

VEE KVALITEET. LAHUSTUNUD ANIOONIDE
MÄÄRAMINE
IOONVAHETUS-VEDELIKKROMATOOGRAAFIAT
KASUTADES. OSA 4: KLORAADI, KLORIIDI JA KLORITI
MÄÄRAMINE MADALA REOSTUSEGA VEES

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 10304-4:2022)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 10304-4:2022 sisaldab Euroopa standardi EN ISO 10304-4:2022 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 16.03.2022.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 10304-4:2022 consists of the English text of the European standard EN ISO 10304-4:2022.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 16.03.2022.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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EUROPEAN STANDARD

EN ISO 10304-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2022

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Supersedes EN ISO 10304-4:1999

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 10304-4:2022)

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 10304-4:2022)

Wasserbeschaffenheit - Bestimmung von gelösten
Anionen mittels Ionenchromatographie - Teil 4:
Bestimmung von Chlorat, Chlorid und Chlorit in gering
belastetem Wasser (ISO 10304-4:2022)

This European Standard was approved by CEN on 8 January 2022.

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

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European foreword

This document (EN ISO 10304-4:2022) has been prepared by Technical Committee ISO/TC 147 "Water quality" in collaboration with 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 September 2022, and conflicting national standards shall be withdrawn at the latest by September 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 10304-4:1999.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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Endorsement notice

The text of ISO 10304-4:2022 has been approved by CEN as EN ISO 10304-4:2022 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 230, *Water analysis*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 10304-4:1997), which has been technically revised. The main changes compared to the previous edition are as follows:

- in the introduction, all requirements concerning the application of the method have been deleted and moved to other clauses;
- in [Clause 2](#), all the references made but withdrawn since the publication of the 1997 edition (e.g. ISO 10304-2) have been deleted and the references ISO 5667-1 and ISO 5667-3 have been moved to the Bibliography;
- in [6.8](#), various eluent formulations have been reduced to one example;
- in [Clause 8](#), the calculation procedure for the peak resolution according to the USP definition [[Formula \(1\)](#)] has been completed with the EP definition [[Formula \(2\)](#)] (both calculations are equivalent);
- in [9.1](#), information that drinking water disinfection treatment using chlorine dioxide can cause the formation of chlorite and chlorate (paragraph 2) and helpful precautions to minimize/eliminate such formation (paragraph 3) have been added;
- in [Clause 11](#), the option to report result concentrations in microgram per litre has been added.

A list of all parts in the ISO 10304 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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

Part 4:

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

WARNING — Persons using this document should be familiar with normal laboratory practice. This document 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.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

1 Scope

This document 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).

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 Bibliography.

An appropriate pre-treatment 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 ^a	Detection
Chlorate	0,03 to 10	CD
Chloride	0,1 to 50	CD
Chlorite ^b	0,05 to 1	CD
	0,1 to 1	UV; $\lambda = 207 \text{ nm to } 220 \text{ nm}$
	0,01 to 1	AD; 0,4 V to 1,0 V

^a The working range is restricted by the ion-exchange capacity of the columns. If necessary, samples can be adjusted to this range by dilution.

^b The minimum working range for chlorite of 0,05 mg/l was obtained using calibration checks, but the interlaboratory trials (see [Table A.4](#)) showed that it is difficult to obtain this with sufficient accuracy, and only if taking great care.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8466-1, *Water quality — Calibration and evaluation of analytical methods — Part 1: Linear calibration function*