IC equipment

IC equipment: Inline dilution (6.5330.120)

Manual

8.110.8029EN / v6 / 2024-07-02

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1 Introduction

1.1 Description

The IC equipment: Inline dilution is used for diluting high-concentration samples before injection into the ion chromatograph.

Sample and dilution solution are mixed in a controlled manner in the Liquid Handling Station (6.2841.120). The diluted solution is pumped to the ion chromatograph's injection valve with a peristaltic pump and injected.

The IC equipment: Inline dilution is a part of selected IC systems. However, it can also be used with a Sample Processor with Swing Head (858 Professional Sample Processor, 814 USB Sample Processor or 815 Robotic USB Sample Processor).

In addition to the IC equipment: Inline dilution (6.5330.120), you will also require:

- Any ion chromatograph
- A Sample Processor with Swing Head and a peristaltic pump (e.g. 858 Professional Sample Processor – Pump)
- A Dosino (2.800.0010)
- A magnetic stirrer (2.741.0010)

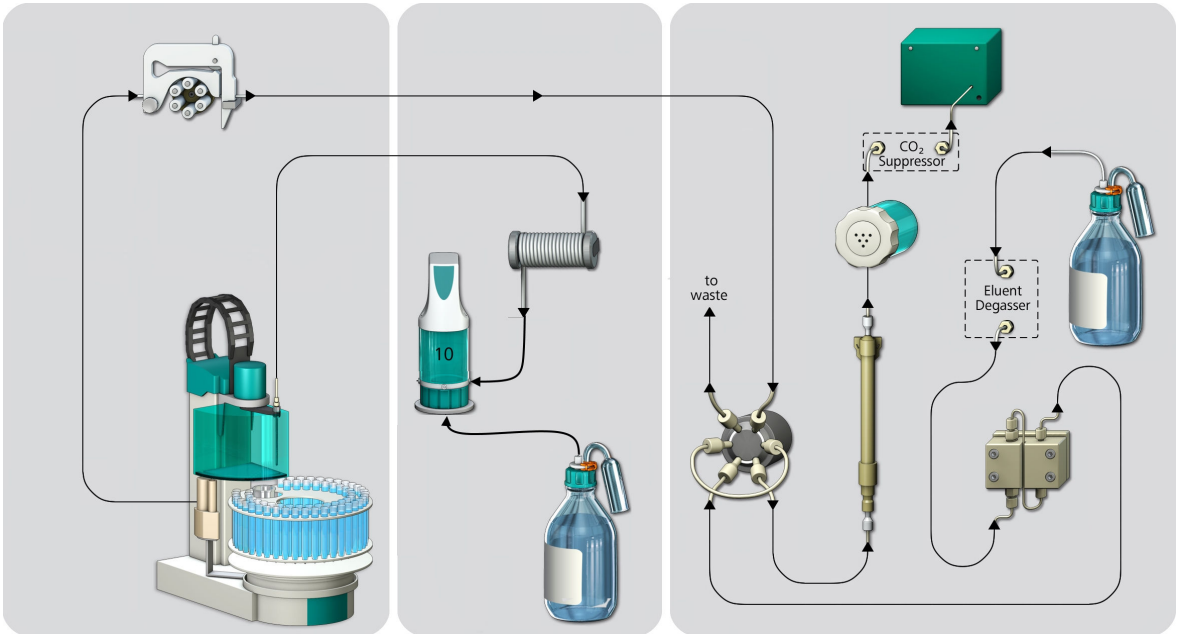


Figure 1 Overview of the inline dilution system

1.2 About the documentation

This manual describes the installation of the IC equipment: Inline dilution and the connection of the capillary connections between the sample vessel, Dosino, Liquid Handling Station, peristaltic pump and the injection valve in the ion chromatograph.

Additional documentation

Topic	Document
Mounting the Liquid Handling Station on the Sample Processor	Manual for the Liquid Handling Station (8.108.8011)
Installing the peristaltic pump and the respective tubing Care and maintenance of the pump tubing	Manual for the Sample Processor (8.858.8002)
Installation of the Dosino	Manual for the 800 Dosino (8.800.8002)
Care and maintenance of the 807 Dosing Unit	Manual for 807 Dosing Unit (8.807.8002)

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.

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** Perform the steps one after the other.
Method	**Dialog text**, **parameter** in the software
File ▶ New	Menu or menu item
[Continue]	**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.
	**WARNING** Warning of optical radiation
	**CAUTION** This symbol draws attention to possible damage to instruments or instrument parts.
	**NOTICE** This symbol highlights additional information and tips.

