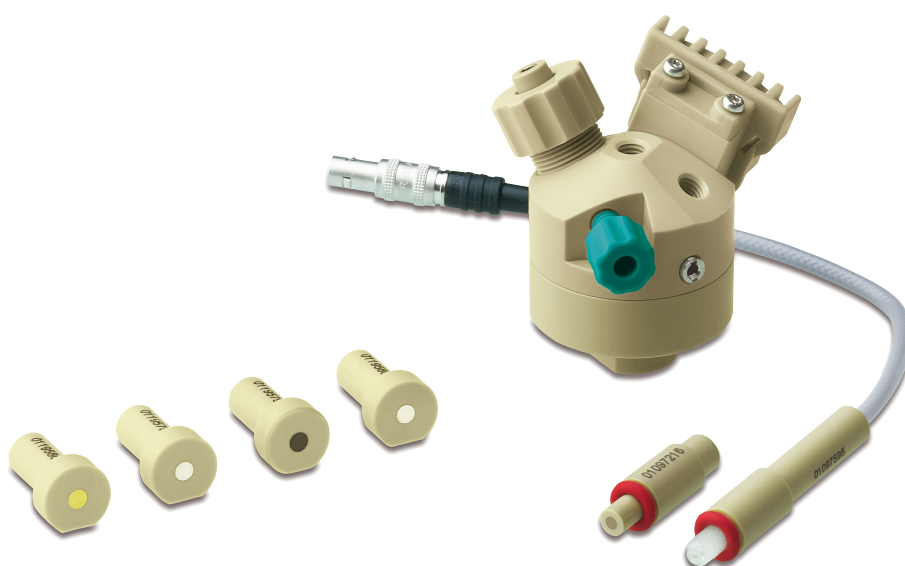


IC equipment



Wall-Jet cell

Manual

8.110.8015EN / 2013-12-12



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IC equipment

Wall-Jet cell

6.5337.0x0

Manual

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Documentation in additional languages can be found on
<http://documents.metrohm.com>.

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1 Introduction

1.1 Description

The Wall-Jet cell is used for amperometric detection with the Amperometric Detector. The Wall-Jet cell applies the wall-jet principle, which means that the inlet is positioned directly opposite the working electrode. A thin vertical jet of eluate is directed onto the working electrode, thus enabling an optimum measurement performance.

The IC equipment Wall-Jet cell is available in four versions:

- Wall-Jet cell without electrodes (6.5337.000).
- Wall-Jet cell Carb (6.5337.010), with one gold working electrode and one palladium reference electrode for the analysis of sugars and amino acids.
- Wall-Jet cell Cyanide (6.5337.020), with one silver working electrode and one palladium reference electrode for applications relating to environmental analysis, e.g. the determination of cyanide and sulfide.
- Wall-Jet cell Anion (6.5331.030), with one glassy carbon working electrode and one silver / silver chloride reference electrode for the analysis of inorganic anions, e.g. nitrite, sulfite and iodide.

A more detailed description of the specifications and areas of application for the individual cells can be found in *Chapter 6, page 20*.

1.2 About the documentation



CAUTION

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

1.2.1 Content and scope

Content of this manual

This manual describes:

- how to insert the working electrode in the Wall-Jet cell.
- how to insert the reference electrode in the Wall-Jet cell.
- how to connect the capillaries and the electrode cables.
- how users can carry out maintenance work.



- the technical specifications of the Wall-Jet cell.
- the supplied and the optional accessories.






Additional information

Detailed information concerning the insertion of the measuring cell into the detector can be found in the manuals for the amperometric detector.

Information on the use, care and maintenance of the working electrodes and reference electrodes can be found in the leaflets enclosed with the electrodes.

1.2.2 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.

3 Installation



CAUTION

Never switch on the measuring cell ...

- ... if it is not simultaneously being rinsed by a conductive eluent; or
- ... if the electrode cables are not completely connected.

