

# Application Specific Columns

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# Application Specific Columns

## Bioptic AV-1, AV-2

### Physical Properties

- **Silica** : Spherical shape
- **Particle Size** : 5  $\mu\text{m}$
- **Bonded Phase** : Avidin
- **Temperature Range** : 4 ~ 40 deg.C
- **pH Range** : 2 ~ 7.5
- **Max. concentration of organic solvent**  
For AV-1 ; < 20 %  
For AV-2 ; No restriction

### Feature

- Glycoprotein bonded silica
- Protein elutes as a void volume peak
- Large sample capacity
- Analysis of drug moving state

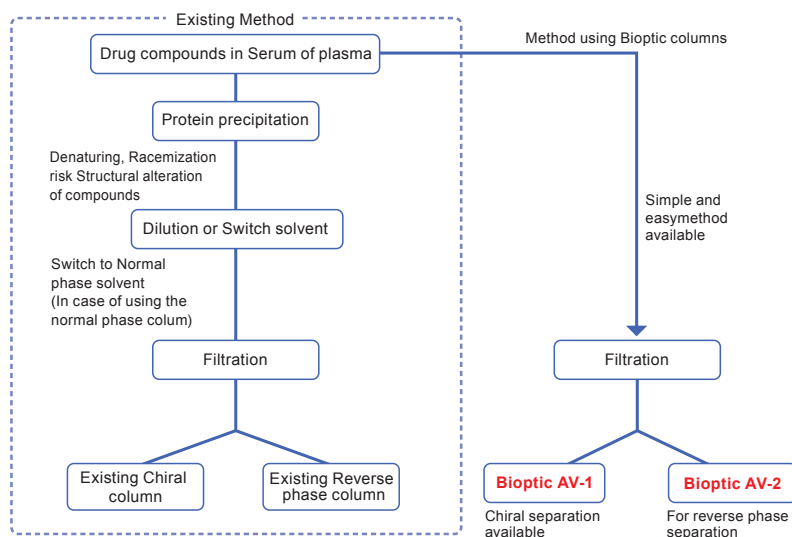
### Bioptic AV-1

- Chiral separation capability
- Chiral separation in a reversed phase mode

### Bioptic AV-2

- Compatible with high concentrations of organic solvents
- Similar retention behavior as reversed phase mode

### Simplified method by using Bioptic columns



### Analytical Columns

Particle Size: 5 $\mu\text{m}$	Length (mm)	I.D. (mm)	Bioptic AV-1	Bioptic AV-2
			Particle Size	Particle Size
			5 $\mu\text{m}$	5 $\mu\text{m}$
150	1.5	5020-18153	5020-18154	
	2.1	5020-02521	5020-02531	
	3.0	5020-02522	5020-02532	
	4.0	5020-02523	5020-02533	
	4.6	5020-02524	5020-02534	

\* 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)	Bioptic AV-1		Bioptic AV-2	
			Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size	Particle Size	Particle Size
1.5, 2.1	10	1.5	5020-19343	5020-19393	5020-19344	5020-19394
2.1, 3.0		3.0	5020-19143	5020-19193	5020-08622	5020-08623
4.0, 4.6		4.0	5020-19043	5020-19093	5020-08620	5020-08621
2.1, 3.0	20	3.0	5020-19543	5020-19593	5020-08626	5020-08627
4.0, 4.6		4.0	5020-19443	5020-19493	5020-08624	5020-08625
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.

## Inertsil® Peptides C18

### Physical Properties

- Silica : 3 Series High Purity Silica Gel
- Particle Size : 4 µm
- Surface Area : 450 m<sup>2</sup>/g
- Pore Size : 100 Å (10 nm)
- Pore Volume : 1.05 mL/g
- Bonded Phase : Octadecyl Groups
- End-capping : Yes
- Carbon Loading : 15 %
- USP Code : L1
- pH Range : 2~7.5

The whole manufacturing process; synthesis of silica gel, chemical modification, packing, quality test, is under the strict quality control. The number of theoretical plates is as many as 100,000 plates/m.

For peptide mapping, analytical result of standard peptides obtained by each lot is attached to the column. For protein analysis, Inertsil WP300 or Inertsil WP300 C8 is recommended.

