Designation: E2707 – 15

An American National Standard

Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure[1]

This standard is issued under the fixed designation E2707; 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 fire-test-response standard prescribes a method to assess the fire performance of a vertically oriented specimen exposed to direct flame impingement in a simulated external fire exposure potentially encountered in a 'Wildland Urban Interface' scenario. This test method provides data suitable for comparing the performance of materials, which are used as the exposed surfaces of exterior walls in construction applications.

NOTE 1—This test method closely follows the test procedure of California Office of State Marshal (SFM) Method 12-7A-1.[2]

1.2 This test method measures the ability of the wall system to resist fire penetration from the exterior into the wall cavity or unexposed side of the test assembly under the conditions of exposure.

1.3 This test method provides data suitable for comparing the performance of vertically oriented materials, products or assemblies in exterior construction applications. The test specimen shall be tested in thicknesses and configurations representative of actual end product or system uses.

1.4 Limitations of the test method are listed in Section 5.5.

1.5 The system of units to be used in referee decisions is the SI system of units; see IEEE/ASTM SI-10 for further details. The units given in parentheses are for information only.

1.6 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.

1.7 *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.*

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

2. Referenced Documents

2.1 *ASTM Standards:*[3]

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

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

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

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)

E176 Terminology of Fire Standards

E1354 Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

E1474 Test Method for Determining the Heat Release Rate of Upholstered Furniture and Mattress Components or Composites Using a Bench Scale Oxygen Consumption Calorimeter

E1740 Test Method for Determining the Heat Release Rate and Other Fire-Test-Response Characteristics of Wall Covering or Ceiling Covering Composites Using a Cone Calorimeter

E2102 Test Method for Measurement of Mass Loss and Ignitability for Screening Purposes Using a Conical Radiant Heater

E2257 Test Method for Room Fire Test of Wall and Ceiling Materials and Assemblies

E2886 Test Method for Evaluating the Ability of Exterior

[1] 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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[2] 2007 California Building Code, Chapter 7A [SFM], Materials and Construction Methods for Exterior Wildfire Exposure, Exterior Wall Siding and Sheathing, SFM Standard 12-7A-1.

[3] 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.

Vents to Resist the Entry of Embers and Direct Flame Impingement

IEEE/ASTM SI-10 American National Standard for Use of the International System of Units (SI): The Modern Metric System

2.2 *ISO Standards:*

ISO 13943 Fire Safety—Vocabulary[4]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this standard, see Terminology E176 and ISO 13943. In case of conflict, the definitions given in Terminology E176 shall prevail.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *orientation, n*—the vertical plane in which the exposed face of the test specimen is located during testing.

3.2.2 *siding (cladding), n*—any material that constitutes the exposed exterior covering of an exterior wall and such material is applied over sheathing or directly attached to the wall system.

3.2.3 *sheathing, n*—the material placed on an exterior wall beneath cladding or siding and directly attached to the wall system used over the wall framework and is attached directly to the wall framing members. Materials called sheathing that are not placed beneath cladding or siding shall be classified as cladding or siding.

3.2.4 *sustained flaming, n*—flame on or over the surface of a test specimen that lasts longer than a period of 4 s.

4. Summary of Test Method

4.1 This test method provides for the direct flame exposure of a wall specimen to a flame source centered at the base of a 1220 by 2440 mm (4 by 8 ft) test assembly.

4.2 This test method employs a gas burner to produce a diffusion flame in contact with the test wall assembly.

4.3 The gas burner produces a prescribed net rate of heat output of 150 kW (8535 BTU/min) for a period of 10 min, after which the flame exposure is terminated.

4.4 The test method measures the ability of the wall system to resist fire penetration from the exterior to the unexposed side of the test assembly under the conditions of exposure. Observations are made for the appearance of sustained flaming or glow on the unexposed side or sustained glowing on the unexposed side, or both, at the end of a 60 min observation period.

