Designation: E2579 – 15

An American National Standard

Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics[1]

This standard is issued under the fixed designation E2579; 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 practice describes procedures for specimen preparation and mounting when testing wood products to assess flames spread and smoke development as surface burning characteristics using Test Method E84.

1.2 This practice applies also to laminated products factory-produced with a wood substrate (see 8.6). This practice does not apply to wood veneers or facings intended to be applied on site over a wood substrate, which are covered by Practice E2404.

1.3 Testing is conducted with Test Method E84.

1.4 Testing for the reporting of the moisture content of the test specimen is conducted with Test Methods D4442.

1.5 This practice does not provide pass/fail criteria that can be used as a regulatory tool.

1.6 Use the values stated in inch-pound units as the standard, in referee decisions. The values in the SI system of units are given in parentheses, for information only; see IEEE/ASTM SI-10 for further details.

1.7 This fire standard cannot be used to provide quantitative measures.

1.8 Fire testing of products and materials is inherently hazardous, and adequate safeguards for personnel and property shall be employed in conducting these tests. Fire testing involves hazardous materials and equipment. This standard gives instructions on specimen preparation and mounting, but the fire-test-response method is given in Test Method E84. See also Section 10.

1.9 The text of this standard references notes and footnotes which provide explanatory materials. These notes and footnotes shall not be considered requirements of the standard.

1.10 *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:*[2]

C1396/C1396M Specification for Gypsum Board

D9 Terminology Relating to Wood and Wood-Based Products

D1038 Terminology Relating to Veneer and Plywood

D1554 Terminology Relating to Wood-Base Fiber and Particle Panel Materials

D4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials

D4444 Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters

D7438 Practice for Field Calibration and Application of Hand-Held Moisture Meters

E84 Test Method for Surface Burning Characteristics of Building Materials

E176 Terminology of Fire Standards

E2404 Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including Vinyl) Wall or Ceiling Coverings, and of Facings and Wood Veneers Intended to be Applied on Site Over a Wood Substrate, to Assess Surface Burning Characteristics

IEEE/ASTM SI-10 International System of Units (SI): The Modern Metric System

2.2 *CSA Standard:*[3]

CSA O121 Douglas Fir Plywood

2.3 *HPVA Standard:*[4]

ANSI/HPVA HP-1 American National Standard for Hardwood and Decorative Plywood

[1] This practice is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the direct responsibility of Subcommittee E05.22 on Surface Burning.

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[2] 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.

[3] Available from Canadian Standards Association (CSA), 178 Rexdale Blvd., Toronto, ON Canada M9W 1R3.

[4] Available from the Hardwood Plywood and Veneer Association, 1825 Michael Faraday Dr., Reston, VA 20190.

2.4 *NIST Standard:*[5]
Voluntary Product Standard PS 1-07 Structural Plywood

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice refer to the terminology contained in Terminologies E176, D9, D1038, D1554, and ANSI/HPVA HP-1.

4. Summary of Practice

4.1 This practice describes procedures for specimen preparation, mounting, and reporting, when testing wood products to assess flame spread and smoke development as surface burning characteristics using Test Method E84.

5. Significance and Use

5.1 Solid board, lumber and timber products (including solid boards, lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber and parallel strand lumber products); panel products (including fibreboard, hardboard, oriented strandboard, waferboard and plywood panel products); decorative wood products and shingles and shakes used as interior wall and ceiling finish are often evaluated with Test Method E84 to comply with code requirements. This practice describes specimen preparation and mounting procedures for such materials and systems.

5.2 If it can be demonstrated that none of the methods described in this practice are applicable to a particular product, other mounting methods shall be permitted to be used. This information shall be included in the report.

5.3 The limitations for this procedure are those associated with Test Method E84.

6. Conditioning

6.1 The test specimens shall be conditioned as described in the section on specimen conditioning in Test Method E84.

7. Test Specimens

7.1 The test specimen sizes shall comply with those described in the test specimen section of Test Method E84. The test specimens shall be butted against the vent end of the fire test chamber and shall consist of a continuous, unbroken length, or of sections joined or butted end-to-end. The test specimens shall have a width of 20 to 24 in. (510 to 610 mm), a length of 24 ft + 12 in. – 6 in. (7.32 m + 305 mm – 152 mm) and a maximum thickness of 4 in. (101 mm).

