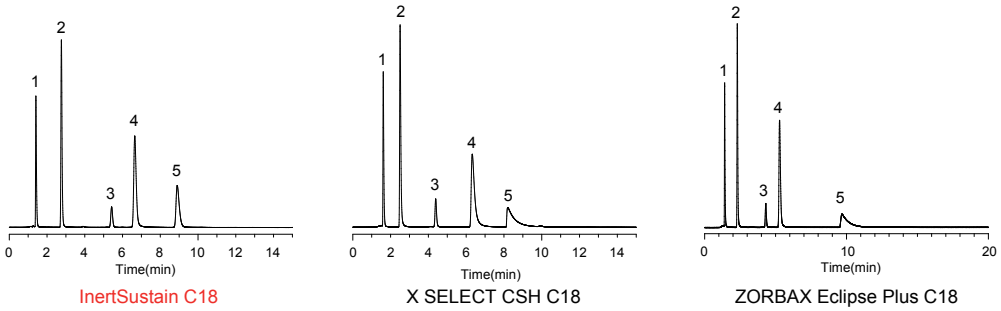
InertSustain® C18

Physical Properties

- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **2 µm, 3 µm, 5 µm**
- **Surface Area** : **350 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **0.85 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Complete**
- **Carbon Loading** : **14 %**
- **USP Code** : **L1**
- **pH Range** : **1~10**

Generally, silica based columns are mechanically stable and provide high efficiencies, however, they cannot be used under alkaline conditions and their residual silanol groups tend to adsorb organic bases. InertSustain C18 employs a radically new type of silica, in which the surface of the silica is uniquely modified, enabling precise control of the silica properties.
InertSustain C18 inherits the advantages of all the current Inertsil HPLC columns (e.g., extremely low operating back pressure, superior inertness to typically any analytes, high efficiency and compatibility with a wide range of solvents), but now can be used for wide pH analysis with consistent performance from column to column and lot to lot.

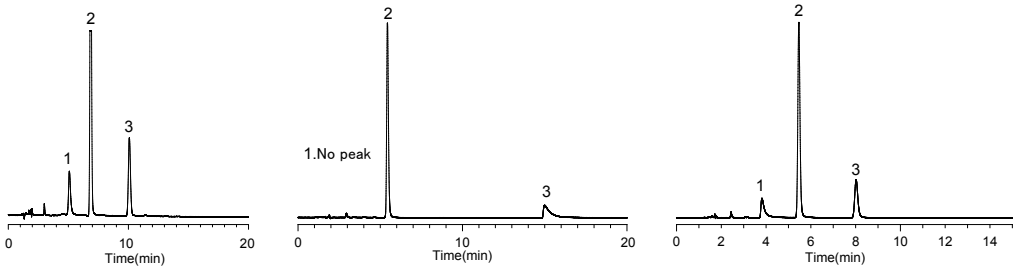
Figure 1 : Basic Compounds



Conditions

Column Size	: 3 µm, 150 × 2.1 mm I.D.
Eluent	: A) CH_3CN
	B) 25 mM K_2HPO_4
	(pH 7.0, KH_2PO_4)
	A/B = 30/70, v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 230 nm
Sample	: 1. Uracil
	2. Pyridine
	3. Phenol
	4. Berberine chloride
	5. Dextromethorphan

