

Guard Columns for  
High Performance Liquid Chromatography

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TSKguardgel, Cartridge

# INSTRUCTION MANUAL





**TOSOH CORPORATION**

## Safety Precautions

To help protect you and/or your property from potential damage and ensure personal safety, please read this manual thoroughly before using the product.

### [Notation Conventions]

Notation	Explanation
 <b>WARNING</b>	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

#### **WARNING**

##### ■ **Keep away from fire**

Not taking proper precautions when using flammable solvents could result in fire, explosion, or poisoning.

#### **CAUTION**

##### ■ **Use only in well-ventilated areas**

In case of insufficient ventilation, flammable and toxic solvents can cause fire, explosion, or poisoning.

##### ■ **Do not spill solvents**

Spillage and leakage can cause fire, electric shock, poisoning, injury, and corrosion. Wear appropriate protective gear when cleaning up a spill.

##### ■ **Wear protective eye gear and gloves**

Organic solvents and acids should not come into direct contact with the skin.

##### ■ **Handle the package with care**

Inappropriate handling may cause rupturing and/or splattering of the product.

##### ■ **Only use this product as intended**

This product is intended for the separation and purification of small molecules and proteins. Do not use it for any other purpose.

##### ■ **Make sure compounds are safe**

Check that the target obtained compounds and solutions after separation and purification are safe.

##### ■ **Proper disposal**

Dispose in accordance with local laws and regulations.

#### **NOTE**

Keep this manual with the product for future reference.

## Precautions : Shipping Solvents

First Aid	Inhalation	<ul style="list-style-type: none"> <li>• Move the person to an area with fresh air and rinse the mouth with plenty of water.</li> <li>• Call immediately for medical attention.</li> </ul>
	Skin exposure	<ul style="list-style-type: none"> <li>• Wash the exposed area with plenty of soap and water.</li> </ul>
	Eye exposure	<ul style="list-style-type: none"> <li>• Open the eyes as wide as possible and rinse with clean water for at least 15 minutes.</li> <li>• Call immediately for medical attention.</li> </ul>
	Ingestion	<ul style="list-style-type: none"> <li>• Rinse the mouth with plenty of water.</li> <li>• Call immediately for medical attention.</li> </ul>
Handling and Storage	Ventilation	<ul style="list-style-type: none"> <li>• Provide adequate air ventilation to keep organic vapor concentrations below approved level.</li> </ul>
	Container handling	<ul style="list-style-type: none"> <li>• Container may break if not handled with care.</li> </ul>
	Wear appropriate protective equipment	<ul style="list-style-type: none"> <li>• Use solvent-resistant gloves and protective eye gear when using this product. Use of a gas mask, additional protective clothing or rubber boots could be appropriate when handling this product.</li> </ul>
	Hazardous substance storage	<ul style="list-style-type: none"> <li>• If any flammable solvents are used for shipping or storage of this produce, keep away from fire or open heat sources.</li> </ul>
Waste Disposal	Disposal methods	<ul style="list-style-type: none"> <li>• Follow local guidelines for disposal. This product can be incinerated safely.</li> </ul>
	General considerations	<ul style="list-style-type: none"> <li>• Please pay attention to all safety precautions with respect to the handling and storage of this product.</li> </ul>
	Disposal precautions	<ul style="list-style-type: none"> <li>• Assure that appropriate countermeasures are taken when incinerating solvents that contain acetonitrile. Fumes produced during incineration may contain nitrogen oxides (TSKguardgel Amide-80 3<math>\mu</math>m, TSKguardgel Amide-80 5<math>\mu</math>m, TSKguardgel CN-80Ts, TSKguardgel ODS-100V 5<math>\mu</math>m, TSKguardgel ODS-100Z 5<math>\mu</math>m, TSKguardgel NH<sub>2</sub>-100 3<math>\mu</math>m).</li> </ul>

Shipping solvent of each column : See the "2. Guard Column Specifications".

