

AN HPLC COLUMN

InertSustain™ C18

Inertsil continues to evolve to InertSustain...



Physical Properties

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

Inertness and Durability combined in a new HPLC column

InertSustain™ C18

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.

1st Stage [Synthesis of Evolved Surface Silica]



InertSustain C18 features Unmatched Inertness and Durability

2nd Stage

Radically New Silica Gel

It is not possible to end-cap 100 % of residual silanols using traditional chemical modification procedures.

GL Sciences studied the possibility of developing a radically new type of silica, a silica that would provide both high inertness (base deactivation) and durability at a wide range of pH.

1st Stage [Synthesis of “Evolved Surface Silica”]

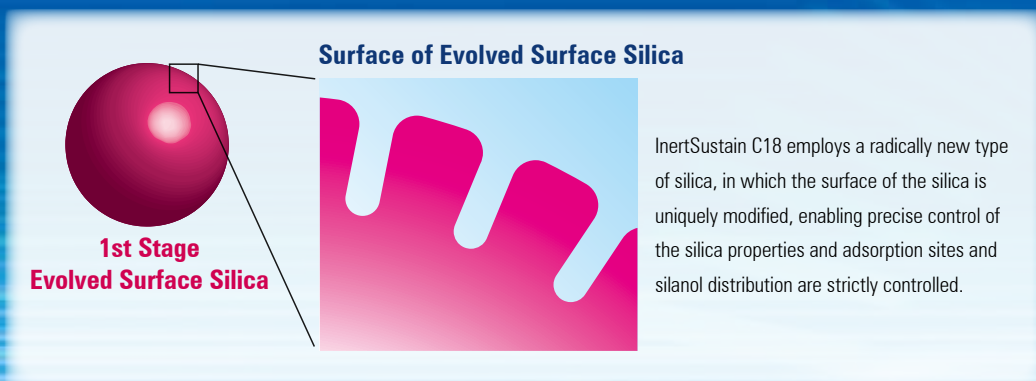
As the adsorption sites and silanol distribution are strictly controlled from the synthesis procedure of the Evolved Surface Silica, InertSustain C18 delivers unmatched inertness to virtually any type of analyte with high durability to acidic, basic mobile phase conditions.

2nd Stage [Chemical Bonding of ODS group]

The introduction of Evolved Surface Silica and our cutting-edge chemical bonding technology make InertSustain C18 compatible with 100 % aqueous mobile phases, while maintaining strong non-polar retentivity.

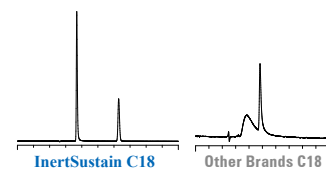
3rd Stage [Complete End-capping]

GL Sciences' complete end-capping technology allows InertSustain C18 to provide high efficiency and superior peak shape even to those well-known strong adsorptive analytes.



BENEFITS

- ① Introducing a Radically New Type of Silica**
 The introduction of Evolved Surface Silica leads to efficient method development at a wide range of pH, creating the possibility of unique selectivity changes.
- ② Superior Peak Shape with Better Resolution**
 As the adsorption sites and silanol distribution are strictly controlled on the Evolved Surface Silica, InertSustain C18 delivers highly stable chromatograms for qualitative and quantitative analysis for all compounds.
- ③ Wide pH Compatibility and High Durability**
 InertSustain C18 is highly durable to acidic and basic mobile phases and can endure from pH 1 to 10. Some samples require high pH for dissolution or to maintain stability. InertSustain C18 would be the first choice column for such applications.
- ④ Strict Quality Control Program results in High Reproducibility**
 Since the entire manufacturing process is under the control of our factory in Japan, reliable and consistent performance from column to column and lot to lot can be stably supplied.
- ⑤ Unmatched Operating Back Pressure**
 Due to the low operating back pressure that InertSustain C18 offers, it can still deliver low pressure even using high-viscosity solvents.



