Data sheet

SepFast™ HighRes Q (400, 500, 600)

SepFast™ HighRes DEAE (400, 500, 600)

SepFast™ HighRes S (400, 500, 600)

SepFast™ HighRes CM (400, 500, 600)

1. Introduction

SepFast HighRes Q, SepFast HighRes DEAE, SepFast HighRes S and SepFast HighRes CM are, respectively, strong anion, weak anion, strong cation and weak cation exchange adsorbents. They are specially designed for high resolution purification of biological molecules in which impure components are hard to separate by normal bioprocessing chromatography media.

SepFast HighRes media has a balanced design to offer high resolution power and also high loading capacity to separate similar components in bioprocessing applications. The core advantages are:

- High resolution at high loading
- High sample loading capacity at high flow
- High productivity

The base matrix is made of a composite of polysaccharides that have been highly cross-linked. The media is very stable to most of the chemical conditions experienced in the bioprocessing industry.

For each type of ion exchange medium, there is a choice of three different base matrices according to pore accessibility of target molecules. The feature and selection guide is listed as follows:

400 serial	500 serial	600 serial
SepFast HighRes Q-400	SepFast HighRes Q-500	SepFast HighRes Q-600
SepFast HighRes DEAE-400	SepFast HighRes DEAE-500	SepFast HighRes DEAE-600
SepFast HighRes S-400	SepFast HighRes S-500	SepFast HighRes S-600
SepFast HighRes CM-400	SepFast HighRes CM-500	SepFast HighRes CM-600
The above media is designed to purify smaller components (e.g. M.W. <100K Dalton).	The above media is designed to purify antibodies from aggregates and other impurities.	The above media is designed to purify large proteins, plasmids or viral particles.

2. Applications

SepFast HighRes media is particularly useful, due to its high resolution with high loading capacity, in a process that requires to purify difficult molecules at high throughput and cost-effective ways.

Characteristics of SepFast HighRes media:

	HighRes Q-400 HighRes Q-500 HighRes Q-600	HighRes DEAE-400 HighRes DEAE-500 HighRes DEAE-600	HighRes S-400 HighRes S-500 HighRes S-600	HighRes CM-400 HighRes CM-500 HighRes CM-600
Matrix	Highly cross-linked polysaccharide composites			
Functional group	Quaternary ammonium strong anion	Diethylaminoethyl weak anion	Sulfo strong cation	Carboxymethyl weak cation
Total ionic capacity	0.11-0.19 mmol/ml	0.11-0.21 mmol/ml	0.09-0.18 mmol/ml	0.09-0.18 mmol/ml
Particle size	20 - 50 μm			
Dynamic binding capacity*	>150 mg/ml BSA at 1 min residence time for HighRes Q-400	>150 mg/ml BSA at 1 min residence time for HighRes DEAE-400	>60 mg/ml hIgG at 1 min residence time for HighRes S-500	>120 mg/ml lysozyme at 1 min residence time for HighRes CM-400
Pressure-flow property**	To be run at a residence time of 2 min and above.			
Operational pressure	Up to 3 bar			
pH stability	2-14 (short term) and 3-12 (long term)			
Working temperature	+4^{O}C to +30^{O}C			
Chemical stability	All commonly used buffers; 1 M acetic acid, 1 M NaOH, 6M guanidine hydrochloride, 8 M urea, 30% isopropanol, 70% ethanol			
Avoid	Oxidizing agents, anionic detergents		Oxidizing agents, cationic detergents	
Storage	20% ethanol	20% ethanol	20% ethanol + 0.2 M sodium acetate	20% ethanol

**Measured at a breakthrough of 10%.*
***Measured in a 32 mm ID column at a bed height of 20 cm.*

3. Method optimization

We recommend scouting the parameters among loading capacity, flow velocity, binding pH, binding ionic strength, elution speed and gradient etc. Due to the fast pore accessibility of SepFast HighRes media, the binding step could be done in a faster flow velocity than the elution step. We recommend to pay special attention to optimize elution conditions to achieve the best separation power.

Strong ion exchange media maintain their charges (and thus their function) over a wide pH range whereas with weak ion exchange media the degree of dissociation and thus ion exchange capacity varies with pH. Therefore, it is more critical to optimize the pH if weak ion exchange media is used.

In general, balancing the degree of component separation against process throughput is the major consideration when optimizing a method. Besides, for the purification of instable or shearing-force sensitive molecules, the operational condition needs be optimized to balance the throughput and the possible damage to the target molecule.

4. Maintenance

Depending on the individual applications, the media may be used many times. For the re-use purpose, please see the following instructions.

Regeneration
After each run, elute any reversibly bound material either with a high ionic strength solution (e.g. 1M NaCl in buffer) or by increased pH.

