pH glass electrodes

General

pH glass electrodes must be inspected and examined with regard to correct performance immediately upon receipt (e.g. pH calibration). pH glass electrodes not functioning irreproachably after delivery must be returned within two months (from date of delivery) for warranty clarification. If the fault is proved to be due to faulty material or manufacture, the electrode will be replaced free of charge. Transport charges, however, have to be paid by the purchaser. Glass breakage is excluded from the warranty.

Do not treat pH electrodes with supersonics and do not press them laterally into the electrode holder (risk of breakage).

Combined pH glass electrodes

Measurement: Remove plug ④ and fill up reference electrolyte ⑤ [c(KCl) = 3 mol/L] (electrical shielding, hydrostatic pressure).

Storage: Place electrodes above the diaphragm in a solution of c(KCl) = 3 mol/L with plugged refill aperture ③. Never allow electrodes to dry up.

Measurement in difficult sample matrices

– **Solutions containing albuminoids** (e.g. dairy products): Immerse electrode in a solution of pepsin and hydrochloric acid [5% pepsin in c(HCl) = 0.1 mol/L)] for several hours once a week. After that, rinse electrode thoroughly.

– **Virtually salt-free solutions** (e.g. drinking water, rainwater): The diaphragm may be affected by precipitated silver chloride (brown diaphragm). Place electrode above the diaphragm with open refill aperture over night in concentrated ammonia, then rinse thoroughly with dist. water and immerse in buffer pH = 4 for app. 1 hour.

– **Solutions containing sulphides**: Black Ag_2S may precipitate in the diaphragm. In this case, treat electrode with freshly prepared 7 % thiourea solution slightly acidified (e.g. with citric acid) or use a silver cleaning agent containing thiourea.

Problems with electrodes?

– **Air bubbles** within the glass membrane ① or the reference electrolyte ⑤ can be removed by gently shaking the electrode in a downward direction.

– **Sluggish response, slope two small** (< 95 %): First treat diaphragm ③: File diaphragm carefully with a diamond nail file, after which the outflowing electrolyte should be visible as a dark ring expanding from the diaphragm.

If this is not successful, etch electrode: Immerse it in 10% ammonium dihydrogen fluoride (NH_4HF_2) for 1 min or in 40 % hydrofluoric acid for some seconds.

Poison affecting the skin! Do not use glass vessels! After etching, dip electrode into a solution of water and hydrochloric acid (H_2O:conc.HCl = 1:1). Then rinse the electrode thoroughly with dist. water and remove silicate wiping it off with a damp cloth. Immerse electrode in the reference electrolyte solution for 24 h or – if an especially small alkali error is to be achieved – treat with the same solution at +50 °C for 5 h.

Electrolyte contains foreign substances or is dried up: Aspirate or shake out reference electrolyte and replace it (several times if required). If necessary, add solid AgCl (essential for correct functioning of electrode).

Combined double junction glass electrodes with sleeve diaphragm

The electrode is delivered with c(KCl) = 3 mol/L as inner and outer electrolyte. If you need an outer electrolyte without Cl^- we recommend $c(KNO_3)$ = sat. If you have to use an outer electrolyte containing ClO_4^-, change the inner electrolyte also, in order to avoid clogging the diaphragm with sparingly soluble $KClO_4$.

Open sleeve diaphragm from time to time and allow electrolyte to flow.

Removing and replacing the sleeve: Pull security ring ⑦ over the pH glass membrane and open sleeve.

Ordering No. for sleeve and security ring: 6.1243.010.

Combined glass electrodes with built-in temperature probe Pt 100 Ω

The 4 mm plugs of the built-in temperature probe must always be plugged in the temperature probe sockets of the pH meter. When measuring with a pH meter without temperature probe input, one of the 4 mm plugs has to be plugged in the reference electrode input.

Separate pH glass electrodes

Separate glass electrodes have to be used in conjunction with a reference electrode (e.g. 6.0701.100 calomel reference electrode). Separate pH glass electrodes have to be stored in dist. water and should never be allowed to dry up.

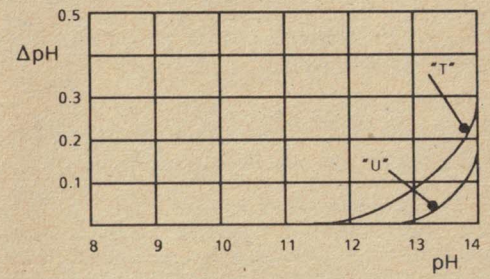
For etching apply the instructions given for combined electrodes. Use dist. water for soaking and storage.

When using separate pH glass electrodes in non-aqueous media, soak the electrode in water between measurements as often as possible; use two electrodes alternatingly if possible.

Korrekturkurve des Alkalifehlers für $c(Na^+) = 1{,}0$ mol/L

Courbe de correction pour l'erreur d'alcalinité de $c(Na^+) = 1{,}0$ mol/L

Correction curve for alkali error with $c(Na^+) = 1.0$ mol/L

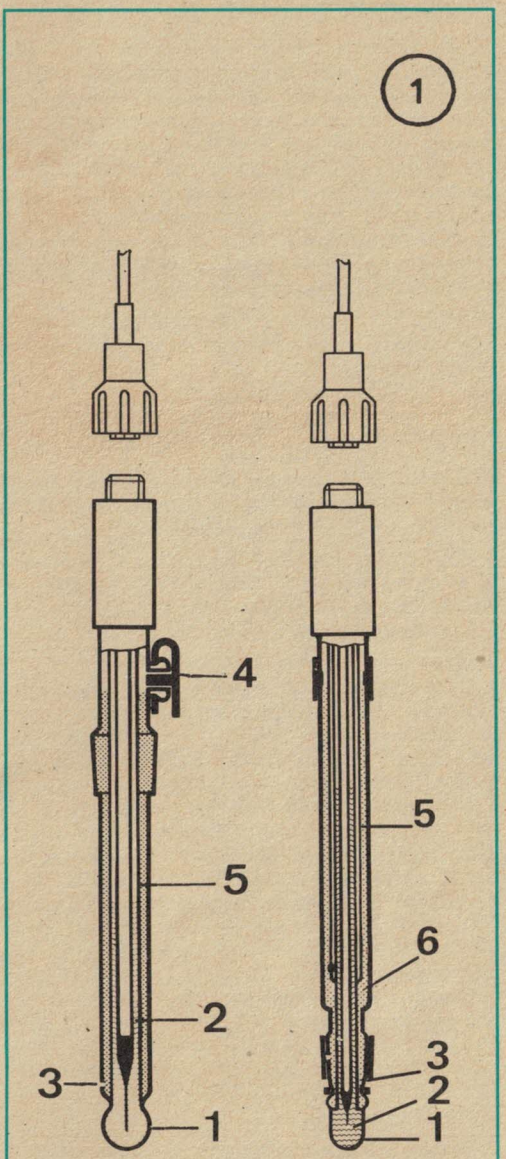


ΔpH ist zum gemessenen pH-Wert zu addieren
ΔpH est à additioner à la valeur pH mesurée
ΔpH has to be added to the measured pH value

METROHM AG 9100 Herisau

Elektroden
Electrodes

Metrohm



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