2021-10-26

Operating Manual

KMZ3, KMZ5

Meinsberg Corrosion Measuring Cells

xylem

Let's Solve Water

Content

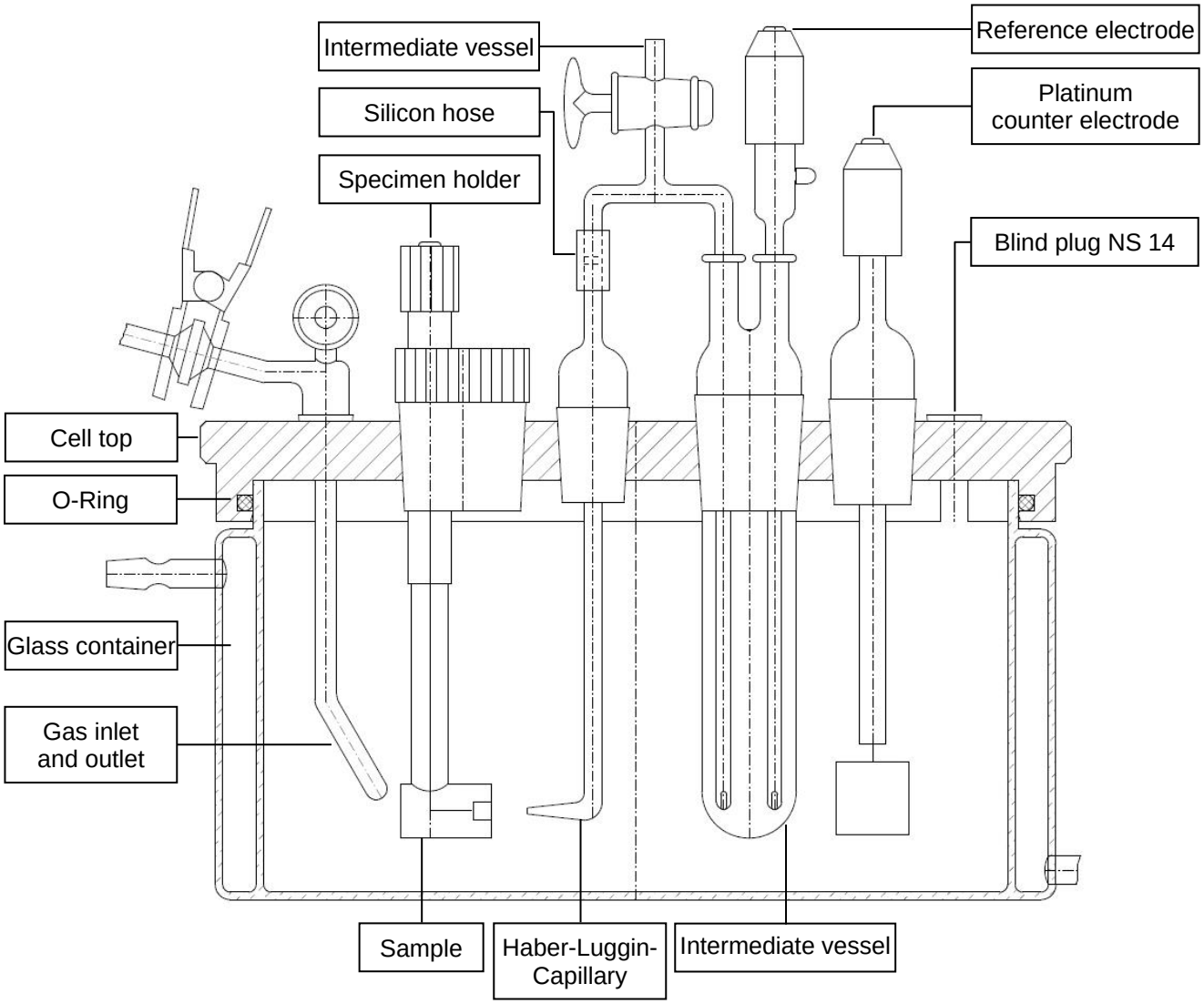
1 Application

The corrosion measuring cells KMZ3 and KMZ5 are 3-electrode measuring cells for potentiostatic and galvanostatic measurements. In connection with a potentiostat/galvanostat they are used for electrochemical investigations and researches. The metallic material which shall be tested will be polarised with a potentiostat or galvanostat. Conclusions concerning the corrosion behavior are possible with measuring results (current-potential-curves and current-time curves.