3.1 Inserting the working electrode

The measuring cell is supplied without electrodes. The working electrode is either included in your equipment or you have ordered it separately.

Insert the working electrode as follows:

Inserting the working electrode

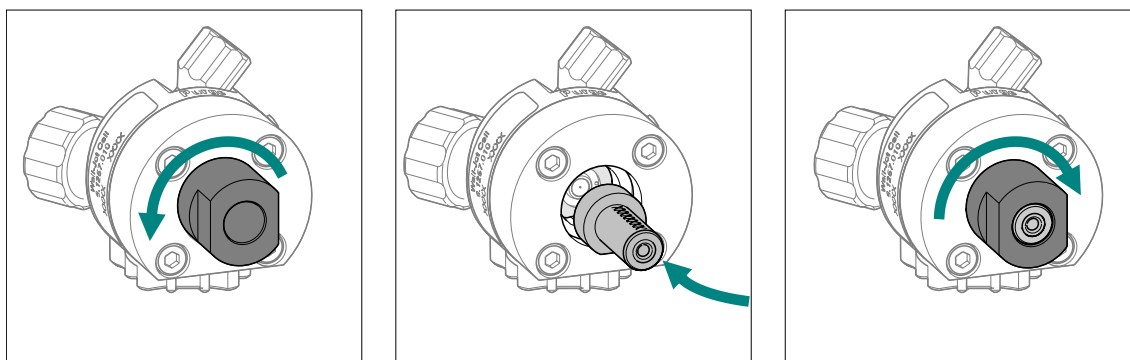


Figure 2 Inserting the working electrode

- 1** Unscrew the pressure screw on the base part of the cell and remove it.
- 2** Insert the working electrode in the opening. The working electrode is formed in such a way that it can be inserted into the measuring cell in only one position.
- 3** Slide the pressure screw over the working electrode and screw it tightly.



3.2 Inserting the reference electrode

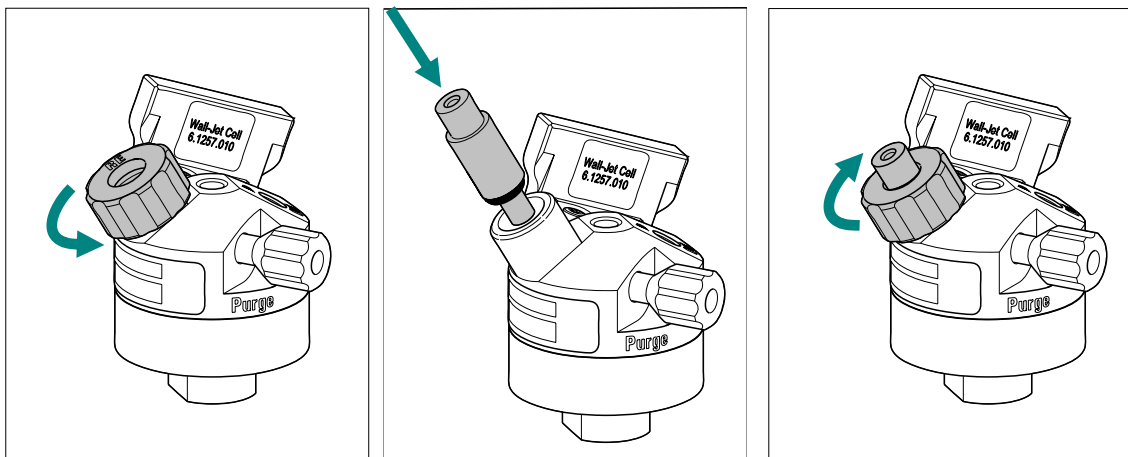
The measuring cell is supplied without electrodes. The reference electrode is either included in your equipment or you have ordered it separately.

Insert the reference electrode as follows:

Inserting the reference electrode

The reference electrode itself and one sealing ring are contained in the packaging for the reference electrode.