Quality and Performance of InertSustain™

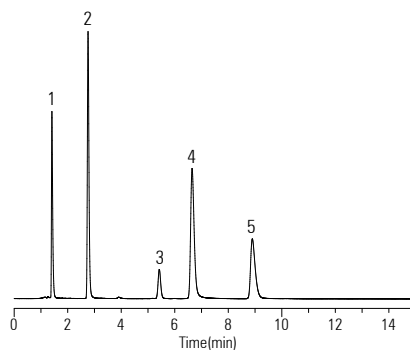
Tailing of peaks or adsorption of peaks can be experienced when a column has residual adsorption sites. Such phenomenon would not be observed on InertSustain as the silanols are completely end-capped, having a neutral silica surface.

To maintain precise product reproducibility, strict chromatographic tests for inertness, durability, theoretical plates and reproducibility of retention time are employed.

Basic Compound

Berberine chloride and Dextromethorphan is a strong basic compound. Severe tailing can be confirmed when the packing material contains residual silanol groups.

As shown on the right, InertSustain delivers highly stable chromatograms for qualitative and quantitative analysis.

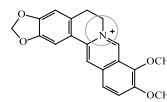


InertSustain C18

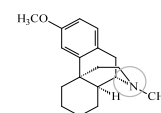
Conditions

Column Size : 3 μ m 150 \times 2.1 mm I.D.
 Eluent : CH₃CN / 25 mM KH₂PO₄ (pH 7.0, K₂HPO₄) = 30 / 70, v/v
 Flow Rate : 0.2 mL / min
 Col. Temp. : 40 °C
 Detection : UV 230 nm

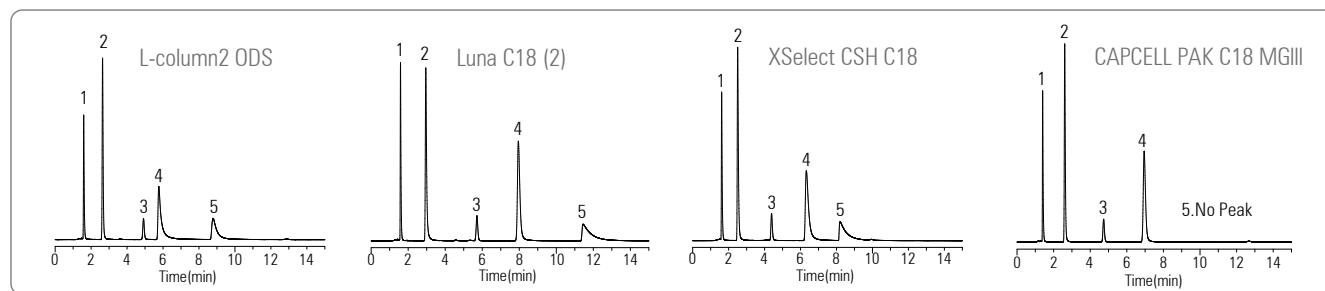
Sample:
 1.Uracil
 2.Pyridine
 3.Phenol
 4.Berberine chloride
 5.Dextromethorphan



Berberine chloride

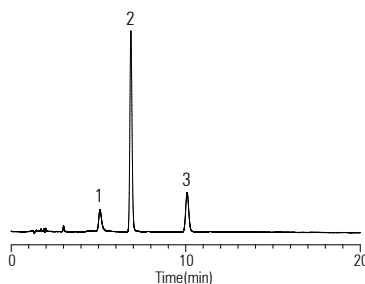


Dextromethorphan



Acidic Compound

Tailing will be observed on Brilliant Blue FCF and Salicylic acid when the surface of the packing material is basic. InertSustain provides superior peak shape as it has a neutral silica surface.

