Determination of Dissolved Oxygen in Water

INTRODUCTION

Difficulties have been experienced in the use of the Winkler method (6.1) for the estimation of dissolved oxygen in the presence of reducing agents such as sulfur dioxide or sulfites. In addition to the method described below there are procedures for measuring biochemical oxygen demand (BOD), and total organic carbon (TOC).

1. SCOPE

Dissolved oxygen present at normal concentrations in waters.

2. PRINCIPLE OF METHOD

A "diffusion current" is established when a solid electrode system sensitive to oxygen concentration is immersed in the test sample. It is linearly proportional to the concentration of molecular oxygen in the test sample.

3. APPARATUS

3.1 *Sensor*

This is composed of two solid metal electrodes electrically connected by a suitable electrolyte and separated from the sample by a membrane permeable to molecular oxygen. Electrode systems of this type exhibit a relatively high temperature coefficient, but most commercially available instruments are temperature-compensated.

3.2 *Amplifier*

This is a meter for amplification of the signal received from the sensor and conversion to suitable concentration read-out.

4. PROCEDURE

4.1 *Calibration*

Follow the manufacturer's procedure. Generally, calibrate the electrode by immersion in a saturated solution of oxygen in water at a known

temperature, then by reference to suitable tables (6.2), the concentration of oxygen present in oxygen-saturated water at that temperature is found.

4.2 *Sample measurement*

Follow the manufacturer's recommended procedure, ensuring that no air bubbles are trapped against the membrane.

5. EXPRESSION OF RESULTS

Results should be reported as milligrams of dissolved oxygen per litre.

6. REFERENCES

6.1 Winkler, L. W. *Ber. Dtsch. Chem. Gesellsch.*, **21**, 2,843, 1888.

6.2 Truesdale, G. A., Downing, A. L., and Lowden, G. F. *J. Appl. Chem.*, **5**, 53-62, 1955.

6.3 Standard Methods for the Examination of Water and Wastewater, 13th Edition, American Public Health Association, 484-488, 1971.