

Shimadzu Packed Column for HPLC

Shim-pack MAqC-ODS I

Instruction Manual

■ Introduction

Shim-pack MAqC-ODS I is an octadecylsilyl (C18)-modified and metal-doped silica-based HPLC high performance column. The metal-doped C18-modified silica gel affords increased retention for basic compounds compared to that of ordinary C18 column due to cation exchange interaction of doped metal compounds as well as hydrophobic interaction. The MAqC-ODS I is suitable for analysis of drug impurities or simultaneous analysis of water-soluble vitamins that often contain basic compounds.

■ Specifications

Item	Contents
Silica particles	Spherical, porous, high purity silica particles
Particle size	5 μm
Pore size	12 nm
Surface Modification	Octadecylsilyl groups (Mono-functional)
Other modification	Endcapping
Carbon contents	about 13%
Type	Stainless steel packed column
Storage solvent	Methanol
pH range	2 – 4 ^{*1}
Maximum Pressure	20 MPa
Operating temperature	50°C ^{*1}

*1. Refer to "■ Column Handling Precautions".

■ Lineup

Size	2.0 mm <i>i.d.</i>	4.6 mm <i>i.d.</i>
150 mm	228-59936-94	228-59936-91

■ Column Installation

- The flow direction of the column is shown as (→) on the column. When installing the column, ensure that this flow direction matches the mobile phase flow direction.
- The column is connected with PEEK male nuts. Ensure that the fittings are connected properly to avoid creating dead volume between the tubing and the column interface. The product name and parts number of the spare PEEK male nuts are as follows;

Item name	P/N	Comments
Male nut, PEEK	228-18565-94	5 /pkg

NOTE: The presence of air in the flow line may damage the column. Before connecting the column, be sure the flow line is completely filled with mobile phase.

■ Mobile Phase Solvent

- Basic mobile phase composition for MAqC-ODS I is a mixture of methanol, acetonitrile and the acidic buffer solution that is commonly used in reversed phase chromatography. The prepared mobile phase must be filtrated with membrane filter (less than 0.45 μm mesh size) prior to use. Phosphate buffer is preferable as acidic buffer.
- The tailing peak shape may be improved by increasing the concentration of the buffer in mobile phase. The increased buffer concentration may afford smaller retentions for the basic compounds.
- MAqC-ODS I affords sufficient retentions for basic compounds without ion pair reagents such as alkyl sulfonates, whereas ordinary C18 column essentially requires.

■ Column Handling Precautions

- Do not overtighten the column (male) nuts during installation. This may damage the fittings.
- Observe the pressure and temperature limits given in "■ Specifications". The steep pressure change over the column may cause deterioration.
- Adjust the pH of mobile phase within the range described in "■ Specifications". Optimum lifetime is obtained at pH 2.5 - pH 4.0 and at 50°C or less when a buffer is used.
- To remove the column from the system, be sure to confirm the temperature of the column becomes the room temperature and the pressure of the column becomes zero.
- Do not shock the column by banging it or dropping it.

NOTE: Filter the sample solutions through a less than 0.45 μm membrane filter, or an equivalent, before use. Suspended particles will lead to column clogging, which will increase the system pressure.

■ Flushing the Column

- To remove neutral, low polarity substances from the column, flush with methanol or acetonitrile at a flow rate of 1.0 mL/min (0.2 mL/min for 2.0 mm *i.d.* column) for 30 minutes. (If organic salts are present, first flush the column with water at these flow rates for 10 minutes so that the salt does not precipitate.)
- For flushing out an ion-pair reagent or other water-soluble material, use a 0.1% acetic acid solution of methanol or acetonitrile.
- It is difficult to remove hydrophilic polymers, such as proteins and nucleic acids, from the column. For such applications, use the guard column (replace periodically) or ultrafiltration prior to injection in order to remove

macromolecules from the sample.

■ Guard Column

The following guard column Shim-pack GVP-ODS is available for MAQC-ODS I. Prepare both holder and cartridge for the first use.

Column types	Description	P/N
2.0 mm <i>i.d.</i>	Shim-pack GVP-ODS 5×2.0 (2 cartridges)	228-34938-93
	Guard column holder, 2.0 mm I.D.	228-34938-94
4.6 mm <i>i.d.</i>	Shim-pack GVP-ODS 10×4.6 (2 cartridges)	228-34938-91
	Guard column holder, 4.6 mm I.D.	228-34938-92

■ Column Storage

Do not allow the column packing material to dry out. When removing the column from the system, cap both ends of the column so that the solvent cannot evaporate. For long-term storage, first flush the column (see Flushing the Column, above), replace the mobile phase described in the Column performance report, then cap both ends of the column before storage. Remember to flush with water first if salt buffers were used as the mobile phase.

■ Certificate of Compliance

These columns come with a quality assurance certificate that refers to the physical properties, chromatographic and column performance. These items are shown in "■ Description Items of the Certificate".

■ Description Items of the Certificate

Item	Contents
Retention Time	The retention time of naphthalene (t_R) is used to determine whether the column meets hydrophobic level requirements.
Plate Number	The number of theoretical plates (N) is calculated for naphthalene to ensure that the column is packed properly. The following formula is used to calculate the number. $N = 5.54 \times (t_R / W_{1/2})^2$ t_R : retention time $W_{1/2}$: peak width at 1/2 height
Tailing Factor	The tailing factor (symmetry factor, Tf) of naphthalene is used to determine that the column is uniformly packed. The following formula is used to calculate the factor. $Tf = W_{0.05} / 2f$ $W_{0.05}$: peak width at 5% height f : width from peak upslope to peak apex at 5% height
Pressure	The column head pressure (MPa) is measured to ensure that the column is packed properly.

■ Technical Support

It is the customer's responsibility to develop and validate analytical conditions for a particular application. However, Shimadzu offers technical support by e-mail and phone for customers who need help.

Write specific questions to analytic@group.shimadzu.co.jp or call your local representative.

※ The contents of this instruction sheet are subject to change without notice.