Product Selection For Wall Assemblies That Need To Comply With

NFPA 285

Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components

Learning Objectives

1. Understand how decisions about insulation, air barriers and exterior cladding materials are impacted by code requirements for NFPA 285 testing
2. When is NFPA 285 testing is required for exterior wall assemblies
3. Understand how 3rd party engineering evaluations can assist with determining compliance of wall assemblies that are required to pass NFPA 285
4. Demystifying the NFPA 285 requirements for exterior wall assemblies.

A Little History

- The energy crisis of the 70's spurred the increasing use of insulation to reduce the cost of using oil and gas to heat buildings
- This resulted in innovative new insulations. Many of which were plastics and tended to be combustible.
- UBC 17-6, UBC 26-4, UBC 26-9 and finally NFPA 285

https://www.pacerepresentatives.com/uploads/NFPA%20285_What%20you%20Need%20to%20Know.pdf

Risks to life safety

- 2017 Grenfell Tower, London
- 2017 Torch Tower, Dubai
- 2015 Address Hotel, Dubai
- 2014 Lacrosse Building, Melbourne
- 2012 Mermoz Tower. France
- 2008 Monte Carlo Hotel, Las Vegas

Case Study: Mixed Use Office Building

Location: Michigan

Building 1 (west):
Historic Hotel + New 3 story Non-Separated Mixed-Use office building

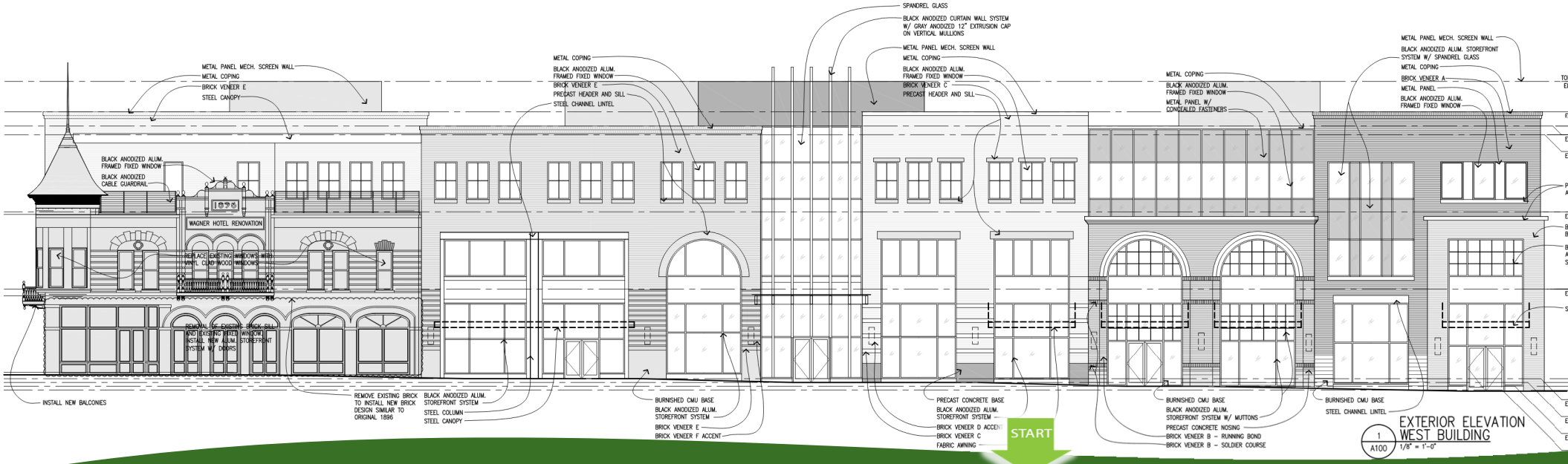
- 2 story historic building Use Group B
- 2 stories of Use Group B (office) over 1 story of A-2 (Restaurant)

Building 2 (east):
New 3 story Non-Separated Mixed-Use office building

2 stories of Use Group B (office) over 1 story of A-2 (Restaurant)

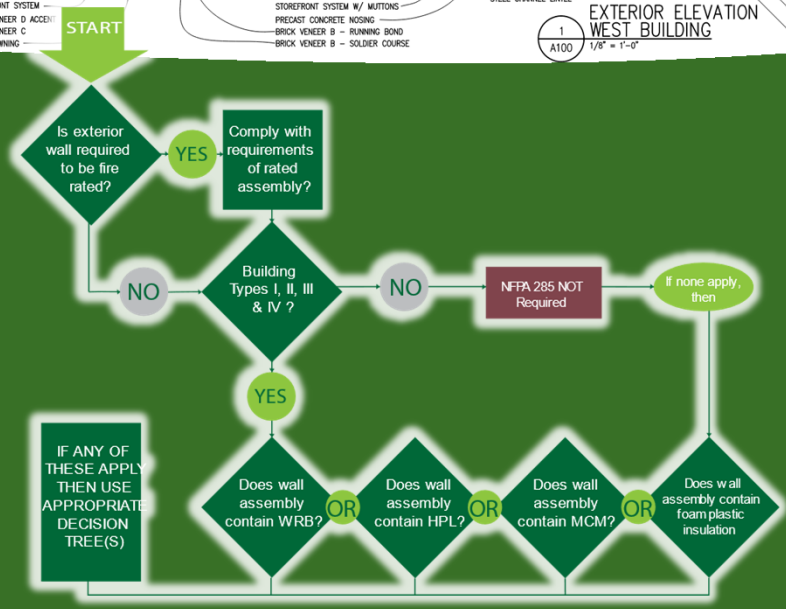
Construction Types

- Historic Building: IIIB (separated from IIB with 2-hour Fire Barrier)
- Both New Construction Buildings: IIB
- Code: MBC 2012