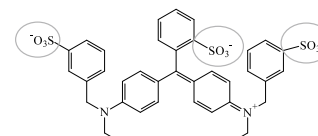


InertSustain C18

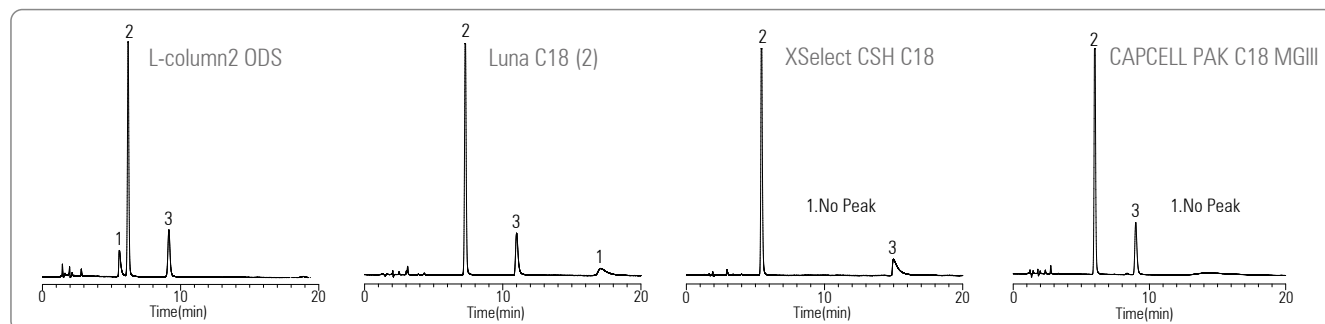
Conditions

Column Size : 3 μ m 150 \times 2.1 mm I.D.
 Eluent : CH₃CN / 0.1 % H₃PO₄ = 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



Brilliant Blue FCF



Wide pH compatibility with Long Column Lifetime

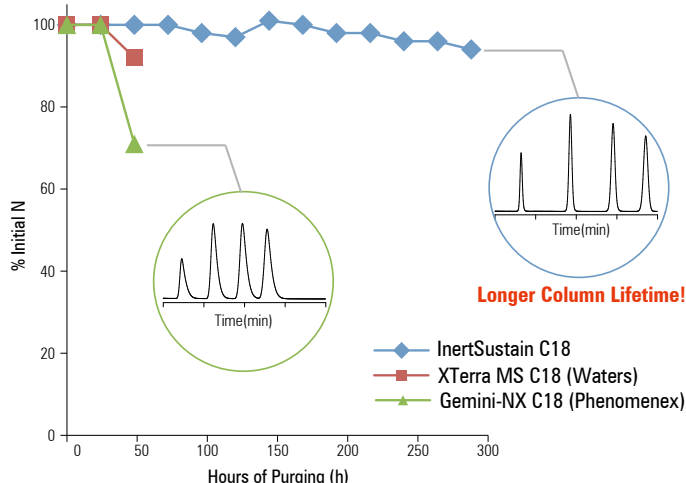
As shown in the experiment on the right, due to the introduction of Evolved Surface Silica, InertSustain C18 maintained high efficiency and peak shape for 300 hours while other “wide pH” column brands failed.

○Purging Conditions

Column size : 5 μm, 150 × 4.6 mm I.D.
 Eluent : 50 mM Triethylamine (pH10.0) / CH₃OH = 70 / 30, v/v
 Flow Rate : 1.0 mL / min
 Col. Temp. : 50 °C

○Analytical Conditions

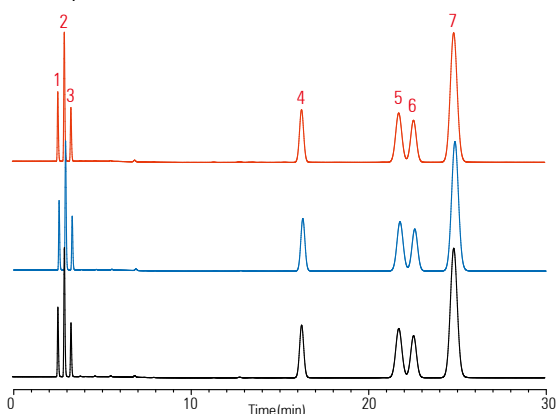
Eluent : CH₃CN / H₂O = 65 / 35, v/v
 Flow Rate : 1.0 mL / min
 Col. Temp. : 40 °C
 Detection : UV 254 nm
 Sample : Naphthalene



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.

