

# OPERATING CONDITIONS and SPECIFICATIONS

## TSKgel® HIC-ADC Butyl

Analytical Column					Connection Type Connection Parts	Applicable Guard Column		
Product No.	Product	Size I.D.(mm) × L(cm)	Particle (µm)	Material		Product No.	Product	Size I.D.(mm) × L(cm)
0023538	TSKgel HIC-ADC Butyl	4.6 × 3.5	5	Stainless steel	Ferrule 1/16" Tubing	0023543	TSKgel guardcolumn HIC-ADC C4	4.6 × 0.5
0023539		4.6 × 10						

Proper usage conditions and specifications are described in this OCS. In case of general use, see the TSKgel Instructions for Use.

### A. Operating Conditions

- Shipping Solvent      Pure water
- Maximum Pressure, Maximum Flow Rate, Proper Flow Rate and Flow Rate for Solvent Replacement

Product No.	Product	Size I.D.(mm) × L(cm)	Maximum Pressure (MPa)	Maximum Flow Rate (mL/min)	Proper Flow Rate (mL/min)	Flow Rate for Solvent Replacement (mL/min)
0023538	TSKgel HIC-ADC Butyl	4.6 × 3.5	30	2.5	0.5 - 1.0	≤0.5
0023539		4.6 × 10		1.5		
Note Pressure is different depending on solvent type (buffer solution, salt concentration and organic solvent concentration), column temperature and gradient conditions. Decrease flow rate, when exceeding maximum pressure.						

- Mobile Phase
  - Water, aqueous solution of salt (sulfate, phosphate, citrate, etc.) and/or buffer solution
  - Water-soluble organic solvents (50 % or less)
  - SDS, guanidine hydrochloride and solubilizers such as urea.  
Note When solubilizers are used, the column lifetime may be shortened compared with use of a standard solvent.
  - pH 2.0 - 12.0  
Note 1 Regarding water, use ultra-pure water or comparable grade water. Regarding organic solvents and reagents, recommend use of grade for special class or HPLC.  
Note 2 Select organic solvents that does not cause salt precipitation.
- Temperature Range for Use      10 - 60 °C
- Storage
  - Procedure :  
After replacing with shipping solvent, remove the column from the instrument and store the column with the plugs attached to both column ends.  
Note Perform replacement to shipping solvent with flow rate for solvent replacement (≤0.5 mL/min).
  - Storage temperature : 4 - 35 °C
- Washing
 

Perform steps (1) and (2). Check performance of column. If not recovered, operate steps (3) and (4) below. As a precaution, when operating step (4), urea or neutral surfactant may remain in column. Operate step (4) only in case column is not recovered with operation from step (1) to step (3).

  - Removal of ionic substance  
Use a high salt concentration solvent or acidic aqueous solution. In case organic solvent is used, please be careful of salt precipitation.
  - Removal of hydrophobic substance  
Use a high concentration organic solvent (50 % or less). Please be careful of salt precipitation.
  - Washing step in case column not recovered with operation step (1) and (2)  
Inject several times aqueous sodium hydroxide solution (from 0.1 to 0.2 mol/L) or acetic acid aqueous solution (from 20 to 40 %) from injector.
  - Removal of sparingly soluble protein  
Use a solvent including urea (from 6 to 8 mol/L) or neutral surfactant (Triton, Tween, Brij, etc.) (from 0.2 to 0.3 %).  
Note 1 It may happen that a column will not recover depending on type of adsorptive substance.  
Note 2 Operate column washing with flow rate for solvent replacement.
- Guard Column      Apply guard column for column protection, when there is applicable guard column available.
- Line Filter
 

Install the line filter shown below between the pump and the injector.

Product No.	Line Filter
0014594	Filter Assembly
0006280	Fluoropore filter (0.45 µm, package of 100)
- Disposal Considerations      Gels are flammable (Vinyl Copolymer).  
When discarding, refer to CAUTION in TSKgel Instructions for Use.

## 10. Others

Connection of the guard column "TSKgel guardcolumn HIC-ADC C4 (Product No. 0023543)" and the analytical column.

Tighten the outlet side end fitting of the guard column to the inlet side end fitting of the column to be connected by manual, and then lightly tighten to the position where you feel a sense of resistance in the clockwise direction using a tool such as a spanner (a guide for the tightening angle : About 30°). After connecting both columns, please send a solvent and check that there is no leakage from the connection part.

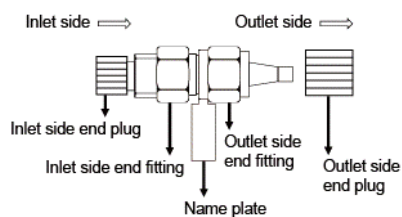


Figure 1—Guard column

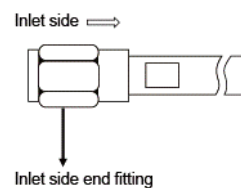


Figure 2—Analytical Column

Note 1 Tightening with an excessive torque of 2.0 N.m or more, repeated desorption of the column, or a strong impact on the column may cause breakage of the tip of the end fitting and deterioration of the column.

Note 2 The end fitting shape of this column is designed to obtain optimum column performance when connected to our adapted analytical column. If you connect our analytical column or other company's column with a different joint shape, a useless volume may arise and the peak may be broad, and the original performance of the column may not be demonstrated.

"Triton" is globally registered trademark of Union Carbide Corporation.

"Tween" is globally registered trademark of Croda International Plc.

"Brij" is globally registered trademark of Croda Americas LLC.

"TSKgel" is registered trademark of Tosoh Corporation in Japan, USA, EU, etc.

## B. Specifications

These columns are shipped with below specifications. Quality control conditions and results are listed in the INSPECTION DATA SHEET.

Product No.	Product	Size I.D.(mm) × L(cm)	Theoretical Plates	Asymmetry Coefficient
0023538	TSKgel HIC-ADC Butyl	4.6 × 3.5	≥ 600	1.0 - 3.0
0023539		4.6 × 10	≥ 2400	1.0 - 3.0



TOSOH