7.2 Wood product test specimens shall be prepared as described in Section 8.

8. Test Specimen Preparation

8.1 *General:*

8.1.1 Wood products shall be representative of the materials which the test is intended to examine.

8.1.2 The preparation of test specimens of wood products treated by pressure impregnation or by other means shall be identical to that specified for untreated wood products.

8.2 *Solid Boards, Lumber, Timber, Fingerjoined Lumber, Glulam, Laminate Wood, Laminated Veneer Lumber and Parallel Strand Lumber Products:*

8.2.1 General construction outline for solid board, lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber and parallel strand lumber decks is shown in Fig. 1.

8.2.2 The thickness of the test material pieces shall be representative of the material which the test is intended to examine.

8.2.3 Batten strips shall be nominal 1 by 3⁄16 in. (25 by 5 mm) and shall be constructed of metal.

8.2.4 Use either cement coated nails or No. 8, 10 or 12 wood screws, two per solid board, lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber and parallel strand lumber piece per batten, and of sufficient length to penetrate through the battens and not less than 75 % of the test material.

8.2.5 For outside edges, use the longest lumber, timber, fingerjoined lumber, glulam, laminate wood laminated veneer

[5] Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 3460, Gaithersburg, MD 20899-3460.

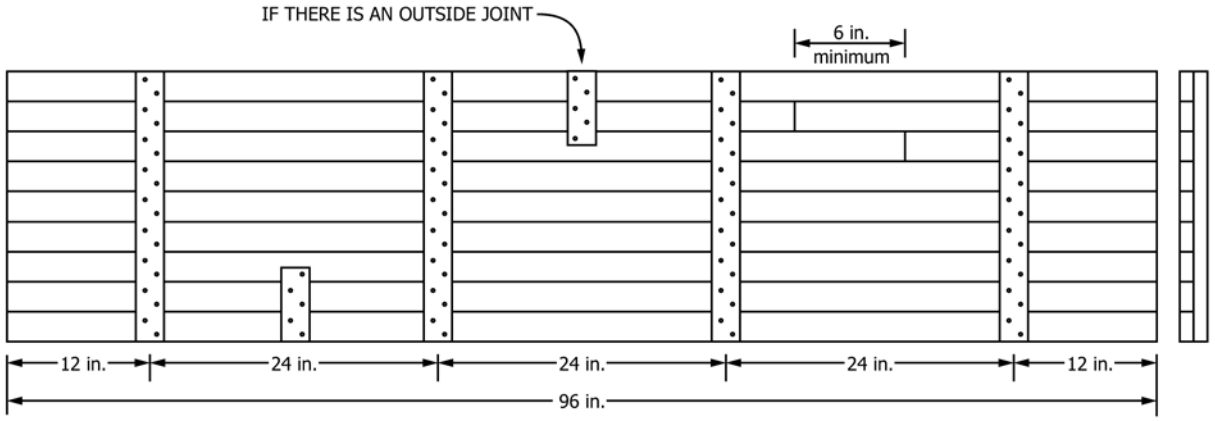

FIG. 1 General Construction Outline for Solid Board, Lumber, Timber, Fingerjoined Lumber, Glulam, Laminate Wood, Laminated Veneer Lumber and Parallel Strand Lumber Decks

lumber parallel strand lumber strips available. If shorter than 96 in. (2.44 m), use 6 in. (152 mm) long batten strips. Do not use lumber, timber, fingerjoined lumber, glulam, laminate wood, laminated veneer lumber, or parallel strand lumber strips less than 24 in. (610 mm) long on outside edges.

8.2.6 Allow 6 in. (152 mm) minimum distance between other joints on adjacent lumber, timber, fingerjoined lumber, glulam, laminate wood laminated veneer lumber parallel strand lumber strips.

8.2.7 While fastening with nails or screws, use cabinet clamps or other suitable means to ensure there are no cracks, or gaps between the lumber, timber, fingerjoined lumber, glulam, laminate wood laminated veneer lumber parallel strand lumber strips in the deck surface.

8.2.8 Mount the specimens on the ledges of the Test Method E84 furnace without using additional means of support.

8.3 *Panel Products with Sufficient Structural Integrity to Support Themselves:*

8.3.1 Panel products with sufficient structural integrity to support themselves shall be cut to the width of the fire test chamber, butted end-to-end, and mounted on the ledges of the Test Method E84 furnace without using additional means of support.

8.3.2 Panel products ¼ in. (6.3 mm) or less in thickness not intended to be applied over gypsum board or a wood substrate shall be cut to the width of the fire test chamber, butted end-to-end, and mounted on the ledges of the Test Method E84 furnace without additional means of support if they have sufficient integrity to support themselves within the test chamber without sagging 1⁄16 in. (1.5 mm) or more when measured at the centre-line of the test chamber.

