

AS 4276.1:2021



# Water microbiology

**Method 1: Water quality — General requirements and guidance for microbiological examinations by culture (ISO 8199:2018, MOD)**



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- ACT Health Directorate
- Australian Society for Microbiology
- Australian Water Association
- Chemistry Australia
- National Association of Testing Authorities Australia
- National Measurement Institute
- NSW Health
- PathWest Laboratory Medicine WA
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# Water microbiology

## Method 1: Water quality — General requirements and guidance for microbiological examinations by culture (ISO 8199:2018, MOD)

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## Preface

This Standard was prepared by the Standards Australia Committee FT-020, Water Microbiology, to supersede AS/NZS 4276.1—2007, *Water microbiology, Method 1: General information and procedures (ISO 8199:2005, MOD)*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to specify requirements and give 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 Standard 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.

This Standard is an adoption with national modifications, and has been reproduced from, ISO 8199:2018, *Water quality — General requirements and guidance for microbiological examinations by culture*. The modifications are additional requirements and are set out in [Appendix ZZ](#), which has been added at the end of the source text.

[Appendix ZZ](#) lists the variations to ISO 8199:2018 for the application of this Standard in Australia.

As this Standard is reproduced from an International Standard, a full point substitutes for a comma when referring to a decimal marker.

The other international reference has not been adopted as an Australian Standard.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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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](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.

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).

## 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.

## NOTES

# Australian Standard®

## Water microbiology

### Method 1: Water quality — General requirements and guidance for microbiological examinations by culture (ISO 8199:2018, MOD)

**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.]