

High Purified Silica Gel Based HPLC Column

**Mightysil** GPII/GP/MS/Aqua



Kanto Reagents



## Mightysil Columns for HPLC

In HPLC Analysis, ODS is an ordinal choice for many purpose and a C8 and C4 with lower hydrophobicity is also used for some application. HPLC column Mightysil series, has variety modified gel and will help your column choice within wide range of packing sorbents. Particularly GP series, you will accomplish any analysis aims of it's highly end-capping of residual silanols of bare silicagel.

### -Reversed Phase-

Mightysil RP-18GP II	ODS with di-functional octadecyl sililation. Excellent durability for acidic or basic eluent achieved by fully optimized endcapping and di-functional modification of silicagel. In some case, stereoselectivity will different from monofunctional ODS.
Mightysil RP-18GP	High performance, conventional column with monofunctional ODS, you will achieve highly cost performance with GP series.
Mightysil RP-18MS (For LC/MS)	Improved reliably for LC/MS by optimized endcapping, you will achieve lower back pressure, while maintaining high theoretical plates. Moreover, elution of residual silylation agent is drastically reduced, the damage for MS detector is distinctly lowered.
Mightysil RP-18GP Aqua	ODS stable retention is achieved with up to 100% water-based eluents. For analysis with high polarity eluent, such as separation of samples with high hydrophilicity.
Mightysil RP-8GP Mightysil RP-4GP	Highly purified spherical silica gel modified with the octyl group and butyl group. You will achieve more retention for substances with a high hydrophobicity samples.

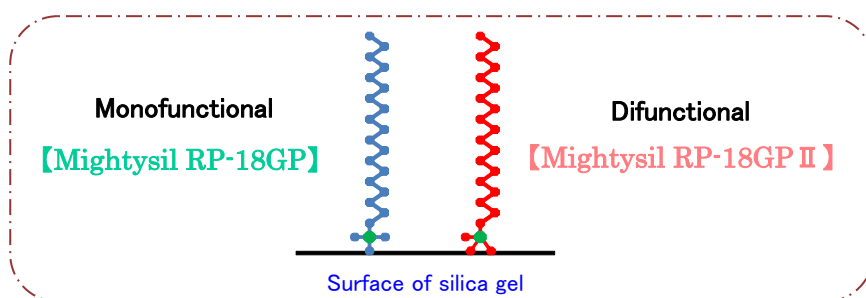
Name	Particle Size (μm)	Pore Size (nm)	Specific Surface Area (m <sup>2</sup> /g)	Modification Group	Carbon Content	Modification
Mightysil RP-18GP II	5	14	270	C18	15%	Difunctional
Mightysil RP-18GP	3, 5	12.5	330	C18	19%	Monofunctional
Mightysil RP-18MS	5	12.5	330	C18	18%	Monofunctional
Mightysil RP-18GP Aqua	3, 5	13.5	270	C18	15%	Monofunctional
Mightysil RP-8GP	5	12.5	330	C8	12%	Monofunctional
Mightysil RP-4GP	5	12.5	330	C4	4%	Monofunctional

### - Normal Phase -

Mightysil NH <sub>2</sub>	Monomeric modified aminopropylsilyl to high purity silicagel. Aminopropyl is often used in the analysis of the saccharide in particular, but is also applied as the weak anion exchange phase and the reverse phase separation which used specific selectivity.
Mightysil Si60	99.99% over high purity silica gels pore size 60 Å for normal phase separation.

Name	Particle Size (μm)	Pore Size (nm)	Specific Surface Area (m <sup>2</sup> /g)	Modification Group	Carbon Content	Modification Type
Mightysil NH <sub>2</sub>	5	7	525	NH <sub>2</sub>	-	Monofunctional
Mightysil Si60	5	6	525	-	-	-

### Figure of modification: Mightysil RP-18GP · GP II



In case of di-functional stationary phase, the functional group is bonding with silanol by retio about 1:2. Therefore the hydrolysis can be suppressed even under acidic conditions, and chemical stability improves compared with a monofunctional ODS silica gel. With Mightysil RP-18 GP II, more stable separation can be achieved under acidic eluents.

