

<b>STN</b>	<b>Stanovenie úplnej aeróbnej biodegradability plastových materiálov vo vodnom prostredí Metóda merania spotreby kyslíka v uzavretom respirometri (ISO 14851: 2019)</b>	<b>STN EN ISO 14851</b>  64 8001
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Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium - Method by measuring the oxygen demand in a closed respirometer (ISO 14851:2019)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 10/19

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Oznámením tejto normy sa ruší  
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EUROPEAN STANDARD

**EN ISO 14851**

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English Version

Determination of the ultimate aerobic biodegradability of  
plastic materials in an aqueous medium - Method by  
measuring the oxygen demand in a closed respirometer  
(ISO 14851:2019)

Évaluation de la biodégradabilité aérobie ultime des  
matériaux plastiques en milieu aqueux - Méthode par  
détermination de la demande en oxygène dans un  
respiromètre fermé (ISO 14851:2019)

Bestimmung der vollständigen aeroben  
Bioabbaubarkeit von Kunststoff-Materialien in einem  
wässrigen Medium - Verfahren mittels Messung des  
Sauerstoffbedarfs in einem geschlossenen  
Respirometer (ISO 14851:2019)

This European Standard was approved by CEN on 12 March 2019.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

**EN ISO 14851:2019 (E)**

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## **European foreword**

This document (EN ISO 14851:2019) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 "Plastics" the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.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.

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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**

The text of ISO 14851:2019 has been approved by CEN as EN ISO 14851:2019 without any modification.

# INTERNATIONAL STANDARD

# ISO 14851

Second edition  
2019-03

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## **Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium — Method by measuring the oxygen demand in a closed respirometer**

*Évaluation de la biodégradabilité aérobie ultime des matériaux plastiques en milieu aqueux — Méthode par détermination de la demande en oxygène dans un respiromètre fermé*



Reference number  
ISO 14851:2019(E)

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Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
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# ISO 14851:2019(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)).

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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).

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 14, *Environmental aspects*.

This second edition cancels and replaces the first edition (ISO 14851:1999), which has been technically revised. It also incorporates the Technical Corrigendum ISO 14851:1999/Cor.1:2005. The main changes compared to the previous edition are as follows:

- the footnotes have been renumbered;
- in [Annex C](#), errors in the key to [Figure C.1](#) have been corrected and minor improvements made to the figure itself;
- in scope and [Clause 8](#), soil and compost have been excluded for the inoculums used in this document;

- in [8.4](#), numbers of test flask for the test material and blank control have been changed from two to three;
- references in this document have been updated for latest active version;
- the Bibliography has been updated.

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).

**ISO 14851:2019(E)****Introduction**

With the increasing use of plastics, their recovery and disposal have become a major issue. As a first priority, recovery is promoted. Complete recovery of plastics, however, is difficult. For example, plastic litter, which comes mainly from consumers, is difficult to recover completely. Additional examples of plastics which are difficult to recover are fishing tackle, plastic microbeads in personal care products and water-soluble polymers. These plastic materials tend to leak from closed waste-management cycles into the environment. Biodegradable plastics are now emerging as one of the options available to solve such environmental problems. Plastic materials, such as products or packaging, which are sent to composting facilities are expected to be potentially biodegradable. Therefore, it is very important to determine the potential biodegradability of such materials and to obtain an indication of their biodegradability in natural environments.

# Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium — Method by measuring the oxygen demand in a closed respirometer

**WARNING** — Sewage, activated sludge, soil and compost may contain potentially pathogenic organisms. Therefore, appropriate precautions should be taken when handling them. Toxic test compounds and those whose properties are unknown should be handled with care.

## 1 Scope

This document specifies a method, by measuring the oxygen demand in a closed respirometer, for the determination of the degree of aerobic biodegradability of plastic materials, including those containing formulation additives. The test material is exposed in an aqueous medium under laboratory conditions to an inoculum from activated sludge.

If an unadapted activated sludge is used as the inoculum, the test simulates the biodegradation processes which occur in a natural aqueous environment; if a mixed or pre-exposed inoculum is used, the method is used to investigate the potential biodegradability of a test material.

The conditions used in this document do not necessarily correspond to the optimum conditions allowing maximum biodegradation to occur, but this document is designed to determine the potential biodegradability of plastic materials or give an indication of their biodegradability in natural environments.

The method enables the assessment of the biodegradability to be improved by calculating a carbon balance (optional, see [Annex E](#)).

The method applies to the following materials.

- Natural and/or synthetic polymers, copolymers or mixtures thereof.
- Plastic materials which contain additives such as plasticizers, colorants or other compounds.
- Water-soluble polymers.
- Materials which, under the test conditions, do not inhibit the microorganisms present in the inoculum. Inhibitory effects can be determined using an inhibition control or by another appropriate method (see, for example, ISO 8192[2]). If the test material is inhibitory to the inoculum, a lower test concentration, another inoculum or a pre-exposed inoculum can be used.

## 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 8245, *Water quality — Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)*

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