### Analytical Columns

Particle Size: 4 µm	Length \ I.D. (mm)	1.0	1.5		
	50	5020-08002	5020-08012		
100	5020-08004	5020-08014			
150	5020-08005	5020-08015			
250	5020-08006	5020-08016			
Particle Size: 4 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	50	5020-08022	5020-08032	5020-08042	5020-08052
	100	5020-08024	5020-08034	5020-08044	5020-08054
	150	5020-08025	5020-08035	5020-08045	5020-08055
	250	5020-08026	5020-08036	5020-08046	5020-08056

\* 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
			4 µm	4 µm
1.0	10	1.0	5020-19211	5020-19261
1.5, 2.1		1.5	5020-19311	5020-19361
2.1, 3.0		3.0	5020-19111	5020-19161
4.0, 4.6		4.0	5020-19011	5020-19061
2.1, 3.0	20	3.0	5020-19511	5020-19561
4.0, 4.6		4.0	5020-19411	5020-19461
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.

## Inertsil® Acrolein C18

### Physical Properties

- Silica : 3 Series High Purity Silica Gel
- Particle Size : 5 µm
- Surface Area : 450 m<sup>2</sup>/g
- Pore Size : 100 Å (10 nm)
- Pore Volume : 1.05 mL/g
- Bonded Phase : Octadecyl Groups
- End-capping : Yes
- Carbon Loading : 9 %
- USP Code : L1
- pH Range : 2~7.5

Inertsil Acrolein offers rapid separation of DNPH-Acetone and DNPH-Acrolein under a general mobile phase condition such as Acetonitrile / Water.

### Analytical Columns

Particle Size: 5 µm	Length(mm)	I.D.(mm)	Cat.No.
	250	4.6	5020-18051

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

\* For maximum operating pressure information, please refer to page 46.

# Application Specific Columns

## InertSphere™ Sugar-1

### Physical Properties

- **Silica** : Styrene Divinylbenzene copolymerization
- **Particle size** : 5 µm
- **Exchange capacity** : 0.7 meq/g
- **Organic solvent resist** : 0 ~ 100 % ( Methanol only )
- **Bonded Phase** : Quaternary Alkylamine
- **pH Range** : 2~14

InertSphere Sugar-1 is a suitable anion-exchange column for sugar analysis. It is packed quaternary ammonium group binding polymer. High sensitivity sugar analysis is available using an electrochemical detector ED723. Especially InertSphere Sugar-1 is suitable for Monosaccharide and Disaccharide analysis.

Note ; Solvent Bottle with CO<sub>2</sub> Trap Cartridge is necessary for analysis to avoid dissolving carbonate ion in the solvent. The Solvent Bottle CO<sub>2</sub> Trap Cartridge contains hazardous material which requires special freight handling. Additional charges apply.

### Analytical Columns

Particle Size: 5µm	Length(mm)	I.D.(mm)	Cat.No.
	150	4.6	5020-11001

\* 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)
			Cat.No.	Cat.No.
4.6	10	4.0	5020-19048	5020-19098

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

\* For maximum operating pressure information, please refer to page 46.



## Inertsil® Sulfa C18

### Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area**: 450 m<sup>2</sup>/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl
- **End-capping** : Yes
- **Carbon Loading** : 15 %
- **USP Code** : L1

As drug residues in food has become a major problem today, developing analytical methods of synthetic bacterial drugs including Sulfa drugs is important. Inertsil Sulfa C18 is a superb ODS column designed for analysis of sulfa drugs.

Each lot of Inertsil Sulfa C18 is tested for the effective separation of sulfa drugs and will be delivered to you with its analytical data.

### Analytical Columns

Particle Size: 3 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	100	5020-07504	5020-07514	5020-07524	5020-07534
150	5020-07505	5020-07515	5020-07525	5020-07535	
Particle Size: 5 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	150	5020-07545	5020-07555	5020-07565	5020-07575
	250	5020-07546	5020-07556	5020-07566	5020-07576

\* 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
2.1, 3.0	10	3.0	5020-19113	5020-19112	5020-19163	5020-19162
4.0, 4.6		4.0	5020-19013	5020-19012	5020-19063	5020-19062
2.1, 3.0	20	3.0	5020-19513	5020-19512	5020-19563	5020-19562
4.0, 4.6		4.0	5020-19413	5020-19412	5020-19463	5020-19462
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.

## Inertsil® AS

### Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 5 µm
- **Surface Area**: 450 m<sup>2</sup>/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl
- **End-capping** : Yes
- **Carbon Loading** : 15 %
- **USP Code** : L1

Inertsil AS is for analysis of Arsenic compounds which are Toxic compounds in environment water. As an Arsenic speciation analysis column, simultaneous analysis of Arsenic compounds is available with HPLC/ICP-MS.