5. Significance and Use

5.1 The test method described herein measures the ability of the exterior wall covering material or system to resist fire penetration from the exterior to the unexposed side of the wall assembly under the specified conditions of exposure.

5.2 Representative joints and other characteristics of an assembly shall be included in a test specimen when these details are representative of the construction of the end-use product(s).

5.3 This test method is applicable to end-use product(s) not having an ideally planar external surface.

5.4 The overall performance of the test specimen is visually documented by full-color photographic records. Video taping of the complete fire test is an acceptable alternative to the photographic record. The use of infrared photography of the unexposed side of the test wall can be used to reveal development of increasing temperatures or persisting hot spots.

5.5 In this procedure, the specimens are subjected to a specific set of laboratory fire test exposure conditions. If different test conditions are substituted or the anticipated end-use conditions are changed, it is not known whether it is possible by use of this test to predict changes in the performance characteristics measured. Therefore, the results are strictly valid only for the fire test exposure conditions described in this procedure.

6. Safety Precautions

6.1 The test procedures involve high temperatures and combustion processes. Therefore, the potential exists for burns, ignition of extraneous objects or clothing, and for inhalation of combustion products.

7. Apparatus

7.1 Unless otherwise noted, dimensions in the following descriptions, shall be followed with a tolerance of ±13 mm (0.5 in.).

7.2 *Wall Assembly Holding Fixture*—The test specimen support assembly shown in Fig. 1 is designed to permit rapid installation and removal of wall assemblies, and to prevent edge penetration of fire at the margins of the wall assembly. It includes a sturdy frame assembly to hold the specimen and a simulated soffit that is non-combustible. The frame assembly permits a 1220 by 2440 mm (4 by 8 ft) prefabricated wall section to be inserted from the rear and to seal in such a way that protects the edges from fire. Side shields are situated near the vertical edges and to within 304 mm (12 in.) of the top of the test wall assembly as shown in Fig. 1 to aid in minimizing extraneous drafts to the surface of the assembly.

7.3 *Burner Details*—The ignition source for the test shall be a gas diffusion burner with a nominal 100 mm wide by 1000 mm long (4 in. wide by 39 in. long) porous top surface of a refractory material, as shown in Fig. 2. With the exception of top surface dimensions, the essential configuration of the burner is comparable to the burner design described in Test Method E2257.

7.4 The burner enclosure shall be positioned so that it is centered relative to the width of the test wall. The distance from the bottom of the test specimen to the top surface of the burner shall be 300 ± 50 mm (12 ± 2 in.). The bottom of the test specimen shall be protected from burner fire exposure by the placement of a 1220 mm (4 ft) wide thermal barrier

[4] Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, http://www.iso.ch.