## Precautions : Packing Material

First Aid	Inhalation	<ul style="list-style-type: none"> <li>• Move the person to an area with fresh air and rinse the mouth with plenty of water.</li> <li>• Call immediately for medical attention.</li> </ul>
	Skin exposure	<ul style="list-style-type: none"> <li>• Wash the exposed area with plenty of soap and water.</li> </ul>
	Eye exposure	<ul style="list-style-type: none"> <li>• Open the eyes as wide as possible and rinse with clean water for at least 15 minutes.</li> <li>• Call immediately for medical attention.</li> </ul>
	Ingestion	<ul style="list-style-type: none"> <li>• Rinse the mouth with plenty of water.</li> <li>• Call immediately for medical attention.</li> </ul>
Handling and Storage	Ventilation	<ul style="list-style-type: none"> <li>• Provide adequate air ventilation to keep organic vapor concentrations below approved level.</li> </ul>
	Container handling	<ul style="list-style-type: none"> <li>• Container may break if not handled with care.</li> </ul>
	Wear appropriate protective equipment	<ul style="list-style-type: none"> <li>• Use solvent-resistant gloves and protective eye gear when using this product. Use of a gas mask, additional protective clothing or rubber boots could be appropriate when handling this product.</li> </ul>
	Hazardous substance storage	<ul style="list-style-type: none"> <li>• If any flammable solvents are used for shipping or storage of this product, keep away from fire or open heat sources.</li> </ul>
	Fire precautions	<ul style="list-style-type: none"> <li>• Do not expose this chromatographic resin to fire or open heat sources.</li> </ul>
Waste Disposal	Disposal method	<ul style="list-style-type: none"> <li>• Dispose in accordance with local laws and regulations. See below for additional precautions.</li> </ul>
	General considerations	<ul style="list-style-type: none"> <li>• Please pay attention to all safety precautions with respect to the handling and storage of this product.</li> </ul>
	Disposal precautions	<ul style="list-style-type: none"> <li>• Fumes produced during incineration may contain nitrogen oxides (TSKguardgel Amide-80 3<math>\mu</math>m, TSKguardgel Amide-80 5<math>\mu</math>m, TSKguardgel CN-80Ts, TSKguardgel NH<sub>2</sub>-100 3<math>\mu</math>m).</li> </ul>

- Combustible packings (Polymer gel)  
TSKguardgel Phenyl-5PW RP, TSKguardgel Octadecyl-4PW
- Flame-retardant packings (Modified silica gel)  
TSKguardgel ODS-S1, TSKguardgel ODS-100S, TSKguardgel Super-ODS, TSKguardgel ODS-80T<sub>M</sub>, TSKguardgel ODS-80Ts, TSKguardgel ODS-120A, TSKguardgel ODS-120T, TSKguardgel CN-80Ts, TSKguardgel Octyl-80Ts, TSKguardgel Amide-80 3 $\mu$ m, TSKguardgel Amide-80 5 $\mu$ m, TSKguardgel ODS-100V 5 $\mu$ m, TSKguardgel ODS-100Z 5 $\mu$ m, TSKguardgel NH<sub>2</sub>-100 3 $\mu$ m

## Table of Contents

1. Introduction .....	1
2. Guard Column Specifications .....	1
3. Structure of Cartridge Holder .....	3
4. Guard Column Installation .....	3
5. Guard Column Replacement .....	4
6. Other Notes .....	4

## 1. Introduction

TSKguardgel is a guard column to protect the analytical column. When impurities that tend to be adsorbed to the packing material are present in a sample, they are adsorbed to the inlet side of the column and accumulate gradually, causing reduction in the number of theoretical plates and lowering in column performance.

In such a case the original column performance can be maintained by connecting a guard column between the injection valve and the analytical column.

The guard column deteriorated should be replaced with a new guard column according to this Instruction Manual.

## 2. Guard Column Specifications

### 2-1 Guard Column

Table 1 Guard column specifications

Part No.	Type	Column Size mm(ID)×cm(L)	Shipping Solvent
0019004	TSKguardgel ODS-80T <sub>M</sub>	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0019005	TSKguardgel ODS-120A	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0019006	TSKguardgel ODS-120T	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0019007	TSKguardgel Phenyl-5PW RP	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=30/70 (V/V)
0019008	TSKguardgel Octadecyl-4PW	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=60/40 (V/V)
0021862	TSKguardgel Amide-80 3 $\mu$ m	2.0×1	C <sub>2</sub> H <sub>5</sub> OH/H <sub>2</sub> O=50/50 (V/V)
0021863	TSKguardgel Amide-80 3 $\mu$ m	3.2×1.5	C <sub>2</sub> H <sub>5</sub> OH/H <sub>2</sub> O=50/50 (V/V)
0021941	TSKguardgel Amide-80 5 $\mu$ m	2.0×1	CH <sub>3</sub> CN/H <sub>2</sub> O=75/25 (V/V)
0019010	TSKguardgel Amide-80 5 $\mu$ m	3.2×1.5	CH <sub>3</sub> CN/H <sub>2</sub> O=75/25 (V/V)
0019011	TSKguardgel ODS-80Ts	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0019012	TSKguardgel Octyl-80Ts	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0019013	TSKguardgel CN-80Ts	3.2×1.5	CH <sub>3</sub> CN/H <sub>2</sub> O=40/60 (V/V)
0019540	TSKguardgel ODS-100S	3.2×1.5	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0021997	TSKguardgel ODS-100V 3 $\mu$ m	2.0×1	CH <sub>3</sub> CN
0021841	TSKguardgel ODS-100V 5 $\mu$ m	2.0×1	CH <sub>3</sub> CN
0021996	TSKguardgel ODS-100Z 3 $\mu$ m	2.0×1	CH <sub>3</sub> CN
0021995	TSKguardgel ODS-100Z 5 $\mu$ m	2.0×1	CH <sub>3</sub> CN
0021453	TSKguardgel ODS-100V 5 $\mu$ m	3.2×1.5	CH <sub>3</sub> CN
0021454	TSKguardgel ODS-100Z 5 $\mu$ m	3.2×1.5	CH <sub>3</sub> CN
0019325	TSKguardgel ODS-S1	2.0×1	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0019672	TSKguardgel Super-ODS	2.0×1	CH <sub>3</sub> OH/H <sub>2</sub> O=70/30 (V/V)
0021971	TSKguardgel NH <sub>2</sub> -100 3 $\mu$ m	2.0×1	CH <sub>3</sub> CN/H <sub>2</sub> O=85/15 (V/V)
0021972	TSKguardgel NH <sub>2</sub> -100 3 $\mu$ m	3.2×1.5	CH <sub>3</sub> CN/H <sub>2</sub> O=85/15 (V/V)

Note : Three guard columns are packed in a box.

