

NFPA 285 Compliant Wall Assemblies

Information for use with Elemax™ 2600 AWB

Building Codes:

Building codes exist to protect public health, safety and welfare when it comes to occupying buildings and structures. While protecting the public, building codes must also ensure that buildings are sustainable, durable and affordable. To help meet these goals building codes require the use of air barriers, water-resistive barriers and continuous insulation. Fire protection plays an important role in building codes and public safety. The 2012 Edition of the International Building Code (IBC) mandated that exterior walls of Type I, II, III and IV construction greater than 40 feet in height and incorporate a combustible air and water-resistive barrier shall meet the requirements of NFPA 285. Please refer to the 2018 IBC section of this document to learn more about the new NFPA 285 exemption requirements for water resistive barriers.

NFPA 285:

"Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components"

The inherent fire-resistive properties of Elemax™ 2600 air and water-resistive barrier (AWB) have allowed it to easily pass this stringent fire test. NFPA 285 is a full scale test method that is used to determine the flame spread properties of exterior non-load bearing walls containing combustible components. The test was developed to evaluate the ability of the wall assembly to resist the following:

- Flame spread over the exterior face of the wall
- Vertical flame spread within the combustible components from one story to the next
- Vertical flame spread over the interior side from one story to the next
- Lateral flame spread from the compartment of fire origin to adjacent compartments

NFPA 285 is a 30-minute burn test that is run on a full scale two story wall assembly that is built as it would be in the field. Two non-combustible rooms are stacked to simulate two stories of a multistory building and then the wall assembly is attached to the exterior face of the rooms. A window opening is placed 30 inches above the lower story slab and is centered horizontally. An overview of the test assembly can be seen in **Figure 1**. The test is designed to simulate a flashover fire that occurs in the lower story room emitting a fire plume through the window of the room of origin. To achieve this scenario the test room burner is ignited first and then after five minutes the window burner is ignited. At thirty minutes after ignition the both burners are shut off and any residual burning is monitored.

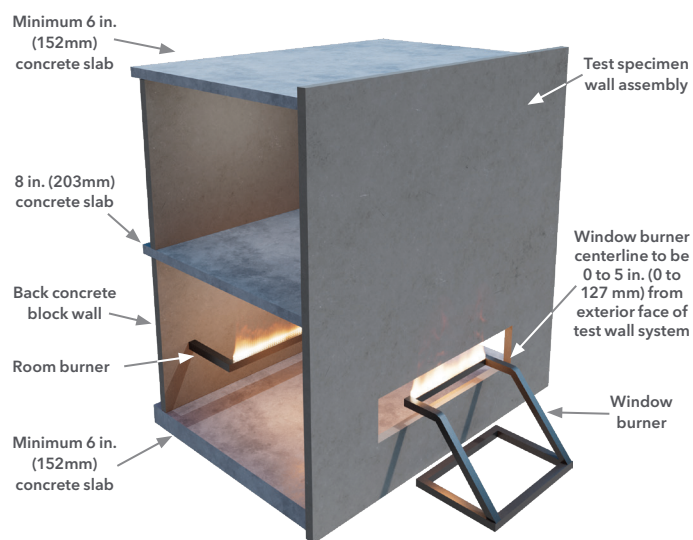


Figure 1

The results of the test are determined by both visual observation made by laboratory personnel and temperature data recorded during the test. The conditions of acceptance are as follows:

- Flames shall not spread vertically ten feet above the window opening. Determined by visual observation or by exceeding 1000°F at related thermocouples.
- Flames shall not spread horizontally five feet on either side of the vertical centerline of the window opening. Determined by visual observation.
- Flames shall not spread inside the wall cavity or horizontally within the wall cavity past the interior room dimension as determined by related thermocouple temperature recordings not exceeding 750°F above ambient temperature.
- Flames shall not spread to the second story room as determined by the interior wall surface thermocouple's not exceeding 500°F above ambient temperature.

- Flames shall not occur in the second story. Determined by visual observation
- Flames shall not escape beyond the intersection of the test specimen at the side walls of the apparatus. Determined by visual observation.

Standardized Industry Burn Testing

ASTM E1354

While NFPA 285 takes into account the entire wall assembly, ASTM E1354 *“Standard Test Method for Heat and Smoke Release Rates for Materials and Products using an Oxygen Consumption Calorimeter”* (more commonly known as “cone calorimeter”) is primarily used for determining heat release rates of products.

This test also provides additional information such as time to ignition, rate of mass loss, smoke evolution, and effective heat of combustion. ASTM E1354 is a laboratory test and the results alone should not be used alone to determine fire hazard or risk fire risk of materials. The test results may be used as elements of a fire hazard assessment or a fire risk assessment which takes into account all factors related to the end use.

Based on cone calorimeter testing, Elemax 2600 AWB has flammability properties similar to gypsum wallboard which is considered to be a limited combustible product per the building codes¹.

