

Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions - Method by analysis of evolved carbon dioxide - Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test (ISO 14855-2:2018)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 14855-2:2018 sisaldab Euroopa standardi EN ISO 14855-2:2018 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 14855-2:2018 consists of the English text of the European standard EN ISO 14855-2:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 22.08.2018.	Date of Availability of the European standard is 22.08.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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ICS 83.080.01

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English Version

Determination of the ultimate aerobic biodegradability of  
plastic materials under controlled composting conditions -  
Method by analysis of evolved carbon dioxide - Part 2:  
Gravimetric measurement of carbon dioxide evolved in a  
laboratory-scale test (ISO 14855-2:2018)

Détermination de la biodégradabilité aérobie ultime  
des matériaux plastiques dans des conditions  
contrôlées de compostage - Méthode par analyse du  
dioxyde de carbone libéré - Partie 2: Mesurage  
gravimétrique du dioxyde de carbone libéré lors d'un  
essai de laboratoire (ISO 14855-2:2018)

Bestimmung der vollständigen aeroben  
Bioabbaubarkeit von Kunststoff-Materialien unter den  
Bedingungen kontrollierter Kompostierung -  
Verfahren mittels Analyse des freigesetzten  
Kohlenstoffdioxides - Teil 2: Gravimetrische Messung  
des freigesetzten Kohlenstoffdioxides im  
Labormaßstab (ISO 14855-2:2018)

This European Standard was approved by CEN on 21 August 2018.

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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.

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

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## European foreword

This document (EN ISO 14855-2:2018) 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 February 2019, and conflicting national standards shall be withdrawn at the latest by February 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 14855-2:2009.

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 14855-2:2018 has been approved by CEN as EN ISO 14855-2:2018 without any modification.

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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)).

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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 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 61, *Plastics*, Subcommittee SC 14, *Plastics and environment*.

This second edition cancels and replaces the first edition (ISO 14855-2:2007), which has been technically revised. It also incorporates the Technical Corrigendum ISO 14855-2:2007/Cor.1:2009.

The main changes compared to the previous edition are as follows.

- The correct values for the particle size of soda talc given in the Technical Corrigendum 1 ISO 14855-2:2007/Cor.1:2009 have been adopted.
- The following numbers of composting vessels have been provided:
  - a) three test vessels for the test mixture;
  - b) three vessels for blank controls;
  - c) three vessels for checking inoculum activity using a reference material.
- The next criterion has been added to the list of validity criteria in [Clause 10](#):
  - c) the inoculum in the blank has produced more than 50 mg but less than 150 mg of carbon dioxide per gram of volatile solids (mean values) after 10 days of incubation.

A list of all parts in the ISO 14855 series can be found on the ISO website.

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

Management of plastics waste is a serious problem in the world. Plastics recovery technologies include material recovery (mechanical recycling, chemical or feedstock recycling, and biological or organic recycling) and energy recovery (heat, steam or electricity as a substitute for fossil fuels or other fuel resources). The use of biodegradable plastics is one valuable recovery option (biological or organic recycling).

Several ISO standards for determining the ultimate aerobic/anaerobic biodegradability of plastic materials have been published. In particular, ISO 14855-1 is a common test method that measures the amount of carbon dioxide evolved using methods such as continuous infrared analysis, gas chromatography or titration.

Compared with ISO 14855-1, the amounts of compost inoculum and test sample used in this document are one-tenth the size. In order to ensure the activity of the compost inoculum, inert material that gives the mixture the same texture as soil is mixed into the inoculum. The carbon dioxide evolved from the test vessel is determined by absorbing it in a carbon dioxide trap and carrying out gravimetric analysis of the absorbent. The method described in this document, which uses a closed system to capture the carbon dioxide evolved, can also be used to obtain valuable information, by means of isotopic-labelling studies, on the way in which the molecular structure of co-polymers degrades.

# Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide —

## Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test

**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 for determining the ultimate aerobic biodegradability of plastic materials under controlled composting conditions by gravimetric measurement of the amount of carbon dioxide evolved. The method is designed to yield an optimum rate of biodegradation by adjusting the humidity, aeration and temperature of the composting vessel.

The method applies to the following materials:

- natural and/or synthetic polymers and copolymers, and mixtures of these;
- plastic materials that contain additives such as plasticizers or colorants;
- water-soluble polymers;
- materials that, under the test conditions, do not inhibit the activity of microorganisms present in the inoculum.

If the test material inhibits microorganisms in the inoculum, another type of mature compost or pre-exposure compost 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 11721-1, *Textiles — Determination of resistance of cellulose-containing textiles to micro-organisms — Soil burial test — Part 1: Assessment of rot-retardant finishing*

ISO 14855-1, *Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide — Part 1: General method*

### 3 Terms and definitions

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