- 1 Slide the sealing ring over the reference electrode.



- 2 Unscrew the fastening screw on the RE connector and remove it.
- 3 Insert the reference electrode into the opening with the flat side facing downward.
- 4 Retighten the fastening screw.

Special case: Ag/AgCl reference electrode

The Ag/AgCl reference electrode (6.1257.720) is, in contrast to the other reference electrodes, permanently connected to the reference electrode cable.

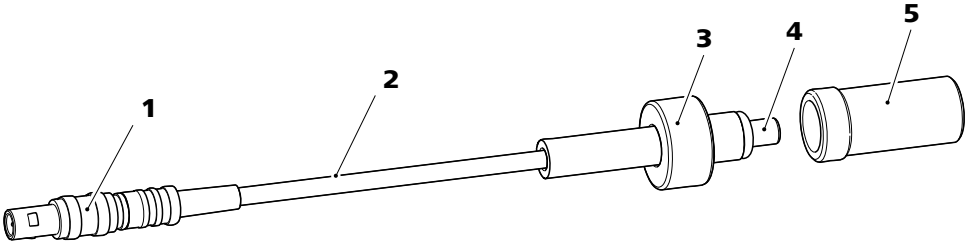


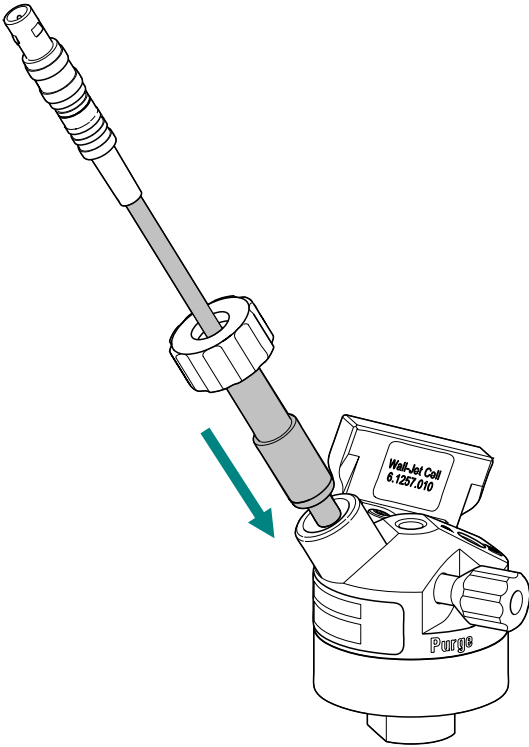
Figure 3 Ag/AgCl reference electrode (6.1257.720)

1 Plug	2 Reference electrode cable Permanently mounted on the reference electrode.
3 Sealing screw For sealing the storage vessel.	4 Reference electrode
5 Storage vessel For storing the Ag/AgCl reference electrode.	

Insert the reference electrode as follows:

Inserting the Ag/AgCl reference electrode

- 1** Take the Ag/AgCl reference electrode out of the storage vessel. Pull the sealing screw of the storage vessel over the plug and reseal the storage vessel with it.





- 2** Unscrew the fastening screw from the reference electrode holder. Push the fastening screw over the cable of the Ag/AgCl reference electrode.
- 3** Check whether the sealing ring is seated on the reference electrode and insert the reference electrode into the reference electrode holder.
- 4** Tighten the reference electrode to the reference electrode holder with the fastening screw.

Further information regarding the correct handling of the Ag/AgCl reference electrode can be found in the leaflet for the Ag/AgCl reference electrode.

3.3 Connecting the detector capillaries

The amperometric detector is equipped with a preheating capillary in its interior to ensure that the eluent flows through the measuring cell at a constant temperature.

Connecting the preheating capillary is optional. If the ambient conditions are optimal or if the eluent is heated in the column, then the measuring results can be sufficiently accurate, even without the use of the preheating capillary.



