



Designation: E2726/E2726M – 12

# Standard Test Method for Evaluating the Fire-Test-Response of Deck Structures to Burning Brands<sup>1</sup>

This standard is issued under the fixed designation E2726/E2726M; 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 test method determines the fire-test-response characteristics of deck structures attached to or in close proximity to primary structures. The burning brand exposures test is intended to determine the surface spread of flame and degradation modes of decking materials when exposed to a burning brand on the upper surface of a deck structure.

1.2 The use of paints, coatings, stains, or other surface treatments for fire protection purposes are beyond the scope of this test method. This test method excludes the use of paints, stains, or coatings for this fire-test-response determination.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

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 the materials, products, or assemblies under actual fire conditions.*

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

1.6 *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.*

## 2. Referenced Documents

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

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the direct responsibility of Subcommittee E05.14 on External Fire Exposures.

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<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.

D2898 Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing

D6662 Specification for Polyolefin-Based Plastic Lumber Decking Boards

D7032 Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)

E84 Test Method for Surface Burning Characteristics of Building Materials

E108 Test Methods for Fire Tests of Roof Coverings

E176 Terminology of Fire Standards

2.2 ICC Evaluation Services, Inc.<sup>3</sup>

AC 109 Acceptance Criteria for Thermoplastic Composite Lumber Products

AC 174 Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology E176.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *deck structure, n*—exterior structures comprised of deck boards or panels, stair treads, risers, and landings of decks, porches, and balconies.

3.2.2 *test material, n*—members that constitute the exposed surface of the deck structures.

## 4. Significance and Use

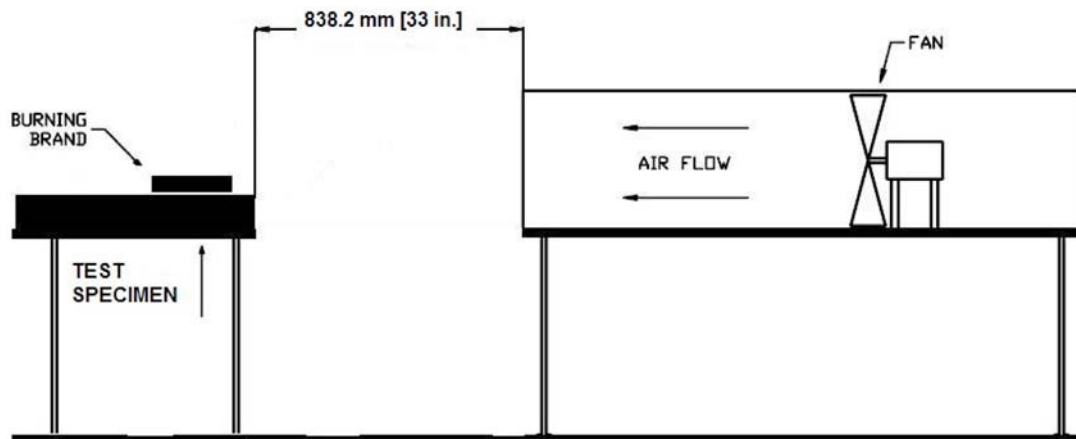
4.1 This test method is intended to establish the test protocol for decking materials and systems. This test method is intended to address a fire caused by exterior sources that involves the upper surface of the deck or structure.

4.2 This test is a practical assessment of fire-test-response characteristics under a prescribed fire loading. This test method is a variation of Test Method E108.

## 5. Test Apparatus

5.1 The essential elements of the fire test apparatus are illustrated in Fig. 1. They include a test deck, an adjustable frame on which the test deck is mounted, a wind tunnel, an air

<sup>3</sup> Available from International Code Council Evaluation Service, 5600 Workman Mill Road, Whittier, CA.



**FIG. 1 Deck Structure Test Specimen and Test Apparatus (Burning-Brand)**

velocity meter with or without the use of a timing device and an adjustable air supply. During the test:

5.1.1 Provide free outlet to outside air beyond and above the test apparatus to exhaust air introduced into the test room by the blower, and

5.1.2 Close all openings into the test room other than those mentioned in 5.1.1, such as doors and windows.

5.2 The temperature of the air supplied by the blower shall be maintained between 10 and 32°C [50 and 90°F].

5.3 *Wind Tunnel* (see Fig. 1)—The wind tunnel shall deliver  $5.3 \pm 0.2$  m/s [ $12 \pm 0.5$  mph] airflow at zero incline over the width of the test specimen. Test Method E108 Burning Brand Roof Test apparatus shall be used, with the following modifications:

5.3.1 *Test Specimen Support*—The test specimen shall be supported horizontally with its leading edge 838.2 mm [33 in.] from the front opening of the wind tunnel with the joists parallel to the airflow and resting on two transverse metal supports. The top surfaces of these supports, which shall be no more than 76 mm [3 in.] wide, are at the same height as the floor of the wind tunnel.

