IC equipment

IC equipment: Inline Ultrafiltration – MiPT (6.5330.210)

Manual

8.110.8039EN / 2019-10-25

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This documentation has been prepared with great care. However, errors can never be entirely ruled out. Please send comments regarding possible errors to the address above.

Table of contents

Table of figures

1 Introduction

1.1 Description of the IC equipment: Inline Ultrafiltration – MiPT

The IC equipment: Inline Ultrafiltration – MiPT (6.5330.210) contains all the required accessory parts for the Inline Ultrafiltration and for the Metrohm intelligent Partial Loop Injection Technique (MiPT).

Combining the Inline Ultrafiltration and MiPT allows for the samples to be filtered and subsequently be filled into the sample loop with an accurately measured volume.

The main component of the Inline Ultrafiltration is the high-performance ultrafiltration cell. This cell is suitable for the filtration of samples that pose particular requirements with regard to filtration effectiveness and sample throughput.

MiPT allows you to fill the 250 µL sample loop with a precisely measured volume. In this process, an 800 Dosino with a 2 mL dosing unit performs the precise dosing increments. MiPT enables calibration with only one standard solution, as the injection volume can be selected freely. The same applies to sample injection. This means, for example, that a small injection volume can be selected for a highly concentrated sample.

The sample needle is rinsed with ultrapure water in the rinsing unit of the Liquid Handling Station (6.2841.120) after each sample aspiration. The Liquid Handling Station (6.2841.120) can be mounted on any Sample Processor equipped with a Swing Head.

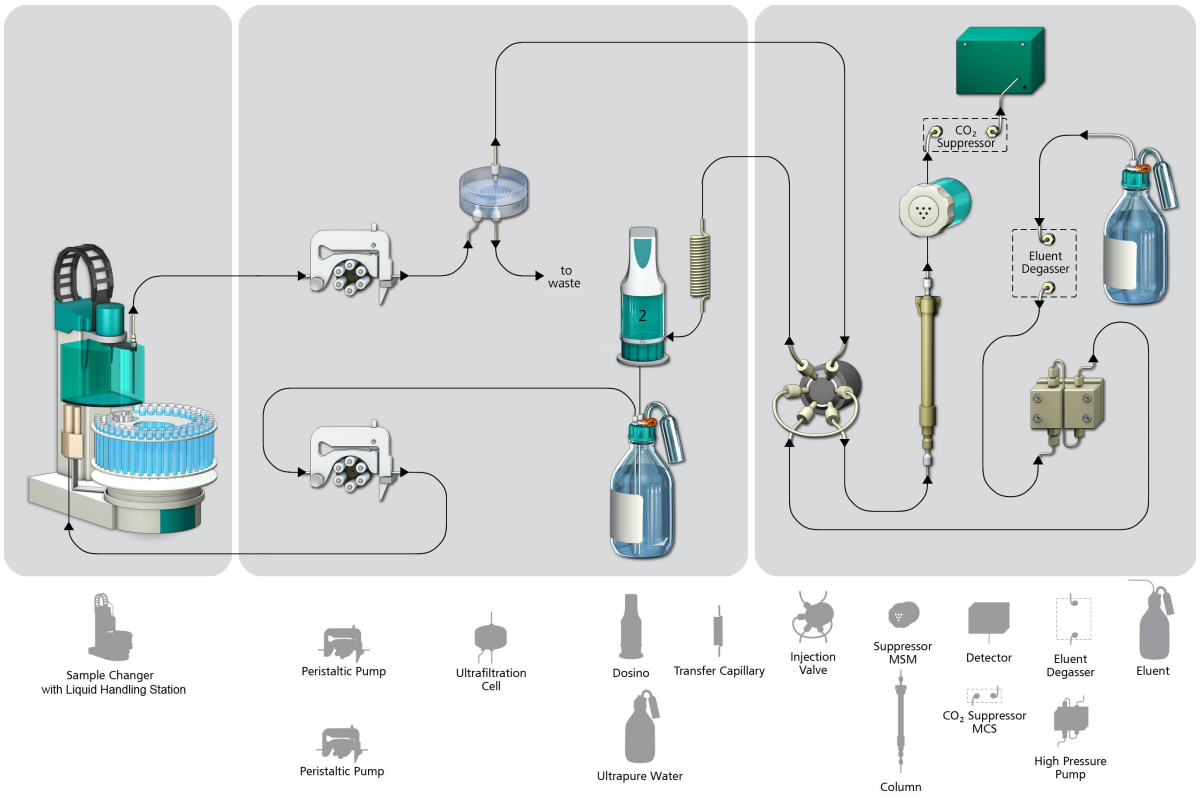


Figure 1 IC equipment: Inline Ultrafiltration – MiPT – Overview

1.2 About the documentation

This manual describes the installation of the IC equipment: Inline Ultrafiltration – MiPT.

CAUTION

Please read through this documentation carefully before putting the equipment into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the equipment.

Additional documentation

Topic	Document
Mounting the Liquid Handling Station on the Sample Processor	8.108.8011 Manual for Liquid Handling Station
Installing the Dosino	8.800.8002 Manual for 800 Dosino
Care and maintenance of the dosing unit	8.807.8002 Manual for 807 Dosing Unit

1.2.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

*(5-**12**)*	**Cross-reference to figure legend** The first number refers to the figure number, the second to the instrument part in the figure.
1	**Instruction step** Carry out these steps in the sequence shown.
Method	**Dialog text**, **parameter** in the software
File ▸ New	Menu or menu item
[Next]	**Button** or **key**
	**WARNING** This symbol draws attention to a possible life-threatening hazard or risk of injury.
	**WARNING** This symbol draws attention to a possible hazard due to electrical current.
	**WARNING** This symbol draws attention to a possible hazard due to heat or hot instrument parts.
	**WARNING** This symbol draws attention to a possible biological hazard.
	**CAUTION** This symbol draws attention to possible damage to instruments or instrument parts.
	**NOTE** This symbol highlights additional information and tips.

