



NFPA 285-19 Wall System Compliance



NFPA 285-19 Wall System Compliance Panel+ by Old Mill Brick

Old Mill Brick Panel+ Wall System has successfully passed the NFPA 285-19 fire test. NFPA 285-19 is the most recent fire-code assembly test. Panel+ is now the complete fire-tested thin veneer wall assembly system that is also the most cost-effective way to incorporate Adhered Masonry Veneer, Continuous Insulation and Air + Water barrier into the building envelope.

The Purpose of NFPA 285

The test is required in the International Building Code (IBC) when foam plastic insulation is used in the exterior walls of construction types I, II, III or IV. Those construction types, by code definition, have exterior walls constructed of noncombustible materials. The test is to determine that combustible foam plastic insulation, when exposed to fire on the exterior face of the wall, does not spread flame over the surface or through the core of the otherwise noncombustible wall assembly.

The test standard NFPA 285 is referenced in the IBC Section 2603.5.5. That standard, or a variation of it, has been referenced in each edition of the IBC since its first edition in 2000, and since the 1980's in the three model codes that preceded it.

The use of NFPA 285 as a means to gain acceptance of wall assemblies with combustible components in noncombustible Type construction (Types 1- - IV) has become more prevalent in recent years based on requirements for testing of WRB's (Water-Resistive Barriers) in Chapter 14 of the 2012 IBC. The flow chart on the following page (Figure 1) is intended to facilitate determination of when testing is necessary. It is current to the 2015 IBC and is also applicable where the 2009 or 2012 IBC are in effect.

Analysis of fire test results by a qualified fire protection engineer may be used to extend NFPA 285 results to other assemblies where changes to the tested NFPA 285 assembly would be judged to perform equal to or better than the test assembly. This allows a manufacturer to gain acceptance of several wall assemblies.



Real Brick. Real Simple.



Figure 1: NFPA 285 Test Requirement Decision Tree

* Foam plastic insulation with ASTM E 84 Flame Spread Index <25 and Smoke Development Index <450; 4 inches thick (102mm) or less; covered by aluminum or steel minimum 0.032 inch thick; and with automatic sprinklers. Ref.: IBC 2603.4.1.4 for full text, 2009, 2012 and 2015 editions.

** WRB is ONLY combustible component in wall assembly and having a wall covering listed in Note 3 (below), or WRB meets requirements for peak heat release, flame spread, smoke development, and incident radiant heat flux listed in the 2015 IBC, Section 1403.5, Exception 2 (only applicable if 2015 IBC is governing code).

*** Brick, concrete, stone, terra cotta, stucco, or steel. (See 2015 IBC Section 1403.5, Exception 1, for full text.)

Frequently Asked Questions

What is NFPA 285?

NFPA 285 is titled, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

NFPA 285 is a 2-story fire test to determine if an exterior wall assembly which contains combustible materials can be used in construction where the code requires exterior walls to be of noncombustible construction. The pass/fail criteria are based on the extent of fire spread (determined visually and by embedded sensors).

Details of the actual test method are available for the National Fire Protection Association (NFPA), www.nfpa.org.

Why is the NFPA 285 important?

NFPA 285 is important for the safety of the building occupants during a fire and the safety of emergency personnel responding to a fire. It provides an indication that the spreading of a fire will not be made significantly worse by the presence of the tested combustible materials.

NFPA 285 is important because it has become one of the standard tests required to demonstrate that a product or system complies with the fire safety requirements of the International Building Code (IBC) for "noncombustible construction".

What is "noncombustible construction"?

Noncombustible construction is, in its purest form, construction that uses only materials that do not burn, such as steel or concrete. Certain buildings are required to be noncombustible construction based on their usage and/or size (large commercial buildings, government buildings, hospitals, schools, etc.). The use of combustible materials in the construction of exterior walls of these buildings is often necessary to achieve required levels of moisture protection or continuous insulation. or both. NFPA 285 was developed to assess whether or not a particular type, amount or configuration of combustible material could be used and still maintain an acceptable level of safety in the event of a fire.

Is testing for use in noncombustible construction a new requirement?

No. Wall assemblies with combustible components such as foam plastic insulation have been required to perform some version of large-scale fire test for the same purpose as NFPA 285 since the 1980's. Originally the test run for EIFS was not "NFPA 285", but previous versions of the same or similar test with Uniform Building Code numbers UBC 17-6, BUC 26-4 and UBC 26-9. (A detailed history of the development of the test is presented in an appendix to the test method which can be purchased from NFPA).

A requirement for testing combustible water-resistive barriers in noncombustible construction wall assemblies was added to the IBC in 2012 (Section 1403.5). This addition brought attention to NFPA 285 because of its application to non-foam-plastics materials and manufacturers. Design professionals became more aware of NFPA 285 and began to ask for information to verify that the materials being specific had been included in a tested assembly.