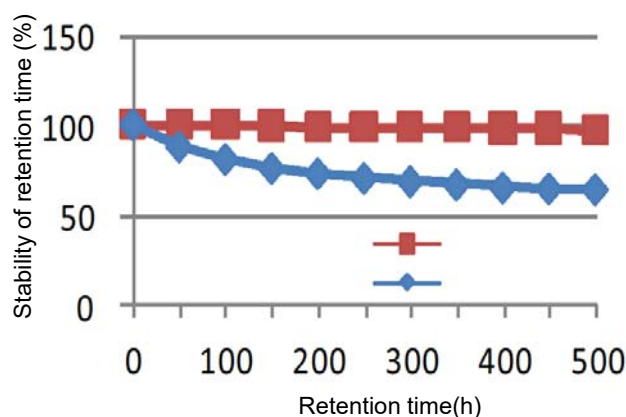
# Mightysil RP-18 GP II

## Difunctional ODS silica gel

Mightysil GP II is highly inert ODS stationary phase because of not only di-functional bonding to 2 silanols but also optimized new end-capping methodology which deactivate the residual silanol groups. Thus peak tailing is suppressed to a minimum and you will achieve the highest sensitivity of any samples. Moreover, excellent durability will be accomplished in use of acid-like eluent for its excellent inertness of stationary phase.

### Excellent durability

Generally, ODS stationary phase is hydrolyzed by acid, like a trifluoroacetic acid (TFA) solution, and deteriorates the column performance irreversibly. Compared with the monofunctional ODS silica gel, "Mightysil RP-18 GP II" demonstrates excellent durability even under acidic eluents and stable retention times can be obtained. This is declare that "Mightysil RP-18 GP II" is also suitable for LC/MS application which often use acidic eluent containing TFA, Formic acid, etc.



After a **0.5%** TFA solution was supplied to the column for sufficient replacement, the column was sealed and left for a predetermined time at a **room temperature of 15 to 20 °C**.

After a predetermined time, the retention time of the anthracene was measured, and compared with the initial retention time.

Column : Mightysil RP-18GP II 150-4.6 (5μm)

Mightysil RP-18GP 150-4.6 (5μm)

Eluent : Acetonitrile/Water=75/25

Flow rate : 1.0mL/min

Temp. : 40°C

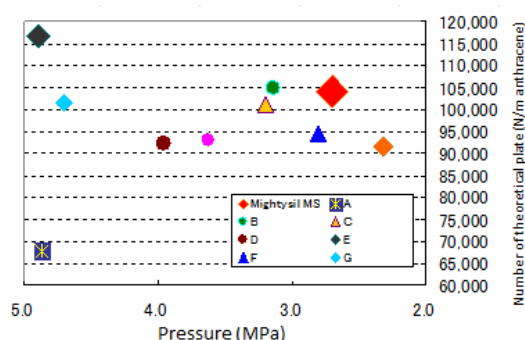
Sample : Anthracene

# Mightysil RP-18MS

## ODS column suitable for LC/MS

We suggest the HPLC column "Mightysil MS" which support becoming high sensitivity LC/MS analysis and is used reliably. We improve the conventional "Mightysil GP" series and realize lower back pressure with keeping its high resolution.

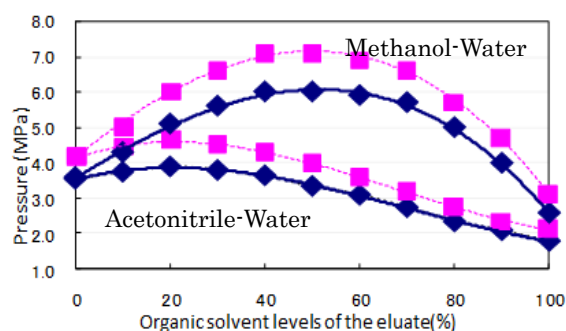
### Higher Number of theoretical plate



We succeeded in reducing 10% of column back pressure in using acetonitrile / water type compared with the GP series by improving classification accuracy of the "Mightysil GP" series. It also can be reliably used for the methanol / water type gradient analysis that cared back pressure.

It has good balance of low back pressure and high number of theoretical plates and it is possible to analyze various analysis objects efficiently.