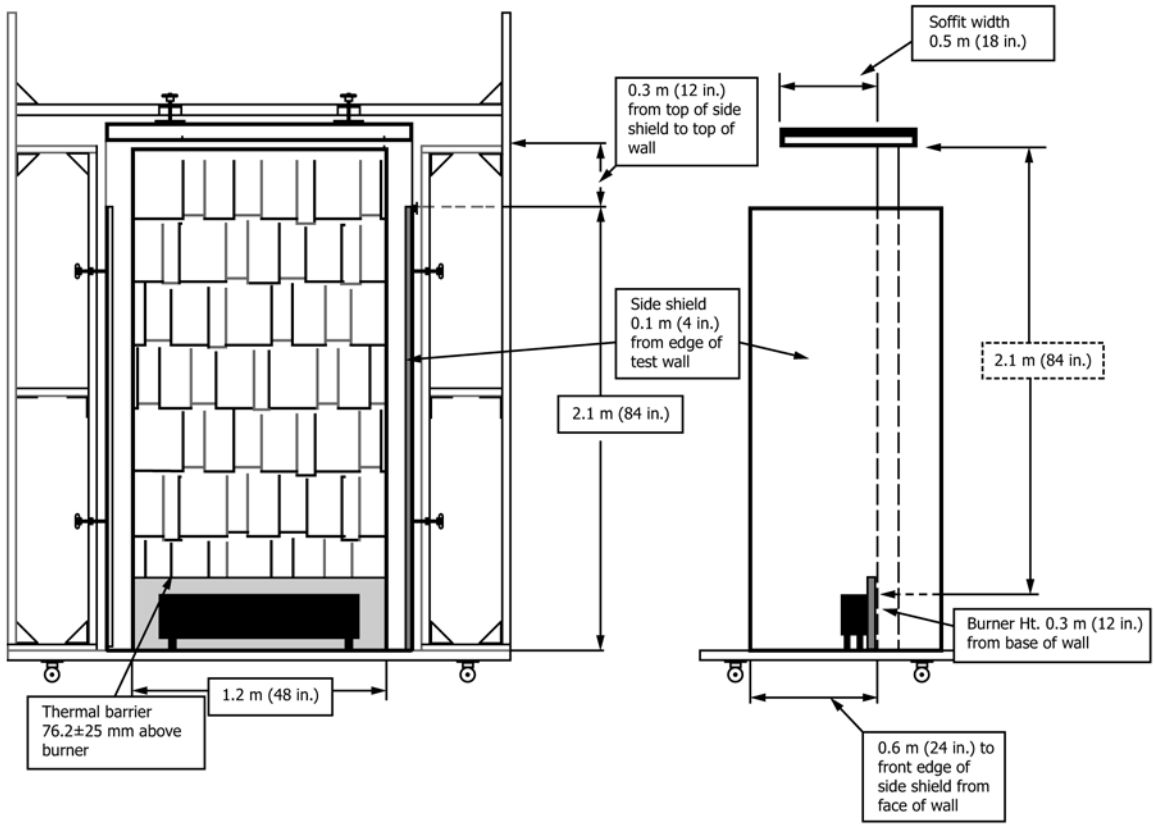

FIG. 1 Test Fixture

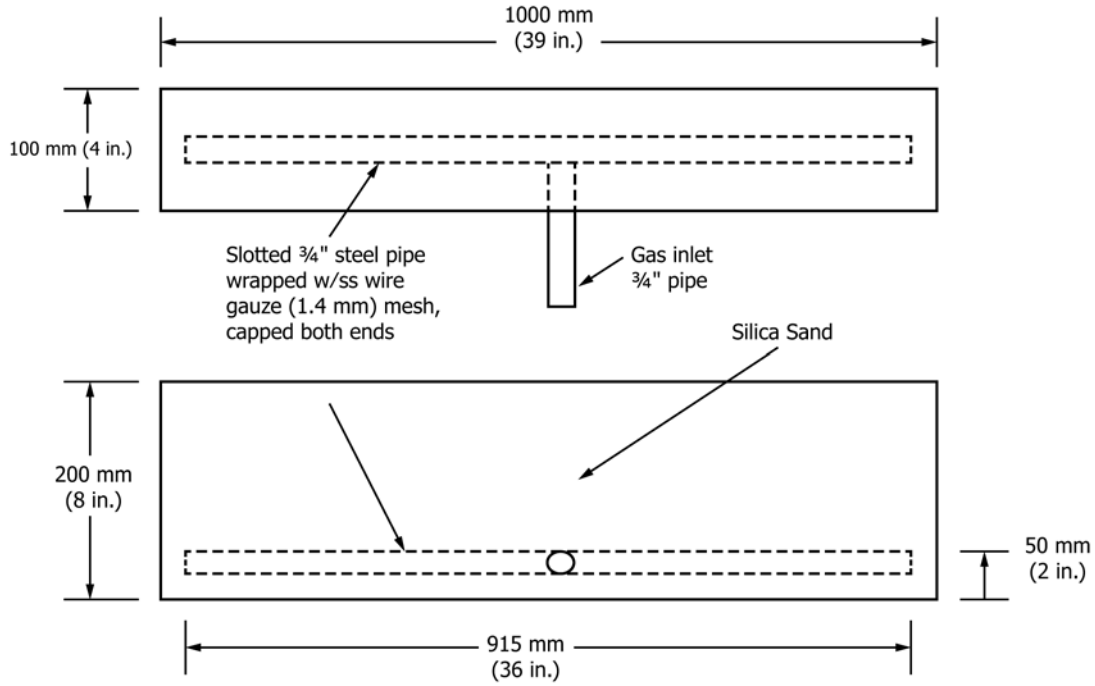

FIG. 2 Gas Burner Ignition Source

consisting of nominal 19 mm (0.75 in.) cement board (or equivalent) between the burner enclosure and the test specimen. The burner enclosure shall be in contact with the protective barrier. The thermal barrier shall be positioned so that the top edge extends 76 ± 25 mm (3 ± 1 in.) above the top edge of the burner, and fastened to the base of the wall in such a manner to prevent obstruction of the burner flame caused by distortion away from the surface of the wall. Any gaps between

the top edge of the thermal barrier and the test wall surface shall be filled with ceramic wool, or equivalent, prior to the test.

7.5 Natural gas, methane or propane shall be supplied to the burner through a metered control system. The gas supply to the burner shall produce a net heat output of 150 ± 8 kW (8535 ± 454 Btu/min) throughout the flame exposure.

7.6 The burner shall be ignited by a pilot burner or a remotely controlled spark igniter.

7.7 *Moisture Meter*—Moisture meters used to determine the moisture content of wood products for compliance with 8.8.4.2 shall be calibrated as described in Test Method D4444.

8. Test Specimen

8.1 Test specimen's dimensions shall be 1220 mm (4 ft) wide by 2440 mm (8 ft) high. The test specimen shall be representative of the end-use wall assembly except as specified in 8.3 and 8.4. The test specimen shall be mounted in the steel frame holding fixture assembly as shown in Fig. 1.

8.2 The test specimen shall incorporate joint detail(s) representative of actual installation.

8.3 For wall assemblies without internal cavity spaces, the entire wall assembly shall constitute the test specimen to be tested. The wall assembly shall be constructed in accordance with manufacturer's specifications or building code requirements, or both, where applicable. Other components of the wall assembly, such as building felt and sheathing, are employed to conform to the manufacturer's specifications or building codes, or both.