ASTM E84

“Standard Test Method for Surface Burning Characteristics of Building Materials” is another important fire performance test standard that is used by to evaluate fire properties of materials. This test method is used to measure surface flame spread and smoke developed. The IBC defines the following three classes of materials based on ASTM E84 results:

	Flame Spread Index	Smoke Developed Index
Class A	0-25	0-450
Class B	26-75	0-450
Class C	76-200	0-450

For combustible materials to be used in non-combustible construction the IBC requires that the material conforms to the Class A Requirements for flame Spread Index and Smoke Developed Index. Elemax 2600 AWB meets these strict criteria. Fire engineering judgments/evaluations/analysis utilize both ASTM E1354 and ASTM E84 as a key indicator’s as to whether or not a material such as an air and water-resistive barrier can be substituted and allowed for use in successful tested NFPA 285 wall assemblies.

IBC 2018

Building codes are constantly evolving and the 2018 IBC includes changes for the requirement of NFPA 285 testing for combustible water-resistive barriers. Section 1402.5 states the following exceptions:

- Walls in which the water-resistive barrier is the only combustible component and the exterior wall has a wall covering of brick, concrete, stone, terra cotta, stucco, or steel with thicknesses in accordance with Table 1404.2.
- Walls in which the water-resistive barrier is the only combustible component and the water-resistive barrier has a Peak Heat Release Rate of less than 150 kW/m², a Total Heat Release of less than 20 MJ/m² and an Effective Heat of Combustion of less than 18 MJ/kg as determined in accordance with ASTM E 1354 and has a flame spread index of 25 or less and a smoke-developed index of 450 or less as determined in accordance with ASTM E 84 or UL
- 723. The ASTM E 1354 test shall be conducted on specimens at the thickness intended for use, in the horizontal orientation and at an incident radiant heat flux of 50 kW/m².
- Windows and doors and flashing for windows and doors shall not be considered to be part of a water resistive barrier for purposes of this section.

Based on these exceptions Elemax 2600 will not be required to undergo NFPA 285 testing².

	2015 IBC Requirements	Elemax 2600
Peak Heat Release Rate	<150 kW/m ²	97 KW/m ² COMPLIES
Total Heat Release	<20 MJ/m ²	5.6 MJ/m ² COMPLIES
Effective Heat of Combustion	<18 MJ/kg	9.8 MJ/kg COMPLIES

NFPA 285 Compliant Wall Assemblies

The following table provides a list of allowable substitutions based on fire property testing of Elemax 2600 AWB, engineering extensions and third party testing detailed in engineering evaluation Project No. 10234 Rev. 2 by Priest & Associates Consulting, LLC.

Wall Component	
Base Wall – Use either 1, 2 or 3	<ol style="list-style-type: none"> 1. Cast Concrete Walls 2. CMU Concrete Walls 3. 20 GA (min.) 3 5/8 in. (min.) steel studs spaced 24 in. o.c. (max.) <ol style="list-style-type: none"> a. 5/8 in. (min.) Type X Gypsum Wallboard Interior b. 1/2 in. (min.) Exterior Gypsum Sheathing c. Lateral bracing every 4 ft vertically d. 4 in., 4 pcf mineral fiber floor line fire stopping e. Up to 6 in. deep studs allowable for specific applications of cavity insulation
Cavity Insulation – Use either 1, 2, 3, 4, 5, 6 7, 8, 9, 10, 11 or 12	<ol style="list-style-type: none"> 1. None 2. Any noncombustible insulation per ASTM E136 3. Any Mineral Fiber (Board type Class A, ASTM E84 faced or unfaced) 4. Any Fiberglass (Batt Type Class A, ASTM E84 faced or unfaced) 5. Icynene LD-C-50 spray foam in 6 in. deep studs (max.) without an air gap 6. Icynene MD-C-200 2 pcf spray foam in 6 in. deep studs (max.) full fill without an air gap 7. Icynene LD-R-210 2 pcf spray foam in 6 in. deep studs (max.) full fill without an air gap 8. SWD Urethane QS 112 2 pcf spray foam in 6 in. deep studs (max.) partial fill with a maximum 2 1/2 in. air gap or full fill 9. Bayer CC EcoBay 2 pcf spray foam in 3 5/8 in. deep studs (max.) with a maximum 2 in. air gap or full fill 10. BASF WallTite 2 pcf spray foam in 3 5/8 in. deep studs (max.) with a maximum 2 in. air gap or full fill 11. Demilec Sealection 500 spray foam in 3 5/8 in. deep studs (max.) full fill 12. Dow Styrofoam SPF CM2030, 2045, or 2060 in 3 5/8 in. deep studs (max.) full fill
WRB Over Sheathing	<ol style="list-style-type: none"> 1. Momentive Elemax 2600 AWB
Exterior Insulation – Choose insulation 1-28 based on cladding in category A, B or C Notes: (1) SWD QS112 and Icynene MD-R-210 cannot be directly applied over 2600 AWB. (2) Adhesion testing of WRB over exterior insulation must be performed to confirm acceptance of application	Exterior insulations allowed behind Class A, B or C Claddings: <ol style="list-style-type: none"> 1. None 2. Mineral Wool Insulation (faced or unfaced) 3. 4 in. (max.) Atlas EnergyShield Pro (or Pro2) 4. 3 1/2 in. (max.) Hunter Xci Class A 5. 3 1/2 in. (max.) Carlisle R2+ Sheathe 6. 3 1/2 in. (max.) Hunter Xci-CG 7. 3 1/2 in. (max.) Carlisle R2+ Matte 8. 3 in. (max.) Dow Thermax 9. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax TSX-8500 10. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax ECOMAXci 11. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax TSX-8510 12. 4 1/2 in. (max.) Rmax ECOBASEci, foam with 5/8 in. (min.) FRT plywood facing out, or FRT plywood facing in - replaces exterior gypsum sheathing 13. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax Durasheath-3 14. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax Thermasheath-3