If the air/moisture barrier is the ONLY combustible component in the wall assembly, and the 2015 IBC is the applicable code, then wall assemblies may be qualified for use based on small scale tests of the air/moisture barrier. The results of the fire tests must all comply with the exceptions listed under Section 1403.5 in the 2015 IBC.

The tested assembly is exactly what was tested. The description of the test specimen in an NFPA 285 report states the product names, generic product types, and material thicknesses. The construction details at the head of a window opening and other pertinent details of the base wall panel are also reported.

Why is the detail of the assembly important?

The nature of fire is that one cannot necessarily predict the performance of one combination of materials based on another. If one material is exchanged for another, it may change the fire test performance in a way that cannot be predicted. Similarly, if the order of application of materials is changed, the fire performance of the overall assembly can change - even if the materials are the same

What if my backup wall is not the same as the backup wall used in the NFPA 285 test?

The backup wall construction for all tests is the same. The test evaluates whether or not the presence of combustible components in the tested wall assembly applied over the noncombustible backup wall construction causes excess flame spread over the face or within the core of the assembly, or within the interior space from one story to the next. Project specific framing details or the use of masonry components in the field constructed assembly does not negate the NFPA 285 test, provided the base construction is noncombustible.

How does Old Mill Brick comply with NFPA 285?

Old Mill Brick performed the testing through a nationally recognized and accredited independent testing lab. We have tested Panel+.

Can you provide me with a copy of the NFPA 285 test report?

Yes, the test report is summarized below and a copy of the actual test report can be located at www.oldmillbrick.com.

What about combinations of materials that have not been tested or analyzed?

They should not be used on noncombustible construction without testing or an analysis. An analysis requires existing data and a rational means of applying that data to the proposed assembly. The fire engineering consultant must determine if analysis is an option based on their experience, their judgement and the availability of relevant data.

Test Procedure & Scope

Intertek Building & Construction (B&C) was contracted by Old Mill Brick, 14932 S Concord Park Dr., Bluffdale, UT 84065, to evaluate the flame propagation characteristics of an exterior, non- load-bearing wall assembly containing Old Mill Panel+ Insulated Thin Veneer System. Testing was conducted at the Intertek B&C test facility in Elmendorf, Texas. Results obtained are tested values and were secured by using the designated test method(s). A summary of test results and the complete graphical test data is reported herein.

The wall assembly was instrumented with thermocouples (TCs) in accordance with figures 6.1(a) and 6.1(b) of NFPA 285 test method. 16-GA Type K TCs were used in the burn room and 24-GA Type K were used on exterior façade and cavity air space. The window burner was positioned in the center of the opening and 4 in. off the exterior face of the wall assembly. Testing was performed on November 12, 2019 in accordance with NFPA 285 test method. Ambient conditions were 56°F and 18% relative humidity. Video recording, digital photographs, visual observations, and data collection were performed prior, during, and after testing was completed. Temperature data was recorded every 15 seconds. The test was performed at 08:59 AM with the burners on for 30 minutes. All observations are recorded in the table located in Section 8.

The apparatus is considered to be under calibrated conditions when the time average temperatures and the time average heat flux readings obtained for a calibration wall match the requirements of Table 8.1.6 of NFPA 285. Calibration was performed with propane gas as the fuel source and the window burner placed 4 inches from the exterior surface of the assembly and vertically centred on the window opening. Table 6.1 of this section shows the average burner flow and heat flux. Table 6.2 shows the time average temperatures obtained during the calibration test. Table 6.3 shows a list of the calibrated equipment used for the test.

Figure 2: Average Burner Output Information

TIME INTERVAL (MIN:SEC)	ROOM BURNER (SCFM)	WINDOW BURNER (SCFM)	2 FT FLUX (W/cm²)	3 FT FLUX (W/cm²)	4 FT FLUX (W/cm ²)
0:00-5:00	16.2	0.0	1.3	0.9	1.3
5:00-10:00	16.2	5.9	2.5	1.9	1.8
10:00-15:00	16.2	6.7	2.9	2.2	2.2
15:00-20:00	17.2	7.6	3.8	2.8	3.1
20:00-25:00	17.1	8.5	4.5	3.2	3.4
25:00-30:00	17.7	8.6	4.7	3.6	3.4

Figure 3: Average Time Temperature Values for Calibration

	THERMOCOUPLE LOCATIONS							
TIME INTERVAL (MIN:SEC)	BURN ROOM (*F)	INT. WALL (*F)	1 FT (*F)	2FT (*F)	3 FT (*F)	4 FT (*F)	5 FT (*F)	6 FT (*F)
0:00-5:00	1098	1082	556	711	660	610	500	489
5:00-10:00	1331	1332	924	971	927	886	749	734
10:00-15:00	1388	1398	1002	1020	977	938	805	777
15:00-20:00	1519	1538	1125	1122	1078	1029	900	880
20:00-25:00	1559	1598	1218	1249	1159	1090	971	940
25:00-30:00	1618	1686	1271	1310	1241	1158	1056	1005

