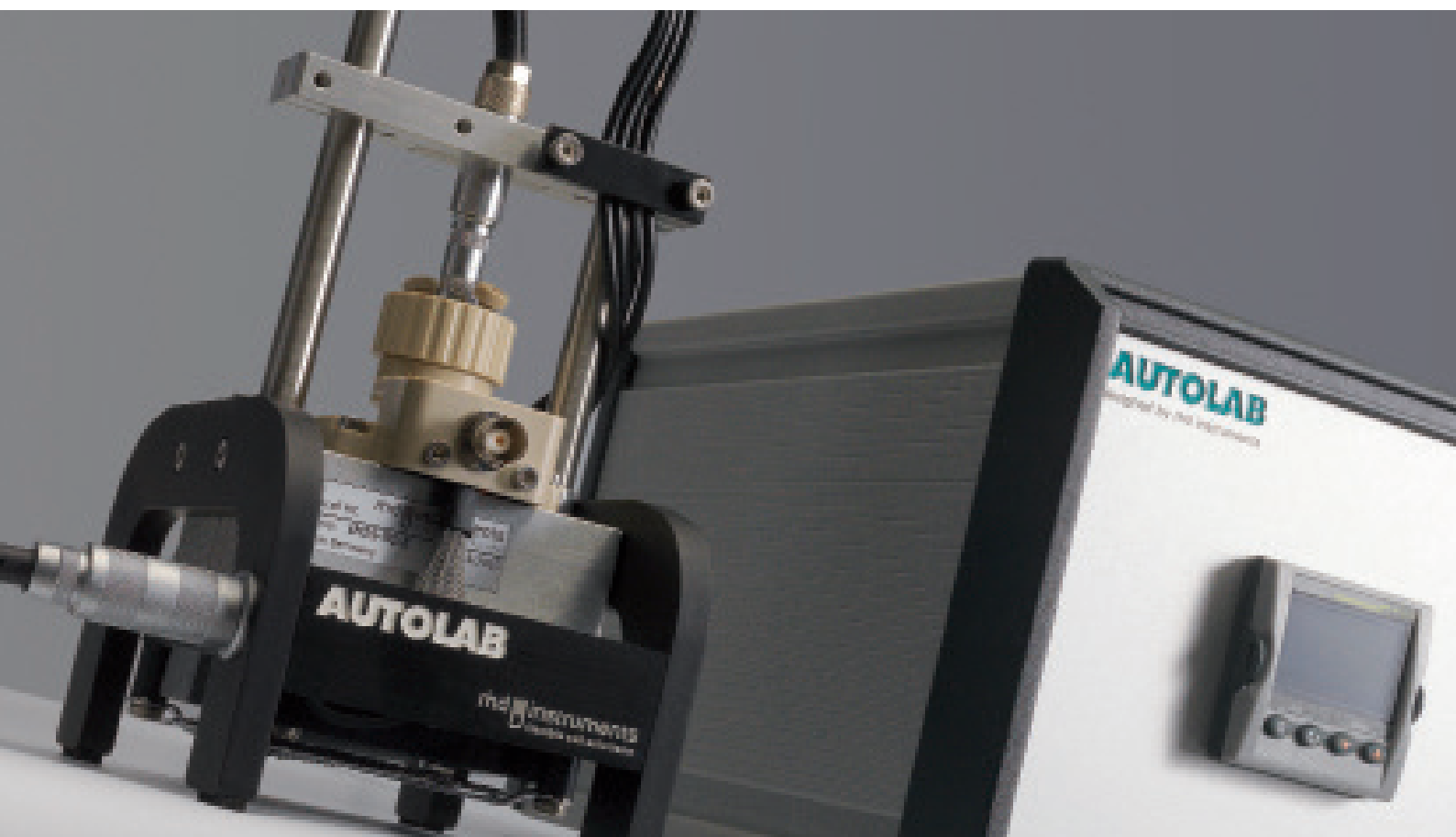


2018/2019

Metrohm Autolab

Microcell HC & Accessories Catalogue



Electrochemistry with temperature control

- Systems
- Cells
- Software
- Accessories

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Autolab Microcell HC - Basic Package

Item 101 - Autolab Microcell HC Basic Package closed

03

Basic setup, compatible with all closed measuring cells.

Included:

- 1 Cell holder Autolab Microcell HC
- 1 temperature controller 3216
- 1 heat sink compound (Item 411, page 14)
- 1 Serial connection kit (item no. 441)
- 1 Adapter box BNC - banana (item no. 442)
- All required connection cables + tools

No measuring cell included.



Item 102 - Autolab Microcell HC Basic Package open

Basic setup, compatible with all open measuring cells.

Included:

- 1 Cell holder Autolab Microcell HC
- 1 Positioning unit with micrometer screw (item no. 572)
- 1 temperature controller 3216
- 1 heat sink compound (Item 411, page 14)
- 1 Serial connection kit (item no. 441)
- 1 Adapter box BNC - banana (item no. 442)
- All required connection cables + tools

No measuring cell included.



Autolab Microcell HC - Measuring Cells

04

Item 201 - TSC 70 open

Measuring cell - type open for liquid samples

Specifications:

- For liquid samples
- $V_{\min} = 70 \mu\text{L}$, $V_{\max} = 100 \mu\text{L}$
- Electrode diameter (Pt wire): 0.25 mm each
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Included:

- 1 Cell unit with Pt sample container
- Electrode plug with 4 glass-sealed Pt wires (item no. 511)

Selected applications:

- Determination of dc-ion conductivity of ionic liquids and other non-volatile 'liquid' samples like polymerized ionic liquids
- Determination of the electrochemical window of ionic liquids (only with internal Pt pseudo-reference electrode of electrode plug)



Electrode plug



Sample container

Autolab Microcell HC - Measuring Cells

202 TSC 1600 open

Measuring cell - type open for liquid samples

Specifications:

