



Designation: D3014 – 19a

# Standard Test Method for Flame Height, Time of Burning, and Loss of Mass of Rigid Thermoset Cellular Plastics in a Vertical Position<sup>1</sup>

This standard is issued under the fixed designation D3014; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope\*

1.1 This is a fire-test-response standard. This test method covers a small-scale laboratory screening procedure for comparing relative extent and time of burning and loss of mass of rigid thermoset cellular plastics. This test method is to be used solely to establish relative burning characteristics.

1.1.1 This test method shall not be used for materials that drip or melt under the test conditions.

1.2 During the course of combustion, gases or vapors, or both, are evolved which are potentially hazardous to personnel. Adequate precautions shall be taken to protect the operator.

1.3 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. A specific precautionary statement is given in 1.2.*

1.4 *This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of materials, products, or assemblies under actual fire conditions.*

1.5 *Fire testing is inherently hazardous. Adequate safeguards for personnel and property shall be employed in conducting these tests.*

NOTE 1—There is no known ISO equivalent to this standard.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

<sup>1</sup> 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

Current edition approved Dec. 1, 2019. Published January 2020. Originally approved in 1973. Last previous edition approved in 2019 as D3014 - 19. DOI: 10.1520/D3014-19A.

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D883 Terminology Relating to Plastics

D1622 Test Method for Apparent Density of Rigid Cellular Plastics

D5025 Specification for Laboratory Burner Used for Small-Scale Burning Tests on Plastic Materials

E176 Terminology of Fire Standards

E456 Terminology Relating to Quality and Statistics

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E2935 Practice for Conducting Equivalence Testing in Laboratory Applications

2.2 *ISO Standard:*<sup>3</sup>

ISO 13943 Fire Safety—Vocabulary

## 3. Terminology

3.1 *Definitions*—For definitions of terms relating to plastics, the definitions in this test method are in accordance with Terminology D883. For terms relating to fire, the definitions in this test method are in accordance with Terminology E176 and ISO 13943. In case of conflict, the definitions given in Terminology E176 shall prevail. For terms relating to precision and bias and associated issues, the terms used in this test method are in accordance with the definitions in Terminology E456.

## 4. Summary of Test Method

4.1 The specimen is mounted by positioning the specimen in a vertical chimney with a glass front and ignited with a bunsen burner for 10 s. The height and duration of flame and the mass percent retained by the specimen are recorded.

## 5. Significance and Use

5.1 Tests made on rigid cellular materials in accordance with the conditions described by this test method can be of considerable value in comparing their burning characteristics.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