2 Overview

2.1 Parts of the IC equipment: Inline Ultrafiltration – MiPT

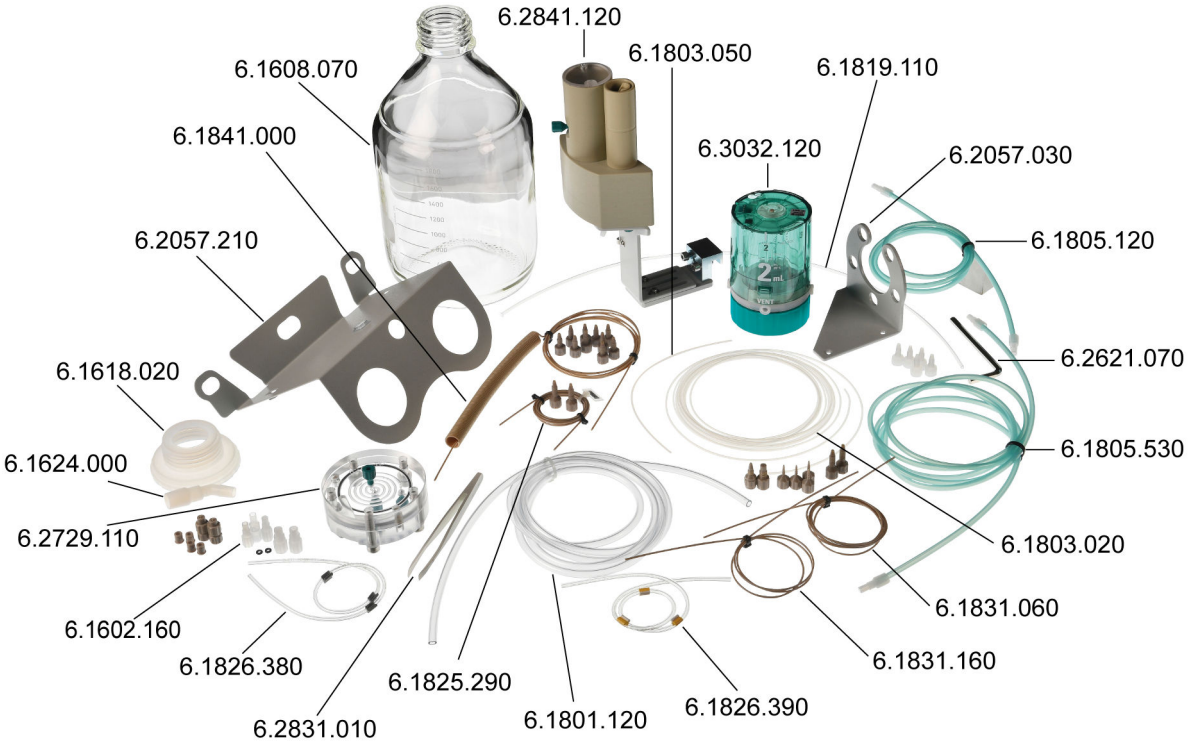


Figure 2 IC equipment: Inline Ultrafiltration – MiPT – Parts

Figure 3 Couplings, adapters and screws of the IC equipment: Inline Ultrafiltration – MiPT

2.2 Components of the ultrafiltration cell

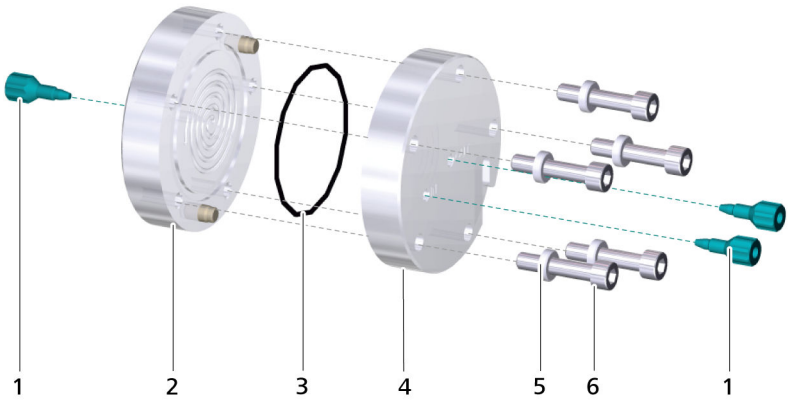


Figure 4 Ultrafiltration cell – Parts

1 Stopper	**2 Upper chamber**

3	**Sealing ring**
4	**Lower chamber**
5	**Washers**
6	**Screws** For joining the upper and the lower part of the cell.

2.3 Connectors of the ultrafiltration cell

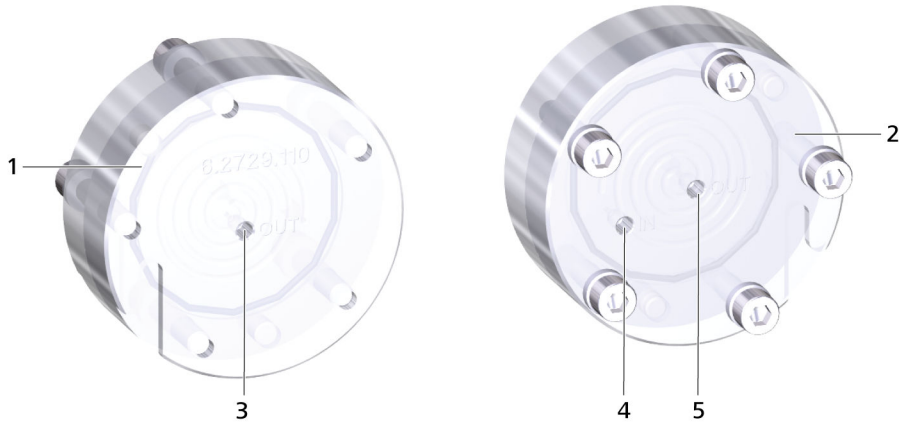


Figure 5 Ultrafiltration cell – Connectors

1	**Upper chamber**
2	**Lower chamber**
3	**Filtrate outlet** Labeled *OUT*.
4	**Sample inlet** Labeled *IN*.
5	**Sample outlet** Labeled *OUT*.

2.4 Components of the Liquid Handling Station

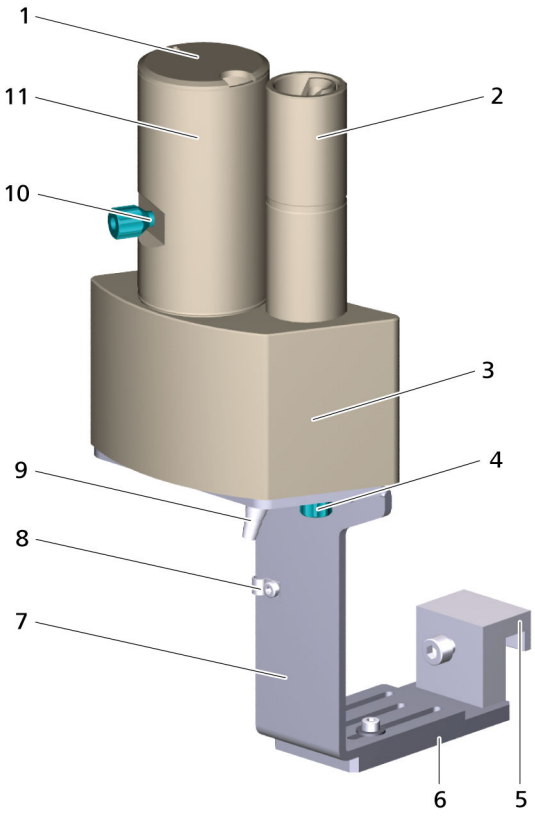
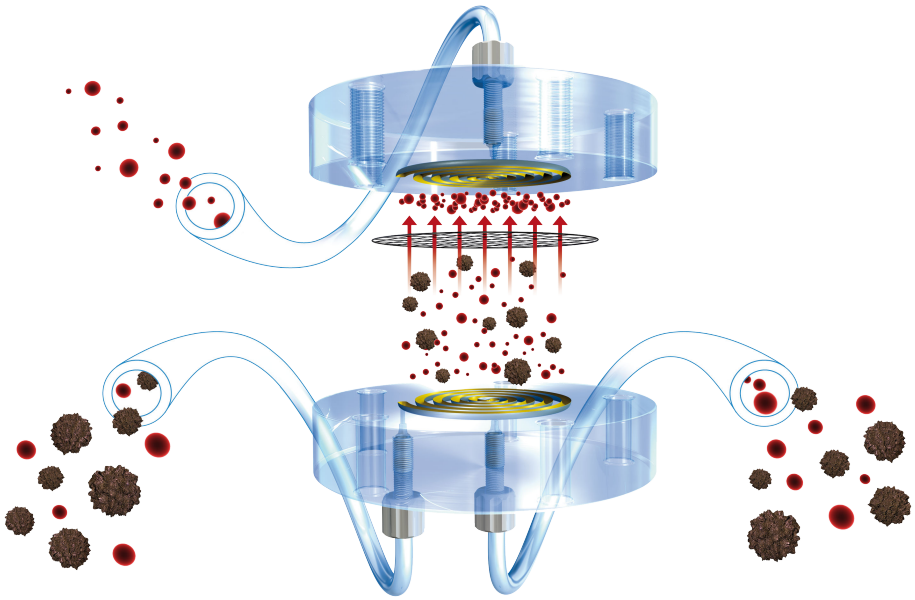


