41033	00216-41034	00808-05008	00808-01101
	4.6	-	-	-	-	-	-	00216-41041	00216-41042	00216-41043	00808-05008	00808-01101

300 Å HPLC column provided. Please contact Welch or your local distributor for other dimensions.

Ultisil™ XB-C1

- Lowest hydrophobicity among reversed phases
- Intermediate polarity between normal phase silica and other alkyl bonded reversed phase
- Alternative selectivity to C18 phase

Ultisil™ XB-C1

Structural Formula	
pH Range	1.5-10.0
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	4(120 Å)
USP List	L13
Endcapped	Yes

Ordering Information

Ultisil™ XB-C1

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
5 µm 120 Å	2.1	00217-31009	09217-31009	00217-31010	00217-31011	00217-31012	00217-31013	00217-31014	00217-31015	00217-31016	-	00808-24023	00808-01107
	3.0	00217-31018	-	00217-31019	00217-31020	00217-31021	00217-31022	00217-31023	00217-31024	00217-31025	-	00808-24023	00808-01107
	4.0	00217-31027	-	00217-31028	00217-31029	00217-31030	00217-31031	00217-31032	00217-31033	00217-31034	00217-31035	00808-04026	00808-01101
	4.6	00217-31036	11217-31036	00217-31037	00217-31038	00217-31039	00217-31040	00217-31041	00217-31042	00217-31043	00217-31044	00808-04026	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.



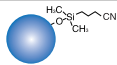
Ultisil™ XB-CN--unique selectivity for polar compounds

Ultisil™ XB-CN column can be used in either reversed or normal phase. Reversed phase CN column has special selectivity for polar compounds, and due to its low hydrophobicity, elution of hydrophobic molecules is fast. Furthermore, XB-CN column shows perfect peak shape for strong basic analytes (including quaternary ammonium salts). Polarity of XB-CN column is the strongest among all reversed columns. It is a good choice for compounds that are strongly retained on standard reversed columns.

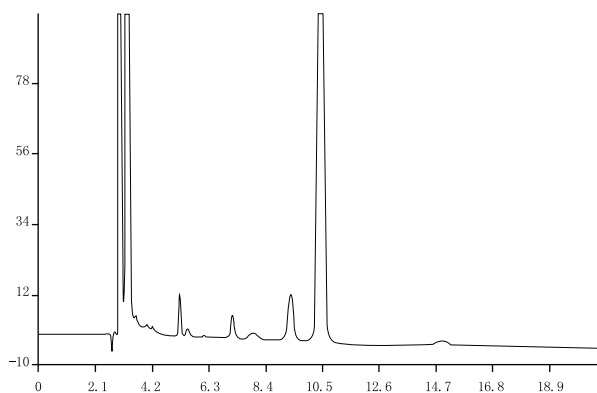
Normal phase CN column can replace SiO₂ column. Equilibrium of normal phase column is fast, and the silica surface activity is better than that of silica column. To prolong column life time, alternation between reversed phase and normal phase uses should be avoided. While XB-CN column can be used in either reversed or normal phase, elution sequence is different in different separation mode.

- Can be used in either reversed or normal phases
- Stable bonding chemistry and excellent surface coverage
- Low hydrophobicity, unique selectivity

Ultisil™ XB-CN

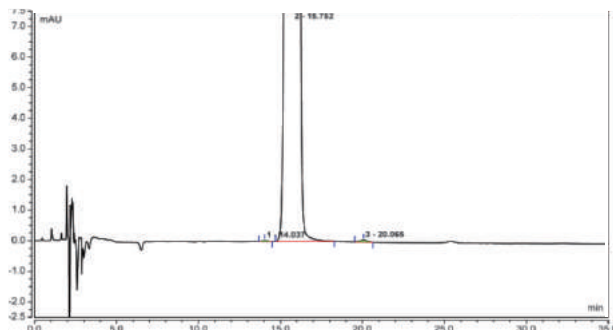
Structural Formula	
pH Range	1.5-9.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	7(120 Å)
USP List	L10
Endcapped	Yes

Rifampicin Isoniazid and Pyrazinamide



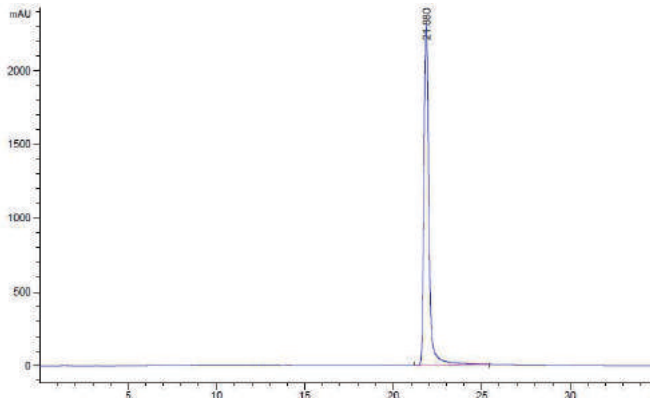
Column:	Ultisil™ XB-CN, 4.6 × 250 mm, 5 μm
Mobile Phase:	0.01 mol/L sodium heptanesulfonate solution* / acetonitrile=54/46 * Dissolve 2.0225 g of sodium heptanesulfonate in 1000 mL water, adjust pH 1.85 with H ₃ PO ₄
Flow Rate:	0.6 mL/min
Detector:	254 nm
Temperature:	30°C
Injection Volume:	20 μL

Carbamazepine



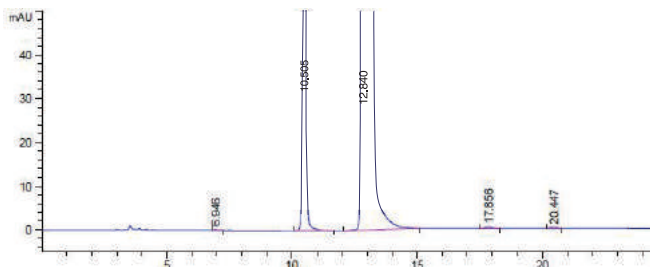
Column:	Ultisil™ XB-CN, 4.6 × 250 mm, 5 μm
Mobile Phase:	Water/methanol/tetrahydrofuran = 850/120/30 Add 0.2ml formic acid and 0.5ml triethylamine for every 1000ml
Flow Rate:	1.5 mL/min
Detector:	230 nm
Temperature:	40°C
Injection Volume:	20 μL

Cetilistat



Column:	Ultisil™ XB-CN, 4.6 × 250 mm, 5 μm												
Mobile Phase:	Mobile phase A: water Mobile Phase B: acetonitrile												
	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>60</td> <td>40</td> </tr> <tr> <td>30</td> <td>20</td> <td>80</td> </tr> <tr> <td>40</td> <td>20</td> <td>80</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	60	40	30	20	80	40	20	80
Time(min)	A(%)	B(%)											
0	60	40											
30	20	80											
40	20	80											
Flow Rate:	1.0 ml/min												
Detector:	221 nm												
Temperature:	35°C												
Injection Volume:	10 μL												

Alogliptin Benzoate



Column:	Ultisil™ XB-CN, 4.6 × 250 mm, 5 μm															
Mobile Phase:	Mobile phase A: acetonitrile/water/TFA=100/1900/1 Mobile Phase B: acetonitrile/water/TFA=1900/100/1															
	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>99</td> <td>1</td> </tr> <tr> <td>30</td> <td>80</td> <td>20</td> </tr> <tr> <td>50</td> <td>10</td> <td>90</td> </tr> <tr> <td>51</td> <td>99</td> <td>1</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	99	1	30	80	20	50	10	90	51	99	1
Time(min)	A(%)	B(%)														
0	99	1														
30	80	20														
50	10	90														
51	99	1														
Flow Rate:	1.0 mL/min															
Detector:	278 nm															
Temperature:	35°C															
Injection Volume:	20 μL															

Ordering Information

Ultisil™ XB-CN


Particle size	Column ID (mm)	Column Length (mm)											Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300	10mm length		
3 μm 120 Å	2.1	00205-21009	09205-21009	00205-21010	00205-21011	00205-21012	00205-21013	00205-21014	00205-21015	00205-21016	-	00808-23005	00808-01107	
	3.0	00205-21018	-	00205-21019	00205-21020	00205-21021	00205-21022	00205-21023	00205-21024	00205-21025	-	00808-23005	00808-01107	
	4.0	00205-21027	-	00205-21028	00205-21029	00205-21030	00205-21031	00205-21032	00205-21033	00205-21034	-	00808-03005	00808-01101	
	4.6	00205-21036	11205-21036	00205-21037	00205-21038	00205-21039	00205-21040	00205-21041	00205-21042	00205-21043	-	00808-03005	00808-01101	
5 μm 120 Å	2.1	00205-31009	09205-31009	00205-31010	00205-31011	00205-31012	00205-31013	00205-31014	00205-31015	00205-31016	-	00808-24005	00808-01107	
	3.0	00205-31018	-	00205-31019	00205-31020	00205-31021	00205-31022	00205-31023	00205-31024	00205-31025	-	00808-24005	00808-01107	
	4.0	00205-31027	-	00205-31028	00205-31029	00205-31030	00205-31031	00205-31032	00205-31033	00205-31034	00205-31035	00808-04005	00808-01101	
	4.6	00205-31036	11205-31036	00205-31037	00205-31038	00205-31039	00205-31040	00205-31041	00205-31042	00205-31043	00205-31044	00808-04005	00808-01101	
10 μm 120 Å	4.0	-	-	-	-	-	-	00205-41032	00205-41033	00205-41034	00205-41035	00808-05005	00808-01101	
	4.6	-	-	-	-	-	-	00205-41041	00205-41042	00205-41043	00205-41044	00808-05005	00808-01101	

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

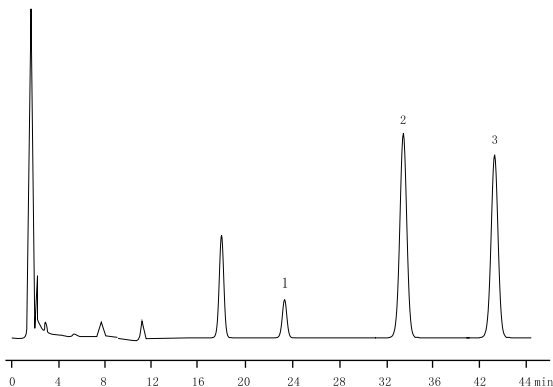
Ultisil™ SiO₂

Ultisil SiO₂ column uses ultra-high purity type B silica particles with no metal contents. SiO₂ column can separate strong hydrophilic compounds in high concentration organic solvent in reversed phase. Good result can be obtained for the analysis of polar compounds which are prone to peak tailing in reversed phase.

Ultisil™ SiO₂

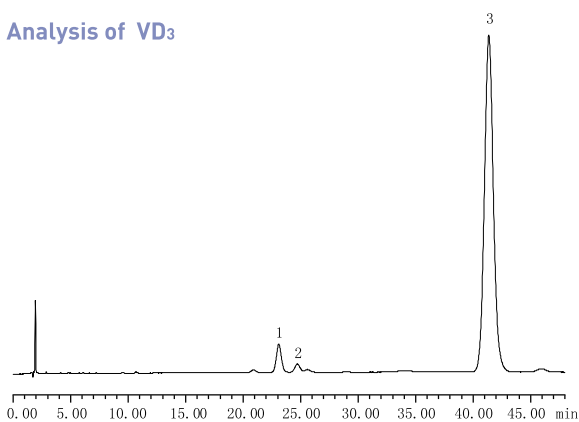
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å), 90(300Å)
Carbon Loading(%)	N/A
USP List	L3
Endcapped	No

Analysis of VD₂



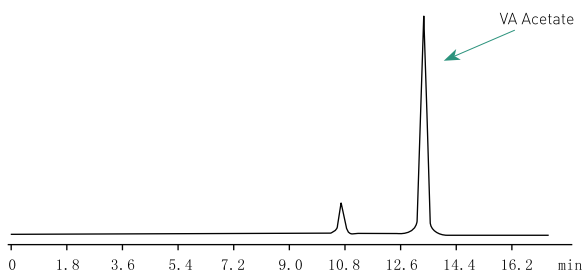
Column:	Ultisil™ SiO ₂ , 4.6 × 250 mm, 5 μm
Mobile Phase:	Hexane / isopropanol=997/3
Flow Rate:	2.0 mL/min
Detector:	254 nm
Temperature:	30°C
Injection Volume:	1. Facade VD ₂ 2. Internal Standard 3. VD ₂

Analysis of VD₃



Column:	Ultisil™ SiO ₂ , 4.6 × 250 mm, 5 μm
Mobile Phase:	N-hexane / n-amyl alcohol=99.7/0.3
Detector:	254 nm
Temperature:	30°C
Flow Rate:	2.0 mL/min
Injection Volume:	1. Facade VD ₃ 2. trans VD ₃ 3. VD ₂

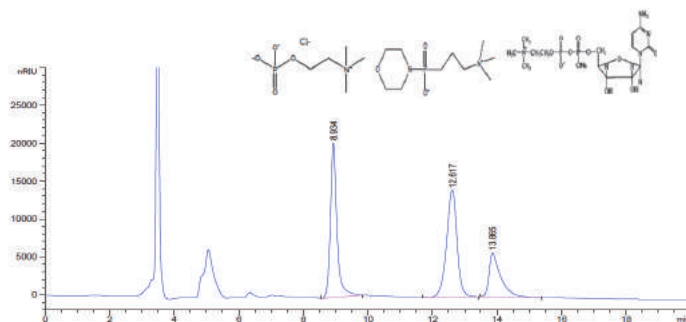
Analysis of VA Acetate



Column:	Ultisil™ SiO ₂ , 4.6 × 250 mm, 5 μm
Mobile Phase:	N-hexane / isopropanol=99.8/0.2
Detector:	326 nm
Temperature:	16°C
Flow rate:	1.0 mL/min

Sample is dissolved with n-hexane.

Separation of chlorophosphorylcholine, Phosphorylcholine morpholine and Citicoline Sodium



Column:	Ultisil™ SiO ₂ , 4.6 × 250 mm, 5 μm
Mobile Phase:	Acetonitrile / water/ glacial acetic acid = 60/40/2
Detector:	RID
Temperature:	35°C
Flow rate:	1.0 mL/min
Injection Volume:	10 μL

Ordering Information

Ultisil™ SiO₂

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00200-21009	09200-21009	00200-21010	00200-21011	00200-21012	00200-21013	00200-21014	00200-21015	00200-21016	-	00808-23007	00808-01107
	3.0	00200-21018	-	00200-21019	00200-21020	00200-21021	00200-21022	00200-21023	00200-21024	00200-21025	-	00808-23007	00808-01107
	4.0	00200-21027	-	00200-21028	00200-21029	00200-21030	00200-21031	00200-21032	00200-21033	00200-21034	-	00808-03007	00808-01101
	4.6	00200-21036	11200-21036	00200-21037	00200-21038	00200-21039	00200-21040	00200-21041	00200-21042	00200-21043	-	00808-03007	00808-01101
5 μm 120 Å	2.1	00200-31009	09200-31009	00200-31010	00200-31011	00200-31012	00200-31013	00200-31014	00200-31015	00200-31016	-	00808-24007	00808-01107
	3.0	00200-31018	-	00200-31019	00200-31020	00200-31021	00200-31022	00200-31023	00200-31024	00200-31025	-	00808-24007	00808-01107
	4.0	00200-31027	-	00200-31028	00200-31029	00200-31030	00200-31031	00200-31032	00200-31033	00200-31034	00200-31035	00808-04007	00808-01101
	4.6	00200-31036	11200-31036	00200-31037	00200-31038	00200-31039	00200-31040	00200-31041	00200-31042	00200-31043	00200-31044	00808-04007	00808-01101
10 μm 120 Å	4.0	-	-	-	-	-	-	00200-41032	00200-41033	00200-41034	00200-41035	00808-05007	00808-01101
	4.6	-	-	-	-	-	-	00200-41041	00200-41042	00200-41043	00200-41044	00808-05007	00808-01101

300Å HPLC column provided Please contact Welch or your local distributor for other dimensions.



Ultisil™ Diol

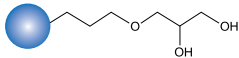
Ultisil™ Diol Column is based on ultra-pure porous spherical silica bonded with 1,2-dihydroxypropyl functional group silica. Ultisil™ Diol is used in normal phase mostly, suitable for separation of peptides, proteins, polar molecules, and organic acids and its polymers.

Like bare silica, Ultisil™ Diol has the ability to form hydrogen bonds and is capable of separating structure isomers. Since most of its surface is covered with organic functions, Ultisil™ Diol absorbs less water, which leads to more reproducible activity. It is also the sorbent of choice when working in normal phase in the presence of water. It has a different selectivity than bare silica gel, and slight modification in the composition of solvent mixture may be necessary to obtain a similar retention.

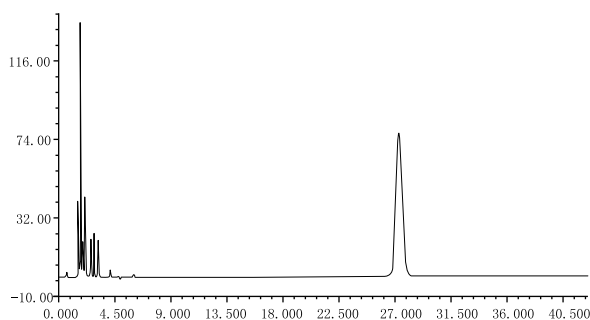
Ultisil™ Diol column is more stable than traditional normal phase columns, such as NH₂/SiO₂. Compared with NH₂/SiO₂ column, Diol column is not sensitive to water. Ultisil™ Diol column can also be used in reversed phase analysis.

- More stable than traditional normal phase columns, such as Silica, Amine
- Can be used in reversed phase analysis
- Similar polarity to Amine
- Good selectivity without excessive retention
- Improved peak shape compared to bare silica

Ultisil™ Diol

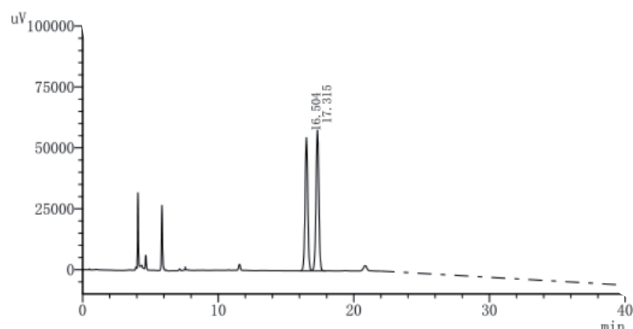
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	2.5(120 Å)
USP List	L20
Endcapped	No

Tacrolimus



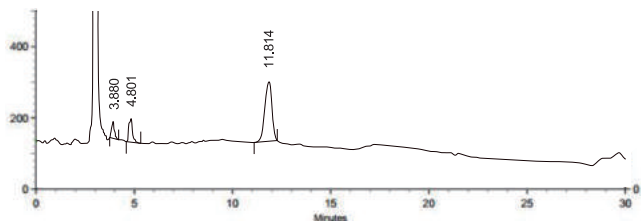
Column:	Ultisil™ Diol, 4.6 ×250 mm, 5 μm
Mobile Phase:	N-hexane/ butyl chloride/ acetonitrile=7/2/1
Detector:	225 nm
Temperature:	Ambient
Flow Rate:	1.7 mL/min
Injection Volume:	5 μL

Cloprostenol Sodium



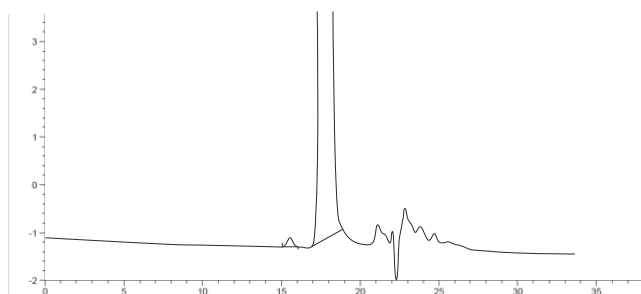
Column:	Ultisil™ Diol, 4.6 ×300 mm, 3 μm
Mobile Phase:	N-hexane/isopropanol =99.5/0.5 (volume ratio)
Detector:	220 nm
Temperature:	Ambient
Flow Rate:	1.0 mL/min
Injection Volume:	10 μL

Propofol



Column:	Ultisil™ Diol, 4.6 ×250 mm, 5 μm																		
Mobile Phase:	Mobile phase A: methanol/water/glacial acetic acid/triethylamine=85/15/0.5/0.05 Mobile Phase B: n-hexane/isopropanol/ mobile phase A=20/48/32																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>5</td> <td>95</td> </tr> <tr> <td>10</td> <td>22</td> <td>78</td> </tr> <tr> <td>22</td> <td>22</td> <td>78</td> </tr> <tr> <td>23</td> <td>90</td> <td>10</td> </tr> <tr> <td>27</td> <td>5</td> <td>95</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	5	95	10	22	78	22	22	78	23	90	10	27	5	95
Time(min)	A(%)	B(%)																	
0	5	95																	
10	22	78																	
22	22	78																	
23	90	10																	
27	5	95																	
Flow Rate:	1.0 mL/min																		
Detector:	ELSD: gas flow rate=2.5 L/min, drift tube temperature: 70°C																		
Temperature:	40°C																		
Injection Volume:	20 μL																		

Insulin



Column:	Ultisil™ Diol, 7.8 ×300 mm, 5 μm
Mobile Phase:	1 mg/mL L-arginine solution/acetonitrile/ glacial acetic acid=65/20/15
Detector:	276 nm
Temperature:	30°C
Flow Rate:	0.5 mL/min
Injection Volume:	20 μL

Ordering Information

Ultisil™ Diol

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00206-21009	09206-21009	00206-21010	00206-21011	00206-21012	00206-21013	00206-21014	00206-21015	00206-21016	-	00808-23020	00808-01107
	3.0	00206-21018	-	00206-21019	00206-21020	00206-21021	00206-21022	00206-21023	00206-21024	00206-21025	-	00808-23020	00808-01107
	4.0	00206-21027	-	00206-21028	00206-21029	00206-21030	00206-21031	00206-21032	00206-21033	00206-21034	-	00808-03020	00808-01101
	4.6	00206-21036	11206-21036	00206-21037	00206-21038	00206-21039	00206-21040	00206-21041	00206-21042	00206-21043	-	00808-03020	00808-01101
5 μm 120 Å	2.1	00206-31009	09206-31009	00206-31010	00206-31011	00206-31012	00206-31013	00206-31014	00206-31015	00206-31016	-	00808-24020	00808-01107
	3.0	00206-31018	-	00206-31019	00206-31020	00206-31021	00206-31022	00206-31023	00206-31024	00206-31025	-	00808-24020	00808-01107
	4.0	00206-31027	-	00206-31028	00206-31029	00206-31030	00206-31031	00206-31032	00206-31033	00206-31034	00206-31035	00808-04020	00808-01101
	4.6	00206-31036	11206-31036	00206-31037	00206-31038	00206-31039	00206-31040	00206-31041	00206-31042	00206-31043	00206-31044	00808-04020	00808-01101
10 μm 120 Å	4.0	-	-	-	-	-	-	00206-41032	00206-41033	00206-41034	00206-41035	00808-05020	00808-01101
	4.6	-	-	-	-	-	-	00206-41041	00206-41042	00206-41043	00206-41044	00808-05020	00808-01101

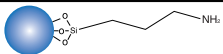
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ XB-NH₂

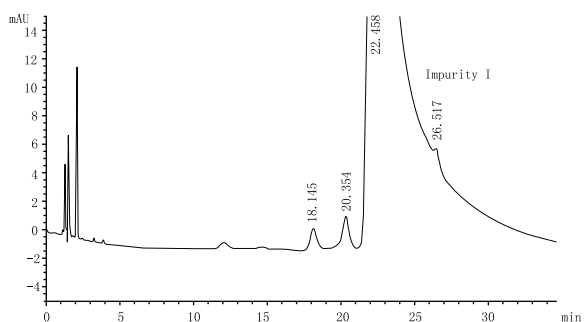
Ultisil™ XB-NH₂ column is based on propyl-amino silane, mostly used in normal phase, but can also be used in reversed phase.

- Used in normal phase for weak anion-exchange, and in reversed-phase HPLC for polar compounds
- For applications in aggressive normal phase mode with aqueous eluent
- Vitamins A and D can be separated in the normal-phase mode
- Carbohydrates and sugars can be separated in the reversed-phase mode

Ultisil™ XB-NH₂

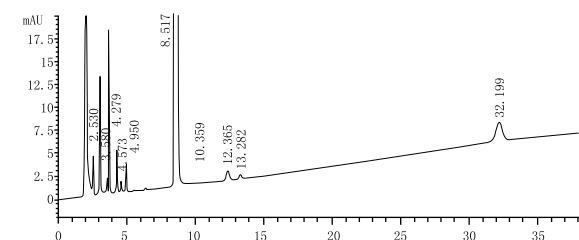
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	4(120 Å)
USP List	L8
Endcapped	No

Acarbose



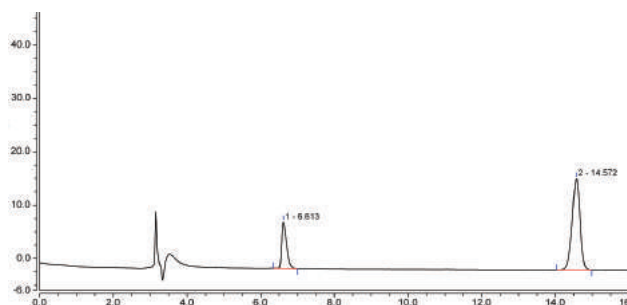
Column:	Ultisil™ XB-NH ₂ , 4.6 ×250 mm, 5 μm
Mobile Phase:	Phosphate buffer */ acetonitrile=28/72 * Dissolve 600 mg of s KH ₂ PO ₄ and 279 mg of ADSP in 100 mL water, add water to make 1000 mL
Detector:	210 nm
Temperature:	35°C
Flow Rate:	2.0 mL/min
Injection Volume:	10 μL

Acetyl-L-carnitine



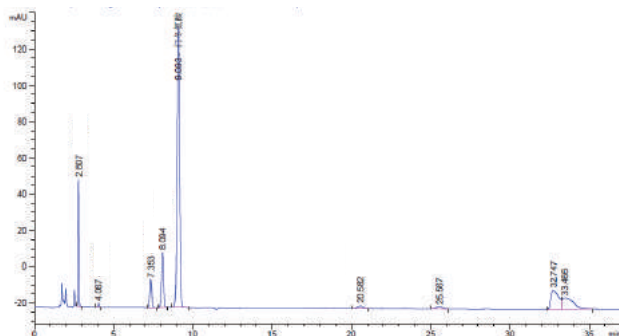
Column:	Ultisil™ XB-NH ₂ , 4.6 ×250 mm, 5 μm
Mobile Phase:	Buffer/acetonitrile=30/70
Detector:	205 nm 210 nm
Temperature:	20°C
Flow Rate:	1.0 mL/min
Injection Volume:	10 μL

Separation of N-tert-butylglycine hydrochloride and N-tert-butylglycine acid chloride hydrochloride



Column:	Ultisil™ XB-NH ₂ , 4.6 ×250 mm, 5 μm
Mobile Phase:	Methanol/isopropanol=80/20
Detector:	210 nm
Temperature:	30°C
Flow Rate:	1.0 mL/min
Injection Volume:	5 μL

Ornithine Aspartate



Column:	Ultisil™ XB-NH ₂ , 4.6 ×250 mm, 5 μm
Mobile Phase:	KH ₂ PO ₄ buffer solution*/acetonitrile=40/60 * Dissolve 2.72 g of KH ₂ PO ₄ in 500 mL water, add 5 mL of concentrated ammonia solution, add water to 1000 mL, adjust pH 5.60±0.05 with H ₃ PO ₄
Detector:	205 nm
Temperature:	30°C
Flow Rate:	1.0 mL/min
Injection Volume:	20 μL

Ordering Information

Ultisil™ XB-NH₂

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3μm	2.1	00204-21009	09204-21009	00204-21010	00204-21011	00204-21012	00204-21013	00204-21014	00204-21015	00204-21016	-	00808-23004	00808-01107
	3.0	00204-21018	-	00204-21019	00204-21020	00204-21021	00204-21022	00204-21023	00204-21024	00204-21025	-	00808-23004	00808-01107
	4.0	00204-21027	-	00204-21028	00204-21029	00204-21030	00204-21031	00204-21032	00204-21033	00204-21034	-	00808-03004	00808-01101
	4.6	00204-21036	11204-21036	00204-21037	00204-21038	00204-21039	00204-21040	00204-21041	00204-21042	00204-21043	-	00808-03004	00808-01101
5μm	2.1	00204-31009	09204-31009	00204-31010	00204-31011	00204-31012	00204-31013	00204-31014	00204-31015	00204-31016	-	00808-24004	00808-01107
	3.0	00204-31018	-	00204-31019	00204-31020	00204-31021	00204-31022	00204-31023	00204-31024	00204-31025	-	00808-24004	00808-01107
	4.0	00204-31027	-	00204-31028	00204-31029	00204-31030	00204-31031	00204-31032	00204-31033	00204-31034	00204-31035	00808-04004	00808-01101
	4.6	00204-31036	11204-31036	00204-31037	00204-31038	00204-31039	00204-31040	00204-31041	00204-31042	00204-31043	00204-31044	00808-04004	00808-01101
10μm	4.0	-	-	-	-	-	-	00204-41032	00204-41033	00204-41034	00204-41035	00808-05004	00808-01101
	4.6	-	-	-	-	-	-	00204-41041	00204-41042	00204-41043	00204-41044	00808-05004	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

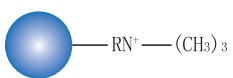
Ultisil™ Ion Exchange Column (XB-SAX&XB-SCX)

Ultisil™ ion exchange columns are available for both Strong Anion Exchange (SAX) and Strong Cation Exchange (SCX) columns. The SCX/SAX columns are silica based with high resolution and high efficiency.

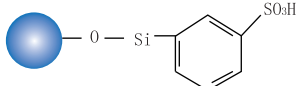
Ultisil™ SAX is a polar bonded phase, consisting of an ammonium-functionalized silane, while Ultisil™ SCX is a classical strong cation exchange, consisting of a covalently bonded aromatic sulfonic acid moiety.

- Organic modifiers such as acetonitrile and methanol may be used with SAX and SCX columns, within organic/buffer solubility constraints
- Retention can be controlled by varying pH, ionic strength and organic modifier content.