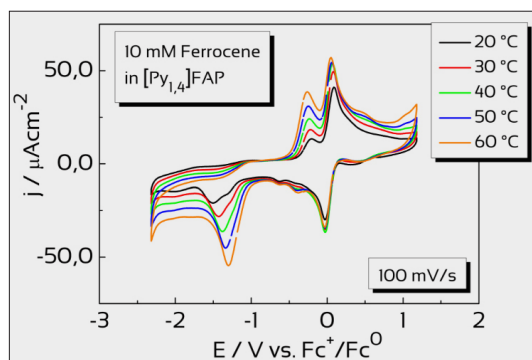
- For liquid samples
- $V_{\min} = 1.0 \text{ mL}$, $V_{\max} = 1.2 \text{ mL}$
- Electrode diameter (Pt wire): 0.25 mm each
- T-range (operation): $-40 \text{ }^{\circ}\text{C}$ to $+100 \text{ }^{\circ}\text{C}$, depending on sample's mass and humidity conditions
- T-range (storage): $+10 \text{ }^{\circ}\text{C}$ to $30 \text{ }^{\circ}\text{C}$

Included:

- 1 Cell unit with Pt sample container
- 1 Electrode plug with 4 glass-sealed Pt wires (item no. 511)

Selected applications:

- Determination of dc-ion conductivity of ionic liquids and other non-volatile 'liquid' samples like polymerized ionic liquids
- Determination of the electrochemical window of ionic liquids (only internal Pt pseudo-reference electrode of electrode plug)



Temperature dependent cyclic voltammetry plots



Electrode plug



Sample container

Autolab Microcell HC - Measuring Cells

06

Item 203 - TSC Sw open

Measuring cell - type open

Specifications:

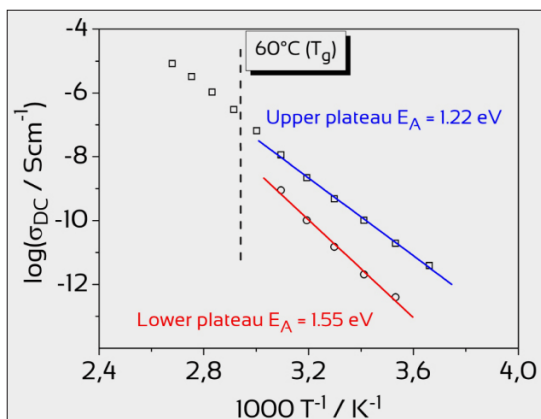
- Maximum diameter of disc-shaped samples (solid): 12mm
- Samples are ideally disc-like in shape and dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Included:

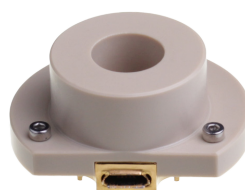
- 1 Electrode plug with one-sided polished stainless steel disc (diameter: 12 mm)
- 1 Cell unit containing one exchangeable one-sided polished stainless steel disc electrode for sample mounting
- 1 Cover made of PEEK to simplify positioning of the upper electrode

Selected applications:

- Determination of dc-ion conductivity of gels and glasses
- Dielectric spectroscopy of solid samples



Arrhenius plot



Sample mount equipped with cover and disc electrode

Electrode plug



Disc electrode with spherical joint

Autolab Microcell HC - Measuring Cells

Item 211 - TSC 70 closed

Measuring cell - type closed

Specifications:

- For liquid samples
- $V_{\min} = 70 \mu\text{L}$, $V_{\max} = 100 \mu\text{L}$
- Electrode diameter (plug): 0.25 mm each
- T-range (operation): $-40 \text{ }^\circ\text{C}$ to $+100 \text{ }^\circ\text{C}$, depending on sample's mass and humidity conditions
- T-range (storage): $+10 \text{ }^\circ\text{C}$ to $30 \text{ }^\circ\text{C}$

Included:

- 1 Cell unit with Pt sample container
- 1 Cap containing electrode plug with 4 glass-sealed Pt wires and two plugs which seal two inlets for connecting fittings (item no. 501)
- 1 Cover made of PEEK
- 2 O-rings 15 x 2 mm made of EPDM by default; other materials are available (item no. 401)

Selected applications:

- Determination of dc-ion conductivity of liquid volatile and/or moisture and air-sensitive samples like carbonate-based battery electrolytes or dye solutions in organic solvents like acetonitrile
- Determination of the electrochemical window of liquid volatile and/or moisture and air-sensitive samples - several capillary-based reference electrodes as well as mountings for Li pseudo-reference electrodes are available (item no. 5241, 525, 5261 and 5271)



Cap with electrode plug



Sample container with PEEK cover



Assembled

Autolab Microcell HC - Measuring Cells

08

Item 212 - TSC 1600 closed

Measuring cell - type closed

Specifications:

- For liquid samples
- $V_{\min} = 1.0$ mL, $V_{\max} = 1.2$ mL
- Electrode diameter (plug): 0.25 mm each
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Included:

- 1 Cell unit with Pt sample container
- 1 Cap containing electrode plug with 4 glass-sealed Pt wires and two plugs which seal two inlets for connecting fittings (item no. 501)
- 1 Cover made of PEEK
- 2 O-rings 15 x 2 mm made of EPDM by default; other materials available (item no. 401)

Selected applications:

- Determination of dc-ion conductivity of liquid volatile and/or moisture and air-sensitive samples like carbonate-based battery electrolytes
- Determination of HOMO-LUMO gaps of organic dyes by measuring cyclic voltammograms of dye solutions in organic solvents like acetonitrile
- Determination of the electrochemical window of liquid volatile and/or moisture and air-sensitive samples - several capillary-based reference electrodes as well as mountings for Li pseudo-reference electrodes are available (item no. 5241, 525, 5261 and 5271)



Cap with electrode plug



Sample container with PEEK cover



Assembled

Autolab Microcell HC - Measuring Cells

Item 213 - TSC Sw closed

Measuring cell - type closed

Specifications:

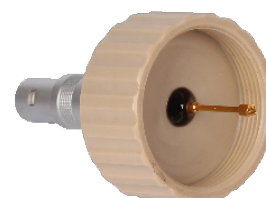
- Max. diameter of disc-shaped samples (solid): 12 mm
- Samples are ideally disc-like in shape and dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Included:

- 1 Cell unit containing one exchangeable one-sided polished stainless steel disc electrode for sample mounting
- 1 Cover made of PEEK
- 1 ball joint-fixed polished stainless steel disc electrode for contacting sample or current collector
- 1 Gold-plated spring for pressure adjustment
- 1 Cap with spring contact
- 2 O-rings 15 x 2 mm made of EPDM by default; other materials are available (item no. 401)