- How to distinguish the guard column (2.0 mm(ID))

The product name is not marked on the following guard columns (2.0 mm(ID)).

[TSKguardgel ODS-S1, TSKguardgel Super-ODS, TSKguardgel ODS-100V 5 $\mu$ m, TSKguardgel Amide-80 3 $\mu$ m, TSKguardgel Amide-80 5 $\mu$ m]

Therefore, please confirm the product name on the package label. And please refer to Figure 1 for the distinction.

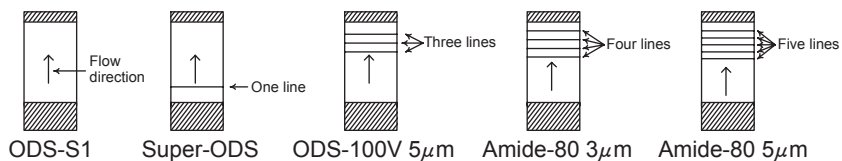


Figure 1 Design of guard column (2.0 mm(ID))

## 2-2 Cartridge Holder

Table 2 Cartridge holder specifications

Part No.	Type	Column Size mm(ID)×cm(L)
0019018	Cartridge holder (3.2×1.5)	3.2×1.5
0019308	Cartridge holder (2.0×1)	2.0×1

Note :Two nuts, two ferrules and two small pieces of tubing are attached to the cartridge holder as accessories.

In addition, column-extracting tool is attached to Part No. 0019018.

### 3. Structure of Cartridge Holder

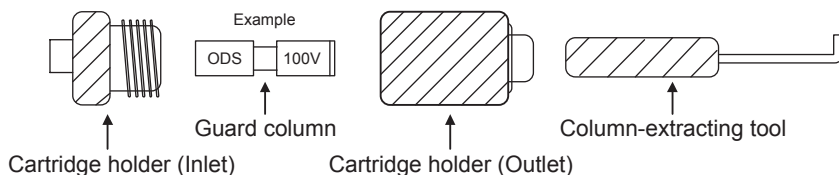


Figure 2 Design of the cartridge holder (3.2 mm (ID)×1.5 cm (L))

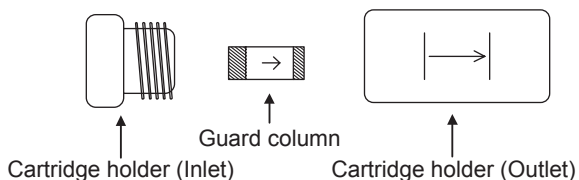


Figure 3 Design of the cartridge holder (2.0 mm (ID)×1 cm (L))

### 4. Guard Column Installation

(1) Guard column installation

- 3.2 mm(ID)×1.5 cm(L)

Insert the metallic filter side of the guard column in the Cartridge holder (Inlet) as shown in Figure 2.

After inserting the fluorocarbon filter side of the guard column in the Cartridge holder (Outlet), tighten the cartridge holder securely by the hand.

Solvent must flow into the column from the inlet side only.

- 2.0 mm(ID)×1 cm(L)

Make sure the flow direction sign on the guard column and first insert the guard column in the Cartridge holder (Inlet) and then the Cartridge holder (Outlet) as shown in Figure 3.

Tighten the cartridge holder securely with a spanner.

Solvent must flow into the column from the inlet side only.

(2) Prepare the piping of the inlet side and the outlet side of the guard column by using the ferrule attached accessories.

- (3) Substitute the solvent in the guard column with at least 1 mL of the measurement solvent before the guard column is connected with the analytical column.

## 5. Guard Column Replacement

- (1) Since a rise of the pressure during operation could mean clogging at the end of the guard column or contamination of the gel, it is a good idea to replace the guard column when the pressure has risen to some extent.

In general, when some changes in measured data are observed, the guard column should be replaced immediately.

Please replace the guard column when the following phenomena are observed.

- Rising of the pressure
- Deteriorating of the column performance
- Changing of the retention times

It is recommended that the guard column is replaced regularly.

- (2) Procedure to replace the guard column

- (i) The guard column is taken out from the cartridge holder.

In the case of the column size of 3.2 mm(ID)×1.5 cm(L), hook on the ditch at the center of the guard column using the column-extracting tool and pull out the guard column.

- (ii) Set a new guard column as described in the installation.

## 6. Other Notes

The usable solvents for the guard column are the same as those for the analytical column. Please refer to the Instruction Manual of the analytical column.



**TOSOH**

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