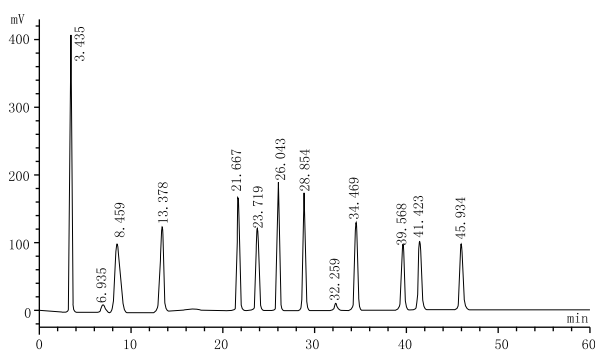
Ultisil™ XB-SAX

Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å), 90(300 Å)
Carbon Loading(%)	7.5(120 Å), 1.5(300 Å)
USP List	L14
Endcapped	No

Ultisil™ XB-SCX

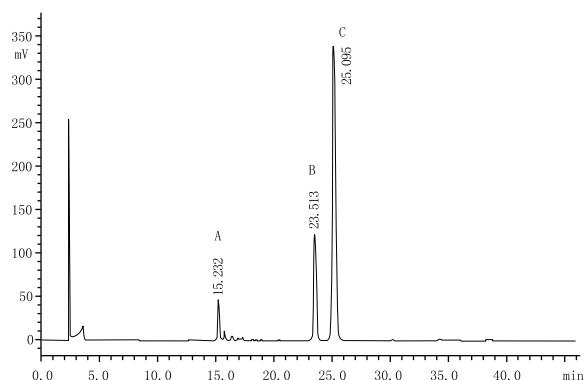
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å), 90(300 Å)
Carbon Loading(%)	12(120 Å), 5(300 Å)
USP List	L9
Endcapped	No

13 Heparin Disaccharides



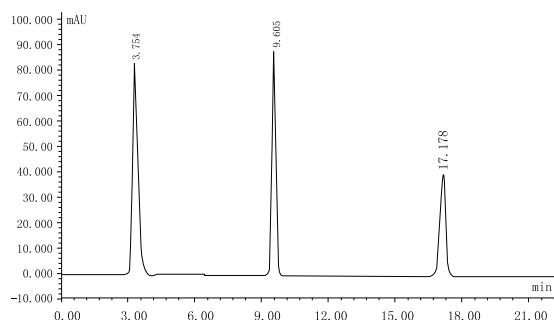
Column:	Ultisil™ XB-SAX, 3.0 ×250 mm, 5 μm
Mobile Phase:	A: weight 0.308 g NaH ₂ PO ₄ to 1000 mL volumetric flask, add 950 mL water to dissolve it, adjust pH 2.9 with H ₃ PO ₄ , then add water to scale mark B: weight 122 g NaClO ₄ to 1000 mL volumetric flask, add 950 mL mobile phase A to dissolve, adjust pH 3.0 with H ₃ PO ₄ , then add mobile phase A to scale mark.
Detector:	234 nm, 202 nm
Temperature:	50°C
Flow Rate:	0.45 mL/min
Injection Volume:	10 μL

Chondroitin Sulfate



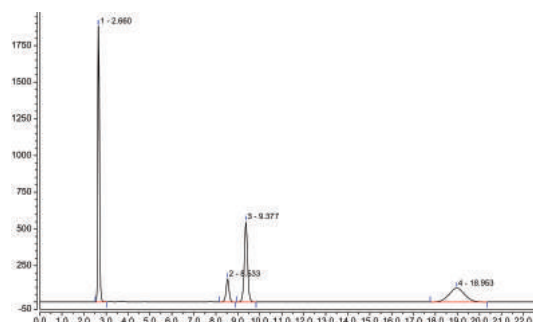
Column:	Ultisil™ XB-SAX, 4.6 ×250 mm, 5 μm
Mobile Phase:	A: water, adjust pH 3.5 with diluted HCl B: 2 mol/L NaCl, adjust pH 3.5 with diluted HCl
Detector:	232 nm
Temperature:	Ambient
Flow Rate:	1.0 mL/min
Injection Volume:	20 μL
Mixed Standards:	Chondroitin disaccharide(B) 6- sulfated chondroitin disaccharide(C) 4- sulfated chondroitin disaccharide(A)

Metformin HCL



Column:	Ultisil™ XB-SCX, 4.6 ×250 mm, 5 μm
Mobile Phase:	1.7% NH ₄ H ₂ PO ₄ (pH 3.0 adjusted by H ₃ PO ₄)
Detector:	218nm
Temperature:	Ambient
Flow Rate:	1.0 mL/min
Injection Volume:	10 μL
Samples In Order:	Icyandiamide, melamin, metformin HCL

Orazamide



Column:	Ultisil™ XB-SCX, 4.6 ×250 mm, 5 μm
Mobile Phase:	1.0% NH ₄ H ₂ PO ₄ (pH 3.0 adjusted by H ₃ PO ₄)
Detector:	215 nm
Temperature:	30 °C
Flow Rate:	1.0 mL/min
Injection Volume:	10 μL
Samples In Order:	Orotic acid, Pyridinepropanimidamide, 4-Amino-5-imidazolecarboxamide hydrochloride and AZO

Ordering Information

Ultisil™ XB-SAX

Particle size	Column ID (mm)	Column Length (mm)					Guard Cartridge	Guard Column Holder		
		50	100	150	200	250				
3 μm 120 Å	2.1	00213-21010	00213-21012	00213-21014	00213-21015	00213-21016	10mm length 00808-23008	00808-01107		
	3.0	00213-21019	00213-21021	00213-21023	00213-21024	00213-21025				
	4.0	00213-21028	00213-21030	00213-21032	00213-21033	00213-21034			00808-03008	00808-01101
	4.6	00213-21037	00213-21039	00213-21041	00213-21042	00213-21043			00808-03008	00808-01101
5 μm 120 Å	2.1	00213-31010	00213-31012	00213-31014	00213-31015	00213-31016	10mm length 00808-24009	00808-01107		
	3.0	00213-31019	00213-31021	00213-31023	00213-31024	00213-31025				
	4.0	00213-31028	00213-31030	00213-31032	00213-31033	00213-31034			00808-04009	00808-01101
	4.6	00213-31037	00213-31039	00213-31041	00213-31042	00213-31043			00808-04009	00808-01101
10 μm 120 Å	4.6	-	-	00213-41041	00213-41042	00213-41043	00808-05009	00808-01101		

Ultisil™ XB-SCX

Particle size	Column ID (mm)	Column Length (mm)					Guard Cartridge	Guard Column Holder		
		50	100	150	200	250				
3 μm 120 Å	2.1	00212-21010	00212-21012	00212-21014	00212-21015	00212-21016	10mm length 00808-23012	00808-01107		
	3.0	00212-21019	00212-21021	00212-21023	00212-21024	00212-21025				
	4.0	00212-21028	00212-21030	00212-21032	00212-21033	00212-21034			00808-03033	00808-01101
	4.6	00212-21037	00212-21039	00212-21041	00212-21042	00212-21043			00808-03033	00808-01101
5 μm 120 Å	2.1	00212-31010	00212-31012	00212-31014	00212-31015	00212-31016	10mm length 00808-24011	00808-01107		
	3.0	00212-31019	00212-31021	00212-31023	00212-31024	00212-31025				
	4.0	00212-31028	00212-31030	00212-31032	00212-31033	00212-31034			00808-04011	00808-01101
	4.6	00212-31037	00212-31039	00212-31041	00212-31042	00212-31043			00808-04011	00808-01101
10 μm 120 Å	4.6	-	-	00212-41041	00212-41042	00212-41043	00808-05011	00808-01101		

300 Å HPLC column provided. Please contact welch or your local distributor for other dimensions.

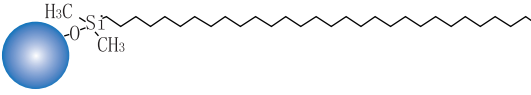
Ultisil™ XB-C30

Carotenoids is a broad class of natural products, of which over 600 types have been found so far, including compounds of different carbon chain length, such as C40, C50 and C30 etc. They are well known to have many biological functions, including cancer prevention and treatment functions.

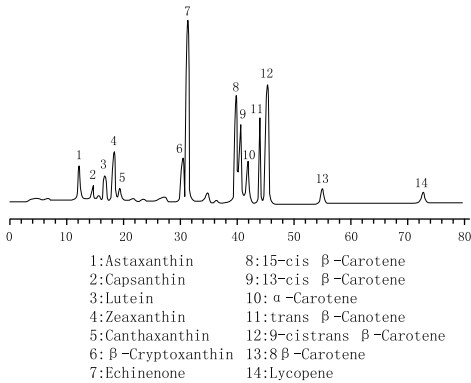
Compared to classical C18 stationary phases, the C30 phase is much more hydrophobic and retaining. Even when pure organic eluent is applied, many sample solutes, such as carotenoids, are able to retain. Ultisil™ C30 is designed for the separation of geometric isomers, polar carotenes, polar and nonpolar xanthophylls, steroids, retinols and fat-soluble vitamins (A, D, K and E).

- Polymeric C30 alkyl chains
- Very lipophilic
- Exceptional selectivity pattern for geometric isomers

Ultisil™ XB-C30

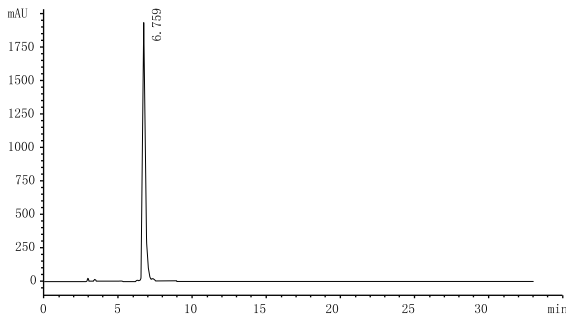
Structural Formula	
pH Range	1.5-10.0
Particle Size	3 µm, 5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	22(120 Å)
USP List	L62
Endcapped	Yes

Separation of Carotenoids



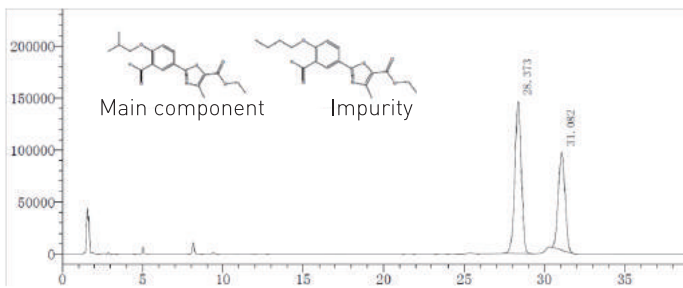
Column:	Ultisil™ XB-C30, 4.6 ×250 mm, 5 µm
Mobile Phase:	A: methanol / MTBE / water=81/15/4 B: methanol/ MTBE=10/90
Gradient Program:	0-90 min (0%B-100%B)
Detector:	450 nm
Temperature:	Ambient
Flow Rate:	1.0 mL/min

Analysis of All-trans Astaxanthin



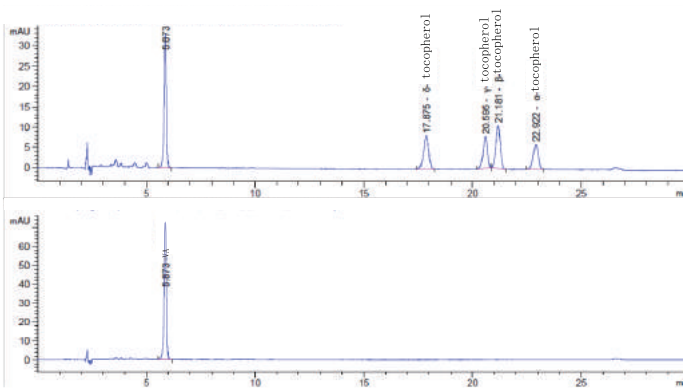
Column:	Ultisil™ XB-C30, 4.6 ×250 mm, 5 µm																		
Mobile Phase:	A: methanol / 1% H ₃ PO ₄ =94/6 B: methanol / TBME/ 1% H ₃ PO ₄ =16/80/4																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>67</td> <td>23</td> </tr> <tr> <td>15</td> <td>52</td> <td>48</td> </tr> <tr> <td>23</td> <td>0</td> <td>100</td> </tr> <tr> <td>27</td> <td>67</td> <td>33</td> </tr> <tr> <td>30</td> <td>67</td> <td>33</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	67	23	15	52	48	23	0	100	27	67	33	30	67	33
Time(min)	A(%)	B(%)																	
0	67	23																	
15	52	48																	
23	0	100																	
27	67	33																	
30	67	33																	
Flow Rate:	1.0 mL/min																		
Detector:	474 nm																		
Temperature:	30 °C																		
Injection Volume:	20 µL																		

Febuxostat Intermediate



Column:	Ultisil™ XB-C30, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/ water=70/30
Detector :	230 nm
Temperature :	30°C
Flow Rate :	1.0 mL/min
Injection Volume	20 μL

VE(α, β, γ, δ -tocopherol) and VA



Column:	Ultisil™ XB-C30, 4.6 ×250 mm, 5 μm		
Mobile Phase:	A: water B: methanol		
Gradient Program:	Time(min)	A(%)	B(%)
	0	4	96
	13	4	96
	20	0	100
	30	4	96
Flow Rate:	0.8 mL/min		
Detector:	294/325 nm		
Temperature:	20°C		
Injection Volume:	10 μL		

Ordering Information

Ultisil™ XB-C30

Particle size	Column ID (mm)	Column Length (mm)											Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300			
3 μm 120 Å	2.1	00223-21009	09223-21009	00223-21010	00223-21011	00223-21012	00223-21013	00223-21014	00223-21015	00223-21016	-	00808-23013	00808-01107	
	3.0	00223-21018	-	00223-21019	00223-21020	00223-21021	00223-21022	00223-21023	00223-21024	00223-21025	-	00808-23013	00808-01107	
	4.0	00223-21027	-	00223-21028	00223-21029	00223-21030	00223-21031	00223-21032	00223-21033	00223-21034	-	00808-03035	00808-01101	
	4.6	00223-21036	11223-21036	00223-21037	00223-21038	00223-21039	00223-21040	00223-21041	00223-21042	00223-21043	-	00808-03035	00808-01101	
5 μm 120 Å	2.1	00223-31009	09223-31009	00223-31010	00223-31011	00223-31012	00223-31013	00223-31014	00223-31015	00223-31016	-	00808-24024	00808-01107	
	3.0	00223-31018	-	00223-31019	00223-31020	00223-31021	00223-31022	00223-31023	00223-31024	00223-31025	-	00808-24024	00808-01107	
	4.0	00223-31027	-	00223-31028	00223-31029	00223-31030	00223-31031	00223-31032	00223-31033	00223-31034	00223-31035	00808-04035	00808-01101	
	4.6	00223-31036	11223-31036	00223-31037	00223-31038	00223-31039	00223-31040	00223-31041	00223-31042	00223-31043	00223-31044	00808-04035	00808-01101	
10 μm 120 Å	4.6	-	-	-	-	-	-	00223-41041	00223-41042	00223-41043	00223-41044	00808-05013	00808-01101	

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ AQ-C18

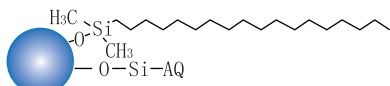
--The most widely used column in food industry

Ultisil™ AQ-C18 columns are designed to have extended retention and selectivity for hydrophilic and polar compounds, which are poorly or not at all retained on other phases. A proprietary bonding chemistry, Ultisil™ AQ-C18 avoids so-called “phase collapse”, even when 100% water is used, a phenomenon that conventional C18 columns typically exhibit at high water content in the mobile phase. Ultisil™ AQ-C18 phase is fully end-capped to ensure the best peak shapes of polar and basic compounds and longer lifetime. Typical applications are separations of water soluble compounds that cannot be retained on traditional C18 phase. Examples include biomolecules, metabolites, and pharmaceutical degradants such as organic acids, water-soluble vitamins, oligosaccharides, amino acids, and small peptides and nucleotides.

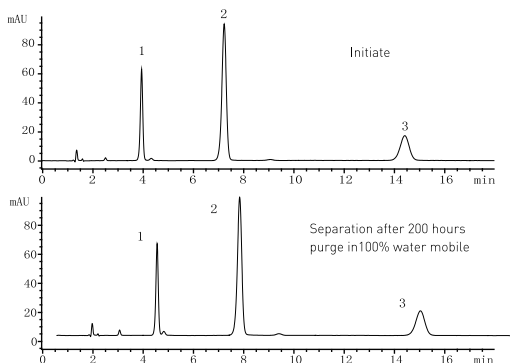
Features:

- No phase collapse, suitable for high aqueous mobile phase
- Less retentive than XB-C18 for non-polar compounds
- Increased retention for polar and water-soluble compounds

Ultisil™ AQ-C18

Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	12(120 Å)
USP List	L1
Endcapped	Yes

Phase collapse research

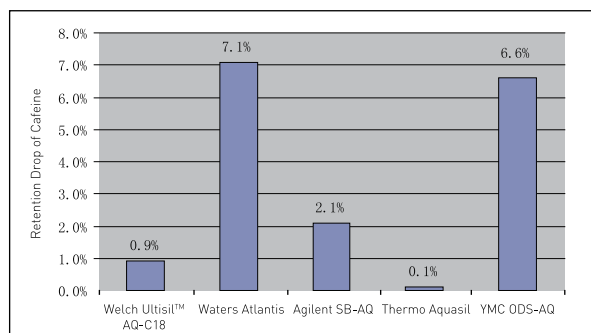


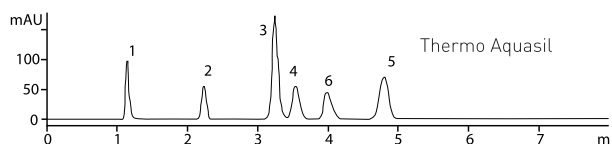
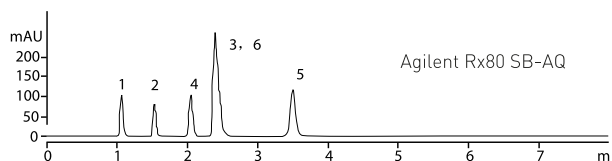
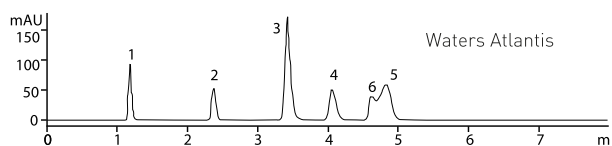
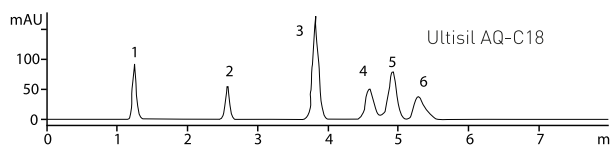
Column:	Ultisil™ AQ-C18, 4.6 ×100 mm, 5 μm
Mobile Phase:	Acetonitrile/50 mM phosphate(pH 3.5)=10/90
Detector:	215nm
Temperature:	25°C
Flow Rate:	1.0 mL/min
Samples:	1.Theophylline 2.Caffeine 3.Phenol

Phase Collapse Comparison with Other Brands

Peak shape is excellent for acid, basic and neutral samples on AQ-C18. When in highly aqueous mobile phase, retention for polar compounds such as organic acids, peptides, nucleosides and water soluble vitamins is strong.

Under the same condition, when compared with other brands in highly aqueous mobile phase, Ultisil™ AQ-C18 shows excellent resistance to phase collapse.



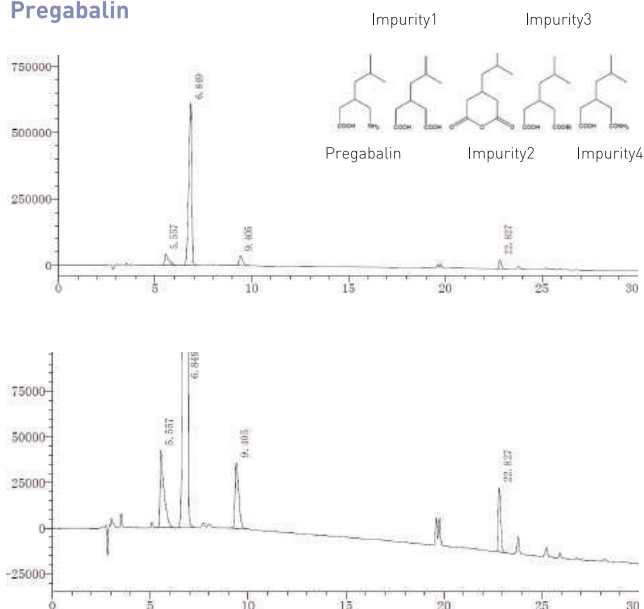


Column:	Ultisil™ AQ-C18, 4.6 ×100 mm, 5 μm
Mobile Phase:	50 mM phosphate, pH2.5
Detector:	210 nm
Temperature:	25°C
Flow Rate:	1.0 mL/min
Samples:	1. Oxalic acid 2. Lactic acid 3. Maleic acid 4. Citric acid 5. Fumaric acid 6. Succinic acid

How to choose XB-C18 and AQ-C18?

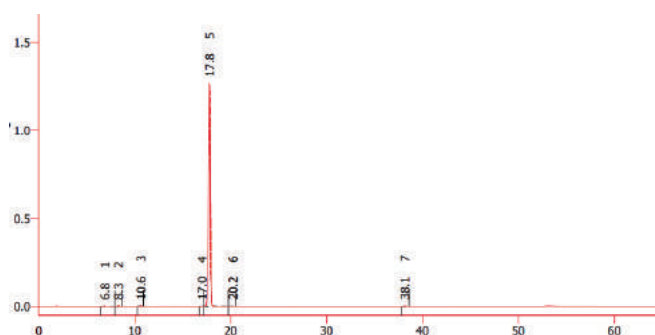
XB-C18	AQ-C18
<ul style="list-style-type: none"> • Suitable for separation of most pharmaceuticals, environment and chemical compounds • Excellent peak shape for basic and polar samples 	<ul style="list-style-type: none"> • Suitable for water soluble strong polar samples, such as traditional Chinese medicine ingredients, food, beverage, organic acids, peptides, nucleosides and water solution vitamins • Best choice for mobile phase that contains <20% organic content

Pregabalin



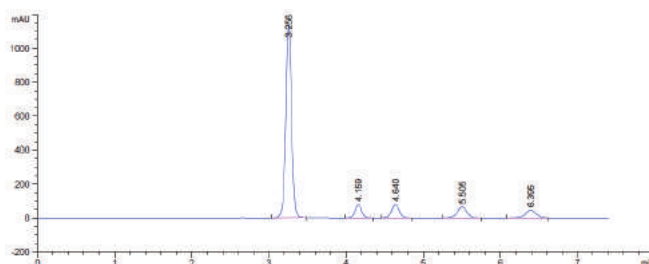
Column:	Ultisil™ AQ-C18, 4.6 ×250 mm, 5 μm															
Mobile Phase:	A: 40 mM (NH ₄) ₂ HPO ₄ /methanol=80/20 B: acetonitrile/methanol=90/10															
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>98</td> <td>2</td> </tr> <tr> <td>5</td> <td>98</td> <td>2</td> </tr> <tr> <td>30</td> <td>50</td> <td>50</td> </tr> <tr> <td>31</td> <td>50</td> <td>2</td> </tr> </tbody> </table>	Time(min)	A	B	0	98	2	5	98	2	30	50	50	31	50	2
Time(min)	A	B														
0	98	2														
5	98	2														
30	50	50														
31	50	2														
Flow Rate:	1.0 mL/min															
Detector:	210 nm															
Temperature:	35°C															
Injection Volume:	20 μL															

Vilazodone hydrochloride



Column:	Ultisil™ AQ-C18, 4.6 ×250 mm, 5 μm																								
Mobile Phase:	Mobile phase A: 0.025 mol/L K ₂ HPO ₄ , adjust pH 6.0 with H ₃ PO ₄ Mobile Phase B: acetonitrile																								
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr><td>0</td><td>75</td><td>25</td></tr> <tr><td>3</td><td>75</td><td>25</td></tr> <tr><td>25</td><td>60</td><td>40</td></tr> <tr><td>40</td><td>35</td><td>65</td></tr> <tr><td>50</td><td>35</td><td>65</td></tr> <tr><td>50.1</td><td>75</td><td>25</td></tr> <tr><td>65</td><td>75</td><td>25</td></tr> </tbody> </table>	Time(min)	A	B	0	75	25	3	75	25	25	60	40	40	35	65	50	35	65	50.1	75	25	65	75	25
Time(min)	A	B																							
0	75	25																							
3	75	25																							
25	60	40																							
40	35	65																							
50	35	65																							
50.1	75	25																							
65	75	25																							
Flow Rate:	1.0 mL/min																								
Detector:	240 nm																								
Temperature:	40°C																								
Injection Volume:	20 μL																								

NMN(nicotinamide mononucleotide)



Column:	Ultisil™ AQ-C18, 4.6 ×250 mm, 5 μm
Mobile Phase:	40mM KH ₂ PO ₄ solution*/methanol=68/32 * Dissolve 2.72 g of KH ₂ PO ₄ and 0.85 g of TBAHS in 500 mL water, adjust pH 6.2 with 1 mol/L KOH
Detector :	259 nm
Temperature :	25 °C
Flow Rate :	1.0 mL/min
Injection Volume	10 μL
Samples:	1. NMN 2. nicotinamide 3. AMP 4. ADP 5. ATP

Ordering Information

Ultisil™ AQ-C18

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder	
		30	33	50	75	100	125	150	200	250	300			
3 μm 120 Å	2.1	00207-21009	09207-21009	00207-21010	00207-21011	00207-21012	00207-21013	00207-21014	00207-21015	00207-21016	-	10mm length	00808-23003	00808-01107
	3.0	00207-21018	-	00207-21019	00207-21020	00207-21021	00207-21022	00207-21023	00207-21024	00207-21025	-	00808-23003	00808-01107	
	4.0	00207-21027	-	00207-21028	00207-21029	00207-21030	00207-21031	00207-21032	00207-21033	00207-21034	-	00808-03003	00808-01101	
	4.6	00207-21036	11207-21036	00207-21037	00207-21038	00207-21039	00207-21040	00207-21041	00207-21042	00207-21043	-	00808-03003	00808-01101	
5 μm 120 Å	2.1	00207-31009	09207-31009	00207-31010	00207-31011	00207-31012	00207-31013	00207-31014	00207-31015	00207-31016	-	00808-24003	00808-01107	
	3.0	00207-31018	-	00207-31019	00207-31020	00207-31021	00207-31022	00207-31023	00207-31024	00207-31025	-	00808-24003	00808-01107	
	4.0	00207-31027	-	00207-31028	00207-31029	00207-31030	00207-31031	00207-31032	00207-31033	00207-31034	00207-31035	00808-04003	00808-01101	
	4.6	00207-31036	11207-31036	00207-31037	00207-31038	00207-31039	00207-31040	00207-31041	00207-31042	00207-31043	00207-31044	00808-04003	00808-01101	
10 μm 120 Å	4.0	-	-	-	-	-	-	00207-41032	00207-41033	00207-41034	00207-41035	00808-05003	00808-01101	
	4.6	-	-	-	-	-	-	00207-41041	00207-41042	00207-41043	00207-41044	00808-05003	00808-01101	

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ LP Series HPLC Column

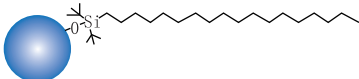
LP is abbreviation for **Low pH**. LP phases are designed for use at low pH conditions. LP phase consists of two very bulky hydrophobic protective groups to prevent siloxane bond from hydrolysis at low pH condition. So Ultisil™ LP column is extremely stable in very low pH mobile phase and at high temperature, even at the lowest pH of 1.0, making it the most stable phase for low pH application in the market. Because it is not endcapped and has more surface silanols, LP phase has more retention for some early eluted polar compounds, and provides different selectivities. Ultisil™ LP-C18 is the most polar C18 among all the C18 products of Welch.

- Not endcapped, prevents siloxane bond from hydrolysis at low pH condition.
- Compatible with 100% water as the mobile phase, more polar than “AQ”, better peak shape and resolution
- Best peak shape for polar compounds
- Exceptional lifetime at low pH (0.5-8.0) and high temperature

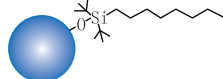
How to choose XB-C18 and LP-C18

When pH < 5.0, based on your separation conditions, you may choose either LP-C18 or XB-C18;
 When pH < 2.0 (such as 0.1% TFA), LP-C18, which provides exceptional stability, longer lifetime, perfect peak shape and superior selectivity, is your best choice

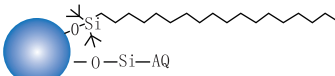
Ultisil™ LP-C18

Structural Formula	
pH Range	0.5-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å), 90(300 Å)
Carbon Loading[%]	10(120 Å), 5(300 Å)
USP List	L1
Endcapped	No

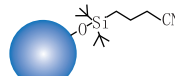
Ultisil™ LP-C8

Structural Formula	
pH Range	1.0-8.0
Particle Size	3 μm, 5 μm
Surface Area(m ² /g)	320(120 Å), 90(300 Å)
Carbon Loading[%]	5.5(120 Å), 3(300 Å)
USP List	L7
Endcapped	No

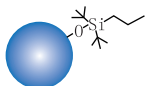
Ultisil™ LP-AQ

Structural Formula	
pH Range	1.0-8.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	5(120 Å)
USP List	L1
Endcapped	No

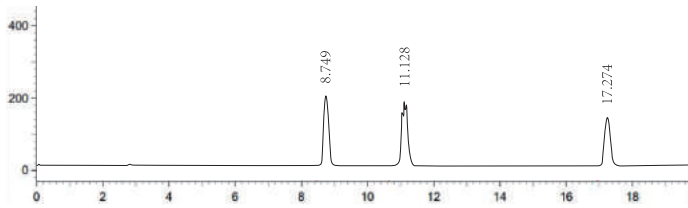
Ultisil™ LP-CN

Structural Formula	
pH Range	1.0-8.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	6(120 Å)
USP List	L10
Endcapped	No

Ultisil™ LP-C3

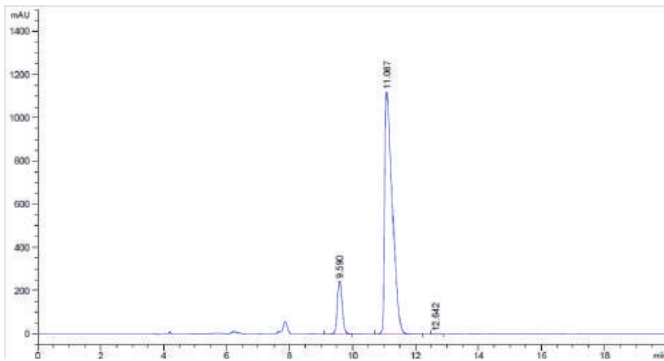
Structural Formula	
pH Range	1.0-8.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	4(120 Å)
USP List	L56
Endcapped	No

4-aminocyclohexanone HCl, cis-4-Aminocyclohexanol and trans-4-Aminocyclohexanol



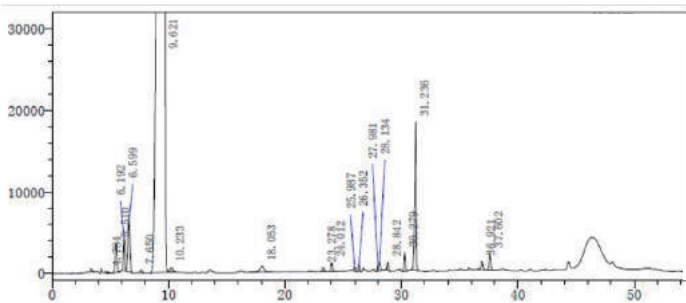
Column:	Ultisil™ LP-C18, 4.6 ×250 mm, 5 μm
Mobile Phase:	A: 0.1% heptafluorobutyric acid B: methanol
Gradient Program:	Time(min) A(%) B(%)
	0 95 5
	10 95 5
	20 60 40
	21 95 5
Flow Rate:	1.0 mL/min
Detector:	ELSD, 115°C, gas: 3.2 L/min
Temperature:	30°C
Injection Volume:	20 μL
Samples in order:	1. trans-4-Aminocyclohexanol 2. 4-aminocyclohexanone HCl 3. cis-4-Aminocyclohexanol

Cefuroxime Sodium



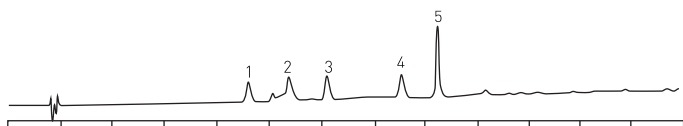
Column:	Ultisil™ LP-C8, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetate buffer*/acetonitrile=85/15 *Dissolve 0.68 g of anhydrous sodium acetate, 5.8 g of glacial acetic acid in 1000 mL water, adjust pH 3.4 with glacial acetic acid
Detector:	273 nm
Temperature:	30°C
Flow Rate:	1.0 mL/min
Injection Volume:	20 μL

Ampicillin Capsules



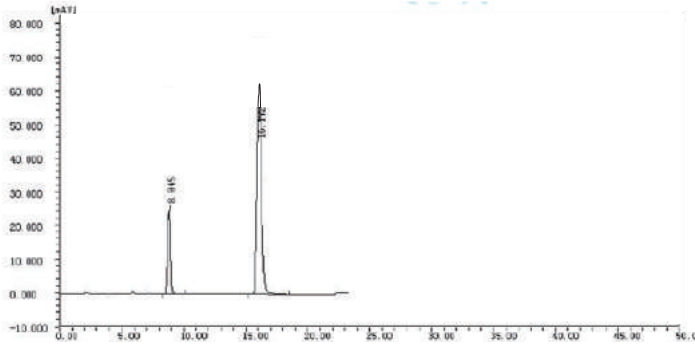
Column:	Ultisil™ LP-AQ, 4.6 ×250 mm, 5 μm
Mobile Phase:	A: 12% acetum/0.2 mol/L KH ₂ PO ₄ /acetonitrile/water=0.5/50/50/900 B: 12% acetum/0.2 mol/L KH ₂ PO ₄ /acetonitrile/water=0.5/50/400/550
Gradient Program:	Time(min) A(%) B(%)
	0 85 15
	10 85 15
	40 0 100
	55 0 100
	60 85 15
Flow Rate:	1.0 mL/min
Detector:	254 nm
Temperature:	30°C
Injection Volume:	20 μL

Peptides



Column:	Ultisil™ LP-AQ, 4.6 ×150 mm, 5 μm, 300 Å
Mobile Phase:	A: 0.1% TFA/water B: 0.1% TFA/acetonitrile
Gradient Program:	Linear gradient, 0-30% B
Flow Rate:	1.0 mL/min
Detector:	254 nm
Temperature:	30°C
Samples in order:	LeuGlyLeu, LeuArgLeu, LeuLeu-amide, leuLeuleu, LeuLeaLeu, LeuLeuValtyr

Hydralazine Hydrochloride



Column:	Ultisil™ LP-CN, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/buffer*=22/78 *Dissolve 1.44 g of lauryl sodium sulfate, 0.75 g of tetrabutylammonium bromide in 1000 mL water, adjust pH 3.0 with 0.05 mol/L sulfuric acid solution
Detector:	230 nm
Temperature:	35°C
Flow Rate:	1.0 mL/min
Injection Volume:	20 μL

Ordering Information

Ultisil™ LP-C18

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00208-21009	09208-21009	00208-21010	00208-21011	00208-21012	00208-21013	00208-21014	00208-21015	00208-21016	-	00808-23014	00808-01107
	3.0	00208-21018	-	00208-21019	00208-21020	00208-21021	00208-21022	00208-21023	00208-21024	00208-21025	-	00808-23014	00808-01107
	4.0	00208-21027	-	00208-21028	00208-21029	00208-21030	00208-21031	00208-21032	00208-21033	00208-21034	-	00808-03010	00808-01101
	4.6	00208-21036	11208-21036	00208-21037	00208-21038	00208-21039	00208-21040	00208-21041	00208-21042	00208-21043	-	00808-03010	00808-01101
5 μm 120 Å	2.1	00208-31009	09208-31009	00208-31010	00208-31011	00208-31012	00208-31013	00208-31014	00208-31015	00208-31016	-	00808-24015	00808-01107
	3.0	00208-31018	-	00208-31019	00208-31020	00208-31021	00208-31022	00208-31023	00208-31024	00208-31025	-	00808-24015	00808-01107
	4.0	00208-31027	-	00208-31028	00208-31029	00208-31030	00208-31031	00208-31032	00208-31033	00208-31034	00208-31035	00808-04015	00808-01101
	4.6	00208-31036	11208-31036	00208-31037	00208-31038	00208-31039	00208-31040	00208-31041	00208-31042	00208-31043	00208-31044	00808-04015	00808-01101
10 μm 120 Å	4.6	-	-	-	-	-	-	00208-41041	00208-41042	00208-41043	00208-41044	00808-05014	00808-01101

Ultisil™ LP-C8

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00209-21009	09209-21009	00209-21010	00209-21011	00209-21012	00209-21013	00209-21014	00209-21015	00209-21016	-	00808-23015	00808-01107
	3.0	00209-21018	-	00209-21019	00209-21020	00209-21021	00209-21022	00209-21023	00209-21024	00209-21025	-	00808-23015	00808-01107
	4.0	00209-21027	-	00209-21028	00209-21029	00209-21030	00209-21031	00209-21032	00209-21033	00209-21034	-	00808-03011	00808-01101
	4.6	00209-21036	11209-21036	00209-21037	00209-21038	00209-21039	00209-21040	00209-21041	00209-21042	00209-21043	-	00808-03011	00808-01101
5 μm 120 Å	2.1	00209-31009	09209-31009	00209-31010	00209-31011	00209-31012	00209-31013	00209-31014	00209-31015	00209-31016	-	00808-24012	00808-01107
	3.0	00209-31018	-	00209-31019	00209-31020	00209-31021	00209-31022	00209-31023	00209-31024	00209-31025	-	00808-24012	00808-01107
	4.0	00209-31027	-	00209-31028	00209-31029	00209-31030	00209-31031	00209-31032	00209-31033	00209-31034	00209-31035	00808-04012	00808-01101
	4.6	00209-31036	11209-31036	00209-31037	00209-31038	00209-31039	00209-31040	00209-31041	00209-31042	00209-31043	00209-31044	00808-04012	00808-01101

5μm Ultisil™ LP-CN, LP-C3, LP-AQ

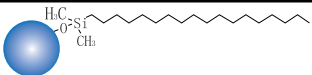
Bonded phase	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	200	250		
LP-CN	4.6	00247-31041	00247-31042	00247-31043	00808-04049	00808-01101
LP-C3	4.6	00265-31041	00265-31042	00265-31043	00808-04050	00808-01101
LP-AQ	4.6	00259-31041	00259-31042	00259-31043	00808-04042	00808-01101

300 Å HPLC column provided. Please contact Welch or your local distributor for other dimensions.

