

# Electrodes for pH measurement













## Which electrode for which application?

Application	Specifics	Electrode	Order no.	Application	Specifics	Electrode	Order no.
<b>General</b>	Standard laboratory, various samples, pH 0...14, T = 0...100 °C	Unitrode	6.0258.010	<b>Leather, paper, textile industry</b>	Bleaching & dye baths	Profitrode	6.0255.100
<b>Water</b>	Demineralized, drinking and sea water, weakly buffered solutions	Aquatrode Plus	6.0257.000		Dampening solutions (offset printing), glue	Unitrode	6.0258.010
<b>Waste water</b>	General	Unitrode	6.0258.010		Leather, paper, textiles (surface measurement)	Flat membrane	6.0256.100
	Sulfide-containing waste water	Profitrode	6.0255.100		Washing liquors	Viscotrode	6.0239.100
<b>Soil samples</b>	Surface measurement or aqueous suspensions	Flat membrane	6.0256.100	<b>Paints, lacquers, solvents</b>	Dye baths, ink, wood stain, lacquers	Profitrode	6.0255.100
<b>Agriculture, plant breeding</b>	Culture media, small volume samples	Biotrode	6.0224.100		Dispersions, emulsions, resins, suspensions	Unitrode	6.0258.010
	Fertilizers	Unitrode	6.0258.010		Paint (surface)	Flat membrane	6.0256.100
	Liquid manure	Profitrode	6.0255.100		Non-aqueous, polar solvents	Solvotrode	6.0229.100
	Nutrient solutions	Viscotrode	6.0239.100	<b>Electroplating, metal processing</b>	General	Profitrode	6.0255.100
	Protein-containing solutions	Porotrode	6.0235.200		Acidic electroplating baths	Unitrode	6.0258.010
<b>Food, stimulants</b>	General	Unitrode	6.0258.010		Cutting-oil emulsions	Viscotrode	6.0239.100
	Protein-containing food, beer	Porotrode	6.0235.200	Etching baths containing fluoride/hydrofluoric acid	Sb electrode	6.0421.100	
	Penetration measurement (dough, cheese, meat)	Spearhead	6.0226.100	<b>Special applications</b>	Concentrated acids	Profitrode	6.0255.100
	Drinking water	Aquatrode Plus	6.0257.000		Photographic baths	Profitrode	6.0255.100
	Juices, wine, spirits	Unitrode	6.0258.010		Emulsions, suspensions, dispersions	Unitrode	6.0258.010
<b>Pharmaceutical industry, biology</b>	Creams, liquid formulations, medicinal syrups, mouthwashes, raw materials	Viscotrode	6.0239.100		Samples at pH > 12	Unitrode	6.0258.010
	Dialysis solutions, urine	Unitrode	6.0258.010		Temperature 50...80 °C	Unitrode	6.0258.010
	Gastric juice, serum, small-volume samples	Biotrode	6.0224.100		Temperature 80...100 °C	Unitrode (Idrolyte)	6.0258.010
	Infusion solutions	Aquatrode Plus	6.0257.000		Ion-deficient solutions, weakly buffered solutions	Aquatrode Plus	6.0257.000
	Protein-containing solutions	Porotrode	6.0235.200		Non-aqueous, polar solvents	Solvotrode	6.0229.100
<b>Cosmetics</b>	Shampoos, emulsions, shower gels, mouth rinses, perfumes	Viscotrode	6.0239.100		Penetration measurement	Spearhead	6.0226.100
	Make-up	Micro-electrode	6.0234.100		Protein-containing solutions	Porotrode	6.0235.200
	Skin (surface measurement)	Flat membrane	6.0256.100		Small volume samples	Biotrode	6.0224.100
<b>Detergents, surfactants</b>	General	Viscotrode	6.0239.100	Surface measurements	Flat membrane	6.0256.100	
	Samples with pH > 10	Profitrode	6.0255.100	Samples containing fluoride/hydrofluoric acid	Sb electrode	6.0421.100	