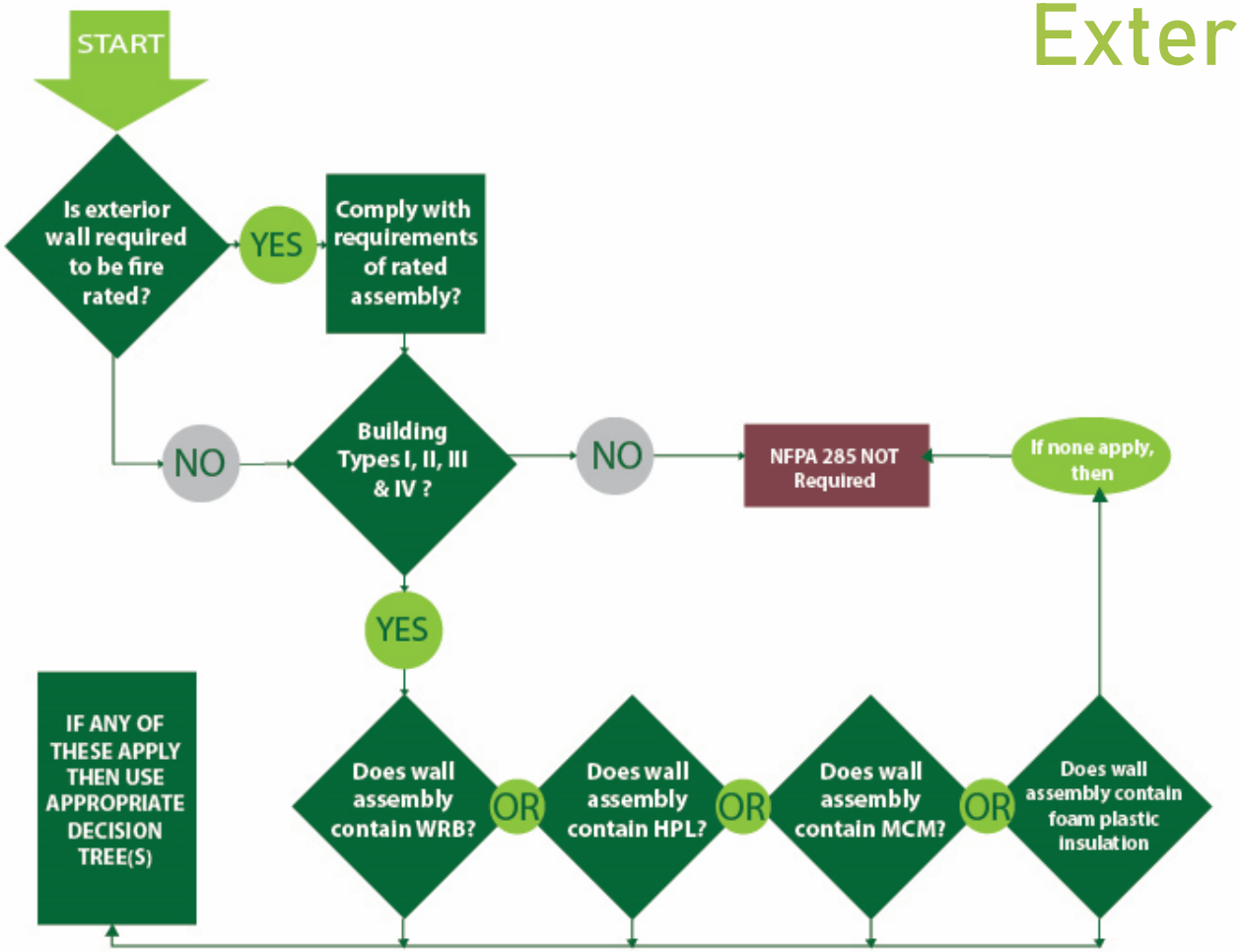


Schematic Design Elevation

- **Façade materials**: Brick, block and natural stone
- Back up materials: CMU or Metal Studs
- **WRB**: Yes - the intent was to seal the joints of the insulation using system tested with assembly. (SPF or PU Sealant dependent on manufacturer testing)
- **Insulation**: Yes. XPS (Extruded Polystyrene)

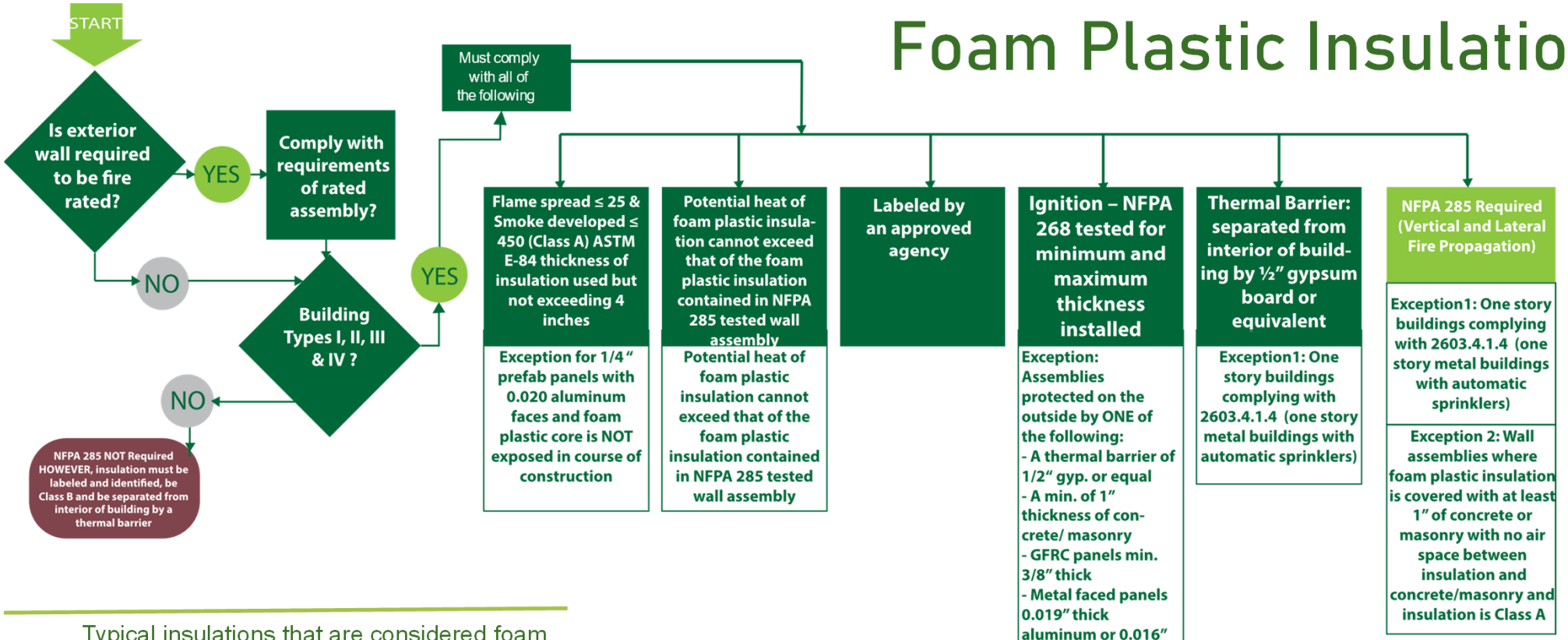


Exterior Wall Assembly Decision Tree



WRB – Water Resistive Barrier
HPL – High-Pressure Decorative Exterior Grade Compact Laminate
MCM – Metal Composite Material

Exterior Wall Containing Foam Plastic Insulation



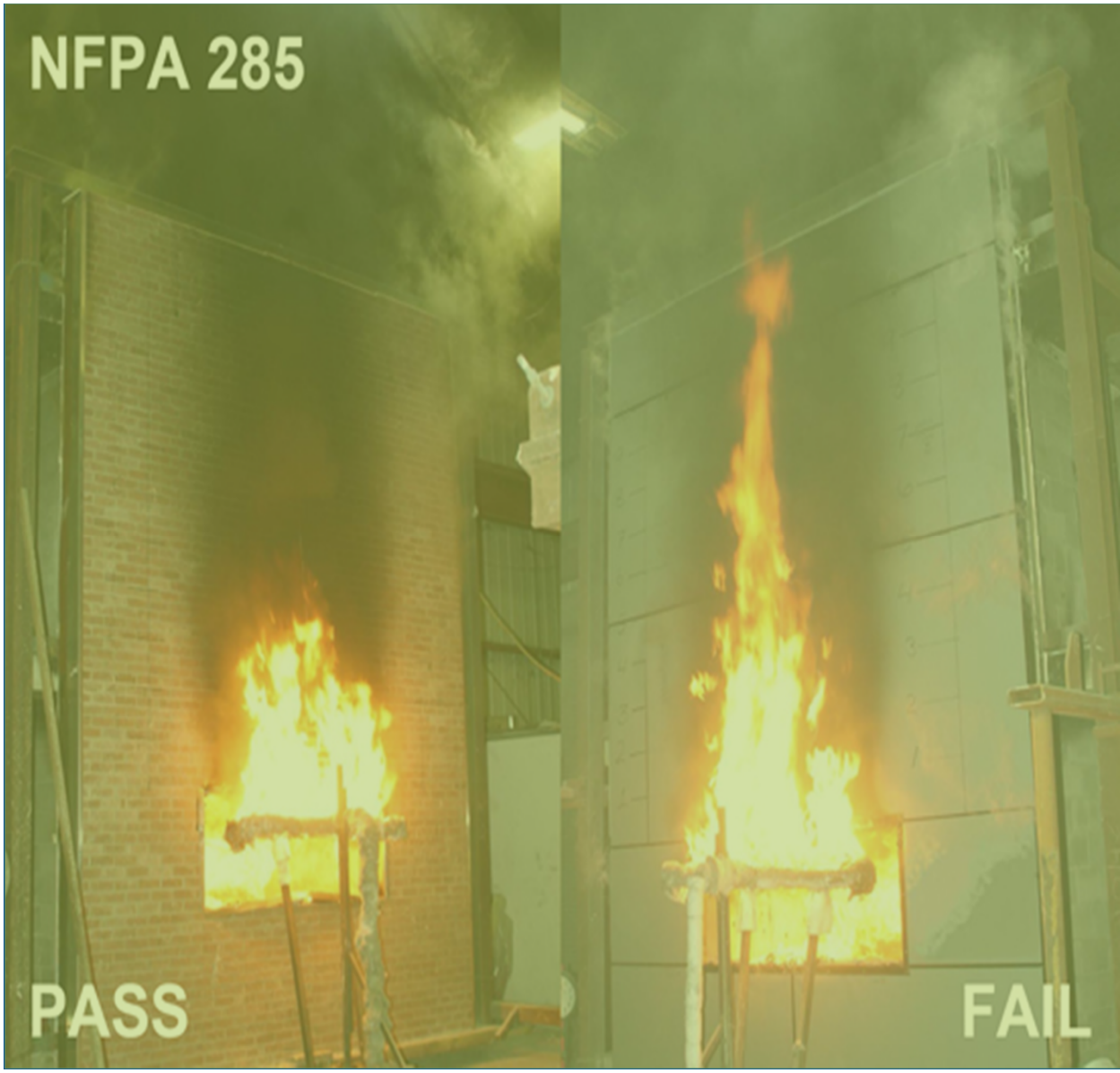
Typical insulations that are considered foam plastic:

- Expanded Polystyrene (EPS)
- Extruded Polystyrene (XPS)
- Polyisocyanurate (polyiso)
- Sprayed Polyurethane Foam (SPF)
- Phenolic

Third Party Test Reports and Engineering Evaluations

- So you know that the XPS has passed NFPA 285 test as part of assembly. Next step is to get manufacturers information on tested assembly and make sure the other components you are including in the wall were part of or can be included in that tested assembly.

- Other 3rd party code evaluations include – ICC ESR, UL ER, etc.



Evaluation Report

ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-2142

Reissued October 2019
Revised December 2019
This report is subject to renewal October 2021.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation
Section: 07 25 00—Water-Resistive Barriers/Weather Barriers
Section: 07 27 00—Air Barriers

REPORT HOLDER:

DUPONT DE NEMOURS, INC.

EVALUATION SUBJECT:

STYROFOAM™ BRAND INSULATION BOARDS AND DUPONT FAN-FOLD PRODUCTS

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)
- 2018, 2015, 2012 and 2009 *International Energy Conservation Code®* (IECC)
- Other Codes (see Section 8.0)

Properties evaluated:

- Surface burning characteristics
- Attic installations
- Crawl space installations
- Air barrier
- Water-resistive barrier
- Thermal resistance
- Exterior walls in Types I-IV Construction
- Wind resistance (ANSI/FS 100)

1.2 Evaluation to the following green code(s) and/or standards:

- 2016 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2015 and 2012 *International Green Construction Code®* (IgCC)
- 2014 and 2011 ANSI/ASHRAE/USGBC/IES Standard 189.1–Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings

Attributes verified:

See Section 2.0.

2.0 USES

STYROFOAM brand insulation boards are extruded polystyrene foam plastic boards used as nonstructural thermal insulating material in buildings of Type I, II, III, IV and V construction under the IBC and dwellings under the IRC. The insulation is for use in wall assemblies, ceiling/floor assemblies, door cavities, roofs, foundations, attic and crawlspaces.

DuPont fan-fold products are extruded polystyrene foam plastic boards used as nonstructural thermal insulation in roofs, on foundations or on walls constructed in accordance with the IBC or IRC.

STYROFOAM DURAMATE™ Plus, STYROFOAM Residential Sheathing, STYROFOAM Residing Board, STYROFOAM Utilityfit, STYROFOAM SCOREBOARD, STYROFOAM Sheathing Material, STYROFOAM Ship Lap, STYROFOAM Square Edge, STYROFOAM Tongue and Groove, STYROFOAM CAVITYMATE™ Ultra, STYROFOAM Ultra SL, STYROFOAM XPS Insulation, DuPont High Performance Underlayment, BLUECOR™, and DuPont Protection Board III brand insulation boards may be used as alternatives to the water-resistive barriers specified in the IBC and IRC when installed in accordance with Section 4.3 and have been verified as conforming to the provisions of (i) CALGreen Section 5.407.1 for water-resistive barriers and Section A4.407.5 for air barriers; (ii) 2015 and 2012 IgCC Section 605.1.2.1 for air barriers; (iii) 2014 ASHRAE 189.1 Section 7.3.1.1 and 2011 ASHRAE 189.1 Section 7.4.2.9 for air barriers; (iv) ICC 700-2015 Section 602.1.8, 11.602.1.8 and 12.6.602.1.8; (v) ICC 700-2012 Section 602.1.8, 11.602.1.8 and 12.5.602.1.8; and (vi) ICC 700-2008 Section 602.9 for water-resistive barriers.

The attributes of the insulation have also been verified as conforming to the provisions of ICC 700-2008 Section 703.2.1.1.1(c) as an air impermeable insulation. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.0 DESCRIPTION

3.1 STYROFOAM Brand Insulation Boards:

The STYROFOAM brand insulation boards, in widths of 1.5 to 4 feet (457 to 1219 mm) and lengths of 8 to 10 feet (2438 to 3048 mm), are installed horizontally over gypsum sheathing or concrete block wall.

When the insulation boards are installed over gypsum sheathing, the boards must be mechanically attached to the wood or steel framing using nails, staples, plastic cap nails or screws. The fasteners must be long enough to penetrate wood framing members a minimum of 0.45 inch (11.4 mm) and steel framing members a minimum of $^3/_4$ inch (19 mm).

When installed directly over concrete block walls, the insulation boards are attached to the block wall with mechanical fasteners or GREAT STUFF™ Pro Gaps & Cracks sealant (ESR-1961). The boards are installed between the rows of brick ties.

Seams and joints between the boards must either be sealed with GREAT STUFF™ Pro Gaps & Cracks sealant (ESR-1961) or covered by minimum 4-inch-wide (102 mm) WEATHERMATE™ Flashing Tape.

Penetrations in the air barrier assembly must be sealed in accordance with Item 3 of 2018 and 2015 IECC Section C402.5.1.1 (2012 IECC Section C402.4.2).

Wall coverings must be mechanically attached through the insulation to wall framing or sheathing.

5.0 CONDITIONS OF USE

The STYROFOAM brand insulation boards and DuPont fan-fold products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 STYROFOAM brand insulation boards and DuPont fan-fold products must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. In the event of a conflict between the installation instructions and this report, this report governs.

5.2 This evaluation report and the manufacturer's published installation instructions, when required by the code official, must be submitted at the time of permit application.

5.3 A water-resistive barrier complying with the requirements of the applicable code must be provided except when installation is as described in Section 4.3 of this report.

5.4 Use of the insulation boards to structurally resist transverse, racking-shear or vertical loading is outside the scope of this report. The walls must be braced in accordance with the requirements of the applicable code.

5.5 The insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be into the wall framing as required by the siding manufacturer's instructions or the applicable code.

5.6 The insulation boards must be separated from the interior of the building by an approved 15-minute thermal barrier, except as described in Section 4.2.

5.7 Where required by the applicable code, a vapor retarder system, which may include the foam plastic insulation, must be installed in the exterior wall, floor, and/or roof ceiling assembly.

5.8 Jobsite certification and labeling of the insulation must comply with 2018 and 2015 IRC Section N1101.10.1 [2012 IRC Section N1101.12 (2009 IRC Section N1101.4)] and 2018, 2015 and 2012 IECC Sections C303.1.1, R303.1.1 and R401.3 (2009 IECC Section 303.1 and 401.3), as applicable.

5.9 Use of insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with 2018, 2015 and 2009 IBC Section 2604.8 (2012 IBC Section 2603.9) or IRC Section R318.4. When use is on exterior walls of buildings of Type I, II, III, or IV, construction must be as described in Section 4.4 and Table 3.

5.10 STYROFOAM brand insulation boards and DuPont fan-fold products are manufactured in Burley, Idaho; Dalton, Georgia; Channahan, Illinois; Pevely, Missouri; Varennes, Quebec; and Wyoming, Michigan, under a quality-control program with inspections by ICC-ES.

