



# SLOVENSKI STANDARD SIST EN ISO 8199:2019

01-maj-2019

Nadomešča:  
SIST EN ISO 8199:2007

---

## Kakovost vode - Splošne zahteve in navodilo za mikrobiološke preiskave v kulturi (ISO 8199:2018)

Water quality - General requirements and guidance for microbiological examinations by culture (ISO 8199:2018)

Wasserbeschaffenheit - Allgemeine Anforderungen und Anleitung für mikrobiologische Untersuchungen mittels Kulturverfahren (ISO 8199:2018)

Qualité de l'eau - Exigences et lignes directrices générales pour les examens microbiologiques sur milieu de culture (ISO 8199:2018)

Ta slovenski standard je istoveten z: EN ISO 8199:2018

---

### **ICS:**

07.100.20	Mikrobiologija vode	Microbiology of water
13.060.45	Preiskava vode na splošno	Examination of water in general

**SIST EN ISO 8199:2019**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 8199:2019

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

EUROPEAN STANDARD

EN ISO 8199

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2018

ICS 07.100.20

English Version

## Water quality - General requirements and guidance for microbiological examinations by culture (ISO 8199:2018)

Qualité de l'eau - Exigences et lignes directrices  
générales pour les examens microbiologiques sur  
milieu de culture (ISO 8199:2018)

Wasserbeschaffenheit - Allgemeine Anforderungen und  
Anleitung für mikrobiologische Untersuchungen  
mittels Kulturverfahren (ISO 8199:2018)

This European Standard was approved by CEN on 6 September 2018.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword.....	3

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 8199:2019](https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019)  
<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

## European foreword

This document (EN ISO 8199:2018) 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 May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

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 8199:2007.

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.

**iTeh STANDARD PREVIEW**  
**Endorsement notice**  
**(standards.iteh.ai)**

The text of ISO 8199:2018 has been approved by CEN as EN ISO 8199:2018 without any modification.

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 8199:2019](#)

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

INTERNATIONAL  
STANDARD

ISO  
8199

Third edition  
2018-10

---

---

**Water quality — General requirements  
and guidance for microbiological  
examinations by culture**

*Qualité de l'eau — Exigences et lignes directrices générales pour les  
examens microbiologiques sur milieu de culture*

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 8199:2019](https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019)

[https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-  
d7cf68ccb7cb/sist-en-iso-8199-2019](https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019)



Reference number  
ISO 8199:2018(E)

© ISO 2018

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 8199:2019

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>



### **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland



# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vii</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Principle</b> .....	<b>4</b>
<b>5 General measurement requirements</b> .....	<b>4</b>
5.1 Uniformity of temperatures.....	4
5.2 Incubation times.....	4
5.3 Volumes and masses.....	4
<b>6 Diluents and culture media</b> .....	<b>5</b>
6.1 General.....	5
6.2 Quality requirements of ingredients.....	5
6.3 Diluents.....	5
<b>7 Sterilization and decontamination</b> .....	<b>5</b>
7.1 Sterilization of apparatus and glassware.....	5
7.2 Sterilization of consumables.....	6
7.3 Decontamination of glassware and materials after use.....	6
7.4 Waste management.....	6
<b>8 Samples and sample handling</b> .....	<b>6</b>
8.1 Sampling.....	6
8.2 Sample preparation.....	7
8.2.1 Waters and other aqueous matrices.....	7
8.2.2 Swabs.....	7
<b>9 Enumeration (quantitative) methods</b> .....	<b>8</b>
9.1 Inoculation of test portions in (or on) solid media.....	8
9.1.1 General.....	8
9.1.2 Pour plate technique.....	8
9.1.3 Spread plate technique.....	9
9.1.4 Membrane filtration technique.....	10
9.1.5 Incubation.....	12
9.1.6 Counting and confirmation from solid media.....	12
9.1.7 General guidance for calculation of results.....	13
9.1.8 Expression of results.....	14
9.2 Enumeration using a liquid medium.....	24
9.2.1 General.....	24
9.2.2 Procedure.....	25
9.2.3 Choice of inoculation system.....	25
9.2.4 Incubation.....	26
9.2.5 Interpretation of results.....	26
9.2.6 Uncertainty of test results.....	27
9.2.7 Determination of MPN values.....	27
<b>10 Detection (qualitative) methods</b> .....	<b>30</b>
10.1 General.....	30
10.2 Procedure.....	31
10.3 Uncertainty of test results.....	31
<b>11 Performance characteristics of methods</b> .....	<b>31</b>
<b>12 Analytical quality control</b> .....	<b>32</b>
12.1 General.....	32

