Boltimate

Core-Shell HPLC Columns

As Fast As Bolt

Ako nás možno kontaktovať:
AZ CHROM s.r.o., Robotnícka 10, 831 03 Bratislava
Tel. 0907 244526 azetchrom@hplc.sk, www.azetchrom.sk

Welch Materials, Inc.

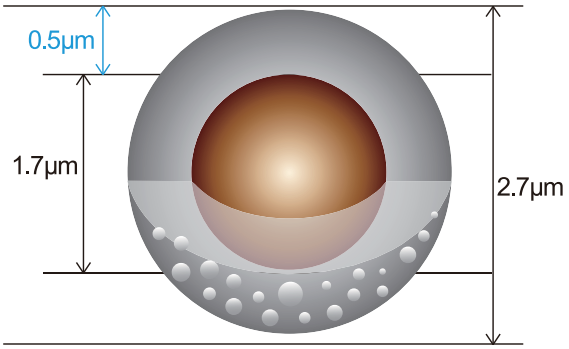
Boltimate

Core-Shell HPLC Columns

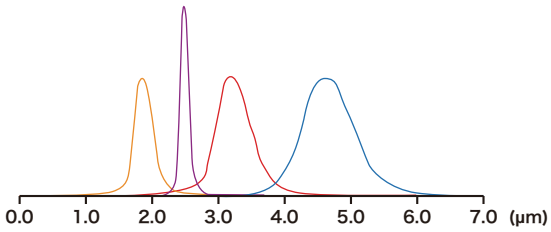
Welch Boltimate™ core-shell HPLC column particle has a size of 2.7 μm, and consists of 1.7 μm solid core and 0.5 μm porous layer(porous shell). This type of column can provide sub-2 μm efficiencies (~200000 p/m) and high resolution at much lower back pressure. Boltimate core-shell column can be used on both HPLC and UHPLC systems, with straight-forward method optimization process.

Features

- 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 distribution
- A standard 2 μm inlet frit prevents plugging by dirty samples, suitable for complex sample analysis
- A variety of bonding phases provide choices of different selectivities, while always maintaining excellent peak shape and lot-to-lot reproducibility
- Maximum pressure: 600bar

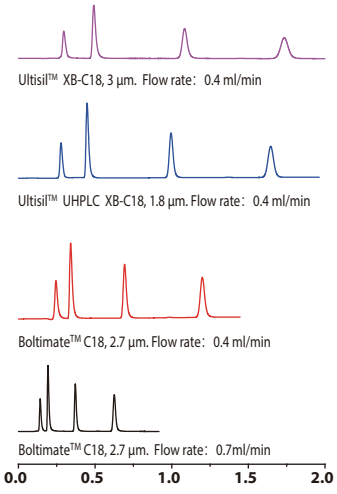


With solid core and thin porous surface layer, core-shell particles decrease the diffusion distance of sample moleculars, enabling faster mobile phase flow rate leading to increased analytical speed. Compared with traditional porous HPLC columns, Boltimate core-shell column has narrower particle size distribution, resulting in higher column efficiency, higher resolution and lower back pressure.



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

1.8μm porous silica 2.7μm core-shell silica 3μm porous silica 5μm porous silica



Column: 2.1×50mm
Mobile phase : ACN : H_2O =60 : 40
Temperature: 24℃
HPLC instrument: Agilent 1290
Flow cell: 1μ L
Injection Value: 1μ L
Samples:
1. Uracil
2. Phenol
3. 4-Chloro Nitrobenzene
4. Naphthalene

Theoretical plate number and column pressure (based on Naphthalene)

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

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

Detection of Ginsenosides:

Chromatographic conditions:

Columns: three types of C18 columns from Welch / Temperature: room temperature / Detection : UV 203nm

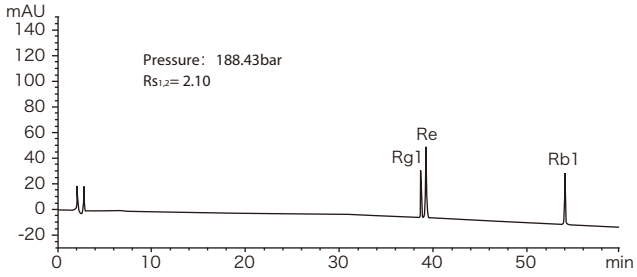
Mobile phase A: 0.1%H_3PO_4 in water / Mobile phase B: Acetonitrile

