

## Recommended Calibration Procedures

1. Rinse the electrode thoroughly with D.I. water to remove all traces of storage solution, process medium, or previous test solution and to prevent "carryover" contamination of the pH buffer test solutions. Also, be certain to thoroughly rinse the electrode with D.I. water after each buffer test.
  2. Insert the electrode in 7.0 pH buffer solution and momentarily stir with electrode to ensure proper contact. Allow a minimum of 30 seconds for electrode to thermally equilibrate with the buffer solution before taking a pH reading. The pH reading should be 7.0 pH  $\pm$  0.33 pH ( $\pm$ 20 mV) @ 25 °C. Make necessary adjustment to the pH meter with the "standardize" or "zero" control for a pH indication = 7.0 pH.
  3. Rinse the electrode with D.I. water and insert in a 4.01 pH buffer solution and stir with electrode to ensure proper contact. Allow a minimum of 30 seconds for proper electrode/solution equilibration before taking a pH reading. Make any necessary adjustments to the pH meter with the "slope" or "span" control for a reading = 4.01 pH units.
- NOTICE:**
- a.) Always use "fresh" pH buffer solutions kept at 25°C for best results.
  - b.) pH buffer solutions above 7.0 pH are less stable and have a very limited life. These high pH buffers will more readily absorb CO<sub>2</sub> from the atmosphere and will typically change to a lower pH value when left open.
  - c.) As the electrode becomes "older" it exhibits slower response times and will become less efficient in terms of its ability to span several pH units with the same repeatability.
  - d.) pH electrodes are imperfect devices and require "calibration" from time to time in order to characterize the electrode to its host pH meter.



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# Broadley-James®

## pH Electrodes

Designed with  
**Sealed And Refillable  
Silver / Silver Chloride  
(Ag/AgCl)**

### REFERENCE HALF-CELL

For use in all conventional Laboratory and  
Industrial pH measurement applications.

### ELECTRODE SPECIFICATIONS

pH Range: 0 - 14 pH  
with least Na<sup>+</sup> Error: 1 - 12 pH  
Bulb Glass: GP (general purpose)  
HT-3 (industrial grade)  
HT-4 (high pH > 12.0)  
Temperature Range:  
Polymer Body: -5 - 80°C  
Glass Body: -5 - 110°C  
Cable: Dual Shielded,  
Low Noise Coax

## ELECTRODE INSTRUCTIONS

- (1) Wet lower portion of electrode, except the cable/cap, in tap water to remove excess salt crystals from storage solution. Carefully remove the lower plastic sleeve or bottle. (This sleeve or bottle, filled with KCl storage solution, is used only for storage and shipping.)

### FOR REFILLABLE STYLE ELECTRODES

Slide (do not twist) the rubber sleeve down or remove the septum cap from the fillhole. Leave fillhole exposed to atmosphere during use.

- (2) For first time usage or after long storage, soak the lower end of the electrode (including the bulb and wick) in 3.8M KCl for 10 minutes. This will hydrate the pH bulb and allow the wick liquid junction to commence flowing.
- (3) If air bubbles are present inside the pH bulb area, shake downwards until the bulb is full of solution.
- (4) Thoroughly rinse the electrode tip with distilled or D.I. water to remove all traces of storage solution, pH buffer, process medium, or previous test solution.
- (5) Perform a two-point pH buffer calibration with the host pH meter. Follow manufacturer's instructions for calibration of the host pH meter.

### CARE AND MAINTENANCE

- (1) If necessary clean the wick and bulb area thoroughly before using the electrode (see below). Improper cleaning may produce drift or slow response.
- (2) For storage, fill the soaker bottle or storage sleeve with 3.8M KCl and insert electrode.

### FOR REFILLABLE STYLE ELECTRODES

#### Refill Solution for single junction electrodes:

3.8M Ag/AgCl solution,  
BJC P/N: AS-3110-C20-0500.

#### Refill Solution for double junction electrodes:

3.8 M KCl solution,  
BJC P/N: AS-3120-C20-0500.

The electrode should be stored in an upright (vertical) position.

Use 3.8M KCl solution, BROADLEY-JAMES P/N: AS-3120-C20-0500. For best results use an electrode storage bottle sized for the electrode's O.D.

### CLEANING ELECTRODE

- (1) INITIAL CLEANING: Wash with a solution of liquid detergent and warm water by gently scrubbing with a soft toothbrush or wet tissue. Follow with thorough rinse in D.I. or clean tap water.
- (2) INORGANIC SCALE DEPOSITS: Dissolve the deposit by immersing the electrode bulb only in dilute HCl for a few minutes. Try not to allow HCl to contact wick junction. Repeat step #1 above.
- (3) ORGANIC OIL OR GREASE FILMS: If film is known to be soluble in a particular organic solvent, wash with this solvent. Try not to allow solvent to contact wick junction or polymer body. Repeat step #1 above. Follow with a 10 - 30 minute soak in 3.8M KCl solution.
- (4) PLUGGED OR DRY CERAMIC WICK: Remove contaminant with one of the above procedures. Soak in 80°C, 3.8M KCl solution for 30 minutes. Allow electrode to cool in same solution to promote flow of internal electrolyte through the liquid junction (wick).