8.4 For wall assemblies with internal cavity spaces, the materials on what would be considered the interior (unexposed) side of the wall assembly shall be omitted from the test specimen. Materials such as insulation normally installed within the cavity space shall be omitted from the test specimen. The wall assembly used as the test specimen shall include the structural support elements and any sheathing, weather barrier and cladding attached to the exterior surface of the structural support elements.

8.5 For wall assemblies composed of layered materials, such as sheathing, siding (cladding) and underlayment, the installation of such layered materials shall be in accordance with manufacturer's instructions, or in the absence of such instructions, applicable building code requirements. In the absence of manufacturer's specifications, the wall assembly shall include the following minimum components: nominal 2 by 4 studs spaced 410 mm (16 in.) on center, and the desired exterior siding material. If sheathing is used, tests shall be run on typical 7/16 in. oriented strandboard (OSB) of Exposure 1 rating. Where specified by the manufacturer, sheathing material and installation shall be in accordance with the manufacturer's instructions. The sheathing shall have one vertical seam on a selected stud with a 3 mm (0.125 in.) gap. The type, thickness, and installation method of any sheathing shall be included in the report.

8.6 Protect the vertical and horizontal edges of the test specimen with 12-mm ceramic wool blanket (or equivalent) to eliminate the gap between the holder and the test specimen and prevent unwanted edge effects caused by heat transfer to the edges of the test specimen through the sample holder.

8.7 *Replicates*—Three matched test specimen assemblies shall be tested.

