


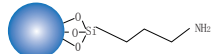
## Ultisil® HILIC Column (HILIC Silica&HILIC NH<sub>2</sub>)

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.

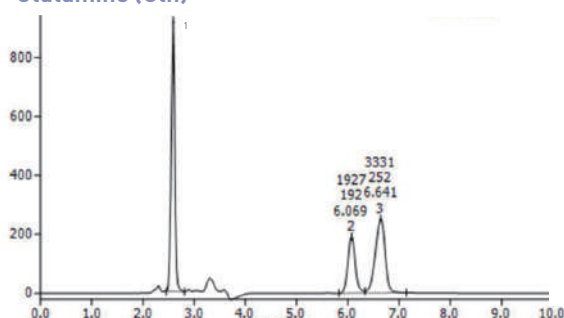
### Ultisil® HILIC Silica

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

### Ultisil® HILIC-NH<sub>2</sub>

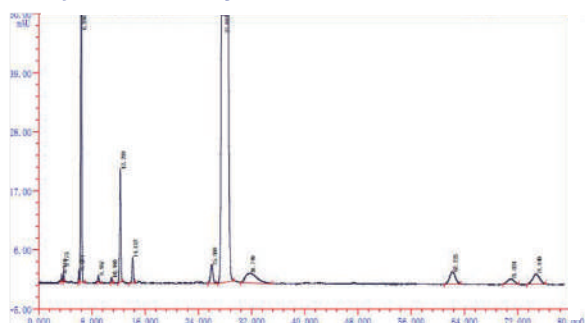
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 µm, 5 µm, 10 µm
Surface Area(m <sup>2</sup> /g)	320(120 Å)
Carbon Loading(%)	4(120 Å)
USP List	L8
Endcapped	No

### 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 <sub>2</sub> , 4.6 ×250 mm, 5µm
Mobile Phase:	Acetonitrile/0.05 mol/L KH <sub>2</sub> PO <sub>4</sub> [adjust pH 4.0 with H <sub>3</sub> PO <sub>4</sub> ] =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	Cartridge holder
		150	200	250		
3 µm 120 Å	4.6	H00228-21041	H00228-21042	H00228-21043	H00808-03026	00808-01101
5 µm 120 Å	4.6	H00228-31041	H00228-31042	H00228-31043	H00808-04044	00808-01101
10 µm 120 Å	4.6	H00228-41041	H00228-41042	H00228-41043	H00808-05016	00808-01101

#### Ultisil® HILIC NH<sub>2</sub>

Particle size	Column ID (mm)	Column Length (mm)			Guard Cartridge	Cartridge holder
		150	250	300		
3 µm 120 Å	4.6	H00231-21041	H00231-21042	H00231-21043	H00808-03025	00808-01101
5 µm 120 Å	4.6	H00231-31041	H00231-31042	H00231-31043	H00808-04047	00808-01101
10 µm 120 Å	4.6	H00231-41041	H00231-41042	H00231-41043	H00808-05017	00808-01101

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

# Ultisil® HILIC Amide

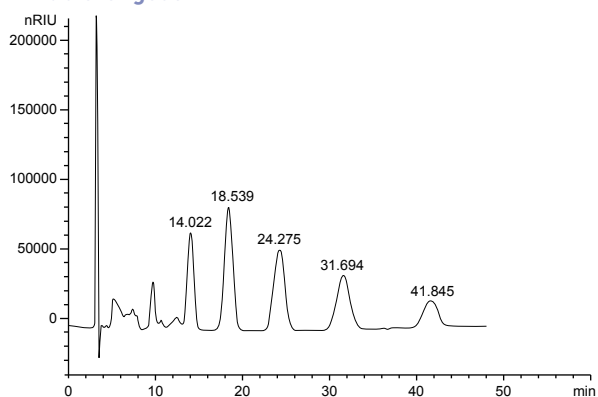
Ultisil® HILIC Amide column is a special column designed for HILIC mode. As amide group has strong hydrophilicity, stability and electrically neutral, Ultisil® Amide has longer life, better separation repeatability and peak shape than NH<sub>2</sub> phase does.