1.3 Displaying accessories

Up-to-date information on the scope of delivery and on optional accessories can be found on the Metrohm website.

1 Searching for a product on the website

- Go to *https://www.metrohm.com*.
- Click on  .
- Enter the article number of the product (e.g. **2.1001.0010**) into the search field and press **[Enter]**.

The search result is displayed.

2 Displaying product information

- To display the products matching the search term, click on **Product models**.
- Click on the desired product.

Detailed information regarding the product is displayed.

3 Displaying accessories and downloading the accessories list

- To display the accessories, scroll down to **Accessories and more**.
  - The **scope of delivery** is displayed.
  - Click on **[Optional parts]** for the optional accessories.
- To download the accessories list, click on **[Download accessories PDF]** under **Accessories and more**.

NOTE

Metrohm recommends keeping the accessories list for reference purposes.

2 Overview

2.1 Parts of the IC equipment: Inline dilution

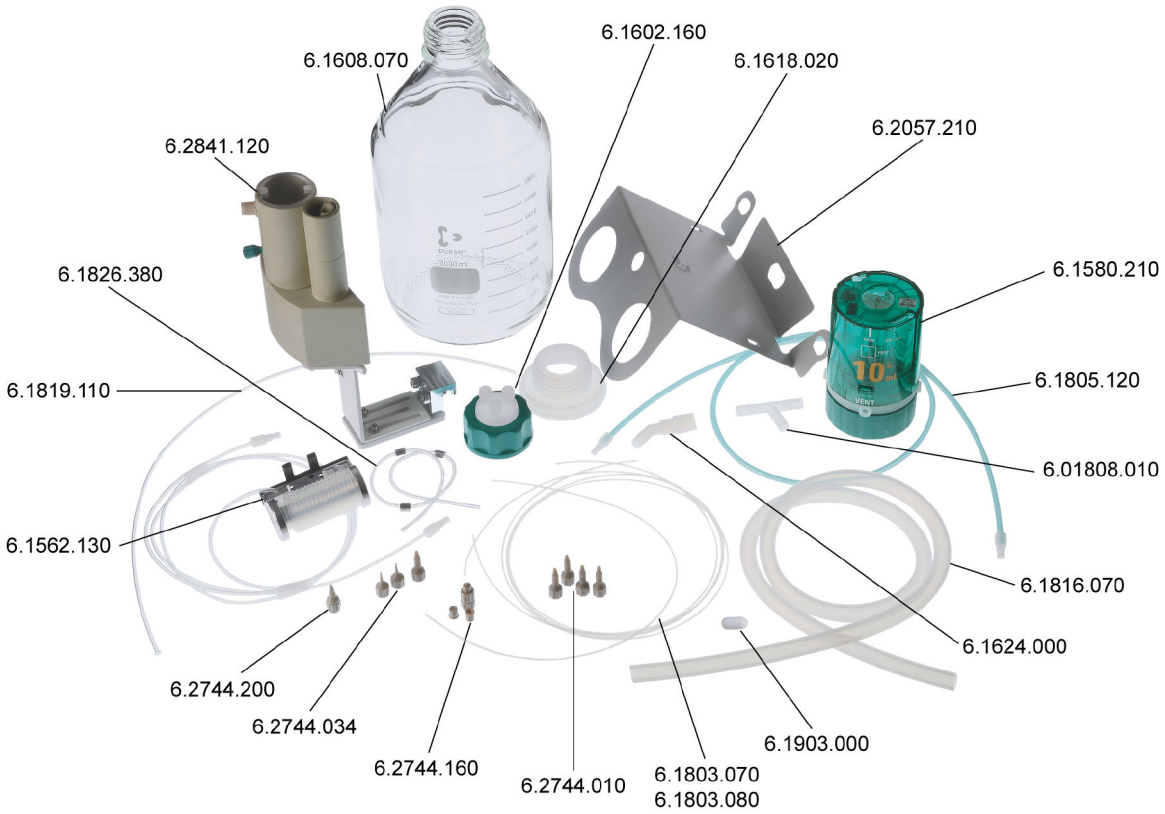


Figure 2 IC equipment: Inline dilution – Parts

2.2 Parts of the Liquid Handling Station