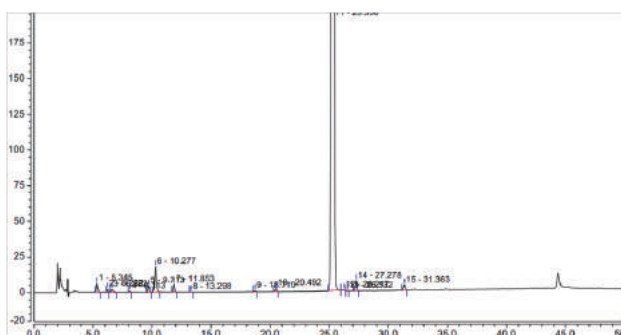
Ultisil™ Plus C18

Ultisil™ Plus C18 HPLC Column is a new generation of C18 column introduced by Welch. Plus C18 adopts unique bonding technique and double endcapping technique, leading to excellent peak shape, separation efficiency, stability and reproducibility.

Ultisil™ Plus C18

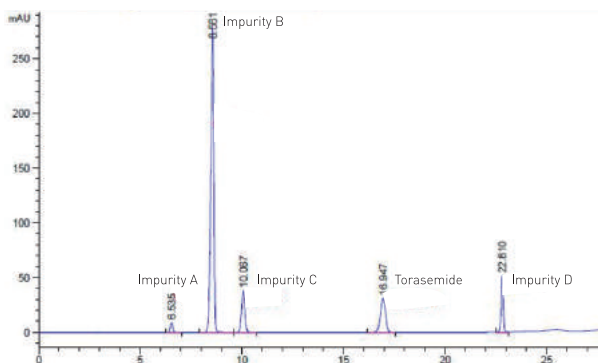
Structural Formula			
pH Range	2.0-8.0	Carbon Loading(%)	10(130 Å)
Particle Size	3.5 μm, 5 μm	USP List	L1
Surface Area(m ² /g)	160(130 Å)	Endcapped	Yes

Lansoprazole



Column:	Ultisil™ Plus C18, 4.6 ×150 mm, 5 μm																		
Mobile Phase:	A: water B: acetonitrile/water/ triethylamine=160 /40/1(%) [adjust pH 7.0 with H ₃ PO ₄]																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>90</td> <td>10</td> </tr> <tr> <td>40</td> <td>20</td> <td>80</td> </tr> <tr> <td>50</td> <td>20</td> <td>80</td> </tr> <tr> <td>51</td> <td>90</td> <td>10</td> </tr> <tr> <td>65</td> <td>90</td> <td>10</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	90	10	40	20	80	50	20	80	51	90	10	65	90	10
Time(min)	A(%)	B(%)																	
0	90	10																	
40	20	80																	
50	20	80																	
51	90	10																	
65	90	10																	
Flow Rate:	0.8 mL/min																		
Detector:	285 nm																		
Temperature:	25°C																		
Injection Volume:	40 μL																		

Toraseamide



Column:	Ultisil™ Plus C18, 4.6 ×250 mm, 5 μm																		
Mobile Phase:	A: 0.02 mol/L KH ₂ PO ₄ , adjust pH 3.5 with H ₃ PO ₄ B: methanol																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>60</td> <td>40</td> </tr> <tr> <td>13</td> <td>60</td> <td>40</td> </tr> <tr> <td>27</td> <td>20</td> <td>80</td> </tr> <tr> <td>31</td> <td>60</td> <td>40</td> </tr> <tr> <td>35</td> <td>60</td> <td>40</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	60	40	13	60	40	27	20	80	31	60	40	35	60	40
Time(min)	A(%)	B(%)																	
0	60	40																	
13	60	40																	
27	20	80																	
31	60	40																	
35	60	40																	
Flow Rate:	1 mL/min																		
Detector:	288 nm																		
Temperature:	40°C																		
Injection Volume:	20 μL																		

Ordering Information

Ultisil™ Plus C18

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3.5 μm 120 Å	2.1	00260-20009	09260-20009	00260-20010	00260-20011	00260-20012	00260-20013	00260-20014	00260-20015	00260-20016	-	00808-23024	00808-01107
	3.0	00260-20018	-	00260-20019	00260-20020	00260-20021	00260-20022	00260-20023	00260-20024	00260-20025	-	00808-23024	00808-01107
	4.0	00260-20027	-	00260-20028	00260-20029	00260-20030	00260-20031	00260-20032	00260-20033	00260-20034	-	00808-03036	00808-01101
	4.6	00260-20036	11260-20036	00260-20037	00260-20038	00260-20039	00260-20040	00260-20041	00260-20042	00260-20043	-	00808-03036	00808-01101
5 μm 120 Å	2.1	00260-31009	09260-31009	00260-31010	00260-31011	00260-31012	00260-31013	00260-31014	00260-31015	00260-31016	-	00808-24029	00808-01107
	3.0	00260-31018	-	00260-31019	00260-31020	00260-31021	00260-31022	00260-31023	00260-31024	00260-31025	-	00808-24029	00808-01107
	4.0	00260-31027	-	00260-31028	00260-31029	00260-31030	00260-31031	00260-31032	00260-31033	00260-31034	00260-31035	00808-04036	00808-01101
	4.6	00260-31036	11260-31036	00260-31037	00260-31038	00260-31039	00260-31040	00260-31041	00260-31042	00260-31043	00260-31044	00808-04036	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

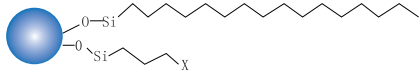
Ultisil™ ALK-C18

Ultisil™ ALK-C18 is a new generation of C18 column introduced by Welch. In this column, hydrophilic groups are bonded into the silica surface, where large number of silanol groups are replaced, reducing the interactions between basic samples and the silanol groups. As a consequence, the selectivity of ALK-C18 is different from that of traditional C18.

Features:

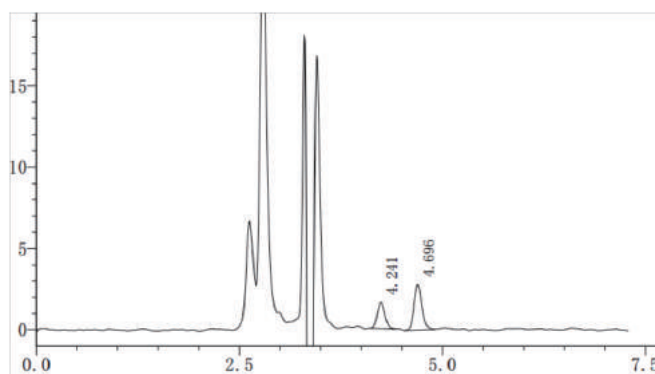
- Mixed solid phase with both hydrophobic and electrostatic interactions
- Excellent peak shape for basic compounds
- Fast separation of similar samples on a column

Ultisil™ ALK-C18

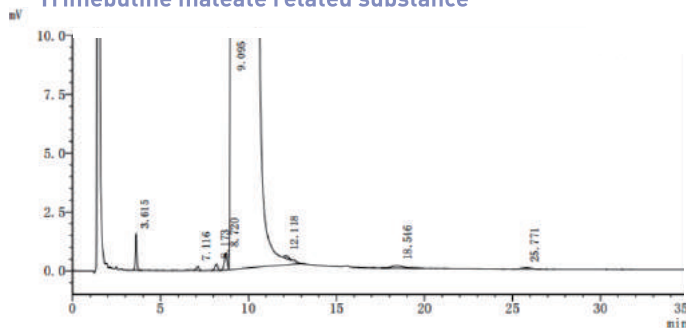
Structural Formula	
pH Range	1.5-10.0
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L1
Endcapped	Yes

AspartanL-aspartyl-L-phenylalanine

Column:	Ultisil™ ALK-C18, 4.6 ×250 mm, 5 µm
Mobile Phase:	Citrate buffer/methanol=67/33
Flow Rate:	1.0 mL/min
Detector:	254 nm
Temperature:	30°C
Injection Volume:	20 µl



Trimebutine maleate related substance



Column:	Ultisil™ ALK-C18, 4.6 ×150 mm, 5 µm
Mobile Phase:	Perchloric acid buffer/acetonitrile=66/35
Flow Rate:	1.1 mL/min
Detector:	254 nm
Temperature:	40°C
Injection Volume:	20 µl

Ordering Information

Ultisil™ ALK-C18

Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	200	250		
5 µm	4.6	00253-31041	00253-31042	00253-31043	10mm length	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

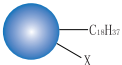
Ultisil™ ODS-3

-- High Water-resistance Octadecyl HPLC Column

Ultisil™ ODS-3 column is packed with high water-resistance octadecyl reversed-phase packing material. The hydrophilic end group of the octadecyl functional group is strictly endcapped, which brings perfect peaks and low adsorption for both alkaline and acid compounds. The 100% water-resistance packing material avoids the collapse of stationary phase and applies to the separation and determination of most compounds.

- 100% water resistance
- High efficiency and resolution
- High sample loading
- Easy preparative magnifying
- Different selectivity from common C18

Ultisil™ ODS-3

Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm
Surface Area(m ² /g)	380(100 Å)
Carbon Loading(%)	15(100 Å)
USP List	L1
Endcapped	Yes

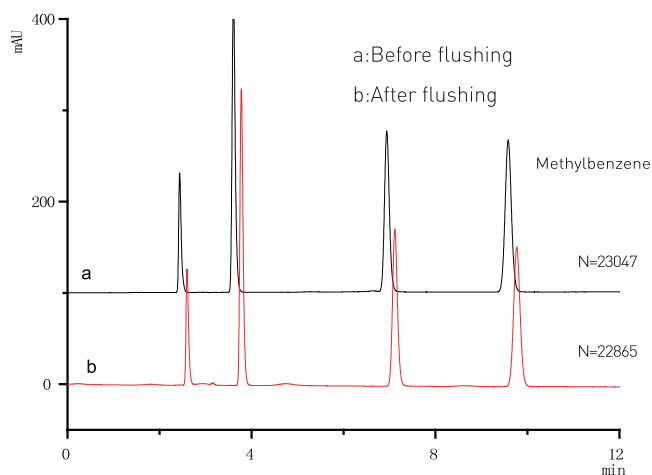
Tests of 48-hour Pure Water Resistance

Mobile Phase: 20 mM K₂HPO₄, adjust pH 7.0 with phosphate

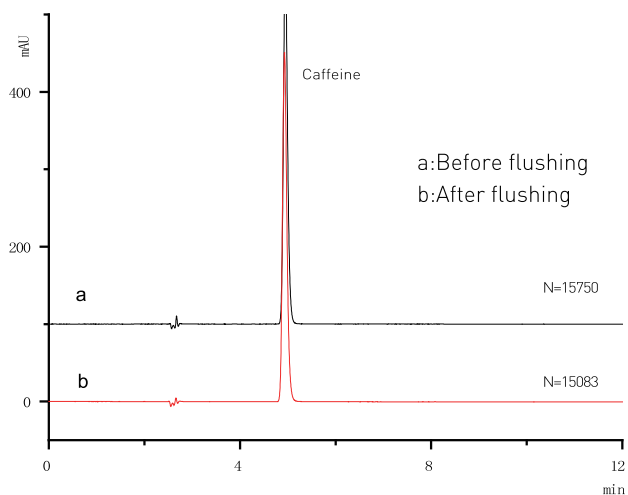
Temperature: 30°C

Flow Rate: 1.0 mL/min

Operation: Flush the column with mobile phase for 24 h. Then test the column efficiency and tailing factor etc. Control the pressure and change the mobile phase every 24 h.



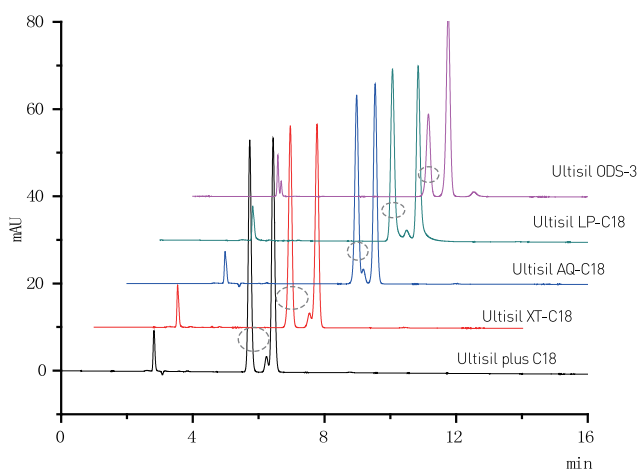
Column:	Ultisil™ ODS-3, 4.6 × 250 mm, 5 μm
Mobile Phase:	Methanol/Water = 75/25
Flow Rate:	1.0 mL/min
Detector:	254 nm
Temperature:	30 °C
Injection Volume:	20 μL
Test Requirement:	N → 20000, T (0.90-1.10)



Column:	Ultisil™ ODS-3, 4.6 ×250 mm, 5 μm
Mobile Phase:	Methanol/Water =45/55
Flow Rate:	1.0 mL/min
Detector:	280 nm
Temperature:	30 °C
Injection Volume:	20 μL
Sample Solution:	Caffeine solution (50 μg/ml)

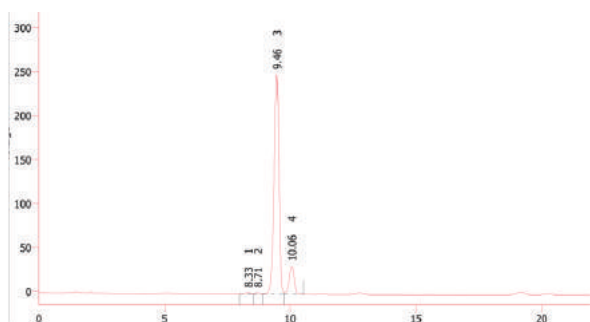
Cefprozil Capsule

Unique selectivity



Column:	Welch C18 columns, 4.6×250 mm, 5 μm
Mobile Phase:	0.05 mol/L NH ₄ H ₂ PO ₄ /acetonitrile=95/5 adjust pH 4 with H ₃ PO ₄
Flow Rate:	1.0 mL/min
Detector:	225 nm
Temperature:	35 °C
Injection Volume:	20 μL

Prostaglandin sample



Column:	Ultisil™ ODS-3, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/water/H ₃ PO ₄ =35/65/0/1
Flow Rate:	1.0 mL/min
Detector:	200 nm
Temperature:	25 °C
Injection Volume:	10 μL

Ordering Information

Ultisil™ ODS-3

Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	200	250		
3 μm	4,6	00275-21041	00275-21042	00275-21043	00808-03031	00808-01101
5 μm	4,6	00275-31041	00275-31042	00275-31043	00808-04043	00808-01101

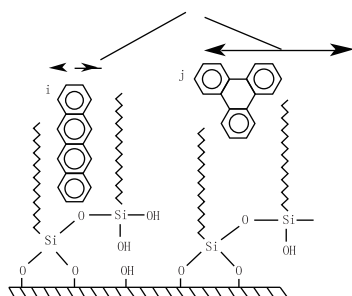
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ XS-C18

Ultisil™ XS-C18 is developed with high column efficiency, high loading and high capacity. It has excellent steric hindrance selectivity, especially shape selectivity.

There are two patterns of Steric Hindrance: Steric Exclusion and Shape Selectivity. Ultisil™ XS-C18 uses unique multi-bonding technique, with high bonding density and short distance between ligands, providing better shape selectivity.

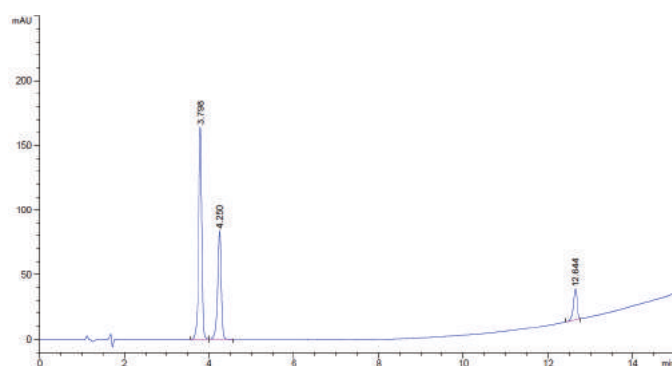
Minimum cross- Section of Solute



Compound i has more narrow size, with smaller cross-sectional area, which allows it to go into the ligands and provides better retention; Compound j has wider size, with bigger cross-sectional area, which makes it rejected out by stationary phase, providing shorter retention time. Thus are two compounds separated. Normal bonded columns have bigger interstices between ligands, which allows both compounds through and results in poor resolution.

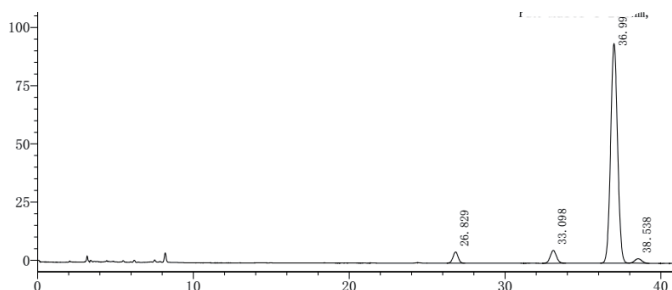
Structural Formula	
pH Range	2.0-10.0
Particle Size	3 μm, 5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading[%]	23(120 Å)
USP List	L1
Endcapped	Yes

Isocyanate mononitrate



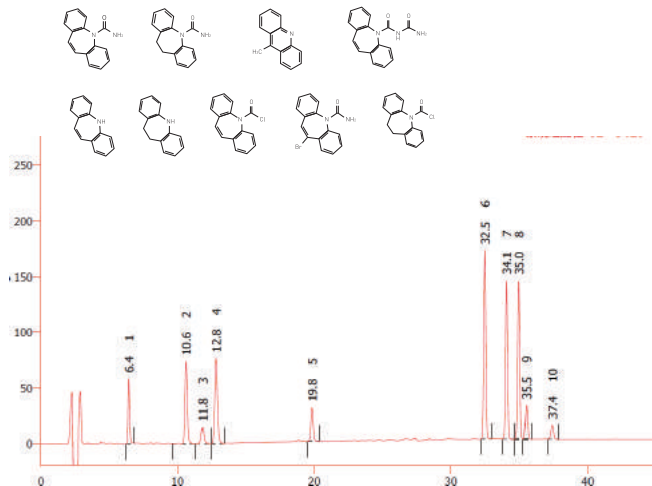
Column:	Ultisil™ XS-C18, 4.6 ×150 mm, 5 μm															
Mobile Phase:	A: water B: methanol															
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A[%]</th> <th>B[%]</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>75</td> <td>25</td> </tr> <tr> <td>5</td> <td>75</td> <td>25</td> </tr> <tr> <td>15</td> <td>30</td> <td>70</td> </tr> <tr> <td>15.1</td> <td>75</td> <td>25</td> </tr> </tbody> </table>	Time(min)	A[%]	B[%]	0	75	25	5	75	25	15	30	70	15.1	75	25
Time(min)	A[%]	B[%]														
0	75	25														
5	75	25														
15	30	70														
15.1	75	25														
Flow Rate:	1.0 mL/min															
Injection Volume:	210 nm															
Temperature:	35°C															
Injection Volume:	10 μL															
Samples in order:	2-isosorbide mononitrate, isocyanate mononitrate, isocyanate nitrate															

Vitamin D3 and isomers



Column:	Ultisil™ XS-C18, 4.6 ×250 mm, 3 μm
Mobile Phase:	Water/methanol=5/95
Flow Rate:	1.0 mL/min
Detector:	264 nm
Temperature:	30°C
Injection Volume:	20 μL
Samples:	Previtamin D3, Trans vitamin D3, vitamin D3, tachysterol D3

Carbamazepine



Column:	Ultisil™ XS-C18, 4.6 x250 mm, 5 μm																		
Mobile Phase:	A: water/triethylamine/formic acid=1000/0/5/0/5 B: methanol/formic acid=1000/0.25																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>65</td> <td>35</td> </tr> <tr> <td>10</td> <td>65</td> <td>35</td> </tr> <tr> <td>30</td> <td>40</td> <td>60</td> </tr> <tr> <td>45</td> <td>40</td> <td>60</td> </tr> <tr> <td>46</td> <td>65</td> <td>35</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	65	35	10	65	35	30	40	60	45	40	60	46	65	35
Time(min)	A(%)	B(%)																	
0	65	35																	
10	65	35																	
30	40	60																	
45	40	60																	
46	65	35																	
Flow Rate:	1.0 mL/min																		
Injection Volume:	230 nm																		
Temperature:	30°C																		
Injection Volume:	10 μL																		
Samples in order:	Impurity B, Carbamazepine, impurity A, impurity C, impurity G, impurity D, impurity F, iminodibenzylcarbonyl chloride, impurity F, impurity E																		

Ordering Information

Ultisil™ XS-C18

Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	200	250		
3 μm	4,6	00277-21041	00277-21042	00277-21043	00808-03034	00808-01101
5 μm	4,6	00277-31041	00277-31042	00277-31043	00808-04046	00808-01101

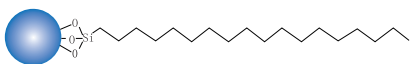
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.



Ultisil™ PAH

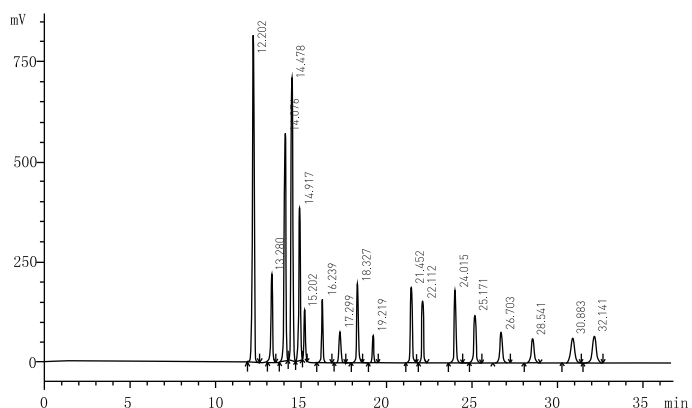
Ultisil™ PAH Column is a special column recently designed by Welch for the separation of PAHs in EPA method 610. PAHs (Polycyclic Aromatic Hydrocarbon) are hydrocarbons with two or more benzene rings, and considered major pollutants. Therefore, the analysis of these potentially carcinogenic compounds in water, air, soil and food takes high priority. Most of PAHs do not exist alone. Substances that may contain PAHs include charcoal, crude oil, creosote, tar, drugs, dyes, plastic, rubber, pesticide, lube, release agent, electrolyte, mineral oil, pitch, insecticide, and bactericide, etc.

Ultisil™ PAH

Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm, 5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	22(120 Å)
USP List	L1
Endcapped	No

Ultisil™ PAH columns can separate all 18 PAHs in EPA method 610 rapidly with high resolution. Ultisil™ PAH columns are silica based columns for PAH analysis with the best peak shape.

Separation of 18 PAHs in EPA method 610



Column:	Ultisil™ PAH, 4.6 ×250 mm, 5 μm		
Mobile Phase:	A:water B: acetonitrile		
	Time(min)	A(%)	B(%)
	0	60	40
	20	0	100
	33	0	100
	34	60	40
Flow Rate:	1.5 mL/min		
Detector:	220 nm		
Temperature:	25°C		
Injection Volume:	10 μL		
Mixed Standards:	1. Naphthalene 2. Acenaphthylene 3. 1- Methyl benzene 4. 2- Methyl benzene 5. Acenaphthene 6. Fluorene 7. Phenanthrene 8. Anthracene 9. Fluoranthene 10. Pyrene 11. Benzo(a)anthracene 12. Chrysene 13. Benzo(b)fluoranthene 14. Benzo(k)fluoranthene 15. Benzo(a)pyrene 16. Indeno(1,2,3-cd)pyrene 17. Dibenzo(a,h)anthracene 18. Benzo(g,h)perylene		

Ordering Information

Ultisil™ PAH

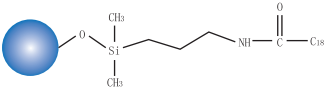
Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	200	250		
3 μm 120 Å	2.1	00210-21014	00210-21015	00210-21016	00808-23018	00808-01107
	3.0	00210-21023	00210-21024	00210-21025	00808-23018	00808-01107
	4.6	00210-21041	00210-21042	00210-21043	00808-03012	00808-01101
5 μm 120 Å	2.1	00210-31014	00210-31015	00210-31016	00808-24010	00808-01107
	3.0	00210-31023	00210-31024	00210-31025	00808-24010	00808-01107
	4.6	00210-31041	00210-31042	00210-31043	00808-04010	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ Polar Embedded HPLC Column (polar-RP&Phenyl-Ether)

Ultisil™ polar embedded phases have been developed for more than 10 years. Earlier polar embedded phase is developed with amide phase. The polar functional group close to the surface increases the wet ability of this phase, thus decreasing phase collapse, making this phase compatible with mobile phase of up to 95% water content. The polar functional group also shields the effects of unreacted silanol groups, providing excellent peak shape for very polar and strong basic compounds and different selectivity than C18 phase. Welch provides two kinds of packing materials - Ultisil™ Polar-RP and Ultisil™ Phenyl-Ether.

