



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 1899-1:1998

Water quality - Determination of biochemical oxygen demand after n days (BOD_n) - Part 1: Dilution and seeding method with allylthiourea

Qualité de l'eau - Détermination de la
demande biochimique en oxygène après
n jours (DOB_n) - Partie 1: Méthode par
dilution et ensemencement avec apport

Wasserbeschaffenheit - Bestimmung des
biochemischen Sauerstoffbedarfs nach n
Tagen (BSB_n) - Teil 1: Verdünnungs- und
Impfverfahren nach Zugabe von

03/1998



National Foreword

This European Standard EN 1899-1:1998 was adopted as Luxembourgish Standard ILNAS-EN 1899-1:1998.

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- Participate in the design of standards
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English version

**Water quality - Determination of biochemical oxygen demand
after n days (BOD_n) - Part 1: Dilution and seeding method with
allylthiourea addition (ISO 5815:1989, modified)**

Qualité de l'eau - Détermination de la demande
biochimique en oxygène après n jours (DOB_n) - Partie 1:
Méthode par dilution et ensemencement avec apport d'allyl
thio-urée (ISO 5815:1989, modifiée)

Wasserbeschaffenheit - Bestimmung des Biochemischen
Sauerstoffbedarfs nach n Tagen (BSB_n) - Teil 1:
Verdünnungs- und Impfverfahren nach Zugabe von
Allylthioharnstoff (ISO 5815:1989, modifiziert)

This European Standard was approved by CEN on 13 February 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This European Standard has been prepared by 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 September 1998, and conflicting national standards shall be withdrawn at the latest by September 1998.

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

This draft European Standard consists of the following parts:

- EN 1899-1 Water quality – Determination of biochemical oxygen demand after n days (BOD_n) – Part 1: Dilution and seeding method with allylthiourea addition
- EN 1899-2 Water quality – Determination of biochemical oxygen demand after n days (BOD_n) – Part 2: Method for undiluted samples

Annex A, which is normative, concerns alternative incubation periods.

Annex B, which is informative, concerns multitesting, which may be used to obtain enhanced precision, or if the presence of substances toxic to microorganisms is suspected.

Endorsement notice

The text of the International Standard ISO 5815:1989 was approved by CEN as a European Standard with agreed common modifications as given below:

- Change in setup (splitting into two parts)
- Addition of annexes.

Introduction

This European Standard EN 1899-1 is a modified version of ISO 5815:1989, "Water Quality - Determination of biochemical oxygen demand after 5 days (BOD₅) - Dilution and seeding method".

The times of incubation specified in the proposal are 5 days - as in ISO 5815 and as has been applied in many European countries - or 7 days as has been applied in several Nordic countries through the past many years. The 7 day incubation will typically give higher BOD results than 5 days incubation time.

With an incubation time of 5 days weekend work can only be avoided, if samples are collected Wednesdays, Thursdays to Fridays. With an incubation time of 7 days, samples collected on the first five weekdays can be analysed without implying weekend work. For this reason a 7 day incubation can be considered more convenient than the conventional 5 day incubation.

A new, modified 7 day incubation is described in a normative annex. The first investigations indicate that BOD results obtained by this modified method are identical to results obtained by the 5 day method described in the proposed standard. It is hoped that more comparative data on these two incubation methods will be obtained during the coming years, so that the modified 7 day incubation method can be included fully at the time of review and revision of this standard.

1 Scope

This European Standard specifies a determination of the biochemical oxygen demand of waters by dilution and seeding with suppression of nitrification.

This standard is applicable to all waters having biochemical oxygen demands greater than or equal to the limit of determination 3 mg/l of oxygen and not exceeding 6000 mg/l of oxygen. For biochemical oxygen demands greater than 6 000 mg of oxygen/l, the method is still applicable, but the errors caused by the necessary dilutions can influence the analytical quality of the test method and the results are to be interpreted with circumspection. In this standard the limit of detection, D_L , is defined as

$$D_L = t_{0,95(f)} \cdot 2 \cdot s_B \cdot \sqrt{1 + \frac{1}{n}} \quad (1)$$

where s_B is the within series standard deviation, $t_{0,95(f)}$ is the student t-value, with f is the degrees of freedom for the determination of s_B and n is the number of analysis for determination of the blank in an analytical series. s_B is calculated from determinations of real samples with a BOD content near the estimated D_L .

In cases where the analytical method does not require any blank correction the term

$$\sqrt{1 + \frac{1}{n}} \quad (2)$$

is omitted.

The results obtained are the product of a combination of biochemical and chemical reactions. They do not have the rigorous and unambiguous character of those resulting from, for example, a single, well-defined, chemical process. Nevertheless, they provide an indication from which the quality of waters can be estimated.

The test can be influenced by the presence of various substances. Those which are toxic to microorganisms, for example bactericides, toxic metals or free chlorine, will inhibit biochemical oxidation. The presence of algae or nitrifying microorganisms can produce artificially high results.

It is absolutely essential that tests conducted according to this standard are carried out by suitably qualified staff.

Annex A describes alternative incubation periods.

Annex B describes multitesting, which can be used to obtain enhanced precision or to demonstrate the presence of substances toxic to microorganisms.