### Lower Column back pressure



Column size: 150-4.6 (5μm)

Eluent: Acetonitrile/Water=75/25

Flow rate: 1.0mL/min

Temp. : 40°C

Detector: UV254nm

Inj. Vol.: 5 μL

Sample: Anthracene 5 μg/mL

Column: Mightysil RP-18MS 150-2 (5μm) ◆

Mightysil RP-18GP 150-2 (5μm) ■

Flow rate: 0.2mL/min

Temp.: 40°C



## Supporting in analysis validations in GLP·GMP

In Analytical validations complied with GLP and GMP, it is necessary to prove the validity of the analytical methods. Since, the physical properties and elution characteristics of the Mightysil GP series are uniform at a high level between batch to batch, it can be used reliably for any analysis not only in validate method but also daily QC procedure.

### 【Strict quality control】

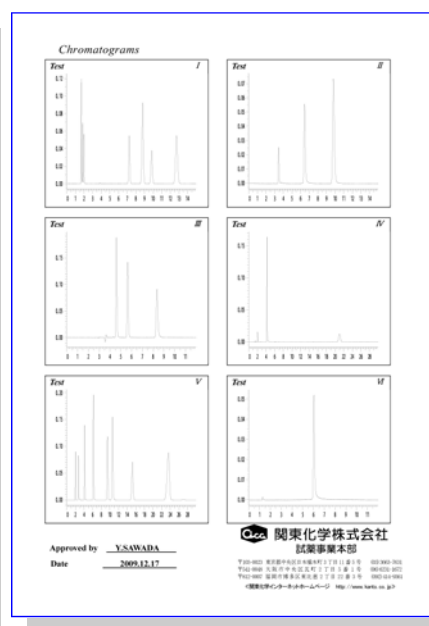
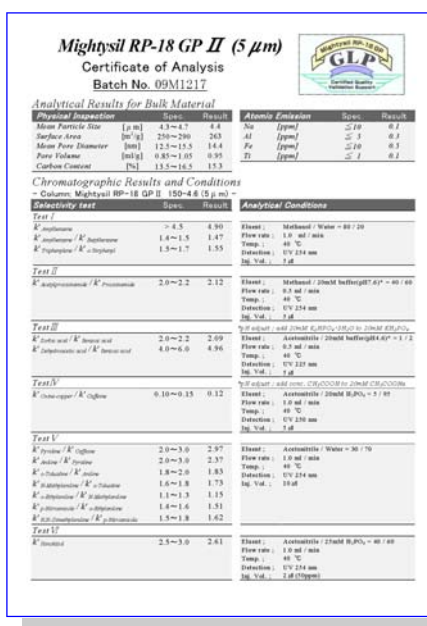
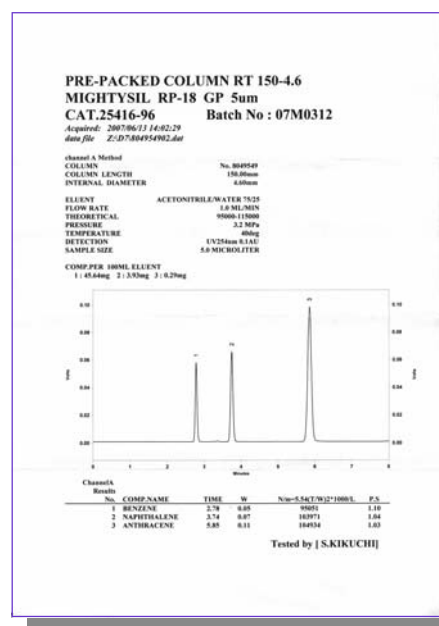
We choose appropriate QC standards to inspect the deviation of both stationary phase and column lots. Testing by many factors influence to the analysis accuracy is launched for checking the precision column filling and reproducibility of stationary phase. High reproducibility is guaranteed for each stationary phase batch and column lot, and you will always find the same elution profile and resolution for each separation. So you can use Mightysil for long year periods from the method validation to the accomplishment of routine QC procedure.

### 【Three batches is prepared at all times】

Since we have a structure to supply three columns with different batches of stationary phase at all times, the differences between batches can be examined in advance, it is helpful for method validation procedure.

### 【Provide Certificate of Analysis = GP series】

The product is provided with a 3 certificate analysis, to prove the column filling condition and to prove the physical properties of the every batch of stationary phase. These certificate represent elution profiles of column and stationary phase which can be used for various certifications of your validation procedure.