CAUTION

The preheating capillary may not be connected if highly flammable liquids are analyzed!

In the event of a leak, the fluid might evaporate and ignite in the heating area.

If the preheating capillary is not used, proceed as follows:

Connecting capillaries to the measuring cell

- 1 Connecting the cell inlet**
Use a pressure screw (6.2744.014) to fasten the detector input capillary to the **In** connector of the measuring cell.

2 Connecting the cell outlet

Use a pressure screw (6.2744.014) to fasten a piece of PEEK capillary (6.1831.010) with a length of 1 to 1.5 m to the **Out** connector of the measuring cell.



NOTE

This capillary must be tested with the IC instrument the first time the detector is put into operation, see the chapter "*Start-up*" in the manual for the detector.

If the preheating capillary is used, proceed as follows:

Connecting capillaries to the measuring cell

1 Connecting the preheating capillary



NOTE

The preheating capillary must be tested with the IC instrument the first time the detector is put into operation, see the chapter "*Start-up*" in the manual for the detector.

- Use a pressure screw (6.2744.014) to connect the detector input capillary to the **Eluent in** connector of the detector.
- Use a pressure screw (6.2744.014) to fasten a piece of PEEK capillary (6.1831.010) to the **Eluent to cell** connector of the detector.

2 Connecting the cell inlet

Use a pressure screw (6.2744.014) to fasten the other end of the PEEK capillary (6.1831.010) to the **In** connector of the measuring cell.

3 Connecting the cell outlet

Use a pressure screw (6.2744.014) to fasten a piece of PEEK capillary (6.1831.010) with a length of 1 to 1.5 m to the **Out** connector of the measuring cell.

**NOTE**

This capillary must be tested with the IC instrument the first time the detector is put into operation, see the chapter "*Start-up*" in the manual for the detector.

3.4 Connecting the electrode cables

**CAUTION**

The electrode cables may not be plugged or unplugged unless the measuring cell is switched off in the software.

**NOTE**

The sockets and the plugs of the cables must be clean and dry.

Connecting the electrode cables to the detector

Prerequisites:

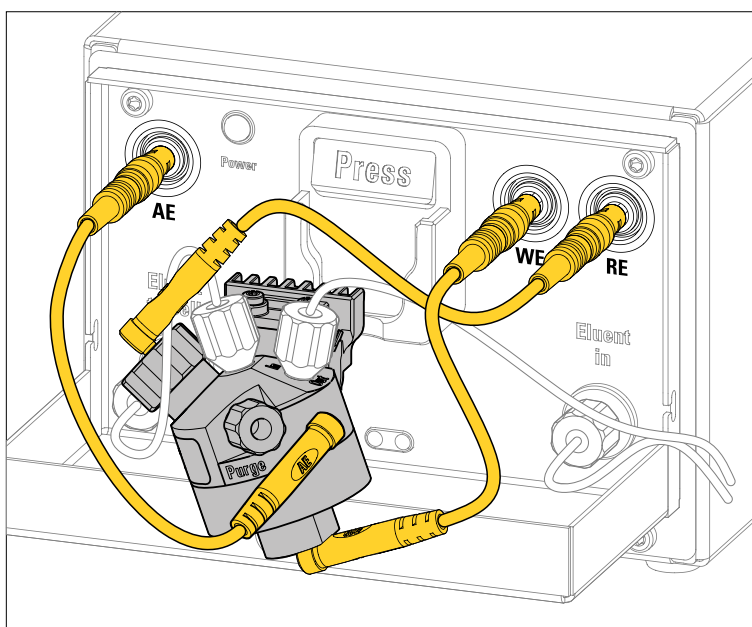
- The measuring cell is switched off.

- 1** Plug the straight plug of the working electrode cable (red sleeve) into the **WE** socket of the detector.
- 2** Plug the straight plug of the reference electrode cable (black sleeve) into the **RE** socket of the detector.
- 3** Plug the straight plug of the auxiliary electrode cable (blue sleeve) into the **AE** socket of the detector.