### Analytical Columns

Particle Size: 3 µm	Length \ I.D. (mm)	2.1
	150	5020-18030
	250	5020-18032

\* 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)	
			Cat.No.		Cat.No.	
			2.1	10	1.5	5020-18031
4.6	4.0	5020-18041	5020-18045			
Holder for Cartridge Guard Column E			For 10 mm Length		5020-08500	

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

\* For maximum operating pressure information, please refer to page 46.

# Corresponding Pharmacopeia (JP, USP, EP)

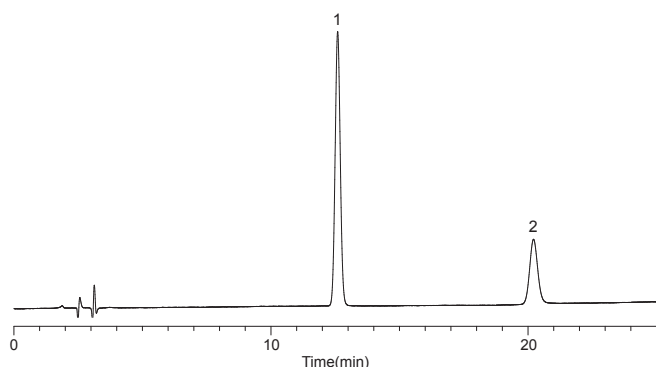
GL Sciences offers various particle sizes and lengths corresponding to Japanese Pharmacopeias (JP), US Pharmacopeias (USP) or European Pharmacopeias (EP).

## 5 µm Particle Size HPLC Columns

Packing material	Column I.D.	Column length	Description	Cat. No.		
C18(ODS)	3.9 mm	150 mm	InertSustain C18	5020-87030		
			Inertsil ODS-4	5020-87023		
			Inertsil ODS-3	5020-87008		
			Inertsil WP300 C18	5020-87045		
		300 mm	InertSustain C18	5020-87031		
			Inertsil ODS-4	5020-87024		
	4.0 mm	125 mm	Inertsil ODS-3	5020-87009		
			InertSustainSwift C18	5020-88251		
			Inertsil WP300 C18	5020-87037		
		300 mm	InertSustain C18	5020-87032		
			Inertsil ODS-4	5020-87025		
			Inertsil ODS-3	5020-87010		
4.6 mm	300 mm	InertSustain C18	5020-87033			
		Inertsil ODS-4	5020-87026			
		Inertsil ODS-3	5020-87011			
C8	3.0 mm	60 mm	Inertsil C8	5020-87000		
	3.9 mm	150 mm	InertSustain C8	5020-87028		
			Inertsil C8-4	5020-87021		
			Inertsil C8-3	5020-87005		
			Inertsil WP300 C8	5020-87046		
	4.0 mm	80 mm	InertSustain C8	5020-87029		
			Inertsil C8-4	5020-87022		
			Inertsil C8-3	5020-87006		
		125 mm	Inertsil C8	5020-87001		
			Pre-column	4.0 mm	25 mm	InertSustain C18
InertSustain C8						5020-87040

\* Please contact us for other sizes of columns.

Figure 1 : Crospovidone

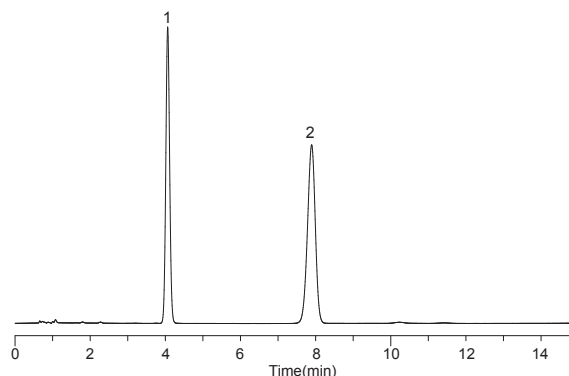


### Conditions

Column : InertSustain C18 (5 µm, 250 × 4.0 mm I.D.)  
 Guard Column : InertSustain C18 (5 µm, 25 × 4.0 mm I.D.)  
 Eluent : A) CH<sub>3</sub>CN  
 B) H<sub>2</sub>O  
 A/B = 1/9, v/v  
 Flow Rate : 1.0 mL/min  
 Col. Temp. : 40 °C  
 Detection : UV 235 nm  
 Injection Vol. : 50 µL  
 Data Source : LC InertSearch No. LB167