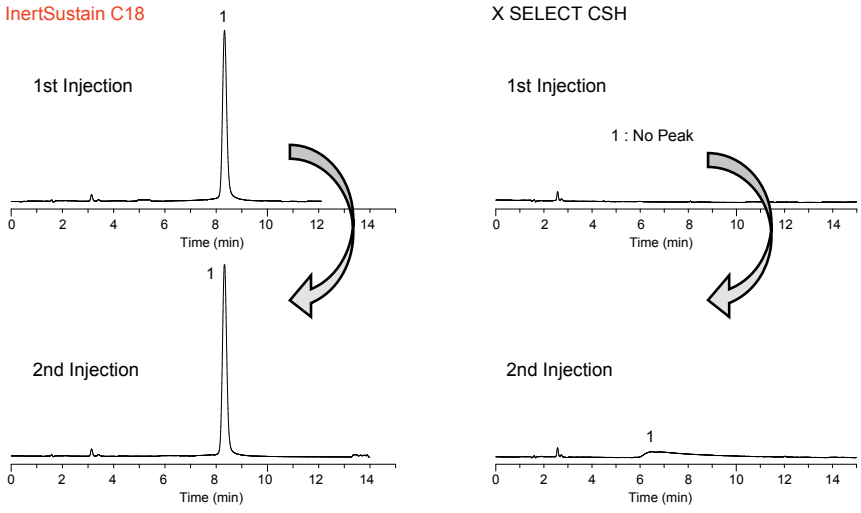
Figure 2 : Acidic Compounds



Conditions

Column Size	: 3 µm, 150 × 2.1 mm I.D.
Eluent	: A) CH_3CN
	B) 0.1 % H_3PO_4
	A/B = 25/75, v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1. Brilliant Blue FCF
	2. Phenol
	3. Salicylic acid

Figure 3 : Chelating Compound



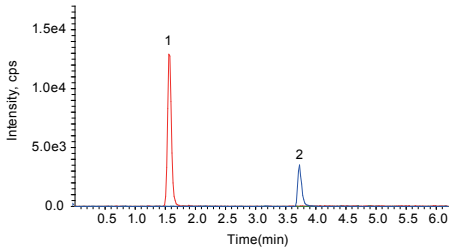
Conditions

Column Size	: 5 µm, 150 × 4.6 mm I. D.
Eluent	: A) CH3CN
	B) 0.1 % H_3PO_4
	A / B = 40 / 60, v / v
Flow Rate	: 1.0 mL / min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1. Hinokitiol

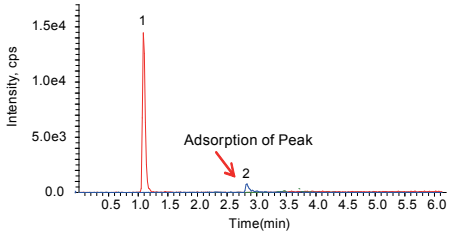
Comparison of Performance to Core-Shell Columns

As shown below, core-shell columns show peak tailing due to the presence of trace metals or silanol groups in their silica gel. Quantitative and qualitative analysis will be a source of concern since the adsorption of compounds can be expected.

InertSustain C18 3 µm



Kinetex C18 (1.7 µm)

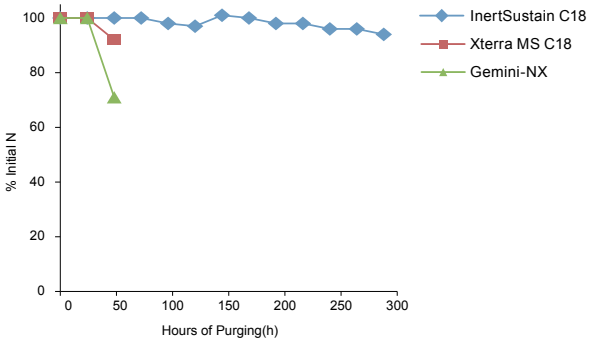


Conditions

Column	:	ODS Column(100 × 2.1 mm I.D.)
Eluent	:	A) 2 mM CH_3COONH_4 in 95 % CH_3CN B) 2 mM CH_3COONH_4 in 10 % CH_3CN A / B = 20 / 80 - 2 min – 100 / 0 - 2.5 min – 100 / 0 - 0.01 min - 20 / 80, v / v (Mixed by a gradient mixer)
Flow Rate	:	0.3 mL / min
Col. Temp.	:	40 °C
Detection	:	LC / MS / MS (4000 QTRAP® : ESI, Positive, MRM)
Injection Vol.	:	10 µL
Sample	:	1. Nitrofurazone (100 µg / L) 2. Lasalocid A (100 µg / L)

Wide pH compatibility with Long Column Lifetime

As shown in the experiment below, due to the introduction of Evolved Surface Silica, InertSustain C18 maintained high efficiency and peak shape for 300 hours while other “wide pH” column brands failed.