Connecting the electrode cables to the measuring cell

Prerequisites:

- The working electrode and the reference electrode are inserted into the measuring cell.
- 1** Plug the angled plug of the working electrode cable (labeled **WE**) into the working electrode socket.
 - 2** Plug the angled plug of the reference electrode cable (labeled **RE**) into the reference electrode socket.
 - 3** Plug the angled plug of the auxiliary electrode cable (labeled **AE**) into the socket (labeled **AE**).





4 Start-up

The measuring cell and the amperometric detector are set to work at the same time. Additional information on this topic can be found in the manual for the detector.

5 Operation and maintenance

5.1 Operation

The measuring cell is operated together with the detector and the entire IC system with the MagIC Net™ software.

Additional information on operation with MagIC Net™ can be found in the "*MagIC Net™ Tutorial*" or in the MagIC Net™ online help.

5.2 Maintenance

The measuring cell must be taken out of the detector for the following maintenance tasks.



CAUTION

The electrode cables may not be unplugged unless the measuring cell is switched off in the software!

Taking the measuring cell out of the detector

- 1 Switch off the measuring cell in the software.
- 2 Disconnect all three electrode cables.
- 3 On the measuring cell holder, push the **Press** button and remove the measuring cell from the holder.

5.2.1 Replacing the working electrode

Depending on the application, the measuring cell can be operated with a variety of different working electrodes. The different working electrodes are available as accessories (*see Chapter 7, page 23*).

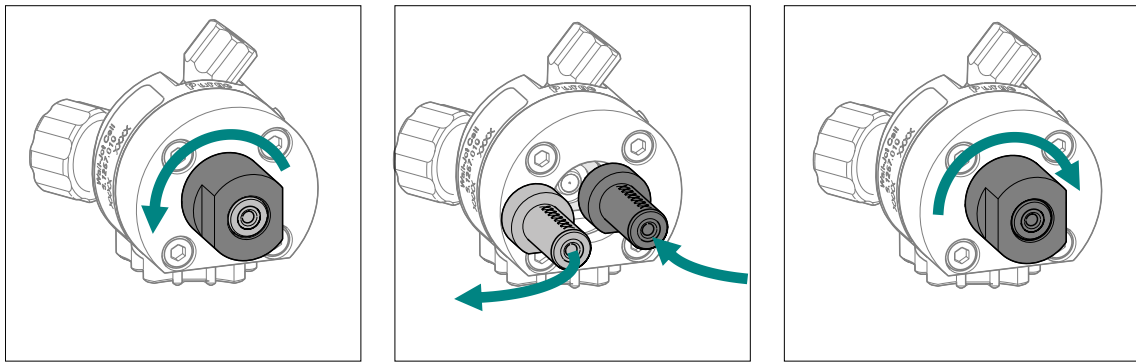
Replacing the working electrode

Prerequisites:

- The measuring cell is switched off.
- The measuring cell has been removed from the detector.
- The electrode cables are unplugged.



No tool is required for replacing the working electrode.



- 1 Unscrew the pressure screw (1-6) on the base part of the cell and remove it.
- 2 Take out the working electrode.
- 3 Insert the new working electrode. The working electrode is shaped in such a way that it can be inserted into the measuring cell in only one position.
- 4 Slide the pressure screw over the working electrode and tighten it.

5.2.2 Replacing the reference electrode

Depending on the application, the measuring cell can be operated with a variety of different reference electrodes. The different reference electrodes are available as accessories (see Chapter 7, page 23).



NOTE

These instructions apply analogously to the Ag/AgCl reference electrode.