# Practical tips, care and maintenance



Unitrode	Aquatrode Plus	Profitrode	Viscotrode	Biotrode	Spearhead pH electrode	Porotrode	Flat membrane pH electrode	Solvotrode	Sb electrode
<p>Combined pH glass electrode, fixed ground-joint diaphragm</p> <ul style="list-style-type: none"> <li>• very low alkali error</li> <li>• insensitive to contamination</li> <li>• high temperature resistance</li> </ul> <p><b>Ordering info</b> 6.0259.100 without cable, plug-in head G 6.0258.010 with Pt 1000 fixed cable, plug F+2 x 2 mm</p>	<p>Combined pH glass electrode, fixed ground-joint diaphragm</p> <ul style="list-style-type: none"> <li>• for low-conductivity or weakly buffered solutions</li> <li>• very rapid response</li> <li>• insensitive to contamination</li> </ul> <p><b>Ordering info</b> 6.0253.100 without cable, plug-in head G 6.0257.000 with Pt 1000 fixed cable, plug F+2 x 4 mm</p>	<p>Combined pH glass electrode, ground-joint diaphragm</p> <ul style="list-style-type: none"> <li>• for difficult matrices</li> <li>• easy-to-clean diaphragm</li> <li>• double-junction construction</li> </ul> <p><b>Ordering info</b> 6.0255.100 (fitting length: 113 mm) without cable, plug-in head 6.0255.110 (fitting length: 170 mm) without cable, plug-in head G 6.0255.120 (fitting length: 310 mm) without cable, plug-in head G</p>	<p>Combined pH glass electrode, ground-joint diaphragm</p> <ul style="list-style-type: none"> <li>• for viscous, protein- or sulfide-containing solutions</li> <li>• easy-to-clean diaphragm</li> </ul> <p><b>Ordering info</b> 6.0239.100 without cable, plug-in head G</p>	<p>Combined pH glass electrode, plied Pt-wire diaphragm</p> <ul style="list-style-type: none"> <li>• for small-volume samples</li> <li>• for protein-containing samples and samples containing organic solvents</li> <li>• shaft diameter 3 mm</li> <li>• reference electrolyte: Idrolyte<sup>1</sup> (6.2308.040)</li> </ul> <p><b>Ordering info</b> 6.0224.100 without cable, plug-in head G</p>	<p>Combined pH glass electrode, pinhole diaphragm</p> <ul style="list-style-type: none"> <li>• for measurement in semi-solid samples</li> <li>• maintenance-free reference electrolyte (gel)</li> <li>• easy-to-clean pinhole diaphragm</li> </ul> <p><b>Ordering info</b> 6.0226.100 without cable, plug-in head G</p>	<p>Combined pH glass electrode, ceramic capillary diaphragm</p> <ul style="list-style-type: none"> <li>• for protein-containing or viscous samples</li> <li>• reference electrolyte: Porolyte<sup>2</sup> (6.2318.000)</li> <li>• easy-to-clean capillary diaphragm</li> </ul> <p><b>Ordering info</b> 6.0235.200 without cable, plug-in head G</p>	<p>Combined pH glass electrode, fixed ground-joint diaphragm</p> <ul style="list-style-type: none"> <li>• for pH-measurement on surfaces (e.g. skin, leather, paper, textiles)</li> <li>• very rapid response</li> </ul> <p><b>Ordering info</b> 6.0256.100 without cable, plug-in head G</p>	<p>Combined pH glass electrode, ground-joint diaphragm</p> <ul style="list-style-type: none"> <li>• rapid response and stable measured values in organic solvents</li> <li>• easy-to-clean diaphragm</li> <li>• electrically shielded</li> <li>• for non-aqueous titrations</li> </ul> <p><b>Ordering info</b> 6.0229.100 without cable, plug-in head G</p>	<p>Combined Sb electrode, ceramic pin diaphragm</p> <ul style="list-style-type: none"> <li>• for pH measurement and titration in samples containing fluoride or hydrofluoric acid.</li> </ul> <p><b>Ordering info</b> 6.0421.100, without cable, plug-in head G</p>
									
<p>Use 6.2308.040 Idrolyte<sup>1</sup>) for measurement at temperatures 80...100 °C or in samples containing organic solvents.</p> <p>Rinse with water or ethanol to remove contamination.</p> <p>Do not wipe electrode!</p> <p>Unitrodes filled with c(KCl) = 3 mol/L should be stored in 6.2323.000 storage solution.</p>	<p>Store in 6.2323.000 storage solution only!</p> <p>Do not wipe electrode!</p>	<p>Store in bridge electrolyte.</p> <p>Lift sleeve ring for cleaning ground-joint diaphragm. Use soft cloth or brush to remove any adhering material.</p> <p>If the sleeve ring is blocked, place the electrode in hot water for a few minutes and try again.</p> <p>Spare ground-joint diaphragm for Profitrodes 6.0255.1X0: order no. 6.1243.020</p>	<p>Store in 6.2323.000 storage solution.</p> <p>Lift sleeve ring for cleaning ground-joint diaphragm. Use soft cloth or brush to remove any adhering material.</p> <p>If the sleeve ring is blocked, place the electrode in hot water for a few minutes and try again.</p>	<p>Store in 6.2308.040 Idrolyte<sup>1</sup>).</p> <p>Rinse with water or ethanol to remove contamination.</p> <p>Do not remove contamination in pinhole diaphragm with a needle. The gel electrolyte might be damaged. Remove electrode slowly from sample to avoid underpressure in the gel electrolyte.</p>	<p>Store in 6.2308.040 Idrolyte<sup>1</sup>).</p> <p>Rinse with water or ethanol to remove contamination.</p> <p>Do not remove contamination in pinhole diaphragm with a needle. The gel electrolyte might be damaged. Remove electrode slowly from sample to avoid underpressure in the gel electrolyte.</p>	<p>Store in 6.2323.000 storage solution.</p> <p>Rinse with water or ethanol to remove contamination.</p>	<p>Store in 6.2323.000 storage solution.</p> <p>Add a small drop of dist. water on the surface to be measured</p>	<p>Store in reference electrolyte.</p> <p>Lift sleeve ring for cleaning ground-joint diaphragm.</p> <p>Condition in dist. water before next measurement (glass membrane only!).</p> <p>If the sleeve ring is blocked, place electrode in hot water for a few minutes and try again.</p> <p><b>Reference electrolytes:</b> c(LiCl) = 2 mol/L in ethanol (6.2312.010) c(TEABr) = 0.4 mol/L in ethylene glycol (6.2320.000)</p>	<p>Store in c(KCl) = 3 mol/L.</p> <p><b>Important:</b> Can only be used together with pH meter that can compensate an asymmetry potential of -370 mV</p>

<sup>1</sup>) Idrolyte is a glycerol-based electrolyte whose ion activity corresponds to that of c(KCl) = 3 mol/L.

<sup>2</sup>) Porolyte is a KCl solution that has been gelled by polymerization and is used in electrodes with a capillary diaphragm (Porotrode).