



Useful information on pH electrodes¹

Junction types: note that all electrodes leak into sample being tested

1. Single Junction:

- more apt to get some Silver from filler solution into sample being measured
- more apt to become clogged with food and protein

2. Double Junction

- will prevent leaking of Silver into sample being measured

Ross electrode:

- double junction: uses iodine in fill solution and only KCl will leak into sample being measured.
- fast response time
- .01 pH precision as compared to 0.02 pH precision for Silver type
- higher price range

3. Liquid Junction: example: Sure Flow (Thermo Scientific)

- will never clog
- best for “dirty” or viscous samples
- high flow rate of KCl = higher maintenance

Junction materials:

Wick type:

- more apt to become clogged
- slower response time than other types
- good for aqueous samples

Ceramic type:

- apt to become clogged

Comparison of electrode types: gel-filled, refillable, polymer

Gel-type

low maintenance
easy to use
.05-.1 pH precision
slower response
6-month avg life
rugged epoxy body

Refillable

wide application
more maintenance
.02 pH precision
faster response
1 yr minimum life
glass or epoxy body

Polymer

Thermo Scient Aqua-Pro line

Epoxy body vs Glass body:

- bulb on epoxy body more fragile than bulb on glass body
- epoxy - harder to clean

Electrode slope and electrode replacement

- ideal slope: 92-102%
- cleaning range: 92-95%
- replacement range: < 92%

When do you need to clean an electrode?

- if takes longer than 30 seconds to stabilize
- if readings drift

Cleaning directions:

- use Kim Wipe for cleaning - other papers can scratch the bulb
- cleaning the bulb: soak 30 minutes in 0.1 M HCl at RT
- cleaning the junction: soak 15 minutes in 0.1 M HCl at 70°C
clean junction usually white
- check for cleanliness: suspend in air for 10 minutes and should see formation of KCl crystals

Electrode storage:

- do not store in water- ions will leach out
- store in pH 7 buffer or storage solution

Calibration:

- calibration buffer will quickly absorb CO₂ from air and change pH - do not re-use
- temperature affects pH-calibrate and measure at the same temperature

Trouble Shooting:

Probes:

- slow response = dirty junction
- noisy (varying) response = clogged junction
- drift = dirty junction

PH Meter:

- use meter shorting strap- reading should be 0 mV +/- 0.2 mV

Warranty periods:

- Ross and re-fillable: 1 yr
- Aqua Pro line: 1 yr
- Gel-filled: 3 months
- Ross Ultra: 2 yrs