### Filling condition 【Theoretical plates】

Regarding the theoretical plates to be used as the index of the filling condition, the upper limit and lower limit are set to a standard value to control the difference between columns, and are provided with each column as an analysis table.

### Test of physicochemical characteristics and the elution characteristics

Regarding the physicochemical characteristics and the elution profiles of the stationary phase itself, we conduct tests for each production of a phase, and the results are provided as a COA. In addition, the data is listed so that the elution profiles can be determined from the chromatogram as well, not only by the it's values.

# HPLC Column Mightysil Products List

Product Name	Particle size (mm)	L (mm)	I.D (mm)	Package (Piece/1pack)	Cat. No.
● <i>Mightysil GP II</i>					Di-Functional ODS
Mightysil RP-18GP II	5	250	20	1	25685-96
guard column	5	10	20	1	25686-96
	5	250	10	1	25687-96
guard column	5	10	10	2	25688-96
	5	150	6	1	25689-96
	5	250	4.6	1	25690-96
	5	150	4.6	1	25691-96
	5	75	4.6	1	25692-96
guard column	5	5	4.6	10	25693-96
	5	250	3	1	25694-96
	5	150	3	1	25695-96
	5	250	2	1	25696-96
	5	150	2	1	25697-96
	5	50	2	1	25698-96
guard column	5	5	2	2	25699-96
	3	250	4.6	1	25606-96
	3	150	4.6	1	25607-96
	3	100	4.6	1	25608-96
	3	75	4.6	1	25609-96
	3	50	4.6	1	25610-96
guard column	3	5	4.6	2	25611-96
	3	250	3	1	25612-96
	3	150	3	1	25613-96
	3	150	2	1	25614-96
	3	100	2	1	25615-96
	3	50	2	1	25616-96
guard column	3	5	2	2	25617-96
● <i>Mightysil GP</i>					Mono-Functional ODS
Mightysil RP-18GP	5	250	20	1	25480-96
	5	50	20	1	25649-96
guard column	5	10	20	1	25481-96
	5	250	10	1	25478-96
guard column	5	10	10	2	25479-96
	5	250	6	1	25476-96
	5	150	6	1	25477-96
	5	250	4.6	1	25415-96
	5	150	4.6	1	25416-96
	5	100	4.6	1	26060-96
	5	75	4.6	1	25417-96
	5	50	4.6	1	26061-96
guard column	5	5	4.6	10	25418-96
	5	250	4	1	25448-96
	5	150	4	1	25449-96
	5	250	3	1	25438-96
	5	150	3	1	25437-96
	5	100	3	1	25655-96
	5	75	3	1	25435-96
	5	50	3	1	25656-96
	5	250	2	1	25470-96
	5	150	2	1	25471-96
	5	100	2	1	25542-96
	5	50	2	1	25543-96
guard column	5	5	2	2	25474-96
	3	250	4.6	1	25513-96
	3	150	4.6	1	25514-96
	3	100	4.6	1	25469-96
	3	75	4.6	1	25515-96
	3	50	4.6	1	25468-96
	3	30	4.6	1	25650-96
guard column	3	5	4.6	2	26057-96
	3	250	3	1	25544-96
	3	150	3	1	25546-96
	3	100	3	1	25652-96
	3	75	3	1	25545-96
	3	50	3	1	25653-96

