Plastid. Põlevusomaduste määramine hapnikuarvu abil. Osa 2: Katsetamine toatemperatuuril

Plastics - Determination of burning behaviour by oxygen index - Part 2: Ambient-temperature test

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN ISO 4589-2:2000 sisaldab Euroopa standardi EN ISO 4589-2:1999 ingliskeelset teksti. Käesolev dokument on jõustatud 11.01.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN ISO 4589-2:2000 consists of the English text of the European standard EN ISO 4589-2:1999. This document is endorsed on 11.01.2000 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This part of ISO 4589 specifies methods for determining the minimum concentration of oxygen, in admixture with nitrogen, that will support combustion of small vertical test specimens under specified test conditions. The results are defined as oxygen index values.	**Scope:** This part of ISO 4589 specifies methods for determining the minimum concentration of oxygen, in admixture with nitrogen, that will support combustion of small vertical test specimens under specified test conditions. The results are defined as oxygen index values.

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Võtmesõnad: determination, fire tests, flammability testing, oxygen index, plastics, test equipment, tests

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English version

Plastics – Determination of burning behaviour by oxygen index

Part 2: Ambient-temperature test
(ISO 4589-2 : 1996)

Plastiques – Détermination du comportement au feu au moyen de l'indice d'oxygène – Partie 2: Essai à la température ambiante (ISO 4589-2 : 1996)

Kunststoffe – Bestimmung des Brennverhaltens durch den Sauerstoff-Index – Teil 2: Prüfung bei Umgebungstemperatur (ISO 4589-2 : 1996)

This European Standard was approved by CEN on 1999-05-06.

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
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Europäisches Komitee für Normung

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Foreword

International Standard

ISO 4589-2 : 1996 Plastics – Determination of burning behaviour by oxygen index – Part 2: Ambient-temperature test,

which was prepared by ISO/TC 61 'Plastics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 249 'Plastics', the Secretariat of which is held by IBN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by December 1999 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 4589-2 : 1996 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

Contents

1 Scope

This part of ISO 4589 specifies methods for determining the minimum concentration of oxygen, in admixture with nitrogen, that will support combustion of small vertical test specimens under specified test conditions. The results are defined as oxygen index values.

Methods are provided for testing materials that are self-supporting in the form of vertical bars or sheet up to 10,5 mm thick. These methods are suitable for solid, laminated or cellular materials characterized by an apparent density greater than 100 kg/m^3. The methods may also be applicable to some cellular materials having an apparent density of less than 100 kg/m^3. A method is provided for testing flexible sheet or film materials while supported vertically.

For comparative purposes, a procedure is provided for determining whether or not the oxygen index of a material lies above some specified minimum value.

Oxygen index results obtained using the methods described in this part of ISO 4589 can provide a sensitive measure of the burning characteristics of materials under certain controlled laboratory conditions, and hence may be useful for quality control purposes. The results obtained are dependent upon the shape, orientation and isolation of the test specimen and the conditions of ignition. For particular materials or applications, it may be necessary or appropriate to specify different test conditions. Results obtained from test specimens of differing thickness or by using different ignition procedures may not be comparable and no correlation with flammability behaviour under other fire conditions is implied.

Results obtained in accordance with this part of ISO 4589-2 must not be used to describe or appraise the fire hazard presented by a particular material or shape under actual fire conditions, unless used as one element of a fire risk assessment that takes into account all of the factors pertinent to the assessment of the fire hazard of a particular application for the material.

NOTES

1 It may not be possible to apply these methods satisfactorily to materials that exhibit high levels of shrinkage when heated, e.g. highly oriented thin film.

2 For assessing the flame propagation properties of cellular materials of density < 100 kg/m^3, attention is drawn to the method of ISO 3582:1978, *Cellular plastic and cellular rubber materials — Laboratory assessment of horizontal burning characteristics of small specimens subjected to a small flame*, for testing horizontal burning characteristics.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4589. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4589 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 293:1986, *Plastics — Compression moulding test specimens of thermoplastic materials.*

ISO 294:1995, *Plastics — Injection moulding of test specimens of thermoplastic materials.*

ISO 295:1991, *Plastics — Compression moulding of test specimens of thermosetting materials.*

ISO 2818:1994, *Plastics — Preparation of test specimens by machining.*

ISO 2859-1:1989, *Sampling procedures for inspection by attributes — Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection.*

ISO 2859-2:1985, *Sampling procedures for inspection by attributes — Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection.*

ISO 3167:1993, *Plastics — Multipurpose test specimens.*

3 Definition

For the purposes of this part of ISO 4589, the following definition applies.

3.1 oxygen index: The minimum concentration of oxygen, by volume percentage, in a mixture of oxygen and nitrogen introduced at 23 °C ± 2 °C that will just support combustion of a material under specified test conditions.

4 Principle

A small test specimen is supported vertically in a mixture of oxygen and nitrogen flowing upwards through a transparent chimney. The upper end of the specimen is ignited and the subsequent burning behaviour of the specimen is observed to compare the period for which burning continues, or the length of specimen burnt, with specified limits for such burning. By testing a series of specimens in different oxygen concentrations, the minimum oxygen concentration is estimated (see 8.6).

Alternatively, for comparison with a specified minimum oxygen index value, three test specimens are tested using the relevant oxygen concentration, at least two of which are required to extinguish before any relevant burning criterion is exceeded.

5 Apparatus

5.1 Test chimney, consisting of a heat-resistant glass tube supported vertically on a base through which oxygen-containing gas mixtures can be introduced (see figures 1 and 2).

The preferred dimensions of the chimney are 450 mm minimum height and 95 mm minimum diameter.

The upper outlet shall be restricted as necessary by an overhead cap having an outlet small enough to produce an exhaust velocity of at least 90 mm/s from that outlet.

NOTE 3 A cap converging to an outlet of 40 mm diameter at a level at least 10 mm above the top of the cylindrical chimney has been found satisfactory.

Chimneys of other dimensions, with or without restricted outlets, may be used, if shown to give equivalent results. The bottom of the chimney, or the base upon which the chimney is supported, shall incorporate a device for distributing evenly the gas mixture entering the chimney. The preferred device comprises a suitable diffuser and a mixing chamber with metal foil. Other devices, such as radial manifolds, may be used, if shown to give equivalent results. A porous screen may be mounted below the level of the specimen holder, to prevent falling combustion debris from fouling the gas entry and distribution paths.

The chimney support may incorporate a levelling device and indicator, to facilitate vertical alignment of the chimney and a test specimen supported therein. A dark background may be provided to facilitate observation of flames within the chimney.

5.2 Test specimen holder, suitable for supporting a specimen vertically in the centre of the chimney.

For self-supporting materials, the specimen shall be held by a small clamp which is at least 15 mm away from the nearest point at which the specimen may burn before the extent-of-burning criterion is exceeded. For supported film or sheet test specimens, the specimen shall be supported by both vertical edges in a frame equivalent to that illustrated by figure 2, with reference marks at 20 mm and 100 mm below the top of the frame.

The profile of the holder and its support should preferably be smooth to minimize induction of turbulence in the rising flow gas.