Selected applications:

- Determination of dc-ion conductivity of gels and glasses
- Dielectric spectroscopy of solid samples



Cap with spring contact



Measuring cell without cap



Platform for sample mounting

Autolab Microcell HC - Measuring Cells

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Item 214_s/e - TSC battery standard/expanded

Measuring cell - type closed

Specifications:

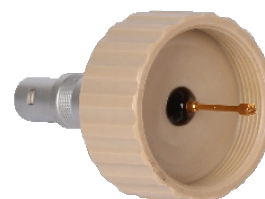
- Maximum diameter of disc-shaped solid sample: 12 mm
- Samples are ideally disc-like in shape and dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Included:

- 1 Nickel-plated cell unit to fix lower electrode
- 2 Stainless steel electrodes (pressed in PEEK) for flat samples
- 2 Electrodes* (pressed in PEEK) for usage of elemental lithium. Electrode material is stainless steel
- 1 Cover made of PEEK
- 1 Gold-plated spring and screw
- 1 Cap with spring contact
- 3 Screw plugs: Li reference plug, capillary plug and blank plug
- O-rings: 4 (8)* x item no. 402 EPDM, 2 x item no. 405 EPDM, 3 x item no. 406 FFKM)
- 100 Ohm test resistor (item no. 591)

Selected applications:

- Determination of dc-ion conductivity of solid ion conductors, glasses, and gels
- Dielectric spectroscopy of solid samples
- Investigations of batteries (half and full cells) and super-caps in two or three-electrode configuration
- Determination of MacMullin number (separators)
- Studies of hybrid materials (solid + liquid)



Cap with spring contact



Gold-plated spring



Gold-plated screw



Upper electrode



Lower electrode for flat sample



Screw plug for capillaries



Assembled

* Only included in the expanded version

Autolab Microcell HC - Measuring Cells

Item 215 - TSC surface

Measuring cell - type closed

Specifications:

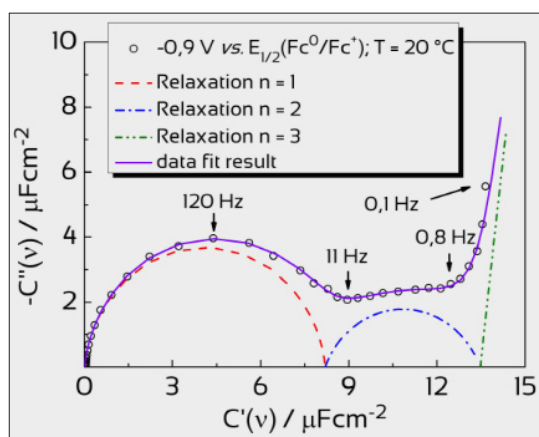
- Rectangular solid samples: minimum side length: 10 mm, maximum side length: 15 mm
- Round solid samples: minimum diameter: 12 mm, maximum diameter: 20 mm
- Maximum sample thickness: 2mm
- Samples should be dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Included:

- 1 Gold-plated platform for sample mounting
- 1 Cover made of PEEK containing 4 gold-plated contact springs
- 1 Cap with exchangeable glassy carbon electrode (diameter: 6 mm; item no. 510, short)
- 3 Plugs: Li reference plug, capillary plug and blank plug
- O-rings: 1 x item no. 401 EPDM, 2 x item no. 404 FFKM, 3 x item no. 406 FFKM)

Selected applications:

- Corrosion studies
- Investigation of the electrochemistry of solid/liquid interfaces



Nyquist plot



Cap with exchangeable glassy carbon electrode



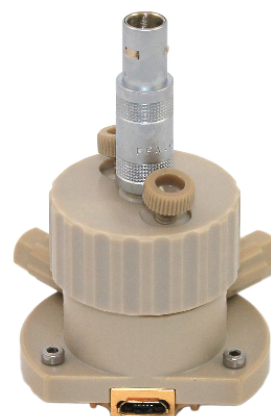
Screw plug for capillaries



PEEK cover with four contact pins



Platform for sample mounting



Assembled

Autolab Microcell HC - Measuring Cells

12

Item 216 - TSC spectro

Measuring cell - type closed

Specifications:

- For liquid samples
- $V_{\min} = 0.5 \text{ mL}^*$, $V_{\max} = 2.0 \text{ mL}$
- Working electrode: Pt gauze electrode by default
- Counter electrode: glassy carbon (cap with exchangeable electrode)
- 2 Windows equipped with collimator lenses enable UV/Vis measurements in transmission mode
- Optical path length adjustable: $\sim 1.4 \text{ mm}$ to 0.12 mm (thickness of Pt mesh)
- Wavelengths: 200-2500 nm
- T-range (operation): $-20 \text{ }^\circ\text{C}$ to $+80 \text{ }^\circ\text{C}$, depending on sample's mass and humidity conditions
- T-range (storage): $+10 \text{ }^\circ\text{C}$ to $30 \text{ }^\circ\text{C}$

Included:

- 1 Gold-plated platform for working electrode mounting
- 1 Pt gauze electrode
- 1 Cap with exchangeable glassy carbon electrode (item no. 512, long); on demand: item no. 510 (short)
- 1 Light-proof PEEK cover
- 2 Screw plugs: capillary plug and blank plug
- O-rings: 2 x item no. 401 FFKM, 1 x item no. 402 FFKM, 1 x item no. 404 FFKM, 1 x item no. 406 FFKM, 2 x 407 FFKM

Selected applications:

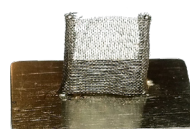
- Spectroelectrochemical studies of inorganic metal complexes or organic dyes in solution (CV + UV/Vis)



Cap with exchangeable electrode



Light-proof PEEK cover with optical windows



Pt gauze electrode



Bottom view of PEEK housing



Gold plated platform



Assembled

* in combination with SP 5102

Autolab Microcell HC - Software

NOVA 2 Software

13

NOVA is the control software for all Autolab instruments and has built-in temperature control and measurement. Temperature control can be integrated into any electrochemical procedure. Convenient export of EIS data for analysis with rhd RelaxIS software.

