AtlasScientific
Biology • Technology

pH Sensor

Helpful Operating Tips

1. The pH Sensor shipped in a plastic bottle contains pH Sensor Storage Solution. The sensor should remain in the bottle until it is used. If the sensor is used infrequently, the bottle and its solution should be saved and the sensor stored in it (See Sensor Storage Section). Take out sensor by loosening plastic top on bottle counterclockwise and pulling sensor out. Slide cap and O-ring off sensor and save ***(SEE FIGS 1 & 2)***.

2. During shipment the air bubble in the sensor's stem may move into the bulb area. If bubbles are seen in the bulb area, hold the sensor by its top cap and shake downward as is done with a clinical thermometer ***(SEE FIG 3)***.

3. Vigorously stir the sensor in the sample, calibration solution, or rinse solution. This action will bring solution to the sensor' surface quicker and improve the speed of response.

4. After exposure to sample, calibration solution, or rinse solution, shake the sensor with a snap motion to remove residual drops of solution ***(SEE FIG 4 on next page)***. This action will minimize contamination from carryover.

5. As a rinse solution, use a part of the next sample or calibration solution which is to be measured. This action will also minimize contamination from carryover.

6. When calibrating, use a calibration solution close in value to that expected from the sample. This action will minimize span errors.

7. Keep calibration solution and samples at the same temperature. This action will eliminate the need to correct values for temperature effects.

FIG. 1

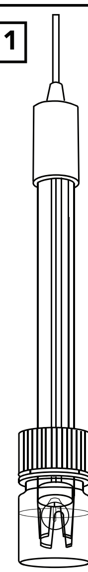


FIG. 2

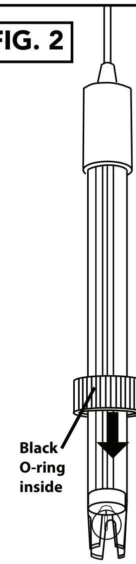
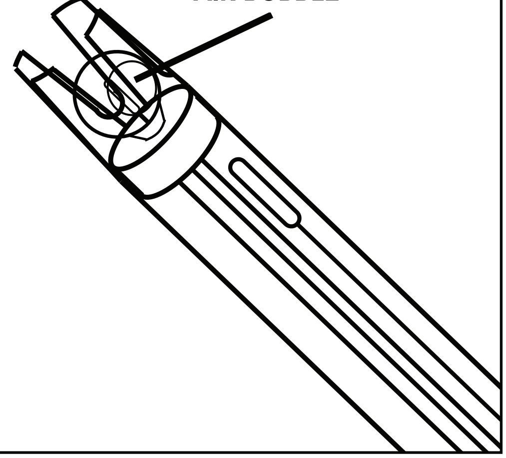


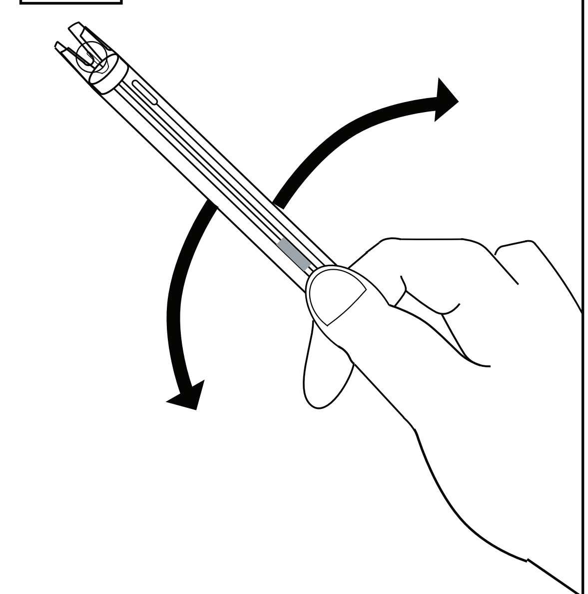
FIG. 3



8. pH readings stabilize faster in some solutions than in others; allow time for reading to stabilize. In general, calibration solution provide stable readings in several seconds (tris calibration solutions take somewhat longer) while samples usually take longer times.