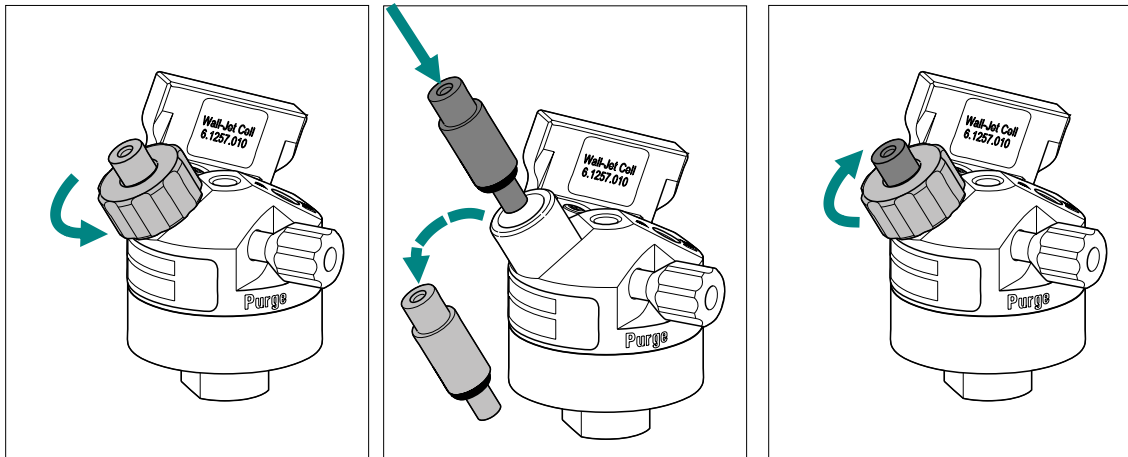
Inserting the reference electrode

Prerequisites:

- The measuring cell is switched off.
- The measuring cell has been removed from the detector.
- The electrode cables are unplugged.

No tool is required for replacing the reference electrode.

- 1 Slide the supplied sealing ring over the new reference electrode.



- 2 Unscrew the fastening screw for the reference electrode and remove it.
- 3 Take out the reference electrode.
- 4 Insert the new reference electrode.
- 5 Tighten the fastening screw again.



NOTE

Important: After an Ag/AgCl reference electrode has been removed!

The Ag/AgCl reference electrode may not be allowed to dry out. Follow the directions for storage contained in the leaflet for the Ag/AgCl reference electrode.

5.2.3 Replacing the spacer

Depending on the application, the measuring cell can be operated with a variety of different spacers. The different spacers are available as accessories (see Chapter 7, page 23).

The measuring cell must be disassembled in order for the spacer to be replaced. Proceed as follows to disassemble the measuring cell:

Disassembling the measuring cell

Prerequisites:

- The measuring cell is switched off.



- The measuring cell has been removed from the detector.
- The electrode cables have been removed.

To disassemble the measuring cell, you need a 2.5 mm hex key.

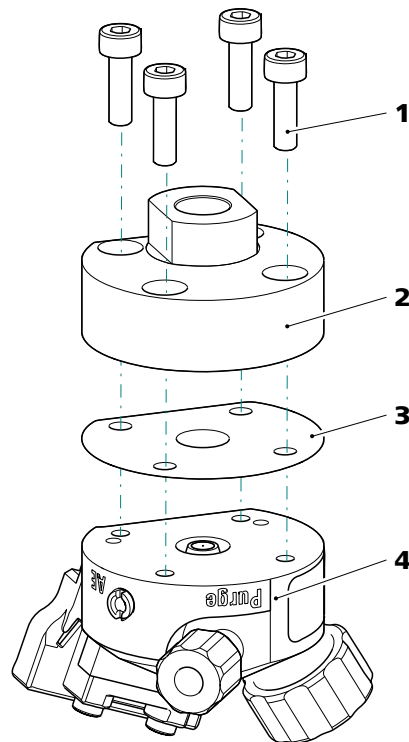


Figure 4 Disassembling the measuring cell

1	Fastening screw (4x)	2	Base part
3	Spacer 6.1257.810 or 6.1257.830.	4	Measuring part With auxiliary electrode.

- 1** Remove the reference electrode.
- 2** Remove the working electrode.
- 3** Unscrew the four screws on the base part of the measuring cell with the hex key and remove them.
- 4** Remove the base part.
- 5** Remove the spacer.