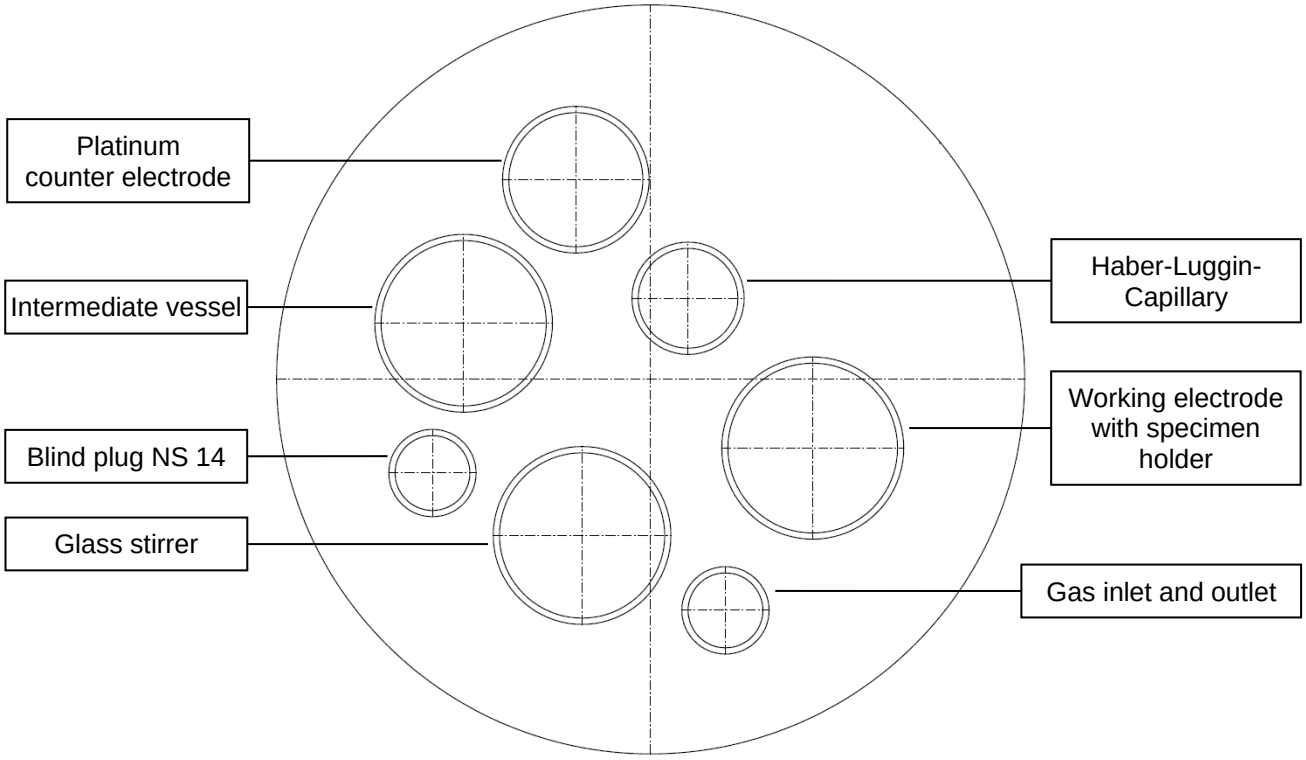
2 Design

The corrosion measuring cell KMZ5 consists of a glass container and a cell top. The cell top contains standard taper joints for the pick-up of:

- Gas inlet and outlet
- Working electrode with specimen holder
- Haber-Luggin-Capillary
- Intermediate vessel with liquid junction tube and reference electrode
- Platinum counter electrode
- Option: precision stirrer unit



The standard taper joints:



The outside diameter and the height of the glass container is 100 mm. The dimensions of the cell top: diameter 120 mm, height 35 mm. The specimen holder consists of two parts: polypropylene stopper with eccentric threaded bore M12x1 mm and a polypropylene specimen shaft with outside thread M12x1 mm for fixing inside. In the upper part of the specimen holder there is a jack for current entry and on the opposite side there is an outside thread M8 for fixing the sample.