Selectivity Test

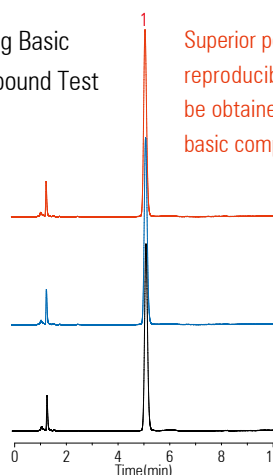


Conditions

Column : InertSustain C18 (5 μm, 250 × 4.6 mm I.D.)
 Eluent : CH₃OH / H₂O = 80 / 20, v/v
 Flow Rate : 0.3 mL / min
 Col. Temp. : 40 °C
 Detection : UV 254 nm

Sample:
 1. Uracil 2. Caffeine 3. Phenol
 4. Butylbenzene 5. o-Terphenyl
 6. Amylbenzene 7. Triphenylene

Strong Basic Compound Test



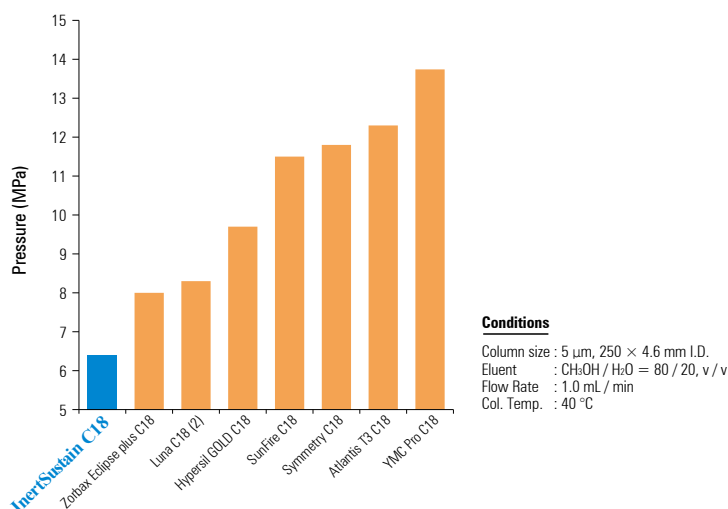
Superior peak shape with highly reproducible chromatograms can be obtained even for those strong basic compounds.

Conditions

Column : InertSustain C18 (5 μm, 250 × 4.6 mm I.D.)
 Eluent : CH₃CN / 25 mM KH₂PO₄ (pH 7.0, K₂HPO₄) = 40 / 60, v/v
 Flow Rate : 1.0 mL / min
 Col. Temp. : 40 °C
 Detection : UV 220 nm
 Sample : 1. Dextromethorphan

Extremely Low Operating Back Pressure

Due to the introduction of Evolved Surface Silica, InertSustain C18 offers a significantly lower operating back pressure without sacrificing efficiency. As shown on the right, InertSustain C18 produces the lowest back pressure than other brands columns in the industry.