- 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

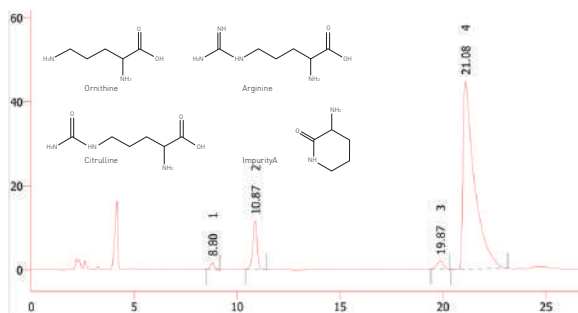
pH Range	2.0-8.0	Carbon Loading(%)	7(120 Å)
Particle Size	3 µm, 5 µm, 10 µm	USP List	L68
Surface Area(m <sup>2</sup> /g)	320(120 Å)	Endcapped	N/A

## 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 <sub>2</sub> PO <sub>4</sub> (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	Cartridge holder
		30	33	50	75	100	125	150	200	250	300	10mm length		
3 µm 120 Å	2.1	H00240-21009	H09240-21009	H00240-21010	H00240-21011	H00240-21012	H00240-21013	H00240-21014	H00240-21015	H00240-21016	-	H00808-23010	00808-01107	
	3.0	H00240-21018	-	H00240-21019	H00240-21020	H00240-21021	H00240-21022	H00240-21023	H00240-21024	H00240-21025	-	H00808-23010	00808-01107	
	4.0	H00240-21027	-	H00240-21028	H00240-21029	H00240-21030	H00240-21031	H00240-21032	H00240-21033	H00240-21034	-	H00808-03021	00808-01101	
	4.6	H00240-21036	H11240-21036	H00240-21037	H00240-21038	H00240-21039	H00240-21040	H00240-21041	H00240-21042	H00240-21043	-	H00808-03021	00808-01101	
5 µm 120 Å	2.1	H00240-31009	H09240-31009	H00240-31010	H00240-31011	H00240-31012	H00240-31013	H00240-31014	H00240-31015	H00240-31016	-	H00808-24025	00808-01107	
	3.0	H00240-31018	-	H00240-31019	H00240-31020	H00240-31021	H00240-31022	H00240-31023	H00240-31024	H00240-31025	-	H00808-24025	00808-01107	
	4.0	H00240-31027	-	H00240-31028	H00240-31029	H00240-31030	H00240-31031	H00240-31032	H00240-31033	H00240-31034	H00240-31035	H00808-04025	00808-01101	
	4.6	H00240-31036	H11240-31036	H00240-31037	H00240-31038	H00240-31039	H00240-31040	H00240-31041	H00240-31042	H00240-31043	H00240-31044	H00808-04025	00808-01101	
10 µm 120 Å	4.6	-	-	-	-	-	-	H00240-41041	H00240-41042	H00240-41043	H00240-41044	H00808-05018	00808-01101	

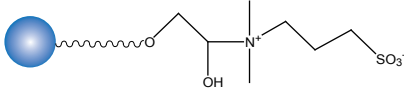
Don't see your needed size or format? Contact Welch or your local distributor for other dimensions.

# 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.

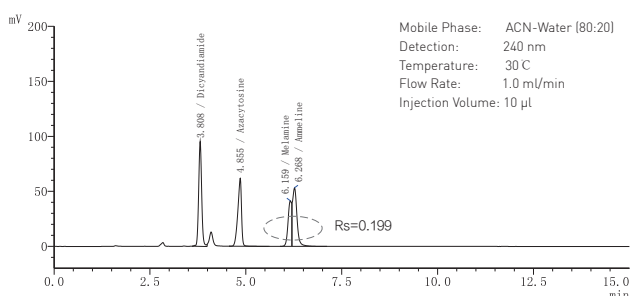
- Amphion-bonded silica stationary phase
- Enhanced hydrophilic interaction brings higher retention for polar and hydrophilic compounds
- Different selectivity from common HILIC packing materials
- Simple mobile phase used for the separation of polar compounds

## Ultisil® HILIC Amphion

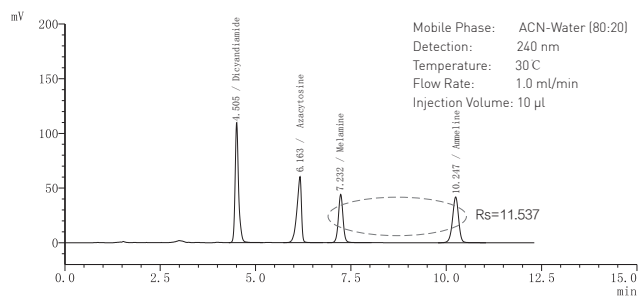
Structural Formula	
pH Range	2.0-8.0
Particle Size	5 µm
Surface Area(m²/g)	320(120 Å)
Carbon Loading(%)	6(120 Å)
USP List	L114
Endcapped	N/A

