



SkillPak™ 2.5 and 5.0 cm Instruction Manual

Introduction

SkillPak 2.5 and 5.0 cm ID columns are designed for fast method development and scale-up, and are pre-packed with TOYOPEARL® or TSKgel® process chromatography media for bioseparations. These columns are intended to be operated with commonly used low- or medium-pressure liquid chromatography systems. SkillPak 2.5 and 5.0 cm ID columns are reproducibly packed using controlled methods and consider the varying compressibility of each resin.

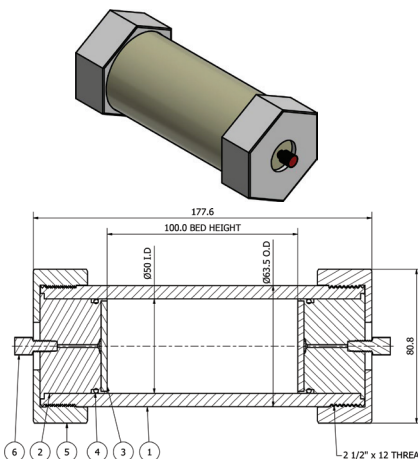
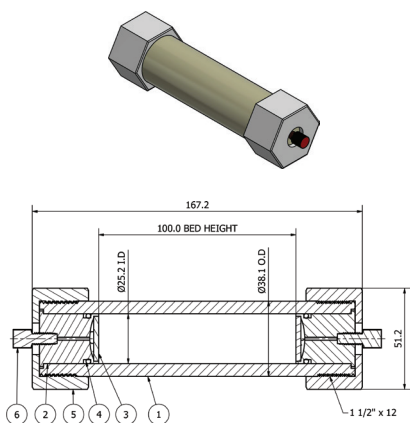
Product Description

Hardware Materials

The hardware of SkillPak 2.5 and 5.0 cm ID columns is composed of biocompatible polymers, mainly polypropylene.

➤ **Figure 1.** Hardware SkillPak 2.5 cm ID × 10 cm L

➤ **Figure 2.** Hardware SkillPak 5.0 cm ID × 10 cm L



➤ **Table 1.** Materials of construction

Item	Quantity	Part list	Material
1	1	Main tube	Polypropylene
2	2	Tube adaptor	Polypropylene
3	2	Frit	Ultra-high-molecular-weight polyethylene (UHMWPE, UHMW)
4	2	O-ring	Ethylene propylene diene monomer (EPDM) rubber
5	2	Hex cap	Nylon
6	2	Stop plug	Polyoxymethylene (POM)

Solvent compatibility

The product contact materials listed in Table 1 are compatible with the following common solutions:

➤ **Table 2.** Solvent compatibility for SkillPak 2.5 and 5.0 cm ID hardware

Water	Citric Acid (< 50%)
Acetic Acid (< 60%)	Methanol
Ethanol	Phosphoric Acid
Acetone	Hydrochloric Acid (<30%)
2% (w/v) Detergents	Sulfuric Acid (<30%)
8 mol/L Urea (< 33 %)	Sodium Hydroxide (< 3 mol/L)
Isopropyl Alcohol (IPA)	Benzyl Alcohol (at room temperature)

The solvent compatibility for the packed media is listed in the TOYOPEARL and TSKgel documentation.

Column specifications

➤ **Table 3.** Specifications of SkillPak 2.5 and 5.0 cm ID columns

Internal diameter	2.5 cm	5.0 cm
Bed height	see labels and CoA	
Volume	see labels and CoA	
Outer diameter incl. hex cap	5.2 cm	8.1 cm
Storage temperature	see labels and CoA	
Frit porosity	10 µm	
Maximum recommended flow rate - in 2 mol/L NaCl for HIC media - in 1 mol/L NaCl for all other media	<ul style="list-style-type: none"> • ≤ 500 cm/h for most TOYOPEARL S, M, F, and C grade resins • ≤ 450 cm/h for TSKgel SP-5PW (20) • ≤ 400 cm/h for TOYOPEARL SuperQ-650S, NH₂-750F, Sulfate-650F, and AF-rProtein A HC-650F • ≤ 300 cm/h for TSKgel SuperQ-5PW (20) and TOYOPEARL Phenyl-600 and HW-40F 	<ul style="list-style-type: none"> • ≤ 300 cm/h for most TOYOPEARL S, M, F, and C grade resins and TOYOPEARL GigaCap Q-650M • ≤ 250 cm/h for TOYOPEARL SuperQ-650S, NH₂-750F, GigaCap series, and Phenyl 600M, • ≤ 200 cm/h TSKgel SuperQ-5PW (20), TSKgel SP-5PW (20), and TOYOPEARL HW-40F
Connections	1/4-28 Standard fittings with flat-bottom geometry for 1/8" OD or 1/16" OD capillary	
Shipping buffer	20% ethanol for TOYOPEARL and TSKgel resins	
Asymmetry factor (As)	0.8 - 1.4 for TOYOPEARL and TSKgel resins	
Plate count	See resin-related specifications on the Certificate of Analysis	
Estimated shelf life	12 months	

Instructions for Use

Installation

SkillPak 2.5 and 5.0 cm ID columns are ready to use upon receipt. Connect the column to the instrument following the recommended flow direction indicated on the column label. Connect the inlet/outlet of the column to the instrument using 1/4-28 standard fittings with flat-bottom geometry for 1/8" OD or 1/16" OD capillary. Finger-tight is recommended.