Replace the spacer as follows:

Replacing the spacer

Prerequisites:

- The measuring cell is disassembled.
- The new spacer is dry, clean and lint-free.

You will need a 2.5 hex key and a pair of tweezers to replace the spacer.

Wear latex gloves when replacing the spacer.

1 Positioning the spacer

- Hold the measuring part in your hand as shown in *Figure 4, page 16*.
- Use tweezers to place the new spacer on the measuring part. The straight side of the spacer must lie on the straight edge of the measuring part and the four small holes in the spacer must be aligned precisely to the boreholes. Use your fingertips to hold the spacer in correct position.

2 Attaching the base part

- Insert the four screws into the boreholes on the base part.
- Carefully mount the base part of the measuring cell: The straight edge of the base part must lie on the straight edge of the measuring part and the four screws must fit precisely in the four boreholes.

Take care to ensure that the boreholes on the base part, the spacer and the measuring part are aligned precisely with one another.

3 Tightening the screws

Tighten the four screws evenly in crosswise sequence with the hex key.

5.2.4 Cleaning the measuring cell

The auxiliary electrode can be readily cleaned when the working electrode has been removed from the cell.



Cleaning the auxiliary electrode

Prerequisites:

- The electrode cables are unplugged.
- The reference electrode has been removed from the measuring cell.
- The working electrode has been removed from the measuring cell.

1

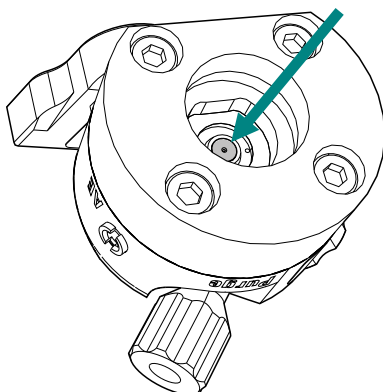


NOTE

When cleaning the auxiliary electrode, the edges of the spacer may get damaged.

The spacer must then be replaced.

- Moisten a cotton swab with 2 mol/L of nitric acid.
- Use this to carefully wipe the auxiliary electrode.
The edges of the spacer may be damaged when wiping the auxiliary electrode.
If the auxiliary electrode is tenaciously stained, we recommend that the spacer be removed prior to cleaning the auxiliary electrode (see Chapter 5.2.3, page 15).



- 2 Rinse off the measuring cell (except for the working electrode and the reference electrode) under running water and dry with a lint-free cloth.



NOTE

When you rinse off the measuring part, take care to ensure that the chip in the cell holder does not get wet.

Cleaning the working electrode

- 1 Clean the working electrode in accordance with the directions contained in the leaflet for the working electrode or polish it if necessary.
- 2 Reinsert the working electrode (*see Chapter 3.1, page 5*).

Inserting the reference electrode

- 1 Reinsert the reference electrode (*see Chapter 3.2, page 6*).



6 Technical specifications

6.1 General

<i>Structure</i>	Flow-through cell with working, reference and auxiliary electrode.
<i>Material</i>	Cell body made of PEEK.
<i>Cell volume</i>	Dependent on the thickness of the spacer:
<i>for 3 mm working electrode and 50 μm spacer</i>	< 0.35 μL
<i>for 2 mm working electrode and 25 μm spacer</i>	< 0.1 μL
<i>Maximum operating pressure</i>	0.4 MPa (100 psi)
<i>Cell recognition</i>	Intelligent cell with automatic identification and monitoring.
<i>Auxiliary electrode</i>	
<i>Type</i>	Installed
<i>Material</i>	Stainless steel
<i>Reference electrode</i>	
<i>Type</i>	Replaceable
<i>Material</i>	<ul style="list-style-type: none"> ▪ Palladium solid-state electrode ▪ Ag/AgCl gel electrode