8.8 *Accelerated Aging/Weathering and Pre-test Conditioning of Test Material:*

8.8.1 When it is anticipated that a regulatory or other agency will require pre-test accelerated aging/weathering of the samples, the manufacturer shall have the option to conduct such weathering. Weathering shall be conducted as specified by the regulatory agency or applicable methods as specified for the product. The process shall evaluate the potential for the fire test response characteristics as measured in this test method to deteriorate due to accelerated aging/weathering of the wall material. Details of the weathering method used, or reference to a standard test method, shall be included in the report (see Appendix X2).

8.8.2 Pieces of any hygroscopic materials from the same stock from which the test assembly was constructed shall be tacked to the assembly during construction in such a manner that they are easily removed. These pieces shall be conditioned with the completed assemblies.

8.8.3 The completed test assemblies are to be stored indoors at temperatures not lower than 16°C (60°F) nor higher than 32°C (90°F) for the period of time necessary to cure the assembly components. Test assemblies are to be stored so that each will be surrounded by freely circulating air.

8.8.4 Just before the test assembly is tested, the pieces of hygroscopic materials prepared in 8.8.2 shall be tested for moisture content.

8.8.4.1 Make the moisture determination on two samples from each piece and report the average. For lumber and other wood-based materials, use Test Methods D4442. Alternatively, the moisture content for lumber and other wood-based materials is permitted to be measured using a moisture meter complying with 7.7. For other hygroscopic materials, use test methods appropriate for those materials.

8.8.4.2 For lumber used in the construction of the supporting wall structure, the moisture content shall not be more than 12 %. For wood sheathing, the moisture content shall not exceed 8 %. For other hygroscopic materials, the moisture shall be within ranges specified by the manufacturer before the assembly is constructed. These specified ranges shall be typical for exposure at 77 ± 9°F (25 ± 5°C) and 55 ± 10 % relative humidity.

9. Calibration

9.1 *Burner Calibration:*

9.1.1 The gas supply to the burner shall be the same as used for testing. The gas shall be metered and kept constant throughout the calibration test.

9.1.2 Place the gas burner in the configuration to be used for testing and obtain a heat release rate value of 150 kW.

9.1.3 Take measurements at least once every 6 s and start 1 min prior to ignition of the burner. Determine the average heat output over a period of at least 1 min by the oxygen

consumption method, or calculate the heat output from the gas mass flow and the net heat of combustion.

9.1.4 Perform calibration prior to each day of testing.

10. Procedure

10.1 The ambient temperature in the test room shall be above 15°C (60°F) and the relative humidity shall be less than 75 %. The test room shall be draft-protected and equipped with an exhaust hood system for removal of products of combustion during testing.

10.2 The horizontal air flow, measured at a horizontal distance of 0.5m (20 in.) from the edge of the wall assembly, shall not exceed 0.5 m/s (1.64 ft/s).

10.3 Prior to testing, and without the test specimen in place, position the frame assembly under the exhaust hood and set the gas burner for the prescribed level of output.

10.4 Once the burner output is verified, position the specimen holder assembly at the desired test location under the collection hood.

10.4.1 Insert the test specimen into the frame assembly, sealing all edges with ceramic wool.

10.4.2 Simultaneously ignite the gas burner and start the timer marking the beginning of the test. Control the burner to a constant 150 ± 8 kW output. Control the hood duct flow to collect all products of combustion.

10.4.3 Continue the flame exposure for a period of 10 min, then shut off the burner. If sustained flaming lasting longer than 4 s on the unexposed side of the test assembly has not occurred, continue the test for an additional 60 min, observing for evidence of sustained flaming lasting longer than 4 s or glow on the unexposed side. Terminate the test prior to the completion of the 60 min observation period at such time as all evidence of flame, glow and smoke has disappeared.

NOTE 2—An infrared thermometer has been found to be useful to detect the increase of temperature on the unexposed side of the test assembly.