9. Keep in mind that all pH sensors age with time. Aging is characterized by shortened span (slope) and slower speed of response. If the meter has a manual or microprocessor slope control, the control can be adjusted to compensate for sensor span errors (but will not affect the speed of response). Aging is best detected by calibrating the sensor in, for example, pH 7 calibration solution, then rinsing and placing the sensor in pH 4 calibration solution. As a rule, if the span is 10% or more in error (a reading of 4.3 or higher for this example) the sensor should be cleaned and retested or reconditioned. If performance is not restored the sensor should be replaced.

FIG. 4

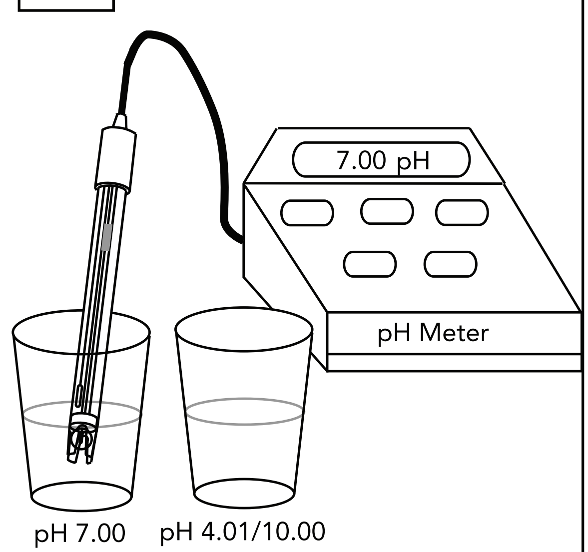


Calibration Procedure

As a rule, follow the procedures recommended by the pH meter manufacturer and keep in mind the Helpful Operating Techniques given on page one. The frequency of calibration is a function of the sensor , the pH meter, and the solutions the sensor is exposed to. The sensor and meter should always be calibrated together with the calibration frequency determined by experience. Use two buffers, for example 7 & 4 or 7 &10 ***(SEE FIG 5)***. Use the following step-wise procedure for both calibration in buffers and for sample measurements:

1. Remove the sensor from its soaker bottle and the save the bottle.
2. Vigorously stir the sensor in a rinse solution.
3. Shake the sensor with a snap action to remove residual drops of solution.
4. Vigorously stir the sensor in the calibration solution or sample and allow the sensor to rest against the beaker's wall.
5. Allow the reading to stabilize and then take the reading.
6. Repeat these steps for each sample or calibration solution determination.

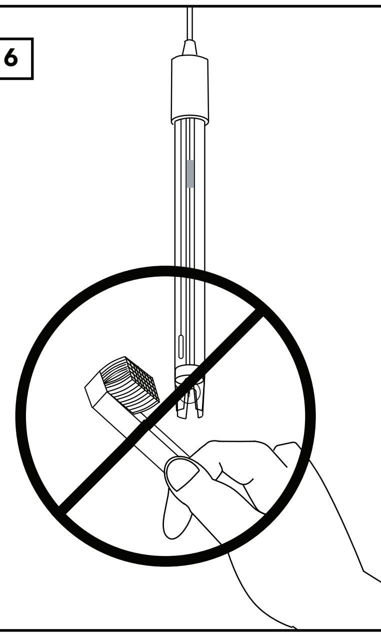
FIG. 5



Sensor Storage

When pH readings are made infrequently, for example, several days or weeks apart, the sensor can be stored simply by replacing it in its soaker bottle. First, slide the cap onto the sensor , then the O-ring, and then insert the sensor into the bottle and firmly tighten the cap. If the solution in the soaker bottle is missing, fill the bottle with pH 4 calibration solution.

FIG. 6



Sensor Cleaning

Coating of the pH bulb can lead to erroneous readings including shortened span (slope). The type of coating will determine the cleaning technique. Soft coatings can be removed by vigorous stirring or by the use of a squirt bottle. Organic chemical or hard coatings should be chemically removed. 5-10% hydrochloric acid (HCl) soak for a few minutes and often removes many coatings. If cleaning does not restore performance, reconditioning may be tried. *Do not use brush or abrasives on the sensor* ***(SEE FIG 6).***

Electrode Reconditioning

When reconditioning is required due to sensor aging (see Helpful Operating Techniques, # 9), we recommend you use The AtlasScientific pH Sensor Reconditioning Kit.

click **here** for instructions