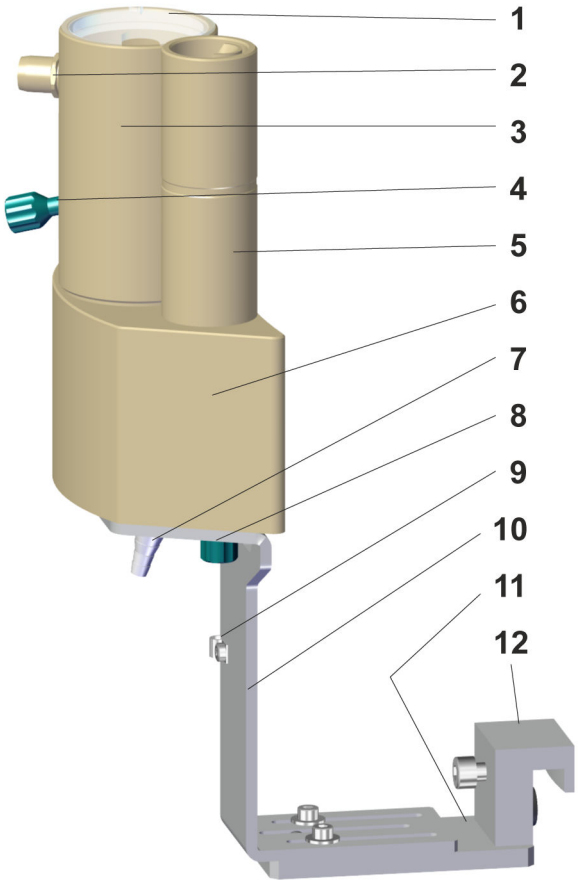


Figure 3 Overview of the instrument IC equipment (left-handed version)

1	**Cover for the mixing vessel**	**2**	**Overflow** with connector
3	**Mixing vessel**	**4**	**Mixing vessel connector - UNF 10/32** sealed with threaded stopper
5	**Rinsing unit**	**6**	**Main body of the IC equipment** with magnetic stirrer dummy
7	**Waste connector**	**8**	**Rinsing connector - UNF 10/32** sealed with threaded stopper
9	**Cable clip**	**10**	**Support bracket**
11	**Base plate**	**12**	**Clamping fastener**

2.3 Mode of operation for sample dilution

Sample dilution is used for samples containing excessively high ion concentrations or excessively high concentrated sample matrices.

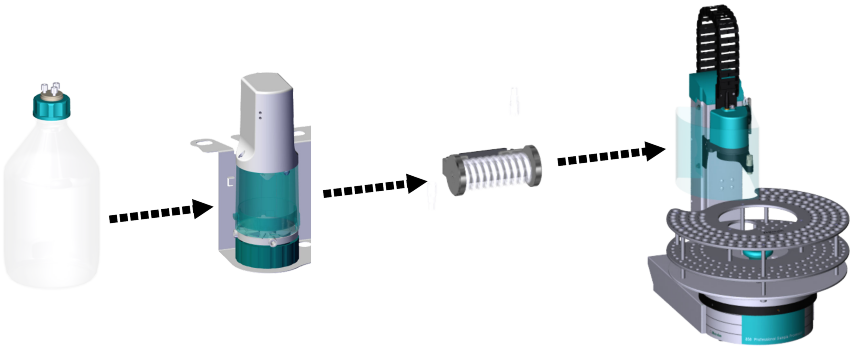
The Dosino doses the amount of sample and the water volume in optimal fashion. In the Liquid Handling Station, the built-in magnetic stirrer thoroughly mixes the sample and the water. Afterwards, the peristaltic pump transfers the diluted sample to the injection valve in the ion chromatograph, where the sample is injected.

Finally, the Liquid Handling Station's mixing vessel is rinsed with ultrapure water.