System Requirements

- Microsoft Windows 7 or later
- .NET Framework 4.5 or above



Item 311 - RelaxIS*

Stand alone fitting software with training option (simulation). Single license with unlimited validity period. The software can be installed on an unlimited number of computers but can only be used by one computer at a time.

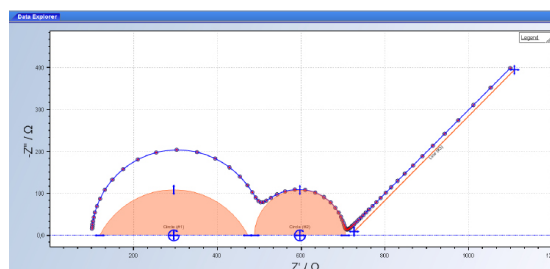
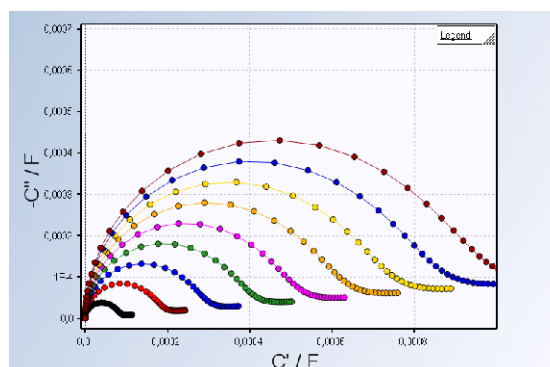
Included:

- 1 Licence for one PC (unlimited number of users)
- Service and support

System Requirements

- Microsoft Windows Vista (SP2) or above
- .NET Framework 4.5 or above

*Please check with your Metrohm distributor for availability.



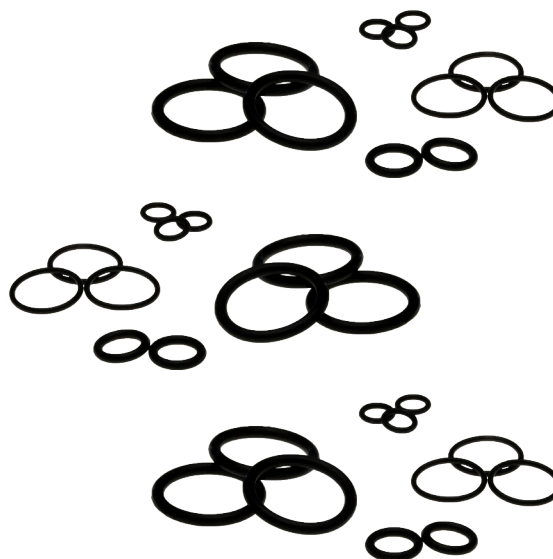
Impedance spectroscopy analysis

Autolab Microcell HC - Accessories

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Item 401x-407x - O-rings

| Size | Item No. | | |
|-------------|----------|------|-------|
| | EPDM | FKM | FFKM |
| 4 x 1.0 mm | 406E | 406F | 406FF |
| 5 x 1.0 mm | - | - | 407FF |
| 6 x 1.5 mm | 404E | 404F | 404FF |
| 7 x 1.5 mm | 403E | 403F | - |
| 10 x 1.0 mm | 402E | - | 402FF |
| 15 x 2.0 mm | 401E | 401F | 401FF |
| 17 x 2.0 mm | 405E | - | - |



Amount: FFKM: 6 pcs. FKM/EPDM: 20 pcs.

Please check the table on page 22 for the O-ring amounts and the materials included by default with the delivery for the respective measuring cell.

Prior to use please check the compatibility of the respective O-ring material with all of your chemicals! Incompatibility may not only result in swelling of the O-rings, but also in serious damage to your sample and even the measuring cell.

Item 411 - Servisol heat sink compound



Amount: 1 ml.

The Safety Data Sheet of the Servisol heat sink compound is available by request.

Item 412 - Cleaning and polishing set - Option: -110 V

Included:

- 1 x 10 g Diamond paste (0.25 µm particle size)
- 560 Cotton pads
- 800 Polishing sticks
- Handheld electrical multipurpose tool
- 5 Polishing pads
- 1 Voltage converter 110 V to 230 V (only 110 V option, e.g. for US customers)



Item 413 - Diamond paste 0.25 µm

Amount: 10 g.



Autolab Microcell HC - Accessories

Item 42x - Conductivity standard solution

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421: $\kappa_{DC} = 1.413 \text{ mS/cm @ } 25 \text{ }^\circ\text{C}$

422: $\kappa_{DC} = 12.880 \text{ mS/cm @ } 25 \text{ }^\circ\text{C}$

Amount: 25 pcs of 20 mL each.

Item 431 - Cooling Box

Cooling box needed for low temperature measurements or below dew point.

Included:

- Temperature controller equipped with display
- Cable feed-through containing one connecting cable Autolab Microcell HC setup/temperature controller and 4 x BNC connecting cables
- 1 Platform suitable for Autolab Microcell HC cell holders

Important:

Rated for 230 V; item no. 444 (voltage converter required for e.g. US customers).



Autolab Microcell HC setup not included

Item 441 - Serial connection kit

Required if no native serial connection is available for communicating with the temperature controller (incl. in item no. 101/102).

Included:

- Moxa® USB-to-serial adapter
- Driver CD



Item 442 - Adapter Box BNC - Banana plug

An elegant way of connecting the measuring cells and the Autolab Microcell HC set up with the Metrohm Autolab potentiostat/galvanostat and lowers the influence of interference (incl. in item no. 101 and 102).

Included:

- 3 x BNC cable of 30 cm length



Autolab Microcell HC - Accessories

16

Item 501 - Cap (4 glass-sealed Pt electrodes)

Cap containing 4 separate glass-sealed Pt- electrodes (diameter = 0.25mm each); surface mirror-like polished.

Suitable for:

- Item no. 211, 212 and 215



Item 502-510 Cap with exchangeable Electrode Tips (ET)

Electrode Tips (ET)

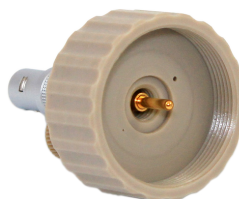
Cap containing:

- 1 Exchangeable electrode pressed in PEEK made of various materials with diverging diameters and lengths as stated in the table on page 17; electrode surface mirror-like polished.

