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New Annex B - See attached word file.

Supplemental Information

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Committee Statement

Committee Statement: For many years engineering judgements have been used to extend data from NFPA 285 assembly tests to systems that have not been tested. This annex provides guidance on how to provide engineering judgements appropriately.

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[Global FR-15]

Annex B Guide for Extensions of Results from Assemblies that Meet NFPA 285 Test Requirements

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Administration.

B.1.1 Scope.

B.1.1.1

This annex covers the extension of NFPA 285 test results obtained from NFPA 285 tests to wall assemblies that contain changes in materials, components, or configurations of materials that differ from a tested wall assembly.

B.1.1.2

This annex is based on principles involving the extension of test data using simple considerations.

B.1.1.3

The extension of test data/results in this annex is primarily based on the fire performance of wall assemblies that meet the acceptance criteria of Chapter 10.

B.1.2 Purpose.

B.1.2.1

The purpose of this annex is to create guidelines for qualified engineers or design professionals to follow when performing a design for or an engineering judgement on NFPA 285 wall assemblies.

B.1.2.2

Statements in this annex only indicate whether the wall assembly with a change in the materials or construction will either meet the requirements of NFPA 285 or not meet the requirements of NFPA 285.

B.1.3 Application.

B.1.3.1

This annex is only applicable for evaluating wall assemblies for compliance with NFPA 285.

B.1.3.2

This annex does not cover the substitution of one proprietary material for another proprietary material or materials for which fire test data are not presently available.

B.1.3.3

An exterior wall assembly that is addressed via this annex is considered to be a system. All the systems' materials and components, such as the base wall, in-cavity insulation, the water-resistive barrier (WRB), exterior insulation, air gap, mounting system, and the exterior veneer or cladding, are considered as parts of the system. These items together achieve a specific NFPA 285 test result.

B.1.3.4

This annex does not purport to be comprehensive in its treatment of nonproprietary modifications of tested constructions. Engineering evaluations or tests are recommended for assessing modifications not specifically covered in this annex.

B.1.3.5

An actual NFPA 285 test with appropriate materials or construction can be used to provide deviations from the guidelines provided in this annex.

B.1.3.6

This annex covers the following types of analyses:

(1) Base wall, including the following:

    (a) Base wall with steel studs and gypsum (see Section B.5)

    (b) Base wall alternatives (e.g., concrete and masonry units)

    (c) Base wall with cavity insulation

(2) Floor line fire stops

(3) Exterior sheathing

(4) WRB over exterior sheathing

(5) Air gap

(6) Exterior insulation

(7) Exterior WRB over insulation

(8) Drainage mats

(9) Exterior cladding

(10) Attachment system

(11) Window perimeter, including headers, jams, and sills (treatment and flashings)

B.1.3.7

To apply some of the principles described in this annex, reference to the test report of the NFPA 285 tested wall assembly is necessary.

B.1.3.8

To apply some of the principles described in this annex, additional fire test information or data might be required. This data must be provided via referenced sources or fire test data.

B.1.3.9

In NFPA 285, the tested wall assemblies are subjected to specific laboratory fire test exposure conditions. Substitution of different test conditions or changes in the construction materials can change the measured fire-test-response characteristics of the wall assembly. Therefore, the extension of data and results are valid only for the fire test exposure conditions described in NFPA 285.

B.1.3.10

The use of this annex might lead to the development of engineering analyses or judgments which, in turn, could be used to obtain approvals for the substitution of materials in NFPA 285 tested wall assemblies.

B.1.3.11

Users of this annex, when developing engineering analyses or judgments, must have knowledge and understanding of NFPA 285 to include performance of pertinent tested assemblies, materials, and NFPA 285 conditions of acceptance.

B.1.3.12

These analyses/judgments, where acceptable to the AHJ, can be used as the basis for approval where an alternative design, material, or method of construction is proposed for use in a previously NFPA 285 tested wall assembly.

B.2 General.

B.2.1

The same conditions of acceptance as specified in NFPA 285 and followed in the establishment of a passing result of the original NFPA 285 tested assembly should be used as the basis of the extension when evaluating the effects of the modification or substitution of components in a wall assembly.

B.2.2

Where replacing a component (or components) in a wall assembly that has been successfully tested per NFPA 285 with baseline component(s), the alternate component(s) must be analyzed individually and, more importantly, as a system. Changing one component can affect the overall fire response of another component and of the entire wall system.

B.3 Limitations.

B.3.1

The extension of the NFPA 285 test results is valid only for changes to the tested specimen that fall within normal and reasonable limits of standard construction practices.

B.3.2

Analyses or judgments are valid only if the identified changes are the only changes in the construction or properties of the components.

B.3.3

Multiple changes can have a different cumulative effect than that of individual changes applied separately.

B.3.4

It is not possible to analyze every configuration or every potential change to a tested configuration. This document provides the best information to date and when in doubt about a change, an NFPA 285 test should be conducted.

B.4 Wall Design.

B.4.1

An exterior wall can have many components, including, but not limited to, the following (interior to exterior):

(1) Base wall interior—gypsum wallboard (or another thermal barrier)

(2) Base wall framing—studs (depth, gauge, materials, and so on)

(3) Stud cavity insulation—combustible and noncombustible, thickness, vapor barriers, and so on

(4) Stud cavity floor line firestop—mineral wool (friction fit or Z clip)

(5) Air gap in stud cavity

(6) Exterior sheathing—gypsum-based sheathing, no sheathing, and other sheathing material

(7) Other base walls—concrete, concrete masonry unit (CMU), other (materials, thickness, and so on)

(8) WRB over exterior sheathing—none, mechanically fastened sheet, fluid applied, self-adhered

(9) Exterior insulation—expanded polystyrene foam plastic insulation (EPS), extruded polystyrene foam plastic insulation (XPS), polyisocyanurate foam plastic insulation (Polyiso), spray polyurethane foam plastic insulation (SPF), mineral wool insulation, and so on

(10) WRB over insulation—none, mechanically fastened sheet, fluid applied, self-adhered

(11) Exterior cladding or veneer attachment system, air gaps, if required, and joints, joint types, joint location, and configuration

(12) Exterior cladding/veneer—materials, thickness

B.5 Analysis: Base Wall—Steel studs/Gypsum.

B.5.1 Interior Wallboard Considerations.

B.5.1.1

Most NFPA 285 tests use **5⁄8** in. thick, Type X gypsum wallboard as the only option. However, **5⁄8** in. thick, Type C gypsum wallboard can be used as an equivalent.

B.5.1.2

Testing experience has shown that using **1⁄2** in. regular gypsum wallboard can cause failures of thermocouple nos. 18 and 19. Therefore, use of **1⁄2** in. regular gypsum board should not be permitted as the interior sheathing unless this material was used in a successful NFPA 285 test.

B.5.2 Steel Stud Considerations.