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

Flow rate:1.3ml/min Injection volume:10μl

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

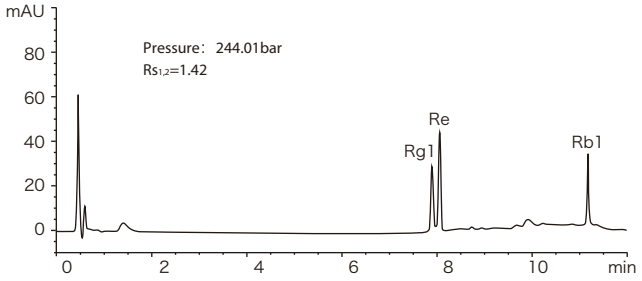


Welch Ultisil™ XB-C18, 4.6×250mm, 5μm, saparation of three Ginsenosides

2. Welch Ultisil™ UHPLC XB-C18 (2.1×50mm, 1.8μm)
Separatrion of Ginsenosides

Flow rate: 0.27ml/min Injection volume: 0.7μ l
Gradient program:

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

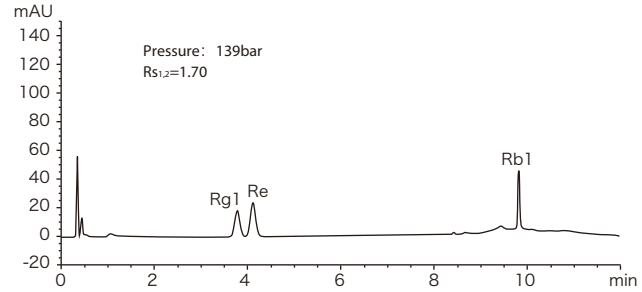


Welch Ultisil™ XB-C18, 2.1×50mm, 1.8μm, separation of three Ginsenosides

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

Flow rate: 0.55ml/min Injection volume:1.7μl
Gradient program:

Time(min)	Mobile phase A(%)	Mobile phase B(%)
0	81	19
6	81	19
7	76	24
12	60	40
12.01	0	100
14	0	100
15	81	19
18	81	19



Welch Boltimate™ C18, 3.0×50 mm, 2.7μm, separation of three Ginsenosides

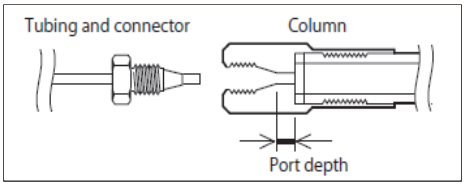
From the results above, Boltimate core-shell column has a lower column pressure and faster analysis time , and high resolution.

Welch provides a variety of bonding phases

Bonding Phases	Feature Description	Particle Size μm	Solid Core Diamameter μm	Porous Shell Depth μm	Pore Size Å	Surface Area m^2/g	C%	End/ capped	pH Range	Maximum Pressure Bar	USP
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	Extended pH range due to hybrid organic/inorganic layer on silica.	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.	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
LP-C18	LP phase utilizes unique technique to prevent siloxane bond from hydrolysis at low pH.	2.7	1.7	0.5	90	120	7	No	1.0-8.5		L1

Ordering Information

2.7μm, 90Å, Boltimate Core Shell Column						
Size(mm)	C18	Phenyl-Hexyl	EXT-C18	EXT-PFP	HILIC	LP-C18
2.1 ×30	960-04009	961-04009	962-04009	963-04009	964-04009	965-04009
2.1×50	960-04010	961-04010	962-04010	963-04010	964-04010	965-04010
2.1×75	960-04011	961-04011	962-04011	963-04011	964-04011	965-04011
2.1×100	960-04012	961-04012	962-04012	963-04012	964-04012	965-04012
2.1×150	960-04014	961-04014	962-04014	963-04014	964-04014	965-04014
3.0×30	960-04018	961-04018	962-04018	963-04018	964-04018	965-04018
3.0×50	960-04019	961-04019	962-04019	963-04019	964-04019	965-04019
3.0×75	960-04020	961-04020	962-04020	963-04020	964-04020	965-04020
3.0×100	960-04021	961-04021	962-04021	963-04021	964-04021	965-04021
3.0×150	960-04023	961-04023	962-04023	963-04023	964-04023	965-04023
4.6×30	960-04036	961-04036	962-04036	963-04036	964-04036	965-04036
4.6×50	960-04037	961-04037	962-04037	963-04037	964-04037	965-04037
4.6×75	960-04038	961-04038	962-04038	963-04038	964-04038	965-04038
4.6×100	960-04039	961-04039	962-04039	963-04039	964-04039	965-04039
4.6×150	960-04041	961-04041	962-04041	963-04041	964-04041	965-04041
4.6×250	960-04043	961-04043	962-04043	963-04043	964-04043	965-04043



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 firts(0.2μm)
	00808-UF020	Replaceable firts(0.2μm)

Guard Column for Boltimate

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

Replaceable cartridge, 5mm length Maximum pressure: 15000psi Boltimate packing material	Based on 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

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