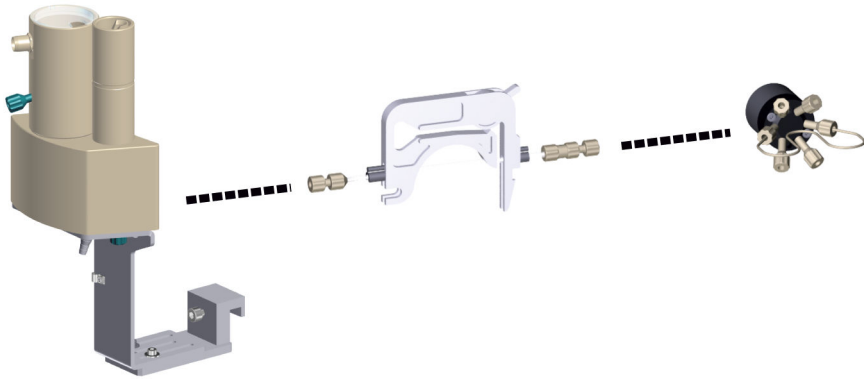
3 Installation

The dilution system consists of the the following flow paths:

Flow path: dilution solution



Flow path: Diluted sample



For an entire dilution system, you will require:

- Any ion chromatograph
- A Sample Processor with Swing Head and a peristaltic pump (e.g. 858 Professional Sample Processor – Pump)
- The IC equipment: Inline dilution (6.5330.120)
- A Dosino (2.800.0010)
- A magnetic stirrer (2.741.0010)

3.1 Preparing the Liquid Handling Station

The Liquid Handling Station forms part of the IC equipment: Inline dilution.

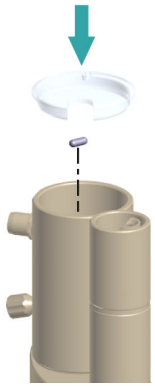
Required accessories

- Liquid Handling Station (6.2841.120)
- Magnetic stirrer (2.741.0010)
- Stirring bar (6.1903.000)

1 Installing the magnetic stirrer

Replace the magnetic stirrer dummy in the Liquid Handling Station with the magnetic stirrer (2.741.0010) see *Manual for the Liquid Handling Station (8.108.8011)*.

2 Inserting the stirring bar into the mixing vessel



- Open the cover of the mixing vessel.
- Place the stirring bar into the mixing vessel.
- Put the cover of the mixing vessel back in place.

3.2 Installing the Liquid Handling Station

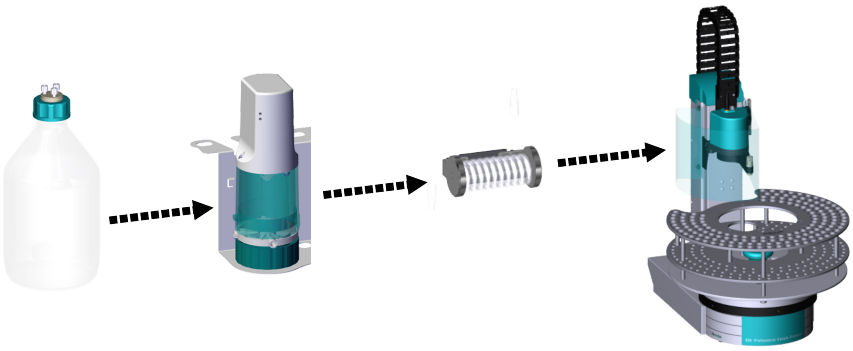
The Liquid Handling Station forms part of the IC equipment: Inline dilution.

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 (8.108.8011)*.

3.3 Installing the dilution solution flow path

The dilution solution (usually ultrapure water) is in a clear glass bottle. The Dosino transfers the dilution solution to the needle of the Sample Processor.



3.3.1 Mounting the Dosino

Attaching the Dosino to the 807 Dosing Unit

Required accessories

- 800 Dosino (2.800.0010)
- 807 Dosing Unit 10 mL without accessories (6.1580.210)

CAUTION

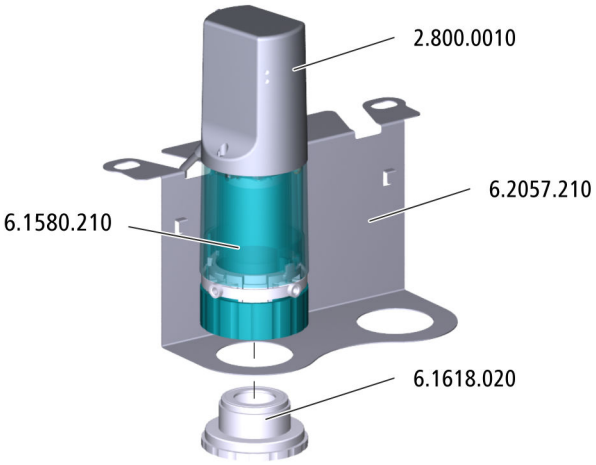
Read through the correct procedure in the Manual for the 800 Dosino before you attach the Dosino to the 807 Dosing Unit.

