Millipore®

User Guide

Natrix® CH Micro Chromatography Membrane

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Contents

Introduction

The Natrix® CH Micro (1.06 mL) small-scale chromatography membrane device contains Natrix® CH membrane, a high-capacity cation exchange chromatography membrane with a hydrophobic interaction component.

The device is supplied ready to use and works with existing chromatography systems. It is well suited for flow-through or bind and elute applications, can be operated at fast flow rates, and is ideal for rapid cycling operations.

The device is intended for laboratory and research use only.

For information on other single-use chromatography products visit www.sigmaaldrich.com.

Technical Information

Definitions

Membrane volume (MV) is the quantity of membrane available for binding within the device. MV is also used in this document to describe both fluid volumes and flow rates (in MV/min). The use of MV is analogous to the use of column volume (CV) in column chromatography.

Materials of Construction

Component	Material
Membrane	Polyacrylamide hydrogel reinforced with polybutyleneterephthalate substrate
Screen separator	Copolymer of polypropylene and polyethylene
Chemistry	Sulfonic acid and t-butyl
Housing	Copolymer of styrene and phenylene ether
Packaging*	Paperboard box

*Recycle packaging material according to local regulations.

Specifications

Parameter	Specification
Nominal Membrane Volume (mL)	1.06
Membrane Configuration	Flat sheet
Membrane Bed Thickness (mm)	1.8
Typical Lysozyme Binding Capacity (mg/mL)*	90
Typical mAb binding capacity (mg/mL)**	80
Typical mAb loading capacity in Frontal mode (g/L) ***	1000
Flow Rate Range (MV/min)	≤ 10
Maximum Operating Pressure (psi/bar)	75/5
Connections	Female Luer

*10% breakthrough dynamic binding capacity in 20 mM sodium phosphate, pH 7.0 at 10 MV/min.

**10% breakthrough dynamic binding capacity in 50 mM sodium acetate, pH 5.0 at 10 MV/min.

***Loading capacity is dependent on feed stream and target aggregate removal.

Chemical Compatibility

Natrix® CH membrane is compatible with most aqueous buffers and solvents commonly used in biomolecule purification processes. Use this information as a guide only, as chemical compatibility can be influenced by conditions including exposure time, temperature, and chemical concentration.

Chemical
0.1 M HCl
1 M NaOH
20% Ethanol
2% Acetone
6 M Guanidine hydrochloride
8 M Urea

Storage and Handling

Natrix® CH Micro devices are supplied in dry condition. Store the devices in the original packaging in a clean, dry location at room temperature and away from direct sunlight.

NOTE Do not freeze. Do not keep the cap open.

Using the Natrix® CH Micro Device

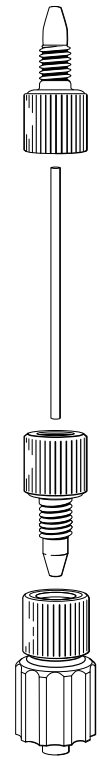
Before Installing the Device

Ensure the mAb feed and all buffers have been sterile filtered with a 0.22 µm membrane before contacting with the Natrix® CH Micro device. Before applying the mAb feed to a new device, ensure that it is equilibrated with the equilibration buffer. Optionally, run a blank cycle before applying a sample.

Installing the Device

Natrix® CH Micro devices have female Luer connections on both ports. The devices are symmetrical and can be run in either direction.

1. Remove the Luer caps from both ports of the device.
2. Connect one port of the device to the outlet tubing on the chromatography system using a male luer connector as shown in the illustration.
3. Flow equilibration buffer in upflow (bottom to top) with the open port facing up at 2 mL/min.
4. Once liquid flows out of the top of the device, if any air bubbles are visible, gently tap or shake to dislodge them. Then connect the open port of the device to the inlet tubing on the chromatography system.
5. Change the flow direction to downflow and step up the flow rate to 10 MV/min. Flow at least 20 MV of equilibration buffer at 10 MV/min. Ensure that UV signal is almost zero and pressure is stable.



Connection of Luer adapters and tubing to the Natrix® CH Micro device

Sanitizing the Device (Optional)

The Natrix® CH Micro device may be sanitized prior to use. The recommended sanitization solution is 0.5 M NaOH. Sanitize for 30 minutes. After sanitization, flush the device with equilibration buffer until the pH and conductivity values stabilize in the expected range.

Integrity Testing

Holdup Volume and System Integrity Test

The device integrity test determines if there are any gross defects in the prototype device. It is recommended to use a 2% acetone solution in the equilibration buffer as the tracer solution (alternatively, 1M NaCl can be used). If the peak is split or otherwise severely distorted, the device might not be integral. It is recommended to discontinue evaluation of the prototype device and contact Technical Services for a replacement.

