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GENERAL INFORMATION

INTRODUCTION

Ingold pH electrodes are manufactured in the United States by skilled European trained glassblowers with many years experience. This experience provides you with quality workmanship in every detail of glass electrode construction.

Ingold also maintains a technical staff which is continually engaged in research and development in order to offer you the finest electrode possible.

Electrode designs are available for nearly every pH application in industry, medicine, and research. Call or write directly to Ingold Electrodes for information concerning your specific needs.

Ingold Electrodes Inc.

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PREPARATION

Examine the electrode for possible damage to the membrane or the body.

After removing the membrane protective cap, soak the electrode for a few hours. Soak combination pH electrodes in a small volume of the electrolyte used to fill the reference chamber. Soak single pH electrodes (those without integral reference cells) in distilled water or pH 7 buffer.

Eliminate any air bubbles in contact with the pH membrane and reference junction of the electrode.

Reference Type	Refill with Ingold Catalog Number
<input type="checkbox"/> AgCl	18513 (3M KCl, AgCl, Sat'd)
<input type="checkbox"/> Argenthal	18816 (3M KCl, no AgCl)
<input type="checkbox"/> Calomel	18512 (KCl, Sat'd)
<input type="checkbox"/> No Reference	
<input type="checkbox"/> Special _____	
Reference Electrolyte: _____	
Bridge Electrolyte: _____	

With distilled water, rinse off any electrolyte which may have crystallized around the glass and the reference diaphragm.

For electrodes with liquid reference electrolyte, remove the fill hole cover during use to ensure pressure equilization with the atmosphere. Check the level of reference electrolyte. It should be approximately 10mm below the filling aperture. Refill with the appropriate electrolyte as indicated above.

STORAGE

When not in use, combination pH electrodes should be kept hydrated in a small volume of its own reference electrolyte protected against evaporation. For a single pH electrode, distilled water or pH 7 buffer (Ingold Catalog No 18503) is recommended. Store a reference electrode in its own reference electrolyte. Store a bridged electrode in its bridge electrolyte.

OPERATION

Ingold pH electrodes can be used with any pH/mV meter. Follow instrument manufacturer's instructions for use of pH electrodes.

When transferring from one solution to another, rinse the electrode thoroughly and blot dry. The electrode membrane should never be dried by rubbing. This will cause the accumulation of static charge which may adversely affect pH readings.

CALIBRATION

For precision analysis, use two standard buffers. It is recommended that the buffer values bracket the sample pH and that one buffer be at pH 6.84 or pH 7.00

For fast routine analysis, one buffer at a value near the sample pH can be used.

MAINTENANCE

When properly cared for, Ingold electrodes can be expected to provide accurate results over thousands of uses. When not in use, the electrode should be kept in solution as detailed under STORAGE. Some maintenance hints are presented below. A troubleshooting guide follows. Further questions are welcomed; call or write the Ingold Technical Service Department for assistance.

Proteinaceous Contamination — Where there is protein contamination, clean the electrode, as

necessary. Use Ingold pH Electrode Cleaner (Catalog No. 18508).

Discoloration of Ceramic Diaphragm — Dark deposits of silver sulfide may appear on the reference diaphragm when the electrode is used in solutions containing sulfides. This deposit can adversely affect the junction potential. To remove, use Ingold Ceramic Diaphragm Cleaner (Ingold Catalog No. 18528) as directed.

Servicing a Dry Reference Junction — The resistance across the reference junction is usually less than $5K\Omega$. A clogged junction will yield higher resistances, often apparent as drifting readings. To clean the junction, immerse the electrode in a beaker of its own electrolyte. Then heat the solution to approximately $70^{\circ}C$ and allow the electrode to soak in this solution while it cools to room temperature.

Reactivating of pH Glass Membrane — Prolonged use of an electrode under adverse conditions may lead to sluggish response characteristics. To improve electrode performance, use Ingold Reactivating Solution (Ingold Catalog No. 18895).

TROUBLESHOOTING GUIDE		
Symptom	Cause	Remedy
No response	Poor meter connection.	Check connector at meter panel for proper type and connection.
	Cracked membrane or internal damage.	Replace electrode.
Slow response	Dehydrated pH membrane.	Rehydrate in a proper solution (See Storage). Follow with reactivation if necessary (See Maintenance).
	Clogged reference junction.	Soak in hot KCl solution (See Maintenance).
	Protein contamination.	Use Ingold pH Electrode Cleaner (see Maintenance).
Noise	Contamination from previous sample.	Rinse membrane thoroughly and blot dry between samples.
	Poor meter connection.	Check connector at meter panel for proper type and connection.
	Insufficient reference electrolyte.	Reference electrolyte level should be 10mm below the fill hole.
Low Slope	Clogged reference junction.	Soak in hot KCl solution (See Maintenance).
	Dehydrated pH membrane.	Rehydrate in a proper solution (See Storage). Follow with reactivation if necessary (See Maintenance).
	Contamination. Damaged membrane.	See above. Replace electrode.

ORDERING INFORMATION

Please request a copy of the Ingold Chemical Accessories brochure (Price List 4) for ordering information concerning solutions mentioned in this publication. Ingold Customer Service and Technical Service Departments are also available for further information or assistance.

For detailed discussions of routine and problem pH

measurements, the following booklets are available upon request:

**Principles and Problems of pH Measurement
Calibration of pH Electrodes**

**pH Electrodes — Stoppage, Ageing, Testing, and
Regeneration**

pH Measurement and Temperature Compensation

Redox Measurement — Principles and Problems