5.11 WEATHERMATE™ Flashing Tape has not been evaluated by ICC-ES for use as flashing under IBC Section 1405.4.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised October 2017).

6.2 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water-resistive Barriers (AC71), dated February, 2003 (editorially revised January 2018).

6.3 Report of room corner fire tests in accordance with NFPA 286.

6.4 Reports of room corner fire tests in accordance with NFPA 286, AC12 Appendix B, for attics and crawlspace in Section 4.2.

6.5 Reports of air leakage tests in accordance with ASTM E283 and ASTM E2357.

6.6 Reports of potential heat tests in accordance with NFPA 259.

6.7 Report of fire propagation tests in accordance with NFPA 285.

6.8 Data in accordance with ANSI/FS 100 for wind resistance.

7.0 IDENTIFICATION

7.1 The STYROFOAM brand insulation boards, and fan-fold products described in this report are identified by a label on the board or packaging material bearing the DuPont de Nemours, Inc. name, product name, plant code or manufacturing address, other information to confirm code compliance, and the ICC-ES evaluation report number (ESR-2142); except for those products that are used in Types I, II, III, and IV construction, which must have the above-noted labeling printed on the board.

7.2 The report holder's contact information is the following:

DUPONT DE NEMOURS, INC.
1501 LARKIN CENTER DRIVE
MIDLAND, MICHIGAN 48642
(866) 583-2583
www.dupont.com/building

8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the following codes:

- 2006 *International Building Code*® (2006 IBC)
- 2006 International Residential Code® (2006 IRC)
- 2006 International Energy Conservation Code® (2006 IECC)

following conditions apply:

1. Attic ventilation is provided when required by 2018 IBC Section 1202.3 (2015 IBC Section 1203.2) or IRC Section R806, as applicable; except unvented attic assemblies are permitted under the conditions prescribed in 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).
2. Under-floor (crawl space) ventilation is provided when required by 2018 IBC Section 1202.4 [2015 IBC Section 1203.4 (2012 and 2009 IBC Section 1203.3)] or IRC Section R408.1, as applicable, except unvented crawl spaces are permitted under the conditions prescribed in IRC Section R408.3.
3. Combustion air is provided in accordance with IMC (*International Mechanical Code*®) Section 701

ASTM C578 Type VI and VII STYROFOAM Brand insulation boards must be installed with code-prescribed ignition barrier.

4.3.3 Attics Only – Installation without a Prescriptive Ignition Barrier: ASTM C578 Type X and ASTM C578 Type IV STYROFOAM brand insulation boards, with a maximum nominal thickness of 1 inch (25.4 mm), covered with a water-resistive barrier (Weathermate [ESR-2862], Weathermate Plus [ESR-3401] or Tyvek [ESR-2375]) exposed to the interior of the attic space, may be installed on the walls of an attic (including gable ends and knee walls) (the attic may contain utilities, including but not limited to, mechanical equipment; electrical wiring; fans; plumbing; gas or electric hot water heaters; gas or electric furnaces; etc.) with no coverings (no thermal or ignition barrier) applied, when all of the following conditions are met:

1. Entry to the attic is only to service utilities and no storage is permitted.
2. There are no interconnected attic areas.
3. Air in the attic is not circulated to other parts of the building.
4. Attic ventilation is provided when required by 2018 IBC Section 1202.3 (IBC Section 1203.2) or IRC Section R806, as applicable; except unvented attic assemblies are permitted under the conditions prescribed 2018, 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4).
5. Combustion air is provided in accordance with IMC Section 701.

4.4 Water-resistive Barrier:

The noted STYROFOAM brand insulation boards (STYROFOAM CAVITYMATE™, STYROFOAM CAVITYMATE™ Plus, STYFOFOAM CAVITYMATE™ SC, STYROFOAM CAVITYMATE™ Ultra, STYROFOAM Ultra SL, STYROFOAM DURAMATE™ Plus, STYROFOAM Residential Sheathing, STYROFOAM Residing Board, STYROFOAM Utilityfit, STYROFOAM SCOREBOARD, STYROFOAM Sheathing Material, STYROFOAM Square Edge and STYROFOAM Tongue and Groove) and DuPont fan-fold products (DuPont High Performance Underlayment, BLUECOR™, and DuPont Protection Board III) may be used as alternate water-resistive barriers as prescribed in 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section

on framing members, framing members are spaced a maximum of 24 inches on center. The insulation boards are attached using $^3/_8$-inch-head (9.5 mm) galvanized nails, 1-inch-crown (25.4 mm) galvanized staples or 1-inch-head (25.4 mm) plastic cap nails or equivalent fasteners long enough to penetrate framing a minimum of $^3/_4$ inch. Nails or staples must not be over-driven. Fastener spacing for boards measuring 4 feet by 8 to 10 feet is a minimum of 12 inches on center around the perimeter and 16 inches on center in the field; for 2-foot-by-8-foot boards, fastener spacing is a minimum of 12 inches on center on each stud (three fasteners per stud). For window installation, the nailing flange is set against sealant bedding and fastened to the framing with galvanized roofing nails 3 inches from each corner and 8 inches on center. Minimum 3-inch-wide flashing is used to seal the sill of windows, and minimum 2-inch-wide flashing is used to seal jambs and heads. Window installation must be in accordance with the window manufacturer's instructions. See also Figure 1.

DuPont fan-fold products must be installed over wood structural sheathing with long joints butted tightly together. The insulation foam board joints must be staggered relative to joints in the structural sheathing. The remainder of the installation is as described above for rigid boards.

For the STYROFOAM brand insulation boards and DuPont fan-fold products mentioned in this section, seams and joints between boards must be covered by minimum $2^7/_8$-inch-wide (73 mm) WEATHERMATE™ Construction Tape or equivalent. Penetrations in exterior walls must be sealed with GREAT STUFF™ Gaps & Cracks sealant (ESR-1961), or an equivalent expanding spray foam sealant, or an elastomeric sealant. See Figures 2 and 3.

4.5 Use on Exterior Walls in Types I, II, III and IV Construction:

When used on exterior walls of Types I, II, III and IV construction, and when installed in accordance with this report, the assembly must comply with Section 2603.5 of the IBC and must be as described in Table 3; the insulation boards must be installed in a single layer of insulation board at a maximum thickness of 3 inches. Alternatively, the insulation boards may be used in Types I, II, III and IV construction when specifically named in another ICC-ES evaluation report, in which case the insulation boards must be installed as described in that report. The potential heat of the ASTM C578 Type X and ASTM C578 Type IV STYROFOAM foam plastic insulation boards and is 2646 Btu/ft^2 per inch of thickness (30.0 MJ/m^2).

4.6 Air Barrier:

4.6.1 Air Barrier Material: When used as an air barrier material, the insulation boards must be installed in accordance with The DuPont de Nemours, Inc.'s installation instructions and this report.

4.6.2 Air Barrier Assembly: When installed on exterior walls as described in this section, the ASTM C578 Type X and ASTM C578 Type IV STYROFOAM foam plastic insulation is part of an air barrier assembly in accordance with 2018 and 2015 IECC Section C402.5.1.2.2 (2012 IECC Section C402.4.1.2.2), based on testing in accordance with ASTM E2357. The assembly qualifies as a continuous air barrier as prescribed in 2018 and 2015 IECC Section C402.5.1 (2012 IECC Section C402.4.1).