Purging Conditions

Column Size	:	5 µm, 150 × 4.6 mm I.D.
Eluent	:	A)CH_3OH B)50 mM Triethylamine (pH 10.0) A/B = 30/70, v/v
Flow Rate	:	1.0 mL/min
Col. Temp.	:	50 °C

Analytical Conditions

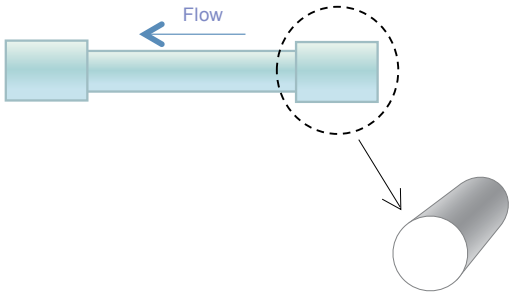
Eluent	:	A) CH_3CN B) H_2O A/B = 65/35, v/v
Flow Rate	:	1.0 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample	:	Naphthalene

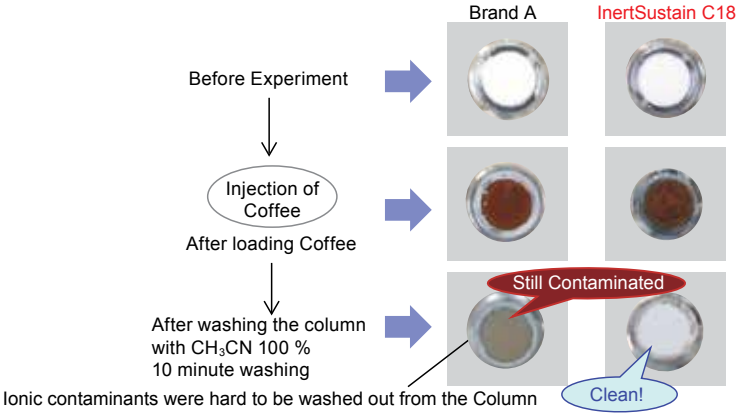
Experience the InertSustain! (Inertness and Sustainability)

Highly end-capped ODS column such as InertSustain C18 offers an opportunity to flush out contaminants from the column surface easily using an organic solvent. Coffee melanoidins are brown heterogeneous polymers contained in coffee. Its components are not clarified yet, but it is considered to contain several ionic compounds, which a poorly end-capped column will adsorb those ionic compounds leading to short column lifetime.

As for ODS column, which is commonly used for HPLC and LC/MS/MS, its inertness has an influence not only on peak shape but also detection sensitivity and durability. It is highly recommended to use highly end-capped column which provides good peak shape for both basic and acidic compounds such as InertSustain C18.

The packing material was visually confirmed by removing the column



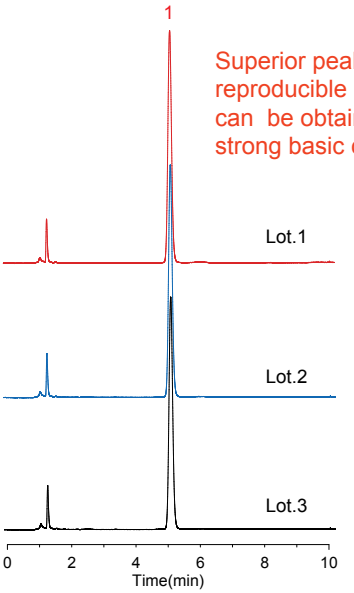


InertSustain® C18

Reliable Reproducibility, Performance and Quality

Rigorous quality control of physical properties and strict chromatographic tests for inertness and selectivity, contribute to the production of InertSustain C18 with an outstanding reproducibility and long column lifetime.

Strong Basic Compound Test

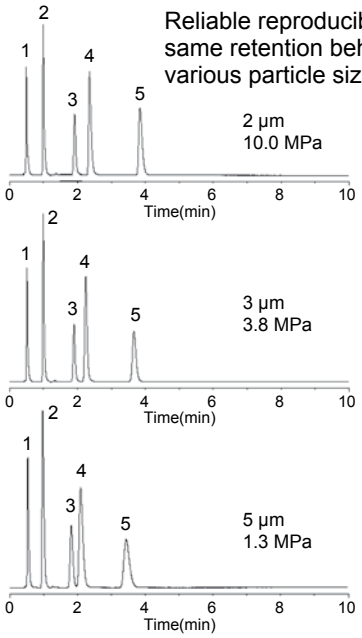


Superior peak shape with highly reproducible chromatograms can be obtained even for those strong basic compounds.

