

Water quality - Determination of phenol index by flow analysis (FIA and CFA)

Water quality - Determination of phenol index by flow analysis (FIA and CFA)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 14402:2000 sisaldab Euroopa standardi EN ISO 14402:1999 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.02.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 14402:2000 consists of the English text of the European standard EN ISO 14402:1999.</p> <p>This document is endorsed on 18.02.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p>Käsitlusala: Determination of the phenol index in waters of different origin (such as ground waters, surface waters, seep waters and waste waters) in mass concentrations of 0.01 to 1 mg/l (in undiluted sample). In particular cases, the range of application may be adapted by varying the operating conditions.</p>	<p>Scope: Determination of the phenol index in waters of different origin (such as ground waters, surface waters, seep waters and waste waters) in mass concentrations of 0.01 to 1 mg/l (in undiluted sample). In particular cases, the range of application may be adapted by varying the operating conditions.</p>
--	--

ICS 13.060.50

Võtmesõnad: chemical analysis, determination of content, flow analysis, indexes (ratios), phenol, quality, water, water pollution, water tests

English version

**Water quality – Determination of phenol index by flow
analysis (FIA and CFA)
(ISO 14402 : 1999)**

Qualité de l'eau – Détermination de
l'indice phénol par analyse en flux
(FIA et CFA) (ISO 14402 : 1999)

Wasserbeschaffenheit – Bestimmung
des Phenolindex mit der Fließanalytik
(FIA und CFA) (ISO 14402 : 1999)

This European Standard was approved by CEN on 1999-07-23.

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.

The European Standards exist 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

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

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 14402 : 1999 Water quality – Determination of phenol index by flow analysis (FIA and CFA), 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 March 2000 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 14402 : 1999 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

Contents

Page

1 Scope	5
2 Normative references	5
3 Determination of phenol index (without distillation) after extraction	5
3.1 Principle	5
3.2 Interferences	5
3.3 Reagents	6
3.4 Apparatus	8
3.5 Sampling	10
3.6 Procedure	11
3.7 Calculation of results	12
4 Determination of phenol index (without extraction) after distillation	13
4.1 Principle	13
4.2 Interferences	13
4.3 Reagents	13
4.4 Apparatus	14
4.5 Sampling	17
4.6 Procedure	17
4.7 Calculation of results	18
5 Expression of results	18
6 Precision and accuracy	18
7 Test report	18
Annex A (informative) Statistical data	19
Bibliography	21

Introduction

Methods for determination of water quality using flow analysis and automatic wet chemical procedures are particularly suitable for the processing of large sample series at a high analysis frequency.

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

Phenol index is an analytical convention. It represents a group of aromatic compounds which under the specific reaction conditions form coloured condensation products. The analytical result is expressed in terms of phenol concentration.

This International Standard describes two methods: the determination of phenol index (without distillation) after extraction, and the determination of phenol index (without extraction) after distillation.

It should be investigated whether and to what extent particular problems will require the specification of additional marginal conditions.

1 Scope

This International Standard specifies two methods for the determination of the phenol index in waters of different origin (such as ground waters, surface waters, seep waters, and waste waters) in mass concentrations of 0,01 mg/l to 1 mg/l (in the undiluted sample). In particular cases, the range of application may be adapted by varying the operating conditions. Clause 3 describes the determination of phenol index (without distillation) after extraction, and in clause 4 the determination of phenol index (without extraction) after distillation is given.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 5667-3:1994, *Water quality — Sampling — Part 3: Guidance on sample handling and preservation*.

ISO 6439:1990, *Water quality — Determination of phenol index — 4-Aminoantipyrine spectrometric methods after distillation*.

3 Determination of phenol index (without distillation) after extraction

3.1 Principle

The sample is fed into a continuously flowing carrier stream and mixed with also continuously flowing solutions of 4-aminoantipyrine and potassium peroxodisulfate. Phenolic compounds in the sample are oxidized by potassium peroxodisulfate, and the resulting quinones react with 4-aminoantipyrine, forming coloured condensation products. These are extracted in a flow extraction unit from the aqueous phase into chloroform. The chloroform phase is separated by a suitable phase separator (e.g. a hydrophobic semipermeable membrane), and the absorbance of the organic phase is measured spectrometrically in a flow spectrometer at 470 nm to 475 nm. More information on this analytical technique is given in the references [6 to 9].

It is absolutely essential that the test described in this International Standard be carried out by suitably qualified staff.

3.2 Interferences

3.2.1 Chemical interferences

Under the prevailing reaction conditions, aromatic amines will also form condensation products with 4-aminoantipyrine, leading to positive bias.