Included:

- Tool for electrode exchange (only for caps with 3 mm electrodes) + 1 x item no. 404 FFKM

In case of spare parts, only the part specified in the table on page 17 is included with delivery. If the spare part is an electrode, the scope of delivery also includes 1 x item no. 404 FFKM.



Cap with contact pin
w/o electrode



Stainless steel electrode,
short, Ø = 6.0 mm



Glassy carbon electrode,
Ø = 3.0 mm

Item 511 - Electrode plug w/4 glass-sealed Pt electrodes

Electrode plug for use with open measuring cell;
4 separate glass-sealed Pt electrodes (diameter = 0.25 mm each); surface mirror-like polished.

Suitable for:

- Item no. 201 and 202



Autolab Microcell HC - Accessories

| Item No. | Description | Material | Diameter (mm) | Type | Suitable for measuring cell |
|----------|-------------|------------------------------------|---------------|-------|-----------------------------|
| 502 | Cap* | Glassy carbon | 3 | | 211*, 212, (215) |
| 5021 | ET for 502 | Glassy carbon | 3 | | 211*, 212, (215) |
| 5022 | ET for 502 | Cap with contact pin w/o electrode | | | 211*, 212, (215) |
| 503 | Cap | Stainless steel | 6 | Short | 215, 216 |
| 5031 | ET for 503 | Stainless steel | 6 | Short | 215, 216 |
| 504 | Cap* | Stainless steel | 3 | | 211*, 212, (215) |
| 5041 | ET for 504 | Stainless steel | 3 | | 211*, 212, (215) |
| 505 | Cap | Platinum | 6 | Short | 215, 216 |
| 5051 | ET for 505 | Platinum | 6 | Short | 215, 216 |
| 506 | Cap* | Platinum | 3 | | 211*, 212, (215) |
| 5061 | ET for 506 | Platinum | 3 | | 211*, 212, (215) |
| 507 | Cap | Copper | 6 | Short | 215, 216 |
| 5071 | ET for 507 | Copper | 6 | Short | 215, 216 |
| 5081 | Cap* | Copper | 3 | | 211*, 212, (215) |
| 081 | ET for 508 | Copper | 3 | | 211*, 212, (215) |
| 510 | Cap | Glassy carbon | 6 | Short | 215, 216 |
| 5101 | ET for 510 | Glassy carbon | 6 | Short | 215, 216 |
| 5102 | ET for 510 | Glassy carbon | 6 | Long | 216 |

*Only 2-electrode measurements are possible with item no. 211.

Item no. 5022 - empty cap for 502 can be used in combination with all electrode tips.

Item 521 - Micro reference electrode classical

Micro reference electrode based on the system
 $\text{Ag}/\text{AgCl}/\text{KCl } 3 \text{ M in H}_2\text{O}$.



Item 522 - Micro reference electrode ionic liquid

Micro reference electrode based on the system
 $\text{Ag}/\text{AgCl}/\text{AgOTf } 10 \text{ mM in [EMIm]TFSI}$.



For items 521-23 please check with your Metrohm distributor for availability.

Autolab Microcell HC - Accessories

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Item 523 - Micro reference electrode organic carbonate

Micro reference electrode based on the system
Ag/AgCl//AgOTf 10 mM in EC:DMC = 1:1.

Selected applications:

- Corrosion studies
- Spectroelectrochemical studies on inorganic metal complexes or organic dyes in solution (CV + UV/Vis)



Item 524x - 526x - Micro reference electrodes pseudo

Micro reference electrode based on metal wire (Ag or Pt);
in case of type Ag/AgCl Ag wire covered with AgCl.

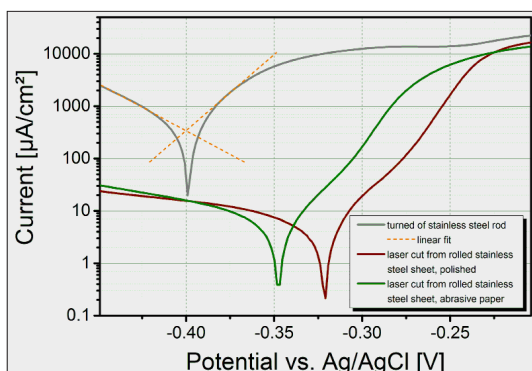
Included:

- Storage container
- Connecting cable

| Type | TSC 1600 Closed | Item No. for the respective measuring cell | | |
|---------|-----------------|--|-------------|-------------|
| | TSC 70 Closed | TSC Battery | TSC Surface | TSC Spectro |
| Ag | 5241 | 5242 | 5243 | 5244 |
| Ag/AgCl | 5271 | 5272 | 5273 | 5274 |
| Pt | 5261 | 5262 | 5263 | 5264 |

Selected applications

- Corrosion studies
- Spectroelectrochemical studies on inorganic metal complexes or organic dyes in solution (CV + UV/Vis)



Tafel plot

Autolab Microcell HC - Accessories

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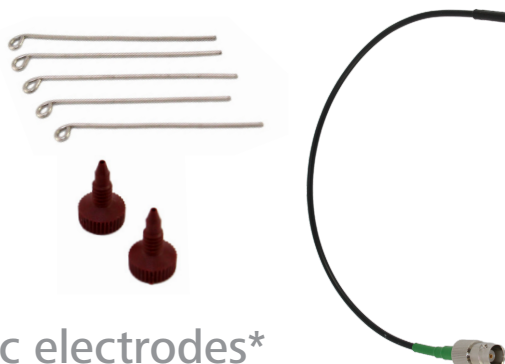
Item 525 - Mount for Li-reference electrode

Elementary Li can be attached to this mount to build a Li-reference electrode; suitable for measuring cell 212 only.

Amount: 5 pcs.

Included:

- 1 Connecting cable and 2 fittings



Item 531 - Stainless steel disc electrodes*

Item 532 - Nickel disc electrodes*

Item 533 - Stainless steel disc electrodes gold plated*

One-sided mirror-like polished disc electrodes made of stainless steel (diameter = 12 mm).

Amount: 6 pcs.



Item 534 - Nickel disc electrodes gold plated*

One-sided mirror-like polished disc electrodes made of nickel (diameter = 12 mm).

