cytiva

RESOURCE Q, 1 mL and 6 mL
RESOURCE S, 1 mL and 6 mL

Ion exchange columns

Instructions for Use

RESOURCE™ Q and S are prepacked columns for separating biomolecules by ion exchange chromatography. The columns are prepacked with SOURCE™ 15Q or SOURCE 15S. The resin is based on rigid, monodisperse ~ 15 µm beads made of polystyrene/divinyl benzene. The small monodisperse bead give high-resolution purification at high flow rates. In addition, hydrophilisation of the beads minimizes nonspecific adsorption and allows high recovery of purified sample. The material of the column body is PEEK (polyetheretherketone). The top frit is made of titanium. The bottom filter is made of polyethylene. They connect to ÄKTA™ design systems or other chromatography systems.

Table of contents

Read these instructions carefully before using RESOURCE columns.

Intended use

The RESOURCE columns are intended for research use only, and shall not be used in any clinical or *in vitro* procedures for diagnostic purposes.

Safety

For use and handling of the product in a safe way, refer to the Safety Data Sheet.

Table 1. Characteristics of RESOURCE Q and S columns

Matrix	Spherical and monodisperse, porous, rigid, polystyrene/divinyl benzene particles	
Ligand	**Q**: Quaternary ammonium (strong anion exchanger) **S**: Methyl sulfonate (strong cation exchanger)	
Mean particle diameter[1]	~ 15 µm	
	Q	**S**
pH stability, operational[2]	2 o 12	2 to 13
pH stability, CIP[3]	1 to 14	1 to 14
pH ligand fully charged	Entire operational pH range	
Maximum operating pressure[4]	1 mL column: 1.5 MPa (15 bar, 218 psi) 6 mL column: 0.6 MPa (6 bar, 87 psi	
Maximum operating flow rate[4]	1 mL column: 10 mL/min 6 mL column: 60 mL/min	
Dynamic binding capacity, QB50	15Q: ~ 45 mg BSA/mL resin[5] 15S ~ 80 mg Lysozyme/mL resin[6]	
Chemical stability	Stable to commonly used aqueous buffers, 1.0 M HCl, 100% ethanol, 100% isopropanol, 100% acetonitril, 100% methanol, 1.0 M NaOH[7]	
Operating temperature	4°C to 40°C	
Storage	**Q**: 20% ethanol, 4°C to 30°C **S**: 0.2 M sodium acetate in 20% ethanol, 4°C to 30°C	

[1] Monodisperse size distribution.
[2] pH range where resin can be operated without significant change in function.
[3] pH range where resin can be subjected to cleaning- or sanitation-in-place without significant change in function.
[4] At 25°C in H_2O.
[5] Dynamic binding capacity at 50% breakthrough by frontal analysis at a mobile phase v elocity of 300 cm/h in a PEEK 7.5/50 column at 5 cm bed height (1 min residence time) for BSA in 20 mM BisTrisPropane, pH 7.0
[6]Dynamic binding capacity at 50% breakthrough by frontal analysis at a mobile phase velocity of 300 cm/h in a PEEK 7.5/50 column at 5 cm bed height (1 min residence time) for Lysozyme in 20 mM Sodium phosphate, pH 6.8.
[7] 1.0 M NaOH should only be used for cleaning purposes.

1 Preparation

Choosing the buffer system

The pH of the start buffer must be at least 0.5 to 1 pH unit above the pI of the target substance when using an anion exchanger (Q) and 0.5 to 1 pH unit below the pI of the target substance when using a cation exchanger (S).

For samples with unknown charge properties, try the following:

- anion exchange (Q)
  start buffer: 20 mM Tris-HCl, pH 8.0
  elution buffer: start buffer including 1 M NaCl, pH 8.0
- cation exchange (S)
  start buffer: 20 mM MES, pH 6.0
  elution buffer: start buffer including 1 M NaCl, pH 6.0

For more information, refer to the handbook *Ion Exchange Chromatography, Principles and Methods*, which can be ordered from Cytiva or downloaded from our web site.

Preparing buffers and sample

To protect the column and prolong its life, we strongly recommend that you prepare buffers and samples with care. Use distilled water. Degas and filter all buffer solutions through a 0.22 µm filter. Filter the sample. When possible, dissolve or dilute it in start buffer. Buffer exchange and desalting is easily accomplished by size exclusion chromatography.

We recommend HiPrep™ 26/10 Desalting, HiTrap™ Desalting or PD-10 Desalting columns.

2 Operation

First time use or after long term storage:

RESOURCE Q is supplied in 20% ethanol and RESOURCE S is supplied in 20% ethanol, 0.2 M sodium acetate.

