Vee kvaliteet. Adsorbeeritavates orgaanilistes ühendites sisalduvate halogeenide (AOX) sisalduse määramine

Water quality - Determination of adsorbable organically bound halogens (AOX)

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 1485:1999 sisaldab Euroopa standardi EN 1485:1996 ingliskeelset teksti.	This Estonian standard EVS-EN 1485:1999 consists of the English text of the European standard EN 1485:1996.
Standard on kinnitatud Eesti Standardikeskuse 12.12.1999 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 12.12.1999 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
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English version

Water quality - Determination of adsorbable organically bound halogens (AOX)

Qualité de l'eau - Dosage des halogènes des composés organiques adsorbables (AOX)

Wasserbeschaffenheit - Bestimmung adsorbierbarer organisch gebundener Halogene (AOX)

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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.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by the 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of an identical text or by endorsement, at the latest by March 1997, and conflicting national standards shall be withdrawn at the latest by March 1997.

This European Standard contains three informative annexes.

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

Introduction

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

AOX is an analytical convention, the result is a parameter used for water quality control purposes. It represents the sum of organically bound chlorine, bromine and iodine (but not fluorine) which can be adsorbed on activated carbon under specified conditions and, if the sample is not filtered, includes that associated with suspended matter.

1 Scope

This European Standard specifies a method for the direct determination of an amount of more than 10 µg/l in water of organically bound chlorine, bromine and iodine (expressed as chloride) adsorbable on activated carbon.

The concentration of inorganic chloride ions in the test sample (see clause 8) needs to be less than 1 g/l. Samples with higher concentrations need to be diluted prior to analysis.

For samples containing suspended solids, halogens adsorbed onto the solid matter are also included. Filtration of the sample before analysis enables the determination of dissolved and particulate AOX to be carried out.

NOTE:The recovery of some polar and hydrophilic compounds, such as monochloroacetic acid, is incomplete.

1.1 *Interferences*

1.1.1 High AOX values can result from the presence of active chlorine. Reactions of this oxidizing agent with organic substances in the sample and with the activated carbon can be prevented by the addition of sodium sulfite, immediately after sampling.

1.1.2 Some inorganic bromine and iodine compounds are irreversibly bound to activated carbon causing positive bias. These interferences can be diminished by the addition of sodium sulfite.

1.1.3 Organic bromine and iodine compounds may, during combustion, decompose to elemental bromine or iodine respectively and this can yield higher oxidation states of these elements. These fractions of AOX may be incompletely determined, thus leading to negative bias.

1.1.4 Insoluble inorganic halides can cause positive bias.

1.1.5 Samples containing living cells (for example microorganisms or algae) may give rise to high results because of their chloride content. In these cases the sample is not analyzed until at least 8 h after acidification.

1.1.6 For samples with high chloride concentrations (approximately 1 g/l) the shaking procedure (see 8.2.1) can result in higher interferences (positive bias, see 9.2) than the column procedure (see 8.2.2).

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated reference, subsequent amendment to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated reference the latest edition of the publication referred to applies.

EN 25667-1 : 1993
Water quality – Sampling – Part 1: Guidance on the design of sampling programmes (ISO 5667-1 : 1991)

EN 25667-2 : 1993
Water quality – Sampling – Part 2: Guidance on sampling techniques (ISO 5667-2 : 1984)

EN ISO 5667-3 : 1995
Water quality – Sampling – Part 3: Guidance on the preservation and handling of samples

prEN 1484 : 1994
Water quality – Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)

EN ISO 3696 : 1995
Water for laboratory use – Specification and test methods

3 Definitions

For the purpose of this European Standard, the following definitions apply:

3.1 Adsorbable organically bound halogens (AOX)

The equivalent amount of chlorine, bromine, and iodine contained in organic compounds, expressed as chloride when determined according to this European standard.

3.2 Dissolved organic carbon (DOC)

The amount of organic carbon present in a water sample after filtration through a membrane filter of pore size 0,45 μm.

4 Principle

Acidification of the water sample with nitric acid. Adsorption onto activated carbon of organic compounds contained in the sample, either by a shaking procedure or by column adsorption. Displacement of inorganic halides by rinsing the activated carbon with acidified sodium nitrate solution. Combustion of the loaded carbon in an oxygen stream. Absorption of the hydrogen halides followed by determination of the halide ions by an argentometric titration, such as microcoulometry. Expression of the result as the mass concentration of chloride.

5 Reagents

Use only reagents of recognized analytical grade and water grade 1 in accordance with EN ISO 3696.
The purity of water, reagents and gases shall be confirmed.

The AOX content shall be negligibly low when compared with the lowest AOX content to be determined. The overall AOX content of water, chemicals, and gases can be checked by measuring the total blank (see 8.5).

5.1 Activated carbon

For the shaking procedure, use an activated carbon of about 10 μm to 50 μm grain size. For the column adsorption, use a grain size distribution of 50 μm to 150 μm.

For the storage of activated carbon, see Annex A.

NOTE: Several methods can be used for the determination of the adsorption capacity. One of these methods is described in [1]. The iodine number gives an indication of the adsorption capacity of the activated carbon. The iodine number determined in accordance with the method specified in [1], should be > 1050.

The blank value of the washed activated carbon shall be less than 15 μg of chloride equivalent per gram of activated carbon.