

Orion pH, ORP and ISE Theory

For Best Results Use Good Laboratory Practices

Follow the recommendations below for accurate pH and ISE measurements. pH and ISE electrodes are sensitive measuring devices and should be cared for properly.

Proper Electrode Storage

Proper electrode storage maximizes electrode performance and extends the electrode life. See page 63 for pH electrode storage information. Generally, ISE electrodes are stored in the least concentrated standard solution. Caution: Do not store the electrodes in distilled water. The filling solution will be diluted and the electrode response will be slow.

Proper Maintenance and Cleaning

Inspect the electrode weekly for scratches, cracks or salt crystallization. If the readings become slow or drift, clean the electrode per the manufacturer's instructions. Excessive cleaning may impair electrode performance and shorten electrode life.

Electrode Fill Hole Cover

If using a refillable electrode, remove fill hole cover during calibration and measurement to ensure a uniform flow of electrode filling solution. Cover the fill hole overnight and during storage.

Filling Solution Level

The filling solution level must be higher than the sample level to maintain a uniform flow of filling solution. At least 1 inch above sample height is recommended.

Rinsing

Rinsing prevents contamination by carry-over on the electrodes. Rinse with deionized water or an aliquot of the buffer, standard or sample. Caution: do not wipe the pH electrode glass bulb. Transfer of static charge onto the glass bulb will result in slow or drift response. To avoid damage and contamination do not wipe the ISE liquid membrane surface.

Stirring

Stir all buffers, standards and samples at a uniform rate to obtain a representative sample measurement and improve electrode response time. Use a magnetic stirrer at a moderate speed. Use a piece of insulating material (e.g. styrofoam or cardboard) between the stir plate and the beaker to prevent heat transfer.

pH Buffers and ISE Standards

pH buffers and ISE standards should be accurate and free of contamination. Keep the buffer or standard bottle tightly sealed. Do not re-use buffers and standards. Verify the buffer or standard is within the expiration date before use. If trouble arises, always use fresh buffers or standards. Use volumetric glassware to prepare solutions accurately.

Temperature

To account for pH slope, buffer and sample changes, use a separate or integrated automatic temperature compensation probe (ATC) or digital LogR™ temperature compensation on Orion PerpHecT® pH meters. For ISE electrodes, calibration and measurement should be performed at the same temperature.

Calibration

Calibration verifies electrode slope and proper function. At least once a day, calibrate with two or three buffers or standards that bracket the expected sample range. Choose pH buffers that are no more than three pH units or no less than one pH unit apart. ISE standards should differ in concentration by a factor of ten.