Amount: 6 pcs.

Item 535 - Stainless steel disc electrodes nickel plated*

One-sided mirror-like polished disc electrodes made of stainless steel (diameter = 12 mm).

Amount: 6 pcs.

Item 541 - Spacer set*

Included:

- 5 x Mylar®-foil (thickness 80 μm)
- 5 x PEEK-foil (thickness 25, 50, 100 and 2 x 200 μm)
Outer-diameter = 12 mm, inner-diameter = 8 mm



*Only suitable for measuring cells 203, 213 and 214.

Autolab Microcell HC - Accessories

20 Item 551 - Capillary-based filling set

Needed for filling additional liquid solution into measuring cell through fittings while cell is closed.

Included:

- 1 Gas-tight Hamilton-syringe



Item 552 - Capillary-based gas-inlet set

Used for adding gas into measuring cell through fittings.



Item 561 - Cable feed-through, with 40mm DIN flange by default

The flange size depends on the requirements of the operator's glove box.

The cable feed-through contains one connecting cable Autolab Microcell HC setup/temperature controller and 4 x BNC connecting cables.



Item 571 - Faraday cage

Faraday cage made of Al profile covered with acrylic glass; cable feed-through for 4 Autolab Microcell HC setups, gas inlet (p_{\max} relative = 0.5 bar).



Item 572 - Faraday cage with dew point sensor

Like 571 + dew point sensor with display.

Voltage rating: 85-264 VAC, 50/60 Hz

Detailed technical specifications are available upon request.

Autolab Microcell HC - Accessories

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Item 581 - Modification set item no. 101 to 102

Modification set needed if closed and open measuring cells should be used with the same Autolab Microcell HC setup.

If an active temperature control is not necessary for the execution of your electrochemical experiments, it represents a cost-effective alternative to the Autolab Microcell HC Basic Package.

Included:

- Positioning unit with micrometer screw



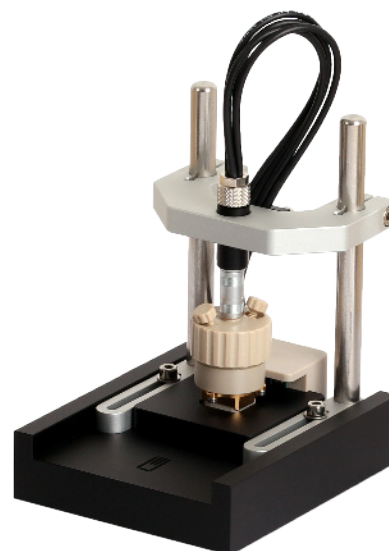
Item 582 - Passive Cell Holder

Cell stand for measurements without the need for temperature control.

If an active temperature control is not necessary for the execution of your electrochemical experiments, you perform these solely at room temperature in air-conditioned rooms, it represents a cost-effective alternative to the Autolab Microcell HC Basic Package.

Included:

- 1 Passive cell holder
- 1 Adapter box BNC - banana (item no. 442)
- 2 Manuals
- All required connection cables + tools



No measuring cell included.

Item 583 - Modification set item no. 102 to 101

Modification set needed if closed and open measuring cells should be used with the same Autolab Microcell HC setup.

Included:

- Connecting cable for closable cells, positioning unit



Item 591 - 100 Ohm Test resistor

100 Ohm Test resistor suitable for measuring cells 203, 213 and 214.

Item 599 - Transport case

High-quality transport case with sufficient space for 1 x item no. 101 and 2 - 3 measuring cells.

Autolab Microcell HC - Spare parts O-rings

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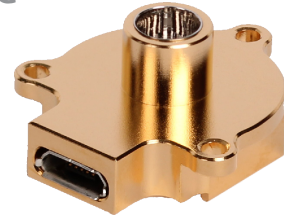
Spare parts - O - rings

| Measuring cell | Size | Amount | Available materials | Default material |
|-----------------|-------------|--------|---------------------|------------------|
| TSC 70 open | - | - | - | - |
| TSC 1600 open | - | - | - | - |
| TSC Sw open | 15 x 2.0 mm | 1 | FKM, EPDM, FFKM | EPDM |
| TSC 70 closed | 15 x 2.0 mm | 2 | FKM, EPDM, FFKM | EPDM |
| TSC 1600 closed | 15 x 2.0 mm | 2 | FKM, EPDM, FFKM | EPDM |
| TSC Sw closed | 17 x 2.0 mm | 2 | FKM, EPDM, FFKM | EPDM |
| TSC battery | 4 x 1.0 mm | 4 - 8 | EPDM, FFKM | FFKM |
| | 10 x 1.0 mm | 2 - 4 | EPDM, FFKM | EPDM |
| | 17 x 2.0 mm | 2 | EPDM, FFKM | EPDM |
| TSC surface | 4 x 1.0 mm | 3 | FKM, EPDM, FFKM | FFKM |
| | 6 x 1.5 mm | 2 | FKM, EPDM, FFKM | FFKM |
| | 15 x 2.0 mm | 1 | FKM, EPDM, FFKM | EPDM |
| TSC spectro | 4 x 1.0 mm | 1 | FKM, EPDM, FFKM | FFKM |
| | 5 x 1.0 mm | 2 | FKM, EPDM, FFKM | FFKM |
| | 6 x 1.5 mm | 1 | FKM, EPDM, FFKM | FFKM |
| | 10 x 1.0 mm | 1 | FKM, EPDM, FFKM | FFKM |
| | 15 x 2.0 mm | 2 | FKM, EPDM, FFKM | FFKM |

Autolab Microcell HC - Spare parts TSC 70 closed

Item 2111 - Thermo block with Pt crucible

1 Gold-plated thermo block for TSC 70 closed equipped with Pt crucible.
Included: Embedded Pt00 temperature sensor.

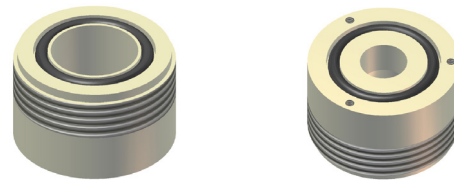


Included:

- Pt100 temperature sensor equipped with Pt crucible

Item 2112 PEEK housing standard

1 Housing for TSC 70 closed.



Included:

- 2 x O-ring 15 x 2 mm EPDM (item no. 401E)

Item 2113 - Peek housing special

1 Housing for TSC 70 closed; short version allowing for low dead volume.

Included:

- 2 x O-ring 15 x 2 mm EPDM (item no. 401E)

Important:

Only compatible in combination with item no. 501 (cap with 4 glass-sealed Pt electrodes). Cap inlets cannot be used!

