METHOD #: 405.1	Approved for NPDES (Editorial Revision 1974)
TITLE:	Biochemical Oxygen Demand (5 Days, 20°C)
ANALYTE:	BOD Biological Oxygen Demand
INSTRUMENTATION:	Probe
STORET No.	00310 Carbonaceous 80082

1.0 Scope and Application

1.1 The biochemical oxygen demand (BOD) test is used for determining the relative oxygen requirements of municipal and industrial wastewaters. Application of the test to organic waste discharges allows calculation of the effect of the discharges on the oxygen resources of the receiving water. Data from BOD tests are used for the development of engineering criteria for the design of wastewater treatment plants.

1.2 The BOD test is an empirical bioassay-type procedure which measures the dissolved oxygen consumed by microbial life while assimilating and oxidizing the organic matter present. The standard test conditions include dark incubation at 20°C for a specified time period (often 5 days). The actual environmental conditions of temperature, biological populationwater movement, sunlight, and oxygen concentration cannot be accurately reproduced in the laboratory. Results obtained must take into account the above factors when relating BOD results to stream oxygen demands.

2.0 Summary of Method

2.1 The sample of waste, or an appropriate dilution, is incubated for 5 days at 20°C in the dark. The reduction in dissolved oxygen concentration during the incubation period yields a measure of the biochemical oxygen demand.

3.0 Comments

3.1 Determination of dissolved oxygen in the BOD test may be made by use of either the Modified Winkler with Full-Bottle Technique or the Probe Method in this manual.

3.2 Additional information relating to oxygen demanding characteristics of wastewaters can be gained by applying the Total Organic Carbon and Chemical Oxygen Demand tests (also found in this manual).

3.3 The use of 60 mL incubation bottles in place of the usual 300 mL incubation bottles, in conjunction with the probe, is often convenient.

4.0 Precision and Accuracy

4.1 Eighty-six analysts in fifty-eight laboratories analyzed natural water samples plus an exact increment of biodegradable organic compounds. At a mean value of 2.1 and

175 mg/L BOD, the standard deviation was ±0.7 and ±26 mg/L, respectively (EPA Method Research Study 3).

4.2 There is no acceptable procedure for determining the accuracy of the BOD test.

5.0 References

5.1 The procedure to be used for this determination is found in:
Standard Methods for the Examination of Water and Wastewater, 15th Edition, p.83, Method 507 (1980).

5.2 Young, J. C., "Chemical Methods for Nitrification Control," J. Water Poll. Control Fed., 45, p. 637 (1973).