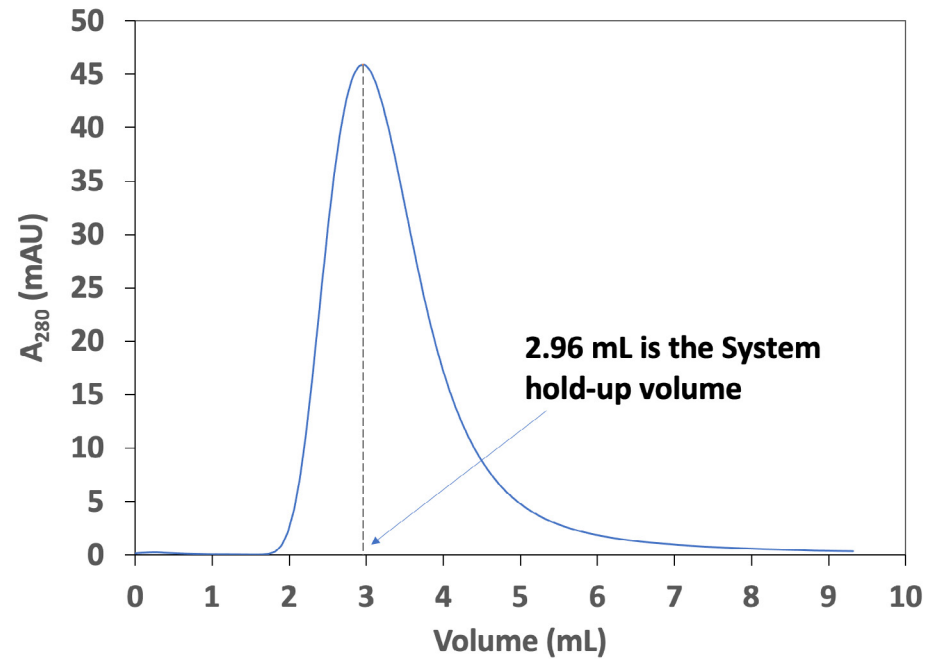
Measuring Device Integrity

Flow equilibration buffer at a flow rate of 10 MV/min through the device and monitor the UV280 or conductivity detector to establish a baseline signal.

Load 2% acetone (or 1M NaCl) solution in equilibration into the 100 µL injection loop.

Inject the tracer solution while continuing to flow equilibration buffer a flow rate of 10 MV/min. The time/volume will be set to zero at this injection event.

The observed peak maximum volume is the system holdup volume. An example of the chromatogram generated during the measurement of the system holdup volume with a 1 mL prototype device is shown below:



Example of a chromatogram showing UV280 of a 2% acetone pulse used to measure the system holdup volume

Recommended Buffer Composition for Purification of mAb in Frontal Mode

Step		Buffer Solution	Volume (MV)	Flow rate (MV/min)
Number	Description			
1	**Equilibrate** with a buffer that has the same pH and conductivity as the mAb feed that will be processed.	Acetate or phosphate buffer is recommended.	10	≤ 10
2	**Load** the membrane with the mAb feed.	Post protein A or protein A and anion exchange polished mAb feed pH adjusted 0.22 µm filtered.	Dependent on sample loading	≤ 10
3	**Wash** with the equilibration buffer to push through any feed that remains on the device.	Acetate or phosphate buffer is recommended.	10	≤ 10
4	**Strip 1** with 0.5 M NaCl to remove impurities that remain on the membrane.	0.5 M NaCl in acetate or phosphate buffer is recommended.	10	≤ 10
5	**Strip 2** with a 1M NaCl solution.	1M NaCl in acetate or phosphate buffer is recommended.	10 – 20	≤ 10
6	**Clean in place** (sanitize).	0.5 M sodium hydroxide + 50 mM NaCl.	10 – 20	≤ 10
7	**Strip 3**	1M NaCl in acetate or phosphate buffer is recommended.	10 – 20	≤ 10
8	**Re-equilibrate** for the next cycle.	Acetate or phosphate buffer is recommended.	10	≤ 10

NOTE The pH and conductivity of equilibration and load depends on the optimum condition to maximize yield and impurity removal. Generally, pH 4 – 6 and 3 – 9 mS/cm conductivity is recommended.

Standard Warranty

The applicable warranty for the products listed in this publication may be found at www.sigmaaldrich.com/terms (within the “Terms and Conditions of Sale” applicable to your purchase transaction).

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For technical assistance please visit:
www.sigma-aldrich.com

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