6.2 Wall-Jet cell for carbohydrate analysis

Working electrode

<i>Material</i>	Gold
<i>Diameter</i>	3 mm

<i>Reference electrode</i>	Palladium solid-state electrode
----------------------------	---------------------------------

<i>Applications</i>	Sugar and amino acids <ul style="list-style-type: none"> ▪ Mono-, di-, oligo- and polysaccharides ▪ Sugar alcohols ▪ Amino sugars ▪ Sugar acids ▪ Amino acids ▪ Antibiotics
---------------------	---

Working range

Acidic medium (pH 1)

<i>Ag/AgCl reference electrode</i>	-0.35 V - +1.10 V
------------------------------------	-------------------

Alkaline medium (pH 13)

<i>Palladium reference electrode</i>	-0.9 V - +0.75 V
--------------------------------------	------------------

6.3 Wall-Jet cell for cyanide analysis

Working electrode

<i>Material</i>	Silver
<i>Diameter</i>	3 mm

<i>Reference electrode</i>	Palladium solid-state electrode
----------------------------	---------------------------------

<i>Applications</i>	Applications relating to environmental analysis <ul style="list-style-type: none"> ▪ Halogenides ▪ Cyanide, sulfide ▪ Thiosulfate ▪ Pharmaceuticals
---------------------	---

*Working range**Acidic medium
(pH 1)**Ag/AgCl refer-
ence electrode* -0.55 V - +0.40 V*Alkaline
medium (pH 13)**Palladium refer-
ence electrode* -1.2 V - +0.1 V**6.4 Wall-Jet cell for anion analysis***Working electrode**Material* Glassy carbon*Diameter* 3 mm*Reference elec-
trode*

Ag/AgCl gel electrode

Applications

Aromatics and amines

- Catecholamines, aromatic amines
- Inorganic anions (nitrite, sulfite, etc.)
- Phenols
- Vitamins
- Some amino acids

*Working range**Acidic medium
(pH 1)**Ag/AgCl refer-
ence electrode* -0.8 V - +1.3 V*Alkaline
medium (pH 13)**Ag/AgCl refer-
ence electrode* -1.5 V - +0.6 V

7 Accessories

Up-to-date information on the scope of delivery and optional accessories for your instrument can be found on the Internet.





NOTE

When you receive your new instrument, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.

Instruments currently sold

If you do not know the article number of your instrument, proceed as follows:

Downloading the accessories list

- 1 Go to the Metrohm website <http://www.metrohm.com/com>.
- 2 Click on .
The **Search** webpage will be displayed.
- 3 Enter a search term relating to the instrument into the search field and click on **Find**.
The search results will be displayed.
- 4 In the search results, select the **Devices** tab (if it is not already selected) and then click on the Metrohm article number of the required instrument (e.g. 2.852.0050).
The page with information pertaining to the searched article is displayed.
- 5 Select the **Parts** tab.
The complete list of accessories with the scope of delivery and the optional accessories will be displayed.
- 6 Click on .



The **Partslists** webpage will be displayed.

7 Select the desired output language.

8 With the article number entered, click on the command **Generate PDF**.

The PDF file with the accessories data will be created in the language selected.

Direct access for all instruments

If you are unable to find your instrument using the search as described above, this may be due to the instrument not being sold anymore. Using the article number, you can download accessories lists for all instruments as follows:

Downloading the accessories list

1 Type <http://partslists.metrohm.com> into your Internet browser.

The **Partslists** webpage will be displayed.

2 Select the desired output language.

3 Enter the article number and click on the **Generate PDF** command.

The PDF file with the accessories data will be created in the language selected.

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