Equilibration

Before the first sample injection, the column should be equilibrated with at least 10 CV of the respective loading buffer. See Table 3 for maximum flow rate. Slowly increase flow until it reaches the desired running flow rate. Do not exceed the maximum flow rate. Buffer composition and gradient design are dependent on the resin type and resin chemistry. Please refer to the TOYOPEARL or TSKgel documentation for information about recommended mobile phases.

Column performance test

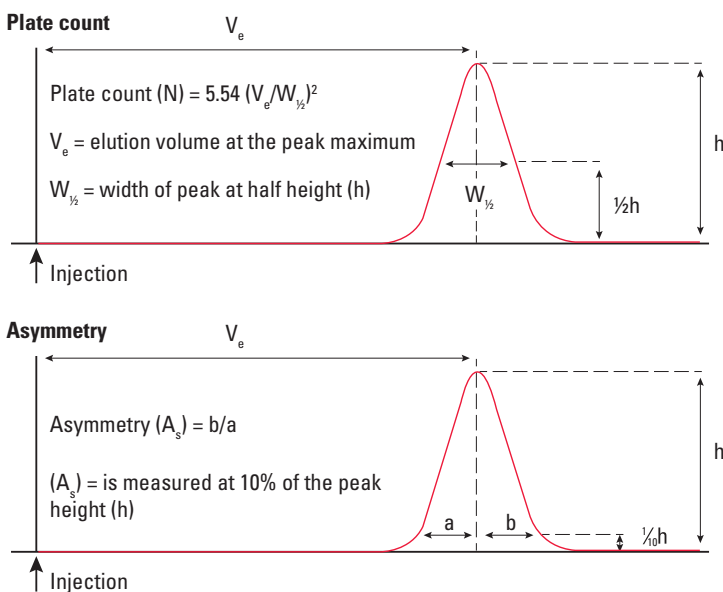
The chromatographic performance of a SkillPak 2.5 or 5.0 cm ID column should be tested initially and at regular intervals throughout use and is determined by the asymmetry factor and plate count, as described in Figure 3. The specifications can be found in the Certificate of Analysis provided with each column.

For TOYOPEARL S-grade, F-grade, M-grade, and TSKgel resins, the evaluation can be carried out as described below:

- Equilibrate columns with ≥ 10 CV of 1 mol/L NaCl @ 100 cm/h
- Inject 1% CV of 3 mol/L NaCl tracer
- Wash with 2 CV of 1 mol/L NaCl @ 100 cm/h

Note: the response can be detected using the conductivity meter.

 **Figure 3.** How to determine plate count and asymmetry



Regeneration and storage conditions

SkillPak 2.5 and 5.0 cm ID columns can be washed/regenerated. The columns can also be returned to the shipping buffer for storage. Please refer to the TOYOPEARL or TSKgel product documentation for information about cleaning and storage solutions. SkillPak 2.5 and 5.0 cm ID columns are reusable as long as the plate counts and asymmetry remain in the desired range, which will largely depend on the care taken, the cleaning performed, and the tolerance of the resin to the applied conditions. The columns are not designed to be repacked.

Reduce, Recycle



Always store the column in its original packaging. It will prolong its lifetime, thus reducing the number of columns you will need.



The box and the foam inserts can be recycled following local regulations. The column can be disposed of as single-use waste according to local regulations.

Tosoh Corporation
Bioscience Division
Shiba-Koen First Bldg.
3-8-2 Shiba, Minato-ku
Tokyo, 105-8623, Japan
Tel: +81-3-5427-5180
email: hlc@tosoh.co.jp

Tosoh Bioscience LLC
3604 Horizon Drive, Suite 100
King of Prussia, PA, USA 19406
Tel: +1-800-366-4875
email: info.tbl@tosoh.com

Tosoh Bioscience GmbH
Im Leuschnerpark 4
64347 Greisheim, Germany
Tel: +49-6155-7043700
email: info.tbg@tosoh.com

Tosoh Bioscience Shanghai Co., Ltd.
Room 1001, Innov Tower, Block A
1801 Hong Mei Road,
Xu Hui District, Shanghai 200233, China
Tel: +86-21-3461-0856
email: info.tbs@tosoh.com.cn

Tosoh Asia Pte. Ltd.
9 Battery Road, MYP Centre
#11-01 Singapore 049910
Tel +65-6226-5106
email: info.tsas@tosoh.com

Tosoh India Pvt. Ltd.
E-302, Lotus Corporate Park,
Graham Firth Compound
Western Express Highway,
Goregaon (East)
Mumbai - 400 063, India
Tel: +91-22-614-85200
email: contact@tosohindia.com

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