Cleaning-in-place (CIP)
CIP is a procedure that removes strongly bound materials such as lipids, endotoxins and denatured proteins that remain in the adsorbent surface after regeneration. Regular CIP prevents the build up of contaminants in the packed bed and helps to maintain the column performance.

A specific CIP protocol should be developed for each process according to the type of contaminants present. The frequency of CIP depends on the nature of individual applications.

The following information works as a general guidance.

Salt with concentration up to 2 M can be used to clean the impurities bound by ionic interactions. The contaminants bound by hydrophobic nature can be removed by the following reagents: 1 M NaOH, low percentage non-ionic detergents (e.g. 0.1 – 2%), 30% isopropanol in basic or acidic conditions (e.g. in the presence of acetic acid or phosphoric acid). A combination of the above reagents can be explored as well. In general, the incubation time should be longer (e.g. from 30 minutes to 2 hours) to ensure full dissociation of the contaminants.

Sanitization
Sanitization using 0.5-1.0 M NaOH with a contact time of 1 hour is recommended.

5. Storage

The media should be stored in 20% ethanol (containing 0.2 M NaAC for strong cation exchange media) or 0.02% sodium azide to prevent microbial growth. Store the media at a temperature of +4°C to +30°C. Before use, equilibrate the media with at least 5 bed volume of running buffer.

6. Ordering information

Product	Quantity	Code no.
SepFast HighRes Q-400	25 ml	470101
	100 ml	470102
	1 litre	470103
Disposable SepFast HighRes Q-400 column	5 x 1 ml	470104
	1 x 5 ml	470105
	1 x 10 ml	470106
	1 x 20 ml	470107
SepFast HighRes Q-500	25 ml	470201
	100 ml	470202
	1 litre	470203
Disposable SepFast HighRes Q-500 column	5 x 1 ml	470204
	1 x 5 ml	470205
	1 x 10 ml	470206
	1 x 20 ml	470207
SepFast HighRes Q-600	25 ml	470301
	100 ml	470302
	1 litre	470303
Disposable SepFast HighRes Q-600 column	5 x 1 ml	470304
	1 x 5 ml	470305

	1 x 10 ml	470306
	1 x 20 ml	470307
SepFast HighRes DEAE-400	25 ml	470401
	100 ml	470402
	1 litre	470403
Disposable SepFast HighRes DEAE-400 column	5 x 1 ml	470404
	1 x 5 ml	470405
	1 x 10 ml	470406
	1 x 20 ml	470407
SepFast HighRes DEAE-500	25 ml	470501
	100 ml	470502
	1 litre	470503
Disposable SepFast HighRes DEAE-500 column	5 x 1 ml	470504
	1 x 5 ml	470505
	1 x 10 ml	470506
	1 x 20 ml	470507
SepFast HighRes DEAE-600	25 ml	470601
	100 ml	470602
	1 litre	470603
Disposable SepFast HighRes DEAE-600 column	5 x 1 ml	470604
	1 x 5 ml	470605
	1 x 10 ml	470606
	1 x 20 ml	470607
SepFast HighRes S-400	25 ml	470701
	100 ml	470702
	1 litre	470703
Disposable SepFast HighRes S-400 column	5 x 1 ml	470704
	1 x 5 ml	470705
	1 x 10 ml	470706
	1 x 20 ml	470707
SepFast HighRes S-500	25 ml	470801
	100 ml	470802
	1 litre	470803
Disposable SepFast HighRes S-500 column	5 x 1 ml	470804
	1 x 5 ml	470805
	1 x 10 ml	470806
	1 x 20 ml	470807
SepFast HighRes S-600	25 ml	470901
	100 ml	470902
	1 litre	470903
Disposable SepFast HighRes S-600 column	5 x 1 ml	470904
	1 x 5 ml	470905
	1 x 10 ml	470906
	1 x 20 ml	470907

SepFast HighRes CM-400	25 ml	471001
	100 ml	471002
	1 litre	471003
Disposable SepFast HighRes CM-400 column	5 x 1 ml	471004
	1 x 5 ml	471005
	1 x 10 ml	471006
	1 x 20 ml	471007
SepFast HighRes CM-500	25 ml	471101
	100 ml	471102
	1 litre	471103
Disposable SepFast HighRes CM-500 column	5 x 1 ml	471104
	1 x 5 ml	471105
	1 x 10 ml	471106
	1 x 20 ml	471107
SepFast HighRes CM-600	25 ml	471201
	100 ml	471202
	1 litre	471203
Disposable SepFast HighRes CM-600 column	5 x 1 ml	471204
	1 x 5 ml	471205
	1 x 10 ml	471206
	1 x 20 ml	471207

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