

Orion pH, ORP and ISE Theory

Low Slope

Clean and/or replace electrode

Condition electrode properly; refer to electrode instruction manual for conditioning procedures

Use fresh buffers or standards and clean glassware

Prepare fresh standards using proper technique

Use recommended ISA for the selected ISE electrode

High Slope

Clean and/or replace electrode

Use fresh buffers or standards and clean glassware

Prepare fresh standards using proper technique

Calibrate with buffers or standards at the same temperature

Drift

Verify correct filling solution and compatibility with the sample

Calibrate and measure at the same temperature; use an ATC probe for pH calibrations and measurements

Clean and/or replace electrode

Refer to the sample requirements and interferences sections in Orion electrode instruction manual

Erratic Response

Verify correct filling solution and compatibility with the sample

Use recommended ISA for the selected ISE electrode

Clean and/or replace electrode

Perform meter check-out; verify proper grounding and power

Off Scale or Over Range Reading

Verify electrode connection; immerse electrode in solution

Remove air bubbles by gently tapping the side of the electrode

Clean or replace electrode

Condition electrode properly; refer to electrode instruction manual for conditioning procedures

Perform meter check-out

Wrong Answer

Verify correct filling solution and compatibility with the sample

Use fresh buffers or standards and clean glassware

Prepare fresh standards using proper technique

Refer to the sample requirements and interferences sections in Orion electrode instruction manual

Troubleshooting

The most important principle in troubleshooting is isolating the components of the system and checking each component in turn. The components of the system are the meter, electrodes, buffers or standards, sample and the technique. If problems persist or if application assistance is needed, contact our Technical Service at 800.225.1480.

pH or ISE/pH Meter

The meter is the least likely problem in the system and is easily eliminated as a possible cause of error. Orion meters include an instrument check-out procedure that verifies proper meter function or locates possible malfunctions. Consult the meter instruction manual for complete instructions.

pH and ISE Electrodes

Before replacing a faulty electrode, review the electrode instruction manual and be sure to:

- Clean the Electrode Thoroughly
- Condition the Electrode Properly
- Use Proper Filling Solutions
- Use Proper Technique
- Review the Electrode Troubleshooting Checklist

pH Buffers and ISE Standards

Always use fresh buffers or standards when problems arise. The quality of analytical results depends greatly upon the quality of the standards. Using fresh buffers and standards could save hours of frustrating troubleshooting. Upon exposure to air, buffers may absorb CO₂ or other material from the air, causing a shift in the pH value. ISE standards may be contaminated or incorrectly prepared.

Sample

If the electrode functions correctly in buffers or standards but not in a sample, the electrode may be adversely affected by a substance in the sample. Refer to the sample requirements and interference sections in Orion instruction manuals for more information. Contact our Technical Service Chemists at 800.225.1480 for additional assistance.

Technique

Review operation procedures and instruction manuals to verify that proper measurement technique has been followed. For ISE measurements verify the method of analysis, direct or incremental technique, is appropriate for the sample. Follow Good Laboratory Practices. See page 57.

Electrode Troubleshooting Checklist

The chart lists the most common electrode symptoms and corrective actions.