Conditions

Column Size : 5 µm, 250 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) 25 mM phosphate buffer (pH 7.0)
A / B = 40 / 60, v / v
Flow Rate : 1.0 mL / min
Col. Temp. : 40 °C
Detection : UV 220 nm
Sample : 1. Dextromethorphan

Same Retention Behavior between Various Particle Sizes



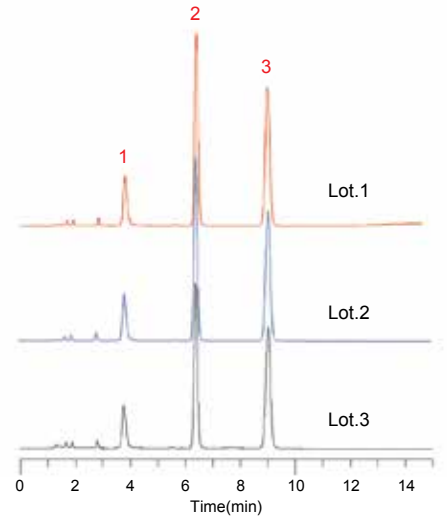
Reliable reproducibility and same retention behavior between various particle size columns

Conditions

Column Size : 50 × 2.1 mm I.D.
Eluent : A) CH_3OH
B) 25 mM phosphate buffer (pH 7.0)
A / B = 30 / 70, v / v
Flow Rate : 0.2 mL / min
Col. Temp. : 40 °C
Detection : UV 230 nm

Sample : 1. Uracil
2. Pyridine
3. Phenol
4. Berberine chloride
5. Dextromethorphan

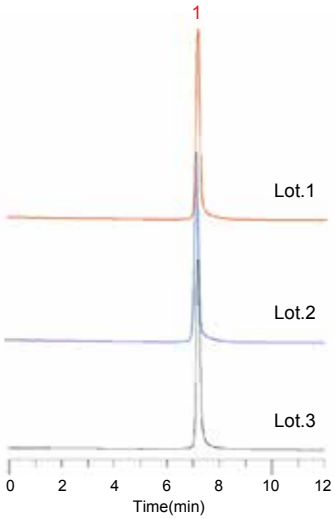
Strong Acidic Compound Test



Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN B) 0.1 % H_3PO_4
A / B = 25 / 75, v / v
Flow Rate : 1.0 mL / min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1. Brilliant Blue FCF
2. Phenol
3. Salicylic acid

Strong Chelating Compound Test



Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN B) 0.1 % H_3PO_4
A / B = 40 / 60, v / v
Flow Rate : 1.0 mL / min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1. Hinokitiol

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-14351	5020-14361	
	50	5020-14352	5020-14362	
	75	5020-14353	5020-14363	
	100	5020-14354	5020-14364	
	150	5020-14355	5020-14365	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14411	5020-14421	5020-14441
	50	5020-14412	5020-14422	5020-14442
	75	5020-14413	5020-14423	5020-14443
	100	5020-14414	5020-14424	5020-14444
	150	5020-14415	5020-14425	5020-14445
	250	5020-14416	5020-14426	5020-14446

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
	30	5020-14301	5020-14311		
	50	5020-14302	5020-14312		
	75	5020-14303	5020-14313		
	100	5020-14304	5020-14314		
	150	5020-14305	5020-14315		
	250	5020-14306	5020-14316		
Particle Size: 3 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-07411	5020-07421	5020-07431	5020-07441
	50	5020-07412	5020-07422	5020-07432	5020-07442
	75	5020-07413	5020-07423	5020-07433	5020-07443
	100	5020-07414	5020-07424	5020-07434	5020-07444
	125	5020-07417	5020-07427	5020-07437	5020-07447
	150	5020-07415	5020-07425	5020-07435	5020-07445
	250	5020-07416	5020-07426	5020-07436	5020-07446
	Length \ I.D. (mm)	1.0	1.5		
	30	5020-14201	5020-14211		
	50	5020-14202	5020-14212		
	75	5020-14203	5020-14213		
	100	5020-14204	5020-14214		
	150	5020-14205	5020-14215		
	250	5020-14206	5020-14216		
Particle Size: 5 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-07311	5020-07321	5020-07331	5020-07341
	50	5020-07312	5020-07322	5020-07332	5020-07342
	75	5020-07313	5020-07323	5020-07333	5020-07343
	100	5020-07314	5020-07324	5020-07334	5020-07344
	125	5020-07317	5020-07327	5020-07337	5020-07348
	150	5020-07315	5020-07325	5020-07335	5020-07345
	250	5020-07316	5020-07326	5020-07336	5020-07346