Item 2114 - Tools, screws and O-rings

Included:

- 1 x Hex key 1.5 mm
- 9 x Screw M2 x 5 (DIN912 A2)
- 1 x Hex wrench M1.5 x 75
- 6 x O-ring 15 x 2 mm EPDM (item no. 401E)



Autolab Microcell HC - Spare parts TSC 1600 closed

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Item 2121 - Thermo block with Pt crucible

1 Gold-plated thermo block for TSC 1600 closed equipped with Pt crucible.

Included

- Pt100 temperature sensor equipped with Pt crucible
- Embedded Pt00 temperature sensor

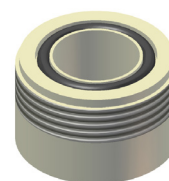


Item 2122 - PEEK housing standard

1 Housing for TSC 1600 closed.

Included:

- 2 x O-ring 15 x 2 mm EPDM (item no. 401E)



Item 2123 - Peek housing special

1 Housing for TSC 1600 closed; short version allowing for low dead volume.

Included:

- 2 x O-ring 15 x 2 mm EPDM (item no. 401E)
- 1 x O-ring 14 x 2 mm EPDM

Important:

Cap inlets cannot be used!

Item 2124 - Tools, screws and O-rings

Included:

- 9 x Screw M2 x 5 (DIN912 A2)
- 1 x Hex key 1.5 mm
- 1 x Hex wrench M1,5 x 75
- 6 x O-ring 15 x 2 mm EPDM (item no. 401E)



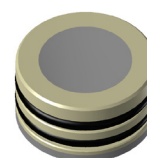
Autolab Microcell HC - Spare parts TSC battery

Item 2141 - Upper electrode for flat samples

1 One-sided polished stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for O-rings.

Included:

- 4 x O-ring 10 x 1 mm EPDM (item no. 402E)



Item 2142 - Upper electrode for contact with Li

1 Stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for O-rings; with punching edge.

Included:

- 4 x O-ring 10 x 1 mm EPDM (item no. 402E)

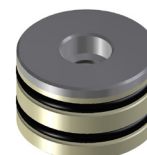
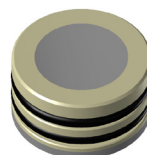


Item 2143 - Lower electrode for flat samples

1 Stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for O-rings; with thread for thermo block at bottom side.

Included:

- 4 x O-ring 10 x 1 mm EPDM (item no. 402E)

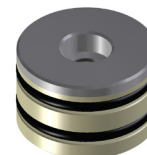


Item 2144 - Lower electrode for contacting Li

1 Stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for O-rings; with punching edge and thread for thermo block at bottom side.

Included:

- 4 x O-ring 10 x 1 mm EPDM (item no. 402E)

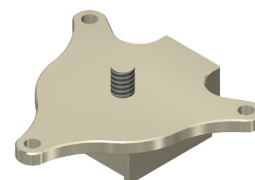


Item 2145 - Thermo block w/o lower electrode

1 Nickel-plated thermo block for TSC battery, with thread to fix lower electrode.

Included

- Embedded Pt100 temperature sensor



Autolab Microcell HC - Spare parts TSC battery

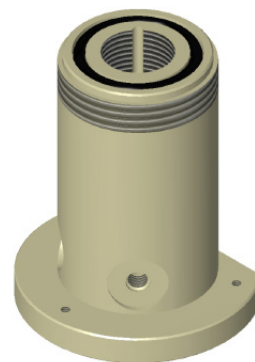
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Item 2146 - PEEK housing

1 Housing for TSC battery w/o fittings and cap.

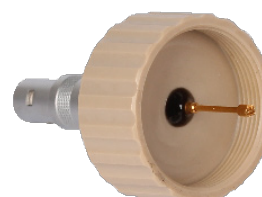
Included:

- 4 x O-ring 17 x 2 mm EPDM (item no. 405E)



Item 2147 - Cap with contact spring

1 Cap with contact spring for usage with TSC battery.



Item 2148 - Screw for adjusting contact pressure

1 Gold-plated screw for adjusting contact pressure (in combination with item no. 21416 or 21417).



Item 2149 - Fitting set and plug

1 Plug and 1 fitting for capillary-based reference electrodes and filling set, 1 fitting for usage with Li as reference electrode, all made of PEEK.

Included:

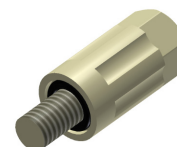
- 3 x O-ring 4 x 1 mm FFKM (item no. 406FF)

Item 21410 - Plug

1 Plug, made of PEEK.

Included:

- 1 x O-ring 4 x 1 mm FFKM (item no. 406FF)



Item 21411 - Capillary fitting

1 Fitting for capillary-based reference electrodes and filling set, made of PEEK.

Included:

- 1 x O-ring 4 x 1 mm FFKM (item no. 406FF)



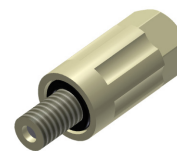
Autolab Microcell HC - Spare parts TSC battery

Item 21412 - Li fitting

1 Fitting for usage of Li as reference electrode, made of PEEK.

Included:

- 1 x O-ring 4 x 1 mm FFKM (item no. 406FF)



Item 21413 - O-ring set

- 16 x O-ring: 10 x 1 mm (EPDM) (item no. 402E).
- 2 x O-ring: 17 x 2 mm (EPDM) (item no. 405E).
- 3 x O-ring: 4 x 1 mm (FFKM) (item no. 406FF).

