
Water quality — Determination of dissolved oxygen — Electrochemical probe method

Qualité de l'eau — Dosage de l'oxygène dissous — Méthode électrochimique à la sonde



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 5814 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

This third edition cancels and replaces the second edition (ISO 5814:1990), which has been technically revised.

The main changes compared to the second edition are:

- a) a calibration procedure using water-saturated air is specified;
- b) the calibration procedure using air-saturated water is omitted.

Water quality — Determination of dissolved oxygen — Electrochemical probe method

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted according to this International Standard be carried out by suitably trained staff.

1 Scope

This International Standard specifies an electrochemical method for the determination of dissolved oxygen in water by means of an electrochemical cell which is isolated from the sample by a gas permeable membrane.

Measurement can be made either as a concentration of oxygen in milligrams per litre, percentage saturation (% dissolved oxygen) or both. The method measures oxygen in water corresponding to 1 % to 100 % saturation. However, most instruments permit measurement of values higher than 100 %, i.e. supersaturation.

NOTE Supersaturation is possible when the partial pressure of oxygen is higher than in air. Especially when strong algal growth is present, supersaturation of up to 200 % and above can occur.

The method measures oxygen in water with a saturation higher than 100 %, when special arrangements to prevent the outgassing of oxygen during the handling and measurement of the sample are made.

The method is suitable for measurements made in the field and for continuous monitoring of dissolved oxygen, as well as measurements made in the laboratory. It is the preferred method for highly coloured and turbid waters, and also for analysis of waters not suitable for the Winkler titration method because of iron- and iodine-fixing substances, which can interfere in the iodometric method specified in ISO 5813^[1].

The method is suitable for drinking waters, natural waters, waste waters, and saline waters. If used for saline waters, such as sea or estuarine waters, a correction for salinity is essential.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Principle

Immersion of a probe, consisting of a cell enclosed by a selective membrane and containing the electrolyte and at least two metallic electrodes, in the water to be analysed.

NOTE The membrane is effectively impermeable to water and ionic dissolved matter, but is permeable to oxygen and a certain number of other gases.

One of the electrodes is made of a noble metal like gold or platinum. Oxygen is reduced at its surface by an electrochemical process. In order to make this process possible, a suitable electrochemical potential is established at this electrode. For polarographic probes, this is achieved by applying an external voltage related to a second electrode. Galvanic probes are able to build up the potential by themselves.