Product Name	Particle size (μm)	L (mm)	I.D (mm)	Package (Piece/1pack)	Cat. No.
Mightysil RP-18GP	3	250	2	1	25516-96
	3	150	2	1	25517-96
	3	100	2	1	25472-96
	3	50	2	1	25473-96
guard column	3	5	2	2	25475-96
	3	100	1	1	25436-96
	3	50	1	1	25434-96
● <i>Mightysil RP-18GP Aqua</i>			ODS suitable for 100% Water Eluents		
Mightysil RP-18GP Aqua	5	250	20	1	25660-96
guard column	5	10	20	1	25661-96
	5	250	10	1	25665-96
guard column	5	10	10	2	25666-96
	5	250	4.6	1	25640-96
	5	150	4.6	1	25641-96
guard column	5	5	4.6	10	25642-96
	5	250	3	1	25667-96
	5	150	3	1	25668-96
	5	250	2	1	25669-96
	5	150	2	1	25670-96
	5	100	2	1	25671-96
	5	50	2	1	25672-96
guard column	5	5	2	2	25673-96
	3	250	4.6	1	25674-96
	3	150	4.6	1	25675-96
	3	100	4.6	1	25676-96
	3	50	4.6	1	25677-96
guard column	3	5	4.6	2	25678-96
	3	250	3	1	25679-96
	3	150	3	1	25680-96
	3	150	2	1	25681-96
	3	100	2	1	25682-96
	3	50	2	1	25683-96
guard column	3	5	2	2	25684-96
● <i>Mightysil RP-8GP</i>			Octylsilanaized silicagel		
Mightysil RP-8GP	5	250	20	1	25518-96
guard column	5	10	20	1	25519-96
	5	250	10	1	25520-96
guard column	5	10	10	2	25521-96
	5	250	6	1	25522-96
	5	150	6	1	25523-96
	5	250	4.6	1	25463-96
	5	150	4.6	1	25462-96
	5	75	4.6	1	25461-96
guard column	5	5	4.6	10	25460-96
	5	250	4	1	25450-96
	5	150	4	1	25451-96
	5	250	3	1	25524-96
	5	150	3	1	25525-96
	5	75	3	1	25526-96
	5	250	2	1	25527-96
	5	150	2	1	25528-96
guard column	5	5	2	2	25529-96
	3	250	4.6	1	25439-96
	3	150	4.6	1	25440-96
	3	100	4.6	1	25441-96
guard column	3	5	4.6	2	25442-96
	3	150	2	1	25443-96

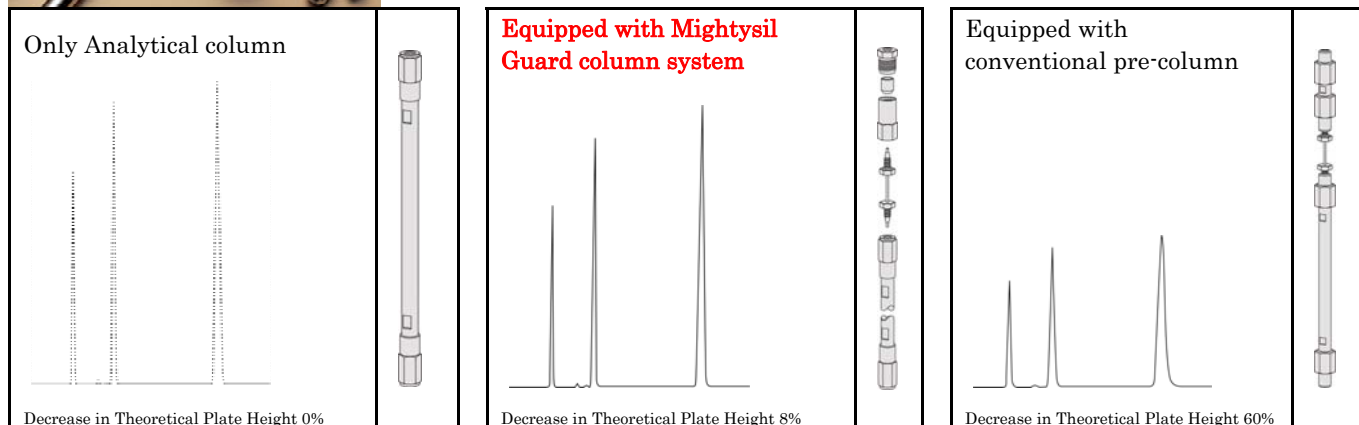
Product Name	Particle size (μm)	L (mm)	I.D (mm)	Package (Piece/1pack)	Cat. No.
<b>● <i>Mightysil RP-4GP</i></b>		<b>Butylsilanaized silicagel</b>			
Mightysil RP-4GP	5	250	20	1	25530-96
guard column	5	10	20	1	25531-96
	5	250	10	1	25532-96
guard column	5	10	10	2	25533-96
	5	250	6	1	25534-96
	5	150	6	1	25535-96
	5	250	4.6	1	25467-96
	5	150	4.6	1	25466-96
	5	75	4.6	1	25465-96
guard column	5	5	4.6	10	25464-96
	5	250	3	1	25536-96
	5	150	3	1	25537-96
	5	75	3	1	25538-96
	5	250	2	1	25539-96
	5	150	2	1	25540-96
guard column	5	5	2	2	25541-96
<b>● <i>Mightysil NH<sub>2</sub></i></b>		<b>Aminopropylsilanized silicagel</b>			
Mightysil NH <sub>2</sub>	5	250	4.6	1	25662-96
	5	150	4.6	1	25663-96
guard column	5	5	4.6	10	25664-96
	5	250	4	1	25452-96
	5	150	4	1	25453-96
	5	250	3	1	25454-96
	5	150	3	1	25455-96
	5	150	2	1	25456-96
	3	250	4.6	1	25489-96
	3	150	4.6	1	25490-96
	3	100	4.6	1	25491-96
guard column	3	5	4.6	2	25492-96
	3	150	2	1	25493-96
<b>● <i>Mightysil Si60</i></b>		<b>High purity bare silicagel</b>			
Mightysil Si60	5	250	20	1	25499-96
guard column	5	10	20	1	25510-96
	5	250	10	1	25497-96
guard column	5	10	10	2	25498-96
	5	250	4.6	1	25482-96
	5	150	4.6	1	25483-96
	5	75	4.6	1	25484-96
guard column	5	5	4.6	10	25485-96
	5	250	4	1	25457-96
	5	150	4	1	25458-96
	5	250	3	1	25486-96
	5	150	3	1	25487-96
	5	75	3	1	25488-96
	5	150	2	1	25459-96
<b>● <i>Mightysil RP-18</i></b>		<b>ODS for large scale preparative HPLC</b>			
Mightysil RP-18	15	250	50	1	25413-96
guard column	15	50	50	1	25414-96
<b>● <i>Mightysil RP-18MS</i></b>		<b>ODS suitable for LC/MS, LC/MS/MS</b>			
Mightysil RP-18MS	5	150	4.6	1	26073-96
guard column	5	5	4.6	10	26074-96
	5	150	2	1	26075-96
	5	50	2	1	26076-96
guard column	5	5	2	2	26077-96

