

SLOVENSKI STANDARD
SIST EN ISO 8192:2007**01-september-2007****BUXca Yý U**
SIST EN ISO 8192:1997

Kakovost vode - Preskus inhibicije porabe kisika z aktivnim blatom za oksidacijo ogljika in amonija (ISO 8192:2007)

Water quality - Test for inhibition of oxygen consumption by activated sludge for carbonaceous and ammonium oxidation (ISO 8192:2007)

Wasserbeschaffenheit - Bestimmung der Hemmung des Sauerstoffverbrauchs von Belebtschlamm nach Kohlenstoff- und Ammonium-Oxidation (ISO 8192:2007)

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 (ISO 8192:2007)

Ta slovenski standard je istoveten z: EN ISO 8192:2007**ICS:**

13.060.70	Preiskava bioloških lastnosti vode	Examination of biological properties of water
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English Version

Water quality - Test for inhibition of oxygen consumption by
activated sludge for carbonaceous and ammonium oxidation
(ISO 8192:2007)

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 (ISO 8192:2007)

Wasserbeschaffenheit - Bestimmung der Hemmung des
Sauerstoffverbrauchs von Belebtschlamm nach
Kohlenstoff- und Ammonium-Oxidation (ISO 8192:2007)

This European Standard was approved by CEN on 29 December 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 8192:2007) has been prepared by Technical Committee ISO/TC 147 "Water Quality" in collaboration with Technical Committee CEN/TC 230 "Water Analysis", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2007, and conflicting national standards shall be withdrawn at the latest by August 2007.

This document supersedes EN ISO 8192:1995.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 8192:2007 has been approved by CEN as EN ISO 8192:2007 without any modifications.

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

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.

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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)

3.3

oxygen consumption rate

uptake of oxygen by activated sludge microorganisms per unit volume of sludge, in unit time

NOTE This quantity is expressed in milligrams per litre per hour [mg/(l·h)].

3.4

specific oxygen consumption rate

uptake of oxygen by activated sludge microorganisms per unit mass of dry sludge (suspended solids), in unit time

NOTE This quantity is expressed in milligrams per gram per hour [mg/(g·h)].

3.5

inhibition of oxygen consumption

decrease of the oxygen consumption rate of an activated sludge plus (a) degradable substance(s) in the presence of the test material, compared with that of a similar mixture without test material

NOTE 1 This quantity is expressed as a percentage.

NOTE 2 In the absence of a substrate, some chemicals (e.g. uncouplers of phosphorylation) can increase oxygen uptake.

3.6

toxic range

range of concentration of a test material over which 0 % to 100 % inhibition occurs

3.7

EC₅₀

effective concentration of the test material giving a calculated or interpolated inhibition of oxygen consumption of 50 % compared with a blank control

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3.8

nitrification

oxidation of ammonium compounds by bacteria

NOTE Usually the intermediate product is nitrite and the end product is nitrate

[ISO 6107-1:2004 ^[3], definition 49].

4 Principle

In the presence of easily biodegradable substances, activated sludge consumes oxygen at a higher rate than in their absence, depending on, among other factors, the concentration of microorganisms. Addition of a toxic concentration of a test material results in a decrease in the oxygen consumption rate. The rates are measured using an oxygen electrode. The percentage inhibition of the oxygen consumption is estimated by comparison of the rate with that of a control mixture containing no test material.

The sensitivity of the activated sludge may be checked with a suitable reference substance. The inhibition of the oxygen uptake by all sludge microorganisms, heterotrophic microorganisms and the oxidation of ammonium salts by nitrifying microorganisms may be separately expressed from measurements of the rate of uptake in the absence and presence of *N*-allylthiourea (ATU), a specific inhibitor of the oxidation of ammonium to nitrite by first-stage nitrifiers. The difference between the two oxygen values is due to nitrification and the residual value in the presence of allylthiourea is due to the heterotrophs. Any oxygen consumption due to abiotic processes may be detected by determining the rate in mixtures of the test material, synthetic medium and water, but omitting activated sludge.