TABLE 3—NFPA 285 COMPLYING WALL ASSEMBLIES FOR MAXIMUM 3-INCH-THICK ASTM C578 TYPE IV STYROFOAM™ INSULATION BOARD

Base Wall System – Use either 1, 2, or 3	1 – Concrete Wall 2 – Concrete masonry wall 3 – 1 layer of $^1/_2$-inch or $^5/_8$-inch Type X Gypsum Wall Board (on interior), installed over steel studs (minimum $3^5/_8$-inch deep, minimum No. 20-gage, maximum 16-inch o.c., lateral bracing every 4 ft. vertically)
Floorline Firestopping	4 pcf mineral wool in each stud cavity and at each floorline. Mineral wool to be attached with Z-clips or equivalent (See Figure 4).
Cavity Insulation – Use either 1, 2, or 3	1 – None 2 – Fiberglass batt insulation (faced or unfaced) 3 – Any non-combustible material
Exterior Sheathing – Use either 1, 2 or 3	1 – None 2 – $^1/_2$-inch thick, exterior type gypsum sheathing 3 – $^5/_8$-inch thick, Type X, exterior-type gypsum sheathing
Weather-Resistive Barrier Applied to Exterior Sheathing – Use 1 or 2	1 – None 2 – Any of the following[1]: a. Air Bloc 31MR[2] – Henry Co. b. AIR-SHIELD™ LMP[2] (black only) – W.R. Meadows c. Backstop® NT[2] – Dryvit d. Barritech™ VP[2] – Carlisle e. CCW-705FR with CCW-702WB Primer[2] – Carlisle f. Fire-Resist Barritech™ NP[2] – Carlisle g. Green Guard® Max Building Wrap – Pactiv h. Perm-A-Barrier® Aluminum Wall Membrane with WB Primer[2] – Grace Construction Products i. Perm-A-Barrier® VPS[2] – Grace Construction Products j. Tyvek® CommercialWrap® (ESR-2375) k. Wall Guardian™ FW100A[2] – STS Inc. l. WEATHERMATE™ (ESR-2862) m. WEATHERMATE™ Plus (ESR-3401) Note: All barriers to be installed at recommended application rates per manufacturer's installation instructions.
Exterior Insulation	ASTM C578 Type IV STYROFOAM™ insulation board: $^1/_2$-inch (minimum) to 3-inch (maximum). Insulation board joints may be covered with 4-inch (maximum) wide asphalt or butyl-based flashing tape
Weather-Resistive Barrier[1] Applied to Exterior Insulation – Use 1, 2, 3, 4 or 5	1 – None 2 – Green Guard® Max Building Wrap – Pactiv 3 – Tyvek® CommercialWrap® (ESR-2375) 4 – WEATHERMATE™ (ESR-2862) 5 – WEATHERMATE™ Plus (ESR-3401)
Exterior Veneer – Use 1, 2, 3, 4, 5 or 6	1 – Brick. Use standard nominal 4-inch thick, clay brick. Use standard brick veneer anchors installed vertically on each stud at a maximum of 24-inch o.c. creating a 2-inch maximum air gap between the exterior insulation and brick. 2 – Concrete – Minimum 2-inch thick, with a 2-inch maximum air gap between exterior insulation and concrete. 3 – Concrete masonry units - minimum 4-inch thick, with a 2-inch maximum air gap between exterior insulation and concrete masonry units. 3 – Limestone – minimum 2-inch thick installed using any standard non-open-joint installation technique such as ship-lap. 4 - Natural stone veneer – minimum 2-inch thick installed using any standard non-open-joint installation technique such as ship-lap. 5 – Pre-cast artificial stone complying with ICC-ES AC51 – minimum $1^1/_2$-inch thick installed using any standard non-open-joint installation technique such as ship-lap. 6 – Terracotta cladding – minimum $1^1/_4$-inch thick installed using any standard non-open-joint installation technique such as ship-lap.
Special Conditions	Use header treatment shown in Figures 5, 6 and 7 for all window and door openings in wall.

1A code-complying water-resistive barrier must be provided, either over the sheathing or over the exterior insulation.

2This material was evaluated by ICC-ES to comply with Section 2603.5 of the IBC, when used as part of the wall assemblies outlined in Table 3, but has not been evaluated for use as a water-resistive barrier under Section 1404.2 of the IBC and Section R703.2 of the IRC.

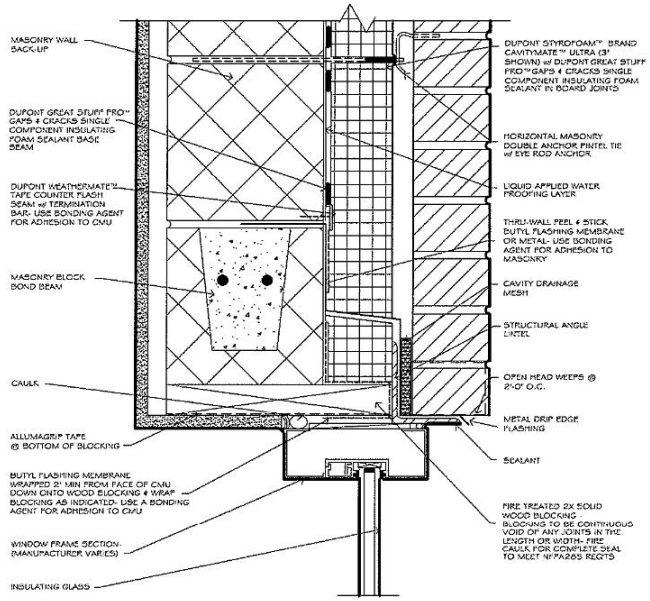


FIGURE 6—WINDOW HEAD DETAIL–FRTW WOOD BLOCKING–MASONRY WALL

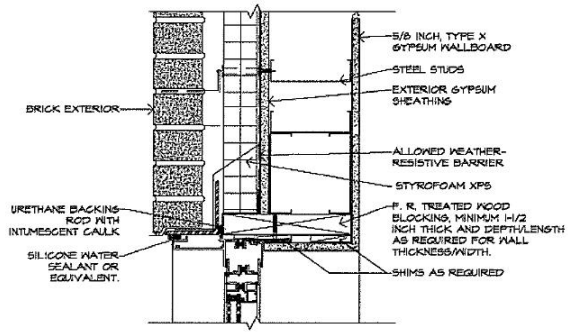


FIGURE 7—WINDOW HEAD DETAIL–FRTW WOOD BLOCKING–FRAMED WALL

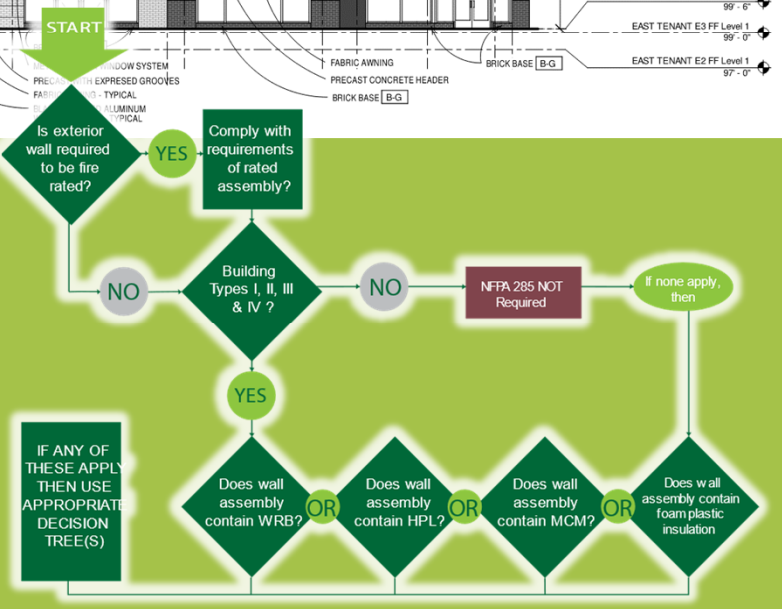
Design Development Elevation

Façade materials: Brick, block, natural stone, metal panel and metal composite panel