Most NFPA 285 tests have employed 3**5⁄8** in. deep (92 mm), 20 or 25 GA. steel studs spaced 24 in. (0.6 m) on center. Field applications typically use 16 in. (0.4 m) or 24 in. (0.6 m) spacing. Wider spacing is not as stable since the wall is potentially more flexible and prone to warping. As with ASTM E 119, *Standard Methods of Tests of Fire Resistance of Building Construction and Materials*), testing, thicker studs, deeper stud depth, and 16 in. (0.4 m) spacing is allowed based on testing worst case. Testing with lateral bracing requires lateral bracing to be used. Testing without lateral bracing can allow lateral bracing as an option. Fire-retardant-wood (FRTW) framing should also be tested.

B.6 Analysis: Base Wall Alternatives—Concrete and CMU.

Testing with non-load-bearing steel or wood stud base walls allows use of concrete or CMU walls as alternatives.

B.7 Analysis: Base Wall Alternatives—Wood Studs.

B.7.1

Where a wood stud wall assembly is to be tested, the following construction should apply:

(1) The wood studs should be FRTW and placed at their maximum spacing.

(2) At each floor line of the test wall, three layers of nominal 2 in. (50 mm) thick wood plates should be used.

(3) The header, sill, and jambs should consist of nominal 2 × 4 in. thick wood.

(4) The cavities should be empty or contain a noncombustible insulation either faced or unfaced.

(5) For interior wallboard, **5⁄8** in. thick, Type X gypsum wallboard should be used.

B.7.2

If an FRTW wood stud wall is tested, the results cannot be applied to a steel stud wall due to potential warping and bending of the steel studs.

B.7.3

An FRTW wood stud wall can be allowed based on a steel stud wall test. The FRTW wood stud wall assembly must comply with Section B.7.

B.7.4

FRTW wood sheathing on the outer face of the studs is only allowed without a test when the wood sheathing is covered on its exterior face by one layer of **5⁄8** in. Type X gypsum sheathing and the interior face of the wall is covered by **5⁄8** in. Type X gypsum wallboard.

B.8 Analysis: Base Wall—Cavity Insulation.

B.8.1

If the base wall assembly is tested without any insulation, then the cavity can remain empty or contain an insulation such as fiberglass or mineral wool. These insulations can be faced or unfaced. Additionally, a 6-mil thick water/air barrier, such as 6-mil polyethylene, can be used when attached to one of the stud faces.

B.8.2

If the base wall assembly is tested with fiberglass (faced or unfaced) insulation, then the cavity can remain empty or contain a fiberglass insulation. This insulation can be faced or unfaced. Additionally, a thin water/air barrier, such as 6-mil polyethylene, can be used when attached to one of the stud faces.

B.8.3

If the base wall assembly is tested with mineral wool (faced or unfaced) insulation, then the cavity must contain the mineral wool insulation. This insulation can be faced or unfaced. Additionally, a thin water/air barrier, such as 6-mil polyethylene, can be used when attached to one of the stud faces.

B.8.4

Testing with cellulose insulation in the base wall assembly allows use of cellulose insulation of the same material and method of application as tested (e.g., wet applied, dry applied, and so on). However, testing with no insulation does not allow one to add cellulose as optional insulation.

B.8.5 SPF Insulation.

B.8.5.1

The following only applies where the SPF is encapsulated from all sides within a framed stud wall (i.e., horizontal floor line firestops at each floor, lateral studs, in-plane gypsum board on both sides). It has been shown that testing with and without air gaps and studs of various thicknesses and depths, burning of the SPF is trapped via the floor line firestops and stud framing when clad on both sides with **5⁄8** in. thick, Type X gypsum wallboard or sheathing. Different rules apply for open cell vs closed cell SPF.

B.8.5.1.1 Open Cell SPF.

B.8.5.1.1.1

Testing with full stud cavity depth of an open cell SPF allows any stud depth of open cell SPF with an air gap (if used) between the SPF and the gypsum wallboard.

B.8.5.1.1.2

It is permissible to determine a worst-case SPF formulation via ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*, testing and test the worst case in the NFPA 285 test wall assembly to facilitate extension to other SPFs within that manufacturer's brand.

B.8.5.1.1.3

It is not permissible to allow SPF of one manufacturer to be used in an NFPA 285 test based on data from another manufacturer.

B.8.5.1.1.4

It is permissible to allow a specific SPF successfully tested per the base wall test described in Section B.21 to be used as a base wall assembly with other materials applied to its exterior face.

B.8.5.1.2 Closed Cell SPF.

Because of the potential intumescing nature of closed cell SPF, the following rules apply:

(1) A test with partial stud depth cavity fill does not permit a full cavity fill when using closed cell SPF.

(2) Testing partial stud depth cavity fill (with air gap) only allows partial fill with the same or lesser air gap for any stud depth.

(3) Testing with full stud depth fill allows full stud depth cavity fill or less.

(4) It is not permissible to allow a manufacturer's SPF to be substituted based on data from another manufacturer's product.

(5) It is permissible to allow a specific SPF successfully tested per the base wall test described in Section B.21 to be used as a base wall assembly with other materials applied to its exterior face.

B.8.6

EPS, XPS, and Polyisocyanurate foam plastic insulations are not typically used in stud cavities but can be allowed based on NFPA 285 test assemblies that use these materials as insulation in the stud cavity.

B.8.6.1

Testing the maximum thickness and density (for EPS or XPS) allows lesser density and thickness. Testing the maximum thickness of polyisocyanurate allows thinner polyisocyanurate.

B.8.6.2

Polyiso brands/products can not be interchanged unless each brand/product has been tested per NFPA 285 to be used in the stud cavity. A Class A Polyiso per ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, can be used in lieu of a Class B Polyiso only when the same facer is used on the Class A Polyiso as used on the Class B Polyiso that was tested per NFPA 285.

B.9 Analysis: Floor Line Firestops.

B.9.1

In actual construction, all NFPA 285–compliant stud-base walls require floor line firestops within the stud cavity. Where the stud cavity is empty or where any insulation is used in the stud cavities, firestopping material is required. The firestopping materials typically used are minimum 4 pcf mineral wool (friction fit or Z-clipped in place) and the mineral wool should be the full depth of the stud cavity and a minimum of 4 in. (100 mm) high.

B.9.2

Where the mineral wool is friction fit, at least 25 percent compression is required. Where it is Z-clipped in place, the Z-clips should be steel. In some constructions, ASTM E2307, *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-scale, Multi-story Test Apparatus,* approved perimeter joint fire barrier

systems can replace the mineral wool system as long as the ASTM E2307 joint is approved for use with the specific wall design in question. It is important that the fire path be analyzed so that the fire is stopped by the ASTM E2307 system, including within the stud cavity of the base wall. A wall with an ASTM E2307 firestop system cannot be installed up against combustible insulation, but can be installed next to mineral wool (of the approved thickness and density), gypsum wallboard (where approved for the ASTM E2307 system), or metallic spandrel plates (where approved by the ASTM E2307 system).