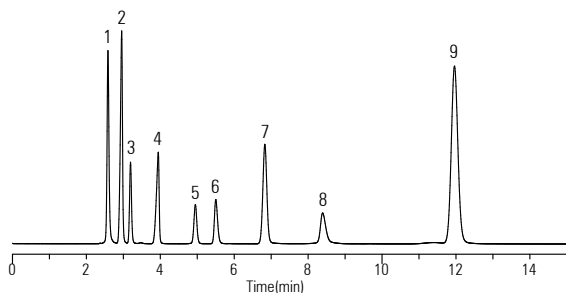


Conditions

Column size : 5 μm, 250 × 4.6 mm I.D.
 Eluent : CH₃OH / H₂O = 80 / 20, v/v
 Flow Rate : 1.0 mL / min
 Col. Temp. : 40 °C

Applications

Organic Acids Compatible with 100 % aqueous mobile phases



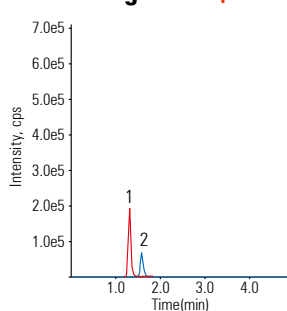
Conditions

System : GL-7400 HPLC system
 Column : InertSustain C18 (5 μ m, 250 \times 4.6 mm I.D.)
 Eluent : 10 mM NH₄H₂PO₄ (pH 2.6, H₃PO₄)
 Flow Rate : 1.0 mL / min
 Col. Temp. : 40 °C
 Detection : UV 210 nm
 Injection Vol. : 10 μ L

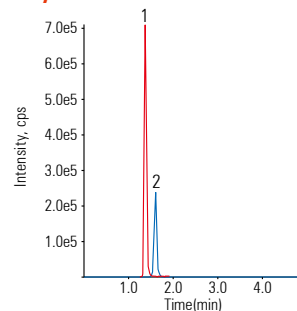
Sample:

1. Oxalic acid (100 mg / L)
 2. Tartaric acid (1000 mg / L)
 3. Glycolic acid (1000 mg / L)
 4. Malonic acid (1000 mg / L)
 5. Lactic acid (1000 mg / L)
 6. Acetic acid (1000 mg / L)
 7. Fumalic acid (10 mg / L)
 8. Succinic acid (1000 mg / L)
 9. Acrylic acid (100 mg / L)

Basic Drugs Wide pH Compatibility



1) 0.1 % HCOOH in H₂O (pH 2.5)



2) 0.1 % Ammonia solution in H₂O (pH 9.5)

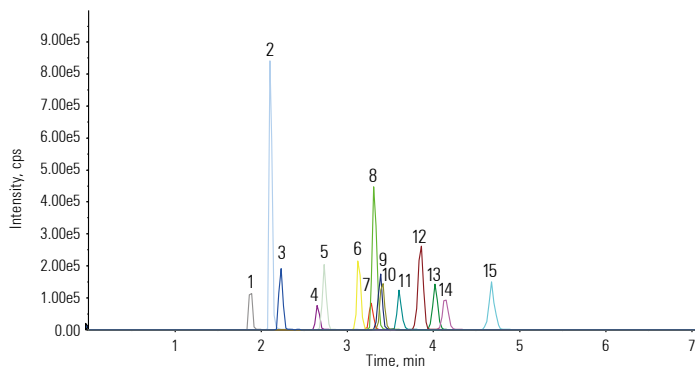
Conditions

System : LC800 HPLC system
 4000 Q TRAP®
 Column : InertSustain C18 (3 μ m, 75 \times 2.1 mm I.D.)
 Eluent : 1) CH₃CN / 0.1 % HCOOH in H₂O (pH 2.5) = 10 / 90, v / v
 2) CH₃CN / 0.1 % Ammonia solution (28 %) in H₂O (pH 9.5) = 30 / 70, v / v
 Flow Rate : 0.3 mL / min
 Col. Temp. : 40 °C
 Detection : LC / MS / MS (ESI, Positive, MRM)
 Injection Vol. : 5 μ L

Sample:

1. Ranitidine (100 ng / mL) Q1: 315.2 Q3: 315.0
 2. Sulpiride (100 ng / mL) Q1: 342.2 Q3: 112.2

Antidepressants Effective for High Sensitivity analysis by LC/MS/MS



Conditions

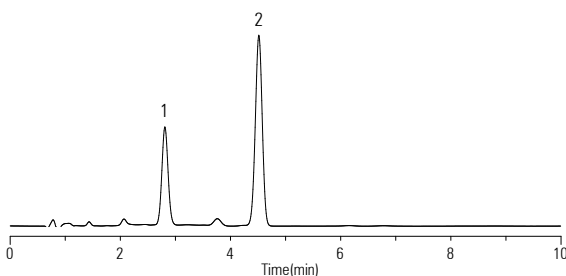
System : LC800 HPLC system
 4000 Q TRAP®
 Column : InertSustain C18 (3 μ m, 150 \times 2.1 mm I.D.)
 Eluent : A) 0.1 % HCOOH in CH₃CN
 B) 0.1 % HCOOH in H₂O
 A / B = 2 / 98 - 0.5 min - 40 / 60 - 5.5 min - 40 / 60, v / v
 Flow Rate : 0.4 mL / min
 Col. Temp. : 40 °C
 Detection : LC / MS / MS (ESI, Positive, MRM)
 Injection Vol. : 2 μ L

Sample : (Q1 / Q3) (Q1 / Q3)

1. Sulpiide (342 / 112)	9. Nortriptyline (264 / 233)
2. Milnacipran (247 / 230)	10. Maprotiline (278 / 250)
3. Trazodone (372 / 176)	11. Amitriptyline (278 / 233)
4. Amoxapine (314 / 271)	12. Trimipramine (295 / 100)
5. Doxepin (280 / 107)	13. Fluoxetine (310 / 44)
6. Desipramine (267 / 72)	14. Sertraline (306 / 275)
7. Fluvoxamine (319 / 71)	15. Clomipramine (315 / 86)
8. Imipramine (281 / 86)	(each 100 ng / mL)

Glycyrrhizins

Effective for Herbal Medicine samples



Conditions

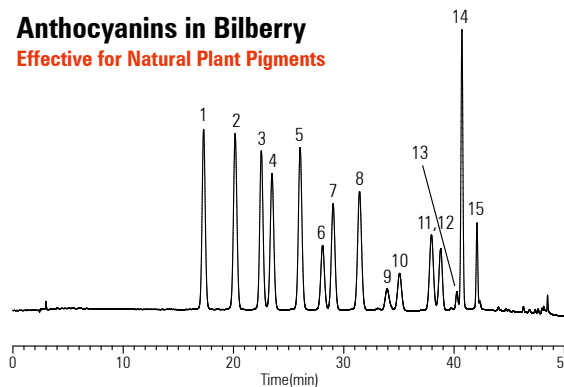
System : GL-7400 HPLC System
 Column : InertSustain C18 (5 μ m, 150 \times 4.6 mm I.D.)
 Eluent : A) CH₃CN
 B) 2.1 % CH₃COOH
 A / B = 40 / 60, v / v
 Flow Rate : 2 mL / min
 Col. Temp. : 40 °C
 Detection : UV 254 nm
 Injection Vol. : 20 μ L

Sample:

1. Glycyrrhizic acid dipotassium salt (250 mg / L)
 2. Propyl *p*-hydroxybenzoate (50 mg / L)

Anthocyanins in Bilberry

Effective for Natural Plant Pigments



Conditions

System : LC800 HPLC system
 Column : InertSustain C18 (5 μ m, 250 \times 4.6 mm I.D.)
 Eluent : A) H₂O / HCOOH = 90 / 10
 B) H₂O / CH₃CN / CH₃OH / HCOOH = 40 / 22.5 / 22.5 / 10
 A / B = 93 / 7 - 35 min - 75 / 25 - 10 min - 35 / 65 - 1 min - 0 / 100 - 4 min - 0 / 100, v / v
 Flow Rate : 1.0 mL / min
 Col. Temp. : 30 °C
 Detection : VIS 535 nm
 Injection Vol. : 10 μ L

Sample: Bilberry powder (1.25 mg/mL)