10.4.4 Perform photographic or video documentation, or both, before, during and after each test.

10.4.5 Perform the tests in triplicate and report as specified in Section 11.

11. Report

11.1 The report shall include the following:

11.1.1 Name and address of the testing laboratory,

11.1.2 Name and address of test sponsor,

11.1.3 Description of the test specimen assembly including construction details of the wall system, including details of individual components and the manufacturer's installation details and limitations as applicable.

11.1.4 Number of specimens tested,

11.1.5 Conditioning of test specimen assemblies,

11.1.6 Pre-test accelerated aging/weathering exposure, as applicable,

11.1.7 Moisture content of hygroscopic elements of wall system construction at the time of testing,

11.1.8 Details of the calibration including heat supply rate,

11.1.9 Date of test and identification number and date of report,

11.2 *Test Results*—The test results shall include:

11.2.1 A notation of the time and location of sustained flaming on the unexposed side of the test assembly during the test along with the sequence number of the test specimen.

11.2.2 A determination of the presence of glow on the unexposed side of the assembly at the end of the 60 min observation period.

11.2.3 Observations of the burning characteristics of the exposed surface of the test wall during and after the test exposure.

12. Precision and Bias

12.1 Repeatability and bias data is currently being worked on by task group E5.14.01.

13. Keywords

13.1 exterior wall covering; fire resistance; fire-test-response characteristic; siding; wall assembly

APPENDIXES

(Nonmandatory Information)

X1. COMMENTARY

X1.1 **Introduction**:

X1.1.1 This test method was developed in response to recommendations developed by the California Office of the State Fire Marshal (SFM) and the International Wildland-Urban Interface Code (IWUIC) regarding the enhancement of exterior fire protection of structures in a wildland fire (exterior wildfire exposure). The SFM recommendations established performance criteria for a variety of materials to be used on the exterior buildings, structures, and detached accessory structures. This test method is intended to address one component of an exterior wildfire exposure, that is, exterior walls exposed to direct flame impingement. The purpose of this standard is to provide a definitive set of procedures for the evaluation and measurement of the resistance to fire penetration of exterior wall structures. The test is a practical attempt to simulate the case where ignition of flammable materials (plants, trash, a deck or shed, etc.) might be adjacent to a building.

X1.2 Exterior Wall Test Method Development

X1.2.1 The major concern for walls having combustible cladding is ignition either directly (by radiation, convection, flame contact) or indirectly (combustion of materials near the

base of the wall), followed by penetration into the wall cavity (directly or indirectly through the wall assembly, or through seams) and then into the building.

X1.2.2 For non-combustible cladding, the major concern is conductive heat transfer through the wall cavity that can ignite studs or other wall cavity materials. Also, for materials having seams, there is a possibility of penetration via these openings.

X1.2.3 In an attempt to better understand the effects of flame impingement on a wall structure, a preliminary test method was developed by the Forest Products Fire Research Laboratory at UC Berkeley. Ignition by ornamental plants (or equivalent combustibles) was considered by the Berkeley researchers as the most probable source of flame impingement of walls, and a number of tests were run to determine the likely intensity and duration of exposure from small to medium size plants. From these tests (and other sources of research), the decision was to use a 150-kW line burner for a 10-min exposure. The exposure time was determined by field reports on the maximum length of time that a structure would be subjected to direct flames from a passing wildfire.

X1.2.4 The wall assembly test module (Fig. 1 in this standard) was designed to permit rapid installation and removal of 1.2-m by 2.4-m (4-ft by 8-ft) wall assemblies, and was designed to prevent penetration of fire at the panel edges. The side enclosure and soffit provide shielding from ambient air currents and permit normal eddy currents to occur. Insulation or sheathing on the back side of the wall assembly were left out of the construction in order to permit visual and infrared observation of combustion or temperature build-up on the unexposed side.