8.4 *Wood Veneers and Panel Products with Insufficient Structural Integrity to Support Themselves:*

8.4.1 Wood veneers and panel products with insufficient structural integrity to support themselves shall be cut to the width of the fire test chamber, butted end-to-end and supported within the fire test chamber by steel rods not more than ⅛ in. (3 mm) in diameter spanning the width of the tunnel. The rods shall be placed approximately 2 in. (51-mm) from each end of each panel and at approximately 24 in. (610 mm) intervals starting with the fire end of each panel.

8.4.2 Wood veneers and panel products ⅛ in. (3 mm) or less in thickness not intended to be applied over gypsum board or a wood substrate, and with insufficient integrity to support themselves within the test chamber without sagging 1⁄16 in. (1.5 mm) or more when measured at the centre-line of the test chamber, shall be cut to the width of the fire test chamber, butted end-to-end, and supported within the test chamber by steel rods not more than ¼ in. (6.3 mm) in diameter spanning the width of the tunnel. The rods shall be placed approximately 2 in. (51 mm) from each end of each panel and at approximately 24 in. (610 mm) intervals starting at the fire end of each panel.

8.5 *Wood Veneers and Panel Products Intended to be Applied over Gypsum Board:*

8.5.1 If the wood veneer or panel product is intended to be applied over gypsum board, the specimens shall consist of the veneer or panel product mounted on ⅝ in. (15.9 mm) Type X thick gypsum board complying with Specification C1396/C1396M. The gypsum board shall not be required to be mounted on studs or battens. Mount the specimens on the ledges of the Test Method E84 furnace without using additional means of support.

8.5.2 The adhesive used to attach the veneer or panel product to the gypsum board shall be that specified by the manufacturer and applied in accordance with manufacturer application instructions.

8.6 *Laminated Products Factory-Produced with a Wood Substrate:*

8.6.1 If the factory-produced laminated product includes a facing or wood veneer applied over a wood substrate, the specimens shall comply with 8.6.1.1 as well as with 8.6.1.2.

8.6.1.1 The specimens shall consist of the finished product, namely the combination of the facing, panel product or wood veneer, the adhesive used and the specific wood substrate that will be used. Mount the specimens on the ledges of the Test Method E84 furnace without using additional means of support.

8.6.1.2 The adhesive used to attach the facing, panel product, or wood veneer to the wood substrate shall be that specified by the manufacturer and applied in accordance with manufacturer's application instructions.

8.7 *Wood Veneers or Facings Intended to be Applied on Site over a Wood Substrate*—If the laminated product is not factory-produced but the wood veneer or facing is to be applied on-site over a wood substrate, the specimens shall comply with the requirements of Practice E2404.

8.8 *Wood Shingles and Shakes:*

8.8.1 Wood shingles and shakes shall be mounted according to manufacturer's instructions on the "A" face of nominal 15⁄16 in. panels of untreated plywood with a face veneer of Douglas fir and with the thicker butt ends of each shingle or shake oriented towards one end of the plywood panel. The plywood shall comply with NIST Voluntary Product Standard PS 1-07. The plywood shall carry the grade stamp of either APA-*The Engineered Wood Association* [6] or TECO[7] , indicating that the plywood has been graded PS 1-07 A-C and is for exterior exposure. Alternatively, the plywood shall be permitted to be stamped as conforming to CSA O121 (Standard for Douglas fir plywood).

8.8.2 The specimens shall be butted end-to end, with the thicker butt-ends of the shingles oriented towards the fire end of the furnace, and mounted on the ledges of the Test Method E84 furnace without using additional means of support.

8.8.3 If it can be demonstrated that the method described in 8.8.1 of this practice is not applicable to a particular type of wood shingle or shake, another mounting method, based on the manufacturer's installation instructions, shall be permitted to be used. This information shall be included in the report.

8.9 *Moisture Content Specimens:*

[6] Information available from APA, The Engineered Wood Association, 7011 South 19th, Tacoma, WA, 98466.

[7] Information available from TECO, 5650 Terra Court, Sun Prairie, WI, 53590.

8.9.1 A minimum of three specimens for the moisture content determination shall be obtained from either the original stock of the test material at the time of specimen preparation or from Test Method E84 fire test samples prior to conducting the fire test (see also Note 1).

