Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 4: Determination of chlorate, chloride and chlorite in water with low contamination

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN ISO 10304-4:2001 sisaldab Euroopa standardi EN ISO 10304-4:1999 ingliskeelset teksti. Käesolev dokument on jõustatud 18.06.2001 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN ISO 10304-4:2001 consists of the English text of the European standard EN ISO 10304-4:1999. This document is endorsed on 18.06.2001 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This standard specifies a method for the determination of the dissolved anions chlorate, chloride and chlorite in water with low contamination (e.g. drinking water, raw water or swimming pool water).	**Scope:** This standard specifies a method for the determination of the dissolved anions chlorate, chloride and chlorite in water with low contamination (e.g. drinking water, raw water or swimming pool water).

ICS 13.060.01

Võtmesõnad: chemical analysis, chlorates, chlorides, chlorites, determination of content, high performance liquid chromatography, quality, soluble matter, water, water pollution, water tests

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 10304-4

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English version

Water quality

Determination of dissolved anions by liquid chromatography of ions
Part 4: Determination of chlorate, chloride and chlorite in water with low contamination
(ISO 10304-4 : 1997)

Qualité de l'eau – Dosage des anions dissous par chromatographie des ions en phase liquide – Partie 4: Dosage des ions chlorate, chlorure et chlorite dans des eaux faiblement contaminées (ISO 10304-4 : 1997)

Wasserbeschaffenheit – Bestimmung von gelösten Anionen mittels Ionenchromatographie – Teil 4: Bestimmung von Chlorat, Chlorid und Chlorit in gering belastetem Wasser (ISO 10304-4 : 1997)

This European Standard was approved by CEN on 1999-03-04.

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 10304-4 : 1997 Water quality – Determination of dissolved anions by liquid chromatography of ions – Part 4: Determination of chlorate, chloride and chlorite in water with low contamination,

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 October 1999 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 10304-4 : 1997 was approved by CEN as a European Standard without any modification.

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

Introduction

The essential minimum requirements of an ion chromatographic system applied within the scope of this part of ISO 10304 are the following:

- Resolution power of the column:	For the anion to be determined it is essential that the peak resolution does not fall below R = 1,3 (clause 7, figure 3)
- Method of detection:	a) Measurement of the electrical conductivity with or without suppressor device b) Spectrometric measurement (UV/VIS), directly or indirectly c) Amperometric direct detection
- Applicability of the method:	Working ranges according to table 1
- Calibration (9.1):	Calibration and determination of the linear working range (see ISO 8466-1). Use of the method of standard addition to special cases of application (9.2).
- Guaranteeing the analytical quality (9.3):	Validity check of the calibration function. Replicate determinations, if necessary.

The diversity of the appropriate and suitable assemblies and the procedural steps depending on them permit a general description only.

For further information on the analytical technique see reference [2].

1 Scope

This part of ISO 10304 specifies a method for the determination of the dissolved anions chlorate, chloride, and chlorite in water with low contamination (e.g. drinking water, raw water or swimming pool water).

An appropriate pretreatment of the sample (e.g. dilution) and the use of a conductivity detector (CD), UV detector (UV) or amperometric detector (AD) make the working ranges given in table 1 feasible.

Table 1 — Working ranges of the analytical method

Anion	Working range mg/l*	Detection
Chlorate	0,03 to 10	CD
Chloride	0,1 to 50	CD
Chlorite**	0,05 to 1 0,1 to 1 0,01 to 1	CD UV; λ=207 nm to 220 nm AD; 0,4 to 1,0 V

* The working range is restricted by the ion-exchange capacity of the columns. Dilute the sample in to the working range, if necessary.

** The minimum working range for chlorite of 0,05 mg/l was obtained using calibration checks, but the round robin trials (annex A, table A.4) showed that it is difficult to obtain this with sufficient accuracy. Thus great care shall be taken when working in the lower range of this method.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 10304. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 10304 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5667-1:1980 *Water quality - Sampling - Part 1: Guidance on the design of sampling programmes.*

ISO 5667-2:1991 *Water quality - Sampling - Part 2: Guidance on sampling techniques.*

ISO 5667-3:1994 *Water quality - Sampling - Part 3: Guidance on the preservation and handling of samples.*

ISO 8466-1:1990 *Water quality - Calibration and evaluation of analytical methods and estimation of performance characteristics - Part 1: Statistical evaluation of the linear calibration function.*

ISO 10304-1:1992 *Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of fluoride, chloride, bromide, nitrate, nitrite, orthophosphate and sulfate in water with low contamination*

ISO 10304-2:1995 *Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 2: Determination of bromide, chloride, nitrate, nitrite, orthophosphate and sulfate in waste water*

ISO 10304-3:1997 *Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate*

ISO 10530: 1992 *Water quality - Determination of dissolved sulfide - Photometric method using methylene blue.*

3 Interferences

3.1 Organic acids such as mono- and dicarboxylic acids or disinfection byproducts (e.g. chloroacetic acid) can interfere.

3.2 Dissolved organics can react with the working electrode of the amperometric detector, causing a decrease in sensitivity.

3.3 The presence of fluoride, carbonate, nitrite and nitrate can cause interference with the determination of chlorate, chloride and chlorite. The respective concentrations given in table 2 are typical for conductivity, UV and amperometric detectors.

3.4 Elevated loads of chloride and bromide can cause interference with the determination of chlorite and chlorate. Remove chloride and bromide with the aid of special exchangers (8.2).

3.5 Solid particles and organic compounds (such as mineral oils, detergents, and humic acids) shorten the life-time of the separator column. They are therefore eliminated from the sample prior to analysis (clause 8).