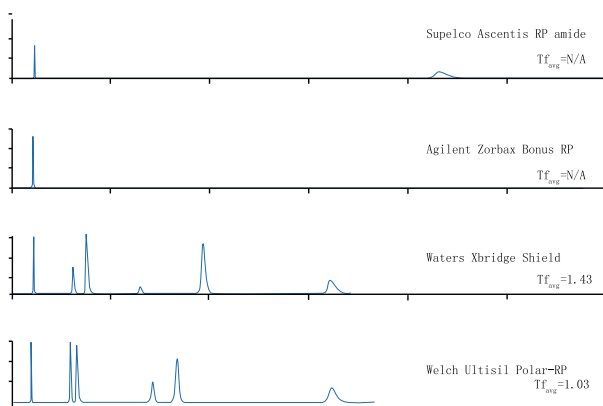
Ultisil™ Polar-RP

Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	18(120 Å)
USP List	L1
Endcapped	Yes

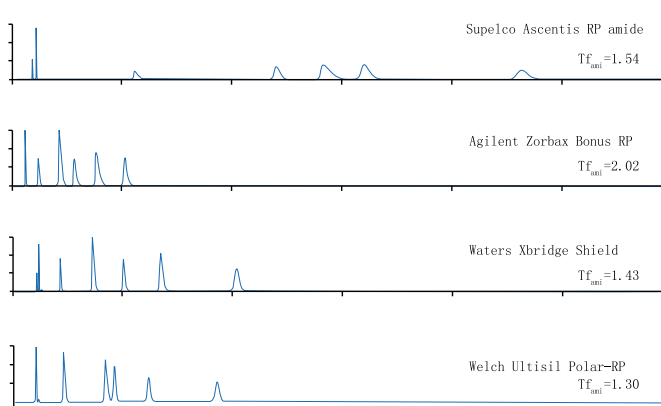
Ultisil™ Polar-RP HPLC Column

- Excellent at 100% water content in mobile phase, even better than AQ-C18
- Different selectivity to AQ-C18
- Excellent peak shape for acidic and basic compounds owing to the “shield” effect of polar linkage to silanol activity by forming hydrogen bonding
- Be retentive for polar compounds. Uracil, which can't be retained on most reversed phase columns at 100% water, can be retained on this column, and eluted after 5-fluorocytosine and cytosine. Analysis of purine, pyrimidine, small molecular acids, catecholamine and water soluble vitamins, requires high water phase content mobile phase
- Fast separation of similar samples on a column

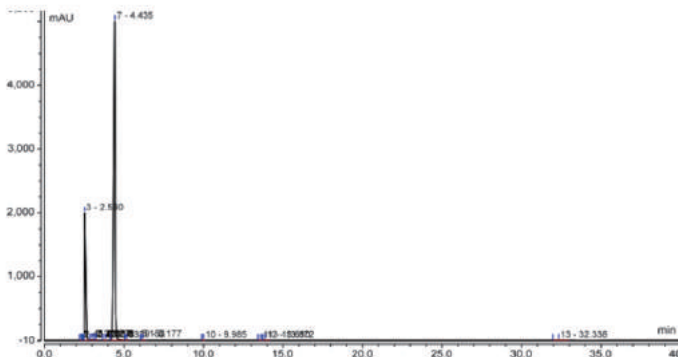
Comparison of separation of acid compounds



Comparison of separation of base compounds



Amoxicillin and clavulanate potassium



Column:	Ultisil™ Polar RP, 4.6 ×150 mm, 5 μm																		
Mobile Phase:	A: phosphate buffer * B: phosphate buffer/acetonitrile=20/80 *Dissolve 1.36 g KH ₂ PO ₃ in 900 mL water, adjust pH 6.0±0.1 with KOH, add water to 1000 mL																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>95</td> <td>5</td> </tr> <tr> <td>0.5</td> <td>95</td> <td>5</td> </tr> <tr> <td>30.5</td> <td>59</td> <td>41</td> </tr> <tr> <td>32</td> <td>95</td> <td>5</td> </tr> <tr> <td>40</td> <td>95</td> <td>5</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	95	5	0.5	95	5	30.5	59	41	32	95	5	40	95	5
Time(min)	A(%)	B(%)																	
0	95	5																	
0.5	95	5																	
30.5	59	41																	
32	95	5																	
40	95	5																	
Flow Rate:	1.0 mL/min																		
Injection Volume:	215 nm																		
Temperature:	30°C																		
Injection Volume:	20 μL																		

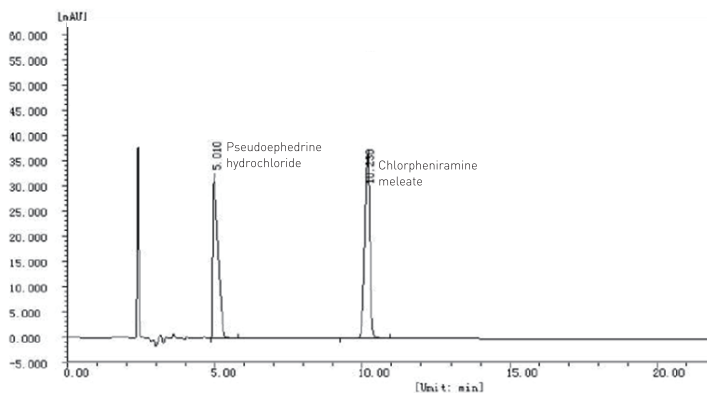
Ultisil™ Phenyl-Ether

Structural Formula	
pH Range	1.5-10.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L11
Endcapped	Yes

Ultisil™ Phenyl-Ether HPLC Column

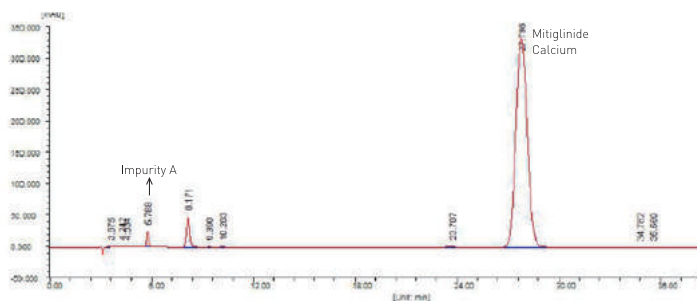
- Improved polar & aromatic reversed phases selectivity that complements the more conventional C18 column chemistries
- Better selectivity than phenyl phase for separation of nitrobenzene isomers
- Improved peak shape of highly acidic polar compounds, and different selectivity from other polar phases such as polar embedded phase
- Compatible with 100% water mobile phase

Chlorphenamine Maleate Pseudoephedrine Hydrochloride Capsules



Column:	Ultisil™ Phenyl-Ether, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/methanol/tetrahydrofuran/ H ₃ PO ₄ /water=320/80/50/1/550 Add 0.43 g lauryl sodium sulfate, adjust pH 3.5 with concentrated ammonia solution
Flow Rate:	1.0 mL/min
Detector:	254 nm
Temperature:	25°C
Injection Volume:	10 μL

Mitiglinide Calcium



Column:	Ultisil™ Phenyl-Ether, 4.6 ×250 mm, 5 μm
Mobile Phase:	0.02 mol/L KH ₂ PO ₃ buffer*/methanol=38/62 *Dissolve 2.72 g KH ₂ PO ₃ in water, add 5mL of triethylamine, add water to 1000 mL, adjust pH 2.5 with H ₃ PO ₄
Flow Rate:	1.0mL/min
Detector:	210 nm
Temperature:	Ambient
Injection Volume:	10 μL

Ordering Information

Ultisil™ Polar RP

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00215-21009	09215-21009	00215-21010	00215-21011	00215-21012	00215-21013	00215-21014	00215-21015	00215-21016	-	00808-23009	00808-01107
	3.0	00215-21018	-	00215-21019	00215-21020	00215-21021	00215-21022	00215-21023	00215-21024	00215-21025	-	00808-23009	00808-01107
	4.0	00215-21027	-	00215-21028	00215-21029	00215-21030	00215-21031	00215-21032	00215-21033	00215-21034	-	00808-03009	00808-01101
	4.6	00215-21036	11215-21036	00215-21037	00215-21038	00215-21039	00215-21040	00215-21041	00215-21042	00215-21043	-	00808-03009	00808-01101
5 μm 120 Å	2.1	00215-31009	09215-31009	00215-31010	00215-31011	00215-31012	00215-31013	00215-31014	00215-31015	00215-31016	-	00808-24017	00808-01107
	3.0	00215-31018	-	00215-31019	00215-31020	00215-31021	00215-31022	00215-31023	00215-31024	00215-31025	-	00808-24017	00808-01107
	4.0	00215-31027	-	00215-31028	00215-31029	00215-31030	00215-31031	00215-31032	00215-31033	00215-31034	00215-31035	00808-04017	00808-01101
	4.6	00215-31036	11215-31036	00215-31037	00215-31038	00215-31039	00215-31040	00215-31041	00215-31042	00215-31043	00215-31044	00808-04017	00808-01101
10 μm 120 Å	4.6	-	-	-	-	-	-	00215-41041	00215-41042	00215-41043	00215-41044	00808-05015	00808-01101

Ultisil™ Phenyl-Ether

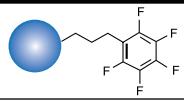
Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
5 μm 120 Å	2.1	00214-31009	09214-31009	00214-31010	00214-31011	00214-31012	00214-31013	00214-31014	00214-31015	00214-31016	-	00808-24034	00808-01107
	3.0	00214-31018	-	00214-31019	00214-31020	00214-31021	00214-31022	00214-31023	00214-31024	00214-31025	-	00808-24034	00808-01107
	4.0	00214-31027	-	00214-31028	00214-31029	00214-31030	00214-31031	00214-31032	00214-31033	00214-31034	00214-31035	00808-04028	00808-01101
	4.6	00214-31036	11214-31036	00214-31037	00214-31038	00214-31039	00214-31040	00214-31041	00214-31042	00214-31043	00214-31044	00808-04028	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

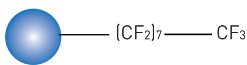
Ultisil™ Fluorinated Phase(PFP&F-C8)

Ultisil™ Fluorinated Phase has high selectivity and increased retention toward closely related compounds, including both aromatic fluorinated compounds and other nonaromatic halogenated compounds. It can be used in reversed phase and provides an alternative and complementary separation to that performed on C8 or C18 columns for many analytes. Fluorinated phase has better separation for ionic and polar compounds than do alkyl phases. Fluorinated phase can provide different elution orders, leading to enhanced selectivity for compounds that are difficult to separate.

Ultisil™ PFP

Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm, 5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L11
Endcapped	Yes

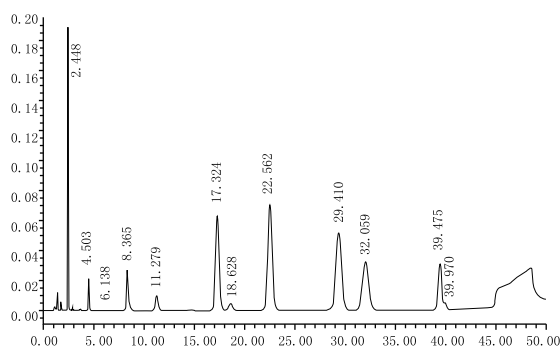
Ultisil™ F-C8

Structural Formula	
pH Range	1.5-10.0
Particle Size	3 μm, 5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L7
Endcapped	Yes

Ultisil™ PFP

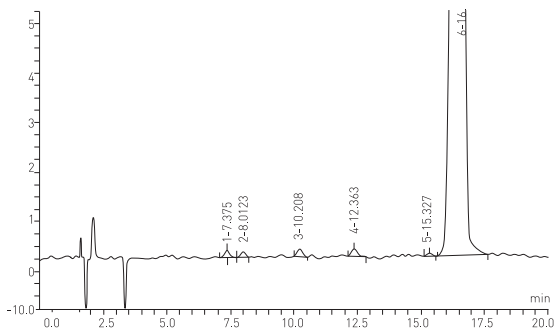
Ultisil™ PF-Phenyl is a phase primarily used in the separation of molecules bearing fluorine atoms, but may also be in the separation of non-fluorinated compounds such as Taxol and its derivatives. Because of its phenyl ring, it has a higher selectivity for aromatic molecules than for other alkyl-fluorinated phases. Ultisil™ PF-Phenyl can separate nitro-benzene isomers (para vs. ortho), which cannot be separated by conventional phenyl phase.

Analysis of Taxol



Column:	Ultisil™ PFP, 4.6 ×250 mm, 5 μm																		
Mobile Phase:	A: acetonitrile B:water																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>35</td> <td>65</td> </tr> <tr> <td>35</td> <td>35</td> <td>65</td> </tr> <tr> <td>60</td> <td>80</td> <td>20</td> </tr> <tr> <td>70</td> <td>85</td> <td>15</td> </tr> <tr> <td>80</td> <td>85</td> <td>65</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	35	65	35	35	65	60	80	20	70	85	15	80	85	65
Time(min)	A(%)	B(%)																	
0	35	65																	
35	35	65																	
60	80	20																	
70	85	15																	
80	85	65																	
Flow Rate:	2.6 mL/min																		
Injection Volume:	227 nm																		
Temperature:	30°C																		
Injection Volume:	10 μL																		

Parecoxib Sodium

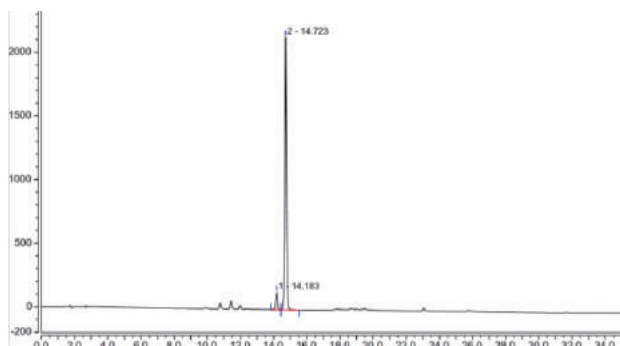


Column:	Ultisil™ PFP, 4.6 ×250 mm, 5 μm												
Mobile Phase:	A: 0.1% TFA water solution B: methanol												
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>55</td> <td>45</td> </tr> <tr> <td>20</td> <td>45</td> <td>55</td> </tr> <tr> <td>40</td> <td>10</td> <td>90</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	55	45	20	45	55	40	10	90
Time(min)	A(%)	B(%)											
0	55	45											
20	45	55											
40	10	90											
Flow Rate:	1.0 mL/min												
Injection Volume:	225 nm												
Temperature:	40°C												
Injection Volume:	10 μL												

Ultisil™ F-C8

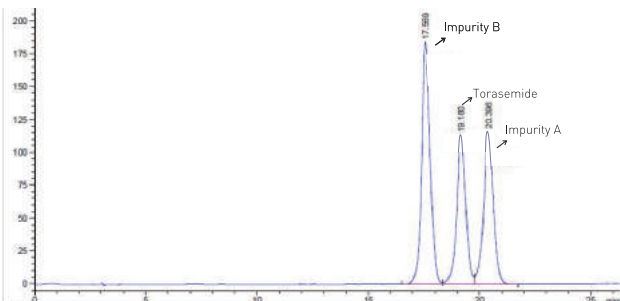
Ultisil™ F-C8 column has high selectivity and increased retention toward halogenated aromatic and alkyl compounds, but different from octal alkyl phase.

Dolasetron Mesylate



Column:	Ultisil™ F-C8, 4.6 ×250 mm, 5 μm																		
Mobile Phase:	A: diammonium hydrogen phosphate/ acetonitrile=1000/53 B: diammonium hydrogen phosphate/ acetonitrile=295/795																		
Gradient Program:	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>100</td> <td>0</td> </tr> <tr> <td>28</td> <td>0</td> <td>100</td> </tr> <tr> <td>38</td> <td>0</td> <td>100</td> </tr> <tr> <td>40</td> <td>100</td> <td>0</td> </tr> <tr> <td>50</td> <td>100</td> <td>0</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	100	0	28	0	100	38	0	100	40	100	0	50	100	0
Time(min)	A(%)	B(%)																	
0	100	0																	
28	0	100																	
38	0	100																	
40	100	0																	
50	100	0																	
Flow Rate:	1.5 mL/min																		
Injection Volume:	210 nm																		
Temperature:	30°C																		
Injection Volume:	20 μL																		

Torasemide



Column:	Ultisil™ F-C8, 4.6 ×250 mm, 5 μm
Mobile Phase:	0.02 mol/L diammonium hydrogen phosphate (pH 7.0)/methanol=65/35
Flow Rate:	1.0 mL/min
Injection Volume:	288 nm
Temperature:	30 C
Injection Volume:	20 μL

Ordering Information

Ultisil™ PFP

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00224-21009	09224-21009	00224-21010	00224-21011	00224-21012	00224-21013	00224-21014	00224-21015	00224-21016	-	00808-23019	00808-01107
	3.0	00224-21018	-	00224-21019	00224-21020	00224-21021	00224-21022	00224-21023	00224-21024	00224-21025	-	00808-23019	00808-01107
	4.0	00224-21027	-	00224-21028	00224-21029	00224-21030	00224-21031	00224-21032	00224-21033	00224-21034	-	00808-03024	00808-01101
	4.6	00224-21036	11224-21036	00224-21037	00224-21038	00224-21039	00224-21040	00224-21041	00224-21042	00224-21043	-	00808-03024	00808-01101
5 μm 120 Å	2.1	00224-31009	09224-31009	00224-31010	00224-31011	00224-31012	00224-31013	00224-31014	00224-31015	00224-31016	-	00808-24035	00808-01107
	3.0	00224-31018	-	00224-31019	00224-31020	00224-31021	00224-31022	00224-31023	00224-31024	00224-31025	-	00808-24035	00808-01107
	4.0	00224-31027	-	00224-31028	00224-31029	00224-31030	00224-31031	00224-31032	00224-31033	00224-31034	00224-31035	00808-04024	00808-01101
	4.6	00224-31036	11224-31036	00224-31037	00224-31038	00224-31039	00224-31040	00224-31041	00224-31042	00224-31043	00224-31044	00808-04024	00808-01101

Ultisil™ F-C8


Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120Å	2.1	00222-21009	09222-21009	00222-21010	00222-21011	00222-21012	00222-21013	00222-21014	00222-21015	00222-21016	-	00808-23021	00808-01107
	3.0	00222-21018	-	00222-21019	00222-21020	00222-21021	00222-21022	00222-21023	00222-21024	00222-21025	-	00808-23021	00808-01107
	4.0	00222-21027	-	00222-21028	00222-21029	00222-21030	00222-21031	00222-21032	00222-21033	00222-21034	-	00808-03023	00808-01101
	4.6	00222-21036	11222-21036	00222-21037	00222-21038	00222-21039	00222-21040	00222-21041	00222-21042	00222-21043	-	00808-03023	00808-01101
5 μm 120Å	2.1	00222-31009	09222-31009	00222-31010	00222-31011	00222-31012	00222-31013	00222-31014	00222-31015	00222-31016	-	00808-24036	00808-01107
	3.0	00222-31018	-	00222-31019	00222-31020	00222-31021	00222-31022	00222-31023	00222-31024	00222-31025	-	00808-24036	00808-01107
	4.0	00222-31027	-	00222-31028	00222-31029	00222-31030	00222-31031	00222-31032	00222-31033	00222-31034	00222-31035	00808-04038	00808-01101
	4.6	00222-31036	11222-31036	00222-31037	00222-31038	00222-31039	00222-31040	00222-31041	00222-31042	00222-31043	00222-31044	00808-04038	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

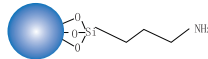
Ultisil™ HILIC Column (HILIC Silica&HILIC NH₂)

HILIC (Hydrophilic Interaction Liquid Chromatography) is a separation mode achieved through the partitioning of polar solutes from high concentration, water-miscible, organic mobile phase into hydrophilic surface environment.

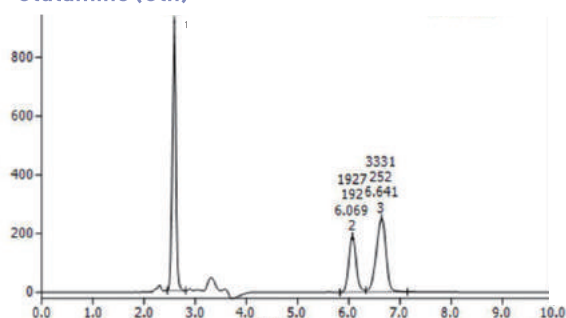
Ultisil™ HILIC Silica

Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	L3
Endcapped	No

Ultisil™ HILIC-NH₂

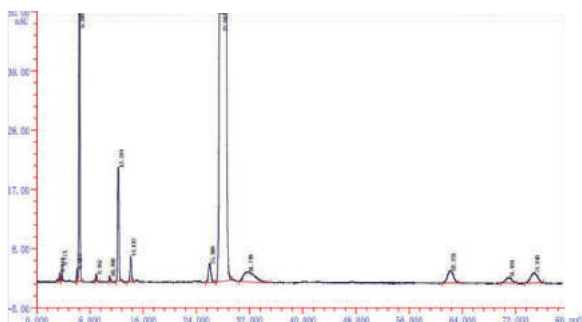
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 μm, 5 μm, 10 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	4(120 Å)
USP List	L8
Endcapped	No

Glutamine (Gln)



Column:	Ultisil™ HILIC Silica, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/0.01mol/L ammonium acetate =65/35
Flow Rate:	1.0 mL/min
Detector:	215 nm
Temperature:	Ambient
Injection Volume:	20 μL
Samples:	Glutamine, chloropropylamine glutamine, dipeptiven

Alanyl Glutamine Injection



Column:	Ultisil™ HILIC-NH ₂ , 4.6 ×250 mm, 5μm
Mobile Phase:	Acetonitrile/0.05 mol/L KH ₂ PO ₄ {adjust pH 4.0 with H ₃ PO ₄ } =65/35
Flow Rate:	0.7 mL/min
Detector:	215 nm
Temperature:	30°C
Injection Volume:	20 μL
Note:	Use the mobile phase to fully activate the column before testing the sample on the column

Ordering Information

Ultisil™ HILIC Silica

Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	200	250		
3 μm 120 Å	4.6	00228-21041	00228-21042	00228-21043	00808-03026	00808-01101
5 μm 120 Å	4.6	00228-31041	00228-31042	00228-31043	00808-04044	00808-01101
10 μm 120 Å	4.6	00228-41041	00228-41042	00228-41043	00808-05016	00808-01101

Ultisil™ HILIC NH₂

Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Guard Column Holder
		150	250	300		
3 μm 120 Å	4.6	00231-21041	00231-21042	00231-21043	00808-03025	00808-01101
5 μm 120 Å	4.6	00231-31041	00231-31042	00231-31043	00808-04047	00808-01101
10 μm 120 Å	4.6	00231-41041	00231-41042	00231-41043	00808-05017	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ HILIC Amide

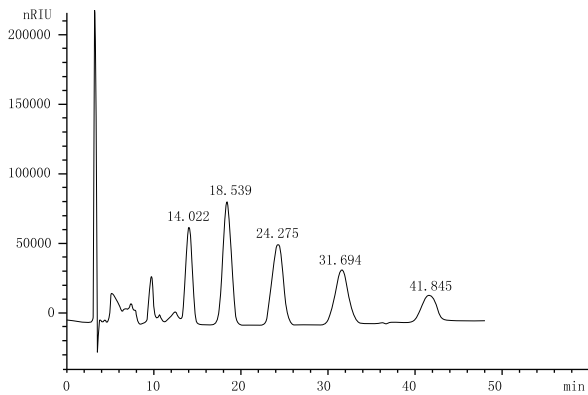
Ultisil™ HILIC Amide column is a special column designed for HILIC mode. As amide group has strong hydrophilicity, stability and electrically neutral, Ultisil™ Amide has longer life, better separation repeatability and peak shape than NH₂ phase does.

- Based on silica bonded with amide groups, appropriate for the separation of hydrophilic samples
- Multiple actions such as hydrogen bond, molecular and electrostatic interactions
- Good compatibility with many kinds of detectors, such as MS detector
- Stable in organic mobile phase that contains water

Ultisil™ HILIC Amide

pH Range	2.0-8.0	Carbon Loading(%)	7(120 Å)
Particle Size	3 μm, 5 μm, 10 μm	USP List	/
Surface Area(m ² /g)	320(120 Å)	Endcapped	N/A

Fructo-oligose



Column:	Ultisil™ HILIC Amide, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/water =70/30
Detector:	RID (40°C)
Temperature:	40°C
Flow Rate:	1.0mL/min
Injection Volume:	20μL
Mixed Standards:	Sucrose, kestose, nystose, megazyme, 1F-Fructofuranosyl nystose)

Ornithine hydrochloride



Column:	Ultisil™ HILIC Amide, 4.6 ×250 mm, 5 μm
Mobile Phase:	20 mmol/L KH ₂ PO ₄ (pH5.6) /acetonitrile =38/62
Detector:	205 nm
Temperature:	30°C
Flow Rate:	1.0mL/min
Injection Volume:	20μL
Samples in order:	1. Citrulline 2. Impurity A 3. Arginine 4. Ornithine

Ordering Information

Ultisil™ HILIC Amide

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 μm 120 Å	2.1	00240-21009	09240-21009	00240-21010	00240-21011	00240-21012	00240-21013	00240-21014	00240-21015	00240-21016	-	00808-23010	00808-01107
	3.0	00240-21018	-	00240-21019	00240-21020	00240-21021	00240-21022	00240-21023	00240-21024	00240-21025	-	00808-23010	00808-01107
	4.0	00240-21027	-	00240-21028	00240-21029	00240-21030	00240-21031	00240-21032	00240-21033	00240-21034	-	00808-03021	00808-01101
	4.6	00240-21036	11240-21036	00240-21037	00240-21038	00240-21039	00240-21040	00240-21041	00240-21042	00240-21043	-	00808-03021	00808-01101
5 μm 120 Å	2.1	00240-31009	09240-31009	00240-31010	00240-31011	00240-31012	00240-31013	00240-31014	00240-31015	00240-31016	-	00808-24025	00808-01107
	3.0	00240-31018	-	00240-31019	00240-31020	00240-31021	00240-31022	00240-31023	00240-31024	00240-31025	-	00808-24025	00808-01107
	4.0	00240-31027	-	00240-31028	00240-31029	00240-31030	00240-31031	00240-31032	00240-31033	00240-31034	00240-31035	00808-04025	00808-01101
	4.6	00240-31036	11240-31036	00240-31037	00240-31038	00240-31039	00240-31040	00240-31041	00240-31042	00240-31043	00240-31044	00808-04025	00808-01101
10 μm 120 Å	4.6	-	-	-	-	-	-	00240-41041	00240-41042	00240-41043	00240-41044	00808-05018	00808-01101

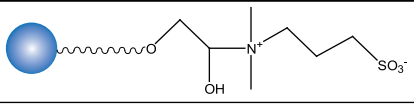
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ HILIC Amphion II

Ultisil™ HILIC Amphion II is a newly developed HILIC column, using amphion-bonded silica as packing material. It applies to the separation of most polar compounds, using acetonitrile or Water other than ion-pairing reagents as mobile phase. The Amphion, containing both Positive Charge Centre and Negative Charge Centre, brings high retention for acid and alkaline compounds through ion-exchange mechanism. Compared with common HILIC packing materials like silica and amino groups, the Amphion-bonded packing material provides better reproducibility and stability.

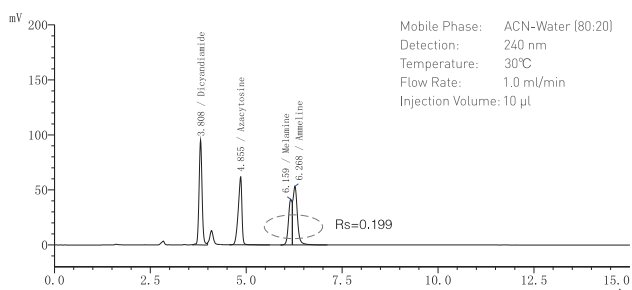
- Amphion-bonded silica stationary phase
- Enhanced hydrophilic interaction brings higher retention for polar and hydrophilic compounds
- Different selectivity from common HILIC packing materials
- Simple mobile phase used for the separation of polar compounds

Ultisil™ HILIC Amphion

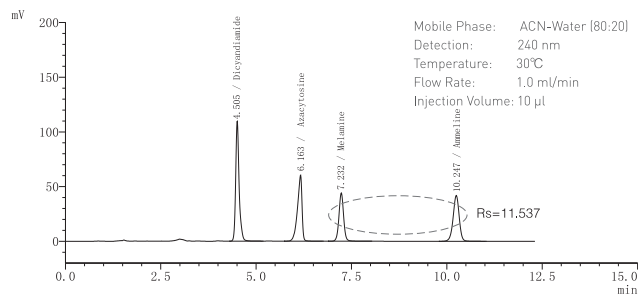
Structural Formula	
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	6(120 Å)
USP List	/
Endcapped	N/A

Comparison

Separation of 4 Polar Compounds (Dicyandiamide, Azacytosine, Melamine, Ammeline)

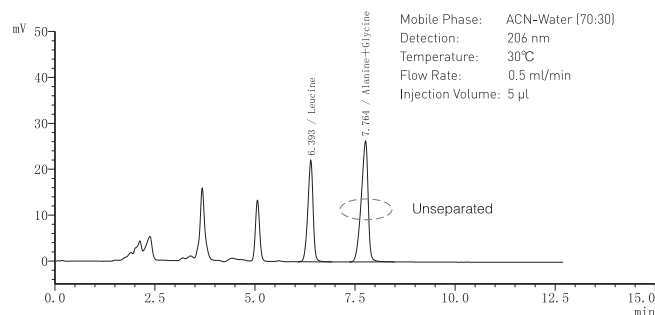


Ultisil™ HILIC SiO₂ 5 µm, 4.6×250 mm

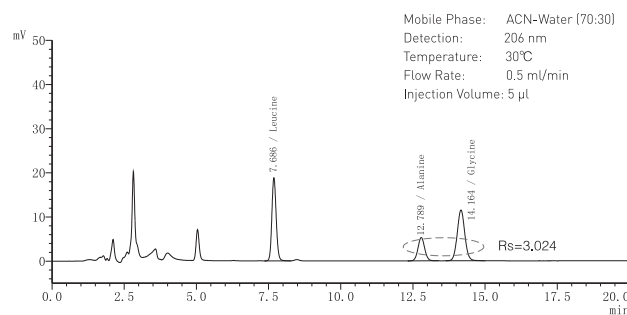


Ultisil™ Amphion II, 5 µm, 4.6×150 mm

Separation of 3 Aliphatic Amino Acids (Leucine, Alanine, Glycine)



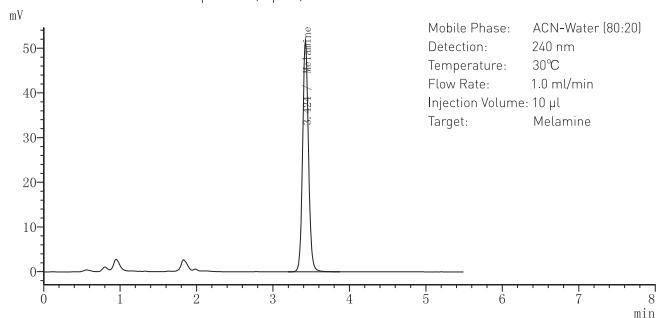
Ultisil™ HILIC SiO₂ 5 µm, 4.6×150 mm



Ultisil™ Amphion II, 5 µm, 4.6×150 mm

Determination of Melamine

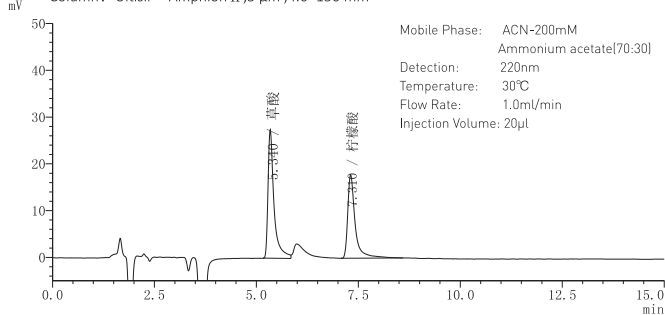
Column: Ultisil™ Amphion II, 5 μm, 4.6×150 mm



Rt	Plates	Tailing Factor
3.424	8087	1.094

Separation of Citrate and Oxalate

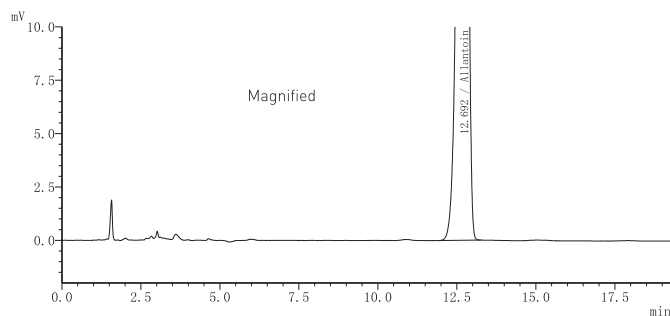
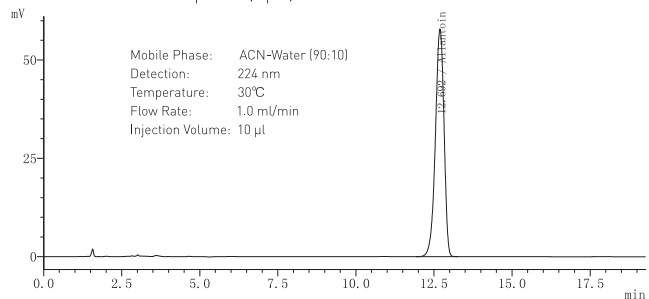
Column: Ultisil™ Amphion II, 5 μm, 4.6×150 mm



Compound	Rt	Plates	Resolution
Oxalate	5.340	7540	--
Citrate	7.310	9487	7.214

Determination of Allantoin

Column: Ultisil™ Amphion II, 5 μm, 4.6×250 mm



Rt	Plates	Tailing Factor
12.692	10196	0.892

Before use, flush with 50 column volumes of mobile phase (acetonitrile/water, 80:20) to equilibrate. Before injection, flush with 20 column volumes of mobile phase to equilibrate. For gradient analysis, flush with 10 column volumes of original mobile phase between injections.

Note:

- Shifts of retention time may occur, if not sufficiently equilibrated.
- Acetonitrile is the most common mobile phase solvent in HILIC mode. Other water-soluble polar organic solvents can also be used as mobile phases. The comparison of elution strength is: THF < Acetone < Acetonitrile < Isopropanol < Ethanol < Methanol < Water.
- Long-period equilibration required, after using buffer salt mobile phase (like ammonium formate, ammonium acetate etc.) and buffer salt being flushed off.
- After use, flush off the buffer salt in the column and store in 100% acetonitrile solvent.

Ultisil™ HILIC Amphion II

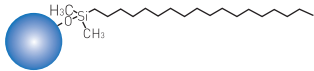
Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
5 μm 120 Å	2.1	00274-31009	09274-31009	00274-31010	00274-31011	00274-31012	00274-31013	00274-31014	00274-31015	00274-31016		00808-24039	00808-01107
	3.0	00274-31018	-	00274-31019	00274-31020	00274-31021	00274-31022	00274-31023	00274-31024	00274-31025	-	00808-24039	00808-01107
	4.0	00274-31027	-	00274-31028	00274-31029	00274-31030	00274-31031	00274-31032	00274-31033	00274-31034	00274-31035	00808-04029	00808-01101
	4.6	00274-31036	11274-31036	00274-31037	00274-31038	00274-31039	00274-31040	00274-31041	00274-31042	00274-31043	00274-31044	00808-04029	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ Amino Acid HPLC Column

Ultisil™ Amino Acid HPLC columns are made from spherical, totally porous, and ultra-high purity (>99.999%) type B silica particles. Our proprietary surface modification before bonding generates a very smooth and uniform surface with less acidic surface silanol. Ultisil™ Amino Acid columns provide the best performance in peak shape, efficiency and resolution for the analysis of 18 amino acids. Complete sample preparation can be achieved in as little as 30 min.

Ultisil™ AA(Amino Acid)

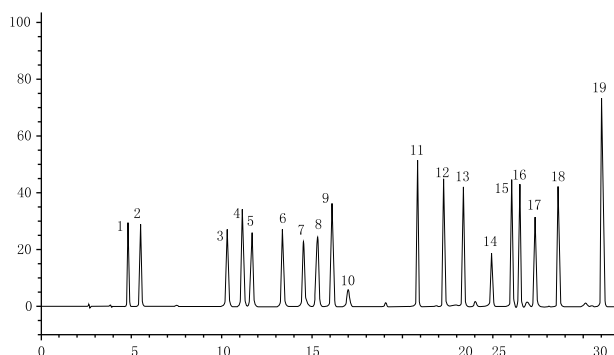
Structural Formula	
pH Range	1.5-10.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	17(120 Å)
USP List	L1
Endcapped	Yes

Ultisil™ Amino Acid Method Package

Ultisil™ Amino Acid Method Package

- Ultisil™ Amino Acid Column (5 μm, 4.6×250 mm), 1 pk
- Amino Acid Standards, 2 bottles. 1 mL/bottle
- Derivatization reagent A
- Derivatization reagent B
- Ultisil™ AA method brochure

Separation of 18 Amino Acids



1. Aspartic Acid	2. Glutamic acid
3. Serine	4. Glycine
5. Histidine	6. Arginine
7. Threonine	8. Alanine
9. Proline	10. Ammonium chloride
11. Tyrosine	12. Valine
13. Methionine	14. Cystine
15. Isoleucine	16. Leucine
17. Norleucine	18. phenylalanine
19. Lysine	

Ordering Information

Ultisil™ Amino Acid	P/N	Description
Method Package	00211-31043	Ultisil™ Amino Acid Column (4.6×250 mm, 5 μm), 1 pk
(P/N 00840-01000)	00814-01027 (A)	Derivatization reagent A, 1 bottle, 10 mL/bottle
	00814-01027 (B)	Derivatization reagent B, 1 bottle, 10 mL/bottle
	00814-01030	Derivatization reagent diluent, 6 bottles, 20 mL/bottle
	00815-01001	Amino Acid Standards, 2 bottles, 1 mL/bottle

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ Mixed Mode Phase(MM C18/SCX&MM NH₂/CN)

Ultisil™ Mixed mode phase, whose selectivity is totally different from conventional reversed phase, is a new packing material that is the development trend of liquid chromatography. There are three modes in the mixed mode phase: reversed phase/anion exchange, reversed phase/cation exchange, reversed phase/amphoteric compound.