The liquid junction tube is equipped with a ground stopper NS 7 and a single-bore stopcock for filling with electrolyte. The Haber-Luggin-Capillary is equipped with a ground stopper NS 19 for integrating in the cell top. Liquid junction tube and Haber-Luggin-Capillary are connected with a silicon hose.

The intermediate vessel is equipped with a ground stopper NS 29 and two ground sockets NS 7 for integrating liquid junction tube and reference electrode (immersion length 155 mm).

The counter electrode consists of ground stopper NS 24 for integrating in the cell top and a platinum sheet with an area of 4 cm^2 and a thickness of 0.1 mm. The gas in- and outlet with ground stopper NS 14, ball taper joint and tube clip for connecting a hose.

The corrosion measuring cell KMZ5 with double jacket container allows a constant heating at different application temperatures. With the help of two tube clips a hose connection can be realized to an external temperature circle (thermostat). The cell top consists of temperature stable polypropylene that an application up to 110 °C is possible. The difference between KMZ3 and KMZ5 is only the double jacket container at KMZ5.

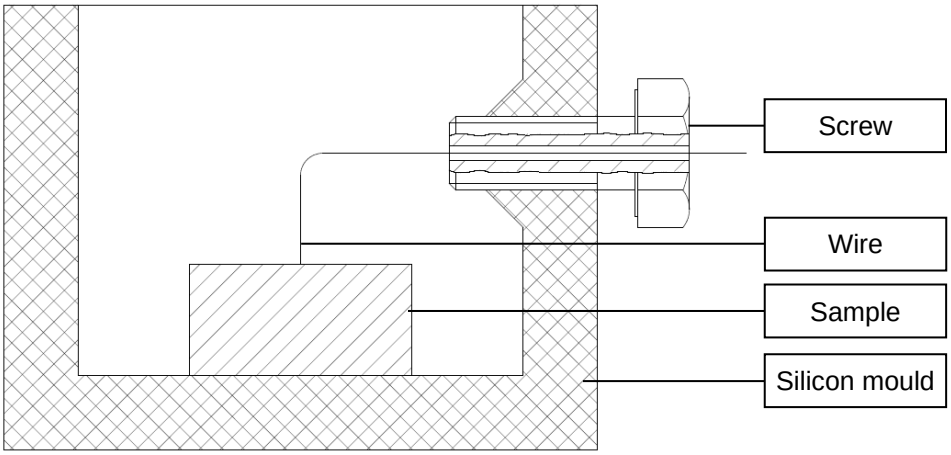
3 Installation

At first the O-ring seal of the cell top is greased to mount it easily on the glass container. The gas in-/outlet and intermediate vessel are installed. After that liquid junction tube and Haber-Luggin-Capillary are connected with a silicon hose. Both components have to be integrated in the standard bore hole carefully. The glass pipes of liquid junction tube and Haber-Luggin-Capillary have to be vertically versus each other. By turning the intermediate vessel this status can be realized. Now the reference electrode is inserted in the intermediate vessel. Finally the counter electrode will be installed. It is important that the standard taper points of all components fit with the cell top.

Preparing samples

Before starting corrosion examinations cylindrical samples have to be prepared. The samples are embedded in polypropylene or epoxy resin to screw them on the specimen holder. Therefore the provided silicon mouldings can be used.