B.9.3

If intumescent firestopping materials are used in the NFPA 285 tested wall assembly, they must also be used in the actual construction. The location of the intumescent firestopping between the tested assembly and the actual assembly must be evaluated so that the tested configuration provides the assumed protection for the actual wall assembly.

B.10 Analysis: Exterior Sheathing.

B.10.1

NFPA 285 tests usually incorporate **1⁄2** in. regular gypsum sheathing, or **5⁄8** in. thick Type X gypsum sheathing conforming to ASTM C1396/C1396M, *Specification for Gypsum Board*, or **5⁄8** in. thick Type X glass matt sheathing conforming to either ASTM C1177, *Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing,* or ASTM C1178, *Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.* Testing with one of these materials qualifies the other materials of the same or greater thickness.

B.10.2

Some approvals allow “None” based on successful NFPA 285 wall assembly tests where the wall assembly had no sheathing. However, allowing no exterior sheathing might allow combustible exterior insulation to burn from both sides, or might allow ignition of combustible cavity insulations.

B.10.3

For wall assembly designs that allow no exterior sheathing, the specific configuration of the wall assembly that passed NFPA 285 should be followed carefully.

B.10.4

Where an exterior insulation is tested with no exterior gypsum sheathing (i.e., the insulation is the exterior sheathing), the use of exterior gypsum sheathing is optional.

B.10.5

Where no exterior gypsum sheathing is tested, any gypsum-based sheathing can be used.

B.11 Analysis: WRB Over Exterior Sheathing.

B.11.1

Some successful NFPA 285 tested wall assemblies have incorporated a WRB product over the exterior sheathing. Testing with a specific WRB allows WRBs with lower or lesser fire characteristics to be used in place of the specific tested WRB.

B.11.2

The determination of the fire characteristics of WRBs can be made using the cone calorimeter in ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*.

B.11.3

B.11.3.1

The cone calorimeter shall be conducted as follows:

(1) Testing should be done in triplicate for each material.

(2) Testing should be conducted at a radiant heat exposure of 50 kW/m^2.

(3) Test material should be applied to the "paintable" paper face of one layer of **5⁄8** in. thick, Type X interior gypsum wallboard (not sheathing).

(4) The test should be conducted per ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter* and all standard data collected and reported.

B.11.3.2

When comparing test data between two or more WRBs, the following data, should be used:

(1) Ignition time(s)

(2) Flame duration(s)

(3) Peak heat release (kW/m^2)

(4) Average heat release for 60-second intervals (kW/m^2)

(5) Average heat release for 180-second intervals (kW/m^2)

(6) Average heat release for 300-second intervals (kW/m^2)

(7) Total heat release (MJ/m^2)

(8) Effective heat of combustion (MJ/kg)

When comparing the values, the parameters in B.11.3.2(3) through B.11.3.2(8) are the most important. If the values of the proposed WRB are better than (i.e., lower), or very similar to the tested WRB, then the substitution can be allowed.

If one or more parameter is significantly higher for the proposed WRB, then a determination must be made if the proposed WRB can be used. Any such determination should be provided in writing.

B.12 Analysis: Exterior Insulation.

B.12.1

Some NFPA 285 tests incorporate exterior insulation. Various types are used, such as mineral fiber (mineral wool), SPF, Polyiso, EPS, and XPS.

B.12.2

Where mineral fiber or mineral wool insulation is used as exterior insulation, a minimum 1 in. (25.4 mm) thickness should be tested. Increasing the thickness or density, or both, of the insulation is allowed.

B.12.3

Where testing the SPF, the Polyiso, the XPS or the EPS, the maximum thickness proposed for use should be installed in the wall assembly and tested. The testing of the maximum thickness allows lesser thicknesses of the same insulation material. Reducing the thickness of a combustible insulation (of the same brand, type, and density) is allowed since the wall has less fuel load than the tested system.

B.12.4

The exterior insulation should be installed per the manufacturer’s installation instructions.

B.12.5

See Section B.20 for guidance regarding the use of exterior insulation in conjunction with window headers as the header design can vary based on the exterior insulation material. The NFPA 285 test conditions and construction details must be used as the minimum basis of the design for the actual construction.

B.12.6

It is not permissible to eliminate the use for exterior insulation, based on testing with insulation and a WRB on the base wall, except when the following applies:

(1) Where a combustible exterior insulation has been tested without a WRB over the base wall, it is permissible to allow elimination of the exterior insulation.

(2) Where eliminating exterior insulation, it is permissible to use WRB's that are allowed to be used over the exterior foam insulation on the tested wall with the specific claddings allowed for that combination and air gap.

(3) Where the WRB was included in the wall assembly that passed the NFPA 285 test with the exterior cladding to be used in the proposed wall.

An NFPA 285 test on one brand or type of insulation cannot be used to qualify another brand or type of insulation.

Where using the same foam plastic insulation in the actual construction as was tested (i.e., brand, type, facing, and so on), the thickness and density can be varied based on a calculation using the BTU/ft^2 value of the insulation used in the successful NFPA 285 test.

B.13 Analysis: WRB Over Exterior Insulation.

B.13.1

Some successful NFPA 285 wall assembly tests have incorporated a WRB product over the exterior insulation that is behind the exterior cladding. Testing with a WRB allows WRBs with lower or lesser fire propagation characteristics to be used in place of the tested WRB. See Section B.11.

B.13.2

It is not permitted to substitute a WRB for NFPA 285 tested WRB based on cone calorimeter testing if the underlying material directly behind the WRB in the cone test is not the same as that used in the successful NFPA 285 wall assembly test.

B.14 Analysis: FRTW Plywood Over Exterior Insulation.

B.14.1

The application of FRTW plywood over the exterior insulation must be verified by an NFPA 285 test.

B.14.2

The type, thickness, and attachment details of the plywood must be the same as that tested. Additionally, the remainder of the proposed wall assembly (i.e., the WRB and veneer), must be the same as that used in the successful NFPA 285 test.

B.15 Analysis: Air Gap.

B.15.1

NFPA 285 testing of wall assemblies with rain-screen claddings or anchored masonry veneer facades incorporate air gaps. The air gap in this case is the distance from the interior face of the cladding, or the interior face of the masonry veneer, to the next underlying material such as the base wall or WRB or insulation. Distance to framing materials/systems are not included in this measurement.

B.15.2

For anchored masonry veneer such as brick facades, the tested air gap is typically 2 in. For metal composite material/aluminum composite material (MCM/ACM), the air gap is typically between 1**1⁄2** and 2**1⁄2** in. (38 mm and 63.5 mm). Other cladding, such as high-pressure laminates (HPL) might have other required air gaps. It is important that the air gap allowed on the actual construction not be greater than 1 in. (25.4 mm) from what was tested for the cladding being evaluated.

A test on a light cladding with a specific air gap can allow the same air gap, (+ **1⁄2** in. [12.7 mm]), or less with other light claddings, or heavy masonry, as long as the tested cladding is worst case.