Figure 6 Liquid Handling Station – Parts

1	**Cover** For the mixing vessel.	**2**	**Rinsing unit**
3	**Main body** With magnetic stirrer dummy.	**4**	**Rinsing unit inlet** Sealed with threaded stopper.
5	**Clamping fastener**	**6**	**Base plate**
7	**Platform**	**8**	**Cable clip**
9	**Waste connector**	**10**	**Mixing vessel outlet** Sealed with threaded stopper.
11	**Mixing vessel**		

3 Mode of operation of the intelligent Partial Loop Injection Technique

1. Emptying the dosing unit
   At the beginning of the determination, the 2-mL dosing unit of the Dosino is emptied.
2. Aspirating sample
   The peristaltic pump between the sample changer and the ultrafiltration cell aspirates the sample.
3. Ultrafiltration



The peristaltic pump delivers a continuous flow of the sample at a high rate through the lower chamber of the ultrafiltration cell. The sample flows along the filtration membrane and then to the waste container.
At the same time, the Dosino generates a vacuum in the upper chamber of the ultrafiltration cell, thus aspirating the sample solution through the filtration membrane. The filtrate enters the transfer capillary.
Less than 20% of the original sample solution volume is analyzed as filtrate. The remainder flows directly into the waste container.

4. Filling the sample loop
    a. The injection valve is switched to the **Fill** position.
    b. The 800 Dosino doses the injection volume from the transfer capillary to the 250 µL sample loop.
    The 800 Dosino doses the required ultrapure water from the ultrapure water bottle to the transfer capillary and the sample loop.
    c. Excess sample and ultrapure water are discharged via port 4 of the dosing unit.
5. Injecting
    The injection valve is switched to the **Inject** position. The sample is injected into the separation column with the eluent.
6. Rinsing
    a. The needle on the Sample Processor moves to the rinse position of the Liquid Handling Station.
    b. The peristaltic pump between the ultrapure water bottle and the Liquid Handling Station delivers ultrapure water to the Liquid Handling Station.
    c. The needle is rinsed in the Liquid Handling Station.

4 Installation

4.1 Installing the ultrafiltration cell

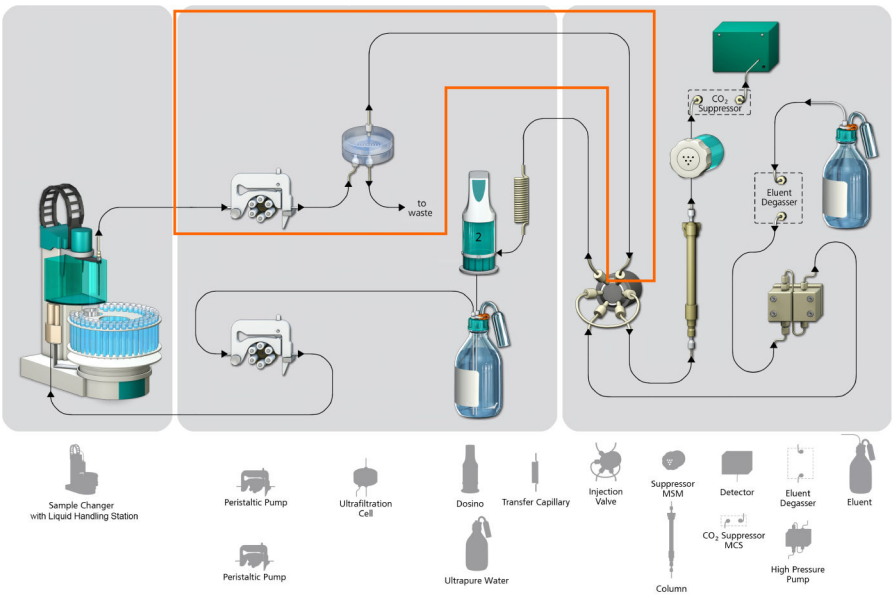


Figure 7 Connecting the ultrafiltration cell – Overview

4.1.1 Preparing the ultrafiltration cell

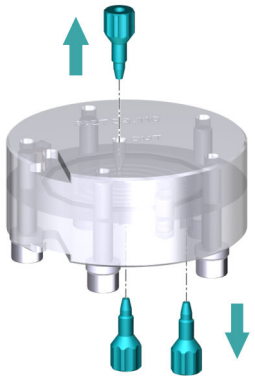
Inserting the filtration membrane

Required accessories

- Ultrafiltration cell (6.2729.110)
- Filtration membrane (6.2714.020)
- 5 mm hex key for IC Sample Processors (6.2621.070)

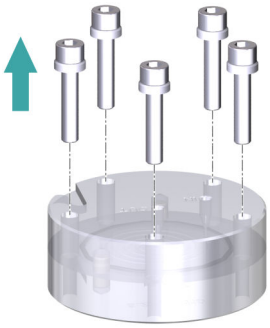
- Plastic tweezers (6.2831.010)

1 Removing the stoppers



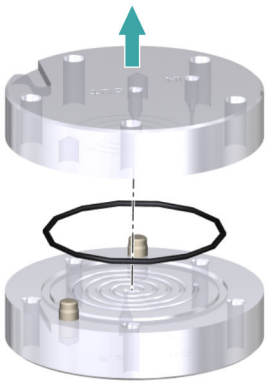
- Remove the 3 green stoppers.
- Turn the ultrafiltration cell around and place it on a table. The screws face upwards.

2 Removing the screws



- Loosen the screws with the hex key.
- Remove the screws with the washers and put them aside.

3 Disassembling the ultrafiltration cell



- Remove the upper chamber of the ultrafiltration cell.
- Remove the sealing ring.

4 Cleaning the ultrafiltration cell

CAUTION

Damage to the ultrafiltration cell

Organic solvents (e.g. acetone) corrode and damage the ultrafiltration cell material (PMMA).

Use only ultrapure water or a water-ethanol mixture (70:30) for cleaning the ultrafiltration cell.

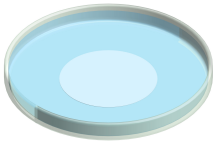
- Thoroughly rinse off the sealing ring, the upper chamber and the lower chamber of the ultrafiltration cell with ultrapure water.
- Dry all parts with a lint-free cloth.

5 Wetting the filtration membrane

NOTICE

In the package containing the filtration membranes, you will find sheets of different thicknesses and colors:

- The firm white cardboard is a cover protecting the filtration membranes. Do not insert the cover into the ultrafiltration cell.
- The thin light-blue sheets are separation sheets placed between 2 filtration membranes. Do not insert the separation sheets into the ultrafiltration cell.
- The thin white sheets are the filtration membranes. Only insert the filtration membranes into the ultrafiltration cell.

