



Dissolved Oxygen Uptake Rate(DOUR) & Standardized Oxygen Uptake Rate (SOUR)

Dissolved oxygen uptake rate (DOUR) is the weight of oxygen consumed by microorganisms per unit of time and is reported as mg/L/hour. Reference method is modified from 2710 B Standard Methods, 18th edition, using a YSI Model 51B oxygen meter.

CALIBRATION

1. Place the BOD probe in a BOD bottle partially filled with deionized H₂O. Allow temperature to stabilize.
2. Switch instrument to "Temperature" and read. Refer to attached table to determine calibration value.
3. Correct for altitude if needed.
4. Switch to appropriate mg/L range and adjust to read calibration value in step 2. Wait 2 minutes to assure stability, readjusting as necessary.

UPTAKE MEASUREMENT

1. Vigorously shake approximately 500 ml (in a 1 Liter container) sample to completely aerate. Immediately pour into a BOD bottle and insert probe into sample. Switch on the stirrer.
2. Record the dissolved oxygen (DO) reading where the needle lags briefly. This is the initial reading. The first time a DOUR is performed, it is useful to graph the DO vs. time. It is proper **to begin recording during the linear portion of the curve**. The lag portion lasts 30 seconds to 1 minute followed by the linear portion.
3. Set time. At the end of this time, record the DO reading. Stop recording if DO is <1.0 mg/L. This is the final reading
4. Calculate DOUR as follows:

$$\text{Mg O}_2/\text{L}/\text{hour} = \frac{\text{Initial DO} - \text{Final DO}}{\text{Time Tested}} \times 60 \text{ min.}$$

5. The Specific Oxygen Uptake Rate (SOUR) accounts for the MLSS/MLVSS having endogenous respiration. It is calculated as:

$$\text{mg O}_2/\text{g MLVSS}/\text{hour} = \frac{\text{DOUR}}{\text{MLVSS (in grams)}}$$



Interpreting SOUR Values

> 20 mg O ₂ /g MLVSS/hour	High	High F/M, young sludge
12 to 20 mg O ₂ /g MLVSS/hour	Normal	Normal decline phase sludge
< 12 mg O ₂ /g MLVSS/hour	Low	Low F/M, old sludge

Attachment: Solubility of Oxygen in Fresh Water.

Temperature °C	Solubility mg/L	Temperature °C	Solubility mg/L
0.0	14.32	23.0	8.58
1.0	14.22	24.0	8.42
2.0	13.83	25.0	8.26
3.0	13.46	26.0	8.11
4.0	13.11	27.0	7.97
5.0	12.77	28.0	7.83
6.0	12.45	29.0	7.70
7.0	12.14	30.0	7.56
8.0	11.84	31.0	7.43
9.0	11.60	32.0	7.31
10.0	11.29	33.0	7.18
11.0	11.03	34.0	7.07
12.0	10.78	35.0	6.95
13.0	10.54	36.0	6.84
14.0	10.31	37.0	6.73
15.0	10.08	38.0	6.62
16.0	9.87	39.0	6.52
17.0	9.67	40.0	6.41
18.0	9.47	41.0	6.31
19.0	9.28	42.0	6.21
20.0	9.09	43.0	6.12
21.0	8.92	44.0	6.02
22.0	8.74	45.0	5.93

Reference: *Standard Methods for the Examination of Water and Wastewater*. 18th



Edition. 1992.