1. To remove ethanol, wash with 5 column volumes of distilled water at 4 mL/min (RESOURCE 1 mL), 6 mL/min (RESOURCE 6 mL). This step removes ethanol and avoids the risk of precipitation if buffer salts come into contact with the ethanol. The step can be omitted if precipitation is not likely to be a problem.
2. Wash with 5 column volumes of start buffer, at 4 mL/min (RESOURCE 1 mL), 6 mL/min (RESOURCE 6 mL).
3. Wash with 5 column volumes of elution buffer, same flow as step 2.
4. Wash with 5 column volumes of start buffer, same flow as step 2.

Perform a blank run to check conductivity and pH.

Separation by gradient elution

Flow: 4 mL/min (RESOURCE 1 mL), 6 mL/min (RESOURCE 6 mL).

Collect fractions throughout the separations.

1. Equilibrate column with 5 to 10 column volumes of start buffer or until the baseline, eluent pH and conductivity are stable.
2. Adjust the sample to the chosen starting pH and ionic strength and apply to the column.
3. Wash with 5 to 10 column volumes of start buffer or until the baseline, eluent pH and conductivity are stable i.e., when all unbound material has washed through the column.
4. Begin elution using a gradient volume of 10 to 20 column volumes and an increasing ionic strength up to 0.5 M NaCl (50%B).
5. Wash with 5 column volumes of 1 M NaCl (100%B) to elute any remaining ionically-bound material.

6 Re-equilibrate with 5 to 10 column volumes of start buffer or until eluent pH and conductivity reach the required values.

For more information about optimization, refer to the handbook *Ion Exchange Chromatography, Principles and Methods*.

3 Maintenance

Cleaning

Correct preparation of samples and buffers and application of a high salt wash (1 M NaCl) at the end of each separation should keep most columns in good condition. However, reduced performance, a slow flow rate, increasing back pressure or complete blockage are all indications that the resin needs to be cleaned using more stringent procedures in order to remove contaminants.

The column design does not permit reversing the direction of the flow as it can cause leakage. The numbers of column volumes and time required for each cleaning step might vary according to the degree of contamination.

The following procedure should be satisfactory to remove common contaminants:

1. Wash with at least 2 column volumes of 2 M NaCl at 1 mL/min (RESOURCE 1 mL), 6 mL/min (RESOURCE 6 mL).
2. Wash with at least 4 column volumes of 1.0 M NaOH (same flow as in step 1).
3. Wash with at least 2 column volumes of 2 M NaCl (same flow as in step 1).
4. Rinse with at least 2 column volumes of distilled water (same flow as in step 1) until the UV-baseline and the eluent pH are stable.
5. Wash with at least 4 column volumes of start buffer or storage buffer (same flow as in step 1) until eluent pH and conductivity have reached the required values.

To remove precipitated proteins, lipids, hydrophobically bound proteins or lipoproteins, refer to the handbook *Ion Exchange Chromatography, Principles and Methods*

Chemical stability

For daily use, RESOURCE columns are stable in common, aqueous buffers such as 1.0 M NaOH, 1.0 M HCl, 70% ethanol, 30% acetonitrile, isopropanol, methanol, and additives such as nonionic detergents.

Avoid cationic detergents with RESOURCE S. Avoid anionic detergents with RESOURCE Q. Avoid oxidizing agents.

Storage

For column storage, wash with 5 column volumes of distilled water followed by 5 column volumes of 20% ethanol. Include 0.2 M sodium acetate in the 20% ethanol solution for RESOURCE S. Degas the ethanol/water mixture thoroughly and apply at a low flow rate to avoid over-pressuring the column.

Store at 4°C to 30°C. Make sure that the column is sealed well to avoid drying out.

CAUTION

70% ethanol can require the use of explosion-proof areas and equipment

4 Ordering information

Product	Quantity	Product code
RESOURCE Q, 1 mL	1	17117701
RESOURCE S, 1 mL	1	17117801
RESOURCE Q, 6 mL	1	17117901
RESOURCE S, 6 mL	1	17118001

Accessories	Quantity	Product code
Union M6 female /1/16" male (for connection to FPLC systems)	5	18385801
Fingertight connector1/6", male (for connection to ÄKTA design systems)	10	18111255

Related products	Quantity	Product code
SOURCE 15Q	10 mL	17094720
SOURCE 15Q	50 mL	17094701
SOURCE 15S	10 mL	17094410
SOURCE 15S	50 mL	17094401
HiTrap Desalting, 5 mL	5 x 5 mL	17140801
HiPrep 26/10 Desalting	1(53 mL)	17508701
HiPrep 26/10 Desalting	4(53 mL)	17508702
PD-10 Desalting columns	30	17085101

Related literature	Product code
Ion Exchange Chromatography, Principles and Methods	11000421

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