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**Kakovost vode – Določevanje raztopljenih anionov z ionsko tekočinsko kromatografijo – 4. del: Določevanje klorata, klorida in klorita v malo onesnaženih vodah (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 (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)

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)

**Ta slovenski standard je istoveten z: EN ISO 10304-4:1999**

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**ICS:**

13.060.50	Preiskava vode na kemične snovi	Examination of water for chemical substances
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN ISO 10304-4

April 1999

ICS 13.060.01

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)

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This European Standard was approved by CEN on 4 March 1999.

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.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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EN ISO 10304-4:1999

## Foreword

The text of the International Standard from Technical Committee ISO/TC 147 "Water quality" of the International Organization for Standardization (ISO) has been taken over as an European Standard 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 October 1999, and conflicting national standards shall be withdrawn at the latest by October 1999.

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.

## Endorsement notice

The text of the International Standard ISO 10304-4:1997 has been approved by CEN as a European Standard without any modification.

NOTE: Normative references to International Standards are listed in annex ZA (normative).

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**Annex ZA (normative)**  
**Normative references to international publications**  
**with their relevant European publications**

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 references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 5667-1	1980	Water quality - Sampling - Part 1: Guidance on the design of sampling programmes	EN 25667-1	1993
ISO 5667-2	1991	Water quality - Sampling - Part 2: Guidance on sampling techniques	EN 25667-2	1993
ISO 5667-3	1994	Water quality - Sampling - Part 3: Guidance on the preservation and handling of samples	EN ISO 5667-3	1995
ISO 10304-1	1992	Water quality - Determination of dissolved fluoride, chloride, nitrite, orthophosphate, bromide, nitrate and sulfate ions, using liquid chromatography of ions - Part 1: Method for water with low contamination	EN ISO 10304-1	1995
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	EN ISO 10304-2	1996
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	EN ISO 10304-3	1997

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# INTERNATIONAL STANDARD

# ISO 10304-4

First edition  
1997-12-15

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## Water quality — Determination of dissolved anions by liquid chromatography of ions —

### Part 4:

Determination of chlorate, chloride and chlorite  
in water with low contamination

iTeh STANDARD PREVIEW

*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*

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Reference number  
ISO 10304-4:1997(E)

**ISO 10304-4:1997(E)****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.

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.

International Standard ISO 10304-4 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*.

ISO 10304 consists of the following parts, under the general title *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*
- *Part 2: Determination of bromide, chloride, nitrate, nitrite, orthophosphate and sulfate in waste water*
- *Part 3: Determination of chromate, iodide, sulfite, thiocyanate and thiosulfate*
- *Part 4: Determination of chlorate, chloride and chlorite in water with low contamination.*

Annexes A and B of this part of ISO 10304 are for information only.

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## 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].

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# Water quality — Determination of dissolved anions by liquid chromatography of ions —

## Part 4:

### Determination of chlorate, chloride and chlorite in water with low contamination

#### 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; $\lambda=207$ 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.*