

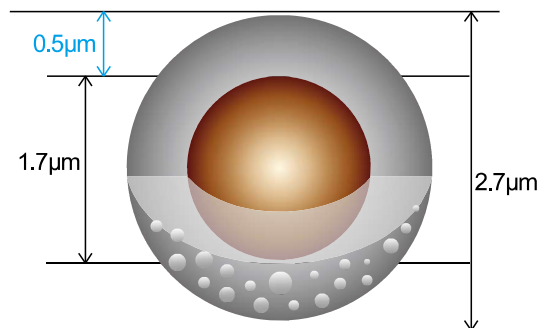
Boltimate™ Core-Shell HPLC Column

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).

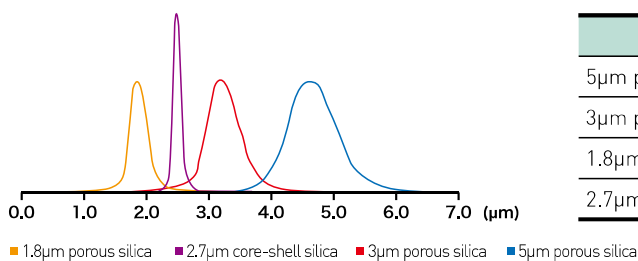
This kind of column can provide sub-2 μm efficiencies (~200000 p/m) and high resolution at much lower back pressure. Boltimate core-shell column can be used on both HPLC and UHPLC system, and method optimization is also very easy.

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 frit is used to resist plugging with dirty samples, suitable for complex samples
- A variety of bonding phases provide different selectivities, excellent peak shape and lot-to-lot reproducibility
- Maximum pressure: 600bar

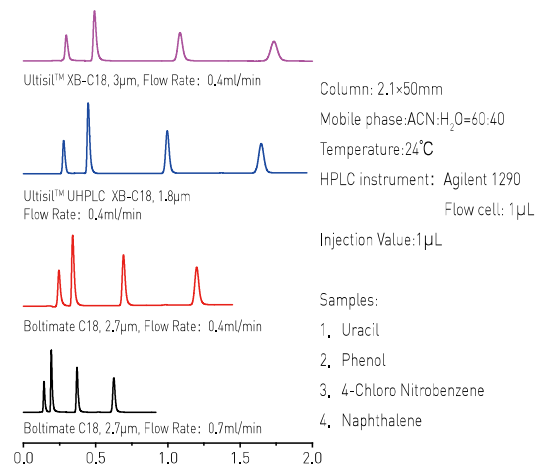


With the solid core and thin porous layer, the diffusion distance of sample molecular decreased, which means fast mobile phase flow rate can be used to increase the analytical speed. Compared with traditional porous HPLC columns, Boltimate core-shell column has the narrower particle size distribution,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

Theoretical plate number and column pressure (based on Naphthalene)



Boltimate C18 column efficiency is almost the same with 1.8 μm TPP (Total Porous Particle) C18 column and two times of 3 μm TPP (Total Porous Particle) 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.

Column	Theoretical Plates	Column Pressure (bar)	Time
Ultisil™ XB-C18, 3μm, 2.1×50mm	5600	85	2.0min
Ultisil™ UHPLC XB-C18, 1.8μm, 2.1×50mm	10500	260	1.8min
Boltimate™ C18, 2.7μm, 2.1×50mm	10100	108	1.5min
Boltimate™ C18, 2.7μm, 2.1×50mm	9500	190	0.8min

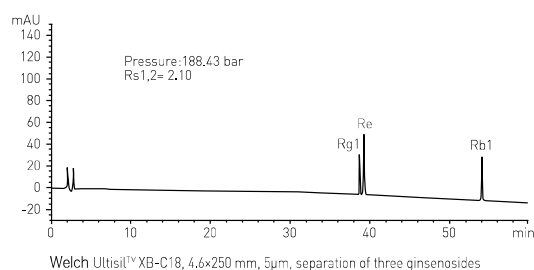
Detection of Ginsenosides:

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 (4.6×250mm, 5μm)

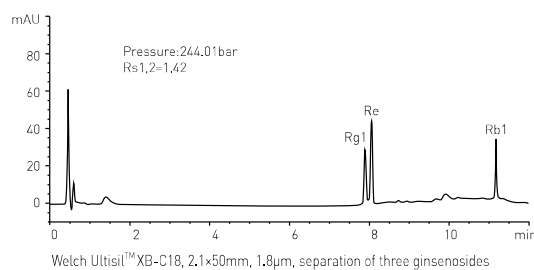
Flow Rate: 1.3 ml/min Injection Volume: 10 μl