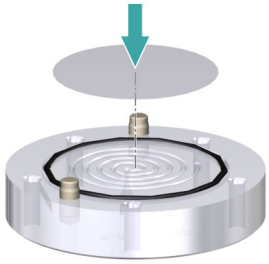


- Using the tweezers, take a new filtration membrane out of the package.
- Place the filtration membrane in a petri dish filled with ultrapure water and allow to hydrate for approx. 2 minutes.

6 Inserting the filtration membrane

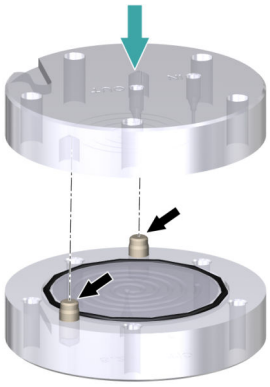
NOTICE

The water-soaked filtration membrane must not dry out before it is inserted. Otherwise it can no longer be used.



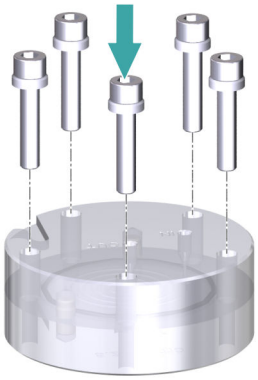
- Place the sealing ring back in the recess.
- Using the tweezers, place the wet filtration membrane centrally inside the sealing ring onto the cell.

7 Assembling the ultrafiltration cell



- Place the upper chamber of the ultrafiltration cell on the lower chamber in such a way that the 2 guide bolts exactly fit into the 2 bore holes.

8 Screwing the ultrafiltration cell together



- Screw the 5 screws with the washers in the ultrafiltration cell by hand first.
- Then firmly tighten them with the hex key in crosswise sequence.

4.1.2 Connecting the ultrafiltration cell

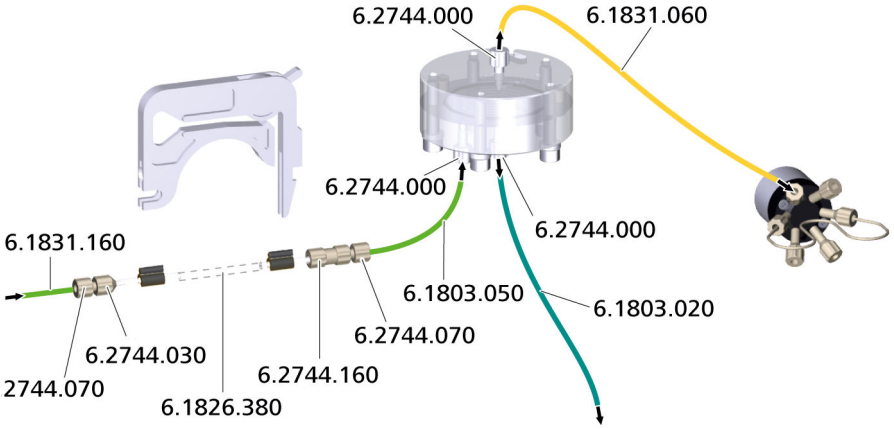


Figure 8 Connecting the ultrafiltration cell

NOTICE

- In order to keep dead volume to a minimum, make sure that the capillaries are as short as possible.
- The capillaries that are used for transferring the filtrate are thinner than the capillaries used for transferring the sample.
- To prevent the capillaries leading into the ion chromatograph from being pinched, always guide them through the capillary feed-throughs provided for this purpose (*see the manual for the ion chromatograph*).

Connecting the ultrafiltration cell

Required accessories

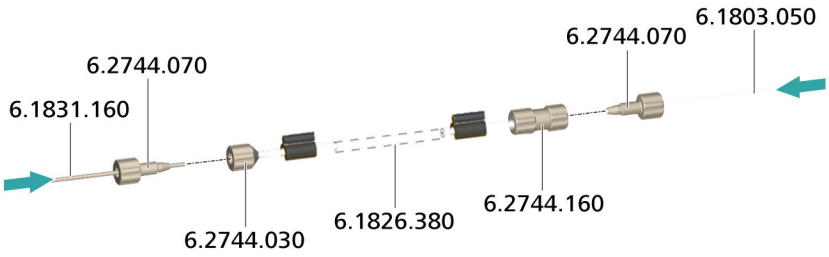
- Ultrafiltration cell (6.2729.110)
- PEEK capillary, 0.5 mm ID / 70 cm (6.1831.160)
- PTFE capillary, 0.5 mm ID / 20 cm (6.1803.050)
- PTFE capillary, 0.97 mm ID / 5 m (6.1803.020)
- PEEK capillary, 0.5 mm ID / 1 m (6.1831.060)
- Pump tubing LFL (gray/gray), 3 stoppers (6.1826.380)
- Pump tubing connection with locking nut (6.2744.160)
- Coupling olive/UNF 10/32 (6.2744.030)
- Pressure screw, short (6.2744.070)
- Pressure screw PVDF (6.2744.000)
- Capillary cutter (6.2621.080)
  The capillary cutter is not included in the IC equipment: Inline Ultrafiltration – MiPT.

1 Preparing the pump tubing

Use the pump tubing with gray stoppers (6.1826.380) for conveying the sample.

- Attach the coupling olive/UNF 10/32 (6.2744.030) to the inlet of the pump tubing.
- Attach the pump tubing connection with locking nut (6.2744.160) to the outlet of the pump tubing (*see chapter "Installing the peristaltic pump" in the manual for the ion chromatograph or in the manual for the Sample Processor*).

2 Connecting the capillaries to the pump tubing



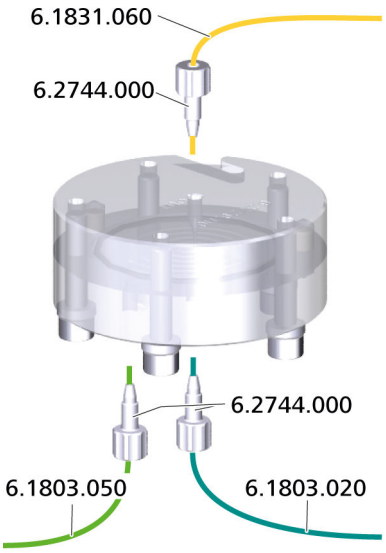
- Screw the PEEK capillary (6.1831.160) to the inlet of the pump tubing using a pressure screw (6.2744.070).
- Screw the PTFE capillary (6.1803.050) to the outlet of the pump tubing using a pressure screw (6.2744.070).

3 Connecting capillaries to the ultrafiltration cell

CAUTION

Use only PVDF pressure screws (6.2744.000) to tighten capillaries to the ultrafiltration cell.

PEEK pressure screws are too hard and can damage the ultrafiltration cell material.



- Tighten the PTFE capillary (6.1803.050) to the inlet labeled *IN* of the ultrafiltration cell's lower chamber using a PVDF pressure screw (6.2744.000).
- Cut the PTFE capillary (6.1803.020) into 3 pieces of the same size with the capillary cutter.
  Tighten 1 PTFE capillary (6.1803.020) to the outlet labeled *OUT* of the ultrafiltration cell's lower chamber using a PVDF pressure screw (6.2744.000).
- Tighten the PTFE capillary (6.1831.060) to the outlet labeled *OUT* of the ultrafiltration cell's upper chamber using a PVDF pressure screw (6.2744.000).