The embedding process of the epoxy resin is done as follows:

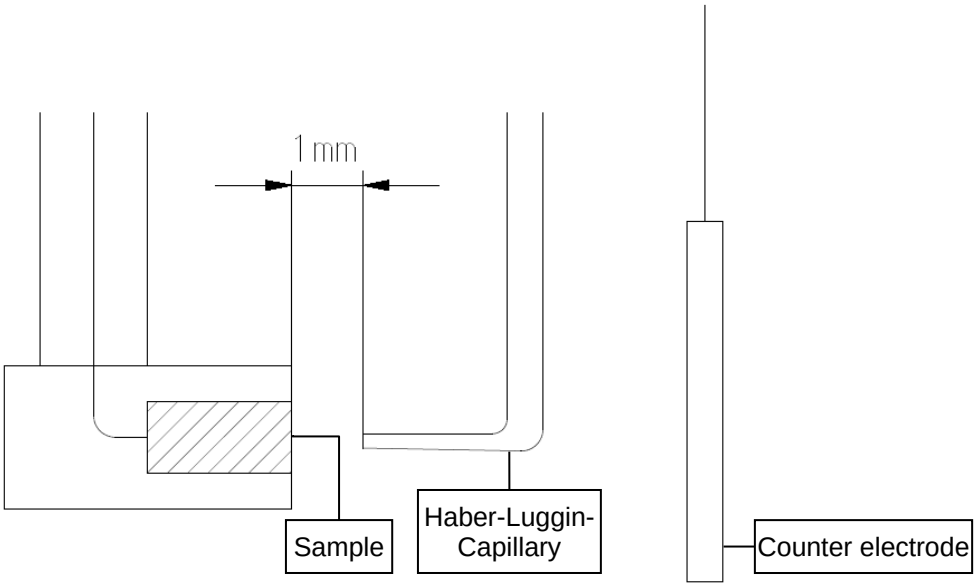


The front side of the sample has to be connected (screwing or soldering) with a wire (Ø 0.6…0.8 mm). After that sample and wire are cleaned and degreased. Now the wire is bent and put through the M8-screw, the sample has to touch the bottom of the moulding. Then the screw is pushed up to the limit stop in the moulding carefully. Screw and moulding are coated with a releasing agent (silicon grease) to remove them after curing process easily. Now the moulding is filled with epoxy resin. After hardening the sample can be removed by pushing against the bottom of the moulding. Finally the screw will be unscrewed for creating the next sample. The prepared sample is screwed in the specimen holder. The wire has to outstand about 1 cm from the jacket connector. By plugging the cable in the jacket of the specimen holder an electrical connection will be realized.

Filling the corrosion measuring cell

At first the glass container is filled with measuring solution (minimum 200 ml). The reference electrode has to be removed that the intermediate vessel can be filled with an injection and a small hose. Now the reference electrode can be reinstalled. After that the liquid junction tube is filled by pushing a small hose through the single-bore stopcock up to the junction. It is important to avoid air bubbles. At last the Haber-Luggin-Capillary and the rest of the liquid junction tube is filled with a pipette filler. Finally the single-bore stopcock has to be closed if there are no bubbles in the filling solution.

After finishing these work steps the specimen holder with prepared sample (working electrode) can be inserted in the cell top. The sample has to be positioned parallel to the counter electrode. Furthermore the working electrode has to be adjusted that the distance between the middle of the sample and the capillary opening of the Haber-Luggin-Capillary is about 1 mm.



Distance to the capillary opening

The height setting of the sample is realized by screwing the thread (M12x1 mm) at the specimen holder. The distance setting is done by turning the eccentric stopper. It is necessary that the specimen holder is fixed with the one hand and the stopper is turned by the other hand. After connecting the cables the measuring process can be started. After finishing the experiment the glass container and the electrolyte are removed. Even during the permanent measurements an additional cell container can be filled and prepared for the next test.

