



INSTRUCTIONS FOR GLASS STERILIZABLE POLARGRAPHIC OXYGEN PROBE

NON TEMPERATURE COMPENSATED D.O.

CALIBRATION

Calibration must be made at the temperature of fermentation. If work is performed under sterile conditions, the system must be calibrated after sterilization.

ZERO POINT OF THE ELECTRODE

The zero current of the O₂ electrode is usually negligibly the electrode zero point should be periodically checked as some electrode faults result in an excessive zero current. Moreover, checking the zero point is necessary before the measurement of low oxygen concentration.

Zero point calibration may be effected in both pure nitrogen and in water saturated with nitrogen. A further alternative is the use of a freshly prepared 2% bisulfite solution.

Calibration with pure nitrogen gas is faster and more reliable. The zero point can be read after about 5 minutes.

ELECTRODE SLOPE

Zero point adjustment must precede slope calibration. In contradiction to zero point calibration, the aqueous phase is preferred for slope adjustment. The following problems arise in calibration done in air:

1. Membrane permeability slightly differs in air and in water.
2. Relative air humidity rarely 100%.
3. Temperature badly defined.

In order to insure the maximum possible measuring accuracy the calibration value is set to at least 70% of the maximum scale reading.

Calibration is usually performed at oxygen saturation since it is the simply adjusted to 100% saturation.

Specifications Polarographic Electrode (Clark type)

Electrode Shaft	Glass
Membrane	Teflon
Cathode	Platinum, diameter 0.015"
Anode	Ag/AgCl
Electrolyte	Chloride Solution

Response Time	45 to 60 seconds 98%
Stability Drift	In water under constant pressure at constant temperature and amounts less than 2% per week
Flow Dependence	Reading in stirred and unstirred solutions differ by approximately 5%
Polarization Time	Several hours

MEMBRANE MOUNTING

1. Cut a ¾" length of silicone rubber tubing and place it in a container of methyl chloroform solvent. The solvent will cause the tubing to swell and soften. Allow the tubing to soak for at least 2 minutes.
2. Using a razor blade, slit the silicone rubber tubing on the probe and carefully remove it and the membrane from the probe. Caution: Do not attempt to slide the silicone tubing off the probe end. Always slit it for removal.
3. Apply a thin bead of silicone RTV around the outside of the probe body about 1/8" from the tip.
4. Remove a new membrane and lay it across the tip of the probe, stretch it slightly and hold its end against the side of the probe with the thumb and forefinger (see Figure 1 below).
5. Remove the silicone rubber tubing from the solvent and carefully slide it over the membrane onto the probe.
6. Inspect the membrane – it should be taut and should not be wrinkled where it covers the cathode.
7. Allow the solvent to evaporate from the silicone tubing and then inspect the membrane again. Trim off excess from behind the silicone tubing.
8. With a hypodermic syringe and needle, fill the probe completely through the fill hole at the rear.
9. After filling the probe, tap the side near the tip to eliminate any air bubble which may be trapped in this area.

Figure 1 – Membrane Mounting Procedure