4 Connecting the remaining capillaries

- Tighten the free end of the PEEK capillary (6.1831.160) to the needle of the Sample Processor (*see manual for the Sample Processor*).

- Tighten the free end of the PEEK capillary (6.1831.060) to Port 1 of the injection valve in the ion chromatograph (*see manual for the ion chromatograph*).
- Either tighten the free end of the PTFE capillary (6.1803.020) to the waste collector or guide it directly to the waste container and tighten it there.

4.1.3 Inserting the ultrafiltration cell

Fastening the ultrafiltration cell to the Sample Processor

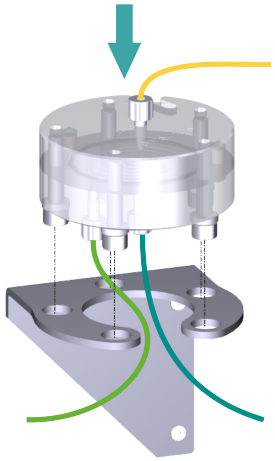
Required accessories

- Holder for the ultrafiltration cell for the IC Sample Processor (6.2057.030)
- Ultrafiltration cell (6.2729.110)

1 Attaching the holder

- Tighten the filtration cell holder to the IC Sample Processor (*see manual for the IC Sample Processor*).

2 Inserting the ultrafiltration cell



- Insert the ultrafiltration cell in such way that the screw heads are located in the holes in the filtration cell holder provided for this purpose.

4.1.4 Deaerating the ultrafiltration cell

Every time a new filtration membrane is inserted, the air which may still be present in the filtration cell and in the capillaries must be removed. To accomplish this, rinse out all capillaries with e.g. ultrapure water.

NOTICE

The entire filtration system must be completely connected prior to the rinsing procedure.

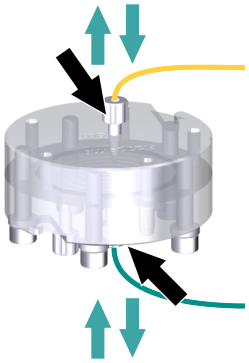
Rinsing the ultrafiltration cell

1 Settings in the software

- Immerse the needle of the Sample Processor into the rinsing solution.
- Switch on the peristaltic pump.
- Rinse the filtration system with ultrapure water for approx. 5 min.

2 Monitoring the rinsing process

- Check whether equal amounts of solution are emerging from both feed lines to the waste container.
- Check whether all the capillary connections from the rinsing solution through the peristaltic pump and the ultrafiltration cell are leak-tight all the way to the waste container.
  If liquid is escaping somewhere, then tighten the corresponding connection or redo the connection.
- Check whether any air bubbles remain trapped in the ultrafiltration cell.
  If air bubbles are trapped in the cell, then unscrew the PTFE capillaries from the filtrate outlet and from the sample outlet and wait until the air bubbles have escaped. Afterwards, tighten the capillaries to the ultrafiltration cell again.



4.2 Equipping the ultrapure water bottle

Mounting the bottle cap

Required accessories

- Eluent bottle / 2 L / GL 45 (6.1608.070) filled with ultrapure water
- Bottle cap for eluents and reagents GL 45 (6.1602.160)
- Adsorber tube for dosing unit (6.1619.000)
  included in the accessories for the dosing unit 2 mL (6.3032.120)
- Adapter SGJ 14 for the adsorber tube 6.1619.XXX (6.1624.000)
- FEP aspiration tubing for the canister (6.1819.110)
- Threaded stopper / M8 (6.1446.080)
  included in the accessories for the bottle cap for eluents and reagents GL 45 (6.1602.160)
- PTFE capillary, 0.97 mm ID / 5 m (6.1803.020)

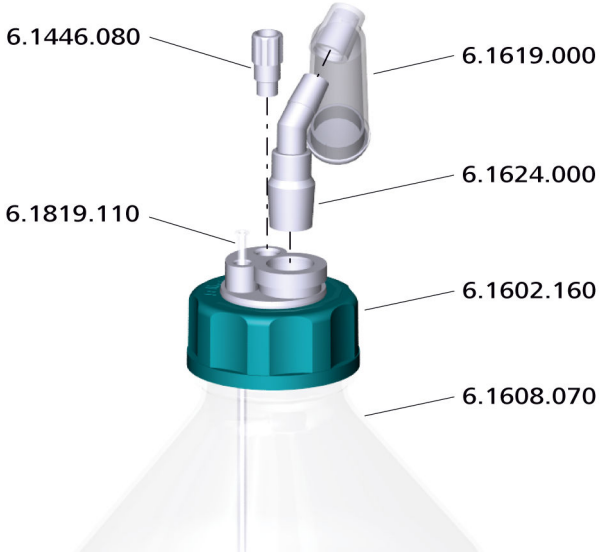


Figure 9 Equipping the ultrapure water bottle

1 Mounting the FEP aspiration tubing

- Insert the FEP aspiration tubing into the M6 opening of the eluent bottle cap.
- Use the capillary cutter to cut the FEP aspiration tubing to such a length that it touches the bottom of the bottle.

2 Inserting the stopper

- Tighten the PTFE capillary with the M8 stopper in the M8 opening of the eluent bottle cap.

3 Mounting the adsorber tube

- Fill the adsorber tube with some cotton and adsorber material.
- Place the adsorber tube onto the adapter.
- Insert the adapter into the SGJ opening of the eluent bottle cap.

4 Mounting the eluent bottle cap

- Screw the eluent bottle cap onto the bottle.

4.3 Installing the Dosino

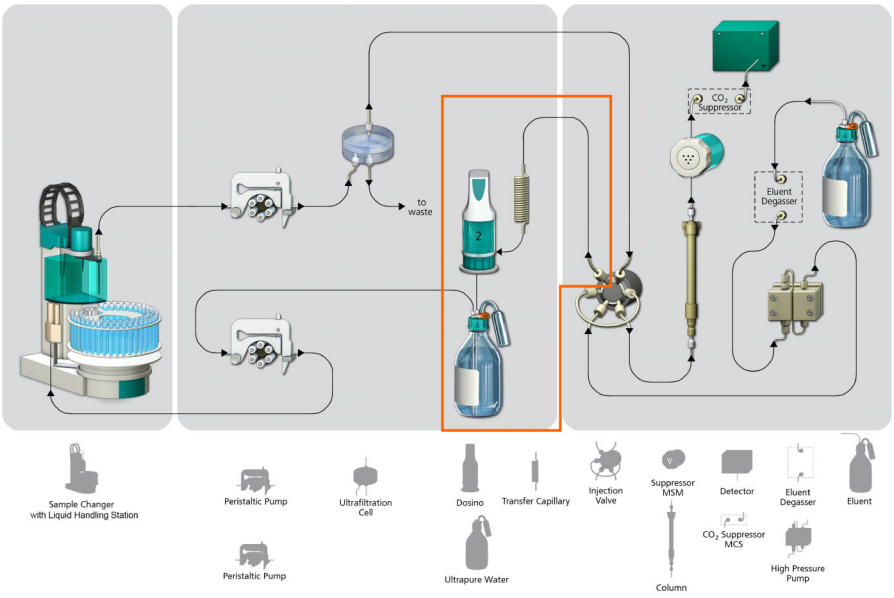


Figure 10 Connecting the Dosino – Overview

4.3.1 Installing the Dosino

Attaching the Dosino to the 807 Dosing Unit

Required accessories

- 800 Dosino (2.800.0010)
  The 800 Dosino is not included in the IC equipment: Inline Ultrafiltration – MiPT.
- Dosing unit 2 mL (6.3032.120)

CAUTION

Please read through the correct procedure in the manual for the 800 Dosino before you attach the Dosino to the dosing unit.

