Basic Knowledge of Dissolved Oxygen

1) Introduction

Dissolved Oxygen is dissolved Oxygen **Gas** in Water, Saltwater or other Liquids

Dissolved Oxygen is for Life on our Planet as important as Oxygen in the Air

The D.O. Concentration is the most important parameter for a healthy Aquatic Life

Surface Water (Ocean, Lakes, Rivers, Ponds) is a Living Organism itself, it has its own life (Bio-Cycle), it can be healthy, it can have problems and it can die. D.O. is the best indicator in what condition the water is.

D.O. Measurement has become very important in the last years and will become even more important for Quality of Living, Health and Food Production

A D.O. measurement was practically not possible before 1956, when Dr Clarke invented the first D.O. Sensor. Improved sensors were introduced by Mackereth 1964 and Hoeffner 1985

2) The D.O. Concentration in Water

When water is exposed to the air it takes up oxygen and other gas-components (N, CO2, etc.) from the air till it is saturated

The D.O. Concentration for Saturation depends on:
Temperature,
Barometric Pressure (Air Pressure),
Salinity (TDS = Total Dissolved Salts),

The D.O. Concentration is measured in ppm, which is mg. Very often it is related to the Air-Calibration, which is considered as 100%. Air has oxygen content of 21%

In Surface Water (Ocean, Lakes, Rivers, Ponds) there is equilibrium of the oxygen taken up from the air and produced by plants (Photosynthesis) and the oxygen consumed by fish and shellfish and bacteria (Decay Processes = rotting of organic material on the bottom)

3) D.O. and Fish Health

Fish and Shellfish need sufficient Oxygen to breath.

Different Fish and Shellfish Species have different requirements of D.O. concentration:
Trout and Salmon need high D.O. Concentrations,
Carps need less high D.O. Concentrations

Depending on the level of D.O. different problems will arise:
Fish stop reproducing,
Fish grow slower,
Fish fall sick,
Fish die

4) The Importance of D.O. Measurement

Very important Parameter for Environmental Control and Pollution Control

Very important Parameter for the Biological Cleaning Process of Waste Water

Very important Parameter for Fish Farming and Shellfish Farming

Very important Parameter for Food Processing and Beer Brewing