\*A Summary of Changes section appears at the end of this standard

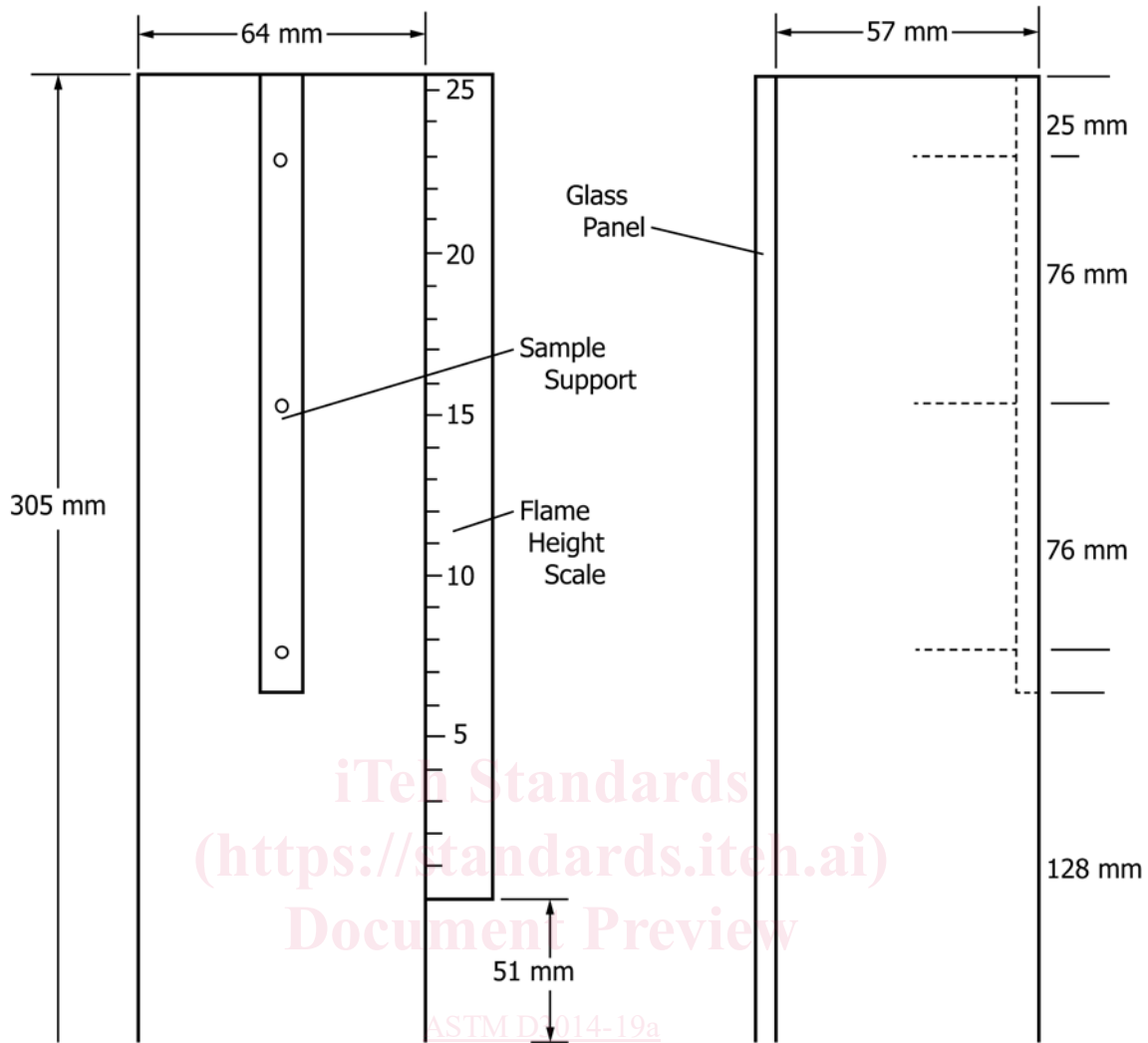


FIG. 1 Critical Dimensions of Chimney

5.2 This test method has been applied to flexible cellular materials and other plastics, but no detailed studies have been conducted to determine its general applicability to these materials.

5.3 In this procedure, the specimens are subjected to one or more specific sets of laboratory test conditions. If different test conditions are substituted or the end-use conditions are changed, it is not always possible by or from this test to predict changes in the fire-test-response characteristics measured. The results are therefore valid only for the fire-test-exposure conditions described in this procedure.

## 6. Apparatus

6.1 *Test Chimney*, conforming to the dimensions in Fig. 1. The body of the chimney shall be made of non-corroding metal. Fastened into the chimney is an insert made of 0.025-mm thick aluminum foil. The insert shall be held in place by a stainless steel channel that carries three pins to support the specimen. A heat-resistant glass panel forms the front wall of the chimney (see Figs. 2 and 3). A scale, in millimeters, graduated at 10-mm intervals shall be provided at

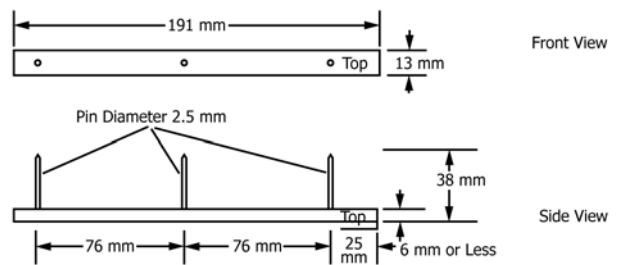


FIG. 2 Critical Dimensions of Specimen Support

one side of the glass panel for determining flame height (see Fig. 1 and Fig. 4). The scale shall begin from a height of 51 mm above the bottom of the chimney.

6.2 *Timer*, capable of measuring to the nearest 0.1 s for determining the duration of burning.

6.3 *Burner*—A standard gas burner with a 9.5-mm inside diameter barrel capable of producing a flame with an inner cone temperature of  $960 \pm 5^\circ\text{C}$  is required to ignite the specimens. See Specification D5025 for burner construction.