1 Attach the Dosino to the dosing unit *(see 8.800.8002 manual for the 800 Dosino)*.

Attaching the dosing unit to the ion chromatograph

Required accessories

- Dosing unit 2 mL (6.3032.120)
- Dosino holder for IC instruments (6.2057.210)
- Thread adapter / S40 on GL 45 (6.1618.020)

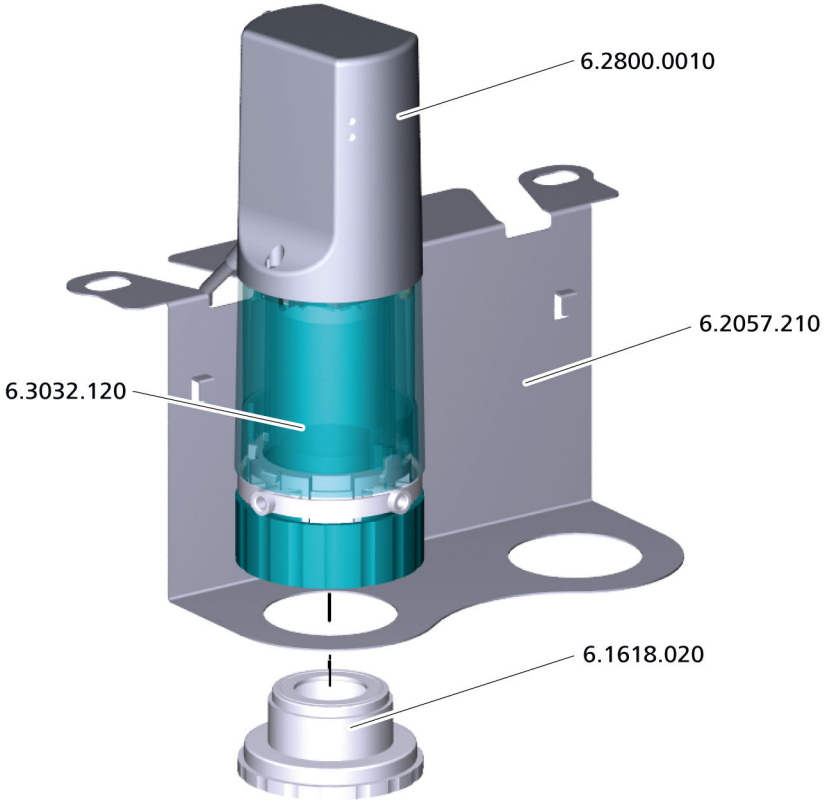


Figure 11 Mounting the Dosino

1 Fitting the Dosino holder onto the ion chromatograph

- Loosen the bottle holder on the ion chromatograph.
- Clamp the Dosino holder under it.
- Fasten the bottle holder again.

2 Attaching the Dosino to the holder

- Attach the Dosino with the dosing unit onto the Dosino holder.
- Fasten the dosing unit to the Dosino holder by tightening the thread adapter from below.

3 Connecting the Dosino to the ion chromatograph

NOTICE

The ion chromatograph **must** be switched off when the Dosino is being plugged to the MSB connector.

- Check whether the ion chromatograph is switched on.
  If this is the case, switch off the ion chromatograph.
- Plug the Dosino cable into one of the ion chromatograph's MSB connectors.

Alternatively, the dosing unit can also be mounted to the Sample Processor *(see 8.800.8002 manual for the 800 Dosino)*.

4.3.2 Connecting the dosing unit with the ultrapure water bottle

Mounting the FEP tubing

Required accessories

- FEP tubing / M6 / 100 cm (6.1805.120)

Figure 12 Mounting the FEP tubing

1
- Tighten one end of the FEP tubing in the M6 opening of the eluent bottle cap.
- Tighten the other end of the FEP tubing in Port 2 of the Dosino.

4.3.3 Connecting the dosing unit to the injection valve

Installing the transfer capillary

Required accessories
- PEEK transfer capillary 2 mL, 5 m (6.1841.000)
- Pressure screw (6.2744.014)
- M6 thread / UNF 10/32 adapter (6.2744.080)

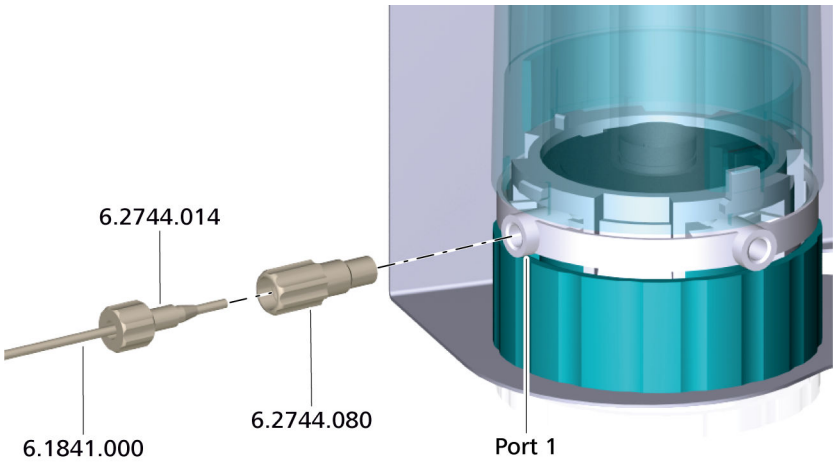


Figure 13 Installing the transfer capillary

1 Mounting the adapter

- Tighten the adapter to port 1 of the dosing unit.

2 Installing the transfer capillary

- Tighten one end of the transfer capillary to the adapter using a pressure screw.
- Guide the free end of the transfer capillary through one of the ion chromatograph's capillary feed-throughs.
- Tighten the end of the transfer capillary to Port 2 of the injection valve.

4.3.4 Connecting the dosing unit to the waste container

Mounting the FEP tubing

Required accessories

- FEP tubing / M6 / 2 m (6.1805.530)
- Adapter Dosino Port 4, M6 inner (6.1808.280)
- Adapter UNF 10/32 outer / M6 inner (6.2744.200)

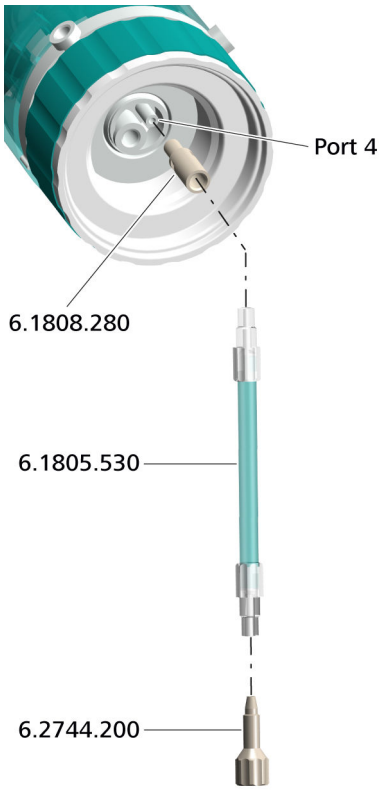


Figure 14 Connecting to the waste container

1 Mounting the adapter

- Tighten the adapter (6.1808.280) to **port 4** of the dosing unit.