X1.2.5 Preliminary tests were performed to obtain data on a wide range of materials and combinations of common materials used in the construction of exterior wall systems. Table X1.1 and Table X1.2 give the cladding and sheathing materials used in the preliminary tests. All sheathing was nominal ½ in. thickness (7/16 in. for OSB, 15/32 in. for plywood). All wall assemblies were framed with Douglas-fir 2 by 4s, 16 in. on center. For cladding, seams were included that would representative of a typical wall. For the horizontal lap cladding products, the patterns included plain bevel, rabbetted bevel, and shiplap. The vertical joints in panelized cladding products were either shiplap or simple butt-joints. Sheathing, when used, was either OSB or plywood, and with and without a butt joint (that is, using an uncut 4 by 8 panel).

X1.2.6 The 10-min 150-kW exposure was used for the siding-sheathing combinations, followed by an additional 60-min observation to detect any smoldering combustion (Table X1.1). The use of infrared photography of the back of the test wall was used to reveal development of increasing temperatures or persisting hot spots. Other tests (Table X1.1 and Table X1.3) were run on solely cladding or sheathing, where the burner was left on until failure to determine the weak points in various materials.

X1.2.7 Most of the siding-sheathing assemblies (Table X1.1) exhibited acceptable performance. However, the hardboard siding failed because it burned vigorously and warped away from the sheathing, exposing it to flames. For the siding-only tests (Table X1.2), flame penetration occurred at joints for “combustible” siding. The exception was fiber-cement siding, for which in one case intermittent flame penetration was first seen at a crack in the panel, while in another, conducted heat ignited a stud behind the siding.

X1.2.8 The nature of the siding joints had a substantial effect on relative performance. Most vulnerable was the plain bevel, while rabbetted and shiplap joints were increasingly resistant to flame-through. The other important factor in fire resistance of siding was the material itself. When the joint type was similar, wood composites such as hardboard and OSB were more vulnerable to fire penetration than solid wood and wood fiber-cement products.

TABLE X1.1 Test Results for Cladding Over Sheathing

Product Description	Joint Type	Sheathing	Result	Notes
1 by 8 Cedar v/rustic pattern	Shiplap siding installed horizontally	7/16 in. OSB	No flame-through, no glowing at test termination	All signs of combustion ceased prior to end of 70 min test period
1 by 6 Ponderosa Pine v/rustic pattern	Shiplap siding installed horizontally	7/16 in. OSB	No flame-through, no glowing at test termination	All signs of combustion ceased prior to end of 70 min test period
1 by 6 Redwood, Rabbeted Bevel pattern	Rabbeted Bevel siding installed horizontally	7/16 in. OSB	No flame-through, no glowing at test termination	Glowing persisted on exposed face at test termination
1 by 6 Ponderosa Pine v/rustic siding pattern, end and edge glued	Shiplap siding installed horizontally	7/16 in. OSB	No flame-through, no glowing at test termination	All signs of combustion ceased prior to end of 70 min test period
Hardboard lap siding	Rabbetted bevel, horizontal lap	7/16 in. OSB	Flame-through at 22 min.	Penetration at lap joint and sheathing joint
Ffiber cement lap siding	Plain bevel, horizontal lap	7/16 in. OSB	No flame penetration or glow	
Fiber cement panel siding	Vertical panel butt joint	7/16 in. OSB	No flame penetration or glow	

TABLE X1.2 Test Results for Cladding Only (No Sheathing)

