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MÄÄRAMINE. MEETOD PIDEVVOOLUANALÜÜSI (CFA JA
FIA) JA SPEKTROMEETRILISE DETEKTEERIMISEGA

Water quality - Determination of ammonium nitrogen -
Method by flow analysis (CFA and FIA) and
spectrometric detection (ISO 11732:2005)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 11732:2005 sisaldab Euroopa standardi EN ISO 11732:2005 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 11732:2005 consists of the English text of the European standard EN ISO 11732:2005.
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English version

**Water quality - Determination of ammonium nitrogen - Method
by flow analysis (CFA and FIA) and spectrometric detection
(ISO 11732:2005)**

Qualité de l'eau - Dosage de l'azote ammoniacal - Méthode
par analyse en flux (CFA et FIA) et détection
spectrométrique (ISO 11732:2005)

Wasserbeschaffenheit - Bestimmung von
Ammoniumstickstoff - Verfahren mittels Fließanalytik (CFA
und FIA) und spektrometrischer Detektion (ISO
11732:2005)

This European Standard was approved by CEN on 3 January 2005.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

International Standard

ISO 11732:2005 Water quality – Determination of ammonium nitrogen – Method by flow analysis (CFA and FIA) and spectrometric detection,

which was prepared by ISO/TC 147 'Water quality' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 230 'Water analysis', the Secretariat of which is held by DIN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by August 2005 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 11732:2005 was approved by CEN as a European Standard without any modification.

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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 11732 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

This second edition cancels and replaces the first edition (ISO 11732:1997), which has been technically revised.

Introduction

Methods using flow analysis are automating wet chemical procedures and are therefore particularly suitable for the processing of large sample series at a high analysis frequency (up to 100 samples per hour).

It is differentiated between flow injection analysis (FIA)^{[1],[2]} and continuous flow analysis (CFA)^[3]. Both methods consist of the automatic dosage of the sample introduced into a flow system (manifold) in which the sample analytes react with the reagent solutions on their way through the manifold. The sample preparation may be integrated into the manifold. The reaction product is measured in a flow detector.

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

Water quality — Determination of ammonium nitrogen — Method by flow analysis (CFA and FIA) and spectrometric detection

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 standard be carried out by suitably trained staff.

1 Scope

This International Standard specifies methods suitable for the determination of ammonium nitrogen in various types of waters (such as ground, drinking, surface, and waste waters) in mass concentrations ranging from 0,1 mg/l to 10 mg/l (in the undiluted sample), applying either FIA (Clause 3) or CFA (Clause 4). In particular cases, the range of application may be adapted by varying the operating conditions.

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 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 5667-1, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes*

ISO 5667-2, *Water quality — Sampling — Part 2: Guidance on sampling techniques*

ISO 5667-3, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of water samples*

ISO 8466-1, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 1: Statistical evaluation of the linear calibration function*

3 Determination of ammonium nitrogen by flow injection analysis (FIA) and spectrometric detection

3.1 Principle

The sample containing ammonium is injected into a continuous carrier stream by means of an injection valve and is mixed with a continuously streaming flow of an alkaline solution. The ammonia formed is separated in a diffusion cell from the solution over a hydrophobic semipermeable membrane and taken up by a streaming recipient flow containing a pH indicator. Due to the resulting pH shift, the indicator solution will change its colour which is measured continuously in the flow photometer. Additional information about this analytical technique is given in references [4], [5], [6], [7] and [8].

NOTE Equipment following this principle using CFA instead of FIA is commercially available, however it has not been validated.