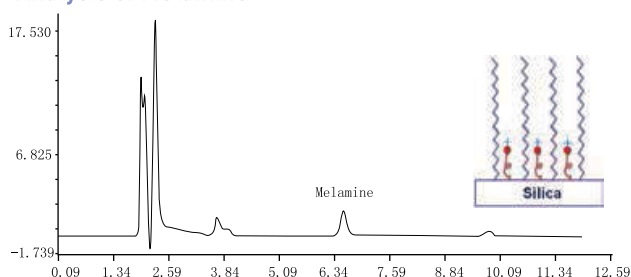
Ultisil™ MM C18/SCX

pH Range	2.0-8.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	/
Endcapped	N/A

Ultisil™ MM NH₂/CN

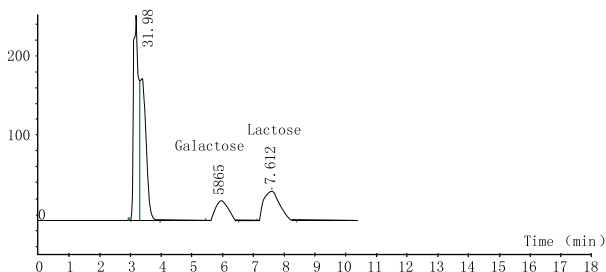
pH Range	2.0-8.0
Particle Size	5 μm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	/
Endcapped	N/A

Analysis of Melamine



Column:	Ultisil™ MM C18/SCX, 4.6 ×250 mm, 5 μm
Mobile Phase:	0.01 M NH ₄ AC(pH3.0)/acetonitrile=62/38
Detector:	240 nm
Temperature:	40°C
Flow Rate:	1.0 mL/min
Injection Volume:	20 μL

Separation of Lactose and Galactose



Column:	Ultisil™ MM NH ₂ /CN, 4.6 ×250 mm, 5 μm
Mobile Phase:	Acetonitrile/water =70/30
Detector:	RID (40°C)
Temperature:	45°C
Flow Rate:	1.0 mL/min
Injection Volume:	20 μL

Ultisil™ MM C18/SCX

Particle size	Column ID (mm)	Column Length (mm)											Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300	10mm length		
5 μm 120 Å	2.1	00235-31009	09235-31009	00243-31010	00235-31011	00235-31012	00235-31013	00235-31014	00235-31015	00235-31016	-	00808-24032	00808-01107	
	3.0	00235-31018	-	00235-31019	00235-31020	00235-31021	00235-31022	00235-31023	00235-31024	00235-31025	-	00808-24032	00808-01107	
	4.0	00235-31027	-	00235-31028	00235-31029	00235-31030	00235-31031	00235-31032	00235-31033	00235-31034	00235-31035	00808-04032	00808-01101	
	4.6	00235-31036	11235-31036	00235-31037	00235-31038	00235-31039	00235-31040	00235-31041	00235-31042	00235-31043	00235-31044	00808-04032	00808-01101	

Ultisil™ MM NH₂/CN

Particle size	Column ID (mm)	Column Length (mm)											Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300	10mm length		
5 μm 120 Å	2.1	00243-31009	09243-31009	00243-31010	00243-31011	00243-31012	00243-31013	00243-31014	00243-31015	00243-31016	-	00808-24041	00808-01107	
	3.0	00243-31018	-	00243-31019	00243-31020	00243-31021	00243-31022	00243-31023	00243-31024	00243-31025	-	00808-24041	00808-01107	
	4.0	00243-31027	-	00243-31028	00243-31029	00243-31030	00243-31031	00243-31032	00243-31033	00243-31034	00243-31035	00808-04037	00808-01101	
	4.6	00243-31036	11243-31036	00243-31037	00243-31038	00243-31039	00243-31040	00243-31041	00243-31042	00243-31043	00243-31044	00808-04037	00808-01101	

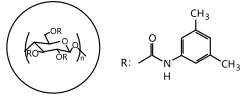
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Ultisil™ Chiral Column

Ultisil™ Chiral Columns are based on spherical silica particles coated with chiral polymers (amylose derivatives or cellulose derivatives). Welch offers 5 µm and 10 µm particles, and four types of chiral columns: Cellu-D, Cellu-J, Amy-D and Amy-s. 80% of all racemic compounds can be separated by these four chiral columns.

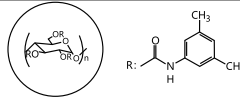
Ultisil™ Cellu-D/Cellu-DR

Cellulose tris (3,5-dimethylphenylcarbamate) coated silica

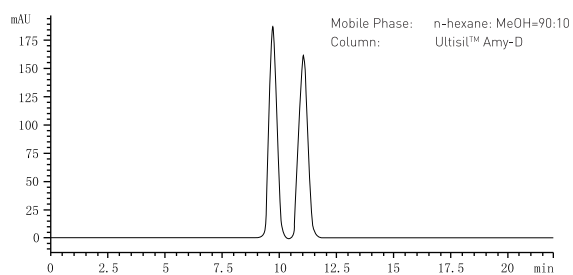
Structural Formula	
pH Range	2.0-9.0
Particle Size	5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	L40
Endcapped	N/A

Ultisil™ AMY-D/AMY-DR

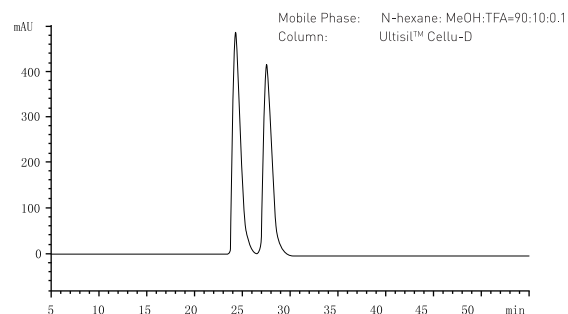
Amylose tris (3,5-dimethylphenylcarbamate) coated silica

Structural Formula	
pH Range	2.0-9.0
Particle Size	5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	L51
Endcapped	N/A

Fenamiphos

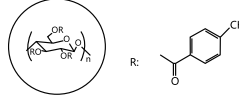


DL-Repaglinide



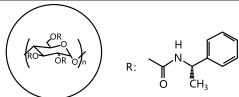
Ultisil™ Cellu-J/Cellu-JR

Cellu-J/Cellu-JR: Cellulose tris (4-methyl benzoate) coated silica

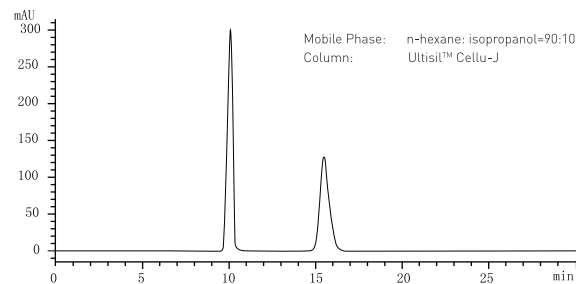
Structural Formula	
pH Range	2.0-9.0
Particle Size	5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	L80
Endcapped	N/A

Ultisil™ Amy-S/Amy-SR

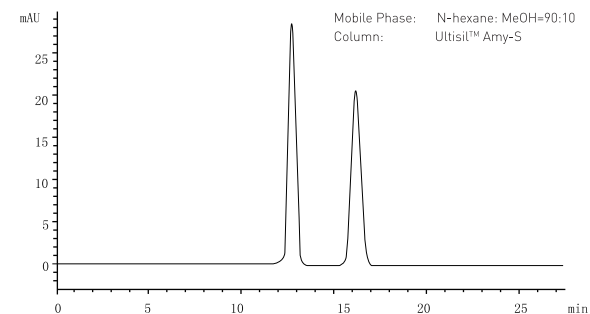
Amylose tris [(S)-α-methylphenyl carbamate] coated Silica

Structural Formula	
pH Range	2.0-9.0
Particle Size	5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	/
Endcapped	N/A

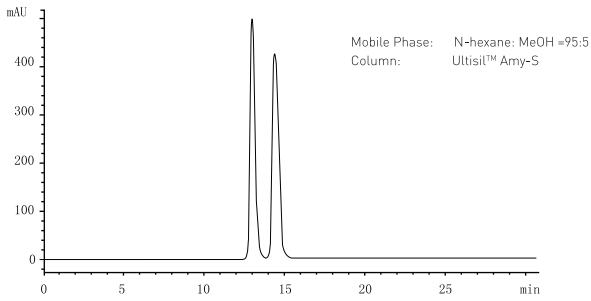
Tröger's Base



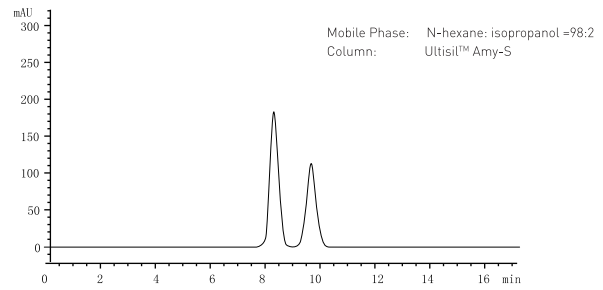
Myclobutanil



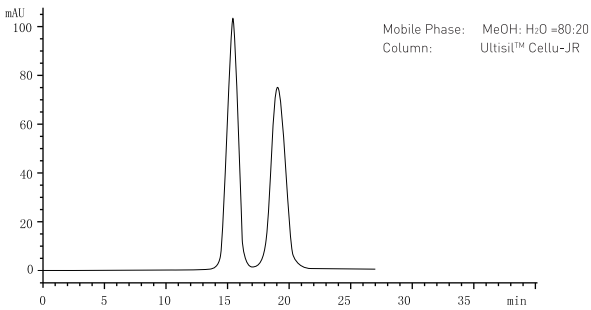
Quizalofop-ethyl



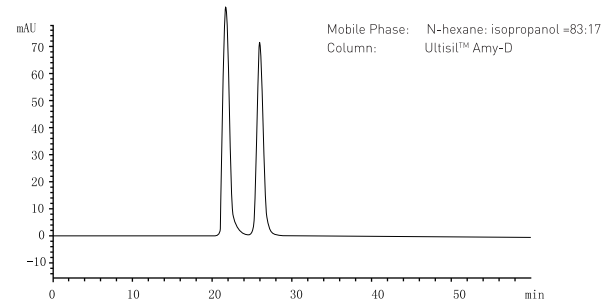
Oxirane,2-[(phenylmethoxy)methyl]-



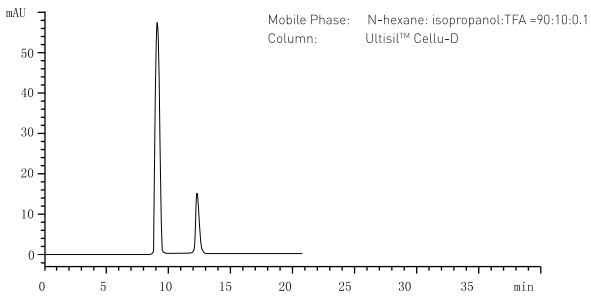
Llaprazole



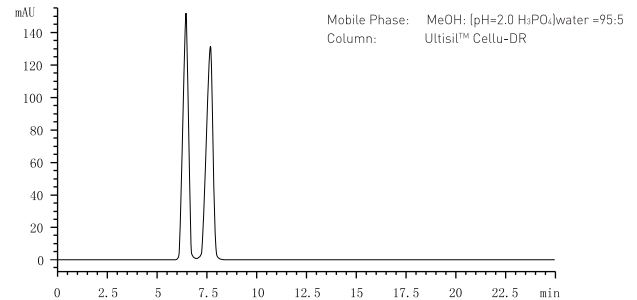
Omeprazole



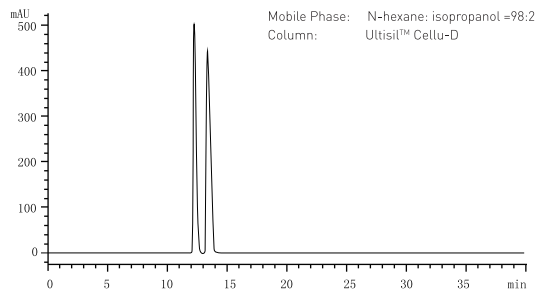
Alkannin



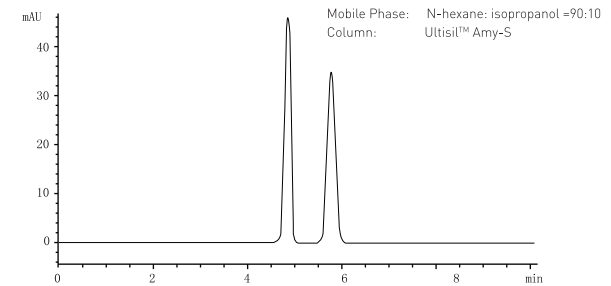
Fmoc-Leu-OH



Butylphthalide



Hexaconazole



Ordering Information

	Particle size	Column ID(mm)	Column Length (mm)		Guard Cartridge	Guard Column Holder		Particle size	Column ID(mm)	Column Length (mm)		Guard Cartridge	Guard Column Holder
			150	250						150	250		
Cellu-D	5 µm	4.6	00219-31041	00219-31043	00808-04014	00808-01101	Cellu-J	5 µm	4.6	00218-31041	00218-31043	00808-04039	00808-01101
	10 µm	4.6	00219-41041	00219-41043	00808-05021	00808-01101		10 µm	4.6	00218-41041	00218-41043	00808-05023	00808-01101
Cellu-DR	5 µm	4.6	00262-31041	00262-31043	00808-04014-R	00808-01101	Cellu-JR	5 µm	4.6	00261-31041	00261-31043	00808-04039-R	00808-01101
	10 µm	4.6	00262-41041	00262-41043	00808-05021-R	00808-01101		10 µm	4.6	00261-41041	00261-41043	00808-05023-R	00808-01101
Amy-D	5 µm	4.6	00221-31041	00221-31043	00808-04040	00808-01101	Amy-S	5 µm	4.6	00220-31041	00220-31043	00808-04041	00808-01101
	10 µm	4.6	00221-41041	00221-41043	00808-05022	00808-01101		10 µm	4.6	00220-41041	00220-41043	00808-05024	00808-01101
Amy-DR	5 µm	4.6	00264-31041	00264-31043	00808-04040-R	00808-01101	Amy-SR	5 µm	4.6	00263-31041	00263-31043	00808-04041-R	00808-01101
	10 µm	4.6	00264-41041	00264-41043	00808-05022-R	00808-01101		10 µm	4.6	00263-41041	00263-41043	00808-05024-R	00808-01101

Xtimate® Series HPLC Column

---Next generation beyond mid-range priced Ultisil™ series

X features of Xtimate® column

eXtra pH range: wide pH range from 1.0 to 12.5, excellent peak shape for strong bases

eXtra column lifetime: 5 times of similar product such as Gemini

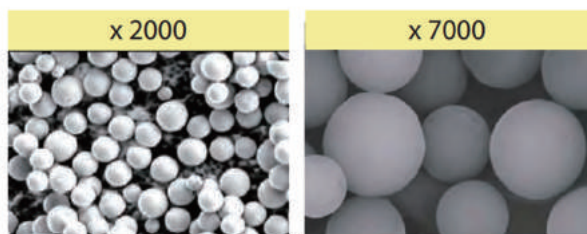
eXtra performance: column efficiency of 5µm columns is as high as 90000/m, 2-3 times of that of Xterra

eXtra care from Welch: enjoy excellent pre-sales and after-sales service from Welch

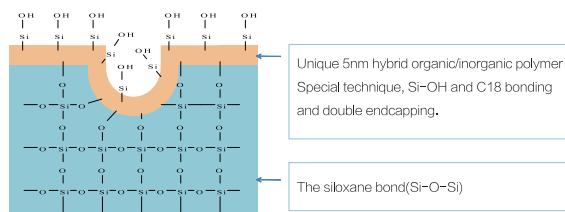
Xtimate® Silica Based HPLC Column

Xtimate® HPLC column derives its outstanding performance from a special hybrid particle based technique, which coats a unique 5nm organic/inorganic polymer layer on the silica surface, so that the pH range is extended to 1.0-12.5.

Xtimate® column is designed for HPLC method development. Regardless of the types of mobile phase or high temperature, Xtimate® HPLC column always has stable performance and long lifetime.

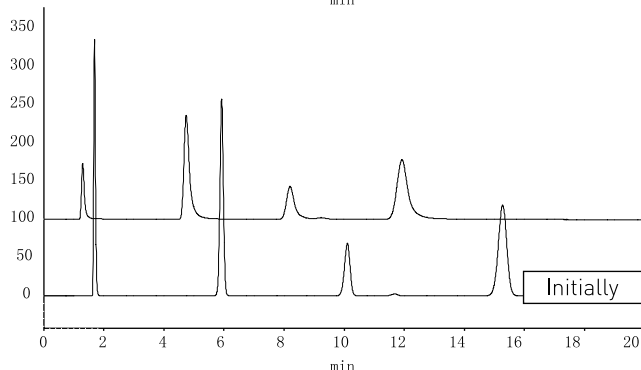
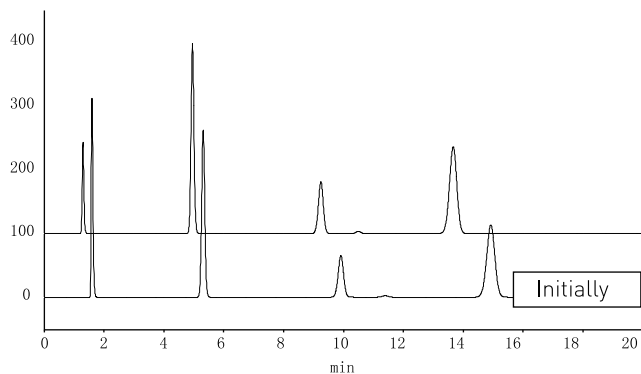


SEM of Hybrid particle



Hybrid Particles Based Xtimate® Technology

Comparison of Peak Shape After Soaking In Base

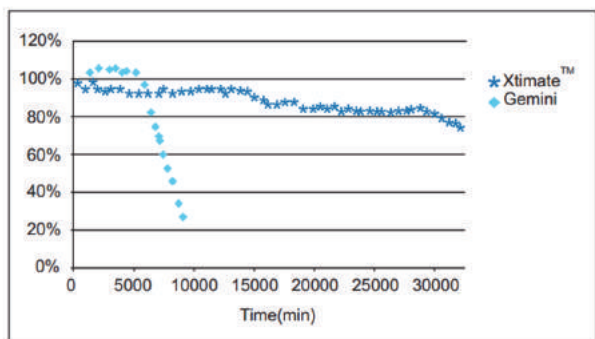


After test at pH 12 condition for 4h, the peak shape of hybrid particles based Xtimate® column shows no difference.

Column:	Xtimate® C18, 5 µm, 150 x 4.6 mm
Mobile Phase:	CH ₃ CN/0.01N-NaOH(aq.(pH=12))=30/70
Flow Rate:	1.0ml/min
Temperature:	40°C
Soak Time:	4 hours

Column:	Ultisil™ C18, 5 µm, 150 x 4.6 mm
Mobile Phase:	CH ₃ OH/H ₂ O=60/40
Flow Rate:	1.0 mL/min
Temperature:	40°C
Detector:	UV 254nm
Samples:	1.Uracil 2.Methyl benzoate 3.Toluence 4.Naphthalene

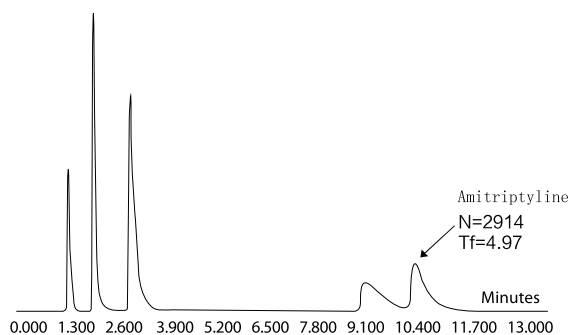
Lifetime Test Comparison: 5 Times Longer Than Gemini



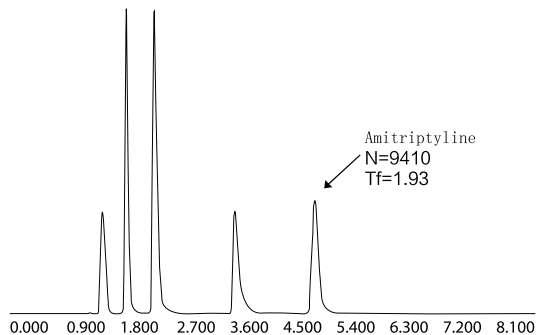
Column:	Xtimate® C18, 5 µm, 150x4.6 mm / Gemini C18, 5 µm, 150x4.6 mm
Mobile Phase:	A: 10mM Ammonium Bicarbonate pH 10.5 B: 90:10 Acetonitrile/buffer
Gradient Program:	0% to 100% B in 10min. 100% B for 7min. 0% B for 3min.
Flow Rate:	1.0 mL/min
Temperature:	50°C
Detector:	UV 254 nm
Samples:	1.Uracil 2.Methyl benzoate 3.Toluence 4.Naphthalene

Unprecedented Peak Shape

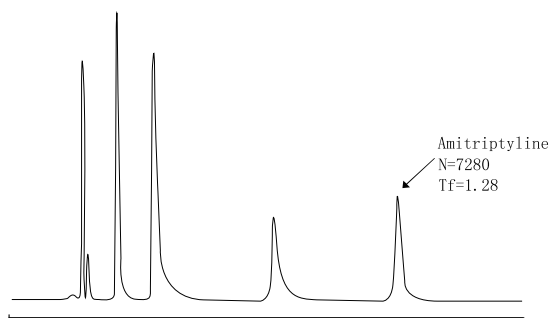
At mid pH, strong bases usually exhibit bad tailing due to secondary interactions between the analytes and the surface silanols. In Welch's unique technique, the hybrid layer totally covers the surface silanols and blocks analytes' access to these surface silanols. Improved bonding and endcapping further reduce silanol activity. As a result, hybrid particle based Xtimate® columns show unprecedented peak shape.



The detection of amitriptyline by poor endcapping product



The detection of Amitriptyline by Symmetry C18



The detection of amitriptyline by Xtimate® C18



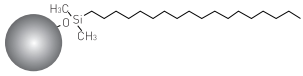
Xtimate® HPLC Column

Besides C18 and C8 bonded phases, Xtimate also provides C4, CN, Phenyl bonded phases.

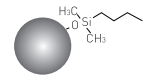
Xtimate® applies a new special Smoothpak™ technique to C18, C8, C4, CN, Phenyl and amino phases, different than the bonding method of other series. As a result, Xtimate® provides a different selectivity, improved stability and reproducibility. In particular, for the Phenyl phase of Phenyl-Hexyl, Xtimate® is totally different from Ultisil™ Phenyl. Xtimate® Phenyl phase's longer hexyl group provides extra hydrocarbon interaction and longer retention than conventional phenyl-propyl phase; it also provides better chemical stability.

Welch also adds polar embedded phase, Polar-RP on Xtimate® particles, to further improve peak shape for very polar and strong basic compounds and provides different selectivity than does C18 phase.

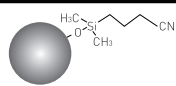
Xtimate® C18

Structural Formula	
pH Range	1.0-12.5
Particle Size	3 µm, 5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	14(120 Å)
USP List	L1
Endcapped	Yes

Xtimate® C4

Structural Formula	
pH Range	1.0-12.5
Particle Size	3 µm, 5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	8(120 Å)
USP List	L26
Endcapped	Yes

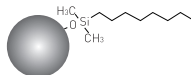
Xtimate® CN

Structural Formula	
pH Range	1.0-12.5
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	7(120 Å)
USP List	L10
Endcapped	Yes

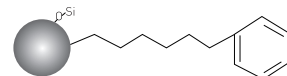
Xtimate® Lactose-NH₂

pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	450(120 Å)
Carbon Loading(%)	7(120 Å)
USP List	L8
Endcapped	No

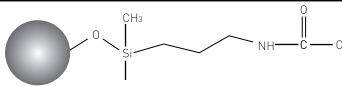
Xtimate® C8

Structural Formula	
pH Range	1.0-12.5
Particle Size	3 µm, 5 µm, 10 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	10(120 Å)
USP List	L7
Endcapped	Yes

Xtimate® Phenyl-Hexyl

Structural Formula	
pH Range	1.0-12.5
Particle Size	3 µm, 5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L11
Endcapped	Yes

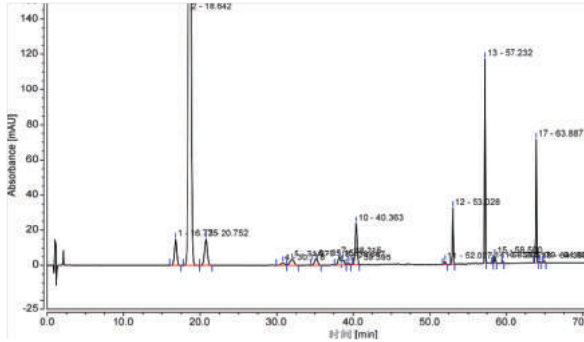
Xtimate® Polar-RP

Structural Formula	
pH Range	1.0-12.5
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	16(120 Å)
USP List	L1
Endcapped	Yes

Xtimate® XB-SCX

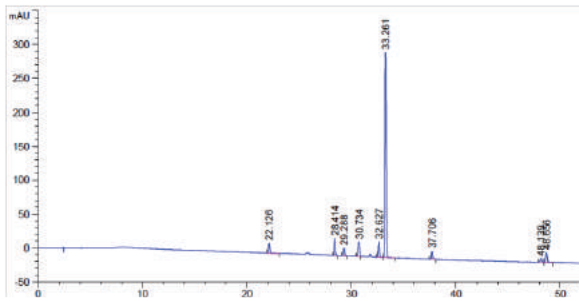
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	300(120 Å)
Carbon Loading(%)	2(120 Å)
USP List	L9
Endcapped	No

Rosuvastatin Calcium



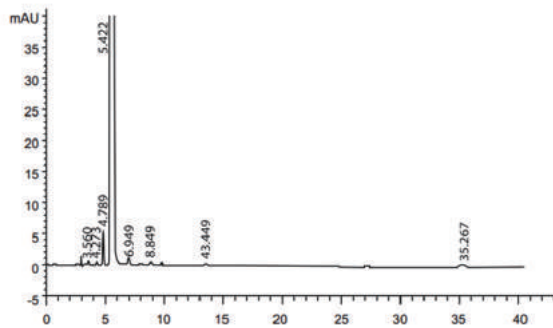
Column:	Xtimate® C18, 3.0 ×150 mm, 3 μm															
Mobile Phase:	A: 1% TFA/acetonitrile/water=1/29/70 B: 1% TFA/acetonitrile/water=1/75/24															
	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0-30</td> <td>100</td> <td>0</td> </tr> <tr> <td>30-50</td> <td>100-50</td> <td>0-40</td> </tr> <tr> <td>50-60</td> <td>60-0</td> <td>40-100</td> </tr> <tr> <td>60-70</td> <td>0</td> <td>100</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0-30	100	0	30-50	100-50	0-40	50-60	60-0	40-100	60-70	0	100
Time(min)	A(%)	B(%)														
0-30	100	0														
30-50	100-50	0-40														
50-60	60-0	40-100														
60-70	0	100														
Flow Rate:	0.75 mL/min															
Temperature:	40°C															
Detector:	242 nm															
Injection Volume:	10 μL															

Cangrelor



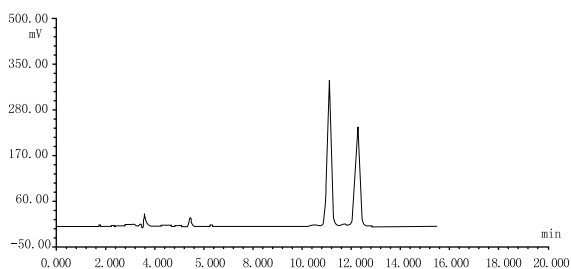
Column:	Xtimate® C18, 4.6 ×250 mm, 5 μm																											
Mobile Phase:	Mobile phase A: 0.05 mol/L K ₂ HPO ₄ (pH 8.5) Mobile Phase B: acetonitrile																											
	<table border="1"> <thead> <tr> <th>Time(min)</th> <th>A(%)</th> <th>B(%)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>95</td> <td>5</td> </tr> <tr> <td>3</td> <td>95</td> <td>5</td> </tr> <tr> <td>35</td> <td>67</td> <td>33</td> </tr> <tr> <td>50</td> <td>60</td> <td>40</td> </tr> <tr> <td>60</td> <td>35</td> <td>65</td> </tr> <tr> <td>65</td> <td>35</td> <td>65</td> </tr> <tr> <td>66</td> <td>95</td> <td>5</td> </tr> <tr> <td>75</td> <td>95</td> <td>5</td> </tr> </tbody> </table>	Time(min)	A(%)	B(%)	0	95	5	3	95	5	35	67	33	50	60	40	60	35	65	65	35	65	66	95	5	75	95	5
Time(min)	A(%)	B(%)																										
0	95	5																										
3	95	5																										
35	67	33																										
50	60	40																										
60	35	65																										
65	35	65																										
66	95	5																										
75	95	5																										
Flow Rate:	1.0 mL/min																											
Temperature:	25°C																											
Detector:	242 nm																											
Injection Volume:	5 μL																											

Valaciclovir Hydrochloride



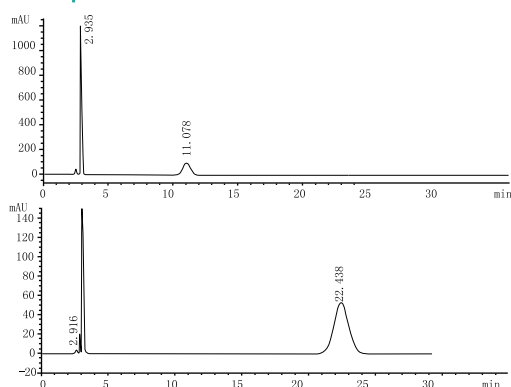
Column:	Xtimate® Phenyl-Hexyl, 250 x 4.6 mm, 5 μm
Mobile Phase:	Methanol/0.01mol/L KH ₂ PO ₄ (pH3.0)=15/85
Flow Rate:	1.0 mL/min
Temperature:	35°C
Detector:	251 nm
Injection Volume:	20 μL

Omeprazole



Column:	Xtimate® C8, 250 x 4.6 mm, 5 μm
Mobile Phase:	10 mmol/L Na ₂ HPO ₄ (pH7.4)/ Acetonitrile=70/30
Flow Rate:	1.0 mL/min
Temperature:	Ambient
Detector:	280 nm
Injection Volume:	20 μL

Enalapril Maleate



Column:	Xtimate® C8, 250 x 4.6 mm, 5 µm
Mobile Phase:	Phosphate buffer/acetonitrile=75/25
Flow Rate:	1.0mL/min
Temperature:	50°C
Detector:	280 nm
Injection Volume:	20 µL

Ordering Information

Xtimate® C18

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder	
		30	33	50	75	100	125	150	200	250	300			
3 µm	2.1	00101-11009	09101-11009	00101-11010	00101-11011	00101-11012	00101-11013	00101-11014	00101-11015	00101-11016	-	00808-23101	00808-01107	
	3.0	00101-11018	-	00101-11019	00101-11020	00101-11021	00101-11022	00101-11023	00101-11024	00101-11025	-	00808-23101	00808-01107	
	4.0	00101-11027	-	00101-11028	00101-21029	00101-11030	00101-11031	00101-11032	00101-11033	00101-11034	-	00808-03101	00808-01101	
	4.6	00101-11036	11101-11036	00101-11037	00101-21038	00101-11039	00101-11040	00101-11041	00101-11042	00101-11043	-	00808-03101	00808-01101	
5 µm	2.1	00101-21009	09101-21009	00101-21010	00101-21011	00101-21012	00101-21013	00101-21014	00101-21015	00101-21016	-	00808-24101	00808-01107	
	3.0	00101-21018	-	00101-21019	00101-21020	00101-21021	00101-21022	00101-21023	00101-21024	00101-21025	-	00808-24101	00808-01107	
	4.0	00101-21027	-	00101-21028	00101-21029	00101-21030	00101-21031	00101-21032	00101-21033	00101-21034	00101-21035	00808-04101	00808-01101	
	4.6	00101-21036	11101-21036	00101-21037	00101-21038	00101-21039	00101-21040	00101-21041	00101-21042	00101-21043	00101-21044	00808-04101	00808-01101	
10 µm	4.0	-	-	-	-	-	-	-	00101-31032	00101-31033	00101-31034	00101-31035	00808-05101	00808-01101
	4.6	-	-	-	-	-	-	00101-31041	00101-31042	00101-31043	00101-31044	00808-05101	00808-01101	

