



# SLOVENSKI STANDARD SIST EN ISO 19340:2018

01-junij-2018

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## Kakovost vode - Določevanje raztopljenega perklorata - Metoda z ionsko kromatografijo (IC) (ISO 19340:2017)

Water quality - Determination of dissolved perchlorate - Method using ion chromatography (IC) (ISO 19340:2017)

Wasserbeschaffenheit - Bestimmung von gelöstem Perchlorat - Verfahren mittels Ionenchromatographie (IC) (ISO 19340:2017)

Qualité de l'eau - Détermination du perchlorate dissous - Méthode par chromatographie ionique (IC) (ISO 19340:2017)

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**Ta slovenski standard je istoveten z: EN ISO 19340:2017**

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### **ICS:**

13.060.50	Preiskava vode na kemične snovi	Examination of water for chemical substances
71.040.50	Fizikalnokemijske analitske metode	Physicochemical methods of analysis

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EUROPEAN STANDARD

EN ISO 19340

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2017

ICS 13.060.50

English Version

## Water quality - Determination of dissolved perchlorate - Method using ion chromatography (IC) (ISO 19340:2017)

Qualité de l'eau - Détermination du perchlorate dissous  
- Méthode par chromatographie ionique (IC) (ISO  
19340:2017)

Wasserbeschaffenheit - Bestimmung von gelöstem  
Perchlorat - Verfahren mittels Ionenchromatographie  
(IC) (ISO 19340:2017)

This European Standard was approved by CEN on 7 October 2017.

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## European foreword

This document (EN ISO 19340:2017) 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of an identical text or by endorsement, at the latest by June 2018, and conflicting national standards shall be withdrawn at the latest by June 2018.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

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INTERNATIONAL  
STANDARD

ISO  
19340

First edition  
2017-10

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**Water quality — Determination of  
dissolved perchlorate — Method using  
ion chromatography (IC)**

*Qualité de l'eau — Détermination du perchlorate dissous — Méthode  
par chromatographie ionique (IC)*

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Reference number  
ISO 19340:2017(E)

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## ISO 19340:2017(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.

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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html). (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods*. [SIST EN ISO 19340:2018](https://standards.iteh.ai/catalog/standards/sist/c8d8c66e-458d-443b-9a2f-490a7097a987/sist-en-iso-19340-2018)  
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# Water quality — Determination of dissolved perchlorate — Method using ion chromatography (IC)

**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 and to determine the applicability of any other restrictions.

**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 dissolved perchlorate in water (e.g. drinking water, mineral water, raw water, surface water, partially treated water or swimming pool water, waste water from drinking/swimming pool water treatment plants).

Appropriate pre-treatment of the sample (e.g. matrix elimination) allows a direct determination of perchlorate  $\geq 1 \mu\text{g/l}$ .

The working range is restricted by the ion-exchange capacity of the separator column. Dilution of the sample to the working range can be necessary.

## 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 3696, *Water for analytical laboratory use — Specification and test methods*

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

ISO 8466-2, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 2: Calibration strategy for non-linear second-order calibration functions*

## 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

## 4 Interferences

Perchlorate is known to be susceptible to microbiological degradation in the absence of nitrate and by anaerobic bacteria (References [5] and [6]).

## ISO 19340:2017(E)

Any substance that has a retention time coinciding with perchlorate and producing a detector response can interfere. Co-elution can be solved by changing separator columns, eluent strength (e.g. gradient elution), modifying the eluent with organic solvents or by selective removal of the interference by sample pre-treatment.

Higher chloride, sulfate, nitrate, orthophosphate, hydrogen carbonate and carbonate concentrations (e.g. 1 g/l) can interfere with the determination of perchlorate (co-elution) or can have an impact on the retention time or the peak shape (distortion) or recovery of perchlorate. This effect can be checked for every matrix by standard addition and the recovery of perchlorate should be within 85 % to 115 %. Interferences can be reduced by sample dilution or with the aid of special cation exchangers (see [7.2](#) and [Clause 9](#)) or be resolved by the application of advanced inline cutting or re-injection techniques (see [Annexes A, B and C](#)).

Metals like iron or aluminium present in samples and eluent will bind to the resin material of the separator column or suppressor resulting in a loss of performance. Metal ions can be eliminated with the aid of special cation exchangers (see [Annex A](#) and [Clause 9](#)).

Solid particles and organic compounds (such as mineral oils, detergents and humic acids) shorten the lifetime of the pre-column and the separator column (see [Clause 9](#)).

## 5 Principle

The method requires the application of high-capacity separator columns which allow the injection of sample volumes, e.g. up to 4 ml.

If necessary, the sample is pre-treated in order to remove anions, metals, organics and solids (see [Clause 9](#)).

Measurement of perchlorate is performed with or without matrix elimination and with or without pre-concentration (see [10.3](#) and [Annexes A, B and C](#)).

Perchlorate is separated by ion chromatography (IC) with suppressed conductivity detection (CD).

As stationary phase, an anion exchange resin is used. Aqueous solutions of salts of monobasic acids and dibasic acids are used as eluents for isocratic or gradient elution e.g. carbonate-, hydrogen carbonate-, hydroxide-eluent and an organic modifier like acetone or acetonitrile ([6.3](#)).

Resolution,  $R$ , shall be checked to ensure that it complies with the required separation conditions ([8.1](#)).

The concentration of perchlorate is determined after a calibration according to ISO 8466-1 or ISO 8466-2.

Control experiments are necessary to check the validity of the calibration function. Replicate determinations can be necessary. The method of standard addition can be applied if matrix interferences are expected.

## 6 Reagents

Use only reagents of pro analysis grade free of compounds containing perchlorate. Weigh the reagents with an accuracy of  $\pm 1$  % of the nominal mass, unless stated otherwise. Prepare alternative concentrations or volumes of solutions as described in [6.3](#) to [6.5](#), if necessary. Alternatively, use commercially available solutions of the required concentration.

**6.1 Water**, ISO 3696, grade 1 and with a resistivity of  $\geq 18,2$  M $\Omega$  cm (25 °C).

**6.2 Sodium perchlorate**, NaClO<sub>4</sub>, > 99 %.