## Comparison

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

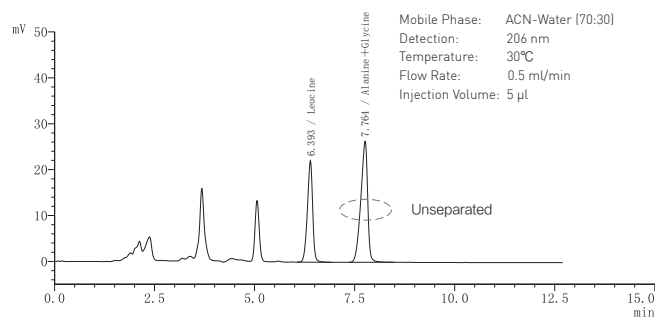


Ultisil® HILIC SiO<sub>2</sub>, 5 µm, 4.6×250 mm

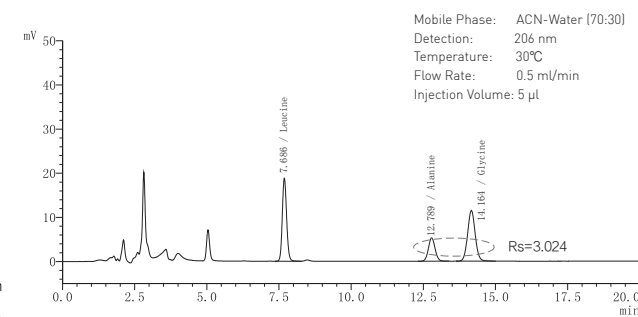


Ultisil® Amphion II, 5 µm, 4.6×150 mm

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



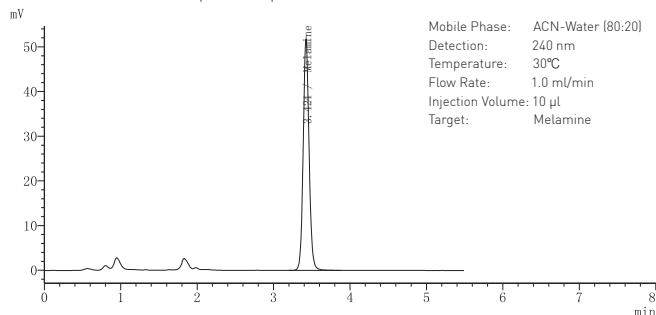
Ultisil® HILIC SiO<sub>2</sub>, 5 µm, 4.6×150 mm



Ultisil® Amphion II, 5 µm, 4.6×150 mm

### Determination of Melamine

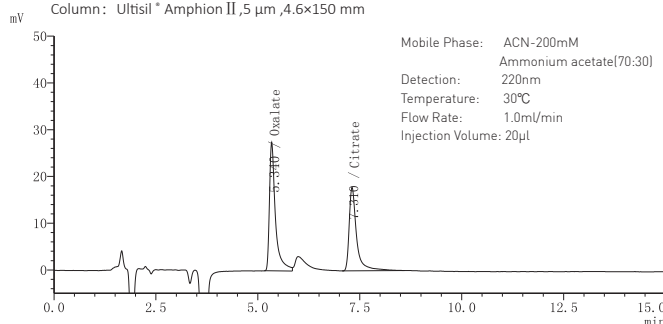
Column: Ultisil® Amphion II, 5 µm, 4.6×150 mm



Rt	Plates	Tailing Factor
3.424	8087	1.094

### Separation of Citrate and Oxalate

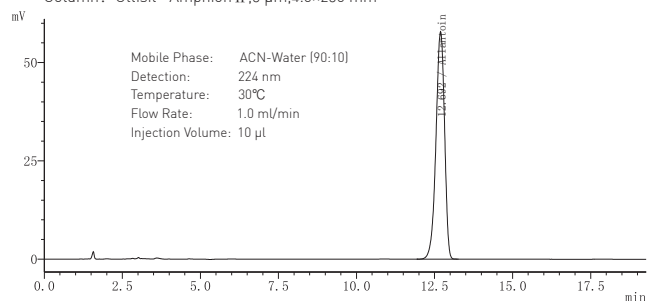
Column: Ultisil® Amphion II, 5 µm, 4.6×150 mm