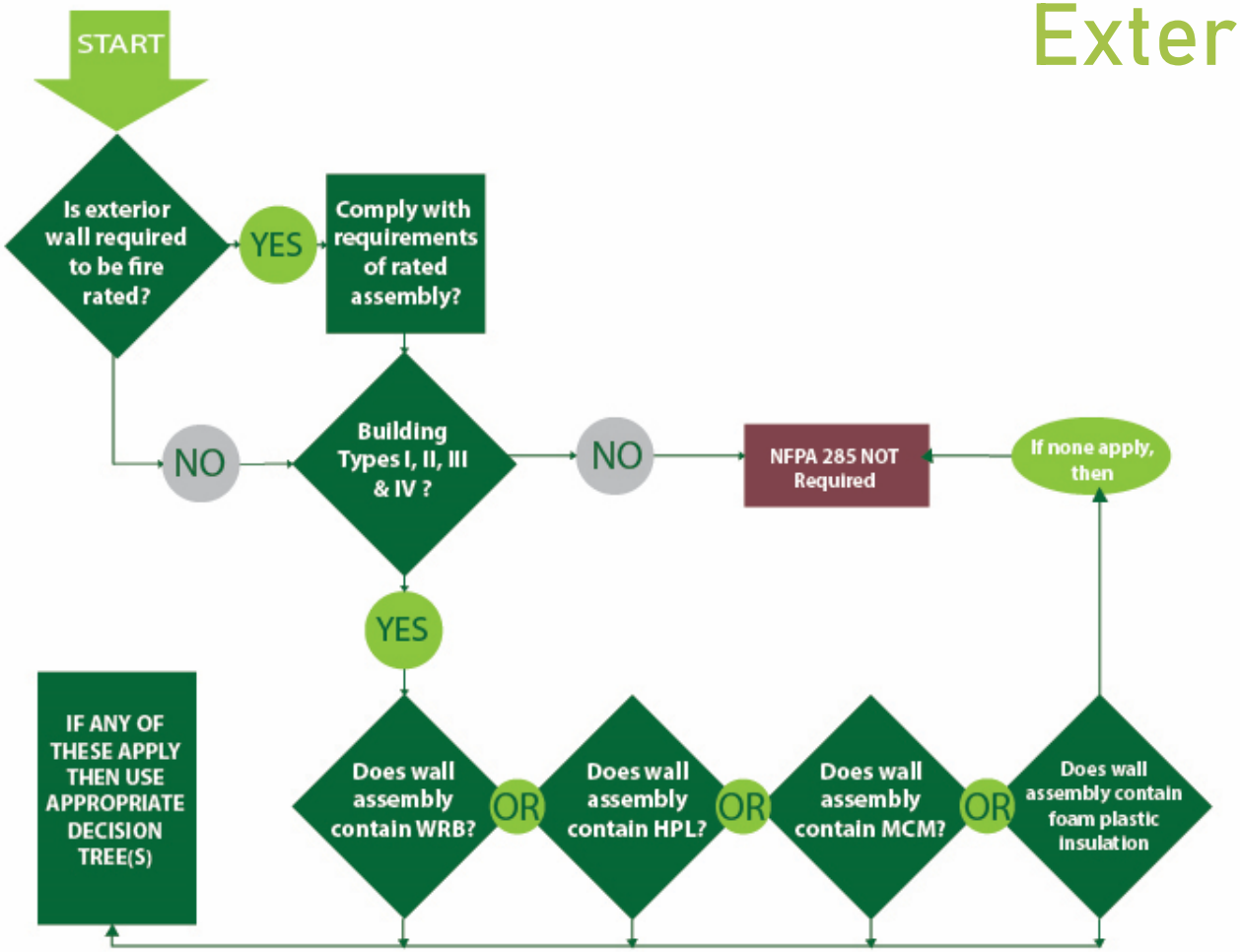
Back up materials: ~~CMU or~~ Metal Studs

WRB: Yes – Gypsum board with integral Air barrier

Insulation: Yes ~~XPS (Extruded Polystyrene)~~ Polyisocyanurate (other option was mineral wool)



Exterior Wall Assembly Decision Tree



WRB – Water Resistive Barrier
HPL – High-Pressure Decorative Exterior Grade Compact Laminate
MCM – Metal Composite Material

Dr J® CERTIFICATION

ANSI ACCREDITED #1131 ISO/IEC 17065 Product Certification Body

IAF INTERNATIONAL ACCREDITATION FORUM

Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1306-03

EnergyShield® Pro, EnergyShield® Pro2, EnergyShield® CGF Pro & EnergyShield® Ply Pro Fire Performance in Buildings of Type I-V Construction

Atlas Roofing Corporation

Product:

EnergyShield® Products

Issue Date:
July 23, 2013
Revision Date:
January 21, 2020
Subject to Renewal:
April 1, 2020

5.2.5.2 The wall assemblies listed in Table 3 are approved for use in buildings of Type I-IV construction.

TABLE 3: APPROVED NFPA 285 WALL ASSEMBLIES[1]

Wall Component	Materials
Base Wall Use either 1, 2, 3, or 4	1. Cast Concrete Walls (1" minimum) 2. CMU Concrete Walls (1" minimum) 3. 20 GA. (min.) 3⅝" (min.) steel studs with ⅝"-thick Type X gypsum wallboard on interior 4. FRT wood studs spaced at a maximum of 24" o.c. with ⅝"-thick Type X gypsum wallboard on interior
Floor Line Fire-Stopping Use 1, 2, or 3	1. None 2. 4", 4 pcf mineral fiber (wool) safing insulation (e.g., Thermafiber) installed with Z-clips or equivalent 3. 1½" FRT lumber for use with FRT studs
Cavity Insulation Use any item 1 - 16 Note: SPF cavity insulations 5 - 16 must use fire stopping at floor lines (compliant with Item 2) and ⅝" exterior gypsum sheathing.	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. 5½" (max.) Icynene LD-C-50 spray foam in 6" deep studs (max.) full fill without an air gap 6. 5½" (max.) Icynene MD-C-200, 2 pcf spray foam in 6" deep studs (max.) full fill without an air gap 7. 5½" (max.) Icynene MD-R-210, 2 pcf spray foam in 6" deep studs (max.) full fill without an air gap 8. 6" (max.) SWD Urethane Quik-Shield (QS) 112, 2 pcf spray foam in 6" deep studs (max.) or partial fill with a maximum 2½" air gap 9. 3½" (max.) Gaco™ 183M spray foam in 3⅝" deep studs (max.) 10. 3½" (max) Gaco™ Western F1850 with ⅝" exterior sheathing in 3⅝" deep studs (max.) 11. 3⅝" (max.) Demilec Sealection® 500 with ⅝" exterior sheathing in 3⅝" deep studs (max.) 12. 3.4" (max.) Demilec HeatLok Soy 200 Plus® with ⅝" exterior sheathing in 3⅝" deep studs (max.) 13. 3" (max.) Bayer Bayseal® with ⅝" exterior sheathing 14. 3" (max.) Lapolla FoamLok™ FL 2000 with ⅝" exterior sheathing in 3⅝" deep studs (max.) 15. 3⅝" (max.) BASF SprayTite® 81206 or WallTite® (US & US-N) with ⅝" exterior sheathing in 3⅝" deep studs (max.) 16. 3⅝" (max.) Acella (Premium Spray Products) Foamsulate™ 220 with ⅝" exterior sheathing in 3⅝" deep studs (max.)
Exterior Sheathing Use either 1, 2, 3, or 4	1. ½" or thicker exterior type gypsum sheathing 2. None, when cavity SPF insulation is not used 3. 2" precast concrete panels attached to structural elements of building 4. ½" or thicker GP DensElement® sheathing with integrated water-resistive barrier (WRB). When SPF is used in cavity, exterior sheathing must be used. See specific sheathing thicknesses above.
WRB over Exterior Sheathing Use any item 1 - 27	1. None 2. Dupont™ Tyvek CommercialWrap® or CommercialWrap® D or other Tyvek Wraps in ESR 2375 – stapled (1 or 2 layers) 3. Henry Air-Bloc® 32MR (75 wet mils) 4. Any WRB which has been tested per *ASTM E1354* (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above.[2] Examples of such are listed below: 5. BASF Enershield® HP, EnergyShield® 1 6. CCW Fire Resist 705, 705 VP, or 705 FR-A, Fire Resist Barritech NP, VP, or VP LT 7. Dow Chemical DefendAir 200 Low Temp or DefendAir 200 C (Charcoal) 8. Dryvit Backstop® NT™, NT™ Smooth, NT™ Spray, NT™ Texture 9. Dupont™ Fluid Applied (0.8 mm) 10. GE Momentive Elemax 2600 11. Grace Perm-A-Barrier® PAB VPL LT, PAB NPL 10, PAB NPL, PAB NPS, PAB VPS, PAB VPL, PAB AWM or PAB VPL 50 12. Henry Air-Bloc® 31MR, Air-Bloc® 33MR, Air-Bloc® 21FR, Air-Bloc® VP 160 13. Hohmann & Barnard Enviro-Barrier™ VP, X Barrier™, Enviro-Barrier™

