

Plastics — Determination of burning behaviour by oxygen index —

Part 2: Ambient-temperature test

The European Standard EN ISO 4589-2:1999, with the incorporation of Amendment A1:2006, has the status of a British Standard

ICS 83.080

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PRI/26, Burning behaviour of plastics and rubbers, upon which the following bodies were represented:

- Association of Building Component Manufacturers
- Association of Manufacturers of Domestic Electrical Appliances
- British Cable Makers Confederation
- British Electrical Systems Association (BEAMA Ltd.)
- British Plastics Federation
- British Railways Board
- Department of the Environment (Building Research Establishment)
- Electrical and Electronic Insulation Association (BEAMA Ltd.)
- Electrical Installation Equipment Manufacturers Association (BEAMA Ltd.)
- Electricity Association
- ERA Technology Ltd.
- Federation of the Electronics Industry
- GAMBICA (BEAMA Ltd.)
- Lighting Industry Federation Ltd.
- Ministry of Defence
- National Supervising Inspectorate
- RAPRA Technology Ltd.
- Society of British Aerospace Companies Limited
- University of Ulster
- Warrington Fire Research Centre

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on 15 December 1996

© BSI September 2006

The following BSI references relate to the work on this standard:
Committee reference PRI/26
Draft for comment 92/46504 DC

ISBN 0 580 26600 1

Amendments issued since publication

Amd. No.	Date	Comments
10627	October 1999	Implementation of the European Standard
16415	September 2006	See national foreword

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	iii
Text of ISO 4589-2	1

National foreword

This British Standard is the official English language version of EN ISO 4589-2:1999, including amendment A1:2006.

ISO 4589-2:1996 is a revision of ISO 4589:1984 which was adopted in the UK as BS 2782-1: Method 141:1986 and which is now superseded.

The start and finish of text introduced or altered by ISO amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by **A1** **A1**.

This British Standard is published under the direction of the Sector Board for Materials and Chemicals whose Technical Committee PRI/26 has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

NOTE International and European Standards, as well as overseas standards, are available from Customer Services, BSI, 389 Chiswick High Road, London W4 4AL.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to iv, pages 1 to 19, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

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 Brandverhaltens durch den Sauerstoff-Index — Teil 2: Bestimmung des Sauerstoff-Index (OI) bei Umgebungstemperatur
(ISO 4589-2:1996)

This European Standard was approved by CEN on 6 May 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

The text of the International Standard from Technical Committee ISO/TC 61, Plastics, of the International Organization for Standardization (ISO) has been taken over as a European Standard by Technical Committee CEN/TC 249, Plastics, the Secretariat of which is held by IBN.

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 December 1999, and conflicting national standards shall be withdrawn at the latest by December 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

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

Foreword to amendment A1

The text of ISO 4589-2:1996/Amd 1:2005 has been prepared by Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 4589-2:1999/A1:2006 by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

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 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 4589-2:1996/Amd 1:2005 has been approved by CEN as EN ISO 4589-2:1999/A1:2006 without any modifications.

INTERNATIONAL STANDARD

**ISO
4589-2**

First edition
1996-07-15

Plastics — Determination of burning behaviour by oxygen index —

Part 2: Ambient-temperature test

*Plastiques — Détermination du comportement au feu au moyen de
l'indice d'oxygène —*

Partie 2: Essai à la température ambiante



Contents

	Page
Foreword	iii
1 Scope	1
2 Normative references	1
3 Definition	1
4 Principle	1
5 Apparatus	2
6 Calibration of equipment	5
7 Preparation of test specimens	5
8 Procedure for determination of oxygen index	8
9 Calculations and expression of results	10
10 Procedure C — Comparison with a specified minimum value of the oxygen index (short procedure)	12
11 Test report	13
Annex A (normative) Calibration of equipment	14
Annex B (normative) Calculation of oxygen concentration	15
Annex C (informative) Typical test results sheet	15
Annex D (informative) Results obtained by interlaboratory trials on type VI specimens	17
Annex E Precision data obtained from an interlaboratory trial carried out in 1978–80	18
Annex ZA (normative) Normative references to international publications with their relevant European publications	19
Figure 1 — Diagram of typical apparatus for determination of oxygen index ³	
Figure 2 — Support frame for non-self-supporting test specimens	4
Figure 3 — Tool for preparing rolled-film specimens	6
Figure 4 — Rolled specimen	7
Table 1 — Equipment calibration frequencies	5
Table 2 — Test specimen dimensions	7
Table 3 — Criteria for oxygen index measurements	9
Table 4 — Values of k for calculating the oxygen index concentration from determinations made by Dixon's "up-and-down" method	11
Table 5 — Precision data	12
Table A.1 — Reference-material oxygen index values	14
Table D.1 — Precision data	17
Table E.1 — Estimated precision limits	18

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4589-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 4, *Burning behaviour*.

Together with parts 1 and 3 (see below), this part of ISO 4589 cancels and replaces ISO 4589:1984.

This revision has been prepared to introduce the following changes relative to the 1984 edition:

- a) to amplify the requirements for equipment calibration (see clause 6 and annex A);
- b) to reduce the permissible deviations for the gas flow rate through the chimney at 40 mm/s from ± 10 mm/s to ± 2 mm/s;
- c) to introduce a relatively short procedure, as procedure C, intended for use for comparison purposes, to determine whether or not the oxygen index of a material lies above a specified minimum value;
- d) to introduce a new specimen (form VI) and a corresponding procedure for testing of thin films. Precision data for the new procedure are given in an informative annex.

ISO 4589 consists of the following parts, under the general title *Plastics — Determination of burning behaviour by oxygen index*:

- *Part 1: Guidance*;
- *Part 2: Ambient-temperature test*;
- *Part 3: Elevated-temperature test*.

Annex A and annex B form an integral part of this part of ISO 4589. Annex C and annex D are for information only.

The text of ISO 4589-2:1996/Amd 1:2005 has been prepared by Technical Committee ISO/TC 61 “Plastics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 4589-2:1999/A1:2006 by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by IBN.

Foreword to amendment A1

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 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 4589-2:1996/Amd 1:2005 has been approved by CEN as EN ISO 4589-2:1999/A1:2006 without any modifications.