## ISO 8199:2018(E)

12.2	Internal quality control.....	32
12.2.1	General.....	32
12.2.2	Process controls.....	32
12.3	External quality assessment.....	33
<b>Annex A (informative) Criteria for the choice of technique.....</b>		<b>35</b>
<b>Annex B (informative) Confidence intervals for colony count technique and choice of method of calculation in special cases.....</b>		<b>40</b>
<b>Annex C (normative) Counting and calculations with two Petri dishes per dilution.....</b>		<b>44</b>
<b>Annex D (normative) Composition, preparation and performance testing of diluents.....</b>		<b>51</b>
<b>Bibliography.....</b>		<b>55</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 8199:2019

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

## 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 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 4, *Microbiological methods*.

This third edition cancels and replaces the second edition (ISO 8199:2005), which has been technically revised. The main changes compared with the previous edition are as follows.

- Clauses have been added for terms and definitions, detection (qualitative) methods, performance characteristics and analytical quality control (AQC).
- The clauses referencing culture media and diluent preparation and QC have been revised to align with ISO 11133 and have been included in a new [Annex D](#).
- The subclause on general guidance for the calculation of results for solid media techniques has been updated to reflect the changes in ISO 7218:2007/Amd.1:2013<sup>[9]</sup> on which the relevant clauses and subclauses in the second edition were based. Modifications have been made, however, to take account of water microbiology techniques (e.g. membrane filtration) and to allow for dilutions other than ten-fold dilutions.
- [Annex B](#) has been added to give guidance on confidence intervals when calculating special cases, relating to the update of the subclause on general guidance for the calculation of results for solid media techniques.
- [Annex C](#) has been added to describe calculations when using duplicate dishes per dilution, relating to the update of the subclause on general guidance for the calculation of results for solid media techniques.
- The subclause relating to enumeration using liquid media had been expanded and includes additional guidance on the use of MPN calculators. The former [Annex B](#) containing MPN tables has been removed.
- The title of this document has been amended to reflect these changes.

**ISO 8199:2018(E)**

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](http://www.iso.org/members.html).

**iTeh STANDARD PREVIEW  
(standards.iteh.ai)**

SIST EN ISO 8199:2019

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

## Introduction

Techniques for the detection and enumeration of microorganisms based on their ability to grow on or in specified culture media are an important and widely used means of assessing the microbiological quality of water. The purpose of this document is to gather in a single document the information common to the various techniques. This reduces repetition of technical details in individual standards and facilitates choice of the technique most suitable for a particular situation. Other guidance has been included on general topics of relevance to these techniques, such as analytical quality control, method performance characteristics and uncertainty of test results.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 8199:2019](https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019)

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 8199:2019

<https://standards.iteh.ai/catalog/standards/sist/7fc4a432-9437-401b-a120-d7cf68ccb7cb/sist-en-iso-8199-2019>

# Water quality — General requirements and guidance for microbiological examinations by culture

**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 according to this document be carried out by suitably trained staff.

## 1 Scope

This document specifies requirements and gives guidance for performing the manipulations common to each culture technique for the microbiological examination of water, particularly the preparation of samples, culture media, and general apparatus and glassware, unless otherwise required in the specific standard. It also describes the various techniques available for detection and enumeration by culture and the criteria for determining which technique is appropriate.

This document is mainly intended for examinations for bacteria, yeasts and moulds, but some aspects are also applicable to bacteriophages, viruses and parasites. It excludes techniques not based on culturing microorganisms, such as polymerase chain reaction (PCR) methods.

## 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 7704, *Water quality — Evaluation of membrane filters used for microbiological analyses*

ISO 11133, *Microbiology of food, animal feed and water — Preparation, production, storage and performance testing of culture media*

ISO 19458, *Water quality — Sampling for microbiological analysis*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

### 3.1

#### accuracy

closeness of agreement between a test result and the accepted reference value

[SOURCE: ISO 6107-8:1993, 1, modified — The note has been deleted.]