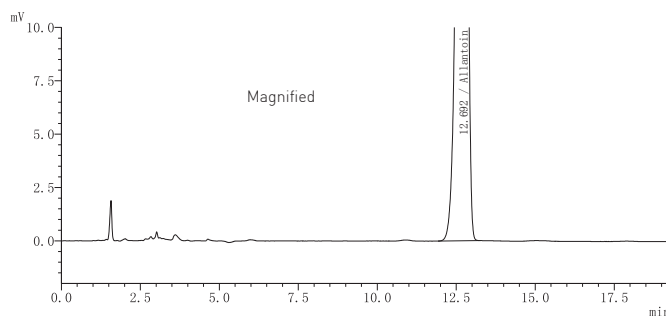
Compound	Rt	Plates	Resolution
Oxalate	5.340	7540	--
Citrate	7.310	9487	7.214

### 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:

- 1) Shifts of retention time may occur, if not sufficiently equilibrated.
- 2) 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.
- 3) Long-period equilibration required, after using buffer salt mobile phase (like ammonium formate, ammonium acetate etc.) and buffer salt being flushed off.
- 4) 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	Cartridge holder
		30	33	50	75	100	125	150	200	250	300		
5 µm 120 Å	2.1	H00274-31009	H09274-31009	H00274-31010	H00274-31011	H00274-31012	H00274-31013	H00274-31014	H00274-31015	H00274-31016		H00808-24039	00808-01107
	3.0	H00274-31018	-	H00274-31019	H00274-31020	H00274-31021	H00274-31022	H00274-31023	H00274-31024	H00274-31025	-	H00808-24039	00808-01107
	4.0	H00274-31027	-	H00274-31028	H00274-31029	H00274-31030	H00274-31031	H00274-31032	H00274-31033	H00274-31034	H00274-31035	H00808-04029	00808-01101
	4.6	H00274-31036	H11274-31036	H00274-31037	H00274-31038	H00274-31039	H00274-31040	H00274-31041	H00274-31042	H00274-31043	H00274-31044	H00808-04029	00808-01101

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## Ultisil® Diol

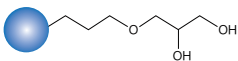
Ultisil® Diol Column is based on ultra-pure porous spherical silica bonded with 1,2-dihydroxypropyl functional group silica. Ultisil® Diol is used in normal phase mostly, suitable for separation of peptides, proteins, polar molecules, and organic acids and its polymers.

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.

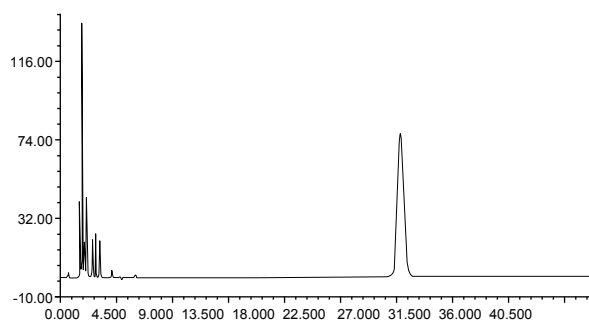
Ultisil® Diol column is more stable than traditional normal phase columns, such as NH<sub>2</sub>, SiO<sub>2</sub>. Compared with NH<sub>2</sub>/SiO<sub>2</sub> column, Diol column is not sensitive to water. Ultisil® Diol column can also be used in reversed phase analysis.