1 Attach the Dosino to the 807 Dosing Unit, see *Manual for the 800 Dosino (8.800.8002)*.

Fastening the Dosino to the ion chromatograph

Required accessories

- Dosino (2.800.010) with 807 Dosing Unit 10 mL without accessories (6.1580.210)
- Dosino holder (6.2057.210)
- Thread adapter (6.1618.020)



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 to the Dosino holder.
- Fasten the Dosino to the Dosino holder by tightening the thread adapter from below.

3 Connecting the Dosino to the ion chromatograph

NOTE

The ion chromatograph **must** be switched off as soon as the Dosino is plugged into the MSB connector.

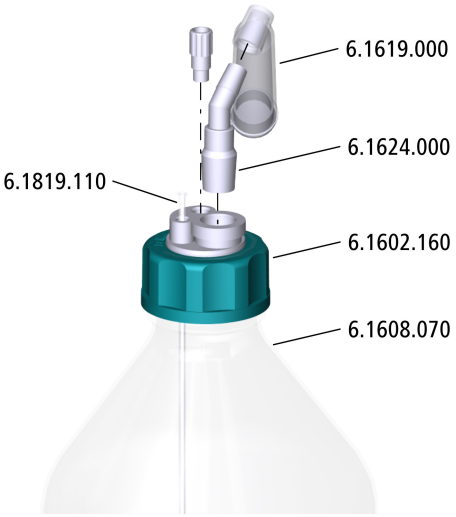
- Check whether the ion chromatograph is switched on.
  If this is the case, switch off the ion chromatograph.
- Plug the Dosino cable into one of the ion chromatograph's MSB connectors.

3.3.2 Equipping the bottle

Required accessories

- Bottle (6.1608.070) filled with dilution solution
- Bottle cap for eluents and reagents (6.1602.160)
- Adsorber tube for 807 Dosing Unit (6.1619.000)
- Adapter SGJ 14 for the adsorber tube (6.1624.000)
- FEP aspiration tubing (6.1819.110)

- M8 stoppers (6.1446.080), included in the accessories for the bottle cap (6.1602.160)
- Capillary cutter (6.2621.080)



1 Mounting the aspiration tubing

- Place the aspiration tubing in the M6 opening of the bottle cap.
- Use the capillary cutter to cut the aspiration tubing to such a length that it touches the bottom of the bottle.

2 Inserting the stopper

- Tighten the M8 stopper to the M8 opening of the 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 bottle cap.

4 Mounting the bottle cap

- Screw the bottle cap onto the bottle.

3.3.3 Mounting the FEP tubing

Required accessories

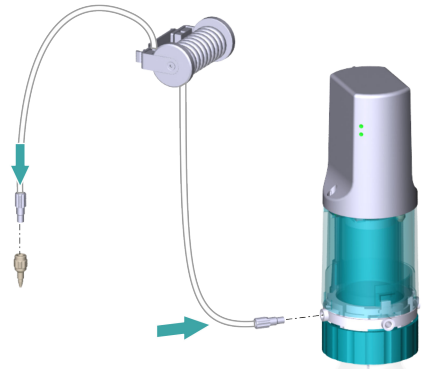
- FEP tubing (6.1805.120)

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

3.3.4 Installing the transfer tubing

Required accessories
- Transfer tubing (6.1562.130)
- Adapter (6.2744.200)

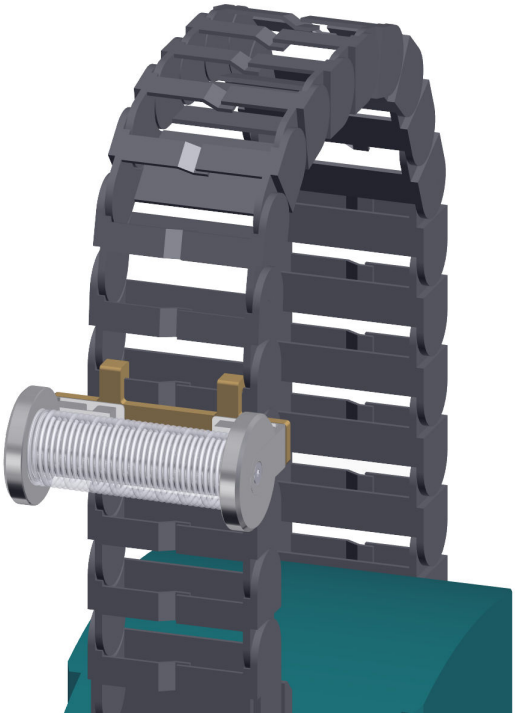
1 Installing the transfer tubing



- Tighten one end of the transfer tubing to Port 1 of the Dosino.
- Tighten the other end of the transfer tubing to the adapter (6.2744.200).