Item 21414 - Tools and screws

Included:

- 9 x Screw M2 x 5 (DIN912 A2)
- 1 x Hex key 1.5 mm
- 1 x Hex key 8 mm
- 1 x Rod-like tool for removing and positioning the upper electrode
- 1 x Wrench for fixing lateral fittings and plug



Item 21415 - 2 mm connection cable

1 Connection cable 2 mm banana plug to BNC female.

Item 21416 - Pressure regulating spring

1 Gold-plated spring, standard version with spring constant = 2.3 N/mm.



Gold-plated spring

Item 21417 - Pressure regulating spring +

1 Gold-plated spring, strong version with spring constant = 32.6 N/mm.



Gold-plated spring

Autolab Microcell HC - Spare parts TSC Surface

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Item 2151 - Thermo block

1 Gold-plated thermo block with plain surface.

Included:

- Embedded Pt100 temperature sensor

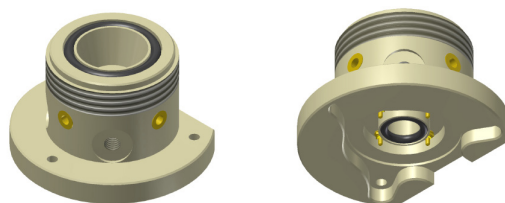


Item 2152 - PEEK housing

1 Housing w/o fittings and cap.

Included:

- 2 x O-ring 15 x 2 mm EPDM (item no. 401E)
- 2 x O-ring 6 x 1.5 mm FFKM (item no. 404FF)
- 1 x 2 mm banana to 2 mm banana cable

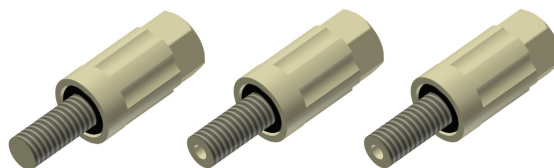


Item 2153 - Fitting set and plug

1 Plug, 1 fitting for capillary-based reference electrodes and filling set, 1 fitting for usage with Li as reference electrode, all made of PEEK.

Included:

- 3 x O-ring 4 x 1 mm FFKM (item no. 406FF)

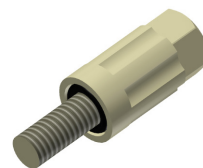


Item 2154 - Plug

1 Plug made of PEEK.

Included:

- 1 x O-ring 4 x 1 mm FFKM (item no. 406FF)

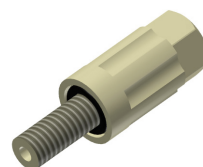


Item 2155 - Capillary fitting

1 Fitting for capillary-based reference electrodes and filling set, made of PEEK.

Included:

- 1 x O-ring 4 x 1 FFKM (item no. 406FF)



Autolab Microcell HC - Spare parts TSC Surface

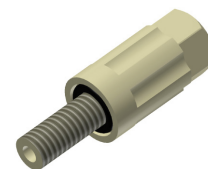
Item 2156 - Li fitting

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1 Fitting for usage of Li as reference electrode, made of PEEK.

Included:

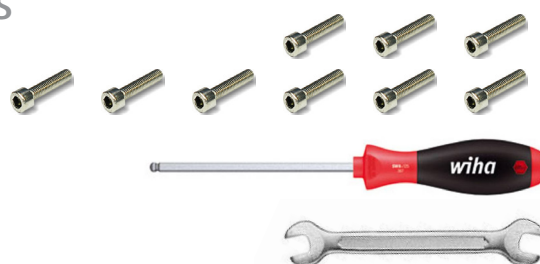
1 x O-ring 4 x 1 FFKM (item no. 406FF)



Item 2157 - Tools and screws

Included:

- 9 x Screw M2 x 5 (DIN912 A2)
- 1 x Hex wrench M1.5 x 75
- 1 x Hex key 1.5 mm
- 1 x Wrench for fixing lateral fittings and plug



Autolab Microcell HC - Spare parts TSC Spectro

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Item 2161 - Thermo block

1 Gold-plated thermo block with plain surface.

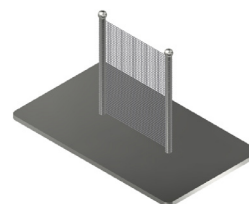
Included:

- Embedded Pt 100 temperature sensor



Item 2162 - Pt Gauze electrode

1 Pt gauze electrode.



Item 2163 - Peek housing

1 Housing consisting of 2 separate parts, w/o optical windows and cap.

Included:

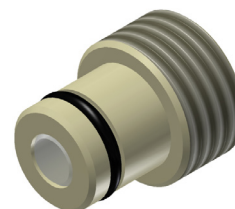
- 2 x O-ring 10 x 1 mm FFKM (item no. 402FFKM)
- 3 x O-ring 15 x 2 mm FFKM (item no. 402FF)
- 3 x Screw M2 x 5 (DIN912 A2)

Item Item 2164 - Optical window

1 Peek screw fitting with optical quartz window.

Included:

- 2 x O-ring 5 x 1 mm FFKM (item no. 407FF)



Item 2165 - Collimating lens kit

2 x SMA Adaptor unit.

Included:

- 2 x Collimating lenses

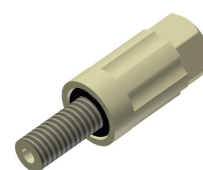


Item 2166 - Fitting for reference electrode

1 Fitting for capillary-based reference electrode or Ag-pseudo reference electrode, type TSC spectro, and filling set.

Included:

- 1 x O-ring 4 x 1 mm FFKM (item no. 406FF)

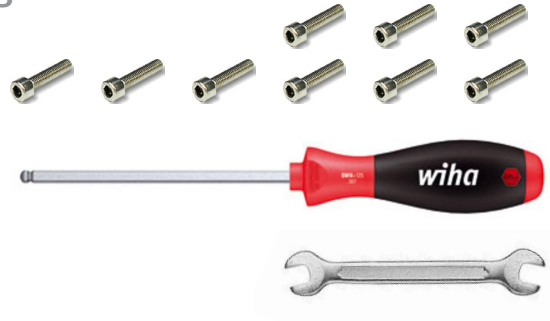


Autolab Microcell HC - Spare parts TSC Spectro

Item 2167 - Tools and screws

Included:

- 9 x Screw M2 x 5 (DIN912 A2)
- 9 x Screw M2 x 8 (DIN912 A2)
- 1 x Hex wrench M1.5 x 75
- 1 x Wrench for fixing lateral fittings and plug
- 1 x Hex key 3 mm



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