Xtimate® C8

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 µm	2.1	00102-11009	09102-11009	00102-11010	00102-11011	00102-11012	00102-11013	00102-11014	00102-11015	00102-11016	-	00808-23102	00808-01107
	3.0	00102-11018	-	00102-11019	00102-11020	00102-11021	00102-11022	00102-11023	00102-11024	00102-11025	-	00808-23102	00808-01107
	4.0	00102-11027	-	00102-11028	00102-21029	00102-11030	00102-11031	00102-11032	00102-11033	00102-11034	-	00808-03102	00808-01101
	4.6	00102-11036	11102-11036	00102-11037	00102-21038	00102-11039	00102-11040	00102-11041	00102-11042	00102-11043	-	00808-03102	00808-01101
5 µm	2.1	00102-21009	09102-21009	00102-21010	00102-21011	00102-21012	00102-21013	00102-21014	00102-21015	00102-21016	-	00808-24102	00808-01107
	3.0	00102-21018	-	00102-21019	00102-21020	00102-21021	00102-21022	00102-21023	00102-21024	00102-21025	-	00808-24102	00808-01107
	4.0	00102-21027	-	00102-21028	00102-21029	00102-21030	00102-21031	00102-21032	00102-21033	00102-21034	00102-21035	00808-04102	00808-01101
	4.6	00102-21036	11102-21036	00102-21037	00102-21038	00102-21039	00102-21040	00102-21041	00102-21042	00102-21043	00102-21044	00808-04102	00808-01101
10 µm	4.0	-	-	-	-	-	-	00102-31032	00102-31033	00102-31034	00102-31035	00808-05102	00808-01101
	4.6	-	-	-	-	-	-	00102-31041	00102-31042	00102-31043	00102-31044	00808-05102	00808-01101

Xtimate® Phenyl-Hexyl

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 µm	2.1	00104-11009	09104-11009	00104-11010	00104-11011	00104-11012	00104-11013	00104-11014	00104-11015	00104-11016	-	00808-23106	00808-01107
	3.0	00104-11018	-	00104-11019	00104-11020	00104-11021	00104-11022	00104-11023	00104-11024	00104-11025	-	00808-23106	00808-01107
	4.0	00104-11027	-	00104-11028	00104-21029	00104-11030	00104-11031	00104-11032	00104-11033	00104-11034	-	00808-03106	00808-01101
	4.6	00104-11036	11104-11036	00104-11037	00104-21038	00104-11039	00104-11040	00104-11041	00104-11042	00104-11043	-	00808-03106	00808-01101
5 µm	2.1	00104-21009	09104-21009	00104-21010	00104-21011	00104-21012	00104-21013	00104-21014	00104-21015	00104-21016	-	00808-24106	00808-01107
	3.0	00104-21018	-	00104-21019	00104-21020	00104-21021	00104-21022	00104-21023	00104-21024	00104-21025	-	00808-24106	00808-01107
	4.0	00104-21027	-	00104-21028	00104-21029	00104-21030	00104-21031	00104-21032	00104-21033	00104-21034	00104-21035	00808-04106	00808-01101
	4.6	00104-21036	11104-21036	00104-21037	00104-21038	00104-21039	00104-21040	00104-21041	00104-21042	00104-21043	00104-21044	00808-04106	00808-01101

Xtimate® C4

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
3 µm	2.1	00107-11009	09107-11009	00107-11010	00107-11011	00107-11012	00107-11013	00107-11014	00107-11015	00107-11016	-	00808-23103	00808-01107
	3.0	00107-11018	-	00107-11019	00107-11020	00107-11021	00107-11022	00107-11023	00107-11024	00107-11025	-	00808-23103	00808-01107
	4.0	00107-11027	-	00107-11028	00107-21029	00107-11030	00107-11031	00107-11032	00107-11033	00107-11034	-	00808-03103	00808-01101
	4.6	00107-11036	11107-11036	00107-11037	00107-21038	00107-11039	00107-11040	00107-11041	00107-11042	00107-11043	-	00808-03103	00808-01101
5 µm	2.1	00107-21009	09107-21009	00107-21010	00107-21011	00107-21012	00107-21013	00107-21014	00107-21015	00107-21016	-	00808-24103	00808-01107
	3.0	00107-21018	-	00107-21019	00107-21020	00107-21021	00107-21022	00107-21023	00107-21024	00107-21025	-	00808-24103	00808-01107
	4.0	00107-21027	-	00107-21028	00107-21029	00107-21030	00107-21031	00107-21032	00107-21033	00107-21034	00107-21035	00808-04103	00808-01101
	4.6	00107-21036	11107-21036	00107-21037	00107-21038	00107-21039	00107-21040	00107-21041	00107-21042	00107-21043	00107-21044	00808-04103	00808-01101

Xtimate® CN

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
5 µm	2.1	00105-21009	09105-21009	00105-21010	00105-21011	00105-21012	00105-21013	00105-21014	00105-21015	00105-21016	-	00808-24105	00808-01107
	3.0	00105-21018	-	00105-21019	00105-21020	00105-21021	00105-21022	00105-21023	00105-21024	00105-21025	-	00808-24105	00808-01107
	4.0	00105-21027	-	00105-21028	00105-21029	00105-21030	00105-21031	00105-21032	00105-21033	00105-21034	00105-21035	00808-04105	00808-01101
	4.6	00105-21036	11105-21036	00105-21037	00105-21038	00105-21039	00105-21040	00105-21041	00105-21042	00105-21043	00105-21044	00808-04105	00808-01101

Xtimate® Polar-RP

Particle size	Column ID (mm)	Column Length (mm)										Guard Cartridge	Guard Column Holder
		30	33	50	75	100	125	150	200	250	300		
5 µm	2.1	00118-21009	09118-21009	00118-21010	00118-21011	00118-21012	00118-21013	00118-21014	00118-21015	00118-21016	-	00808-24111	00808-01107
	3.0	00118-21018	-	00118-21019	00118-21020	00118-21021	00118-21022	00118-21023	00118-21024	00118-21025	-	00808-24111	00808-01107
	4.0	00118-21027	-	00118-21028	00118-21029	00118-21030	00118-21031	00118-21032	00118-21033	00118-21034	00118-21035	00808-04152	00808-01101
	4.6	00118-21036	11118-21036	00118-21037	00118-21038	00118-21039	00118-21040	00118-21041	00118-21042	00118-21043	00118-21044	00808-04152	00808-01101

Xtimate® Lactose-NH₂

Dimension	P/N	Guard Cartridge(10mm length)	Guard Column Holder
4.6×300, 5 µm	00121-21044	00808-04151	00808-01101

Xtimate® XB-SCX

Dimension	P/N	Guard Cartridge(10mm length)	Guard Column Holder
4.6×150, 5 µm	00120-21041	00808-04153	00808-01101
4.6×250, 5 µm	00120-21043	00808-04153	00808-01101

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Xtimate® Polymer Based Column

Xtimate® Sugar-H is a special column designed for Ribavirin. Packed with H⁺ modified low-linking polystyrene-divinylbenzene spheres (PS-DVB), this column can be applied for the analysis of organic acids and mixed alcohols.

Xtimate® Sugar-Ca is a strong cation exchange column packed with Ca²⁺ modified PS-DVB resins; can be used for the analysis of sugar products.

Xtimate® PS/DVB is based on polystyrene-divinylbenzene. This column can be used in extreme conditions (pH 1-14).

Xtimate® Sugar-H

pH Range	1.0-3.0
Particle Size	5 µm, 8 µm
Cross-link	8%
Counter Ion	H ⁺
USP List	L17
Max. Temp.	95°C

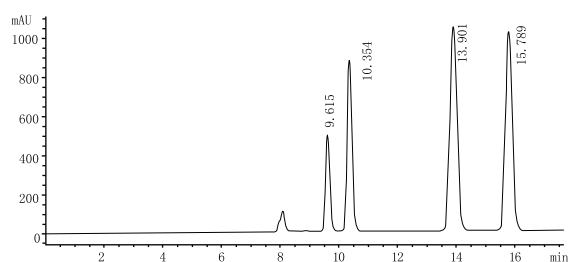
Xtimate® Sugar-Ca

pH Range	5.0-9.0
Particle Size	5 µm, 8 µm
Cross-link	8%
Counter Ion	Ca ²⁺
USP List	L19
Max. Temp.	95°C

Xtimate® PS/DVB

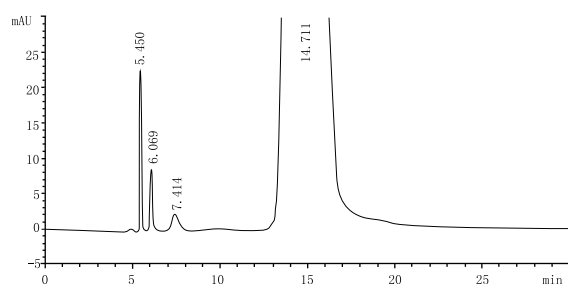
pH Range	1.0-14.0
Particle Size	5 µm, 10 µm
Surface Area(m ² /g)	450(300 Å)
USP List	L21
Max. Temp.	75°C

Separation of Organic Acids



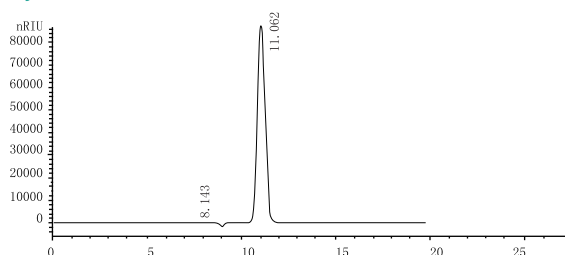
Column:	Xtimate® Sugar-H, 5 µm, 300 x 7.8 mm
Mobile Phase:	H ₂ SO ₄ water solution (pH 2.0)
Flow Rate:	0.5 mL/min
Temperature:	60°C
Detector:	RID
Injection Volume:	20 µL
Organic Acids:	Maleic acid, L-malic acid, fumaric acid, sodium acetate trihydrate

Ketophenylalanine Calcium



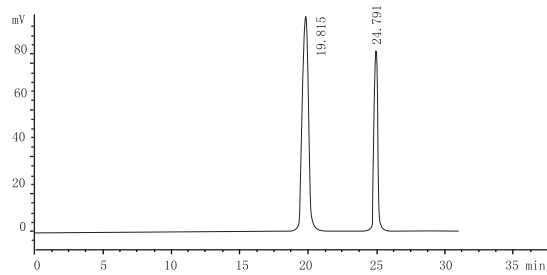
Column:	Xtimate® Sugar-H, 5 µm, 300 x 7.8 mm
Mobile Phase:	0.025 mol/L H ₂ SO ₄ water solution
Flow Rate:	0.8 mL/min
Temperature:	20°C
Detector:	205 nm
Injection Volume:	20 µL

Xylose



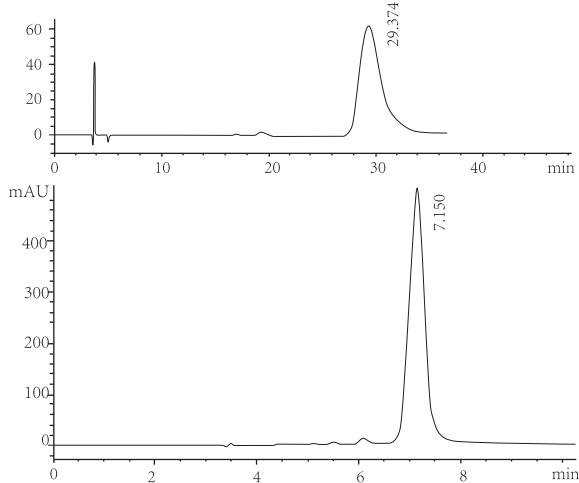
Column:	Xtimate® Sugar-Ca, 5 µm, 300 x 7.8 mm
Mobile Phase:	Ultra-pure water
Flow Rate:	0.6 mL/min
Temperature:	85°C
Detector:	RID 55°C
Injection Volume:	20 µL

Mannitol



Column:	Xtimate® Sugar-Ca, 8 µm, 300 x 7.8 mm
Mobile Phase:	Ultra-pure water
Flow Rate:	0.5 mL/min
Temperature:	80°C
Detector:	20 µL
Injection Volume:	R of mannitol and Sorbitol >2

Doxycycline HCl



Column:	Xtimate® PS/DVB, 8 µm, 250 x 7.8 mm
Mobile Phase:	50g TBA with 100 mL water, 200 mL buffer (pH 8.0), 25 mL TBAHS(10g/L, pH 8.0, adjust with NaOH), 5 mL EDTA(40 g/L, pH 8.0, adjust with NaOH), dilute to 500 mL with water
Flow Rate:	2.0 mL/min
Temperature:	75°C
Detector:	254 nm
Injection Volume:	20 µL
Notes:	Be sensitive to column temperature

Ordering Information

Xtimate® PS/DVB

Particle size	Column ID(mm)	Column Length (mm)	
		250	300
5 µm	4.6	00111-21043	00111-21044
	7.8	00111-21051	00111-21052
5 µm	4.6	00111-23043	00111-23044
	7.8	00111-23051	00111-23052
10 µm	4.6	00111-33043	00111-33044
	7.8	00111-33051	00111-33052

Xtimate® Sugar-H

Particle size	Column ID(mm)	Column Length (mm)		
		150	250	300
5 µm	4.6	00109-41041	00109-41043	00109-41044
	7.8	00109-41050	00109-41051	00109-41052
8 µm	4.6	00109-43041	00109-43043	00109-43044
	7.8	00109-43050	00109-43051	00109-43052

Xtimate® Sugar-Ca

Particle size	Column ID(mm)	Column Length (mm)		
		150	250	300
5 µm	4.6	00108-41041	00108-41043	00108-41044
	7.8	00108-41050	00108-41051	00108-41052
8 µm	4.6	00108-43041	00108-43043	00108-43044
	7.8	00108-43050	00108-43051	00108-43052

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

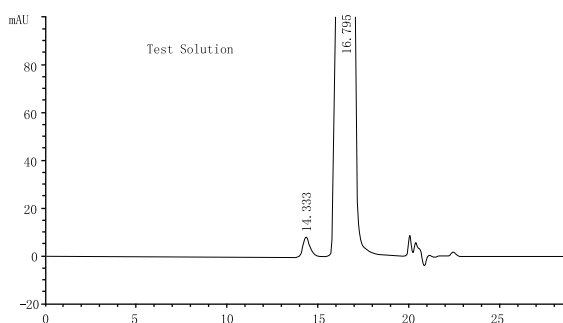
Xtimate® SEC

Xtimate® SEC (size exclusion chromatography), also known as “global protein hydrophilic modified silica column”, is made from ultra-high purity, stable silica bonded with hydrophilic polymer and diol functional groups. This double bonding mechanism, which makes possible of nonspecific adsorption of high Mw polymers, proteins, biological enzymes, polypeptides and other biological samples, can be applied to separating water-soluble polymers from biomacromolecules.

- Ultra-high purity, stable silica bonded with hydrophilic polymer and diol functional groups.
- 5 µm or 3 µm silica microsphere, high separation efficiency
- 120 Å minibore columns fit for analysis of polar compounds such as cephalosporins; 300Å ones fit for biomacromolecules such as proteins and polypeptides.
- Five pore sizes: 120 Å, 300 Å, 500 Å, 700 Å and 1000 Å.

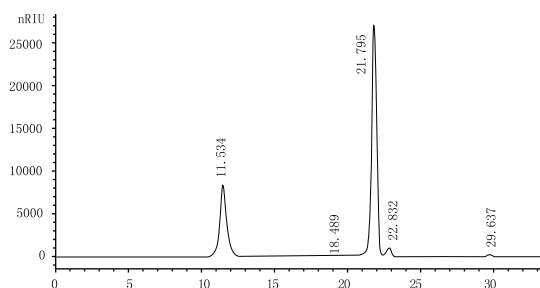
Phase	Xtimate® SEC-120	Xtimate® SEC-300	Xtimate® SEC-500	Xtimate® SEC-700	Xtimate® SEC-1000
Materials	Silica particles bonding hydrophilic polymer	Silica particles bonding hydrophilic polymer	Silica particles bonding hydrophilic polymer	Silica particles bonding hydrophilic polymer	Silica particles bonding hydrophilic polymer
Particle Size(µm)	3, 5	3, 5	5	5	5
Pore Size(Å)	120	300	500	700	1000
Protein Molecule Range	500-150,000	5,000-1,250,000	10,000-3,500,000	15,000-5,000,000	50,000-7,500,000
Soluble Polymer Molecule Mass Range	500-25,000	1,000-100,000	2,000-500,000	2,500-500,000	5,000-1,500,000
Maximum Pressure	~4,500	~3,500	~3,000	~3,000	~3,000
pH Range	2-7.5 (7.5-9.5 for short time)	2-7.5 (7.5-9.5 for short time)	2-7.5 (7.5-9.5 for short time)	2-7.5 (7.5-9.5 for short time)	2-7.5 (7.5-9.5 for short time)
Range of Salt Concentration	20 mM~2.0 M	20 mM~2.0 M	20 mM~2.0 M	20 mM~2.0 M	20 mM~2.0 M
Highest Temperature(°C)	~80°C	~80°C	~80°C	~80°C	~80°C
Mobile Phase	Aqueous or organic phase	Aqueous or organic phase	Aqueous or organic phase	Aqueous or organic phase	Aqueous or organic phase

Sex Hormone in Cosmetics



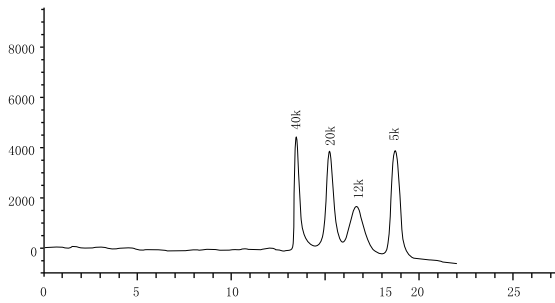
Column:	Xtimate® SEC-120, 3 µm, 300 x 7.8 mm
Mobile Phase:	Acetic acid/acetonitrile/ 0.1%arginine=15/20/65
Flow Rate:	0.5 mL/min
Temperature:	35°C
Detector:	276 nm
Injection Volume:	100 µL

Iron Dextran



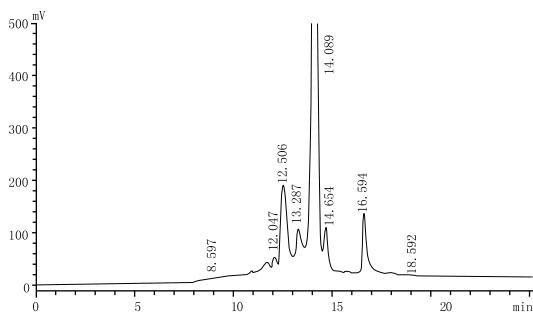
Column:	Xtimate® SEC-300, 5 µm, 300 x 7.8 mm
Mobile Phase:	Dissolve 7.1g Na ₂ SO ₄ to 1000 mL water, filter
Flow Rate:	0.5 mL/min
Temperature:	Ambient
Detector:	RID
Injection Volume:	20 µL

Analysis of Molecular Weight of Polyethylene Glycol



Column:	Xtimate® SEC-300, 5 µm, 300 x 7.8 mm
Mobile Phase:	Ultrapure Water
Flow Rate:	1.0 mL/min
Temperature:	40°C, RID: 40°C
Detector:	RID
Injection Volume:	20 µL

Cefoxitin Sodium



Column:	Xtimate® SEC-120, 5 µm, 300 x 7.8 mm
Mobile Phase:	Phosphate buffer/acetonitrile=95/5
Flow Rate:	0.9 mL/min
Temperature:	30°C
Detector:	232 nm
Injection Volume:	20 µL

Ordering Information

Xtimate® SEC

Bonded phase	Particle size	Column ID(mm)	Column Length (mm)	
			250	300
SEC-120	3 µm	4.6	00237-21043	00237-21044
		7.8	00237-21051	00237-21052
	5 µm	4.6	00237-31043	00237-31044
		7.8	00237-31051	00237-31052
SEC-300	3 µm	4.6	00237-23043	00237-23044
		7.8	00237-23051	00237-23052
	5 µm	4.6	00237-33043	00237-33044
		7.8	00237-33051	00237-33052
SEC-700	5 µm	4.6	00237-34043	00237-34044
		7.8	00237-34051	00237-34052
SEC-1000	5 µm	4.6	00237-35043	00237-35044
		7.8	00237-35051	00237-35052

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

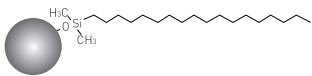
Topsil® Series HPLC Column

Topsil® series HPLC column is a next-generation column by Welch, besides Ultisil™, Xtimate® and Welchrom®. This series use different silica and provide different selectivity.

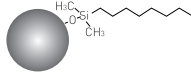
Features:

- High purity silica (99.99%) with 150 Å pore size and 260 m²/g surface area
- 12% carbon loading for C18 phase
- Because of large pore and moderate carbon loading, Topsil® C18 phase can also be used as AQ-C18 without phase collapse
- Endcapped for excellent peak shape and lifetime
- Lower back pressure than Ultisil™, almost the same column efficiency as Ultisil™
- Good for small molecules and peptides
- Topsil phases including C18, C8, Phenyl-Hexyl, Silica, NH₂ and CN

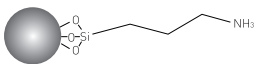
Topsil® C18

Structural Formula	
pH Range	2.0-9.5
Particle Size	3 µm, 5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	12(150 Å)
USP List	L1
Endcapped	Yes

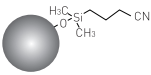
Topsil® C8

Structural Formula	
pH Range	2.0-9.5
Particle Size	3 µm, 5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	10(150 Å)
USP List	L7
Endcapped	Yes


Topsil® NH₂

Structural Formula	
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	3(150 Å)
USP List	L8
Endcapped	No

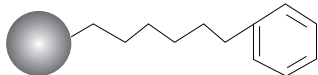
Topsil® CN

Structural Formula	
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	6(150 Å)
USP List	L10
Endcapped	Yes

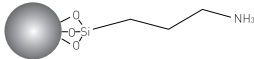
Topsil® Silica

Structural Formula	
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	N/A
USP List	L3
Endcapped	No

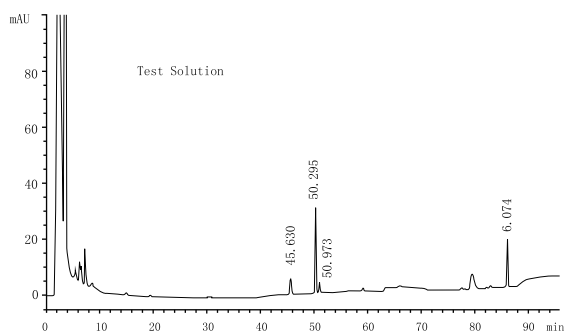
Topsil® Phenyl-Hexyl

Structural Formula	
pH Range	2.0-9.5
Particle Size	3 µm, 5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	12(150 Å)
USP List	L11
Endcapped	Yes

Topsil® HILIC NH₂

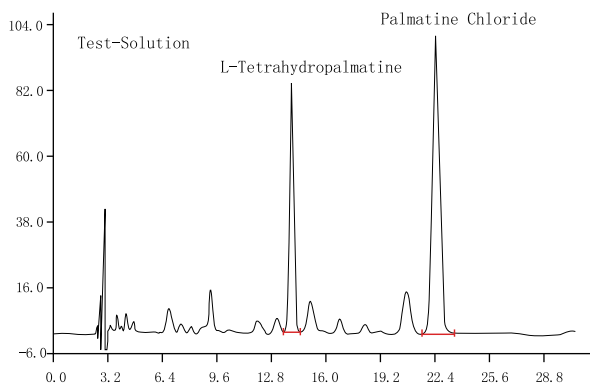
Structural Formula	
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m ² /g)	260(150 Å)
Carbon Loading(%)	3(150 Å)
USP List	L8
Endcapped	No

Compound Salvia Tablets



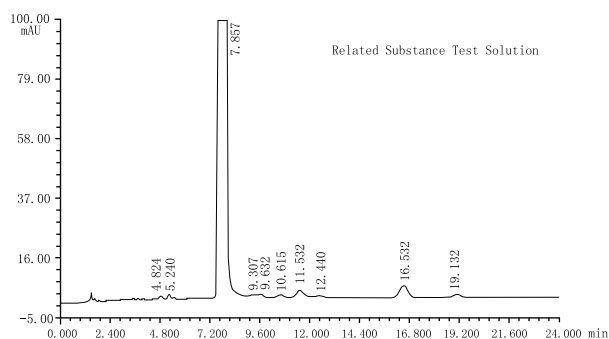
Column:	Topsil® C18, 250x4.6 mm, 5 µm
Mobile Phase:	A: acetonitrile B: water
Gradient Program:	Time(min) A(%) B(%)
	0 19 81
	35 19 81
	55 71 29
	70 71 29
100 40 60	
Flow Rate:	1.0 mL/min
Temperature:	30°C
Detector:	203 nm
Injection Volume:	20 µL

Epigeal Srephaia Root



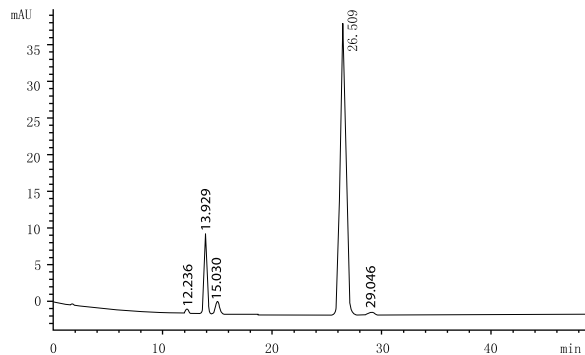
Column:	Topsil® C18, 250x4.6 mm, 5 µm
Mobile Phase:	25 mM sodium acetate buffer{2% trimethylamine, adjust pH to 3.50 with acetic acid}
Flow Rate:	1.5 mL/min
Temperature:	40°C
Detector:	280 nm
Injection Volume:	20 µL

Ketoprofen



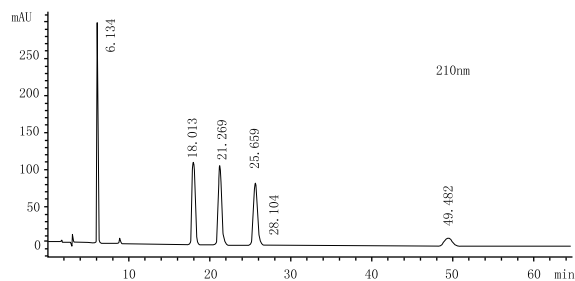
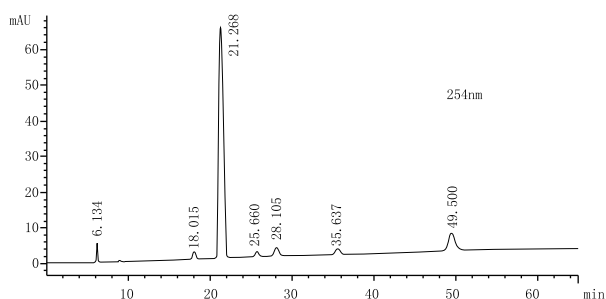
Column:	Topsil® C18, 150x4.6 mm, 5 µm
Mobile Phase:	Phosphate buffer {68g KH ₂ PO ₄ dissolve in 1000 mL water, adjust pH to 3.5 with H ₃ PO ₄ }
Flow Rate:	1.0 mL/min
Temperature:	30°C
Detector:	233 nm
Injection Volume:	20 µL

Vitamin D3



Column:	Topsil® Silica, 250x4.6 mm, 5 µm
Mobile Phase:	N-hexane/n-amyl alcohol=99.7/0.3
Flow Rate:	2.0 mL/min
Temperature:	30°C
Detector:	254 nm
Injection Volume:	20 µL

Sex hormone in Cosmetics



Column:	Topsil® Phenyl-Hexyl, 250x4.6 mm, 5 µm
Mobile Phase:	Methanol/water=60/40
Flow Rate:	1.0 mL/min
Temperature:	30°C
Detector:	210 nm, 254 nm
Injection Volume:	20 µL
Mixed Standards:	Estrogen: estradiol, oestrone, estrotilben, estriol Androgen: testosterone, methyltestosterone Progestational hormone: progesterone

Ordering Information

3 µm Topsil analytical columns

Bonded phase	Column ID (mm)	Column Length (mm)									Guard Cartridge	Guard Column Holder
		30	50	75	100	125	150	200	250	300		
C18	2.1	00410-02009	00410-02010	00410-02011	00410-02012	00410-02013	00410-02014	00410-02015	00410-02016		00808-23301	00808-01107
	3.0	00410-02018	00410-02019	00410-02020	00410-02021	00410-02022	00410-02023	00410-02024	00410-02025	-	00808-23301	00808-01107
	4.0	00410-02027	00410-02028	00410-02029	00410-02030	00410-02031	00410-02032	00410-02033	00410-02034	00410-02035	00808-03301	00808-01101
	4.6	00410-02036	00410-02037	00410-02038	00410-02039	00410-02040	00410-02041	00410-02042	00410-02043	00410-02044	00808-03301	00808-01101
C8	2.1	00420-02009	00420-02010	00420-02011	00420-02012	00420-02013	00420-02014	00420-02015	00420-02016		00808-23302	00808-01107
	3.0	00420-02018	00420-02019	00420-02020	00420-02021	00420-02022	00420-02023	00420-02024	00420-02025	-	00808-23302	00808-01107
	4.0	00420-02027	00420-02028	00420-02029	00420-02030	00420-02031	00420-02032	00420-02033	00420-02034	00420-02035	00808-03302	00808-01101
	4.6	00420-02036	00420-02037	00420-02038	00420-02039	00420-02040	00420-02041	00420-02042	00420-02043	00420-02044	00808-03302	00808-01101
Phenyl-Hexyl	2.1	00460-02009	00460-02010	00460-02011	00460-02012	00460-02013	00460-02014	00460-02015	00460-02016		00808-23305	00808-01107
	3.0	00460-02018	00460-02019	00460-02020	00460-02021	00460-02022	00460-02023	00460-02024	00460-02025	-	00808-23305	00808-01107
	4.0	00460-02027	00460-02028	00460-02029	00460-02030	00460-02031	00460-02032	00460-02033	00460-02034	00460-02035	00808-03305	00808-01101
	4.6	00460-02036	00460-02037	00460-02038	00460-02039	00460-02040	00460-02041	00460-02042	00460-02043	00460-02044	00808-03305	00808-01101