2 Tightening the adapter to the needle
- Tighten the adapter to the Sample Processor needle, see *Manual for the Sample Processor (8.858.8002)*.

3 Installing the transfer tubing on the Sample Processor



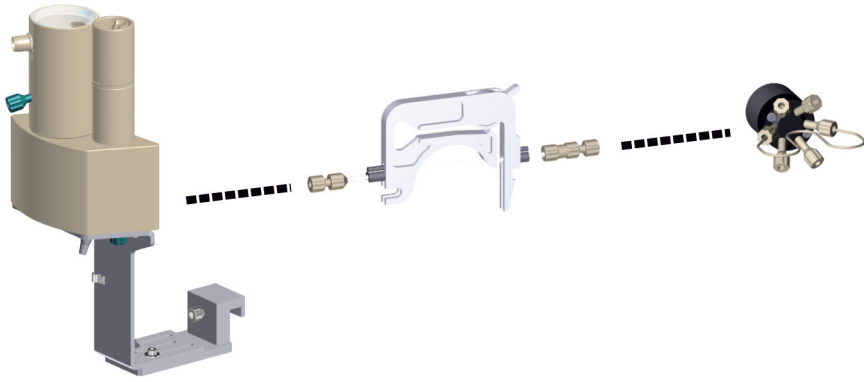
- Install the transfer tubing on the guide chain of the Sample Processor, see *Manual for the Sample Processor (8.858.8002)*.

3.4 Installing the diluted sample flow path

Pump the diluted sample either with a peristaltic pump *(see chapter 3.4.1, page 14)* or with an 807 Dosing Unit *(see chapter 3.4.2, page 16)*.

3.4.1 Pumping the sample with the peristaltic pump

The Sample Processor's peristaltic pump transfers the diluted sample from the Liquid Handling Station's mixing vessel to the ion chromatograph's injection valve. To pump the sample with a peristaltic pump, follow the procedure below.



Required accessories

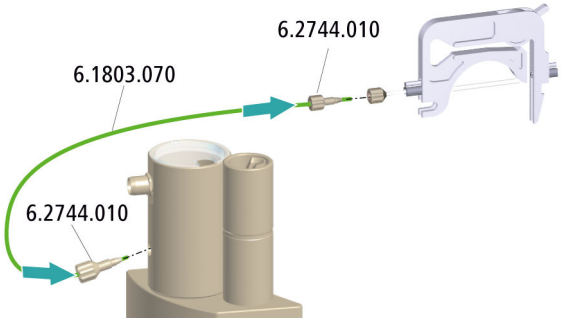
- Liquid Handling Station (6.2841.120)
- PTFE capillary, 40 cm (6.1803.070)
- PTFE capillary, 1 m (6.1803.080)
- 3 pressure screws (6.2744.010)
- Pump tubing with gray stoppers (6.1826.380)
- Coupling olive/UNF 10/32 (6.2744.034)
- Pump tubing connection with locking nut (6.2744.160)

1 Preparing the pump tubing

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

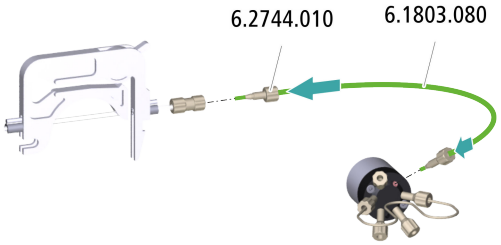
- Attach the coupling olive/UNF 10/32 (6.2744.034) to the inlet.
- Tighten the pump tubing connection with locking nut (6.2744.160) to the outlet, see *Manual for the Sample Processor (8.858.8002)*. Use the following adapter:

2 Connecting the 40 cm PTFE capillary



- Tighten one end of the 40 cm capillary (6.1803.070) to the outlet of the mixing vessel using a pressure screw (6.2744.010).
- Tighten the other end of the capillary to the pump tubing inlet using a pressure screw.