A test on a heavy masonry cladding with a specific air gap can allow the same air gap (**1⁄2** in. [12.7 mm]), or less with other masonry claddings as long as the tested cladding is worst case.

B.16 Analysis: Drainage Mats.

B.16.1

The use of drainage mats is becoming more common in some types of wall constructions. Typically, these are installed between the back face of the veneer and the front face of the underlying material.

B.16.2

The drainage mat might or might not fill the depth of the gap into which it is installed.

B.16.3

Noncombustible drainage mats can be used in the actual construction over exterior insulation without NFPA 285 testing where the air gap tested is not exceeded.

B.16.4

Combustible drainage mats can be used over exterior insulation only if tested with the specific exterior insulation and cladding as a system.

B.16.5

Combustible drainage mats installed in a wall assembly can only be used if it is to be used in the same location and between the same materials that were used on the tested system.

B.16.6

Use of cone calorimeter test data might not provide adequate information for evaluating potential substitution of drainage mat materials. This is due to potential influences of density, thickness, attachment details, and so on.

B.17 Analysis: Exterior Cladding/Veneer.

B.17.1

To date, most approvals for insulation or WRBs have been historically based on tests with brick or MCM/ACM claddings. These two claddings have been considered as acceptable baseline claddings from which most other noncombustible claddings can be approved. Other noncombustible claddings can be evaluated against brick or ACM as potential improvements to the tested design, are considered equivalent, or are deemed to not affect NFPA 285 test results.

B.17.2

For NFPA 285 wall assembly fire tests where a worst-case cladding choice for combustible underlying components is desired, the choice cladding to be used must be demonstrated to be the worst case for those under consideration. The method should also include comparative predicted performance of alternate cladding materials.

B.17.3

Where an NFPA 285 test used a firestop within the airspace between the cladding and insulation or base wall, this firestop is required for all actual construction using this cladding/insulation/base wall combination. However, a major concern is where the firestop was located in the test sample and how this location relates to the actual construction.

B.18 Analysis: Specific Testing Information for Various Claddings.

B.18.1 MCM/ACM/ZCM Panel.

B.18.1.1

The MCM is a broad category of panels that consist of a metal facing on each side of a solid plastic core material. The primary MCM in use today is the aluminum-faced panel (ACM).

B.18.1.2

Changes in the core material (e.g., formulation, thickness, density, and so on) of a tested MCM within a brand must be analyzed on a case-by-case basis. It is difficult to predict core/skin adhesion under fire conditions.

B.18.1.3

Changes to the metal skin (e.g., type, alloy, thickness, and so on) of a tested ACM/MCM (with the same core as the tested core) is allowed only if the alternate skin provides same-as or better fire performance to the tested skin. For example, testing with aluminum skin allows, based on higher melting points, titanium skin, copper skin or stainless steel skin, but not zinc.

B.18.1.4

If the exterior facer of the cladding material is not mechanically fastened to resist delamination during testing, the system must be tested.

B.18.1.5

If the exterior skin of the cladding material is mechanically fastened to resist delamination during testing, the worst-case scenario is a routed return panel mechanically fastened to anchor extrusions, either continuous or clip, where the joint is open (i.e., no sealant to restrict airflow through the perimeter of the panel to the free air cavity). The width of the joint is typically **1⁄2** in.; however, reasonable variation in that joint width would not seem to impact the airflow to the free air cavity.

B.18.1.6

Typical system depths provide a free-air cavity 1**1⁄2** in. to 2 in. (38 mm to 50 mm) behind the panel (back face of the panel to insulation or sheathing). Thus, as a guideline, the free-air cavity depth should be 2 in. (50 mm) ± **1⁄2** in. (12.7 mm) and 2 in. (50 mm) + **1⁄2** in. (12.7 mm) to any smaller free-air cavity.

B.18.1.7

The free-air gap in the actual construction should not exceed **1⁄2** in. greater than the tested free-air gap.

B.18.1.8

Successful NFPA 285 testing with an ACM typically allows claddings that are less flammable than ACM/MCM (with open joints) such as uninsulated metal panels (e.g., aluminum or copper), noncombustible fiber cement, porcelain, mortared thin brick, other masonry, and materials of similar noncombustibility.

NFPA 285 testing with MCMs does not allow other combustible claddings.

B.18.2 Composite Panels (non-MCM).

B.18.2.1

Composite panels typically consist of an aluminum facer but have cores that are adhesively applied to the facers. The cores are typically aluminum honeycomb or corrugated metals, with stone or other composite material veneer.

B.18.2.2

Composite panels must be tested per NFPA 285. Even though the exterior facer is non-combustible and has a Class A flame-spread rating per ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*. Previous unsuccessful NFPA 285 testing has demonstrated potential problems with adhesives or other materials used in construction of composite panels.

B.18.3 Brick Façade.

Testing with brick allows other masonry with specific thickness and no open joints.

Calculations of the interior surface temperature of the cladding can make use of thermal diffusivity techniques to determine the equivalent thickness. The values of the properties used in the calculation must have been determined at the expected temperatures. Additionally, the references for the values of the various parameters must be reported. An exception to this rule is where the exterior cladding and the exterior insulation systems (and any materials in between) are noncombustible.

B.18.4 High-Pressure Laminates (HPL).

B.18.4.1

Testing the thickest HPL panel is not always worst case. It is advisable to test the thinnest and thickest panels.

B.18.4.2

Mineral wool or mineral fiber exterior insulation is typically used in successful NFPA 285 tests.

B.18.4.3

Testing without mineral wool exterior insulation and with a WRB allows mineral wool to be added as an option.

B.18.4.4

Where a 2 in. or greater thickness of mineral wool or mineral fiber is installed directly over the WRB, any type of WRB can be used.

B.18.4.5

Testing with exposed fasteners does not qualify concealed fasteners.

B.18.4.6

Testing with concealed fasteners does not qualify exposed fasteners.

B.18.5 Exterior Insulation and Finish System (EIFS).

B.18.5.1

Each EIFS lamina system (i.e., combination of base coat, mesh, and finish coat) must be tested separately.

B.18.5.2

An EIFS system must be tested and built with materials from the same manufacturer. EIFS components from different manufacturers cannot be mixed.

B.18.5.3

Each EIFS drainage system must be tested separately.

B.18.5.4

A test on the maximum EPS or XPS thickness can allow thinner EPS or XPS of the same density or lower density.

B.18.5.5

Insulation board edges at system terminations must be back or edge wrapped unless tested otherwise in the NFPA 285 test. If back-wrapping is used in the test, then in actual construction back-wrapping should be used at the following:

(1) Top and bottom of each wall

(2) Other horizontal wall terminations

(3) Door and window penetrations

(4) Expansion and control joints

B.18.6 Insulated Metal Panels (IMPs).

B.18.6.1

The fire performance of IMPs can be affected by both the panel's construction and the configuration/installation of the panels.