5 µm Topsisil analytical columns

Bonded phase	Column ID (mm)	Column Length (mm)									Guard Cartridge	Guard Column Holder
		30	50	75	100	125	150	200	250	300		
C18	2.1	00410-01009	00410-01010	00410-01011	00410-01012	00410-01013	00410-01014	00410-01015	00410-01016	-	00808-24301	00808-01107
	3.0	00410-01018	00410-01019	00410-01020	00410-01021	00410-01022	00410-01023	00410-01024	00410-01025	-	00808-24301	00808-01107
	4.0	00410-01027	00410-01028	00410-01029	00410-01030	00410-01031	00410-01032	00410-01033	00410-01034	00410-01035	00808-04301	00808-01101
	4.6	00410-01036	00410-01037	00410-01038	00410-01039	00410-01040	00410-01041	00410-01042	00410-01043	00410-01044	00808-04301	00808-01101
C8	2.1	00420-01009	00420-01010	00420-01011	00420-01012	00420-01013	00420-01014	00420-01015	00420-01016	-	00808-24302	00808-01107
	3.0	00420-01018	00420-01019	00420-01020	00420-01021	00420-01022	00420-01023	00420-01024	00420-01025	-	00808-24302	00808-01107
	4.0	00420-01027	00420-01028	00420-01029	00420-01030	00420-01031	00420-01032	00420-01033	00420-01034	00420-01035	00808-04302	00808-01101
	4.6	00420-01036	00420-01037	00420-01038	00420-01039	00420-01040	00420-01041	00420-01042	00420-01043	00420-01044	00808-04302	00808-01101
Phenyl-Hexyl	2.1	00460-01009	00460-01010	00460-01011	00460-01012	00460-01013	00460-01014	00460-01015	00460-01016	-	00808-24305	00808-01107
	3.0	00460-01018	00460-01019	00460-01020	00460-01021	00460-01022	00460-01023	00460-01024	00460-01025	-	00808-24305	00808-01107
	4.0	00460-01027	00460-01028	00460-01029	00460-01030	00460-01031	00460-01032	00460-01033	00460-01034	00460-01035	00808-04305	00808-01101
	4.6	00460-01036	00460-01037	00460-01038	00460-01039	00460-01040	00460-01041	00460-01042	00460-01043	00460-01044	00808-04305	00808-01101
CN	2.1	00440-01009	00440-01010	00440-01011	00440-01012	00440-01013	00440-01014	00440-01015	00440-01016	-	00808-24304	00808-01107
	3.0	00440-01018	00440-01019	00440-01020	00440-01021	00440-01022	00440-01023	00440-01024	00440-01025	-	00808-24304	00808-01107
	4.0	00440-01027	00440-01028	00440-01029	00440-01030	00440-01031	00440-01032	00440-01033	00440-01034	00440-01035	00808-04304	00808-01101
	4.6	00440-01036	00440-01037	00440-01038	00440-01039	00440-01040	00440-01041	00440-01042	00440-01043	00440-01044	00808-04304	00808-01101
NH ₂	2.1	00430-01009	00430-01010	00430-01011	00430-01012	00430-01013	00430-01014	00430-01015	00430-01016	-	00808-24303	00808-01107
	3.0	00430-01018	00430-01019	00430-01020	00430-01021	00430-01022	00430-01023	00430-01024	00430-01025	-	00808-24303	00808-01107
	4.0	00430-01027	00430-01028	00430-01029	00430-01030	00430-01031	00430-01032	00430-01033	00430-01034	00430-01035	00808-04303	00808-01101
	4.6	00430-01036	00430-01037	00430-01038	00430-01039	00430-01040	00430-01041	00430-01042	00430-01043	00430-01044	00808-04303	00808-01101
Silica	2.1	00450-01009	00450-01010	00450-01011	00450-01012	00450-01013	00450-01014	00450-01015	00450-01016	-	00808-24306	00808-01107
	3.0	00450-01018	00450-01019	00450-01020	00450-01021	00450-01022	00450-01023	00450-01024	00450-01025	-	00808-24306	00808-01107
	4.0	00450-01027	00450-01028	00450-01029	00450-01030	00450-01031	00450-01032	00450-01033	00450-01034	00450-01035	00808-04306	00808-01101
	4.6	00450-01036	00450-01037	00450-01038	00450-01039	00450-01040	00450-01041	00450-01042	00450-01043	00450-01044	00808-04306	00808-01101
HILIC NH ₂	2.1	00431-01009	00431-01010	00431-01011	00431-01012	00431-01013	00431-01014	00431-01015	00431-01016	-	00808-24307	00808-01107
	3.0	00431-01018	00431-01019	00431-01020	00431-01021	00431-01022	00431-01023	00431-01024	00431-01025	-	00808-24307	00808-01107
	4.0	00431-01027	00431-01028	00431-01029	00431-01030	00431-01031	00431-01032	00431-01033	00431-01034	00431-01035	00808-04307	00808-01101
	4.6	00431-01036	00431-01037	00431-01038	00431-01039	00431-01040	00431-01041	00431-01042	00431-01043	00431-01044	00808-04307	00808-01101

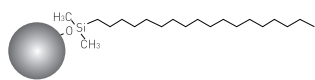
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Welchrom® Seires HPLC Column

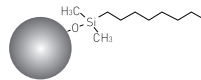
-- Combination of perfect peak shape and lowest back pressure

- Perfect peak shape and low back pressure
- Ultra-high purity(>99.999%) Type B silica particles
- New bonding and endcapping technique
- Economically priced

Welchrom® C18

Structural Formula	
pH Range	1.5-10.0
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	19(120 Å)
USP List	L1
Endcapped	Yes

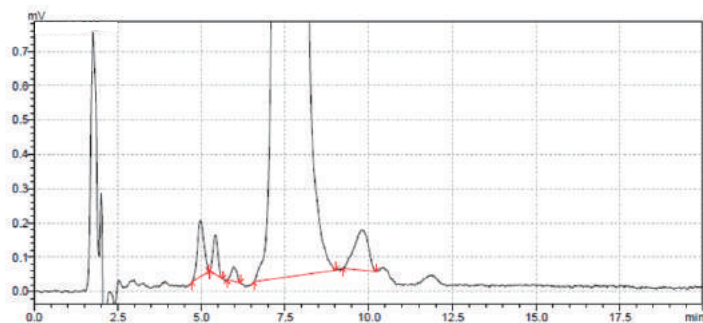
Welchrom® C8

Structural Formula	
pH Range	1.5-10
Particle Size	5 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L7
Endcapped	Yes

Comparison with other brands

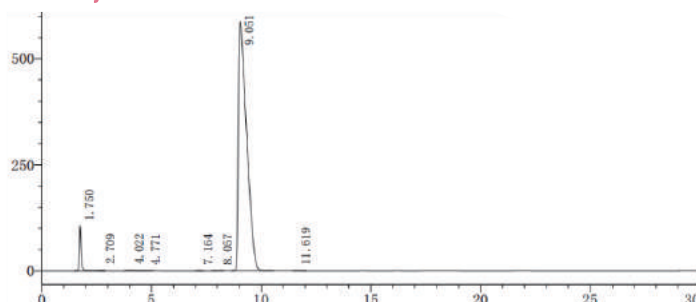
Brands	Tailing factor(amitriptyline)	Back pressure(Methanol/H ₂ O)=75/25
Welchrom® XB-C18	1.29	77 bar
Chrom C18	1.52	108 bar
Sino Chrom C18	1.71	106 bar
BinChrom C18	1.67	102 bar

Butenafine HCL



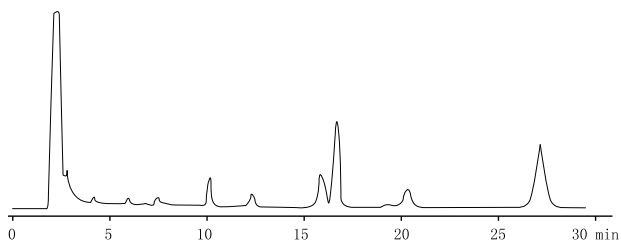
Column:	Welchrom® C18, 4.6x250 mm, 5 µm
Mobile Phase:	Acetate buffer/methanol/ isopropanol=17/70/13
Flow Rate:	1.0 mL/min
Temperature:	Ambient
Detector:	282 nm
Injection Volume:	10 µL

Pentoxyverine citrate



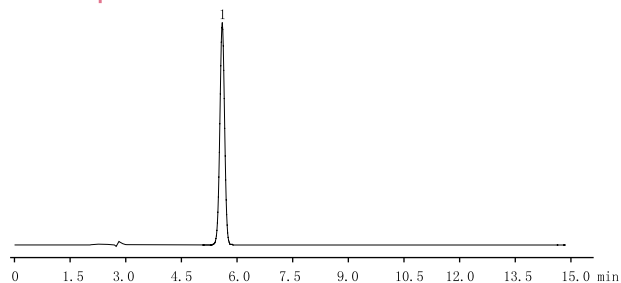
Column:	Welchrom® C18, 4.6x150 mm, 5 µm
Mobile Phase:	Water* /methanol=45/55 * Dilute 10 mL triethylamine to 1000 mL, adjust pH 3.0 with H ₃ PO ₄
Flow Rate:	1.0 mL/min
Temperature:	30°C
Detector:	215 nm
Injection Volume:	20 µL

Tanshinone IIA in Salvia Miltiorrhiza



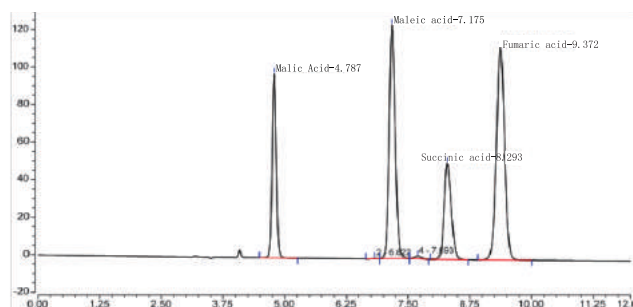
Column:	Welchrom® C18, 4.6x250 mm, 5 µm
Mobile Phase:	Methanol/water=75/25
Flow Rate:	1.0 mL/min
Temperature:	22°C
Detector:	270 nm

Imidacloprid



Column:	Welchrom® C18, 250x4.6 mm, 5 µm
Mobile Phase:	Methanol/water=45/55
Flow Rate:	1.0 mL/min
Temperature:	25°C
Detector:	260 nm

Malic acid



Column:	Welchrom® C8, 4.6x250 mm , 5 µm
Mobile Phase:	Phosphoric acid/methanol/ water=1/100/900
Flow Rate:	0.8 mL/min
Temperature:	20°C
Detector:	214nm
Injection Volume:	5 µL

Ordering Information

5 µm Welch Analytical Column

Bonded phase	Column ID (mm)	Column Length (mm)									Guard Cartridge	Guard Column Holder
		30	50	75	100	125	150	200	250	300		
C18	2.1	00310-02009	00310-02010	00310-02011	00310-02012	00310-02013	00310-02014	00310-02015	00310-02016	-	00808-24201	00808-01107
	3.0	00310-02018	00310-02019	00310-02020	00310-02021	00310-02022	00310-02023	00310-02024	00310-02025	-	00808-24201	00808-01107
	4.0	00310-02027	00310-02028	00310-02029	00310-02030	00310-02031	00310-02032	00310-02033	00310-02034	00310-02035	00808-04201	00808-01101
	4.6	00310-02036	00310-02037	00310-02038	00310-02039	00310-02040	00310-02041	00310-02042	00310-02043	00310-02044	00808-04210	00808-01101
C8	2.1	00320-02009	00320-02010	00320-02011	00320-02012	00320-02013	00320-02014	00320-02015	00320-02016	-	00808-24202	00808-01107
	3.0	00320-02018	00320-02019	00320-02020	00320-02021	00320-02022	00320-02023	00320-02024	00320-02025	-	00808-24202	00808-01107
	4.0	00320-02027	00320-02028	00320-02029	00320-02030	00320-02031	00320-02032	00320-02033	00320-02034	00320-02035	00808-04202	00808-01101
	4.6	00320-02036	00320-02037	00320-02038	00320-02039	00320-02040	00320-02041	00320-02042	00320-02043	00320-02044	00808-04202	00808-01101

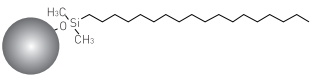
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

UHPLC Column

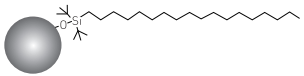
Welch also offers Ultisil™ UHPLC (1.8 µm) columns. With high column efficiency and good lot-to-lot reproducibility, Ultisil™ UHPLC can generate high quality data, decreasing the probability of repeated sample analyses while reducing the consumption of solvent at the same time. Ultisil™ UHPLC series offer a variety of bonded phases, specified guard columns and pre-columns for the users to design and realize faster and more environmentally friendly chromatography applications with higher resolution.

- Ultra Resolution: same resolution as or better than that of conventional column which has more packing materials
- Ultra speed: UHPLC offers more information per unit time and higher speed owing to its smaller particles.
- Sensitivity: higher N, narrower peak width (W), higher peak height. The system sensitivity of 1.8 µm UHPLC is 70% and 40% higher than that of conventional column of 5µm and 3.5µm packings, respectively.

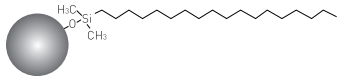
Ultisil™ UHPLC XB-C18

Structural Formula	
pH Range	1.5-10.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	17(120 Å)
USP List	L1
Endcapped	Yes

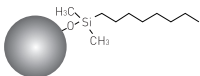
Ultisil™ UHPLC LP-C18

Structural Formula	
pH Range	0.5-8.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	10(120 Å)
USP List	L1
Endcapped	No

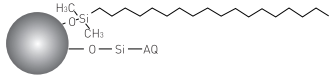
Xtimate® UHPLC C18

Structural Formula	
pH Range	1.0-12.5
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	14(120 Å)
USP List	L1
Endcapped	Yes

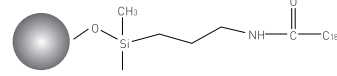
Ultisil™ UHPLC XB-C8

Structural Formula	
pH Range	1.5-10.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L7
Endcapped	Yes

Ultisil™ UHPLC AQ-C18

Structural Formula	
pH Range	1.5-10.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L1
Endcapped	Yes

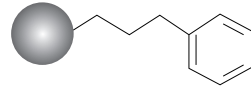
Ultisil™ UHPLC Polar-RP

Structural Formula	
pH Range	1.5-10.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	18(120 Å)
USP List	L1
Endcapped	Yes

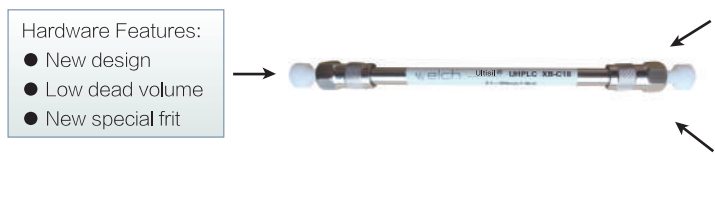
Ultisil™ UHPLC HILIC

Structural Formula	
pH Range	2.0-8.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	N/A
USP List	L3
Endcapped	No

Ultisil™ UHPLC XB-Phenyl

Structural Formula	
pH Range	1.5-10.0
Particle Size	1.8 µm
Surface Area(m ² /g)	320(120 Å)
Carbon Loading(%)	12(120 Å)
USP List	L11
Endcapped	Yes

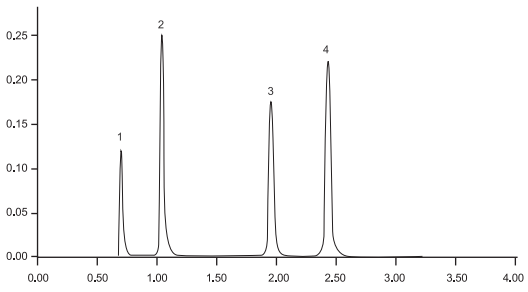
Hardware Features:



- Hardware Features:**
- New design
 - Low dead volume
 - New special frit

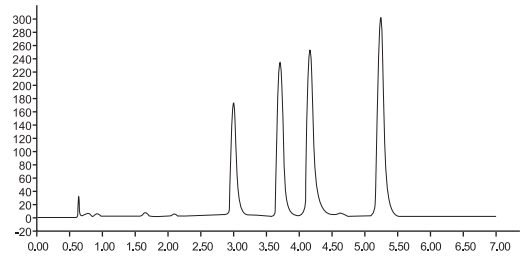
- Packing Materials Features:**
- High efficiency 1.8µm particles
 - High column efficiency and excellent strength
 - Variety of bonding chemistries
 - Stable column bed, highest pressure: 15000psi

- Column Packing Features:**
- Unique column packing technique
 - Withstand ultra-high pressure of UHPLC instruments



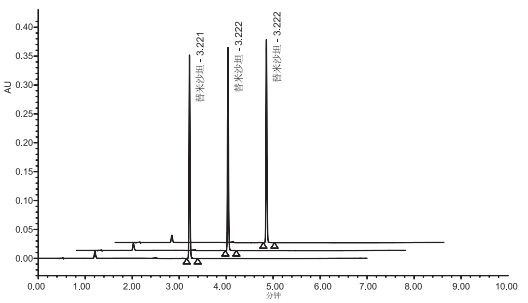
Column:	Ultisil™ UHPLC XB-C18, 2.1 ×100 mm, 1.8 µm
Mobile Phase:	Acetonitrile/water=65/35
Gradient Program:	254 nm
Temperature:	Ambient
Flow Rate:	0.35 mL/min
Injection Volume:	2 µL
Back Pressure:	5000 psi
Instrument:	Water Acquity UPLC
Samples in Order:	Uracil Phenol 4-chloronitrobenzene Toluene

Analysis of Aflatoxin



Column:	Ultisil™ UHPLC XB-C18, 2.1 ×100 mm, 1.8 µm
Mobile Phase:	Methanol/acetonitrile/water=18/18/64
Detector:	FLD Excitation:365 nm Emission:450 nm
Temperature:	35°C
Flow Rate:	0.35 mL/min
Injection Volume:	2 µL
Instrument:	Water UPLC
Samples in Order:	G2, G1, B2, B1

Analysis of Telmisartan Tablets





	Sample Name	Retention Time	Area	USP Theoretical plate number
1	Telmisartan	3.222	487938	126585
2	Telmisartan	3.222	487646	126607
3	Telmisartan	3.221	488317	126791

Ordering Information
1.8 µm UHPLC column

Bonded phase	Column ID (mm)	Column Length (mm)					Guard Cartridge	Guard Column Holder
		30	50	75	100	150		
Ultisil XB-C18	2.1	00201-11009	00201-11010	00201-11011	00201-11012	00201-11014	U808-201-25	00808-01109
	3.0	00201-11018	00201-11019	00201-11020	00201-11021	00201-11023	U808-201-25	00808-01109
	4.6	00201-11036	00201-11037	00201-11038	00201-11039	00201-11041	U808-201-45	00808-01109
Ultisil XB-C8	2.1	00202-11009	00202-11010	00202-11011	00202-11012	00202-11014	U808-202-25	00808-01109
	3.0	00202-11018	00202-11019	00202-11020	00202-11021	00202-11023	U808-202-25	00808-01109
	4.6	00202-11036	00202-11037	00202-11038	00202-11039	00202-11041	U808-202-45	00808-01109
Ultisil AQ-C18	2.1	00207-11009	00207-11010	00207-11011	00207-11012	00207-11014	U808-207-25	00808-01109
	3.0	00207-11018	00207-11019	00207-11020	00207-11021	00207-11023	U808-207-25	00808-01109
	4.6	00207-11036	00207-11037	00207-11038	00207-11039	00207-11041	U808-207-45	00808-01109
Ultisil XB-Phenyl	2.1	00203-11009	00203-11010	00203-11011	00203-11012	00203-11014	U808-203-25	00808-01109
	3.0	00203-11018	00203-11019	00203-11020	00203-11021	00203-11023	U808-203-25	00808-01109
	4.6	00203-11036	00203-11037	00203-11038	00203-11039	00203-11041	U808-203-45	00808-01109
Ultisil LP-C18	2.1	00208-11009	00208-11010	00208-11011	00208-11012	00208-11014	U808-208-25	00808-01109
	3.0	00208-11018	00208-11019	00208-11020	00208-11021	00208-11023	U808-208-25	00808-01109
	4.6	00208-11036	00208-11037	00208-11038	00208-11039	00208-11041	U808-208-45	00808-01109
Ultisil Polar-RP	2.1	00215-11009	00215-11010	00215-11011	00215-11012	00215-11014	U808-215-25	00808-01109
	3.0	00215-11018	00215-11019	00215-11020	00215-11021	00215-11023	U808-215-25	00808-01109
	4.6	00215-11036	00215-11037	00215-11038	00215-11039	00215-11041	U808-215-45	00808-01109
Ultisil HILIC	2.1	00200-11009	00200-11010	00200-11011	00200-11012	00200-11014	U808-209-25	00808-01109
	3.0	00200-11018	00200-11019	00200-11020	00200-11021	00200-11023	U808-209-25	00808-01109
	4.6	00200-11036	00200-11037	00200-11038	00200-11039	00200-11041	U808-209-45	00808-01109
Xtimate C18	2.1	00101-01009	00101-01010	00101-01011	00101-01012	00101-01014	U808-101-25	00808-01109
	3.0	00101-01018	00101-01019	00101-01020	00101-01021	00101-01023	U808-101-25	00808-01109
	4.6	00101-01036	00101-01037	00101-01038	00101-01039	00101-01041	U808-101-45	00808-01109

Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

Inline Filter for UHPLC

	P/N	Description
	00808-01221	UltraShield inline Filter, SS, 0.5 µm stainless steel frit, 15000 psi
	00808-01222	Direct Connect Precolumn inline Filter, with 0.2µm Replacement Frits×5, 18000 psi
	00808-UF020	Replaceable frits (0.2 µm)

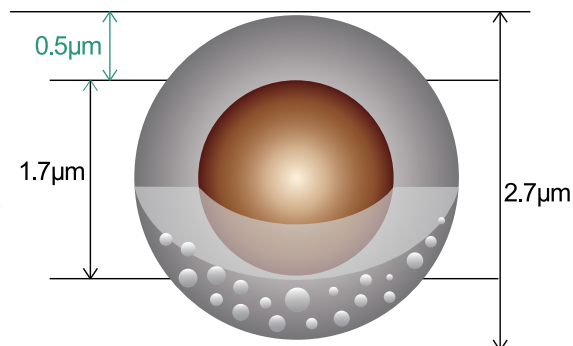
Boltimate™ Core-Shell HPLC Column

Welch Boltimate™ core-shell HPLC column particle size is 2.7 μm, which consists of 1.7 μm solid core and 0.5 μm porous layer (porous shell).

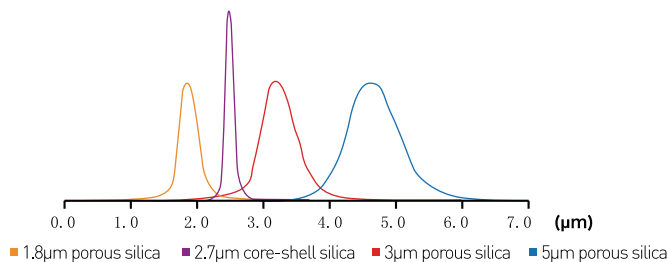
This kind of column can provide sub-2 μm efficiencies (~200000 p/m) and high resolution at much lower back pressure. Boltimate core-shell column can be used on both HPLC and UHPLC system, and method optimization is also very easy.

Features

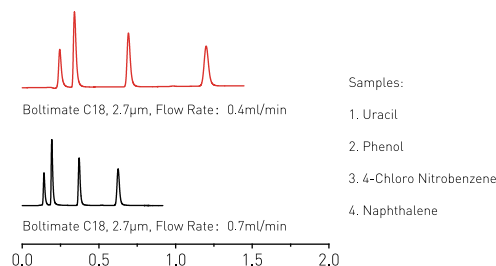
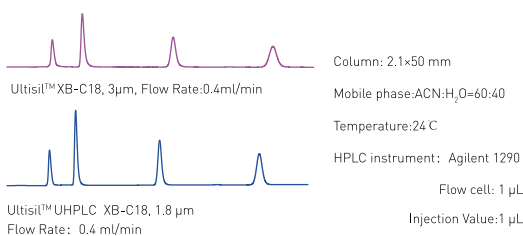
- Provide sub-2 μm efficiencies (~200000 p/m) and ultra-high resolution at much lower back pressure
- Ultra fast separation
- Compatible with both HPLC and UHPLC system
- Narrow particle size distribution
- A standard 2 μm inlet filter is used to resist plugging with dirty samples, suitable for complex sample
- A variety of bonding phases provide different selectivities, excellent peak shape and lot-to-lot reproducibility
- Maximum pressure: 600 bar



With the solid core and thin porous layer, the diffusion distance of sample molecular decreased, which means fast mobile phase flow rate can be used to increase the analytical speed. Compared with traditional porous HPLC columns, Boltimate core-shell column has the narrower particle size distribution, which provides higher column efficiency, higher resolution and lower back pressure.



	D10	D90	D90/D10
5 μm porous silica	3.61	5.22	1.44
3 μm porous silica	2.83	3.98	1.41
1.8 μm porous silica	1.51	2.11	1.40
2.7 μm Boltimate core-shell silica	2.51	2.81	1.12



Column	Theoretical plates	Column Pressure (bar)	Time
Ultisil™ XB-C18, 3 μm, 2.1x50 mm	5600	85	2.0 min
Ultisil™ UHPLC XB-C18, 1.8 μm, 2.1x50 mm	10500	260	1.8 min
Boltimate™ C18, 2.7 μm, 2.1x50 mm	10100	108	1.5 min
Boltimate™ C18, 2.7 μm, 2.1x50 mm	9500	190	0.8 min

Boltimate C18 column efficiency is almost the same with 1.8 μm porous C18 column, and two times of 3 μm porous C18 column. Even with 2X faster flow rate, the pressure of Boltimate is still lower than 1.8 μm porous C18 column with the same column dimensions run under the same analysis conditions, without decreasing efficiency at the mean time.

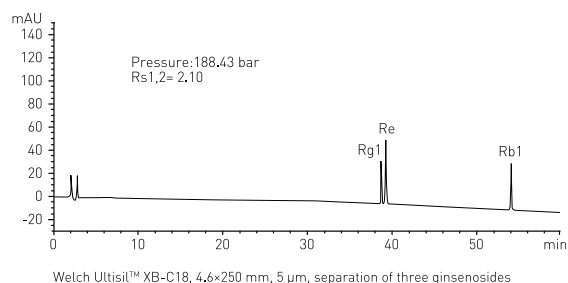
Detection of Ginsenosides:

Chromatographic conditions:

Column: three types of C18 columns from Welch / Temperature: room temperature / Detection : UV 203 nm
 Mobile phase A: 0.1% H₃PO₄ in water / Mobile phase B: Acetonitrile

1. Welch Ultisil™ XB-C18(4.6×250 mm, 5 μm)

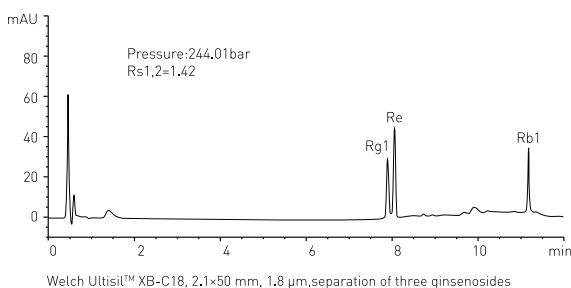
Flow Rate: 1.3 mL/min Injection Volume: 10 μL



Gradient program:

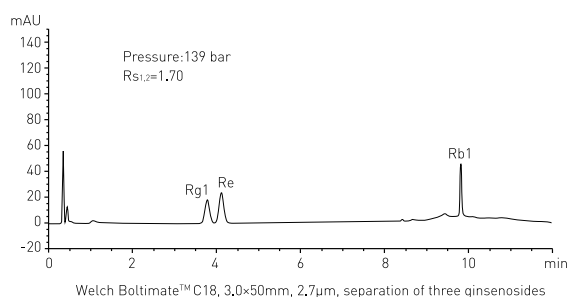
Time(min)	Mobile Phase A (%)	Mobile Phase B (%)
0	81	19
30	81	19
35	76	24
60	60	40
60.1	0	100
70	0	100
70.1	81	19
78	81	19

2. Welch Ultisil™ UHPLC XB-C18 (2.1×5 mm, 1.8 μm)



Time(min)	Mobile Phase A (%)	Mobile Phase B (%)
0	81	19
6	81	19
7	76	24
12	60	40
12.1	0	100
14	0	100
15	81	19
18	81	19

3. Welch Boltimate™ C18 (3.0×50 mm, 2.7 μm)



Time(min)	Mobile Phase A (%)	Mobile Phase B (%)
0	81	19
6	81	19
7	76	24
12	60	40
12.1	0	100
14	0	100
15	81	19
18	81	19

From the results above, Boltimate core-shell column has a lower column pressure and faster analysis time, and the resolution is high.

Welch provides a variety of bonding phases

Bonded Phase	Features	Particle Size μm	Solid Core Diameter μm	Porous Shell Depth μm	Pore Size Å	Surface Area m ² /g	C%	End/capped	pH Range	Maximum Pressure bar	USP List
C18	Excellent peak shape and resolution for acids, bases, and neutrals. Exceptional resolution and lifetime.	2.7	1.7	0.5	90	120	9	Double	2-8.5	600	L1
Phenyl-Hexyl	Alternative selectivity for phenyl groups	2.7	1.7	0.5	90	120	7	Double	2-8.5		L11

Bonded Phase	Features	Particle Size μm	Solid Core Diameter μm	Porous Shell Depth μm	Pore Size \AA	Surface Area m^2/g	C%	End/capped	pH Range	Maximum Pressure bar	USP List
EXT-C18	The exist of hybrid organic/inorganic layer extend pH range of silica. pH range: 1.5-12	2.7	1.7	0.5	90	120	8	Double	1.5-12	600	L1
EXT-PFP	An alternative selectivity for halogenated compounds and polar analytes. Wide pH range	2.7	1.7	0.5	90	120	5	Double	1.5-12		L43
HILIC	With its unbonded silica, Boltimate HILIC retains and separates polar analytes.	2.7	1.7	0.5	90	120	-	No	2-8.5		L3
LP-C18	Excellent peak shape and resolution at low pH.	2.7	1.7	0.5	90	120	7	No	1-8.5		L1



Ordering Information

2.7 μm , 90 \AA , Boltimate Core-shell Column

Particle size	Column ID (mm)	Column Length (mm)						Guard Cartridge	Guard Column Holder
		30	50	75	100	150	250		
C18	2.1	960-04009	960-04010	960-04011	960-04012	960-04014	-	U808-960-25	00808-01109
	3.0	960-04018	960-04019	960-04020	960-04021	960-04023	-	U808-960-25	00808-01109
	4.6	960-04036	960-04037	960-04038	960-04039	960-04041	960-04043	U808-960-45	00808-01109
Phenyl-Hexyl	2.1	961-04009	961-04010	961-04011	961-04012	961-04014	-	U808-961-25	00808-01109
	3.0	961-04018	961-04019	961-04020	961-04021	961-04023	-	U808-961-25	00808-01109
	4.6	961-04036	961-04037	961-04038	961-04039	961-04041	961-04043	U808-961-45	00808-01109
EXT-C18	2.1	962-04009	962-04010	962-04011	962-04012	962-04014	-	U808-962-25	00808-01109
	3.0	962-04018	962-04019	962-04020	962-04021	962-04023	-	U808-962-25	00808-01109
	4.6	962-04036	962-04037	962-04038	962-04039	962-04041	962-04043	U808-962-45	00808-01109
EXT-PFP	2.1	963-04009	963-04010	963-04011	963-04012	963-04014	-	U808-963-25	00808-01109
	3.0	963-04018	963-04019	963-04020	963-04021	963-04023	-	U808-963-25	00808-01109
	4.6	963-04036	963-04037	963-04038	963-04039	963-04041	963-04043	U808-963-45	00808-01109
HILIC	2.1	964-04009	964-04010	964-04011	964-04012	964-04014	-	U808-964-25	00808-01109
	3.0	964-04018	964-04019	964-04020	964-04021	964-04023	-	U808-964-25	00808-01109
	4.6	964-04036	964-04037	964-04038	964-04039	964-04041	964-04043	U808-964-45	00808-01109
LP-C18	2.1	965-04009	965-04010	965-04011	965-04012	965-04014	-	U808-965-25	00808-01109
	3.0	965-04018	965-04019	965-04020	965-04021	965-04023	-	U808-965-25	00808-01109
	4.6	965-04036	965-04037	965-04038	965-04039	965-04041	965-04043	U808-965-45	00808-01109

A in-line filter or a guard column can save your money by extending the life of your analytical column.

