

The word redox is a combination of reduction and oxidation. This measurement is a measure for electron activity (exchange of electrons  $e^-$ ), which are caused by dissolved reducing and oxidizing substances which exist in water. The redox potential (ORP) is expressed in mV, can be negative or positive and is a sum parameter which does not allow a selective determination of specific oxidants or reducing agents.

An oxygen-rich environment always has a high redox potential. A low redox potential, however, indicates lack of oxygen and an increase of organic substances (which use up oxygen).

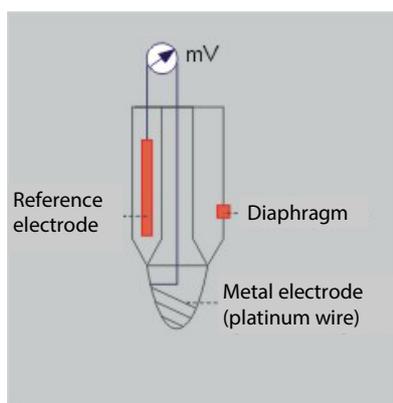
"Collapse" of a body of water occurs if the redox potential is lower than approx. -180 mV (at a pH of 7.5). Such water usually exhibits a high proportion of nitrogen – and/or phosphorus compounds.

In the European Union, there are no threshold values for the redox potential in drinking water. Tap water has a redox potential of approx. +500mV, oxygenated water of a mountain stream has one of approx. +300 mV and spring water has a potential of +150 mV.

### How to measure the redox potential (ORP)

The sensor consists of a reference electrode and a metal electrode (also termed measuring electrode). This metal electrode mostly consists of gold or platinum.

The dissolved ions capability of accepting or releasing electrons defines the potential of the metal electrode and thus the electrical voltage of the entire measuring chain.



Picture 1: Principle of the ORP measurement

The Hamilton reference electrode consists of silver/silver chloride (Ag/AgCl) and the metal electrode consists of platinum. All voltages measured refer to this reference electrode.

The redox potential measurement is dependent on temperature and the pH value. For an evaluation

of this redox potential, knowledge of the two other parameters is generally necessary.

### Benefits of the measurement of the redox potential

In water treatment plants, the redox potential is used for monitoring treatment steps such as ozonation, elimination of manganese and nitrate or disinfection.

The sensor POLILYTE PLUS ORP ARC 120 The sensor used in the AquaMaster is part of Hamilton's ARC programme. In the upper portion of the sensor, the data is digitalized. All necessary operating activities can be carried out via the AquaScat.



Picture 2: Hamilton POLILYTE ORP PLUS ARC 120

The sensor provides values of the redox potential and the temperature.

### Product

SIGRIST product and configuration:

- Hamilton POLILYTE ORP PLUS ARC 120

Parameter settings

- The sensor is calibrated and ready to use upon delivery

Advantages of the Hamilton sensor

- » Customer benefits
  - The ARC concept allows permanent quality monitoring of the sensor
    - » A warning is given if the sensor needs to be replaced
    - » The Hamilton calibration standard is recognized automatically.
  - The sensor is preconfigured
    - » Replacement is very simple
    - » Retrofitting is very simple
  - A precise calibration standard of 475 mV is offered.