Instructions for Use

CIM PrimaS® 0.05 mL Monolithic 96-well Plate (2 µm channels)

CIM Convective Interaction Media®
BIA-122.5118-2

SARTORIUS

Contents

1. About These Instructions for Use

These instructions are part of the device. They apply to the device product number indicated on the cover page.

2. Safety

⚠ WARNING
Denotes a hazard that may result in death or severe injury if it is not avoided.

⚠ CAUTION
Denotes a hazard that may result in moderate or minor injury if it is not avoided.

NOTICE
Denotes a hazard that may result in property damage if it is not avoided.

2.1. Intended Use

CIM® monolithic plates are standard format plates prefilled with unique monolithic chromatographic media intended for diagnostic or screening purposes. They enable high-throughput process development through fast and efficient evaluation of binding, washing, elution conditions and other chromatographic parameters. The properties of the medium are directly comparable to CIM® chromatographic columns, making monolithic plates a robust tool in early process development stages.

CIM® ion exchange monolithic plates are used for fast, highly efficient screening of samples or purification parameters for proteins, viruses and virus like particles. The following information is being provided to ensure proper product care and optimal product performance.

2.2. Safety Note

Follow the guidelines in this Instructions for Use. Improper use may result in malfunction, personal injury, or damage of the product or material. Follow safety instructions, wear gloves, safety glasses, and a lab coat during operation.

3. Technical Data

Column chemistry	Multimodal (anion exchange–hydrogen bonding)
Channel radius	1050 nm (950 nm – 1150 nm)
Support matrix	Poly(glycidyl methacrylate -co- ethylene dimethacrylate)

Monolith dimensions	Diameter: 5 mm; length: 2.5 mm; monolith volume: 0.05 mL
Plate format	127 x 85.5 x 31 mm, plate material: polypropylene (PP) and polyethylene (HDPE)
Well load volume (WV)	Up to 900 µL, 96 wells
Operating parameters	Operating vacuum between -0.015 and -0.03 MPa | -0.15 and -0.3 bar | -2.18 and -4.35 psi; Maximum vacuum -0.06 MPa | -0.6 bar | -8.7 psi; Operating centrifugation force 500 g; Maximum centrifugation force 1000g; Operating positive pressure between 9 and 11 psi; Maximum positive pressure 15 psi.
Operating temperature	4 °C (39 °F) to 40 °C (104 °F)
Chemical stability	All commonly used aqueous buffers, 0.1 M HCl, 500 mM acetic acid, 500 mM phosphoric acid, 2% benzyl alcohol, 0.1 M NaOH (tested up to 120 min), and 20 % ethanol solution. Avoid oxidizing agents. Avoid prolonged use of concentrated acids (more than 0.5 M) like hydrochloric or sulphuric acid. Avoid > 0.1 M NaOH solution.
Recommended pH	Working range 2–11, cleaning in place 1–13
Storage conditions	2 °C (36 °F) to 25 °C (77 °F); 20 % ethanol
Shelf life	3 years

4. Installation

Remove the product from its shipping box or crate and place on a flat surface. Carefully inspect the product for any damage that may have occurred during shipping. Immediately report any such damage to your vendor and the courier. The product is shipped in the designated storage solution at ambient temperature and should be stored upon receiving as stated under Technical Data.

NOTICE
Do not store the product below 0 °C (32 °F).

5. Getting Started

The plate does not require a fully automated robot system and can be operated using a vacuum manifold or centrifuge. Operating parameters can be found under Technical Data. Before use, remove the top and bottom cover seals and remove storage solution by vacuum or centrifugation.

Note: When using a vacuum manifold with a vacuum pump, the maximum separation between the bottom of the plate and the top of the collection plate should not exceed 5 mm to prevent cross contamination. Turn off the vacuum as soon as the sample/solution is removed.
Note: With a centrifuge, ensure the collection plate well volume is suitable for the intended loading volume. Centrifuge the plate until the sample/solution is removed. Adjust centrifugation time accordingly.

5.1. General Recommendations

The following are general guidelines to consider when working with chromatography. The guidelines may not apply to specific plate chemistry or sample properties.

- Treat loading material appropriately (e.g. pre-treat, filter, concentrate / dilute, etc.). For more details, please refer to the Guideline 'Pre-treatment of complex biological samples before column purification and regeneration procedures for columns with increased back pressure' (biaseparations.com/en/library/guidelines).
- Always use freshly prepared mobile phases, filtered through 0.2 μm filter, compatible with mobile phases.
- Air bubbles will not disturb the stationary phase and can be washed out of the plate. However, drying the monolith risks damaging the stationary phase.
- Surfactants can improve recoveries in virus purification. Non-ionic surfactants will not interact with ion exchange chromatography media. Non-UV-absorbing (at working wavelengths) surfactants will improve the baseline signal.
- Ensure all components of the system used are compatible with the working solutions (e.g. sodium hydroxide, organic solvents, high salt concentrations, etc).