2 Mounting the FEP tubing

- Connect one end of the FEP tubing to the adapter (6.1808.280).
- Connect the free end of the FEP tubing to the waste collector with the adapter (6.2744.200).

4.4 Exchanging the sample loop

Required accessories

- PEEK sample loop 250 µL (6.1825.290)

1 Replace the sample loop on the injection valve with the 250 µL sample loop (*see the manual for the ion chromatograph*).

4.5 Connecting the Liquid Handling Station

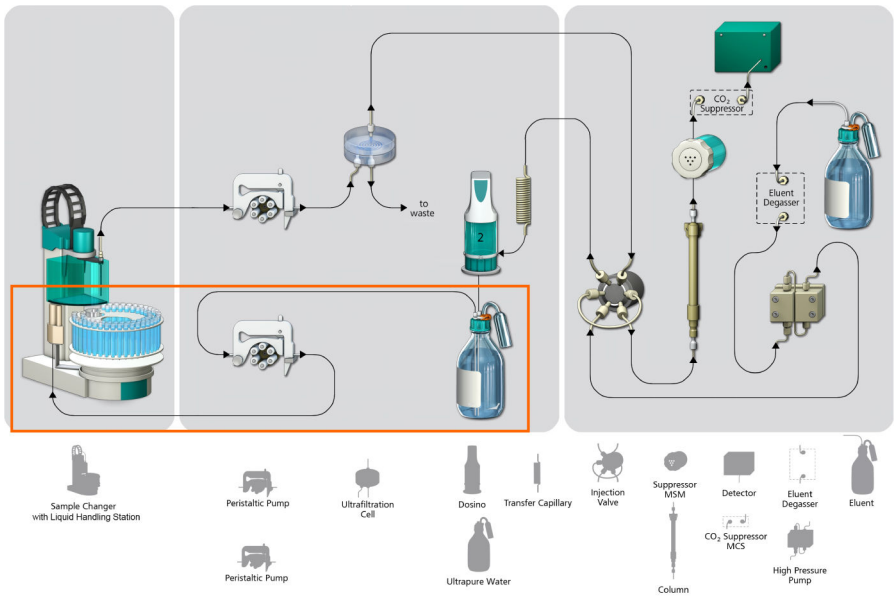


Figure 15 Connecting the Liquid Handling Station – Overview

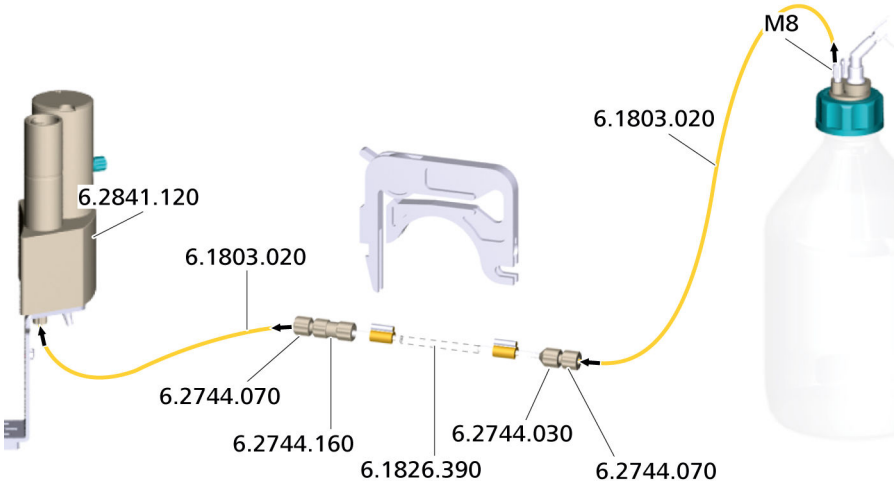


Figure 16 Connecting the Liquid Handling Station

NOTICE

- In order to keep dead volume to a minimum, make sure that the capillaries are as short as possible.
- The capillaries that are used for transferring the filtrate are thinner than the capillaries used for transferring the sample.
- To prevent the capillaries leading into the ion chromatograph from being pinched, always guide them through the capillary feed-throughs provided for this purpose (*see the manual for the ion chromatograph*).

Connecting the Liquid Handling Station

Required accessories

- Liquid Handling Station , left (6.2841.120)
- Pump tubing LFL (yellow/yellow), 3 stoppers (6.1826.390)
- PTFE capillary, 0.97 mm ID / 5 m (6.1803.020)
- Pump tubing connection with locking nut (6.2744.160)
- Coupling olive/UNF 10/32 (6.2744.030)
- Pressure screw, short (6.2744.070)

1 Installing the Liquid Handling Station

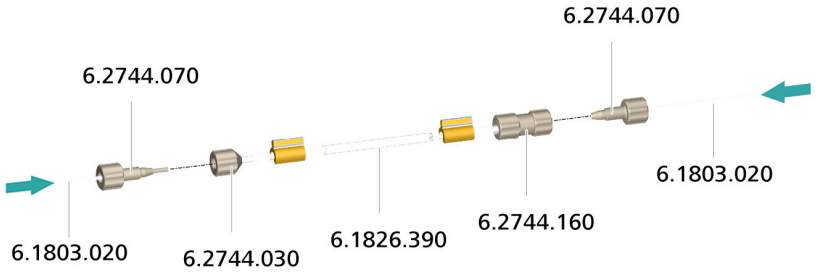
Install the Liquid Handling Station on the left side of the Sample Processor (*see manual for the Liquid Handling Station*).

2 Preparing the pump tubing

Use the pump tubing with yellow stoppers (6.1826.390) for conveying the ultrapure water.

- Attach the coupling olive/UNF 10/32 to the inlet of the pump tubing.
- Attach the pump tubing connection with locking nut (6.2744.160) to the outlet of the pump tubing (*see chapter "Installing the peristaltic pump" in the manual for the ion chromatograph or in the manual for the Sample Processor*).

3 Connecting the capillaries to the pump tubing



- A PTFE capillary (6.1803.020) was connected to the bottle (6.1608.070) *(see chapter 4.2, page 19)*. Tighten this PTFE capillary (6.1831.020) to the inlet of the pump tubing with yellow stoppers (6.1826.390) using a pressure screw (6.2744.070).
- Tighten the other PTFE capillary (6.1803.020) to the outlet of the pump tubing with yellow stoppers (6.1826.390) using a pressure screw (6.2744.070).

4 Connecting the Liquid Handling Station

Connect the free end of the PTFE capillary (6.1803.020) to the outlet of the pump tubing with the Liquid Handling Station.

5 Operation and maintenance

5.1 Operation

5.1.1 Service life of the filtration membrane

One of the most commonly encountered problems in filtration is that solid substances in the sample are deposited on the filtration membrane, causing it to become blocked over time. The ultrafiltration cell has been designed so as to prevent this effect to the extent possible. It has a symmetrical design and is placed horizontally in the Sample Processor or in the ion chromatograph. The sample flows through the lower chamber of the ultrafiltration cell and the filtrate is aspirated from the top. In this way, solid substances adhere less to the membrane.