4 Technical Data

Glass container	▪ External diameter: 100 mm (KMZ3), 130 mm (KMZ5) ▪ Internal diameter: 95 mm ▪ Height: 100 mm (KMZ3), 120 mm (KMZ5) ▪ Volume: 500 ml ▪ Minimum volume of electrolyte: 200 ml
Cell top	▪ Diameter: 120 mm ▪ Height: 35 mm ▪ Material: PVC (KMZ3), PP (KMZ5)
Working temperature	▪ KMZ3: max. 50 °C ▪ KMZ5: max 110 °C
Specimen holder	▪ Polypropylene stopper: - Standard cone NS 29 - Internal thread M12x1 mm ▪ Polypropylene shaft with connector jacket and thread: - Length: 140 mm - Shaft thread: M12x1 mm - Thread for mounting the sample: M8
Platinum electrode	▪ Standard glass cone NS 24 ▪ Platinum sheet: 4 cm^2
Gas inlet and outlet	▪ Standard glass cone NS 14 ▪ 2 ball taper joints with tube chip and connectors
Liquid junction tube	▪ with single-bore stopcock ▪ NS-Kern 7
Haber-Luggin-Capillary	▪ with single-bore stopcock ▪ Standard glass cone NS 19
Intermediate vessel	▪ Standard glass cone NS 29 ▪ 2 glass sleeves NS 7

5 Delivery volume and accesories

Delivery volume:

- Cell container with cell top incl. handle (stainless steel)
- Platinum counter electrode
- Intermediate vessel
- Liquid junction tube with single-bore stopcock
- Haber-Luggin-Capillary
- Specimen holder
- 3 silicon moulds and a special screw
- Gas inlet and outlet (with 2 tube clips and 2 ball sleeve clamps)
- Blind plug 1 x NS 14, 1 x NS 29
- Silicon hose (for connection of Haber-Luggin-Capillary and Liquid junction tube)
- Injection 10 ml and micro hose (filling of the Liquid junction tube)
- Manual

Reference electrodes:

- Ag/AgCl: SE10NSK7, SE11NSK7
- Hg/Hg_2Cl_2: KE10NSK7, KE11NSK7
- Hg/Hg_2SO_4: HgE10NSK7, HgE11NSK7
- Hg/HgO: HgO10NSK7, HgO11NSK7

Accessories:

Counter electrode	Platinum counter electrode; NS 24; platinum sheet 4 cm^2
Intermediate vessel	NS 29 and 2 x NS 7
Liquid junction tube	Electrolyte bridge with one way NS 7 valve
Haber-Luggin-Capillary	NS 19
Haber-Luggin-Capillary/AEH	for KMZ5AEH; NS 19 in special design for application with specimen holder AEH
Specimen Holder	Standard specimen holder; material PP
Specimen covered with PP	Specimen is covered with polypropylene (Probe is provided through the customer; Ø 8…10 mm, length 25 mm – other dimensions on request)
Silicon moulds with screw	3 Silicon moulds with screw
Changeable Head/AEH (PP)	changeable working electrode head for KMZ5AEH as amendment to standard specimien holder; NS 29; PP
Changeable head /AEH (PVC)	changeable working electrode head for KMZ5AEH as amendment to standard specimien holder; NS 29; PVC
Cell container KMZ 3	glass container with cell top
Cell Container KMZ 5	glass container with cell top and hose connections, double-walled
Gas inlet and outlet	glass part with ball sleeve cone and ball sleeve pan without connectors NS 14
Ball sleeve clamp (VA)	Ball Sleeve Clamp (VA) for gas in- and outlet
Ball coupling	Coupling for gas inlet
Pan coupling	Coupling for gas outlet
KPG stirrer	Stirrer with shaft and socket; NS 29; glass

6 Guarantee

Meinsberg products are manufactured with high precision by strict quality specifications and tested individually. Is there any fault observable on the originally packed product, it must be returned immediately

7 Recycling and Disposal

The product and his packaging are manufactured as far as possible from materials which can be disposed of environmental-friendly and recycled in a technically appropriate manner.

8 Service and Returns

Manufacturer:

Xylem Analytics Germany GmbH

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D-82362 Weilheim
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Service and Returns:

Xylem Analytics Germany Sales GmbH & Co. KG

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1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

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