5.3.2 *Fragments*—Burning fragments shall be free to fall to the floor of the room.

5.4 *Anemometer*—A device for measuring airflow across the deck shall be provided.

**NOTE 1**—Any direct reading instrument with scale graduated in increments of not more than 6 m/min [20 ft/min] or any timed instrument with scale graduated (for a 1 min timed reading) in increments of not more than 1.5 m/min (5 ft/min) will be suitable.

5.5 *Burner*—Gas-fueled burner for brand ignition. The flame temperature of the igniting flame shall be  $888 \pm 28^\circ\text{C}$  [ $1630 \pm 50^\circ\text{F}$ ] measured 59 mm [ $2\frac{3}{16}$  in.] above the top of the burner, which is shielded from drafts.

## 6. Test Specimens (see Fig. 2)

6.1 The test specimen shall consist of joists as specified in 6.3 and test material as specified in 6.4.

6.2 *Test Specimen Size*—The overall size of the test specimen shall be nominally 610 by 710 mm [24 by 28 in.]. The overall test specimen length (that is, direction of joists) shall be  $710 \pm 51$  mm [ $28 \pm 2$  in.] to accommodate variations in the

test material's individual deck board width; the length of the test material shall be  $610 \pm 4$  mm [ $24 \pm \frac{3}{16}$  in.].

6.3 *Joists*—The test material shall be supported by two nominal 50 by 150 mm [2 by 6-in.] joists running perpendicular to the test material's deck boards with a  $406 \pm 4$  mm [16 in.] center-to-center spacing, creating a  $90 \pm 4$  mm [ $3.5 \pm 0.16$  in.] overhang on the outer side of each edge joist. Joist length shall meet the requirements specified in 6.2.

### 6.4 Test Material:

6.4.1 All test materials shall be representative of the as-manufactured product including the cross sectional dimensions.

6.4.2 Test material shall be sampled to meet the intended end-use of the test data.

6.4.3 Prior to testing, all test material and joists shall be conditioned to a constant weight or for a minimum of 30 days at  $21 \pm 2^\circ\text{C}$  [ $70 \pm 4^\circ\text{F}$ ] and  $50\% \text{ RH} \pm 5\%$ , whichever comes first. Constant weight shall be defined as a change in test material weight less than or equal to 2 % in a 24-h period.

6.4.4 Edge-to-edge spacing and method of attachment shall conform to the manufacturer's installation recommendations. The test material shall be flush with the ends of the joists at the front of the test specimen (that is, the edge of the test specimen facing the front opening of the wind tunnel). Test material at the back of the test specimen (that is, the edge of the test specimen furthest away from the front opening of the wind tunnel) manufactured with tongue-and-groove edge connections shall be spaced and attached according to the manufacturer's recommendations.

## 7. Calibration

### 7.1 Calibrating Air Current:

7.1.1 Set up the test apparatus and position a smooth deck, 1.3 m [4 ft-4 in.] long on the framework at a 127 mm per 304.8 mm [5 in. per 12 in.] horizontal incline.

7.1.2 Measure the air velocity at the center and 76 mm [3 in.] from the edges of the deck.

7.1.3 Position the center of the air measuring device  $95 \pm 3$  mm [ $3\frac{3}{4} \pm \frac{1}{8}$  in.] above the surface. The air flow through and around the instrument shall be as free and undisturbed as possible.