1. Delphinidin-3-O-galactoside	9. Peonidin-3-O-galactoside
2. Delphinidin-3-O-glucoside	10. Petunidin-3-O-arabinoside
3. Cyanidin-3-O-galactoside	11. Peonidin-3-O-glucoside
4. Delphinidin-3-O-arabinoside	12. Malvidin-3-O-galactoside
5. Cyanidin-3-O-glucoside	13. Peonidin-3-O-arabinoside
6. Petunidin-3-O-galactoside	14. Malvidin-3-O-glucoside
7. Cyanidin-3-O-grabinoside	15. Malvidin-3-O-arabinoside
8. Petunidin-3-O-glucoside	

Analytical Columns

Particle Size: 2 µm Max. Operating Pressure: 80 MPa (800 Bar)	I.D. (mm)	2.1	3.0		
	Length (mm)	Cat.No.	Cat.No.		
	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		
Particle Size: 3 µm Max. Operating Pressure: 20 MPa (200 Bar)	I.D. (mm)	1.0	1.5		
	Length (mm)	Cat.No.	Cat.No.		
	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		
	I.D. (mm)	2.1	3.0	4.0	4.6
	Length (mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
	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	
150	5020-07415	5020-07425	5020-07435	5020-07445	
250	5020-07416	5020-07426	5020-07436	5020-07446	
HP Series Particle Size: 3 µm Max. Operating Pressure: 50 MPa (500 Bar)	I.D. (mm)	2.1	3.0	4.6	
	Length (mm)	Cat.No.	Cat.No.	Cat.No.	
	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	
Particle Size: 5 µm Max. Operating Pressure: 20 MPa (200 Bar)	I.D. (mm)	1.0	1.5		
	Length (mm)	Cat.No.	Cat.No.		
	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		
	I.D. (mm)	2.1	3.0	4.0	4.6
	Length (mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
	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
	150	5020-07315	5020-07325	5020-07335	5020-07345
	250	5020-07316	5020-07326	5020-07336	5020-07346

Conventional Guard Columns, Cartridge Guard Columns

Diameter of the Analytical Column Applicable (mm)	Conventional Guard Column		Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set 2 Cartridge E Guard Columns and 1 Holder	
	Length (mm)	I.D. (mm)	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

Preparative Columns

	I.D. (mm)	50	100	150	250
	Length (mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
Particle Size: 5 µm	6	5020-07352	5020-07354	5020-07355	5020-07356
	7.6	5020-07362	5020-07364	5020-07365	5020-07366
	10	5020-14252	5020-14254	5020-14255	5020-14256
	14	5020-14262	5020-14264	5020-14265	5020-14266
	20	5020-14272	5020-14274	5020-14275	5020-14276

Preparative Guard Columns

	I.D. (mm) x Length (mm)	Cat.No.
Particle Size: 5 µm	6.0 × 50	5020-07357
	7.6 × 50	5020-07367
	10 × 50	5020-14257
	14 × 50	5020-14267
	20 × 50	5020-14277

* End-fittings are 1/16" Waters –compatible.

* Other column sizes available upon request.

Worldwide Ordering Information

To find your local distributor, please visit our website at

<http://www.glsciences.com/products/contact.html>

Simply select your country from the list and your local distributor information will be displayed.

* All trademarks are the property of their respective owners.

• We reserve the right to change specifications to make improvements without notice.

GL Sciences Inc.

22-1 Nishishinjuku 6-chome, Shinjuku-ku,
Tokyo 163-1130, Japan
Tel. +81-3-5323-6620 Fax. +81-3-5323-6621
<http://www.glsciences.com>
E-mail: world@glsc.co.jp



211 bis Avenue J.F. Kennedy - BP 1140
03103 Montluçon cedex - France
Hotline 33 (0)4 70 03 73 09
Tél 33 (0)4 70 03 88 55 - Fax 33 (0)4 70 03 82 60
e-mail interchrom@interchim.com

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