Nevertheless, depending on the level and type of contamination in the sample, the filtration process must be monitored and the filtration membrane replaced if necessary.

A declining recovery rate in standard solution analyses is an indicator for an imminent blockage of a filtration membrane. These standard solutions should ideally be prepared with the sample matrix to be analyzed.

If a large number of samples is analyzed, we, at Metrohm, recommend measuring check standards regularly (in the case of samples with high particle loads, after every 5th to 10th sample). No general prediction regarding the number of filtration cycles can be made. Also, the change in the recovery rate may be different with more samples being analyzed. Whereas the recovery rate with one sample matrix may remain constant over many samples and then suddenly drop off severely, its decline may be slow and continuous with a different sample composition.

At which time a filtration membrane needs to be replaced depends on the sample matrix and the specifications of the analysis method applied. Experience has shown that minuscule particles and suspended substances in the sample matrix will lead to blockage of the filtration membrane faster than coarser particles will, because the latter will be more readily propelled past the membrane in the flow of sample material.

The following table lists some sample types that were filtered with the ultrafiltration cell (6.2729.110) and a filtration membrane (6.2714.020) with a pore size of 0.2 µm and subsequently analyzed on a Metrohm ion chromatograph. The concentration of the following seven anions was determined for each sample type: F^-, Cl^-, NO_2^-, Br^-, NO_3^-, HPO_4^{2-}, SO_4^{2-}.

Table 1 Filtration of various samples

Sample designation	Number of samples per filter
Orange juice with fruit pulp	40
Surface water	500
Drinking water	1,000
Ground water	500
Waste water 1	1,000
+Waste water 2	130
Waste water 3	40
Waste water 4	80
NaCl solution (1%)	5,000
Schöniger absorption solution	100
Acidic earth extracts	1,000
Aqueous earth extracts	200

5.1.2 Selecting the filtration membrane

You can apply existing sample preparation procedures to the Metrohm ultrafiltration cell (6.2729.110). If you use a different filtration membrane than the one supplied, please note that, even if the particle size is known, selecting a membrane with a suitable pore size does not automatically yield the desired results. Our investigations have shown that the retention capacity of conventional filtration membranes does not always correspond to their specified pore size. The following table shows the qualitative filtration action of filtration membranes with different nominal pore sizes. Aqueous solutions containing silica particles with particle sizes of 1.5 µm and 5 µm were used in the test.

Table 2 Selection of the filtration membrane

Test solutions: silica particles in water	Pore size of the filtration membrane[1]	Effect
0.5%, 5 µm	0.15 µm	no permeation
0.5%, 5 µm	3 µm	no permeation
0.5%, 5 µm	8 µm	no permeation
0.5%, 5 µm	10 µm	permeation[2]
0.5%, 5 µm	12 µm	no permeation
0.5%, 1.5 µm	0.15 µm	no permeation
0.5%, 1.5 µm	3 µm	permeation

[1] Nominal pore size according to manufacturer's statement.

[2] Except for this membrane, all membranes were from the same manufacturer.

Due to the lower filter thickness the retention capacity of filtration membranes may be lower than that of filters with the same pore size but a higher filter thickness. Take this into account when selecting the filtration membrane.

5.2 Maintenance

5.2.1 Replacing the filtration membrane

The filtration membrane used has to be in perfect condition in order to enable a consistent quality of the analysis results. The filtration membrane therefore must be replaced in regular intervals *(see chapter 5.1, page 29)*.

Replacing the filtration membrane

1 Taking the ultrafiltration cell out of the system

- In the software, stop the system and wait until the pressure has been released.
- Remove all capillaries from the ultrafiltration cell.
- Take the ultrafiltration cell out of the holder.

2 Cleaning the ultrafiltration cell

- Carry out steps 2 to 8 in the instructions *Inserting the filtration membrane on page 10*.

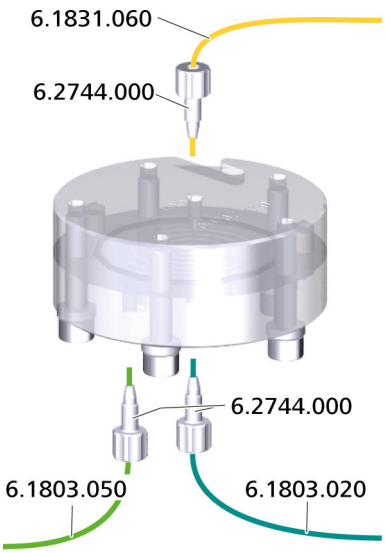
3 Connecting capillaries to the ultrafiltration cell

CAUTION

Damage to the ultrafiltration cell caused by using the wrong pressure screws

PEEK pressure screws are too hard and could damage the ultrafiltration cell material.

- Use only PVDF pressure screws (6.2744.000) to tighten capillaries to the ultrafiltration cell.



- Tighten the PTFE capillary (6.1803.050) to the inlet labeled *IN* of the ultrafiltration cell's lower chamber using a PVDF pressure screw (6.2744.000).
- Tighten the PTFE capillary (6.1803.020) to the outlet labeled *OUT* of the ultrafiltration cell's lower chamber using a PVDF pressure screw (6.2744.000).
- Tighten the PTFE capillary (6.1803.060) to the outlet labeled *OUT* of the ultrafiltration cell's upper chamber using a PVDF pressure screw (6.2744.000).

4 Inserting the ultrafiltration cell into the holder

- Place the ultrafiltration cell back in the holder *(see chapter 4.1.3, page 17)*.

5 Deaerating the ultrafiltration cell

Carry out all steps contained in the instructions *Rinsing the ultrafiltration cell on page 18*.

5.2.2 Maintenance of the dosing unit (6.3032.120)

Maintenance work on the dosing unit has to be performed regularly. Information on the care and maintenance of the dosing unit can be found in the manual for the dosing unit *(see 8.807.8002 Manual 807 Dosing Unit)*.

6 Technical specifications

6.1 Ultrafiltration cell (6.2729.110)

Material	PMMA (poly(methyl methacrylate))
Solvent compatibility	Water or water-ethanol mixture (70:30) (**no** other organic solvents)
Cell volume	240 µL (each from inlet opening to outlet opening)

6.2 Filtration membrane (6.2714.020)

Pore diameter	0.2 µm
Membrane diameter	47 mm
Material	Regenerated cellulose

6.3 Liquid Handling Station (6.2841.120)

The manual for the Liquid Handling Station contains information about the technical specifications of the Liquid Handling Station *(see 8.108.8011 Manual Liquid Handling Station)*.

6.4 Dosing unit 2 mL (6.3032.120)

The manual for the dosing unit contains information about the technical specifications of the dosing unit *(see 8.807.8002 Manual 807 Dosing Unit)*.

7 Accessories

Up-to-date information on the scope of delivery and optional accessories for your product can be found on the Internet. You can download this information using the article number as follows:

Downloading the accessories list

1. Enter *https://www.metrohm.com/* into your Internet browser.
2. Enter the article number (e.g. **6.5330.210**) into the search field.
   The search result is displayed.
3. Click on the product.
   Detailed information regarding the product is shown on various tabs.
4. On the **Included parts** tab, click on **Download the PDF**.
   The PDF file with the accessories data is created.

NOTICE

Once you have received your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.

Index