

## 330 O<sub>2</sub> OXYGEN

1 - 10 ppm \ 360 Tests

*Winkler-Conversion → Mn-EDTA Colour Complex*

- Fill 20.5mmØ glass to brim with sample
- Add 1 drop each of **O<sub>2</sub>-1** and **O<sub>2</sub>-2**
- Add pearl - close without trapping bubbles - mix well by inversion
- Add 1 drop of **O<sub>2</sub>-3** - close and mix
- Set aside for 3' - Transfer to a 16mmØ tube
- Switch on the Photometer 660
- Enter  and press  for 330 O<sub>2</sub>
- Set filter as indicated to 525nm and press
- Insert 16mmØ tube with plain water and press
- Insert 16mmØ tube with transferred sample and press
- Record as dissolved Oxygen ppm (mg/l)

The solubility of oxygen in water of 9.1ppm at 20° by weight corresponds to 3.1% by volume, about one seventh of that in air. The substantial temperature dependence of solubility ranges between 14.2ppm at 1° and 7.6ppm at 30°. The effective activity therefore bears some relation to the theoretical maximum at the prevailing temperature and pressure conditions, being referred to as % Saturation. Wherever possible, measurements should be carried out on-site, for which electrode instruments are frequently used. Chemical methods are mostly based on the oxidation-state conversion principle of WINKLER (1886). At first reagent O<sub>2</sub>-1, a slightly acid solution of Mn(II), stable against oxidation, is added to the sample. When this is made alkaline with reagent O<sub>2</sub>-2, a suspension of flocculent white Mn(II)-hydroxide appears. Oxygen in the water immediately oxidizes this to brown Mn(IV)-oxyhydrate, its tint roughly corresponding to the oxygen content. *Carvalho, Calado & de Moura* (1963) developed a direct colorimetric determination by quantitatively converting this on acidification (here with O<sub>3</sub>-3) to a pink Mn(III)-EDTA complex, all other common EDTA-complexes including that of Mn(II) being colourless. Oxygen is essential to water-life. The momentary oxygen level at the surface and depth of lakes and rivers is determined by several, partly cyclic effects of gain and loss. In general, a value of under 6ppm O<sub>2</sub> is considered impoverished, one under 4ppm as the critical minimum level for fish. The oxygen requirement of these varies from low (eel) to high (trout).

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