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Plastics — Determination of the burning behaviour of horizontal and vertical specimens in contact with a small-flame ignition source

*Plastiques — Détermination du comportement au feu d'éprouvettes
horizontales et verticales au contact d'une petite flamme comme source
d'allumage*



Reference number

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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.

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 1210 was prepared by Technical Committee ISO/TC 61, *Plastics*, Sub-Committee SC 4, *Burning behaviour*.

This second edition cancels and replaces the first edition (ISO 1210:1982), of which it constitutes a technical revision.

Annex A of this International Standard is for information only.

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International Organization for Standardization

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Plastics — Determination of the burning behaviour of horizontal and vertical specimens in contact with a small-flame ignition source

1 Scope

1.1 This International Standard specifies a small-scale laboratory screening procedure for comparing the relative burning behaviour of vertically or horizontally oriented plastic specimens exposed to a small-flame ignition source.

1.2 This method of test determines the afterflame/afterglow times and damaged length of specimens. It is applicable to solid and cellular materials having an apparent density of not less than 250 kg/m^3 , determined in accordance with ISO 845. This method is not applicable to materials that shrink away from the applied flame without igniting.

1.3 The classification system described in annex A is intended for quality assurance and the preselection of component materials for products.

This system is not intended for assessment of the fire behaviour of building materials or furnishings. The method of test described may be used for the preselection acceptance of a material, providing positive results are obtained at the thickness equal to the smallest thickness used in the application.

NOTE 1 Test results are influenced by material components, e.g. pigments, fillers and fire-retardants, and properties such as the direction of anisotropy and molecular mass.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard

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 291:1977, *Plastics — Standard atmospheres for conditioning and testing*.

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

ISO 294:1975, *Plastics — Injection moulding test specimens of thermoplastic materials*.

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

ISO 845:1988, *Cellular plastics and rubbers — Determination of apparent (bulk) density*.

ISO 1043-1:1987, *Plastics — Symbols — Part 1: Basic polymers and their special characteristics*.

ISO 5725:1986, *Precision of test methods — Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests*.

ISO 10093:—¹⁾, *Plastics — Fire tests — Standard ignition sources*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 afterflame: Persistence of flaming of a material, under specified test conditions, after the ignition source has been removed.

3.2 afterflame time: The length of time for which a material continues to flame, under specified test

1) To be published.

conditions, after the ignition source has been removed.

3.3 afterglow: Persistence of glowing of a material, under specified test conditions, after cessation of flaming or, if no flaming occurs, after removal of the ignition source.

3.4 afterglow time: The time during which a material continues to glow, under specified test conditions, after cessation of flaming or after the ignition source has been removed.

4 Principle

A test specimen bar is supported horizontally or vertically by one end and the free end is exposed to a specified gas flame. The burning behaviour of the bar is assessed by measuring the linear burning rate (method A) or the afterflame/afterglow times (method B).

5 Significance of test

5.1 Tests made on a material under the conditions specified can be of considerable value in comparing the relative burning behaviour of different materials, in controlling manufacturing processes, or in assessing any change in burning characteristics prior to, or during use. The results obtained from this method are dependent on the shape, orientation and environment surrounding the specimen and on the conditions of ignition. Correlation with performance under actual service conditions is not implied.

5.2 Results obtained in accordance with this International Standard shall not be used to describe or appraise the fire hazard presented by a particular material or shape under actual fire conditions. Assessment for fire hazard requires consideration of such factors as: fuel contribution, intensity of burning (rate of heat release), products of combustion and environmental factors such as the intensity of source, orientation of exposed material and ventilation conditions.

5.3 Burning behaviour as measured by this test method is affected by such factors as density, any anisotropy of the material and the thickness of the specimen.

5.4 Certain materials may shrink from the applied flame without igniting. In this event, test results are not valid and additional test specimens will be required to obtain valid tests. If the test specimens continue to shrink from the applied flame without igniting, these materials are not suitable for evaluation by this method of test.

5.5 The burning behaviour of some plastic materials may change with time. It is accordingly advisable to make tests before and after ageing by an appropriate procedure. The preferred oven conditioning shall be 7 days at 70 °C. However, other ageing times and temperatures may be used by agreement between the interested parties and shall be noted in the test report.

5.6 The effect on the burning behaviour of additives, deterioration, and possible loss of volatile components are measurable using this method. Results obtained using this method may serve for comparing the relative performance of materials and can be helpful in material assessment.

6 Apparatus

6.1 Laboratory fume hood/cupboard, having an inside volume of at least 0,5 m³. The chamber shall permit observation and shall be draught-free, while permitting normal thermal circulation of air past the specimen during burning. For safety and convenience, it is desirable that this enclosure (which can be completely closed) be fitted with an evacuation device, such as an exhaust fan, to remove products of combustion, which may be toxic. However, it is important to be able to turn the device off during the actual test and start it again immediately after the test to remove the products of combustion.

NOTE 2 The amount of oxygen available to support combustion is naturally important for the conduct of these flame tests. For tests conducted by this method when burning times are protracted, chamber sizes less than 1 m³ may not provide accurate results.

6.2 Laboratory burner, as specified in ISO 10093, (ignition source P/PF2), having a barrel length of 100 mm ± 10 mm and an internal diameter of 9,5 mm ± 0,3 mm. Do not equip the barrel with an end attachment such as a stabilizer.

6.3 Ring stand, with clamps or the equivalent, adjustable for positioning of the specimen.

6.4 Timing device, accurate to 1 s.

6.5 Measuring scale, graduated in millimetres.

6.6 Supply of technical-grade methane gas, with regulator and meter for uniform gas flow.

NOTE 3 Other gas mixtures having a heat content of approximately 37 MJ/m³ have been found to provide similar results.

6.7 Desiccator, containing anhydrous calcium chloride or other drying agent.