NOTICE
Always ensure mobile phases are compatible before mixing them or applying consecutively on the plate. Examples of in-compatible buffers are: magnesium ion-containing buffers and sodium hydroxide (forms precipitate), acetonitrile and sodium hydroxide (forms ammonia and acetate), ammonium acetate and sodium hydroxide (potential formation of explosive atmosphere), ethanol and sodium hydroxide (forms ethoxides). Wash the plate with water or another compatible solution when using two incompatible solutions consecutively.

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6. Operating the Plate

6.1. Equilibration

For robust and consistent operation of the plate, equilibration should be performed before starting with sample analysis when the plate was stored, regenerated or cleaned in place. Flush any storage or cleaning solution out of each well by washing with 2 WV of deionised water. The plate should be equilibrated with a suitable counter-ion. Binding buffer should have the same or similar composition to the loaded sample. To speed up equilibration, a buffer containing a higher concentration of the appropriate ion may be used (e.g. the elution buffer), as described here.

1. If needed wash each well with 2 WV of water to prevent mixing of incompatible buffers.
2. Wash each well with at least 3 WV of elution mobile phase (which contains elevated salt concentration). For weak ion exchangers, an extended contact time is recommended (lower pressure or lower centrifugal force can be used to extend the contact time (~0.2 Bar or 500 g)).
3. Wash each well with at least 2 WV of binding mobile phase. The composition of this mobile phase should be similar to the sample composition.

6.2. Strip | Regeneration

A strip is typically implemented in the screening run to remove tightly-bound sample components. It is common to use the same approach as the elution: elevated salt concentration (e.g. 2 M NaCl), change in pH (low pH or high pH solution), or other.
We recommend to clean the plate after screening run. See the section Cleaning in Place.

7. Cleaning | Maintenance

Cleaning and maintenance of the device may improve its lifetime and increase reproducibility. Sample properties should be taken into account for plate cleaning.

7.1. Cleaning in Place (CIP)

In some cases, a simple regeneration of the plate is not sufficient. Sample molecules may not completely elute from the plate or may even precipitate on the plate. This build-up of contaminants on the monolithic plate may cause loss of resolution and binding capacity or a complete blockage of the plate. A specific CIP procedure should be designed for the type of contaminants present in the sample. In most cases the following procedure can be used:

1. Wash each well with 1 WV of deionised water.
2. Wash each well with 2 WV of 0.1 M NaOH and 2 M NaCl. **Note**: Concentrations of NaOH higher than 0.1 M will irreversibly damage the plate.
3. Wash each well with 1 WV of deionised water.
4. To reduce the pH, wash the plate with at least 2 WV of a solution containing 0.1 M acetic acid and 1 M NaCl at pH 5. Other concentrated buffer (e.g. 0.1–0.5 M buffer, pH 5–6) can be used.
5. Wash each well with 1 WV of deionised water.
6. Restore the pH by washing each well with 2 WV of a concentrated buffer (e.g. 0.1–0.5 M buffer) to restore the appropriate pH.

Note: NaOH forms a precipitate with bivalent metal cations (e.g. Mg^{2+}, Ca^{2+}). Precipitation causes a gradual pressure increase over consecutive runs until complete plate blockage. The precipitate can be dissolved with a 0.1 M HCl wash. Consecutive washes with acid will have negative impact on plate lifetime. To prevent precipitation, wash the plate with at least 10 CV of water or a compatible buffer before and after NaOH.

8. Storage

Wash the plate with at least 1 WV per well of deionized water and proceed with at least 1 WV per well of storage solution. Add storage solution to each well. Seal the plate and store at the temperature specified in the table Technical Data. If there is a possibility of biological contamination from the sample it is recommended to store the plate between 2 °C (36 °F) and 8 °C (46 °F).

Note: Clean and equilibrate the plate before long-term storage.
Note: NaOH-ethanol mixtures at any concentration form ethoxide anions that are highly destructive to biomolecules. Caution is recommended. Neutralise the plate environment before introducing ethanol.

9. Troubleshooting

Problems arising during the analysis are usually related to the device, sample, mobile phase, or the instrumentation. It is advisable to use an elimination approach to exclude possible causes. Please refer to our troubleshooting guide (biaseparations.com/en/library/guidelines).

10. Decommissioning | Transportation

If there is reason to return the product, complete a Return Form (biaseparations.com/en/terms-conditions) and contact help.bia@sartorius.com.

Contaminated samples used during the process that could cause biological or chemical hazards are potentially hazardous substances. If the product has come into contact with hazardous substances, steps must be taken to ensure proper decontamination and declaration.

Procedure
Decontaminate the product. The operator of the product is responsible for adhering to local government regulations on the proper decontamination and declaration for transport and disposal.

11. Ordering Information

Transferring the workflow to a different scale or format (analytical, screening) is simple with CIM®. Contact your local support to find the appropriate products.

The information and figures contained in these
instructions correspond to the version date
specified below.
Sartorius reserves the right to make changes to
the technology, features, specifications and
design of the equipment without notice.
Masculine or feminine forms are used to
facilitate legibility in these instructions and
always simultaneously denote the other gender
as well.

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