



Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)¹

This standard is issued under the fixed designation D 2863; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope *

1.1 This test method covers a fire-test-response procedure. This test method describes a procedure for measuring the minimum concentration of oxygen that will just support flaming combustion in a flowing mixture of oxygen and nitrogen.

1.2 Methods are provided for testing materials that are structurally 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 15 kg/m³. The methods may also be applicable to some cellular materials having an apparent density of less than 15 kg/m³. A method is provided for testing flexible sheet or film materials while supported vertically.

NOTE 1—Although this test method has been found applicable for testing other materials, the precision of the test method has not been determined for these materials, or for specimen geometry's and test conditions outside those recommended herein.

1.3 This test method may be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and shall not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazards statement are given in Note 2.

NOTE 2—**Warning:** During the course of combustion, gases or vapors, or both, are evolved which may be hazardous to personnel.

NOTE 3—This test method and ISO 4589-2 are technically equivalent

when using the Type A gas measurement and control device accuracy as described in 6.4.

2. Referenced Documents

2.1 ASTM Standards:

D 618 Practice for Conditioning, Plastics and Electrical Insulating Materials for Testing²

D 1071 Test Methods for Volumetric Measurement of Gaseous Fuel Samples³

D 1622 Test Method for Apparent Density of Rigid Cellular Plastics²

D 2444 Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)⁴

D 4802 Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet⁵

E 176 Terminology of Fire Standards⁶

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁷

2.2 ISO Standards:

4589-2 Plastics—Determination of Flammability by Oxygen Index—Part 2, Ambient Temperatures⁸

7823-1 Poly(Methylmethacrylate) Sheets—Types, Dimensions and Characteristics—Part 1—Cast Sheets⁸

3. Terminology

3.1 Definitions:

3.1.1 *ignition*—for the purpose of this standard shall imply the initiation of flaming combustion.

3.1.2 *oxygen index (OI)*—the minimum concentration of oxygen determined by the method in 9.1, expressed as volume percent, in a mixture of oxygen and nitrogen that will just support flaming combustion of a material initially at 23 ± 2°C under the conditions of this test method.

3.1.3 Definitions of terms relating to fire are in accordance with Terminology E 176.

² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 05.05.

⁴ Annual Book of ASTM Standards, Vol 08.04.

⁵ Annual Book of ASTM Standards, Vol 08.03.

⁶ Annual Book of ASTM Standards, Vol 04.07.

⁷ Annual Book of ASTM Standards, Vol 14.02.

⁸ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.30 on Thermal Properties (Section D20.30).

Current edition approved July 10, 2000. Published October 2000. Originally published as D 2863 – 70. Last previous edition D 2863 – 97.