

Plastics — Smoke generation —

Part 2: Determination of optical density by a single chamber test

The European Standard EN ISO 5659-2:1998 has the status of a
British Standard

ICS 13.220.40; 83.080.01

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National foreword

This British Standard is the English language version of EN ISO 5659-2:1998. It is identical with ISO 5659-2:1994 and incorporates Technical Corrigendum 1 to that standard, issued 1997-03-01. It supersedes BS ISO 5659-2:1994 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/26, Burning behaviour of plastics and rubbers, which has the responsibility to:

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

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

Attention is drawn to the fact that CEN and CENELEC standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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, page 2, the ISO title page, pages ii to iv, pages 1 to 25 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Sector Committee for Materials and Chemicals, was published under the authority of the Standards Committee and comes into effect on 15 January 1999

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English version

Plastics — Smoke generation — Part 2: Determination of optical density by a single-chamber test

(ISO 5659-2:1994, including Technical Corrigendum 1:1997)

Plastiques — Production de fumée —
Partie 2: Détermination de la densité optique
par un essai en enceinte unique
(ISO 5659-2:1994, Rectificatif
Technique 1:1997 inclus)

Kunststoffe — Rauchentwicklung —
Teil 2: Bestimmung der optischen Dichte durch
Einkammerprüfung
(ISO 5659-2:1994, einschließlich
Technische Korrektur 1:1997)

This European Standard was approved by CEN on 12 June 1998.

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

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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 an 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 February 1999, and conflicting national standards shall be withdrawn at the latest by February 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 the United Kingdom.

Endorsement notice

The text of the International Standard ISO 5659-2:1994, including Technical Corrigendum 1:1997 has been approved by CEN as a European Standard without any modification.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

INTERNATIONAL STANDARD

ISO
5659-2

First edition
1994-12-15

Plastics — Smoke generation —

Part 2:

Determination of optical density by a
single-chamber test

Plastiques — Production de fumée —

*Partie 2: Détermination de la densité optique par un essai en enceinte
unique*



Reference number

ISO 5659-2:1994/15



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Descriptors: Plastics, tests, high temperature tests, determination, smoke generation, test equipment, specimen preparation.

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 5659-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 4, *Burning behaviour*.

ISO 5659 consists of the following parts, under the general title *Plastics — Smoke generation*:

- *Part 1: Guidance*;
- *Part 2: Determination of optical density by a single-chamber test*;
- *Part 3: Determination of optical density by dynamic flow*.

Annex A forms an integral part of this part of ISO 5659. Annex B and Annex C are for information only.

Introduction

Fire is a complex phenomenon: its development and its effects depend upon a number of interrelated factors. The behaviour of materials and products depends upon the characteristics of the fire, the method of use of the materials and the environment in which they are exposed (see also ISO/TR 3814 and ISO/IEC Guide 52).

A test such as is specified in this part of ISO 5659 deals only with a simple representation of a particular aspect of the potential fire situation, typified by a radiant heat source, and it cannot alone provide any direct guidance on behaviour or safety in fire. A test of this type may, however, be used for comparative purposes or to ensure the existence of a certain quality of performance (in this case smoke production) considered to have a bearing on fire behaviour generally. It would be wrong to attach any other meaning to results from this test.

The term “smoke” is defined in ISO/IEC Guide 52 as a visible suspension of solid and/or liquid particles in gases resulting from incomplete combustion. It is one of the first response characteristics to be manifested and should almost always be taken into account in any assessment of fire hazard as it represents one of the greatest threats to occupants of a building on fire.

The responsibility for the preparation of ISO 5659 was transferred during 1987 from ISO/TC 92 to ISO/TC 61 on the understanding that the scope and applicability of the standard for the testing of materials should not be restricted to plastics but should also be relevant to other materials where possible, including building materials.

The attention of all users of this test is drawn to the warnings which immediately precede the “Scope” clause.

WARNING

1 Avoidance of misleading inferences

This standard method of test should be used solely to measure and describe the properties of materials, products or systems in response to heat or flame under controlled laboratory conditions, and should not be considered or used by itself for describing or appraising the fire hazard of materials, products or systems under actual fire conditions or as the sole source on which regulations pertaining to smoke production can be based.

2 Avoidance of danger to test operators

So that suitable precautions to safeguard health are taken, the attention of all concerned in fire tests is drawn to the fact that harmful gases are evolved in combustion of test specimens. Care must also be taken during cleaning operations on the smoke chamber to avoid inhalation of fumes or skin-contact with smoke deposits.

Attention is drawn to the hazards arising from the hot radiator cone, and the use of a mains-voltage electricity supply.

A safety blow-out panel, as specified in 7.2.1.1, is essential for the protection of operators from the risk of explosion from sudden pressure surges.

1 Scope

1.1 This part of ISO 5659 specifies a method of measuring smoke production from the exposed surface of specimens of essentially flat materials, composites or assemblies not exceeding 25 mm in thickness when placed in a horizontal orientation and subjected to specified levels of thermal irradiance in a closed cabinet with or without the application of a pilot flame. This method of test is applicable to all plastics and may also be used for the evaluation of other materials (e.g. rubbers, textile-coverings, painted surfaces, wood and other building materials).

1.2 Values of optical density determined by this test are specific to the specimen or assembly material in the form and thickness tested, and are not to be considered inherent, fundamental properties.

1.3 The test is intended for use in research and development and not primarily as a basis for ratings for building codes or other purposes. No basis is provided for predicting the density of smoke which may be generated by the materials upon exposure to heat and flame under other exposure conditions, nor has any correlation been established with measurements derived from other test methods.

The fact that this test procedure excludes the effect of irritants on the eye should also be taken into account when applying the test results.

1.4 It is emphasized that smoke production from a material varies according to the irradiance level to which the specimen is exposed. In making use of the results of this method, it should be borne in mind that the results are based on exposure to the specific irradiance levels of 25 kW/m² and 50 kW/m².