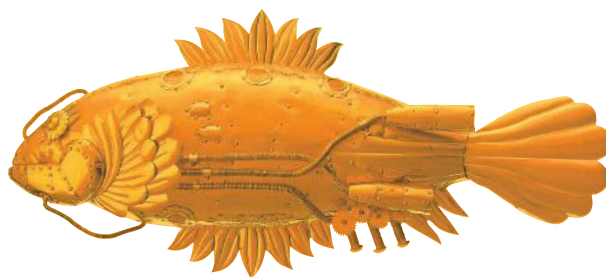


# Shodex™



## HPLC Columns

MANUAL

IC SI-90 4E

**SHOWA**  
**DENKO**  
EUROPE

Columns manufactured by Showa Denko K.K Japan

Made in Japan

**Shodex HPLC Columns**

Europe, Middle East, Africa, Russia

For technical support please use  
contact details shown below:

**SHOWA DENKO EUROPE GmbH**

Shodex Business

Konrad-Zuse-Platz 3

81829 Munich, Germany

E-mail: [support@shodex.de](mailto:support@shodex.de)

Phone: +49 (0)89 93 99 62 37

[www.shodex.de](http://www.shodex.de)

# Operation Manual

## Shodex™ IC SI-90 4E

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

### 1. Introduction

The Shodex IC SI-90 4E column is developed for use in suppressor method anion chromatography.

The seven anions, fluoride, chloride, nitrite, bromide, nitrate, phosphate and sulfate can be separated quickly with high sensitivity.

### 2. Specifications

Table 1

Product name	Column size (ID x L (mm))	Theoretical plate number	Particle size	Application
IC SI-90 4E	4.0 x 250	>5000 (SO <sub>4</sub> )	9μm	For analysis
IC SI-90G	4.6 x 10	****	9μm	As guard column

The packing material is an anion exchanger made from polyvinylalcohol gel chemically bonded with quaternary ammonium.

The liquid with which the columns are filled at delivery is a mixture of 1.8 mM Na<sub>2</sub>CO<sub>3</sub> and 1.7 mM NaHCO<sub>3</sub>.

Table 2

	SI-90 4E
Column material	PEEK
Recommended eluent	1.8 mM Na <sub>2</sub> CO <sub>3</sub> + 1.7 mM NaHCO <sub>3</sub>
Maximum flow rate	2.0 mL/min
Recommended flow rate	1.0 mL/min
Maximum pressure	10.0 MPa
Usable pH range	pH 3~12
Recommended temperature range	20 ~ 60°C

### 3. Sample pretreatment

1) Inject the sample into the column only after it has been passed through a 0.45 μm membrane filter to remove particles.

2) Any sample containing protein should be injected into the column only after protein has been eliminated from the sample.

3) Inject the sample containing organic impurities into the column only after the sample has undergone solid extraction treatment (Sep-Pak PS-1).

#### 4. Eluent

Normally aqueous solution of described in the table 2 can be used as an eluent for Shodex IC SI columns.

1) 1.8 mM Na<sub>2</sub>CO<sub>3</sub> + 1.7 mM NaHCO<sub>3</sub>

Measure 0.191 g of Na<sub>2</sub>CO<sub>3</sub> and 0.143g of NaHCO<sub>3</sub> into a 1 liter measuring flask.  
Make it up a 1 liter solution using distilled and deionized water.

2) Eluent for measuring low concentration ions: 1.0 mM Na<sub>2</sub>CO<sub>3</sub> + 4.0 mM NaHCO<sub>3</sub>

Measure 0.106g of Na<sub>2</sub>CO<sub>3</sub> and 0.336g of NaHCO<sub>3</sub> into a 1 liter measuring flask.  
Make it up a 1 liter solution using distilled and deionized water.

**CAUTION!** This eluent is recommended to use for following cases:

- Injection volume is 50 µL or more.
- Sample contains high concentration of carbonate.

3) Eluent for separation of inorganic ions and organic ions such as acetate and formate: 12.0 mM Na<sub>2</sub>CO<sub>3</sub> (for SI-90).

Measure 1.008g of NaHCO<sub>3</sub> into a 1 liter measuring flask and make it up a 1 liter solution using distilled and deionized water.

#### 5. Storage

The column should be thoroughly flushed with fresh eluent.

Column disconnected from the LC system should be tightly capped both ends to prevent internal drying, and stored in a room that has less temperature fluctuation.

## 6. Regeneration

Cause	Washing procedure
Polution by low valency hydrophilic ions	Reverse the column and wash by the following steps. <ol style="list-style-type: none"> <li>1. 15 minutes: deionized water (0.5mL/min).</li> <li>2. 60 minutes: 10 times concentrated eluent (0.5mL/min).</li> <li>3. 15 minutes: deionized water (0.5mL/min).</li> <li>4. 60 minutes: eluent (0.5mL/min).</li> </ol>
Polution by high valency hydrophobic ions	Reverse the column and wash by the following steps. <ol style="list-style-type: none"> <li>1. 15 minutes: deionized water (0.5mL/min).</li> <li>2. 10 minutes: 5% acetonitrile (0.5mL/min).</li> <li>3. 60 minutes: 100% acetonitrile (0.5mL/min).</li> <li>4. 30 minutes: deionized water (0.5mL/min).</li> <li>5. 60 minutes: eluent.</li> </ol>
Ireguar peak shape of NO <sub>3</sub>	Washed by the following steps. (the same flow as usual) <ol style="list-style-type: none"> <li>1. 15 minutes: deionized water (0.5mL/min).</li> <li>2. 25 minutes: 1mM Na<sub>2</sub>CO<sub>3</sub> (0.5mL/min).</li> <li>3. 3 days: set the end caps and store in room temperature (Replace the solvent after 3 days stored).</li> <li>4. 60 minutes: eluent (0.5mL/min).</li> </ol>

When a column is deteriorated by the foreign substances remaining in the column or adsorbed by the packing material, the substances might be washed out by the procedure described below. However, sometimes the procedure is not sufficient to regenerate the column and, in such case, it is necessary to replace the column with a new one. And, even if the column can be regenerated, the column performance may be not so good as before.