- 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

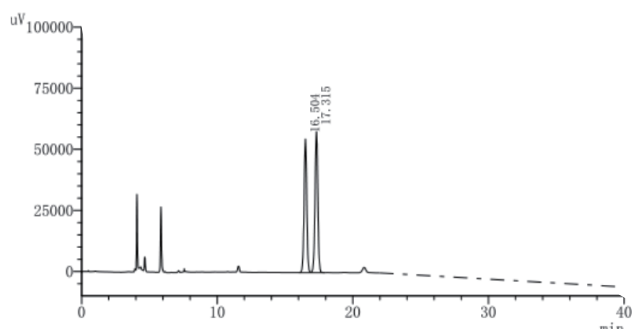
Structural Formula	
pH Range	2.0-8.0
Particle Size	3 µm, 5 µm, 10 µm
Surface Area(m <sup>2</sup> /g)	320(120 Å)
Carbon Loading(%)	2.5(120 Å)
USP List	L20
Endcapped	No

### Tacrolimus



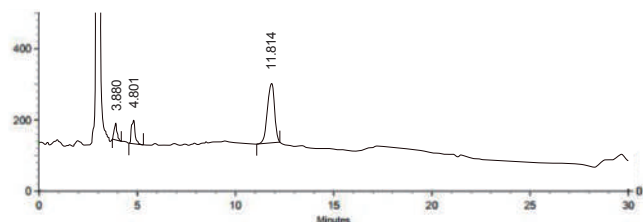
Column:	Ultisil® Diol, 4.6 × 250 mm, 5 µm
Mobile Phase:	N-hexane/ butyl chloride/ acetonitrile=7/2/1
Detector:	225 nm
Temperature:	Ambient
Flow Rate:	1.7 mL/min
Injection Volume:	5 µL

### Cloprostenol Sodium



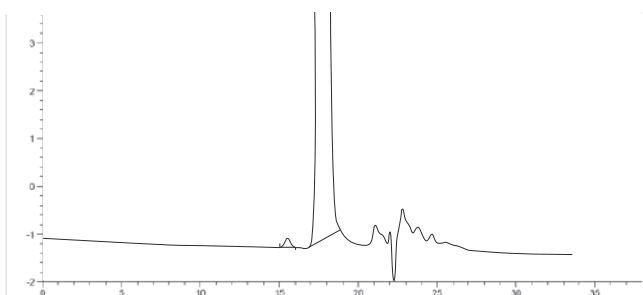
Column:	Ultisil® Diol, 4.6 × 300 mm, 3 µm
Mobile Phase:	N-hexane/isopropanol =99.5/0.5 (volume ratio)
Detector:	220 nm
Temperature:	Ambient
Flow Rate:	1.0 mL/min
Injection Volume:	10 µL

## 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	Cartridge holder	
		30	33	50	75	100	125	150	200	250	300			
3 μm 120 Å	2.1	H00206-21009	H09206-21009	H00206-21010	H00206-21011	H00206-21012	H00206-21013	H00206-21014	H00206-21015	H00206-21016	-	H00808-23020	00808-01107	
	3.0	H00206-21018	-	H00206-21019	H00206-21020	H00206-21021	H00206-21022	H00206-21023	H00206-21024	H00206-21025	-	H00808-23020	00808-01107	
	4.0	H00206-21027	-	H00206-21028	H00206-21029	H00206-21030	H00206-21031	H00206-21032	H00206-21033	H00206-21034	-	H00808-03020	00808-01101	
	4.6	H00206-21036	H11206-21036	H00206-21037	H00206-21038	H00206-21039	H00206-21040	H00206-21041	H00206-21042	H00206-21043	-	H00808-03020	00808-01101	
5 μm 120 Å	2.1	H00206-31009	H09206-31009	H00206-31010	H00206-31011	H00206-31012	H00206-31013	H00206-31014	H00206-31015	H00206-31016	-	H00808-24020	00808-01107	
	3.0	H00206-31018	-	H00206-31019	H00206-31020	H00206-31021	H00206-31022	H00206-31023	H00206-31024	H00206-31025	-	H00808-24020	00808-01107	
	4.0	H00206-31027	-	H00206-31028	H00206-31029	H00206-31030	H00206-31031	H00206-31032	H00206-31033	H00206-31034	H00206-31035	H00808-04020	00808-01101	
	4.6	H00206-31036	H11206-31036	H00206-31037	H00206-31038	H00206-31039	H00206-31040	H00206-31041	H00206-31042	H00206-31043	H00206-31044	H00808-04020	00808-01101	
10 μm 120 Å	4.0	-	-	-	-	-	-	-	H00206-41032	H00206-41033	H00206-41034	H00206-41035	H00808-05020	00808-01101
	4.6	-	-	-	-	-	-	H00206-41041	H00206-41042	H00206-41043	H00206-41044	H00808-05020	00808-01101	

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