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19250	5020-19249	5020-19300	5020-19299
1.5, 2.1		1.5	5020-19350	5020-19349	5020-19400	5020-19399
2.1, 3.0		3.0	5020-19150	5020-19149	5020-19200	5020-19199
4.0, 4.6		4.0	5020-19050	5020-19049	5020-19100	5020-19099
2.1, 3.0	20	3.0	5020-19550	5020-19549	5020-19600	5020-19599
4.0, 4.6		4.0	5020-19450	5020-19449	5020-19500	5020-19499
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

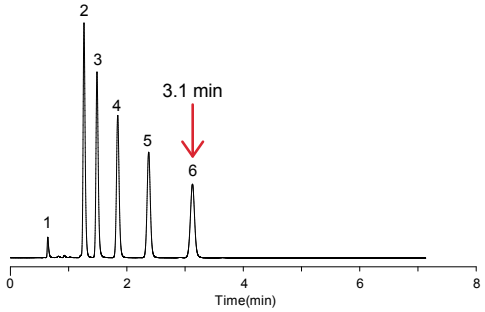
InertSustainSwift™ C18

Physical Properties

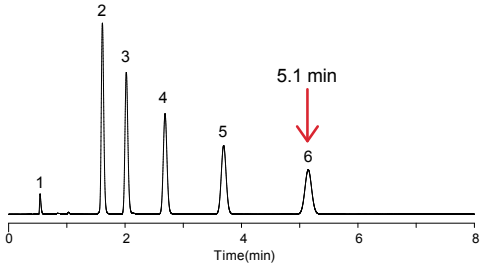
- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **1.9 µm, 3 µm, 5 µm**
- **Surface Area** : **200 m^2/g**
- **Pore Size** : **200 Å (20 nm)**
- **Pore Volume** : **1.00 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Complete**
- **Carbon Loading** : **9.0 %**
- **USP Code** : **L1**
- **pH Range** : **1.0~10.0**

As shown in figure 1, InertSustainSwift C18 maintains the same extreme inertness , wide pH range and provide rapid separations with symmetric peaks. The optimization of surface area, pore size and chemical bonding delivers superior peak shapes (Figure 2). Figure 3 proves InertSustainSwift C18 is also ideal for LC/MS/MS applications which offer highly sensitive results and enables MS compatible buffers to be used due to the extremely inert silica gel.

Figure 1 : Comparison of Retentivity



InertSustainSwift C18 (1.9 µm)

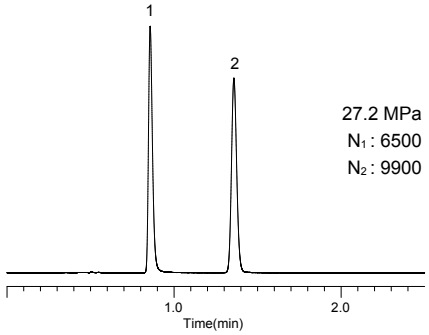


InertSustain C18 (2 µm)

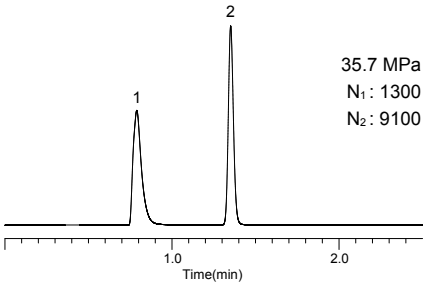
Conditions

Column Size	:	50 × 2.1 mm I.D.
Eluent	:	A) CH_3OH
		B) H_2O
		A/B = 80/20, v/v
Flow Rate	:	0.2 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample	:	1. Uracil
		2. Toluene
		3. Ethylbenzene
		4. Propylbenzene
		5. n-Butylbenzene
		6. n-Amylbenzene

Figure 2 : Comparison of Efficiency



InertSustainSwift C18 (1.9 µm)

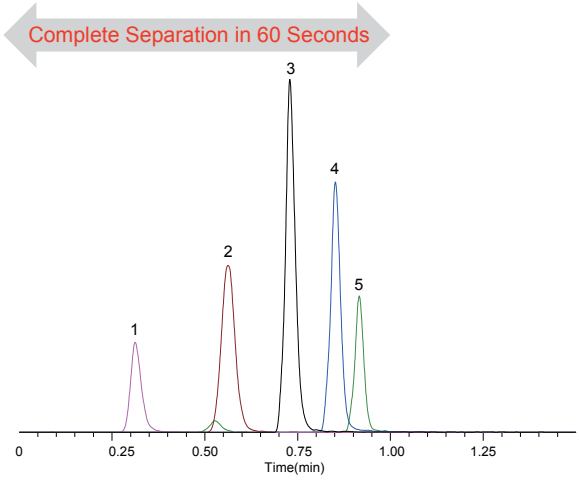


Acguity BEH C18 (1.7 µm)