NOTE 1—The preparation of the specimens for the determination of the oven dry moisture content of the select-grade red oak calibration material is discussed in A2.1.1 of Test Method E84.

8.9.2 Once the specimens of the test material for the oven-dry moisture content determination are cut from the test material or test specimen, the specimens shall immediately be attached to or placed on the Test Method E84 fire test specimen and remain in the same room as the Test Method E84 fire test specimen until the "original mass" is recorded at the time of the fire test.

9. Testing of Specimens

9.1 Except as noted in 9.2 and 9.3, all testing shall be conducted using the methodology described in Test Method E84.

9.2 The integer moisture content of the test specimen shall be determined in accordance with Method B, oven-drying (secondary) method in Test Methods D4442, except as noted in 9.3 (see Note 2).

9.3 If the specimens contain any degree of volatilizable material other than water, Method C, the distillation method in Test Methods D4442, shall be permitted to be used. The weight of the moisture content specimens shall be determined within 4 h of being removed from the conditioning chamber and recorded as the "original mass" of the moisture content specimen.

NOTE 2—Moisture meters (Test Methods D4444 and Practice D7438) are suitable for monitoring the moisture content during conditioning but are not considered suitable for the final moisture content given the wide range of wood products tested in accordance with Test Method E84. Thus, the oven-drying method is required.

10. Operator Safety

10.1 The primary concerns for operator safety are associated with the fire-test-response procedure, Test Method E84, and not with the specimen preparation procedure. Safety recommendations are included in Test Method E84.

11. Report

11.1 Report a detailed description of the system being tested.

11.2 Report a detailed description of the specimen preparation method used, including any substrate or adhesive, if used, and its application rate, per Section 8.

11.3 Report the integer moisture content values for the moisture content specimens. Report the mean, standard deviation, number of moisture content specimens and any deviation from this standard or Test Methods D4442.

11.4 Report all the information required in the reporting section of Test Method E84, including observations, graphical results and the values of the flame spread index and of the smoke developed index in each test.

12. Keywords

12.1 fibreboard; fingerjoined lumber; fire; fire test; flame spread; glulam; hardboard; laminate wood; laminated veneer lumber; lumber; oriented strandboard; parallel strand lumber; plywood; shingles and shakes; smoke developed; solid boards; Steiner tunnel; timber; waferboard; wood products

ANNEXES

A1. WOOD PRODUCTS INTENDED TO BE APPLIED OVER GYPSUM BOARD

A1.1 This practice specifies that wood products intended to be applied over gypsum board be mounted over ⅝ in. (15.9 mm) thick Type X gypsum board complying with Specification C1396/C1396M. Test results, as calculated in Section 9 of Test Method E84 and observations of the burning characteristics of wood products mounted over ⅝ in. (15.9 mm) thick Type X gypsum board product are applicable to those for wood products on other gypsum board products not less than ½ in. (12.7 mm) thick.

A2. WOOD PRODUCTS INTENDED TO BE APPLIED OVER WOOD SUBSTRATES

A2.1 This practice specifies that wood products intended to be applied over wood substrates be mounted over the "A" face of nominal 15⁄32 in. untreated plywood complying with NIST Voluntary Product Standard PS 1-07 and having a face veneer of Douglas fir. Test results, as calculated in Section 9 of Test Method E84 and observations of the burning characteristics of wood products mounted over this one wood substrate are applicable to those for wood products mounted on other wood substrates not less than 7⁄16 in. (11 mm) thick.

A3. WOOD PRODUCTS INTENDED TO BE APPLIED OVER AN AIRSPACE

A3.1 This practice does not provide for the mounting of wood products and wood veneer and panel products over an airspace. The practice of installing wood products and wood veneer and panel products ¼ in. (6.3 mm) or less in thickness directly to framed walls or ceilings without gypsum board or another wood substrate behind those products is not recommended.

A4. SAGGING, DELAMINATING, AND FALLING OF FLAKES OR PARTICLES OF WOOD CHAR DURING TEST METHOD E84 FIRE TESTS

A4.1 The practice of supporting on steel rods (See 8.4) wood veneers and panel products having insufficient structural integrity to support themselves within the test chamber without sagging is intended to minimize the sagging of test specimens prior to commencement of Test Method E84 fire tests. During fire tests, wood veneers and panel products may sag or delaminate and pieces of char may fall from the test specimens as flakes or particles of various dimensions and thicknesses. The use of steel rods to support test specimens without sagging prior to the fire test is not intended to prevent the sagging, delaminating or falling of flakes or particles of char during the fire tests.