

<p>भारतीय मानक मसौदा</p> <p>विआयनीकरण कॉलम के संचालन और रखरखाव — रीति संहिता</p> <p>(पहला पुनरीक्षण)</p> <p><i>Draft Indian Standard</i></p> <p>OPERATION AND MAINTENANCE OF DEIONIZING COLUMNS – CODE OF PRACTICE</p> <p>(<i>First Revision</i>)</p> <p>(Not to be reproduced without the permission of BIS or used as an Indian Standard)</p> <p>ICS 13.060.25</p>	
Environment Protection Sectional Committee, CHD 32	Last date of comments: 04.02.2024

FOREWORD

(Formal clause to be added later)

Deionizing columns are handy and economical wherever small quantities of distilled/deionized water are required. They work on the principle of ion exchange. Raw water is passed through the cation and anion exchange columns where it is demineralized and water equivalent to, or better than, distilled water is produced. Mobility of the plant is yet another advantage.

Ion exchange process is continuous and is interrupted only for periodic regeneration of the resins. Cation exchanger requires to be regenerated by means of hydrochloric acid (5 percent) or sulphuric acid (2 to 5 percent) and anion exchanger by sodium hydroxide solution (5 percent), depending upon calcium content of the water.

Water containing free chlorine not above 0.1 mg/l is recommended for the purpose of deionization.

This standard was originally published in 1980. In this revision suitable modifications in relevant clauses have been done based on the technological advancements over the last 40 years. . This revision has been taken up in order to bring out the standard in the latest style and format of the Indian Standards.

1 SCOPE

1.1 This standard lays down the sequence of operations to be followed in the use of deionizing columns and prescribes the precautions to be taken in their operation and maintenance.

1.2 This standard applies to small scale laboratory size units and not to large scale industrial units.

2 TWO-BED DEIONIZERS

2.1 Regeneration

2.1.1 *Cation Exchanger*

2.1.1.1 Backwash the unit with deionized water at the specified flow rate and temperature for the given length of time, as recommended by the supplier.

2.1.1.2 Regenerate the bed with the required quantity and concentration of the acid specified by the supplier / manufacturer at the flow rate and temperature specified by the supplier.

2.1.1.3 Rinse the column with deionized water at the flow rate and for the given length of time as specified by the supplier/ manufacturer.

2.1.2 *Anion Exchanger*

2.1.2.1 Backwash the bed with deionized water at the specified flow rate for the given length of time, as recommended by the supplier/ manufacturer.

2.1.2.2 Regenerate the bed with the required quantity and concentration of the alkali at the flow rate and temperature specified by the supplier.

2.1.2.3 Rinse the column with deionized water at the specified flow rate for the given length of time.

2.2 Operation

Start operating the two-bed unit at the recommended flow rate till breakthrough is indicated by conductivity (monitored using inbuilt or separate conductivity meter) or by any other parameter.

3 MIXED BED DEIONIZERS

3.1 Normally these are used as polishing units and not in place of deionizing columns.

3.2 Regeneration

3.2.1 Backwash the unit with deionized water at the specified flow rate for the given length of time and allow the two layers to separate.

3.2.2 Regenerate the two resins in the deionizer using the special device in the column as recommended by the supplier. Regeneration may also be done by taking them into two different columns, washing and then reintroducing them into the mixed bed deionizer.

3.2.3 Mix the cation and the anion exchangers thoroughly by air mixing.

3.2.4 Rinse the mixed bed with deionized water at the specified flow rate for the given length of time, as recommended by the supplier.

3.3 Operation

Start operating the mixed bed unit at the recommended flow rate till breakthrough is indicated by conductivity (monitored using inbuilt or separate conductivity meter) or by any other parameter.

4 PRECAUTIONS TO BE TAKEN IN THE OPERATION AND MAINTENANCE OF DEIONIZERS

4.1 Ion exchange beds shall never be allowed to dry. Locate the units away from sources of heat, such as boiler, furnace, etc.

4.2 Keep the bed in an exhausted and not in a regenerated condition if it is expected to remain out of use for some length of time.

4.3 Ensure that all valves are closed at the end of operation or regeneration if it is expected not to use the unit immediately.

4.4 Ensure that all fittings, tube connectors and conductivity meter attached to the unit are in proper working conditions, and there should not be any leakage.

4.5 Ensure to observe the appropriate safety considerations for handling of regeneration chemicals and the resultant waste products.

4.6 Ensure to observe appropriate guidelines for disposal of the waste products generated during regeneration process.