B.18.6.2

Typically, NFPA 285 tests of IMPs involve steel facings on both sides of the panel. Other metal facings can be used with melting points less than steel based on NFPA 285 testing of those panels.

B.18.6.3

In actual construction, the thickness of the facers on each side of the IMP must be the same or greater than that used in a successful NFPA 285 test.

B.18.6.4

Typically, flat profiles have greater potential for flame-spread than complex profiles.

B.18.6.5

NFPA 285 testing of thicker panels allows the use of thinner panels.

B.18.6.6

To qualify both horizontal and vertical IMPs, the IMP must be tested in both the vertical and the horizontal configurations.

B.18.6.7

Where an IMP is successfully NFPA 285 tested without a base wall and installed directly to the test apparatus, the IMP can be allowed for use over a steel stud frame wall.

B.18.6.8

Where the IMP is covered with a combustible veneer, combination must be tested per NFPA 285.

B.18.6.9

Testing of IMP with concealed fasteners allows the use of exposed fasteners.

B.18.7 Fiber Cement Board.

B.18.7.1

Fiber cement board that has met the requirements of ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*, should be considered noncombustible.

B.18.7.2

Many fiber cement board products contain combustible resins. Thus, if the cement board does not meet the requirements of ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*, the cement board should be considered to be a combustible veneer.

B.18.7.3

Joint locations were introduced in the 2019 edition. If different joint locations that fall outside the scope of NFPA 285 are used, then the actual construction wall assemblies must use the joint locations of the tested locations.

B.18.7.4

If the joint locations specified in the 2019 edition of NFPA 285 are used on the tested wall assembly, then any joint location is qualified for the actual wall assembly.

B.18.8 Fiber Reinforced Plastic (FRP).

B.18.8.1

Due to the various formulations and configurations in which FRP can be used as exterior veneer, each actual project wall construction requires an NFPA 285 test.

B.19 Analysis: Attachment System.

B.19.1

Most NFPA 285 wall assembly tests incorporate generic cladding attachment systems. Most approvals or listings do not list attachment systems because it is not practical to include every possible cladding attachment that would qualify. There are simply too many to list.

B.19.2

For tests with anchored brick veneer, common brick ties are used. Since heavy masonry claddings are durable under fire conditions, their attachment system (such as brick ties) typically does not get exposed to direct flames during the test. It should be noted that some brick attachments use zinc barrel ties and melt in the area of flame exposure thus loosening the brick attachment.

B.19.3

For MCM/ACM or HPL systems, there is no common attachment system. See Section B.21 for typical ACM joint types and attachments. Most ACM or HPL manufacturers do not manufacture attachment systems, but they do sell their product to ACM or HPL fabricators who manufacture attachment systems.

B.19.4

Given a tested design, alternate attachment systems might be allowed if the alternate system has similar melting temperatures, mass, and orientation and does not create an air gap larger than the tested system.

B.19.5

For HPL, two attachment types are typical—exposed fastener and concealed fastener. The two are not interchangeable. Alternate attachment systems for each type might be allowed if the alternate system has similar melting temperatures, mass, and orientation and does not create an air gap larger than the tested system.

B.19.6

For other light claddings (e.g., metal panels, fiber cement board, and so on), similar guidance can apply.

B.19.7

Some manufacturers have developed attachment systems that use composite materials, typically rigid fiberglass. These systems should be tested per NFPA 285 to assure in initial compliance. Where the composite materials are protected by mineral wool or mineral fiber, they can usually be substituted for metal framing systems.

B.20 Analysis: Window Perimeter—Headers/Jamb/Sill Treatment and Flashings.

B.20.1

Most NFPA 285 tests incorporate window perimeters to simulate actual construction.

B.20.2

A generic window header design was introduced in the 2019 edition and if used in a successful NFPA 285 test, other variations of window perimeters can be used. Some of these variations include use of steel or wood at various thicknesses.

B.20.3

If an NFPA 285 test is successful and did not use any window perimeter treatments, then any type of window perimeters can be used.

B.20.4

For tests of wall assemblies with exterior insulation, the type of foam plastic insulation can be either insensitive or sensitive to window perimeter treatment design.

B.20.4.1

Most NFPA 285 tests with Polyiso insulation products have been performed using specific thicknesses of aluminum or sheet steel perimeters. The tested material and thickness are the minimum allowed in the actual construction.

B.20.4.2

Most NFPA 285 tests with SPF insulation products have been performed using specific thickness of sheet steel perimeters. The tested material and thickness are the minimum allowed in the actual construction.

B.20.4.3

Most NFPA 285 tests with EPS or XPS insulation products have been performed with very specific window perimeters (typically incorporating mineral wool insulation or wood—FRT and non-FRT). The tested configuration, material, and its thickness are the minimum allowed in the actual construction.

B.20.4.4

For steel stud cavity combustible insulation tests, most tests use the C-channel steel stud framing as the window perimeter. In some cases, mineral wool is used to separate the stud cavity insulation from the perimeter steel. The tested material and thickness are the minimum allowed in the actual construction.

B.20.5

A successful NFPA 285 test with aluminum window perimeter plate/sheet can allow other materials with higher melting points to be used since the aluminum melts in this area.

B.20.6

A successful NFPA 285 test with steel window perimeters allows use of steel or stainless steel of the same thickness or greater.

B.20.7

A test with FRTW lumber meeting the requirements of NFPA 703 allows use of any FRTW lumber of same thickness or greater.

B.20.8

A test with mineral wool allows use of mineral wool of the same thickness/density or greater.

B.20.9

Combustible tapes and flashings at the window opening are not a cause for a failure in testing due to the limited area of application around the window opening. Typically, these materials only extend approximately 12 to 18 in. (0.30 m to 0.45 m) from the edges of the window opening. Thus, any flashing material can be used as long as it is limited in its application.

B.20.10

Where a wall is only insulated with mineral wool in the stud cavity and the wall is without an exterior combustible WRB, or where a wall is insulated on the exterior side of the base wall with unfaced 2 in. (50 mm) (min. 4 pcf) mineral wool over a combustible WRB, the window perimeter is not critical for noncombustible claddings.

B.20.11

Where a wall contains a combustible WRB on the base wall and no exterior insulation, the window perimeter design should be based on designs for combustible exterior insulation where combustible WRB's are allowed over the insulation.

B.21 Base Wall Tests with SPF Cavity Insulation.

B.21.1

Base wall tests with SPF cavity insulation typically use **5⁄8** in. thick, Type X gypsum interior wallboard and exterior sheathing on steel studs (typically 3**5⁄8** in. [92 mm] deep, 20 ga) and are firestopped within the stud cavity at the floor line with mineral wool (min. 4 pcf, min. 4 in. [100 mm] thick).

B.21.2

Where a base wall test incorporates a combustible cavity insulation such as SPF in the stud cavity, the test criteria is more stringent than the normal criteria specified in NFPA 285. In this test, no flaming on the exterior face of the wall is allowed. Thus, the gypsum sheathing must not significantly crack nor allow combustible gasses or flames to the exterior side of the assembly.

