

pH Electrode Selection Guide

The Electrode Pair

Sensing and reference half-cell electrodes must be used together to complete the pH circuit. Most of the electrodes in our catalog are combination electrodes that house both half-cells in a single probe.

Sensing Half-Cells

Sensing half-cells are the measuring portion of the electrode system and contain the pH-sensitive membrane.

Glass vs ISFET Sensors

The glass membrane or bulb of an electrode is constructed for use in specific conditions. Different types of glass membranes can strengthen the electrode, expand its temperature range, or prevent sodium error at high pH values.

- General-purpose glass: various pH ranges, temperatures to 100°C (212°F).
- Blue glass: pH 0-13, temperatures to 110°C (230°F)
- Amber glass: pH 0-14, temperatures to 110°C (230°F), low sodium (Na⁺) error (In solutions with high Na⁺ concentrations, Na⁺ can be misread as H⁺ at pH 12 and higher.)

The solid-state ISFET (ion-specific field effect transistor) electrodes have non-glass measuring surface won't break and wipes clean for dry storage—excellent for use in the food industry.

Glass vs Epoxy Body

Epoxy-body electrodes are impact resistant and ideal for rough handling, but should not be used at higher temperatures or for inorganics. Glass-body electrodes withstand high temperatures and highly corrosive materials or solvents.

Reference Half-Cells

Reference half-cells provide the reference potential needed for pH measurement. Our selection of electrodes includes a variety of reference cell options:

Single- vs Double-Junction

In combination electrodes, the reference junction allows H⁺ ions to pass freely between the reference and sensing half-cells to complete the electrical circuit. Economical single-junction electrodes are ideal for general-purpose applications. Use double-junction electrodes with solutions that contain sulfides, heavy metals, or tris buffers to prevent contamination of the reference cell.

Although most reference cells feature a H⁺-permeable glass junction, electrodes with reference junctions made of TEFLON[®] PTFE are also available—use with solutions that may clog conventional glass junctions.

Silver/Silver Chloride (Ag/AgCl) vs Calomel (Hg/Hg₂Cl₂)

Ag/AgCl is the most common internal element, suitable for almost all applications [temp limit: 80°C (176°F)]. Hg/Hg₂Cl₂ is recommended for use in solutions containing proteins, organics, or heavy metals that could react with silver and clog the reference junction [temp limit: 70°C (158°F)].

Refillable vs Sealed

Refillable electrodes have ports that allow you to refill the reference chamber with reference solution—they are economical and long-lasting. Sealed electrodes are rugged and require virtually no maintenance; however, they must be replaced when the fill-solution level is low.

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