Sample :  
 1. 1-Vinyl-2-pyrrolidone  
 2. Vinyl acetate

Figure 2 : Clopidogrel sulfate



### Conditions

Column : InertSustain C18 (5 µm, 150 × 3.9 mm I.D.)  
 Eluent : A) 0.87 g/L IPCC-05 in H<sub>2</sub>O (pH 2.5, H<sub>3</sub>PO<sub>4</sub>)  
 /CH<sub>3</sub>OH = 19/1, v/v (IPCC-05: Sodium 1- Pentanesulfonate)  
 B) CH<sub>3</sub>CN/CH<sub>3</sub>OH = 19/1, v/v  
 A/B = 60/40, v/v  
 Flow Rate : 1.5 mL/min  
 Col. Temp. : 30 °C  
 Detection : UV 220 nm  
 Injection Vol. : 10 µL  
 Data Source : LC InertSearch No. LB161

Sample :  
 1. p-Hydroxybenzoic acid iso-propyl ester  
 (133 mg/L)  
 2. Clopidogrel sulfate (132 mg/L)

7  $\mu\text{m}$  Particle Size HPLC Columns

Packing material	Column I.D.	Column length	Description	Cat. No.
C18(ODS)	4.0 mm	250 mm	Inertsil ODS-3	5020-87012
		300 mm	Inertsil ODS-3	5020-87013
	4.6 mm	120 mm	Inertsil ODS-3	5020-87041
		125 mm	Inertsil ODS-3	5020-87038
		250 mm	Inertsil ODS-3	5020-87014
		300 mm	Inertsil ODS-3	5020-87015
NH2	4.6 mm	125 mm	Inertsil NH2	5020-87044

10  $\mu\text{m}$  Particle Size HPLC Columns

Packing material	Column I.D.	Column length	Description	Cat. No.
C18(ODS)	3.9 mm	300 mm	Inertsil ODS-3	5020-87016
			Inertsil ODS	5020-87002
	4.0 mm	150 mm	Inertsil ODS-3	5020-87017
			Inertsil ODS-3	5020-87018
			Inertsil ODS-3	5020-87019
			Inertsil ODS	5020-87003
	4.6 mm	300 mm	Inertsil ODS-3	5020-87020
			Inertsil ODS	5020-87004
			Inertsil ODS	5020-87004

## Other ODS(C18)Columns

Packing material	Column I.D.	Column length	Description	Cat. No.
3 $\mu\text{m}$	4.6 mm	33 mm	Inertsil ODS-SP	5020-87035
3.5 $\mu\text{m}$	3.0 mm	150 mm	Inertsil WP300 C18	5020-87034
4 $\mu\text{m}$	3.9 mm	150 mm	Inertsil ODS-3	5020-87007

\* Please contact us for other sizes of columns.

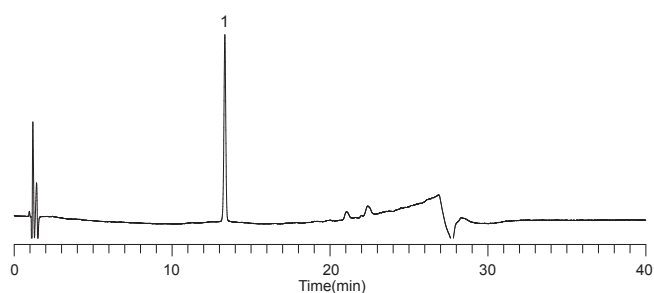
Pharmacopeias applications are available on page 137~138.

Also many other applications are available at InertSearch and Technical Note on our website.

InertSearch..... <http://www.glsciences.com/tech/inertsearch/>

LC Technical Note..... [http://www.glsciences.com/tech/lc\\_technicalnote/](http://www.glsciences.com/tech/lc_technicalnote/)

Figure 3 : Telmisartan



## Conditions

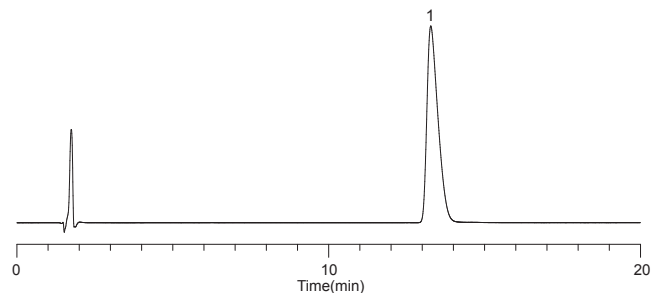
Column : Inertsil ODS-SP (5  $\mu\text{m}$ , 125  $\times$  4.0 mm I.D.)  
 Eluent : A) CH<sub>3</sub>CN/CH<sub>3</sub>OH = 4/1, v/v  
 B) 2.0 g/L KH<sub>2</sub>PO<sub>4</sub> + 3.4 g/L IPCC-05 (pH 3.0, 10 % H<sub>3</sub>PO<sub>4</sub> in H<sub>2</sub>O)  
 (IPCC-05: Sodium 1-Pentanesulfonate)  
 A/B = 30/70 - 25 min - 80/20, v/v