B.21.3

If the base wall test with SPF cavity insulation results in minor flaming around the window perimeter and no appearance of flames on the exterior face, then the following are permissible:

(1) It is permissible to add on top of the tested base wall any cladding (combustible or noncombustible) that has been tested or approved to be used in an NFPA 285–compliant assembly.

(2) It is permissible to add on top of the tested base wall any cladding (combustible or noncombustible) paired with approved polyisocyanurate, EPS, XPS, or SPF insulation and specifically allowed WRBs that have been tested or approved to be used in an NFPA 285–compliant assembly.

(3) It is permissible to pair with approved polyisocyanurate, EPS, XPS, or SPF.

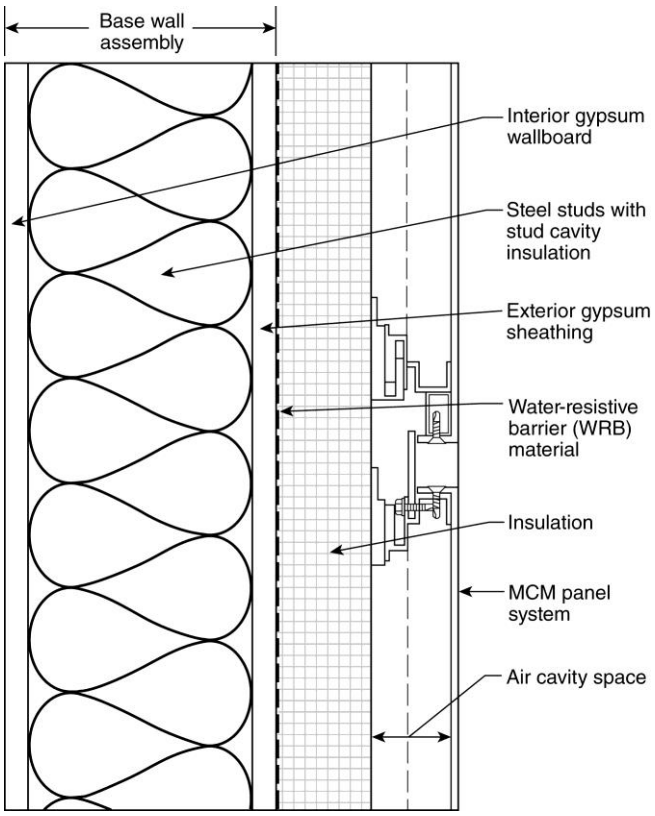
B.22 ACM Cladding Information.

B.22.1 Product Thickness.

For NFPA 285 analysis, products with the highest fuel content typically are considered worst case. It is assumed that the 4 mm and 6 mm products both use the same inner/outer aluminum skins. The 6 mm panels use a thicker core material to achieve the 6 mm panel

thickness. Based on this, the 6 mm product would represent the worst-case fire scenario. Figure B.22.1 shows an example of an ACM Assembly.

Figure B.22.1 Example of an ACM Assembly.



B.22.2 Joint Design.

Most ACM systems are offered with various joint designs. Some designs allow air to freely flow in and out of the cladding system (i.e., rainscreen) at panel joint locations. The three basic types are as follows:

(1) *Open Joint Rainscreen.* Open joint rainscreen is worst case from a fire test point of view since these systems allow air to freely flow.

(2) *Wet Seal System.* A wet seal system uses backer rods and caulk to seal panel joints. Typically, these use silicone caulk, which does not readily spread flame.

(3) *Dry Seal System.* The dry seal system is the most complicated but is commonly used in NFPA 285 fire tests. The dry seal system is a semi-open joint design that has been used by many ACM manufacturers to meet the requirements of NFPA 285. Testing based on this system has historically

allowed use of any ACM that has passed NFPA 285 testing in many third-party approvals.

B.22.3 Additional Comments on Joint Types—Caulk/Backer Rod.

The wet seal system utilizes caulk and backer rod within joints. For this joint type, it is possible that the flame spread of the caulk/backer rod alone can cause a visual flame spread failure. See 10.2.1.2(2).

The possible failure due to the caulk/backer rod system is not a problem of the ACM/MCM but of the caulk/backer rod materials that can be solved by mandating products with FR chemistry. The problem is that the flame spread (under NFPA 285 conditions) of the caulk/backer rod can only be determined with an NFPA 285 test.

If the caulk/backer rod issue is of concern, it is recommended to test the open joint system, but include the caulk/backer rod in vertical joints to evaluate the flame spread of the joint/backer rod assembly. This limits the brand/model of caulk/backer rods used to what was tested, and to products with similar or better flame spread or flammability.

In the specific case of noncombustible backer rod sealed with weather-resistant caulking, an ASTM E84, *Standard Method of Test for Surface Burning Characteristics of Building Materials*, test of two strips of caulking on GRC board and centered on each burner, if Class A, qualifies that caulk for use in sealing joints between panels.

First Revision No. 6-NFPA 285-2020 [Global Input]

Remove “ANSI” and “Standard for” from UL standards throughout the document.

Submitter Information Verification

Committee:

Submittal Date: Fri May 22 07:24:36 EDT 2020

Committee Statement

Committee Statement: Removal of repetitive wording and removal of ANSI because many years ago, UL preferred the ANSI/UL reference because there was a transition of traditional UL standards towards an ANSI standards development process.

Now, years later, a large majority of UL Standards are ANSI approved and follow the ANSI development and maintenance process. However, sometimes readers are confused because they don't understand the standards are UL standards, not developed by ANSI. There are many other references to standards promulgated by different standards development organizations where they are considered ANSI approved but do not include ANSI in the reference.

Response Message: FR-6-NFPA 285-2020

Public Input No. 2-NFPA 285-2019 [Global Input]

First Revision No. 11-NFPA 285-2020 [Detail]

Move sections 4.6.13 and 4.6.14 to 7.1.16 and 7.1.17. Renumber current 7.1.16 and remaining sections.

Submitter Information Verification

Committee:

Submittal Date: Fri May 22 08:20:19 EDT 2020

Committee Statement

Committee Statement: Sections 4.6.13 and 4.6.14 are better located in the calibration chapter and should be moved to section 7.1.16 and 7.1.17. The current 7.1.16 and remaining sections should be renumbered.

Response Message: FR-11-NFPA 285-2020

First Revision No. 13-NFPA 285-2020 [Detail]

5.7.1.5

The test assembly shall not have projections added to the wall that extend beyond the outer planar surface of the wall unless they are included in the same location as in the actual construction.

Submitter Information Verification

Committee:

Submittal Date: Fri May 22 08:30:45 EDT 2020

Committee Statement

Committee Statement: This new section makes it clear that fins or projections added to the outer surface of the wall effect the results of this test. A revision in Chapter 11 now requires these projections to be reported as well.

