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SIST EN ISO 10304-1:1998

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EUROPEAN STANDARD

EN ISO 10304-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 1995

ICS 13.060.40

Descriptors: water, quality, water pollution, soluble matter, chemical analysis, determination of content, fluorides, chlorides, nitrites, orthophosphates, bromides, nitrates, sulphates, high performance liquid chromatography

English version

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 (ISO 10304-1:1992)

Qualité de l'eau - Dosage des ions fluorure, chlorure, nitrite, orthophosphate, bromure, nitrate et sulfate dissous, par chromatographie des ions en phase liquide - Partie 1: Méthode applicable pour les eaux faiblement contaminées (ISO 10304-1:1992)

Wasserbeschaffenheit - Bestimmung der gelösten Anionen Fluorid, Chlorid, Nitrit, Orthophosphat, Bromid, Nitrat und Sulfat mittels Ionenchromatographie - Teil 1: Verfahren für gering belastete Wasser (ISO 10304-1:1992)

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This European Standard was approved by CEN on 1994-11-03. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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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Ref. No. EN ISO 10304-1:1995 E

Foreword

This European Standard has been taken over by the Technical Committee CEN/TC 230 "Water analysis" from the work of ISO/TC 147 "Water quality" of the International Organization for Standardization (ISO).

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 1995, and conflicting national standards shall be withdrawn at the latest by September 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Endorsement notice

The text of the International Standard ISO 10304-1:1992 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications 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 (including amendments).

| <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 |

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INTERNATIONAL STANDARD

ISO
10304-1

First edition
1992-11-15

**Water quality — Determination of dissolved
fluoride, chloride, nitrite, orthophosphate,
bromide, nitrate and sulfate ions, using liquid
chromatography of ions —**

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Part 1:
Method for water with low contamination

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*Qualité de l'eau — Dosage des ions fluorure, chlorure, nitrite,
orthophosphate, bromure, nitrate et sulfate dissous, par
chromatographie des ions en phase liquide —*

Partie 1: Méthode applicable pour les eaux faiblement contaminées



Reference number
ISO 10304-1:1992(E)

ISO 10304-1:1992(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 10304-1 was prepared by Technical Committee ISO/TC 147, *Water quality*, Sub-Committee SC 2, *Physical, chemical, biochemical methods*.

ISO 10304 consists of the following parts, under the general title *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*
- *Part 2: Method for waste water*
- *Part 3: Determination of chromate, thiocyanate and thiosulfate*

Annex A of this part of ISO 10304 is for information only.

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International Organization for Standardization
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Introduction

Many different ion-exchange chromatography systems can be considered. It is therefore not appropriate to indicate the type of column, mobile phase, detector type etc. that is to be used. Thus detailed information is not given at any stage during the method, although guidance is provided. However, the quality parameters which should be met by the chromatography conditions chosen are defined.

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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

1 Scope

1.1 General

This part of ISO 10304 specifies a method for the determination of fluoride, chloride, nitrite, orthophosphate, bromide, nitrate and sulfate in water with low contamination (e.g. drinking water, rain water, ground water and surface water) in the following ranges:

| | |
|------------------------------------|----------------------|
| Fluoride (F): | 0,01 mg/l to 10 mg/l |
| Chloride (Cl): | 0,1 mg/l to 50 mg/l |
| Nitrite (NO ₂): | 0,05 mg/l to 20 mg/l |
| Orthophosphate (PO ₄): | 0,1 mg/l to 20 mg/l |
| Bromide (Br): | 0,05 mg/l to 20 mg/l |
| Nitrate (NO ₃): | 0,1 mg/l to 50 mg/l |
| Sulfate (SO ₄): | 0,1 mg/l to 100 mg/l |

NOTE 1 Anion symbols are used without charges throughout the text.

In certain cases, the range of application may be changed by variations in the working conditions (e.g. sample volume, dilution, separating columns, pre-concentration techniques, sensitivity ranges of detectors, etc.).

1.2 Interferences

1.2.1 Some organic acids, such as malonic acid, maleic acid and malic acid, may interfere in the determination of inorganic anions if they are present in high concentrations.

1.2.2 The determination of fluoride in particular is subject to interference by formic acid, acetic acid and carbonate, even at low concentrations.

1.2.3 Cross sensitivity (lack of resolution) may occur in the case of large differences in concentration between the anions determined (F, Cl, NO₂, PO₄, Br, NO₃, SO₄).

1.2.4 The bromide and phosphate anions do not interfere in the working range specified, unless otherwise stated.

1.2.5 In a buffered eluent (e.g. carbonate/hydrogencarbonate), the determination will not be influenced by the sample pH in the range of pH 2 to pH 9.

1.2.6 The concentration ratios given in table 1 were checked experimentally for various representative conditions. No interferences could be observed when 50 µl of sample volume was used for the chromatographic analysis.

1.2.7 The information in 1.2.4 to 1.2.6 is valid only as long as the quality requirements of the separating column are fulfilled (see clause 6) and the electrical conductivity of the sample is less than 1 000 µS/cm (except fluoride: < 500 µS/cm). For natural samples, the peak resolution (*R*) needs to be better than 1,3 (see figure 3).

1.2.8 Solid material and organic compounds (e.g. mineral oils, detergents and humic acids) shorten the life-time of the separating column. They should therefore be removed from the sample prior to analysis (see clause 7).