Conditions

Column Size	:	50 × 2.1 mm I.D.
Eluent	:	A) CH_3OH
		B) H_2O
		A/B = 30/70, v/v
Flow Rate	:	0.4 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample	:	1. Pyridine
		2. Phenol

Figure 3 : Rapid LC/MS/MS Analysis of Basic Drugs



Conditions

Column	:	InertSustainSwift C18(1.9 µm, 50 × 2.1 mm I.D.)
Eluent	:	A) 10 mM Ammonium Formate in H_2O
		B) 10 mM Ammonium Formate in CH_3OH
		A/B = 70/30 – 0.3 min - 40/60 – 0.5 min
		- 0/100 – 0.1 min – 0/100 – 0.01 min -70/30- 0.5 min - 70/30 ,v/v
Flow Rate	:	0.6 mL/min
Col. Temp.	:	40 °C
Detection	:	LC/MS/MS (ESI, Positive, MRM)
Sample	:	1. Acebutolol
		2. Atenolol
		3. Labetalol
		4. Nadolol
		5. Pindolol

Analytical Columns

	Length / I.D. (mm)	2.1	3.0	
Particle Size: 1.9 µm	50	5020-88228	5020-88233	
	100	5020-88230	5020-88235	
	150	5020-88231	5020-88236	
HP Series Particle Size: 3 µm Max. Operating Pressure : 50 MPa (500 Bar)	Length / I.D. (mm)	2.1	3.0	4.6
	50	5020-88210	5020-88216	5020-88222
	100	5020-88212	5020-88218	5020-88224
	150	5020-88213	5020-88219	5020-88225
	250	5020-88214	5020-88220	5020-88226

* End-fittings are 1/16" Parker style.
* For maximum operating pressure information, please refer to page 46.

	Length / I.D. (mm)	1.0	1.5		
	30	5020-88160	5020-88166		
	50	5020-88161	5020-88167		
	75	5020-88162	5020-88168		
	100	5020-88163	5020-88169		
	150	5020-88164	5020-88170		
	250	5020-88165	5020-88171		
Particle Size: 3 µm	Length / I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-88124	5020-88131	5020-88138	5020-88145
	50	5020-88125	5020-88132	5020-88139	5020-88146
	75	5020-88126	5020-88133	5020-88140	5020-88147
	100	5020-88127	5020-88134	5020-88141	5020-88148
	125	5020-88253	5020-88254	5020-88255	5020-88256
	150	5020-88128	5020-88135	5020-88142	5020-88149
	250	5020-88129	5020-88136	5020-88143	5020-88150
	Length / I.D. (mm)	1.0	1.5		
	30	5020-88038	5020-88044		
	50	5020-88039	5020-88045		
	75	5020-88040	5020-88046		
	100	5020-88041	5020-88047		
	150	5020-88042	5020-88048		
	250	5020-88043	5020-88049		
Particle Size: 5 µm	Length / I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-88001	5020-88008	5020-88015	5020-88022
	50	5020-88002	5020-88009	5020-88016	5020-88023
	75	5020-88003	5020-88010	5020-88017	5020-88024
	100	5020-88004	5020-88011	5020-88018	5020-88025
	125	5020-88249	5020-88250	5020-88251	5020-88252
	150	5020-88005	5020-88012	5020-88019	5020-88026
	250	5020-88006	5020-88013	5020-88020	5020-88027

* End-fittings are 1/16" Parker style.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-88199	5020-88105	5020-88200	5020-88106
1.5, 2.1		1.5	5020-88201	5020-88107	5020-88202	5020-88108
2.1, 3.0		3.0	5020-88197	5020-88103	5020-88198	5020-88104
4.0, 4.6		4.0	5020-88195	5020-88101	5020-88196	5020-88102
2.1, 3.0	20	3.0	5020-88205	5020-88111	5020-88206	5020-88112
4.0, 4.6		4.0	5020-88203	5020-88109	5020-88204	5020-88110
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.