Response Message: FR-13-NFPA 285-2020

First Revision No. 7-NFPA 285-2020 [Section No. 1.1.1]

1.1.1*

This standard provides a test method for determining the fire propagation characteristics of exterior wall assemblies ~~and panels used as components of curtain wall assemblies~~ that are constructed using combustible materials or that incorporate combustible components.

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Fri May 22 07:26:18 EDT 2020

Committee Statement

Committee Statement: This revision resolves the incorrect interpretation of the scope of NFPA 285 includes exterior wall assemblies and panels, as either or both are used as components of curtain wall assemblies. This latter interpretation is most likely if the reader is not aware of the revisions of this sentence from the 2012 edition to the 2019 edition of this standard. Removing the struck out text creates a clearer scope that does not lend itself to misinterpretation.

Response Message: FR-7-NFPA 285-2020

Public Input No. 5-NFPA 285-2020 [Section No. 1.1.1]

First Revision No. 1-NFPA 285-2020 [Section No. 1.2]

1.2 Purpose.

The purpose of this standard is to provide a standardized fire test procedure for evaluating the suitability of exterior wall assemblies ~~and panels used as components of curtain wall assemblies~~ that are constructed using combustible materials or that incorporate combustible components for installation on buildings.

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Wed May 20 13:35:22 EDT 2020

Committee Statement

Committee Statement: This revision resolves the incorrect interpretation of the scope of NFPA 285 includes exterior wall assemblies and panels, as either or both are used as components of curtain wall assemblies. This latter interpretation is most likely if the reader is not aware of the revisions of this sentence from the 2012 edition to the 2019 edition of this standard. Removing the struck out text creates a clearer scope that does not lend itself to misinterpretation.

Response Message: FR-1-NFPA 285-2020

Public Input No. 6-NFPA 285-2020 [Section No. 1.2]

First Revision No. 8-NFPA 285-2020 [Section No. 2.3.1]

2.3.1 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM C1396/C1396M, *Specification for Gypsum Board*, 2017.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, ~~2018~~ 2020 .

ASTM E136, *Standard Test Method for ~~Behavior of~~ Assessing Combustibility of Materials ~~in~~ Using a Vertical Tube Furnace at 750°C*, ~~2016a~~ 2019a .

ASTM E2652, *Standard Test Method for ~~Behavior of~~ Assessing Combustibility of Materials ~~in~~ Using a ~~Vertical~~ Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, ~~2016~~ 2018 .

ASTM E2965, *Standard Test Method for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Consumption Calorimeter*, 2017.

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Fri May 22 07:29:52 EDT 2020

Committee Statement

Committee Statement: Reference updates.

Response Message: FR-8-NFPA 285-2020

Public Input No. 3-NFPA 285-2020 [Section No. 2.3.1]

First Revision No. 16-NFPA 285-2020 [Section No. 2.4]

2.4 References for Extracts in Mandatory Sections.

NFPA 5000®, Building Construction and Safety Code®, ~~2018~~ 2021 edition.

Submitter Information Verification

Committee: FIZ-AAA
Submittal Date: Fri Jun 26 13:07:48 EDT 2020

Committee Statement

Committee Statement: Updated to latest edition.
Response Message: FR-16-NFPA 285-2020

First Revision No. 2-NFPA 285-2020 [New Section after 5.7.1.2]

5.7.1.3

The sides and the top of the wall shall be sealed with noncombustible material prior to the test unless complying with 5.7.1.4 .

5.7.1.4

Where the top of the wall is not completely sealed in the actual design to be constructed, the assembly shall be tested that way.

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Wed May 20 14:10:21 EDT 2020

Committee Statement

Committee Statement: Sealing the perimeter of the wall assembly prevents additional airflow throughout the assembly. This practice is commonly done with flashing or mineral wool.

Response Message: FR-2-NFPA 285-2020

First Revision No. 12-NFPA 285-2020 [Section No. 5.7.1.3]

5.7.1.6*

The framing system used to support the wall assembly that makes up the test specimen shall consist of steel studs or wood studs unless the construction is not intended to incorporate studs .

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Fri May 22 08:29:57 EDT 2020

Committee Statement

Committee Statement: Not all construction types incorporate studs.

Response Message: FR-12-NFPA 285-2020

First Revision No. 14-NFPA 285-2020 [Section No. 10.2.2]

10.2.2 Vertical Flame Propagation: Combustible Components and Insulation.

Flame propagation shall not occur vertically through the combustible components or the combustible insulation installed within the test specimen, as determined in accordance with the following:

(1) For test specimens constructed of exterior wall panels greater than ¼ in. (6.4 mm) thick containing combustible components, temperatures in the combustible components shall not exceed 750°F (417°C) above their temperature as measured immediately after the start of the test by thermocouple nos. 28 and 31 through 40, as shown in Figure 6.1(a) and in Figure 6.1(b), Details A and B.

(2) For test specimens constructed of exterior wall panels containing combustible components and having a wall cavity with an air space as shown in Figure 6.1(a) and in Figure 6.1(b), Details C, E, F, and I, the following conditions shall be met:

  (a) Temperatures in the wall cavity air space shall not exceed 1000°F (538°C) as measured by thermocouples nos. 28 and 31 through 40.

  (b) Temperatures in the wall cavity and stud cavity insulation shall not exceed 750°F (417°C) above their temperature as measured immediately after the start of the fire test by thermocouples nos. 55 through 65 and 68 through ~~79~~ 78 , as applicable.

(3) For test specimens constructed of exterior wall panels that are ¼ in. (6.4 mm) thick or less, containing combustible components and having a wall cavity without an air space, temperatures in the wall cavity and stud cavity insulation shall not exceed 750°F (417°C) above their temperature as measured immediately after the start of the fire test by thermocouples nos. 28, 31 through 40, and 55 through 65, as applicable, as shown in Figure 6.1(a) and in Figure 6.1(b), Detail D.

(4) For test specimens constructed of noncombustible or limited-combustible exterior wall panels and having a wall cavity with an air space as shown in Figure 6.1(a) and in Figure 6.1(b), Details G, H and I, the following conditions shall be met:

  (a) Temperatures in the wall cavity air space shall not exceed 1000°F (538°C) as measured by thermocouples nos. 28 and 31 through 40.

  (b) Temperatures in the wall cavity and stud cavity insulation shall not exceed 750°F (417°C) above their temperature as measured immediately after the start of the fire test by thermocouples nos. 55 through 65 and 68 through 78, as applicable.

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Fri May 22 11:07:19 EDT 2020

Committee Statement

Committee Statement: Error correction.

Response Message: FR-14-NFPA 285-2020

First Revision No. 4-NFPA 285-2020 [Section No. 11.1]

11.1* Fire Test Report.