Test Assembly Description

Interior Cladding

The interior surface of the wall assembly was clad with 4 ft × 8 ft × 5/8 in. thick American Gypsum TYPE X gypsum board meeting the requirements of ASTM C1396. The gypsum board was fastened to the wall framing with #6 x 1-1/4 in. long, bugle head, self-drilling screws with a nominal spacing of 8 in. around the board perimeter and 12 in. in the field. Drywall orientation on the burn floor consisted of four pieces of gypsum board fastened to the core wall, with the run edge running parallel with the framing and the cut edge perpendicular to the framing. Drywall orientation on the second floor consisted of vertically oriented boards with the run edge running parallel with the framing and the cut edge perpendicular to the framing. Drywall orientation for the areas above the top support angle and below the bottom support angle consisted of boards that were oriented with the run edge perpendicular with the framing. The joints and fastener heads received a Level 2 finish using USG Sheetrock® Brand paper joint tape and USG Sheetrock® Brand joint compound.

Framing

The core wall consisted of 18 ft. long, 6 in. deep, 20 GA galvanized steel studs spaced 16 in. oc fastened to 13 ft. 4 in. long, 6 in. deep, 20 GA galvanized steel track as shown in Section 14. The studs were connected to the track with one #6 x 1/2 in. long self-drilling, pan head fastener per stud flange. Johns Manville MinWool® Safing pieces with a nominal density of 4.0 pcf were installed per the manufacturer's installation instructions to fit into each stud cavity placed at the second story floor line. The safing length dimensions were no less than the apparatus floor slab thickness of 8 in.

Exterior Sheathing

4 ft × 8 ft × 1/2 in. thick Densglass Gold Sheathing, was placed horizontally across the full exterior surface of the assembly. The gypsum sheathing was fastened to the wall framing with #6 x 1-1/4 in. long, bugle head, selfdrilling screws with a nominal spacing of 8 in. around the board perimeter and 12 in. in the field.

Weather Barrier

Old Mill Polylaminate Reinforcing Fabric, embedded in Old Mill Air & Water Barrier, was applied to all corners on the base wall. Old Mill Air & Water Barrier was then applied over the exterior sheathing by roller to 16-mil WFT. It was then allowed to dry for at least 2 hrs.

Insulation Board

Old Mill Brick Adhesive Mortar was applied to the Old Mill Air & Water Barrier surface using a notched steel trowel.

Bond Mesh

Old Mill 2 in. Bond Mesh strips were installed in the first, fifth, ninth and thirteenth course above the window to the extent of the first stud beyond the window on both sides of the window, attached with 2 in. Old Mill Washer and 4 in. Self-Drilling Zinc Plated screws.

Mortar and Stone Veneer

Old Mill Brick Adhesive Mortar was applied using a grout bag into the pre-molded courses in the Old Mill Panel+ EPS Insulating Board. Old Mill TB-27006CS Thin Brick Flats and Old Mill TBC-27006CS Thin Brick Corners were applied (not more than 15 lbs per square foot) before the mortar was able to dry. Type S Mortar was then used to point the joints between the thin bricks using a grout bag, left to become thumbprint hard, then tooled with a concave jointer. The sample was then allowed to cure for a minimum of 28 days.

Window Detail

Steel L-angle, 0.040 in. thick; 4 in. deep with 3 in. leg (4 in. piece has a drip edge), was fastened with the 3 in. leg fastened to the wall at the top of the window opening, using 3/4 in. self-drilling screws. Old Mill Brick window header foam block was applied to the angle using a 1/2 in. bead of Old Brick Adhesive between the foam block/3 in. leg and foam block/4 in. leg junctions.

Test Results

TEST REQUIREMENTS	TEST RESULTS	PASS/ FAIL
Flames did not reach 10 ft. above the window opening header.	Flames did not reach 10 ft. above the window opening header.	PASS
Flames did not reach lateral distance of 5 ft. from the vertical centerline.	Flames did not reach lateral distance of 5 ft. from the vertical centerline.	PASS
Flames did not propagate beyond the limits of the first story test room.	Flames did not propagate beyond the limits of the first story test room.	PASS
No visible flaming in the second story test room.	No visible flaming in the second story test room.	PASS
TC's 11 and 14-17 (1000°F limit)	TC's 11 and 14-17 did not exceed their 1000 °F limit.	PASS
TC's 18-19, 28, and 31-40 (1000°F limit)	TC's 18-19, 28, and 31-40 did not exceed their 1000°F limit.	PASS

Conclusion

Intertek B & C (Elmendorf) performed a test for Old Mill Brick containing the Old Mill Panel+ Insulated Thin Brick Veneer System in accordance with NFPA 285-19, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components. In conclusion, the assembly met the conditions of acceptance as outlined in the standard. Testing was completed on November 12, 2019.

Photos

Photo 1: NFPA 285 Panel+ wall assembly prior to testing.



Photo 2: NFPA 285 Panel+ wall assembly during fire testing.



Photo 3: High-rise residential and commercial buildings benefit from Panel+.



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