

COMBINATION ORP ELECTRODE INSTRUCTIONS

INTRODUCTION

This combination ORP electrode is designed for maximum reliability, accuracy, and ease of use. The electrode is shipped with a protective boot filled with an ORP membrane/junction wetting agent (1:1 pH4 buffer/KCl). Crystals which may form around the protective boot in no way affect electrode performance.

PREPARATION

1. Remove the ORP bulb protector boot covering the ORP band and rinse the bottom of the electrode with deionized water. Save the boot if the electrode will be stored.
2. Prior to first usage, or after long-term storage, immerse the ORP electrode in deionized water for thirty minutes. The electrode is now ready for use.

ELECTRODE STANDARDIZATION

1. Add sufficient crystals of quinhydrone to saturate a solution of 7.00 pH buffer. This will be apparent by undissolved crystals suspended in solution. While stirring, immerse electrode into the solution. Measure potential after 30 seconds to one minute. Potential should be within ± 30 mV of the following values:

Temperature (C):	20	25	30
Potential (mV):	+92	+86	+79 (Ag/AgCl ref)
	+47	+41	+34 (Calomel ref)

2. Remove electrode and rinse thoroughly with distilled water. Add sufficient crystals of quinhydrone to saturate a solution of 4.01 pH buffer. This will be apparent by undissolved crystals suspended in solution. While stirring, immerse electrode into the solution. There should be a rapid response. Measure potential after 30 seconds to one minute. Potential should be within ± 30 mV of the following values:

Temperature (C):	20	25	30
Potential (mV):	+268	+263	+258 (Ag/AgCl ref)
	+223	+218	+213 (Calomel ref)

The mV difference between the two solutions is theoretically 177 mV. The absolute values may shift a few mV due to slight liquid junction variations in a given reference electrode. **NOTE:** quinhydrone buffers are not stable and should be discarded after completion of this test.

If the mV difference is less than 150 mV or the buffer potentials are offset by more than 30 mV, clean the ORP electrodes by one of the procedures outlined in the electrode cleaning section below.

3. Rinse the electrode with distilled water. Place in sample and stir. Allow meter reading to stabilize for 30 seconds to one minute. Record reading. For best accuracy, the temperature of the ORP standards and samples should be identical and at room temperature.

ELECTRODE STORAGE

When not in use, the ORP element may be stored in buffer solution for an ideal storage chamber for long periods. If left in air for an extended period of time, remove salt crystals on the outside of the reference junction by rinsing with distilled water.

ELECTRODE CLEANING

Electrodes which are mechanically intact with no broken parts can often be restored to normal performance by one of the following procedures:

Salt Deposits: Dissolve the deposit by immersing the electrode in 0.1 M HCl for five minutes, followed by immersion in 0.1M NaOH for five minutes, and thorough rinsing with distilled water.

Oil/Grease Films: Wash electrode in a little detergent and hot water. Rinse electrode tip with distilled water.

Clogged Reference Junction: Heat a diluted KCl solution to 60-80°C. Place the reference portion of the ORP electrode into the heated KCl solution for approximately 10 minutes. Allow the electrode to cool while immersed in some unheated KCl solution.

Protein Deposits: Dissolve the deposit by immersing the electrode in a 1% pepsin solution with a background of 0.1M HCl for five minutes, followed by thorough rinsing with distilled water.

SPECIFICATIONS

ORP Range:	0 +/- 2000mV
Slope:	59 +/- 3 mV/pH unit at 25°C
Response Time:	< 20 seconds (95% response)
Stability:	< 3 mV drift/24 hours