Hach Environmental
5600 Lindbergh Drive
Loveland, CO 80539
Tel: 970-669-3050
Fax: 970-461-3921
www.hachenvironmental.com

pH Calibration
Video Transcript

Function

The pH sensor consists of two electrodes: The Measuring Electrode is surrounded by a glass bulb, The Reference Electrode is surrounded by an electrolyte solution and is separated from the water sample by a porous junction. By measuring the electrical potential between these two electrodes, the sensor can determine the Hydrogen ion activity and calculate the pH for a given water sample.

Maintenance

In order to give consistently accurate readings, the pH sensor should be maintained on a regular basis. Oils, sediment, and biological contaminants on the bulb or reference junction will result in errant readings or a very slow response. Leaching or dilution of the electrolyte solution in the reference will cause the readings to drift over time.

The glass bulb is very thin and fragile. Care should always be taken not to damage it when servicing the instrument. The sensor should be cleaned with a cotton swab or soft brush and soapy water.

The reference junction is a threaded cap with a sleeve of porous Teflon in the center. The Teflon allows the reference electrolyte to make an electrical connection to the sample water while preventing them from mixing freely. If it becomes clogged or dirty, replace it.

Turn the junction counter-clock-wise to unscrew it from the base. If you have the integrated sensor/reference, you will need a flat screwdriver to do this. With the junction off, pour the old electrolyte solution out and replace it with fresh. For extended deployments or for monitoring extremely low conductivity water add a salt tablet to the reference electrolyte as well. This will maintain the saturation level of the electrolyte as the salt slowly leaches through the Teflon junction.

Fill the reference until the electrolyte forms a slight dome over the top. Gently place the new junction into the top of the reference tube so that no air remains inside, and turn it clock-wise until the o-ring is sealed tightly. As you tighten you will see a small amount of electrolyte and possibly bubbles being forced out of the junction. This is the air being purged from inside the junction. If this purging effect does not occur, the junction may be clogged and must be replaced.

The pH sensor is now ready to be calibrated.

- **VERY CAREFULLY** clean the glass bulb with a very soft brush and a mild soap. The bulb is made from extremely thin glass and is very fragile.
- Replace the reference junction if it is visibly fouled. Water with strong biological activity tends to foul the junction more rapidly.

Hach Environmental
5600 Lindbergh Drive
Loveland, CO 80539
Tel: 970-669-3050
Fax: 970-461-3921
www.hachenvironmental.com

- Replace the electrolyte solution regularly. Water with very low levels of dissolved solids or high flow rates will leach the salts out of the solution and dilute it more quickly. Your specific water conditions will determine how frequently this should be done.
- Use of the salt tablets from the maintenance kit will keep the electrolyte solution saturated for longer periods of time.
- The pH sensor should not be allowed to dry out for extended periods. When not in use, store the sensor in pH 4 buffer, or alternatively, clean tap water.
- **DO NOT** store the sensor in de-ionized water or sample water. DI water will damage the sensor bulb, and the organisms in sample water will foul the bulb and junction.

Calibration

Establish a connection to the sonde with Hydras 3LT. Click the button labeled '**Operate Sonde'.** When the sonde finishes its initialization, click the '**Calibration**' tab, then click the '**pH Units**' tab. You will see pictures of the four different pH probes available as well as the current pH value, the date and time, and the current temperature.

Rinse and dry the sensors and attach the storage/calibration cup. Fill the cup about 25% with pH buffer 7 and screw the storage cap on. Shake for six seconds. Remove the storage cap and pour the buffer 7 out. Fill the cup with buffer 7 again, this time over the top of the pH sensor. Wait one minute for the readings to stabilize. When the readings are stable, type a value of 7.00 into the box, adjusted for temperature if necessary, and click '**Calibrate**'. A "Calibration Successful" message will appear.

If the pH readings continue to drift for an extended period of time, or jump up and down, the sensor may need to be cleaned or replaced.

Pour the buffer 7 out, rinse the sensors, and dry them. Fill the cup about 25% with pH 4 or 10 buffer solution depending on your expected deployment conditions. Screw on the storage cap and shake for six seconds. Remove the storage cap and pour the buffer solution out. Fill the cup with buffer solution again, this time over the top of the pH sensor. Wait one minute for the readings to stabilize. When the reading stabilizes, type the labeled value of the solution into the box, adjusted for temperature, and click '**Calibrate**'. A "Calibration Successful" message will appear.

If the pH readings continue to drift for an extended period of time, or jump up and down, the sensor may need to be cleaned or replaced.

The pH sensor is now calibrated.

If desired, a linearity test may be performed with a buffer opposite that used for pH slope calibration. For example, if pH 10 was used to calibrate, check with pH 4, or if pH 4 was used to calibrate, check with pH 10. Repeat the process used for the previous calibration with the opposing buffer solution, but do not click the calibrate button again.