

# Notes for the successful measuring with pH and Redox electrodes:

Decisive for a most extensive lifetime of the electrode and therefore especially solid and reproducible measurements is the maintenance and care, besides the appropriate electrode for the according application. The following points are of high importance:

## Preparation and general

The electrode is delivered with a mounted watering cap. Prior to measuring and calibrating/adjusting remove this cap. It contains an aqueous solution. In most cases a 3 mol/l KCl solution (L 911) is used. For individual cases please check the technical data of the electrode. You are also welcome to contact us for further assistance.

## Measuring

Open the refill opening on refillable electrodes before processing measurements. Immerse the sensor into the solution to be measured at least up to the diaphragm. When using refillable sensors please pay attention that the electrolyte fill level is 5 cm above the level of the medium to be measured (see refilling). Rinse the sensor with distilled water between measurements, however do not wipe off. Carefully dab off excess drops.

## Calibration and setting

In order to minimize false measuring results with pH electrodes being used under extreme conditions or at the limit of the specified application areas, the electrodes should be calibrated more frequently and when necessary adjusted also for guaranteeing the appropriate condition for measuring safety. The measurement can only be as precise as the exactness of the last setting and its

actuality. For determining whether the pH electrode has changed since the last setting, the electrode should be calibrated i.e. checked using the according buffer solution. When deviations are discovered, a setting i.e. calibration of the electrode data (slope and zero point) on the pH meter is necessary. If buffer solutions are taken from a bottle, ensure that the bottle is reclosed immediately after removal. Never refill the used buffer solution into the bottle, always throw it away. For an accurate calibration we recommend to operate with our certified buffer ampoules, which are sterilized in superheated steam acc. to DIN 19 266. These buffer ampoules correspond to national standards. Only use fresh buffer solutions and pay attention to the temperature stability. When using electrodes without an integrated temperature sensor, the pH meter must be set to the actual temperature of the buffer solution.



Redox sensors are not calibrated. They can be checked for proper function using appropriate test solutions.

## Refilling of liquid electrolyte electrodes

The missing solution in the electrolyte area of the reference system must be refilled regularly, in order to guarantee that the fill level of the electrolyte solution is at least 5 cm above the level of the medium being measured. BlueLine electrodes can be refilled simply by pumping electrolyte solution into them with a small dispensing bottle (cf. fig.).



The electrolyte solution must be completely renewed, when electrodes are used rarely and therefore the fill level varies only faintly. Any crystals in the electrolyte area can be disintegrated through warming of the electrode in a water base. The electrolyte solution should thereafter be renewed, whereby it should be rinsed a couple of times with fresh electrolyte solution prior to filling the new remaining solution into the electrolyte area.

## Storage and maintenance

The electrodes should be stored between 0 and 40°C in aqueous solution (L 911). They must not be stored in distilled water. Depending on the storage conditions (temperature and humidity) the aqueous solution in the cap can run dry preterm. In this case the electrode must be rinsed for a minimum of 24 hours (L 911). The usability of the electrode must then be checked.

## Cleaning

Contaminations on the pH glass membrane/Redox sensor (measuring electrode) and the diaphragm cause measuring deviations. Before heading to further cleaning steps, the glass membrane should be cleaned with an ethanol tinctured cloth. For the case that further deviations should appear with the calibration, the cleaning process should be continued by the following steps. Depending on the degree of contamination, submerge only the measuring electrode or the complete electrode i.e. including also the diaphragm into the cleaning solution:

- Coverings can be removed with diluted inorganic acid (i.e. hydrochloric acid 0,1 mol/l or NaOH 0,1 mol/l).
- Organic contamination can be dissolved with suitable solutions.
- Fat is removed with tenside solution.
- Protein removed with hydrochloric pepsin solution (cleaning solution L 510).

## When cleaning please note:

- Ensure that any cleaning agent, which has leaked into the electrode, does not come into contact with the reference system; if necessary rinse out the reference electrode with electrolyte solution.
- After cleaning the electrode please rinse it with distilled water, do not rub dry.
- Any blocked ceramic diaphragms can be made functional through careful rubbing with sandpaper or using a diamond file.
- The pH glass membrane must not be scratched!
- Platinum diaphragms must not be maintained mechanically. A chemical cleaning (i.e. with diluted hydrochloric acid) will rinse and reopen (i.e. extraction with vacuum).



*The platinum diaphragm developed by SCHOTT gives electrodes particularly constant and reproducible measuring characteristics.*

*It consists of twisted platinum wires potted into the glass shaft of the electrode. The defined intermediate space between the platinum wires ensures a continuously uniform electrolyte flow rate in all mediums and at all temperatures, which remains constant over the entire service life of the electrode.*