3 Connecting the 1 m PTFE capillary



- Tighten one end of the 1 m capillary (6.1803.080) to the pump tubing outlet using a pressure screw (6.2744.010).
- Tighten the other end of the capillary to the injection valve's sample inlet in the ion chromatograph using a pressure screw (6.2744.010).

4 Inserting the pump tubing into the tubing cartridge

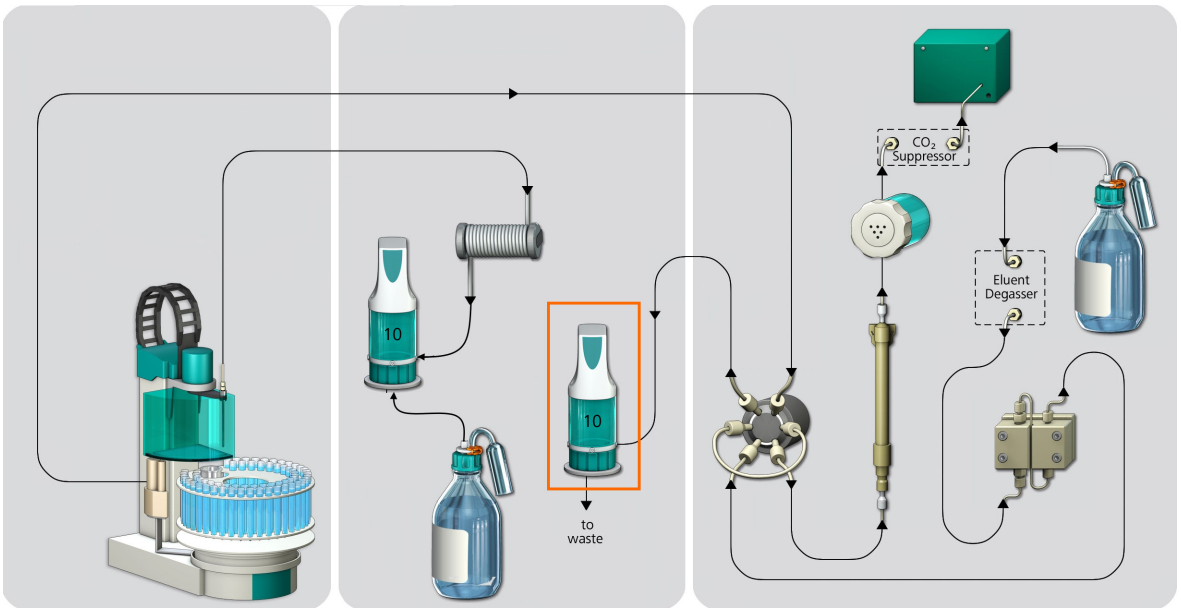
- Insert the pump tubing in the tubing cartridge, see *Manual for the Sample Processor (8.858.8002)*.

5 Inserting the tubing cartridge

- Insert the tubing cartridge in the cartridge holder, see *Manual for the Sample Processor (8.858.8002)*.

3.4.2 Pumping the sample with the 807 Dosing Unit

Optionally transfer the sample with an 807 Dosing Unit 20 mL or an 807 Dosing Unit 50 mL. To do this, mount the 807 Dosing Unit after the injector.



3.5 Mounting the dilution station drainage tubing

Mounting the dilution station drainage tubing

Required accessories

- Silicone tubing 8 mm internal diameter / 1 m (6.1816.070)
- Y tubing connector, PP, 3 x 7-8 mm (6.01808.010)