Product Description	Joint Type	Application	Result	Notes
T1-11 Southern Yellow Pine, 19/32 in.(nom)	Vertical panel lap joint	Direct to studs	No flame-through, no glowing at test termination	All signs of combustion ceased prior to end of 70 min test period
T1-11 Douglas fir, 19/32 in.(nom)	Vertical panel lap joint	Direct to studs	No flame-through, no glowing at test termination	All signs of combustion ceased prior to end of 70 min test period
Reverse Board & Batt, Douglas fir (19/32 in.)	Vertical panel lap joint	Direct to studs	No flame-through, no glowing at test termination	All signs of combustion ceased prior to end of 70 min test period
1 by 6 Plain Bevel, Western Red Cedar, FRT	Plain bevel, horizontal lap	Direct to studs	Flame-through at 19 min	Failed at lap joint
1 by 8 Redwood, finger-jointed, Rabbetted bevel	Rabbetted bevel, horizontal lap	Direct to studs	Flame-through at 6 min	Failed at lap joint
Wood fiber cement board, Plain bevel lap siding	Plain bevel, horizontal lap	Direct to studs	Flame-through at 21.5 min	Stud ignited
Wood fiber cement board, Panel siding	Vertical butt joint, panel	Direct to studs	Flame-through at 29 min	Failed at crack in panel

TABLE X1.3 Test Results for Sheathing Only

Product Description	Joint Type	Result	Notes
Oriented Strandboard, 7/16 in.	Vertical butt joint (on stud)	Flame-through at 12 min	Failed at joint
Douglas fir plywood, (CDX), nom 15/32 in.	Vertical butt joint (on stud)	Flame-through at 15 min	Failed at joint
Oriented Strandboard, 7/16 in.	No joint	Flame-through at 12 min	Failed at joint
Douglas fir plywood, (CDX), nom 15/32 in.	No joint	Flame-through at 15 min	Failed at joint

X1.2.9 The length of the recommended observation period (60 min) after the 10-min burner exposure is considered important to ensure the detection of sustained smoldering combustion. In WUI fires, the persistence of smoldering combustion could lead to loss of structures long after they might be considered safe.

X1.2.10 Based on the UC Berkeley test method development program, the California SFM adopted the following **Conditions of Acceptance**:

X1.2.10.1 Absence of flame penetration through the wall assembly at any time.

X1.2.10.2 Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-min test.

X2. ACCELERATED AGING/WEATHERING OF TEST MATERIAL

X2.1 The intent of the investigation will determine whether or not some form of accelerated aging/weathering of the test material prior to conducting the fire test is warranted. For product development research it may not be important or cost effective to subject a prototype test material to a treatment cycle before conducting a fire test. That decision is afforded the product development proponent. However, it is important to alert the user of this test method that test material exposure conditions are always important to consider.

X2.2 It is reasonable to assume that some form of accelerated aging/weathering cycle will be required by an AHJ or listing agency when it is important to evaluate the permanence of the fire retardant properties of the product. In this case the particular aging process will be defined by the intended end-use application and the materials content of the product being tested. Because this is a test method that can be used for a wide range of products or assemblies, or both, it is not reasonable to assume that all materials should be subjected to the same accelerated aging/weathering process, particularly when materials content can be dramatically different between product types. For example, Test Method D2898 has long been used as an accelerated weathering process with fire retardant treated lumber products where leaching of chemicals may be an issue. For a product comprised of 100 % plastic, where leaching may not be an issue, some other environmental stress may be appropriate.

X2.3 There are several different accelerated aging/weathering procedures available. The effectiveness of these procedures vary with changes in the composition of the substrate being aged. The following procedures, Practice D2898, Specification D6662, and Specification D7032 are currently available. Care should be taken in choosing the

procedure that is most appropriate for the material under evaluation. Always check with the regulatory agency to verify which procedure they require prior to testing.

X2.4 The language has been worded so that accelerated aging/weathering is not required in all cases, but is required where such results are a condition of acceptance for a product to be used in a code regulated application. As such, the language provides the flexibility needed for the range of materials being used for exterior wall applications.

X3. SUSTAINED FLAMING

X3.1 The definition of sustained flaming in 3.2.4 is derived from that in Terminology E176: "flame on or over the surface of a test specimen that lasts longer than a defined period of time." The defined period of time of 4 s used in this standard is consistent with that of other standards, including Test Methods E2886, E1354, E1474, E1740, and E2102, and reflects current laboratory practice.