Wall Component	
Exterior Insulation – Choose insulation 1-28 based on cladding in category A, B or C	<p>Exterior insulations allowed behind Class A or B Claddings:</p> <ol style="list-style-type: none"> 15. ATLAS EPS Products <ol style="list-style-type: none"> a. Includes ThermalStar LCI 15 (15 psi product, 1.35 pcf) up to 7.2 inches thick b. ThermalStar LCI 25 (25 psi product, 1.70 pcf) up to 5.4 inches thick c. ThermalStar CHROME 15 (15 psi product, 1.35 pcf) up to 7.2 inches thick d. ThermalStar CHROME 25 (25 psi product, 1.70 pcf) up to 5.4 inches thick 16. 3 in. (max.) Dow Type IV or Type X Styrofoam XPS (Class A) 17. 3 in. or 5 in. (max. depending on header) Owens Corning Type IV or X Foamular XPS (Class A) 18. 3 1/2 in. (max.) Hunter Xci-Foil 19. 3 1/2 in. (max.) Carlisle R2+ Foil 20. 3 1/2 in. (max.) SWD QS 112 21. 6 in. (max.) Icynene MD-R-210 22. 4 1/4 in. (max.) Dow Thermax 23. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax TSX-8500 24. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax ECOMAXci 25. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax TSX-8510 26. 4 1/2 in. (max.) Rmax ECOBASEci, foam with 5/8 in. (min.) FRT plywood facing out, or FRT plywood facing in - replaces exterior gypsum sheathing 27. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax Durasheath-3 28. 4 1/2 in. (max.) consisting of a single panel or multiple thinner panels Rmax Thermasheath-3
WRB Over Exterior Insulation – Use either 1 or 2	<ol style="list-style-type: none"> 1. None 2. Momentive Elemax 2600 AWB
Exterior Cladding – Use claddings in Category A, B or C depending on exterior insulation. For Special category, refer to manufacturer allowed constructions for details.	<ol style="list-style-type: none"> 1. Category A (Masonry with max 2 in. air gap) <ol style="list-style-type: none"> a. Brick - Nominal 4 in. clay brick or veneer with maximum 2 in. air gap behind the brick. Brick with ties/anchors 24 in. o.c. (max.) b. Concrete - Minimum 2 in. thick with maximum 2 in. air gap between concrete and insulation c. Concrete Masonry Units - Minimum 4 in. thick with maximum 2 in. air gap between CMU and insulation 2. Category B (masonry without air gap) <ol style="list-style-type: none"> a. Limestone - minimum 2 in. thick with non-open joint installation technique such as shiplap b. Natural Stone Veneer - minimum 2 in. thick with non-open joint installation technique such as shiplap c. Precast Artificial Stone - minimum 1 1/2 in. thick complying with ICC-ES, AC 51 with non-open joint installation technique such as shiplap d. Terra Cotta Cladding - minimum 1 1/4 in. thick with non-open joint installation technique such as shiplap e. Stucco - minimum 3/4 in. thick exterior cement plaster and lath 3. Category C (Thin claddings with max 2 in. air gap) <ol style="list-style-type: none"> a. Any MCM/ACM that has passed NFPA 285 b. Metal Skin (Steel, Copper) c. Cement board siding 4. Special Cladding Category <ol style="list-style-type: none"> a. Trespa 8 mm, 10 mm, 13 mm Meteon Kraft FR using installation TS110, TS110-285, TS110-285Z, TS210-285, TS220-285 <p><i>Refer to Trespa approved designs for construction details. WRB 1, or 2 may be used over exterior sheathing.</i></p>

Wall Component	
Window Header	Contact Momentive Technical Service for a complete copy of the engineering evaluation including window header requirements.

Please be advised that the information provided in this table is provided as a guide to assist Momentive product users in developing project specifications and details. Consult appropriate specification documents, data sheets, building codes and any other information deemed necessary for specific requirements. Momentive product users are responsible for determining the suitability of Momentive products for the particular application and all related project details. Contact third party manufacturers included in the above referenced table to confirm acceptance and approval for use of their products in the wall assemblies listed above. For a complete copy of our NFPA 285 test report, engineering evaluation or to request an additional wall assembly engineering evaluation please contact Momentive Technical services at 904-710-4688.

(1) Priest Associates Project No. 10234. Rev 2 dated 11-30-2015

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