Flow Rate : 1.0 mL/min  
 Col. Temp. : 40 °C  
 Detection : UV 230 nm

Injection Vol. : 2  $\mu\text{L}$   
 Data Source : LC InertSearch No. LB163

Sample :  
 1. Telmisartan

Figure 4 : Risperidone



## Conditions

Column : Inertsil WP300 C18 (3.5  $\mu\text{m}$ , 150  $\times$  3.0 mm I.D.)  
 Eluent : A) CH<sub>3</sub>CN  
 B) H<sub>2</sub>O  
 C) THF  
 A/B = 200/800/1.5, v/v/v (pH 3.0, 28 % NH<sub>4</sub> Solution)

Flow Rate : 0.55 mL/min  
 Col. Temp. : 25 °C  
 Detection : UV 275 nm

Injection Vol. : 10  $\mu\text{L}$   
 Data Source : LC InertSearch No. LB125

Sample :  
 1. Risperidone(100 mg/L)

# Corresponding SFC

Mainly supercritical CO<sub>2</sub> is used as mobile phase in SFC (Supercritical Fluid Chromatography). It is said suitable for high speed analysis because of lower viscosity than the general HPLC mobile phase and fast diffusion speed is fast in mobile phase. It is exceptional method for preparative and purification purpose because almost mobile phase is volatilized when back to normal pressure.

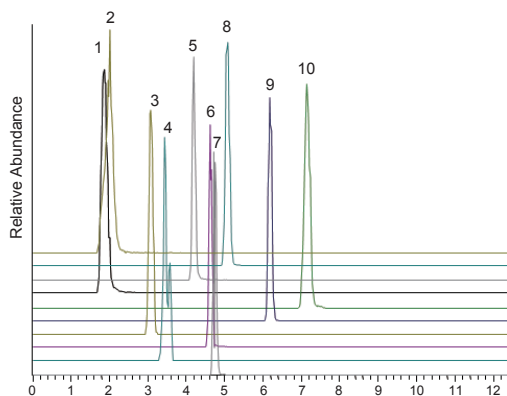
InertSustain and Inertsil series columns are available for SFC analysis.

The packing materials are the same as HPLC columns but they are packed in stainless tubes which correspond to SFC.

Various packing materials are available, and then utilize for expand the SFC application range.

## Example of SFC/MS Analysis

Ten(10) kinds of pesticides are analyzed with Inertsil ODS-EP which contains a polar group embedded between the silica surface and Octadecyl group (C18) as the below. The separation patterns are different from polar group chemical bonded column like mainly used on SFC.



### Conditions

Column Size : Inertsil ODS-EP (5 µm, 250 × 4.6 mm I.D.)  
Eluent : A) Supercritical carbon dioxide  
          B) 0.1 % ammonium formate in methanol  
          A/B = 95/5 - 1 min - 95/5 - 2 min - 90/10 - 10 min - 80/20  
Flow Rate : 3 mL/min  
Col. Temp. : 35 °C  
Injection vol. : 5 µL  
Back Pressure : 10 MPa

### Sample:

1. Methamidophos	6. Chlorfluazuron
2. Acetamiprid	7. Acequinocyl
3. Carbendazim	8. Pyridaben
4. Dimethirimol	9. Cypermethrin
5. Emamectin benzoate (B1a)	10. Etofenprox

This data is provided by Prof. Dr. Akio Baba.

## About packing materials

InertSustain and Inertsil series are available. Please contact us the details.

\* Inspected with HPLC only, not with SFC.

## Sizes

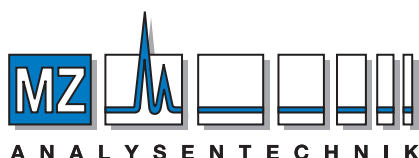
The following four(4) sizes are available as standard SFC columns.

Please describe the packing materials when you order.

Description	Cat.No.
Corresponding SFC column 5 µm, 2.1 × 150 mm	5020-01007
Corresponding SFC column 5 µm, 4.6 × 250 mm	5020-01006
Corresponding SFC column 5 µm, 10 × 250 mm	5020-01008
Corresponding SFC column 5 µm, 20 × 250 mm	5020-01009

\* Maximum operating column pressures are 28 MPa on 2.1 × 150 mm and 25 MPa on 4.6 × 250 mm.

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



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