A fire test report shall be prepared to document the fire test and shall contain all of the following:

* Description of the test specimen wall assembly, including the following:

  Drawings showing the structural design in plan and elevation, principal cross-section and other sections as needed for clarity, and joint locations and details

  Drawings and description of the construction used in the test around the window opening header, jambs, and sills, including the type and thickness of the closure material around the perimeter of the opening; the fastening detail, including the type, size, and spacing of fasteners around the perimeter of the window opening; and the type, thickness, and density of any insulation or blocking used internal to the window opening closure

  Details of the attachment of the wall assembly to the test apparatus

A.11.1.2(1) –

Additional information concerning the wall assembly components might be required by the authority having jurisdiction, including the following:

  Flame spread index and smoke developed index values per ASTM E84, *Standard Method of Test for Surface Burning Characteristics of Building Materials* , or UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials* , as required

  Self-ignition temperature of plastic materials per ASTM D1929, *Test Method for Ignition Properties of Plastics*

  Potential heat value of combustible materials per NFPA 259 converted to Btu/ft^2 (MJ/m^2) for the combustible components in the assembly tested

Location of thermocouples

The date and results (temperature and heat flux) of the most recent calibration

Ambient conditions at the start of the fire test

Temperatures of all thermocouples during the fire test

Burner gas flow data obtained during the fire test, including type of gas used and total gas flow of both burners for the duration of the fire test

Comparison of burner gas flow data obtained during the fire test to the burner gas flow data obtained during the latest calibration test

Position of the vertical centerline of the window burner with respect to the exterior face of the wall assembly for the fire test and the latest calibration test

Visual observations made during the fire test

Photographs of the following:

  Wall assembly — prior to fire test, exterior face

  Wall assembly — fire test in progress, exterior face

  Wall assembly — post-fire test, exterior face

  Wall assembly — post-fire test, interior face, both stories

  Wall cavity insulation in wall assembly — post-fire test

Damage sketch(es) of the wall assembly

Extent of residual burning that continues during the 10-minute period immediately after the gas flow to the gas burners has been shut off

Visual observations of smoke accumulation inside the second-story test room during the fire test

Performance of the wall assembly with respect to each of the applicable conditions of acceptance

~~*(see Chapter 10)*~~

11.1.1

A fire test report shall be prepared to document the fire test.

11.1.2

A fire test report shall contain all of the following:

(1)* Description of the test specimen wall assembly, including the following:

(a) Drawings showing the structural design in plan and elevation, principal cross-section and other sections as needed for clarity, projections and joint locations and details

(b) Drawings and description of the construction used in the test around the window opening header, jambs, and sills, including the type and thickness of the closure material around the perimeter of the opening; the fastening detail, including the type, size, and spacing of fasteners around the perimeter of the window opening; and the type, thickness, and density of any insulation or blocking used internal to the window opening closure

(c) Details of the attachment of the wall assembly to the test apparatus

A.11.1.2(1)

Additional information concerning the wall assembly components might be required by the authority having jurisdiction, including the following:

(a) Flame spread index and smoke developed index values per ASTM E84, *Standard Method of Test for Surface Burning Characteristics of Building Materials*, or UL 723, ~~*Standard for*~~ *Test for Surface Burning Characteristics of Building Materials*, as required

(b) Self-ignition temperature of plastic materials per ASTM D1929, *Test Method for Ignition Properties of Plastics*

(c) Potential heat value of combustible materials per NFPA 259 converted to Btu/ft^2 (MJ/m^2) for the combustible components in the assembly tested

(2) Location of thermocouples

(3) The date and results (i.e., temperature and heat flux) of the most recent calibration

(4) Ambient conditions at the start of the fire test

(5) Temperatures of all thermocouples during the fire test

(6) Burner gas flow data obtained during the fire test, including type of gas used and total gas flow of both burners for the duration of the fire test

(7) Comparison of burner gas flow data obtained during the fire test to the burner gas flow data obtained during the latest calibration test

(8) Position of the vertical centerline of the window burner with respect to the exterior face of the wall assembly for the fire test and the latest calibration test

(9) Visual observations made during the fire test

(10) Photographs of the following:

(a) Wall assembly — prior to fire test, exterior face

(b) Wall assembly — fire test in progress, exterior face

(c) Wall assembly — post-fire test, exterior face

(d) Wall assembly — post-fire test, interior face, both stories

(e) Wall cavity insulation in wall assembly — post-fire test

(11) Damage sketch(es) of the wall assembly

(12) Extent of residual burning that continues during the 10-minute period immediately after the gas flow to the gas burners has been shut off

(13) Visual observations of smoke accumulation inside the second-story test room during the fire test

(14) Performance of the wall assembly with respect to each of the applicable conditions of acceptance *(see Chapter 10)*

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Wed May 20 14:33:42 EDT 2020

Committee Statement

Committee Statement: This revision applies only to section 11 (1)a and adds the term "projections" based on new requirements in chapter 5. This section has been reformatted. The text shown as struck out is broken up into sections 11.1.1 and 11.1.2.

Response Message: FR-4-NFPA 285-2020

First Revision No. 9-NFPA 285-2020 [Section No. B.1.2.1]

C.1.2.1 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM C1177, *Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing* , 2017.

ASTM C1178, *Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel* , 2018.

ASTM C1396/C1396M, *Specification for Gypsum Board* , 2017.

ASTM D1929, *Test Method for Ignition Properties of Plastics*, 2016 edition.

ASTM E84, *Standard Method of Test for Surface Burning Characteristics of Building Materials*, ~~2018~~ 2020 .

ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*, 2017.

ASTM E119, *Standard Methods of Tests of Fire Resistance of Building Construction and Materials*, ~~2016a~~ 2019 .

ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter,* 2017.

ASTM E2307, *Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-scale, Multi-story Test Apparatus,* 2020.

Submitter Information Verification

Committee: FIZ-AAA
Submittal Date: Fri May 22 07:44:07 EDT 2020

Committee Statement

Committee Statement: Updates to referenced standards.
Response Message: FR-9-NFPA 285-2020

Public Input No. 4-NFPA 285-2020 [Section No. B.1.2.1]

First Revision No. 10-NFPA 285-2020 [Section No. B.1.2.2]

C.1.2.2 ICC Publications.

International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001.

International Building Code, ~~2018~~ 2021 .

UBC Standard 17-6, *Method of Test for the Evaluation of Flammability Characteristics of Exterior, Nonload-bearing Wall Panel Assemblies Using Foam Plastic Insulation*, 1988.

UBC Standard 26-4, *Method of Test for the Evaluation of Flammability Characteristics of Exterior, Nonload-bearing Wall Panel Assemblies Using Foam Plastic Insulation*, 1997.

UBC Standard 26-9, *Method of Test for the Evaluation of Flammability Characteristics of Exterior, Nonload-bearing Wall Assemblies Containing Combustible Components Using the Intermediate-scale, Multistory Test Apparatus*, 1997.

Uniform Building Code, 1997.

Submitter Information Verification

Committee: FIZ-AAA

Submittal Date: Fri May 22 07:45:08 EDT 2020

Committee Statement

Committee Statement: Updates to referenced standards.

Response Message: FR-10-NFPA 285-2020

Public Input No. 11-NFPA 285-2020 [Section No. B.1.2.2]