
**Water quality — Test for inhibition of
oxygen consumption by activated sludge
for carbonaceous and ammonium
oxidation**

*Qualité de l'eau — Essai d'inhibition de la consommation d'oxygène par
des boues activées pour l'oxydation du carbone et de l'ammonium*

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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 8192 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 5, *Biological methods*.

This second edition cancels and replaces the first edition (ISO 8192:1986), which has been technically revised.

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Introduction

Information generated by this method for assessing the potential toxicity of substances, mixtures and waste waters to activated sludge may be helpful in estimating the effect of a test material on mixed bacterial communities in the aquatic environment, especially in aerobic biological treatment systems. The susceptibility of oxygen uptake by different sub-populations of the bacterial communities to inhibition by chemicals and waste waters is not necessarily uniform and selective effects may profoundly influence the outcome of the test.

There are two principal groups of microorganisms contributing to the total oxygen consumption by activated sludge: heterotrophic organisms mainly responsible for the breakdown of carbon-based substrates (carbonaceous oxidation) and autotrophic nitrifying organisms causing the oxidation of ammonium to nitrate (nitrification).

This International Standard may be used to assess the toxicity of substances on total oxygen uptake (i.e. carbonaceous oxidation and nitrification combined) or, by deliberately adding a specific inhibitor of nitrification, also to assess toxicity of substances to the carbonaceous and nitrification components separately.

For the determination of the nitrification inhibition with this method, a sufficiently nitrifying activated sludge is required. Indications of nitrification may be investigated further by application of ISO 9509^[4].

The user of this method should be aware that particular problems could require the specification of additional marginal conditions.

The inhibitory effect of a test material may be exerted on both components or it may be exerted predominantly on only one of them. Nitrification is the process more commonly prone to selective inhibition.

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WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This International 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 a method for assessing the inhibitory effect of a test material on the oxygen consumption of activated sludge microorganisms.

This method is intended to represent the conditions in biological waste-water treatment plants. It gives information on inhibitory or stimulatory effects after a short exposure (usually 30 min up to 180 min or even more) of the test material on activated sludge microorganisms.

This method is applicable for testing waters, waste waters, pure chemicals and mixtures of chemicals. Concerning the chemicals, the method refers to those which are soluble under the test conditions. Special care is necessary with materials of low water solubility, high volatility and with materials abiotically consuming or producing oxygen.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

activated sludge

accumulated biological mass (floc) produced in the treatment of waste water by the growth of bacteria and other microorganisms in the presence of oxygen

(ISO 6107-1:2004 [3], definition 2)

3.2

concentration of suspended solids of an activated sludge

amount of solids obtained by filtration or centrifugation of a known volume of activated sludge and drying at about 105 °C to constant mass

(ISO 9888:1999 [6], definition 3.4)