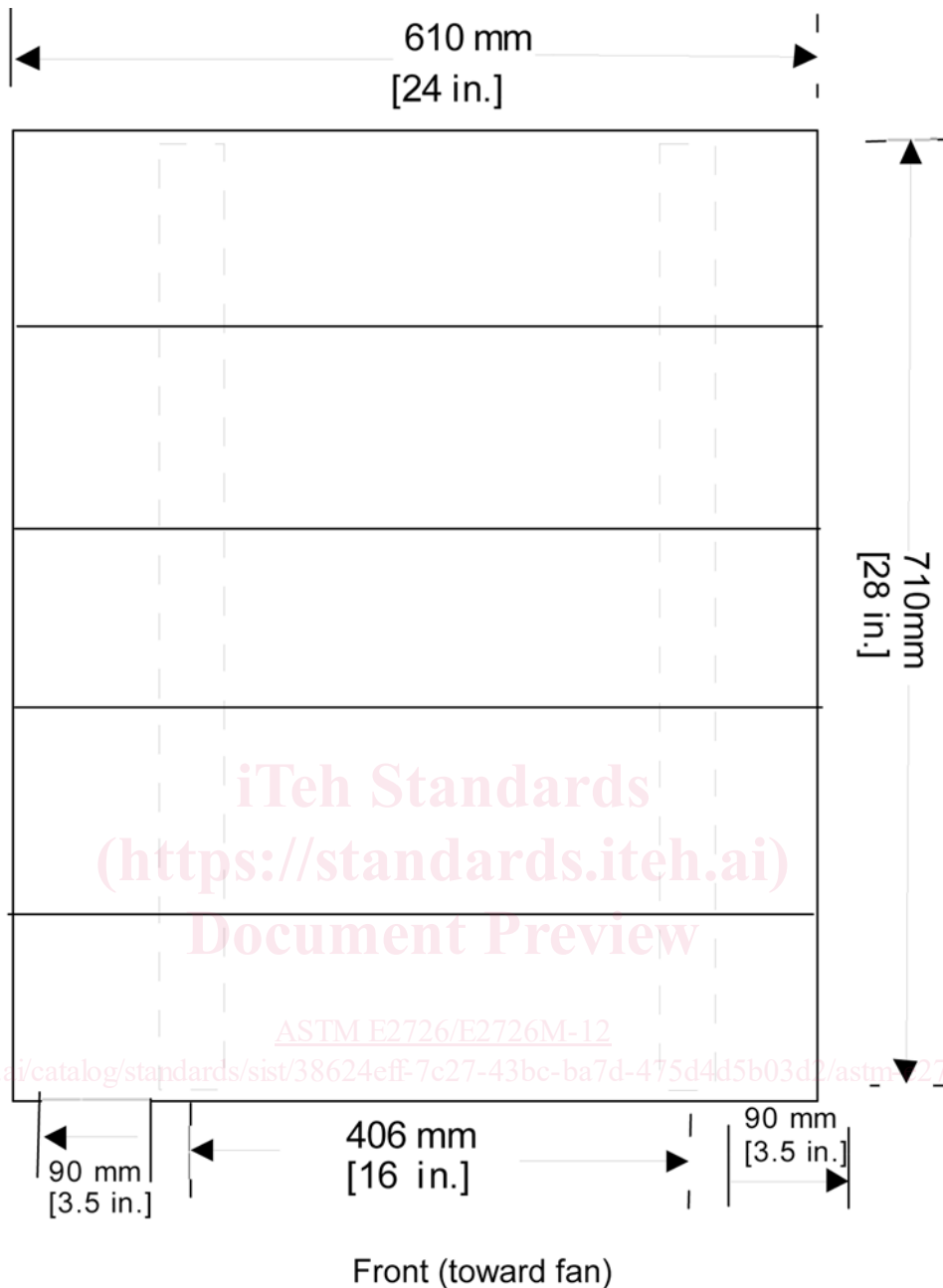


FIG. 2 Test Specimen

7.1.4 Adjust the air supply to produce a 1 min timed average velocity of  $5.3 \pm 0.2$  m/s [ $12 \pm 0.5$  mph] at each of three locations detailed in 7.1.2.

**8. Procedure**

- 8.1 Conduct this test on three replicate test specimens.
- 8.2 Mount each test specimen in the manner described in 5.1.1 with the framework 838.2 mm [33 in.] from the air duct outlet.

8.3 *Size and Construction of Brands*—Construct each brand (Fig. 3), as follows, and condition in an oven at 41 to 49°C [105 to 120°F] for at least 24 h.

8.3.1 The Class A test Brand shall consist of a grid 305 mm [12 in.] square and approximately 57 mm [2¼ in.] thick made of oven dry Douglas fir lumber free of knots and pitch pockets. Use 36 nominal 25 by 25 by 305 mm [1 by 1 by 12 in.] strips, dressed on all four sides to 19 by 19 mm [¾ by ¾ in.] and placed in three layers of twelve strips each with strips spaced