

Operation Manual

Shodex™ STANDARD S series

(Please read this manual carefully to achieve accurate and consistent molecular weight information for a long time)

Important Handling Instructions

Caution!

- Please consult the Safety Data Sheet (SDS) of reagents and solvents used with the column and understand their proper handling methods to prevent potential health hazards or death from occurring.
- Please wear appropriate personal protective equipment such as lab goggles and gloves when handling organic solvents and acid and alkaline reagents. Avoid any direct physical contact to prevent chemical injuries.

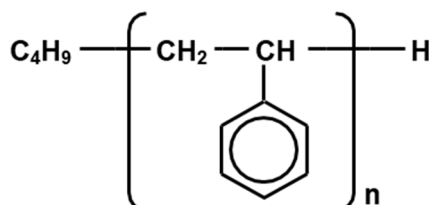
Before Using the Column

- (1) Please visually inspect the package and outside of the reagent bottles for any damage.
- (2) Please check if product name and serial number written on the package, reagent bottle adhesive labels, and enclosed INSPECTION CERTIFICATE are matching and correct.

1. Introduction

Thank you for purchasing the Shodex™ product. Shodex™ STANDARD S series is standard kits, each containing a set of polystyrene (PS) with different molecular weights. They dissolve easily in tetrahydrofuran (THF), chloroform, toluene, o-dichlorobenzene (ODCB), etc. The standards have narrow molecular weight distributions, and thus suitable for preparing calibration curves required in relative molecular weight distribution analyses by size exclusion chromatography (SEC). Please select a kit with molecular weight ranges (see below) that meet the molecular weight range of your target samples.

2. Structural Formula



3. Product Lineup

Product Code	Product Name	Contents	Molecular Weight (Mp) Range
F8601105	STANDARD SL-105	0.5 g x 10 kinds	580 - 25,000
F8602105	STANDARD SM-105	0.5 g x 10 kinds	1,000 - 2,500,000
F8603075	STANDARD SH-75	0.5 g x 7 kinds	600,000 - 7,000,000

(Note) Molecular weights (Mp, Mw/Mn) of a standard kit may vary depending on production lot.

4. How to Use Standards

4.1 Sample Solution Preparation

- (1) Viscosity of a high molecular weight compound is largely influenced by its molecular weight and concentration. A sample solution with high viscosity cause peak broadening and elution delay, and this makes it difficult to obtain its accurate molecular weight distribution. In general, the larger the molecular weight of a compound, the higher its viscosity becomes. To suppress the influence from high viscosity, it is recommended to lower the sample concentration. Please use the below table as a reference when preparing sample solutions.

Molecular Weight Range	Optimal Concentration (w/v)
5000 - 1,000,000	0.05 %
1,000,000 ≤	≤ 0.01 %

- (2) Add solvent to standards. Let them stand at room temperature to dissolve and homogenize the standard samples. The time required for swelling and dissolution depends on molecular weight of a standard. Lower-molecular-weight standards swell and dissolve in a few hours. However, higher-molecular-weight standards (1,000,000 or larger) require a longer time. Dissolve them with occasional gentle stirrings over a day.
- (3) Filter the prepared sample solutions using disposable 0.45- μ m filters.
- (4) Store the sample solution in a refrigerator (about 4 °C recommended) to prevent oxidative degradation.
- (5) Use refrigerated sample solutions within 2 weeks.

Attention!

· Ultra-sonication may cause shear degradation if used to dissolve standards, and thus not recommended.

3.2 Calibration Curve

Analyze standard samples under the same analysis conditions as target samples. Prepare a calibration curve for measuring molecular weight distribution using retention times of each standard sample and their peak top molecular weight (Mp) values stated on the INSPECTION CERTIFICATE.

4. Storage

Store undissolved standards in a 20 - 25 °C dark place.

Attention!

· Avoid direct sunlight and extreme temperature changes.

5. Expiration Date

Expiration date of an unopened standard is 4 years from the inspection date.

Note

· The inspection date is stated on the INSPECTION CERTIFICATE.

Refer to the Shodex™ website (<https://www.shodex.com/>) for product details and their applications. For additional assistance, contact the distributor from whom you purchased the column or contact your regional Shodex™ support office (https://www.shodex.com/en/support_office/list/).

6. Warranty (Ver. 4STD)

(1) Showa Denko K. K. warrants that the Shodex™ product, at the time of delivery to the user, will conform to the specification of the attached INSPECTION CERTIFICATE, if the Shodex product is used in accordance with the attached operating manual. The foregoing warranty is exclusive and is in lieu of all other warranties with respect to the Shodex product, whether written, oral, implied, statutory or otherwise. No warranties by Showa Denko K. K. are implied or otherwise created, including, but not limited to, the warranty of merchantability and fitness for particular purposes.

(2) Any claim of inconformity to the specification must be notified to Showa Denko K.K. within ten (10) days after delivery to the user. User's exclusive remedy and Showa Denko K.K.'s exclusive liability for such claim are limited to the replacement of the Shodex product in question. In no event is Showa Denko K.K. liable for any indirect, incidental or consequential damage arising out of in connection with the Shodex product, whether or not such damage is allegedly based on breach of warranty, negligence or otherwise.

(3) No warranty is made in any of the following cases:

3-1 If the Shodex product is not used in accordance with the operating manual

3-2 If the Shodex product is remodeled by anyone other than person or firm designated by Showa Denko K.K.

3-3 If the Shodex product is disposed of

3-4 If the Shodex product is resold by the user without giving prior written notice to Showa Denko K.K.

3-5 If the performance of the Shodex product is not conform to the specification of the attached INSPECTION CERTIFICATE due to any of the reasons below:

a. Computer virus

b. Impurities contained in the sample, reagent, gas air or cooling water provided by the user

c. Breakdown or malfunction of equipment, apparatus or component used in combination with the Shodex product

d. Force majeure such as fire, earthquake, flood, other natural disaster, crime, riot, act of terrorism, war or radioactive contamination

(4) In no event is Showa Denko K.K. liable for

4-1 the results of analysis or preparations using the Shodex product or any portion of the same, including, but not limited to, the reliability, accuracy, efficacy and safety of said results, and

4-2 the occupational hazard in the use of the Shodex product, whether or not such use is made in accordance with the attached Conditions for use.

(5) The Shodex product is for laboratory use only. It must not be used for clinical diagnosis. Showa Denko K.K. is not liable for any use of the Shodex product except laboratory use.

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ORpak, RSpak, SUGAR, USPpak.

Products described in the operation manual are not intended for medical use or medical applications.