Gradient program:

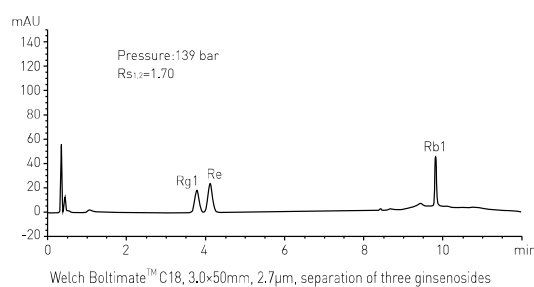
Time(min)	Mobile Phase A (%)	Mobile Phase B (%)
0	81	19
30	81	19
35	76	24
60	60	40
60.1	0	100
70	0	100
70.1	81	19
78	81	19

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



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 (3.0×50mm, 2.7μm)



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

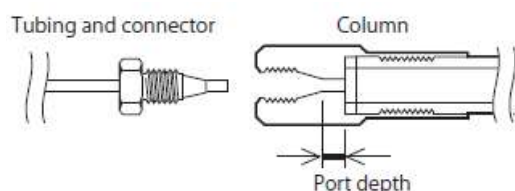
From the results above, Boltimate core-shell column has a lower column pressure and faster analysis time, and the resolution is high.

Welch provides a variety of bonding phases

Bonding Phases	Features	Particle Size μm	Solid Core Diameter μm	Porous Shell Depth μm	Pore Size $\text{\AA}$	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
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		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	1.5-10		L43
HILIC	With its unbonded silica, Boltimate HILIC retains and separates polar analytes.	2.7	1.7	0.5	90	120	-	-	2-8.5		L3

Ordering Information

2.7 μm , 90 $\text{\AA}$, Boltimate Core-shell Column					
Size(mm)	C18	Phenyl-Hexyl	EXT-C18	EXT-PFP	HILIC
2.1×30	960-04009	961-04009	962-04009	963-04009	964-04009
2.1×50	960-04010	961-04010	962-04010	963-04010	964-04010
2.1×75	960-04011	961-04011	962-04011	963-04011	964-04011
2.1×100	960-04012	961-04012	962-04012	963-04012	964-04012
2.1×150	960-04014	961-04014	962-04014	963-04014	964-04014
3.0×30	960-04018	961-04018	962-04018	963-04018	964-04018
3.0×50	960-04019	961-04019	962-04019	963-04019	964-04019
3.0×75	960-04020	961-04020	962-04020	963-04020	964-04020
3.0×100	960-04021	961-04021	962-04021	963-04021	964-04021
3.0×150	960-04023	961-04023	962-04023	963-04023	964-04023
4.6×30	960-04036	961-04036	962-04036	963-04036	964-04036
4.6×50	960-04037	961-04037	962-04037	963-04037	964-04037
4.6×75	960-04038	961-04038	962-04038	963-04038	964-04038
4.6×100	960-04039	961-04039	962-4039	963-04039	964-04039
4.6×150	960-04041	961-04041	962-04041	963-04041	964-04041
4.6×250	960-04043	961-04043	962-04043	963-04043	964-04043



Port Style of Endfitting	Port depth
Parker	2mm

An 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
Direct connect inline filter, maximum pressure 15000psi. Inline frit, cannot be replaced.	00808-01221	Pre-column inline filter, 0.5µm
Direct connect inline filter, maximum pressure 18000psi.	00808-01222	Direct connect inline filter, contain 5 replaceable frits (0.2µm)
	00808-UF020	Replaceable frits (0.2µm)

Guard Column for Boltimate

	P/N	Description
Direct connect guard column, maximum pressure 15000psi, contain 5mm cartridge.	00808-01109	Direct connect guard column

Replaceable cartridge, 5mm length Maximum pressure 15000psi Boltimate packing material.	According to your HPLC column ID(mm):	
	2.0-3.0	3.2-8.0
	Choose suitable cartridge (mm):	
	2.1 × 5.0mm	4.0 × 5.0mm
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- PFP	U808-963-25	U808-963-45
Boltimate™ HILIC	U808-964-25	U808-964-45