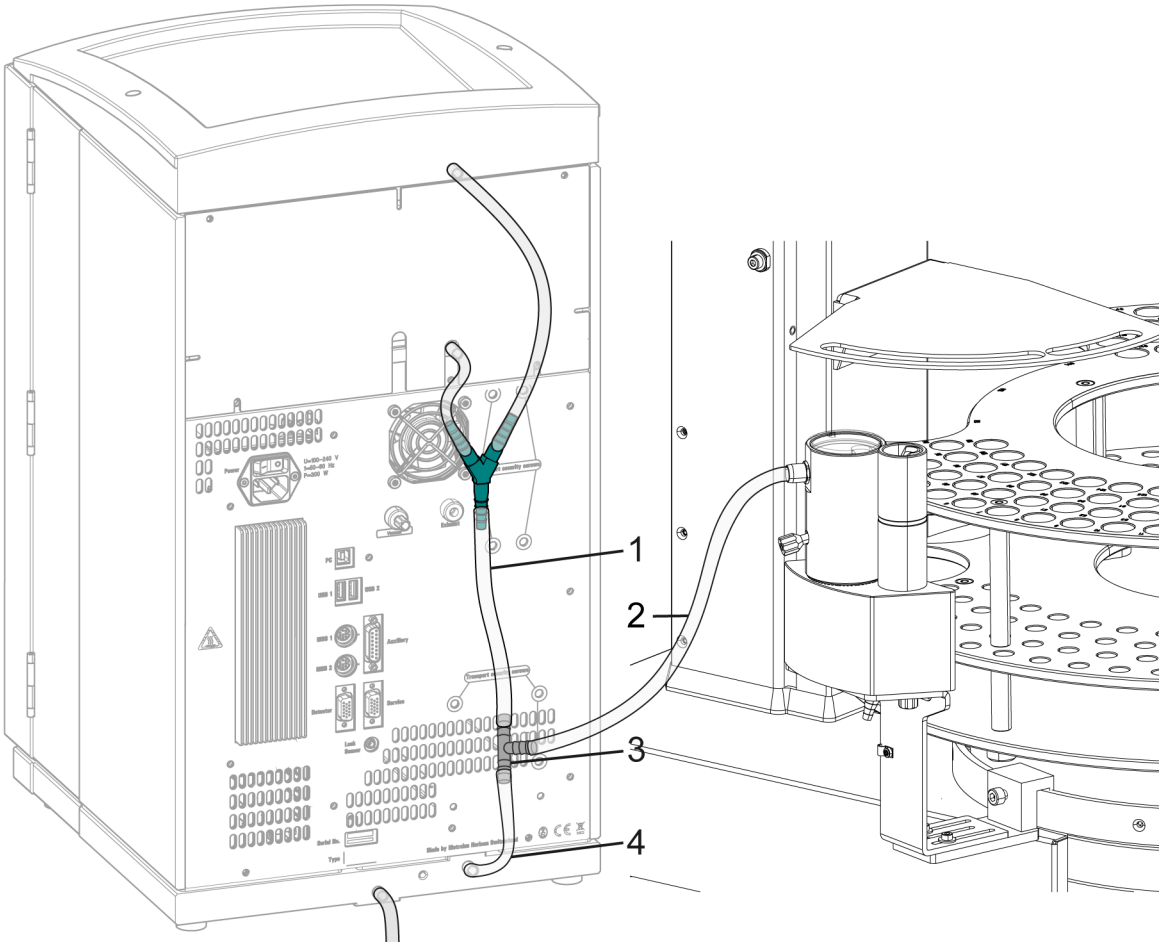


Figure 4 Drainage tubing

1 **Ion chromatograph drainage tubing** Bottle holder connection/detector chamber Y connector	**2** **Silicone tubing 6.1816.070** long tubing piece Dilution station overflow connection – Y connector
3 **Y tubing connector, PP, 3 x 7-8 mm 6.01808.010**	**4** **Silicone tubing 6.1816.070** short tubing piece Y connector connection – base tray drainage tubing connection

1 Converting the drainage tubing on the ion chromatograph

- Loosen the drainage tubing on the ion chromatograph *(4-**1**)* from the drainage tubing connection on the base tray.
- Attach the drainage tubing to one end of the Y connector *(4-**3**)*.

2 Mounting the silicone tubing 6.1816.070

- Cut off an approx. 10 cm long piece of the silicone tubing. Connect the Y connector and the drainage connection of the base tray with the short piece of tubing *(4-**4**)*.
- Cut off an approx. 40 to 80 cm long piece of the silicone tubing. The length of the tubing depends on the placement of the sample changer and the ion chromatograph. Cut the piece of tubing as short as possible.
  Connect the overflow of the dilution station and the Y connector with the long piece of tubing *(4-**2**)*.

NOTE

If necessary, shorten the long piece of tubing until the liquid always flows downwards. A U-shaped bend in the tubing or a horizontal position of the tubing can cause liquid to back up.

4 Operation and maintenance

4.1 807 Dosing Unit (6.1580.210)

Maintenance work on the 807 Dosing Unit must be performed regularly. Information on the care and maintenance of the 807 Dosing Unit can be found in the Manual for the 807 Dosing Unit.

5 Technical specifications

5.1 Liquid Handling Station (6.2841.120)

Information on the technical specifications of the Liquid Handling Station can be found in the manual for the Liquid Handling Station.

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