## Guard column system -Holder Kit for guard Column -



It is recommended to use a Guard columns in order to extend the column life. Avoid arising back pressure, ghost peaks, and broad peaks caused by contamination, eg., from biological extracted samples.

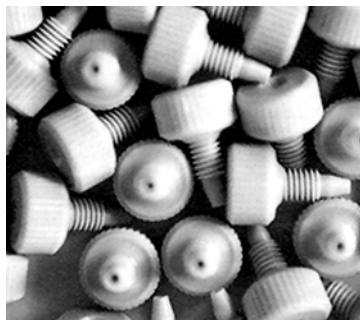
- Easy-to-use and economical cartridge type
- Small dead-volume type; a high performance column guard with smaller dead volume that protects the resolution of the main column.



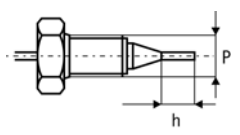
Product Name	L (mm)	I.D (mm)	Package (Piece/1pack)	Cat. No.
Mightysil guard column holder for 20mm I.D.	10	20	1	25431-96
Mightysil guard column holder for 10mm I.D.	10	10	1	25432-96
Mightysil guard column holder for 3/4.6/6mm I.D.	5	4.6	1	25430-96
Mightysil guard column holder for 2mm I.D.	5	2	1	25433-96

\* Capillary and Ferrules connecting between Analytical Column and Guard Column is included in Holder Kit.

## Column fitting connector –Handy Connector-



Most manufacturers uses a different length of ferrule tip (h) so be careful when replacing the column. The column can be connected reliably without concerns of these differences, by using the handy connector.

Maker	Connection Type	Length of "h"
KANTO		Abt. 2.0mm
Waters		Abt. 3.5mm
TOSOH		Abt. 4.5mm
Shimadzu (LC6A or later)		Abt. 2.3mm
Hitachi (L6500 or later)		Abt. 2.9mm
Jasco (800 or later)		Abt. 2.5mm

Product Name	Package (Piece/1pack)	Cat. No.
Handy Connector (Fingertightable)	5	18685-96
For O.D. 1/16" Capillary, Ferrule/Screw Combined PEEK Connector		