Inline Filter for Boltimate:

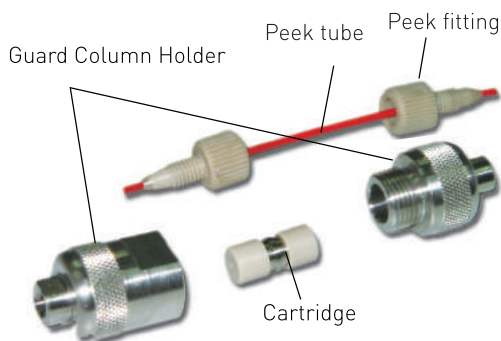
	P/N	Description
	00808-01221	UltraShield inline Filter, SS, 0.5 μm stainless steel frit, 15000 psi
	00808-01222	Direct Connect Precolumn inline Filter, with 0.2 μm Replacement Frits \times 5, 18000 psi
	00808-UF020	Replaceable frits (0.2 μm)

Guard Column and Pre-Column Inline Filter

Guard column	Pre-column Inline Filter
--------------	--------------------------

- Between injector and analytical column
- All have column holders
- All have frit to retain solid particles

Packing materials inside a Guard Column cartridge.	Filter inside a Pre-column.
Remove strongly adsorbed sample components	Trap particulate matter from the fluid path, but does not remove sample components or contaminants.
Internal diameters should match as closely as possible and packing material should be of the same particle size and chemistry as the analytical column	i) Can be used with other brands of columns ii) Designed to be wholly disposable or has replaceable filters in a re-useable holder







General Guard Column Kit(e.g. Ultisil XB-C18, 4.6×10 mm)

P/N	Description	Piece
00808-01101	Stand Alone Analytical Guard Holder(φ: 4.6mm, 7000psi)	1
00808-04001	Ultisil™ XB-C18, Cartridge: 5µm,120Å, 4.6×10mm	2
00808-01301	1/16"Peek Tube, 7cm Length	1
00808-01303	PEEK Fitting, for 1/16" OD tubing	2

Pre-Column Inline Filter

Picture	Description	Configuration	P/N	Instrument
	ColumnShield Precolumn Filter, PEEK, 0.5µm Ti frit, 5000 psi	Column Shield Precolumn Filter, PEEK × 1	00808-01220	HPLC
	In-Line Precolumn Filter holder, 6000 psi	In-Line Precolumn Filter holder × 1	00808-01201-1	
	Analytical Replacement Frits, 2 µm	Analytical Replacement Frits, 2 µm × 1	00808-01202	
	Analytical Replacement Frits, 0.5 µm	Analytical Replacement Frits, 0.5 µm × 1	00808-01203	
	In-Line Precolumn Filter holder kit (2µm)	In-Line Precolumn Filter holder, 6000 psi × 1 Analytical Replacement Frits 2 µm × 2 1/16"Peek Tube, 7 cm Length × 1 PEEK Fitting, for 1/16" OD tubing × 2	00808-01201	
	In-Line Precolumn Filter holder kit (0.5µm)	In-Line Precolumn Filter holder, 6000 psi × 1 Analytical Replacement Frits, 0.5 µm × 2 1/16"Peek Tube, 7cm Length × 1 PEEK Fitting, for 1/16" OD tubing × 2	00808-01201-05	
	UltraShield Precolumn Filter, SS, 0.5 µm stainless steel frit, 15000 psi	Column Shield Precolumn Filter, SST × 1 5/16"solid wrench × 1	00808-01221	UHPLC, Core-shell
		Column Shield Precolumn Filter, SST, Waters Port × 1, 5/16"solid wrench × 1	00808-01221-W	
	Direct Connect Precolumn Filter, with 0.2 µm Replacement Frits × 5, 18000 psi	Direct Connect Precolumn Filter × 1 0.2µm UHPLC Replacement Frits × 5 3/8" solid wrench × 2	00808-01222	
	UHPLC Replacement Frits, 0.2 µm	0.2 µm UHPLC Replacement Frits × 1	00808-UF020	

Guard Column Holder

Picture	Description	Configuration	P/N	Instrument
	Stand Alone Analytical Guard Holder (φ: 4.6 mm, 7000 psi)	Stand Alone Analytical Guard Holder × 1	00808-01101	HPLC
	Stand Alone NarrowBore Guard Holder (φ: 2.1 mm, 7000 psi)	Stand Alone Narrow Bore Guard Holder, × 1	00808-01107	
	Direct Connect Analytical Guard Holder (φ: 4.6 mm, 7000 psi), compatible with Parker, Valco, Waters columns	Direct Connect Analytical Guard Holder × 1 1/4" solid wrench × 1	00808-01108	
	Holder: 316L Stainless Steel, PEEK Ferrule, 15000 psi, 5 mm UHPLC Cartridges	Direct Connect UHPLC Analytical Guard Holder × 1, 7/16" solid wrench × 2	00808-01109	UHPLC, Core-shell

Guard Column Cartridges

Xtimate Guard Column Cartridges					
Specification	3 μm, 2.1×10 mm [Cartridges]	5 μm, 2.1×10 mm [Cartridges]	3 μm, 4.6×10 mm [Cartridges]	5 μm, 4.6×10 mm [Cartridges]	10 μm, 4.6×10 mm [Cartridges]
C18	00808-23101	00808-24101	00808-03101	00808-04101	00808-05101
C8	00808-23102	00808-24102	00808-03102	00808-04102	00808-05102
Phenyl-Hexyl	00808-23106	00808-24106	00808-03106	00808-04106	-
C4	00808-23103	00808-24103	00808-03103	00808-04103	-
CN	-	00808-24105	-	00808-04105	-
Polar-RP	-	00808-24111	-	00808-04152	-
Lactose-NH ₂	-	00808-24110	-	00808-04151	-
XB-SCX	-	00808-24112	-	00808-04153	-

Ultisil Guard Column Cartridges					
Specification	3 μm, 2.1×10 mm [Cartridges]	5 μm, 2.1×10 mm [Cartridges]	3 μm, 4.6×10 mm [Cartridges]	5 μm, 4.6×10 mm [Cartridges]	10 μm, 4.6×10 mm [Cartridges]
XB-C18	00808-23001	00808-24001	00808-03001	00808-04001	00808-05001
XB-C8	00808-23002	00808-24002	00808-03002	00808-04002	00808-05002
XB-Phenyl	00808-23006	00808-24006	00808-03006	00808-04006	00808-05006
XB-C4	00808-23011	00808-24008	00808-03030	00808-04008	00808-05008
XB-C1	-	00808-24023	-	00808-04026	-
XB-CN	00808-23005	00808-24005	00808-03005	00808-04005	00808-05005
SiO ₂	00808-23007	00808-24007	00808-03007	00808-04007	00808-05007
Diol	00808-23020	00808-24020	00808-03020	00808-04020	00808-05020
XB-NH ₂	00808-23004	00808-24004	00808-03004	00808-04004	00808-05004
XB-SAX	00808-23008	00808-24009	00808-03008	00808-04009	00808-05009
XB-SCX	00808-23012	00808-24011	00808-03033	00808-04011	00808-05011
XB-C30	00808-23013	00808-24024	00808-03035	00808-04035	00808-05013
AQ-C18	00808-23003	00808-24003	00808-03003	00808-04003	00808-05003
LP-C18	00808-23014	00808-24015	00808-03010	00808-04015	00808-05014
LP-C8	00808-23015	00808-24012	00808-03011	00808-04012	-
LP-AQ	-	00808-24026	-	00808-04042	-
LP-CN	-	00808-24027	-	00808-04049	-
LP-C3	-	00808-24028	-	00808-04050	-
Plus C18	00808-23024(3.5μm)	00808-24029	00808-03036(3.5μm)	00808-04036	-
ALK C18	-	00808-24030	-	00808-04033	-
ODS-3	00808-23016	00808-24031	00808-03031	00808-04043	-

Ultisil Guard Column Cartridges					
Specification	3 µm, 2.1×10 mm [Cartridges]	5 µm, 2.1×10 mm [Cartridges]	3 µm, 4.6×10 mm [Cartridges]	5 µm, 4.6×10 mm [Cartridges]	10 µm, 4.6×10 mm [Cartridges]
XS-C18	00808-23017	00808-24033	00808-03034	00808-04046	-
PAH	00808-23018	00808-24010	00808-03012	00808-04010	-
Polar-RP	00808-23009	00808-24017	00808-03009	00808-04017	00808-05015
Phenyl-Ether	-	00808-24034	-	00808-04028	-
PPF	00808-23019	00808-24035	00808-03024	00808-04024	-
F-C8	00808-23021	00808-24036	00808-03023	00808-04038	-
HILIC Silica	00808-23023	00808-24037	00808-03026	00808-04044	00808-05016
HILIC NH ₂	00808-23022	00808-24038	00808-03025	00808-04047	00808-05017
HILIC Amide	00808-23010	00808-24025	00808-03021	00808-04025	00808-05018
HILIC Amphion	-	00808-24039	-	00808-04029	-
Amino Acid	-	00808-24040	-	00808-04023	-
MM C18/SCX	-	00808-24032	-	00808-04032	-
MM NH ₂ /CN	-	00808-24041	-	00808-04037	-
Cellu-D	-	00808-24042	-	00808-04014	00808-05021
Cellu-DR	-	00808-24042-R	-	00808-04014-R	00808-05021-R
Amy-D	-	00808-24043	-	00808-04040	00808-05022
Amy-DR	-	00808-24043-R	-	00808-04040-R	00808-05022-R
Cellu-J	-	00808-24044	-	00808-04039	00808-05023
Cellu-JR	-	00808-24044-R	-	00808-04039-R	00808-05023-R
Amy-S	-	00808-24045	-	00808-04041	00808-05024
Amy-SR	-	00808-24045-R	-	00808-04041-R	00808-05024-R

Topsil Guard Column Cartridges				
Specification	3 µm, 2.1×10 mm [Cartridges]	5 µm, 2.1×10 mm [Cartridges]	3 µm, 4.6×10 mm [Cartridges]	5 µm, 4.6×10 mm [Cartridges]
C18	00808-23301	00808-24301	00808-03301	00808-04301
C8	00808-23302	00808-24302	00808-03302	00808-04302
Phenyl-Hexyl	00808-23305	00808-24305	00808-03305	00808-04305
CN	-	00808-24304	-	00808-04304
NH ₂	-	00808-24303	-	00808-04303
Silica	-	00808-24306	-	00808-04306
Hilic-NH ₂	-	00808-24307	-	00808-04307

Welchrom Guard Column Cartridges		
Specification	5 µm, 2.1×10 mm [Cartridges]	5 µm, 4.6×10 mm [Cartridges]
C18	00808-24201	00808-04201
C8	00808-24202	00808-04202

UHPLC Guard Column Cartridges		
	Column ID (mm)	
	2.0-3.0	3.2-8.0
	Cartridges(mm)	
	2.1 × 5.0mm	4.0 × 5.0 mm
Ultisil UHPLC XB-C18	U808-201-25	U808-201-45
Ultisil UHPLC AQ-C18	U808-207-25	U808-207-45
Ultisil UHPLC XB-C8	U808-202-25	U808-202-45
Ultisil UHPLC XB-Phenyl	U808-203-25	U808-215-45
Ultisil UHPLC Polar RP	U808-215-25	U808-215-45
Ultisil UHPLC LP-C18	U808-208-25	U808-208-45
Ultisil UHPLC HILIC	U808-209-25	U808-209-45
Xtimate UHPLC C18	U808-101-25	U808-101-45

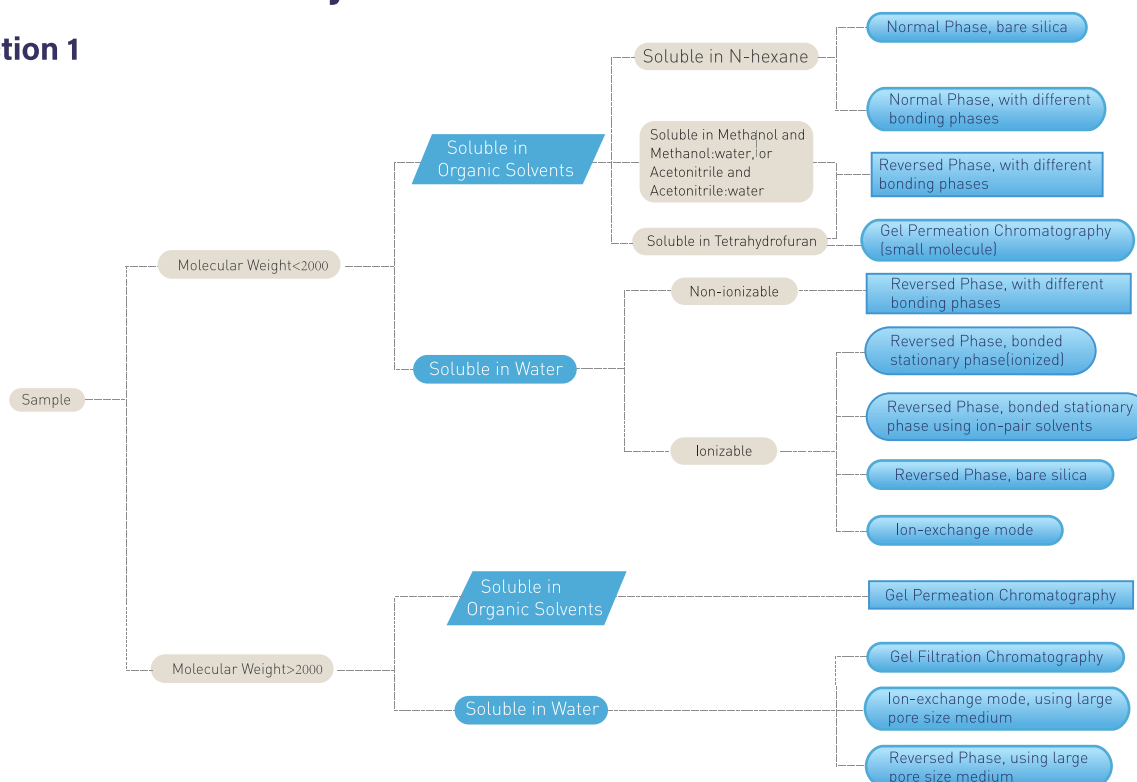
Boltimate Guard Column Cartridges		
	Column ID (mm)	
	2.0-3.0	3.2-8.0
	Cartridges(mm)	
	2.1 × 5.0mm	4.0 × 5.0 mm
Boltimate C18	U808-960-25	U808-960-45
Boltimate Phenyl- Hexyl	U808-961-25	U808-961-45
Boltimate EXT-C18	U808-962-25	U808-962-45
Boltimate EXT-PPF	U808-963-25	U808-963-45
Boltimate HILIC	U808-964-25	U808-964-45
Boltimate LP-C18	U808-965-25	U808-965-45

Description	P/N
1/16" Peek Tube, 7cm Length	00808-01301
PEEK Fitting, for 1/16" OD tubing	00808-01303
PEEK Ferrule, for 1/16" OD tubing	00808-01308
1/4"-5/16" solid wrench	3/9-7/16-sw
3/8"-7/16" solid wrench	3/9-7/16-sw

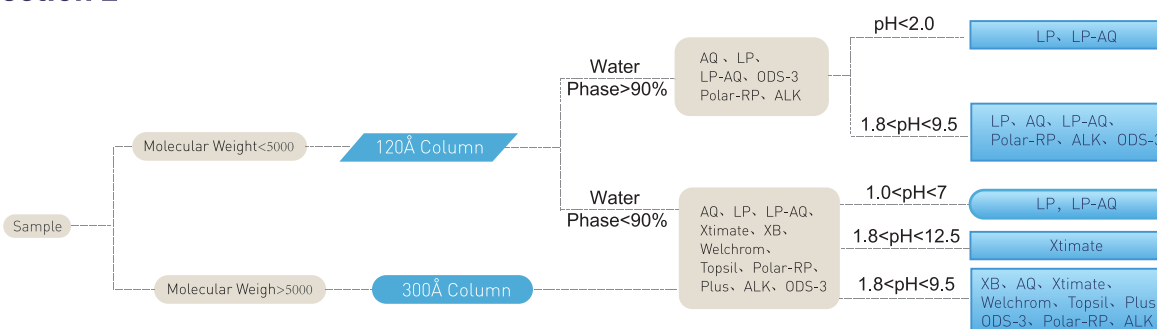
Appendix

1. Selection of Analysis Modes

Selection 1



Selection 2



2. Method Development Tool Kit for Pharmaceutical Industry

This kit consists of different columns with different bonding phases and selectivities. Please refer to details below for the application range. Besides columns, the tool kit also includes technical support from Welch technical team throughout the development of methods.

To develop a new method, purpose and requirements of the analysis shall first be confirmed, thus ideal parameters and results can be confirmed. First of all shall be the HPLC mode, which determined normally by following factors:

- Type and solubility of target compound
- Molecular weight of target compound
- Sample matrix
- Available stationary phases and columns

★ Please select the tool kit based on preliminary analysis of above tips.

The "Universal" Kit

Column	Bonded phase	USP	Dimension	Description	Application range
Xtimate® C18	C18	L1	4.6 × 250mm, 5µm	Organic–inorganic hybridized surface; high chemical stability under high–content buffer salts conditions High pH tolerance (1.0–12.5); Double end–capped, high universality.	First choice for beginning; Great universality; Better peak shape.
Ultisil™ LP–C18	C18	L1	4.6 × 250mm, 5µm	Side chain steric protection to shield hydroxyl group; No end–capping (pH range 0.5–8.0); High steric hindrance selectivity; 100% water to 0% water and normal reagents applicable; Little loss on MS or ELSD under strong acid conditions.	First choice for mobile phase pH under 2; Strong orthogonality with Xtimate C18 column.
Ultisil™ XS–C18	C18	L1	4.6 × 250mm, 5µm	Unique high–density bonding, high carbon capacity, double end–capping; high steric hindrance selectivity, strong separation ability for mixture of planar solid structure; applies to separation of structural isomerism.	Strong orthogonality with normal C18 column; First choice for separating isomers.
Ultisil™ Polar–RP	C18	L1	4.6 × 250mm, 5µm	Polar group embedded in carbon chain of reversed–phase C18 stationary phase, brings good retention and peak symmetry for strong polar and alkalic substances; Embedded polar group enables hydrophilic stationary phase, with better retention of materials not retained on normal C18, and high tolerance to high water content mobile phase.	100% water tolerable; First choice for strong polar substances.
Ultisil™ XB–Phenyl	Phenyl	L11	4.6 × 250mm, 5µm	Classic reverse–phase bonding phase, provides better selectivity for benzene rings compared to linear alkane bonded phases.	Substance containing benzene rings.
Ultisil™ PFP	Phenyl	L11	4.6 × 250mm, 5µm	Fluorinated stationary phase, stronger ion exchange and polarity than alkyl stationary phase; Good selectivity for halogen–containing substances and structural isomers.	Separation of positional isomers on phenyl ring; Substance with halogen substituent.
Ultisil™ XB–NH ₂	NH ₂	L8	4.6 × 250mm, 5µm	First choice for sugar compounds	Polar compounds or sugar
Ultisil™ HILIC SiO ₂	SiO ₂	L3	4.6 × 250mm, 5µm	Most classic bonding phase in HILIC mode.	Strong polar compound
Ultisil™ UHPLC XB–C18	C18	L1	2.1 × 100mm, 1.8µm	Ultra high pressure LC, shortening retention time.	Fast separation under ultra high pressure.
Boltimate™ EXT–C18	C18	L1	3.0 × 100mm, 2.7µm	Low column pressure, high efficiency.	Fast separation in normal LC system

Tool Kits for "Special Application"

"High-Select & Universal" Kit

Contains: Ultisil™ XB–C18, Ultisil™ LP–C18, Xtimate® C18
Dimension: 4.6*250mm, 5µm (other dimensions also available)

- Applies to method screening, for general chromatographic analysis requirements;
- Suitable for strong polar compounds, acidic, neutral, alkaline substances.

"Isomer Analysis" Kit

Contains: Ultisil™ PFP, Ultisil™ PAH, Ultisil™ Hilic SiO₂
Dimension: 4.6*250mm, 5µm (other dimensions also available)

- Applies to isomer mixtures.
- Strong selectivity for ortho, para, meta isomers on indophenol ring and planar solid structure mixtures.

"Bio-samples Analysis" Kit

Contains: Ultisil™ LP–C18 (300Å), Ultisil™ XB–C4 (300Å), Ultisil™ XB–C8 (300Å)
Dimension: 4.6*250mm, 5µm (other dimensions also available)

- Large pore size (300Å), suitable for macromolecules like proteins or peptides etc, providing better interaction with bonded phases;
- Various bonding phases with different retention, applies to retention and separation of proteins and peptides of various molecular sizes.

"Extended Selectivity" Kit

Contains: Ultisil™ Polar–RP, Ultisil™ ALK–C18, Ultisil™ XB–CN
Dimension: 4.6*250mm, 5µm (other dimensions also available)

- Applies to method screening, for general chromatographic analysis requirements;
- Applies to strong polar or non–polar compounds and alkalines, with high water ratio conditions.

"Hydrophilic Substance Analysis" Kit

Contains: Ultisil™ AQ–C18, Ultisil™ Polar–RP, Ultisil™ LP–C18
Dimension: 4.6*250mm, 5µm (other dimensions also available)

- Applies to strong polar substance without retention on normal C18, or separation of organic acid mixtures;
- Compatible with 100% – 0% water phase mobile phase.

For further details about the columns, please refer to user manual attached with each column.

3. Welch HPLC Column Selection by USP Listing

HPLC Column	Particle Size	pH Range	Carbon Loading	Surface Area(m ² /g)	Endcapped
L1: Octadecyl silane chemically bonded to porous silica or ceramic microparticles, 1.5 to 10 µm in diameter, or a monolithic rod.					
Ultisil XB-C18	3, 5, 10 µm	1.5-10.0	17%(120Å), 8%(300Å)	320(120Å), 90(300Å)	Yes
Ultisil AQ-C18	3, 5, 10 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Ultisil LP-C18	3, 5, 10 µm	0.5-8.0	10%(120Å), 5%(300Å)	320(120Å), 90(300Å)	No
Ultisil LP-AQ	5 µm	1.0-8.0	5%(120Å)	320(120Å)	No
Ultisil Polar-RP	3, 5, 10 µm	1.5-10.0	18%(120Å)	320(120Å)	Yes
Ultisil AA(Amino Acid)	5 µm	1.5-10.0	17%(120Å)	320(120Å)	Yes
Ultisil PAH	3, 5 µm	1.5-10.0	22%(120Å)	320(120Å)	No
Ultisil ALK C18	5 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Ultisil Plus C18	3.5, 5 µm	2.0-8.0	10%(130Å)	160(130Å)	Yes
Ultisil ODS-3	3, 5 µm	2.0-8.0	15%(100Å)	380(100Å)	Yes
Ultisil XS-C18	3, 5 µm	2.0-10.0	23%(120Å)	320(120Å)	Yes
Xtimate C18	3, 5, 10 µm	1.0-12.5	14%(120Å)	320(120Å)	Yes
Xtimate Polar-RP	5 µm	1.0-12.5	16%(120Å)	320(120Å)	Yes
Welchrom C18	5 µm	1.5-10.0	19%(120Å)	320(120Å)	Yes
Topsil C18	3, 5 µm	2.0-9.5	12%(150Å)	260(150Å)	Yes
Boltimate C18(Core-shell)	2.7 µm	2.0-8.5	9%(90Å)	120(90Å)	Yes
Boltimate EXT-C18(Core-shell)	2.7 µm	1.5-12.0	8%(90Å)	120(90Å)	Yes
Boltimate LP-C18(Core-shell)	2.7 µm	1.0-8.5	7%(90Å)	120(90Å)	No
Ultisil UHPLC XB-C18	1.8 µm	1.5-10.0	17%(120Å)	320(120Å)	Yes
Ultisil UHPLC AQ-C18	1.8 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Ultisil UHPLC LP-C18	1.8 µm	0.5-8.0	10%(120Å)	320(120Å)	No
Ultisil UHPLC Polar-RP	1.8 µm	1.5-10.0	18%(120Å)	320(120Å)	Yes
Xtimate UHPLC C18	1.8 µm	1.0-12.5	14%(120Å)	320(120Å)	Yes
L3: Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.					
Ultisil SiO ₂	3, 5, 10 µm	2.0-8.0	N/A	320(120Å), 90(300Å)	No
Ultisil HILIC Silica	3, 5, 10 µm	2.0-8.0	N/A	320(120Å)	No
Ultisil UHPLC HILIC	1.8 µm	2.0-8.0	N/A	320(120Å)	No
Topsil Silica	5 µm	2.0-8.0	N/A	260(150Å)	No
Boltimate HILIC	2.7 µm	2.0-8.5	N/A	120(90Å)	No
L7: Octyl silane chemically bonded to totally porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.					
Ultisil XB-C8	3, 5, 10 µm	1.5-10.0	12%(120Å), 4%(300Å)	320(120Å), 90(300Å)	Yes
Ultisil LP-C8	3, 5 µm	1.0-8.0	5.5%(120Å), 3%(300Å)	320(120Å), 90(300Å)	No
Ultisil F-C8	3, 5 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Xtimate C8	3, 5, 10 µm	1.0-12.5	10%(120Å)	320(120Å)	Yes
Welchrom C8	5 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Topsil C8	3, 5 µm	2.0-9.5	10%(150Å)	260(150Å)	Yes
Ultisil UHPLC XB-C8	1.8 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
L8: An essentially monomolecular layer of aminopropyl-silane chemically bonded to totally porous silica gel support, 3 to 10 µm in diameter.					
Ultisil XB-NH ₂	3, 5, 10 µm	2.0-8.0	4%(120Å)	320(120Å)	No
Ultisil HILIC-NH ₂	3, 5, 10 µm	2.0-8.0	4%(120Å)	320(120Å)	No
Topsil NH ₂	5 µm	2.0-8.0	3%(150Å)	260(150Å)	No
Topsil Hilic-NH ₂	5 µm	2.0-8.0	3%(150Å)	260(150Å)	No
Xtimate Lactose-NH ₂	5 µm	2.0-8.0	7%(120Å)	450(120Å)	No
L9: Irregular or spherical, totally porous silica gel having a chemically bonded, strongly acidic cation-exchange coating, 3 to 10 µm in diameter.					
Ultisil XB-SCX	3, 5, 10 µm	2.0-8.0	12%(120Å), 5%(300Å)	320(120Å), 90(300Å)	No
Xtimate XB-SCX	5 µm	2.0-8.0	2%(120Å)	300(120Å)	No
L10: Nitrile groups chemically bonded to porous silica particles, 3 to 10 µm in diameter.					
Ultisil XB-CN	3, 5, 10 µm	1.5-9.0	7%(120Å)	320(120Å)	Yes
Ultisil LP-CN	5 µm	1.0-8.0	6%(120Å)	320(120Å)	No
Xtimate CN	5 µm	1.0-12.5	7%(120Å)	320(120Å)	Yes
Topsil CN	5 µm	2.0-8.0	6%(150Å)	260(150Å)	Yes
L11: Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.					
Ultisil XB-Phenyl	3, 5, 10 µm	1.5-10.0	12%(120Å), 4%(300Å)	320(120Å), 90(300Å)	Yes
Ultisil Phenyl-Ether	5 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Ultisil PFP	3, 5 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
Xtimate Phenyl-hexyl	3, 5 µm	1.0-12.5	12%(120Å)	320(120Å)	Yes
Topsil Phenyl-hexyl	3, 5 µm	2.0-9.5	12%(150Å)	260(150Å)	Yes
Boltimate Phenyl-hexyl(Core-shell)	2.7 µm	2.0-8.5	7%(90Å)	120(90Å)	Yes
Boltimate EXT-PFP(Core-shell)	2.7 µm	1.5-12.0	5%(90Å)	120(90Å)	Yes
Ultisil UHPLC XB-Phenyl	1.8 µm	1.5-10.0	12%(120Å)	320(120Å)	Yes
L13: Trimethylsilane chemically bonded to porous silica particles, 3 to 10 µm in diameter.					
Ultisil XB-C1	5 µm	1.5-10.0	4%(120Å)	320(120Å)	Yes

HPLC Column	Particle Size	pH Range	Carbon Loading	Surface Area(m ² /g)	Endcapped
L14: Silica gel having a chemically bonded, strongly basic quaternary ammonium anion-exchange coating, 5 to 10 µm in diameter.					
Ultisil XB-SAX	3, 5, 10 µm	2.0-8.0	7.5%(120Å), 1.5%(300Å)	320(120Å), 90(300Å)	No
L17: Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 7 to 11 µm in diameter.					
Xtimate Sugar-H	5, 8 µm	1.0-3.0	N/A	N/A	N/A
L19: Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, 9 µm in diameter.					
Xtimate Sugar-Ca	5, 8 µm	5.0-9.0	N/A	N/A	N/A
L20: Dihydroxypropane groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.					
Ultisil Diol	3, 5, 10 µm	2.0-8.0	2.5%(120Å)	320(120Å)	No
L21: A rigid, spherical styrene-divinylbenzene copolymer, 3 to 30 µm in diameter.					
Xtimate PS/DVB	5, 10 µm	1.0-14.0	N/A(100Å, 300Å)	N/A	N/A
L22: A cation-exchange resin made of porous polystyrene gel with sulfonic acid groups, about 10 µm in size.					
Xtimate Sugar-H	5, 8 µm	1.0-3.0	N/A	N/A	N/A
L26: Butyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.					
Ultisil XB-C4	3, 5, 10 µm	1.5-10.0	8%(120Å), 3%(300Å)	320(120Å), 90(300Å)	Yes
Xtimate C4	3, 5 µm	1.0-12.5	8%(120Å)	320(120Å)	Yes
L33: Packing having the capacity to separate dextrans of 4,000 to 500,000 daltons. It is spherical, silica-based and processed to provide pH stability.					
Xtimate SEC-120	3, 5 µm	2.0-7.5	N/A(120Å)	N/A	N/A
Xtimate SEC-300	3, 5 µm	2.0-7.5	N/A(300Å)	N/A	N/A
Xtimate SEC-500	5 µm	2.0-7.5	N/A(500Å)	N/A	N/A
Xtimate SEC-700	5 µm	2.0-7.5	N/A(700Å)	N/A	N/A
Xtimate SEC-1000	5 µm	2.0-7.5	N/A(1000Å)	N/A	N/A
L40: Cellulose tris-3,5-dimethylphenylcarb-amate coated porous silica particles, 5 to 20 µm in diameter.					
Ultisil Cellu-D/Cellu-DR	5, 10 µm	2.0-9.0	N/A	320(120Å)	N/A
L43: Pentafluorophenyl groups chemically bonded to silica particles 5 to 10 µm in diameter.					
Ultisil PFP	3, 5 µm	1.5-10.0	13%(120Å)	320(120Å)	Yes
Boltimate EXT-PFP(Core-shell)	2.7 µm	1.5-12.0	5%(90Å)	120(90Å)	Yes
L51: Amylose tris-3,5-dimethylphenylcarbamate-coated, porous, spherical, silica particles, 5 to 10 µm in diameter.					
Ultisil Amy-D/Amy-DR	5, 10 µm	2.0-9.0	N/A	320(120Å)	N/A
L56: Propyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.					
Ultisil LP-C3	5 µm	1.0-8.0	4%(120Å)	320(120Å)	No
L59: Packing having the capacity to separate proteins by molecular weight over the range of 5 to 7000 kDa. It is spherical (1.5-10 µm), silica-based, and processed to provide hydrophilic characteristics and pH stability.					
Xtimate SEC-120	3, 5 µm	2.0-7.5	N/A(120Å)	N/A	N/A
Xtimate SEC-300	3, 5 µm	2.0-7.5	N/A(300Å)	N/A	N/A
Xtimate SEC-500	5 µm	2.0-7.5	N/A(500Å)	N/A	N/A
Xtimate SEC-700	5 µm	2.0-7.5	N/A(700Å)	N/A	N/A
Xtimate SEC-1000	5 µm	2.0-7.5	N/A(1000Å)	N/A	N/A
L60: Spherical, porous silica gel, 10 µm or less in diameter, surface has been covalently modified with alkyl amide groups and endcapped.					
Ultisil Polar-RP	3, 5, 10 µm	1.5-10.0	18%(120Å)	320(120Å)	Yes
Xtimate Polar-RP	5 µm	1.0-12.5	16%(120Å)	320(120Å)	Yes
Ultisil UHPLC Polar-RP	1.8 µm	1.5-10.0	18%(120Å)	320(120Å)	Yes
L62: C30 silane bonded phase on a fully porous spherical silica, 3 to 15 µm in diameter.					
Ultisil XB-C30	3, 5, 10 µm	1.5-10.0	22%(120Å)	320(120Å)	Yes
L80: Cellulose tris(4-methylbenzoate)-coated, porous, spherical, silica particles, 5 µm in diameter.					
Ultisil Cellu-J/Cellu-JR	5, 10 µm	2.0-9.0	N/A	320(120Å)	N/A
Not Included in USP List					
Ultisil HILIC Amide	3, 5, 10 µm	2.0-8.0	7%(120Å)	320(120Å)	N/A
Ultisil HILIC Amphon II	5 µm	2.0-8.0	6%(120Å)	320(120Å)	N/A
Ultisil Amy-S/Amy-SR	5, 10 µm	2.0-9.0	N/A	320(120Å)	N/A
Ultisil MM NH ₂ /CN	5 µm	2.0-8.0	N/A(120Å)	320(120Å)	N/A
Ultisil MM C18/SCX	5 µm	2.0-8.0	N/A(120Å)	320(120Å)	N/A

4. Cross Reference

Ultisil XB-C18 can substitute:

Symmetry C18	Symmetry shield RP C18	
Luna C18	Luna C18(2)	Discovery C18
Hypersil BDS C18	Alltima C18	Zobax Eclipse C18
BetaBasic C18	Platinum EPS C18	Betasil C18
Inertsil ODS-2	Inertsil ODS-3	Supelcosil LC-18-DB
Kromasil 100A C18	HyPURITY C18	

Ultisil AQ-C18 can substitute:

Aquasil C18	Atlantis C18
Zorbax SB-AQ C18	Synergi Hydro-RP C18
HydroBond PS C18	HydroBond AQ C18
Ultra Aqueous C18	Prontosil C18 AQ
YMC-Pack ODS-AQ	Elite Sino Chrom ODS-BP

Ultisil XB-C8 can substitute:

Symmetry C8	Luna C8	Luna C8(2)
Discovery C8	Hypersil BDS C8	Alltima C8
Zorbax Eclipse XDB C8	BetaBasic C8	Platinum EPS C8
Betasil C8	Inertsil C8	Inertsil C8-3
Supercosil LC-8-DB	Kromasil 100A C8	HyPURITY C8
YMC-Pack C8-AM	Adsorbosphere HS C8	Develosil C8
Cosmosil C8-MS	Nucleosil 100 C8 HD	

Other Ultisil Columns: XB-CN, XB-Phenyl, XB-CN, SiO₂ and Polar RP can replace the most of the same type columns of other brands.

Xtimate[®] (wide pH range) can substitute:

Waters	Xterra series
	Xbridge series
Agilent	Extend series
Phenomenex	Gemini series

Chiral Column Reference Table

Company	Brand	Coated Normal Phase				Coated Reversed Phase			
		Cellu-D	Cellu-J	Amy-D	Amy-S	Cellu-D/R	Cellu-J/R	Amy-D/R	Amy-S/R
Welch	Ultisil	Cellu-D	Cellu-J	Amy-D	Amy-S	Cellu-D/R	Cellu-J/R	Amy-D/R	Amy-S/R
Daicel	Chiralcel	OD-H	OJ-H			OD-RH	OJ-RH		
	Chiralpak			AD-H	AS-H			AD-RH	AS-RH

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