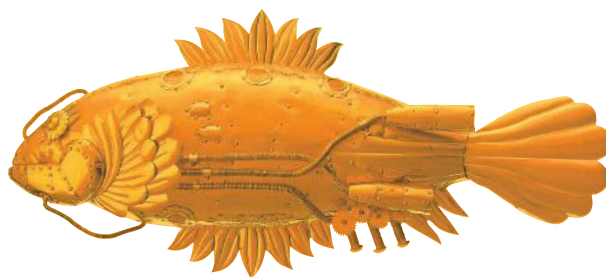


Shodex™



HPLC Columns

MANUAL

IC YK-421

SHOWA
DENKO
EUROPE

Columns manufactured by Showa Denko K.K Japan
Made in Japan

Shodex HPLC Columns
Europe, Middle East, Africa, Russia

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Operation Manual

Shodex™ IC YK-421

(Please read this manual carefully before using the column to ensure performance and life.)

1. Introduction

Shodex IC YK-421, specially designed for the separation of alkali metals, alkaline earth metals, alkyl amines and ethanol amines. Using this column, simultaneous separation of monovalent and divalent cations is possible by isocratic mode.

2. Instructions in handling <Important>

Caution! * Take notice of keeping instructions about the solvents and the reagents used with the column not to occur problems related to losing your health or leaking.

Attention! * Use the column within the regular range of flow rate, pressure and temperature. There is a danger of deteriorating the performance when it is handled beyond the permissible range even for a short time. See the clause "Usable conditions" about the permissible range.

3. Specifications

Column size:	4.6 mm I.D. x 125 mm L.
Column material (inside):	Stainless steel type 316.
Packing material:	Silica gel bonded with carboxylic group.
In-column solvent (initial):	5mM Tartaric acid + 1mM Dipicolinic acid + 24mM Boric acid
Usable temperature:	From room temperature to 60°C.
Theoretical plates:	2800 min.
Usable pH range:	Between 2 and 7.
Usable organic solvent:	Acetonitrile up to 70%.
Max. flow rate:	1.5 mL/min.
Max. pressure:	15 MPa

4. Directions

- 1) Sample should be dissolved or diluted in the eluent used and pH should be between 2 and 8.
- 2) Replacement of the eluent should be done at the flow rate of 0.3 mL/min. The start up to the pumping should be done also at the flow rate of 0.3 mL/min.
- 3) Install guard column, YK-G immediately upstream of the main column to protect it from contamination by the sample. Please connect it with piping in the column after throwing away about 1mL of the initial outflow liquid that flows out. The outflow of a yellow liquid is not due to an abnormal column.
- 4) Please stop both ends of the column with the eluent enclosed when the column is not used for a long term, and preserve it in the cool dark place.
- 5) The particle is generated easily in the liquid when the compound liquid of the organic acid is assumed to be an eluent, and exchange the liquids frequently, please. It is effective to add the boric acid of 1.5g/L to the eluent to prevent the particle being generated. As a result, use for one week or more becomes possible. The chromatogram doesn't change by adding the boric acid.

5. Eluent

The one that the dipicolinic acid was added can be used for a tartaric acid, an organic acid the citric acid etc. or nitric acids and the dilute aqueous solutions to the mineral acid like phosphoric acid as an eluent. The action of the dipicolinic acid brings the elution of the ion of two values forward so that the cation of two values may form the dipicolinic acid and the complex ion. Especially, Ca^{2+} elutes ahead of Mg^{2+} .

6. Washing of column

The dissolution behavior might change remarkably while measuring it repeatedly for a long time. It is thought that this happens because the adsorption element of the sample inside accumulated on the surface of the packing material. For this case, the performance might recover when the following washing it.

- 1) 50mM tartaric acid solution is thrown and 50mL is thrown by the flowing quantity of 0.3mL/min.

2) 5mM tartaric acid/acetonitrile =50/50 is thrown and 50mL is thrown by the flowing quantity of 0.3mL/min.

Attention!

- 1) Do not remove the end fittings of the column under any circumstances.
- 2) Do not make a strong impact on the column: such as hitting or dropping on the floor.
- 3) Replace the solvent in the chromatograph with the eluent to be used before connecting the column.
- 4) Connect the column so that the flow direction corresponds to the arrow mark on the tag.
- 5) In the connection of the column, we will recommend the use of the connector made of PEEK of the hand tightening type.

7. Warranty

1) Showa Denko K. K. warrants that the Shodex Column, at the time of delivery to the user, will conform to the specification of the attached Certificate of Analysis, if the Shodex Column is used in accordance with the operating manual. The foregoing warranty is exclusive and is in lieu of all other warranties with respect to the Shodex Column, 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 Column 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 Instrument, 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:

(1) If the Shodex Column is not used in accordance with the operating manual.

(2) If the Shodex Column is remodeled by anyone other than person or firm designated by Showa Denko K.K.

(3) If the Shodex Column is resold by the user without giving prior written notice to Showa Denko K.K.

(4) If the performance of the Shodex Column is not conform to the specification of the attached Certificate of Analysis 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 Column
- d) Force majeure such as fire, earthquake, flood, other natural disaster, rime, riot, act of terrorism, war or radioactive contamination

4) In no event is Showa Denko K.K. liable for (i) the results of analyses or preparations using the Shodex Column or any portion of the same, including, but not limited to, the reliability, accuracy, efficacy and safety of said results, and (ii) the occupational hazard in the use of the Shodex Column, whether or not such use is made in accordance with the attached Conditions for use.

5) The Shodex instrument 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 Instrument except laboratory use.