	17. Sto Emerald Coat® or Gold Coat® 18. STS Wall Guardian® FW 100A 19. Tremco ExoAir® 230 (31.5 mils), ExoAir® 130, ExoAir® 111 20. Vaproshield Wrapshield SA®, Revealshield SA® 21. WR Meadows Air-Shield™ LMP (Gray), Air-Shield™ LMP (Black), Air-Shield™ TMP, Air-Shield™ LSR, Air-Shield™ SMP 22. Soprema® LM 204 VP, Sopraseal® Stick VP, Sopraseal® 1100T, Soprasolin HD 23. Siga Majvest 500 SA 24. Dörken Systems Inc. DELTA®-STRATUS SA 25. Fortifiber WeatherSmart, WeatherSmart Drainable, WeatherSmart Commercial 26. Pecora XL-Perm^{ULTRA} VP, XL-Perm^{ULTRA} NP, ProPerm VP 27. NaturaSeal NS-A-250LP, NS-A-250HP
Exterior Insulation Use either 1, 2, 3, or 4 Items 1-3 may be multiple layers of 1 inch thick (minimum) Items 1, 2, & 3 may be multiple layers of thinner product with facers on each side.	1. 4" (max.) Atlas EnergyShield® Pro (or Pro2) 2. 4" (max.) RBoard Pro (or EnergyShield® CGF Pro) 3. 4 3/4" (max.) EnergyShield® Ply Pro (4" Energyshield® CGF Pro with 5/8" or 3/4" FRT Plywood) 4. Any exterior insulation which has been tested per *ASTM E1354* (at a minimum of 20 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above.[2] Note: ½" (min.) exterior gypsum sheathing may be attached to exterior side of any item listed above.
WRB Over Exterior Insulation Use any item 1 - 20 Note – Item 2 is an insulation joint tape, not full coverage. Items 15 and 16 may only be used with claddings 1 - 6	1. None 2. Atlas 3" IPG Cold Weather Foil Tape 3. CCW 705FR-A, Barritech NP, Barritech VP, VP LT, 705 VP 4. Dow Chemical DefendAir 200 Low Temp or DefendAir 200 C (Charcoal) 5. Dryvit Backstop® NT™, NT™ Smooth, NT™ Spray, NT™ Texture 6. GE Momentive SEC 2500 Silshield, SilShield SEC2600 AWB (aka Elemax 2600) 7. Grace Perm-a-Barrier® PAB AWM, PAB VPL, PAB VPS, PAB NPS, PAB NPL, PAB VPL LT 8. Henry Foilskin, Metal Clad, Air-Bloc® 31MR, Air-Bloc® 33MR, Air-Bloc® 21FR, VP 160, AB 17 9. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-110A 10. Parex WeatherSeal Spray and Roll On 11. Prosoco R-Guard® VB, R-Guard® Cat-5, R-Guard® Cat-5 Rainscreen, Spraywrap MVP 12. Sto EmeraldCoat® 13. Vaproshield Wrapshield SA®, Vaproshield Revealshield SA® 14. Soprema® Soprasolin HD (with any cladding) 15. Soprema® Sopraseal Stick VP (only with claddings 1-6) 16. Siga Majvest® 500 SA (only with claddings 1-6) 17. Dupont™ Tyvek® CommercialWrap or CommercialWrap D or other Tyvek Wraps in ESR 2375 18. WR Meadows Air-Shield SMP 19. Fortifiber WeatherSmart, WeatherSmart Drainable, WeatherSmart Commercial 20. Pecora XL-Perm^{ULTRA} VP, XL-Perm^{ULTRA} NP, ProPerm VP
Exterior Cladding Use any one of these items Note: Cladding 8 (Zinc) may only be used with Energyshield® Pro or Pro2.	1. Brick – nominal 4" clay brick or veneer with maximum 2" air gap behind the brick. Brick ties/anchors 24" o.c. (max.) 2. Stucco – minimum ¾" thick exterior cement plaster and lath. A secondary WRB (WRB items above allowed over foam) can be installed between the insulation and lath and must not be full-coverage asphalt or butyl-based self-adhered membranes, but may be asphalt or butyl-based slip sheet (stapled) with no adhesive. 3. Limestone – minimum 2" thick 4. Natural stone veneer – minimum 2" thick 5. Cast artificial stone – minimum 1½" thick complying with *ICC-ES AC 51* 6. Terracotta cladding – minimum 1¼" thick 7. Any ACM that has successfully passed *NFPA 285*

Wall Component	Materials
	8. Uninsulated sheet metal building panels including aluminum, steel, copper or zinc (see note) 9. Uninsulated fiber-cement cladding siding minimum ¼" thick 10. Stone/aluminum honeycomb composite building panels that have successfully passed *NFPA 285* criteria 11. Autoclaved-aerated-concrete (AAC) panels (minimum 1½" thick) 12. Reynobond® ZCM Zinc metal composite panel 13. Terreal Zephir® Evolution Rainscreen System (terra cotta), minimum 9/16" thick 14. FunderMax® M.Look using the manufacturer standard installation technique. The air gap between the cladding and insulation or WRB must not exceed 1½". 15. CERACLAD using the manufacturer standard installation technique with an air gap not exceeding 0.59". 16. CUPACLAD Slate: 101 Logic, 101 Random, 101 Parallel, 210 Vanguard

SI: 1 inch = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis by Jensen Hughes, Inc. and Priest and Associates.
2. Acceptance criteria for *ASTM E1354* testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis by Priest and Associates.
3. T_{ign} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test.

5.2.6 EnergyShield® Pro and EnergyShield® Pro2 were tested to assess their performance with regard to fire resistance rated walls in accordance with *UL 263* (or *ASTM E119*) and *IBC* Section 2603.5.1.

5.2.6.1 EnergyShield® Pro, EnergyShield® Pro2 and EnergyShield® CGF Pro have been accorded a UL BRYX listing per *UL 723*, which allows them to be used in *UL 263* tested assemblies permitting products classified in accordance with the UL BRYX classification. Therefore, EnergyShield® Pro, EnergyShield® Pro2 and EnergyShield® CGF Pro are approved for the following UL assemblies:

5.2.6.1.1 BXUV.U424

5.2.6.1.2 BXUV.U425

5.2.6.1.3 BXUV.V499

5.2.6.2 Additionally, EnergyShield® Pro and EnergyShield® Pro2 are UL Listed in the following designs:

5.2.6.2.1 BXUV.U026

5.2.6.2.2 BXUV.U326

5.2.6.2.3 BXUV.U330

5.2.6.2.4 BXUV.U355

5.2.6.2.5 BXUV.U460

5.2.6.2.6 BXUV.U902

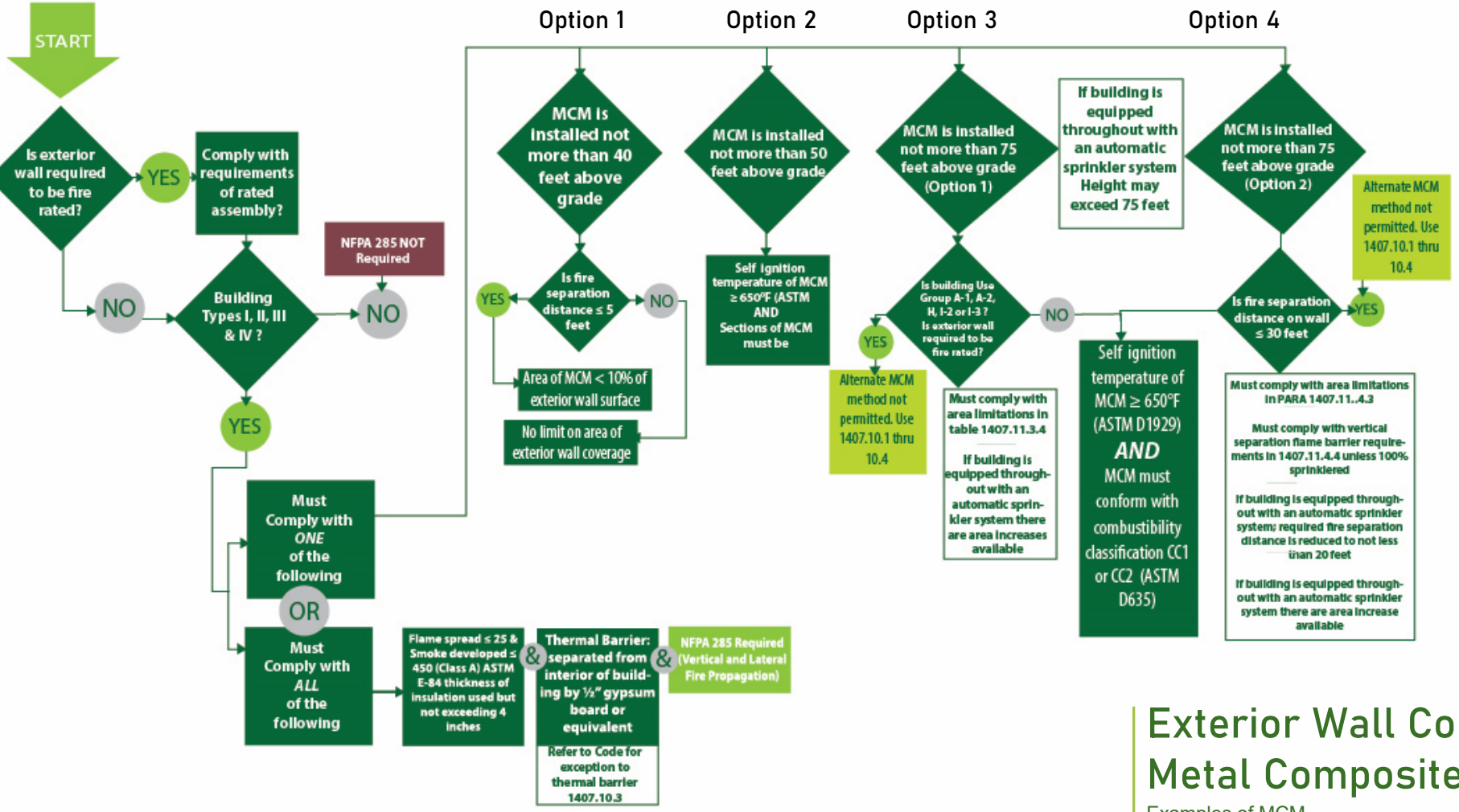
5.2.6.2.7 BXUV.U904

5.2.6.2.8 BXUV.U905

5.2.6.2.9 BXUV.U906

5.2.6.2.10 BXUV.U907

5.2.6.2.11 BXUV.V455



Exterior Wall Containing Metal Composite Material

Examples of MCM

- Reynobond
- Alpolic

ES ICC EVALUATION SERVICE

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ICC-ES Evaluation Report

ESR-2653

Reissued September 2018

This report is subject to renewal September 2020.

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

MITSUBISHI CHEMICAL COMPOSITES AMERICA, INC.

ADDITIONAL LISTEES:

MITSUBISHI CHEMICAL COROPORATION

MITSUBISHI POLYESTER FILM GmbH

EVALUATION SUBJECT:

ALPOLIC®/fr WALL PANELS

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2015 *International Building Code®* (2015 IBC)
- 2012 *International Building Code®* (2012 IBC)
- 2009 *International Building Code®* (2009 IBC)
- Other Codes (see Section 8.0)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Structural
- Fire performance
- Durability

1.2 Evaluation to the following green code(s) and/or standards:

- 2016 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2015, 2012 and 2008 ICC 700 *National Green Building Standard*™ (ICC 70-2015, ICC 700-2012 and ICC 700-2008)

Attributed verified:

- See Section 3.1

2.0 USES

The Alpolic®/fr wall panels are aluminum composite panels

Additionally, the Alpolic®/fr wall panels are used as an interior wall finish in accordance with Section 803 of the IBC. For installation on exterior walls of Type I, II, III, or IV construction, the Alpolic®/fr wall panels must be installed as a component of exterior wall assemblies constructed in accordance with Section 4.3 of this report. For installation on exterior fire-resistance-rated walls, the wall assemblies must be constructed in accordance with Section 4.5.

3.0 DESCRIPTION

3.1 Panels:

The Alpolic®/fr wall panels are aluminum composite wall panels manufactured in two nominal thicknesses, 4 millimeters and 6 millimeters (0.16 or 0.23 inch). The panels consist of two nominally 0.020-inch-thick (0.5 mm) aluminum skins bonded to both surfaces of a polyethylene-based core [nominal density of 93 pcf (1490 kg/m^3)] that contains inorganic fillers. The panel skins have a factory-applied painted finish.

The nominal thickness of the core material is 0.118 inch (3 mm) for the 4-millimeter-thick (0.16 mm) wall panels and 0.197 (5.0 mm) for the 6-millimeter-thick (0.23 inch) wall panels.

The Alpolic®/fr wall panels are available in widths from 30 inches (762 mm) to 62 inches (1575 mm). Lengths are available from 4 feet (1219 mm) to 24 feet (7315 mm). The 4-millimeter- and 6-millimeter-thick Alpolic®/fr MCM wall panels weigh 1.54 psf and 2.23 psf (7.5 and 10.9 kg/m^2), respectively.

The Alpolic®/fr wall panels have a flame-spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84.

The attributes of the Alpolic®/fr wall panels have been verified as conforming to the provisions of (i) CALGreen Sections A4.405.1.3 (prefinished materials) and A5.406.1.2 (reduced maintenance); (ii) ICC 700-2015 and ICC 700-2012 Sections 601.7, 11.601.7, and 12.1(A).601.7 (site-applied finishing materials); and (iii) ICC 700-2008 Section 601.7 (site-applied finishing materials). Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. The code may provide supplemental information as guidance.

fabricator in a rout-and-return, dry-set type installation method (see Figure 1):

- Continuous I-shaped extruded aluminum stiffeners (see callout 1 of Figure 1), alloy 6063-T6.
- Extruded aluminum mounting bars along perimeter of the panels (see callouts 2 and 3 of Figure 1), alloy 6063-T6.
- Extruded aluminum retainer clips (see detail of callout 3), alloy 6063-T6.
- Spline angles.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The maximum allowable transverse loads for the Alpolic®/fr panels installed in accordance with this report are as follows:

- 4mm Alpolic®/fr wall panels: 75 psf (3.6 kPa) positive; and 22.5 psf (1.1 kPa) negative
- 6mm Alpolic®/fr wall panels: 75 psf (3.6 kPa) positive; and 22.5 psf (1.1 kPa) negative

4.2 Installation:

4.2.1 General: If there are any conflicts between this report and the manufacturer's installation instructions, this report governs. The manufacturer's published installation instructions and this report must be strictly adhered to, and a copy of the manufacturer's instructions must be available at all times on the jobsite during installation.

4.2.2 Installation (Rout-and-return, Dry-set Type Method):

The system's fabricator must route around the entire perimeter of the flat panels along the panel edges using a V-groove router, leaving the face sheet uncut at the base of the routed groove. The panel edges are then folded at a right angle to create a return leg at each panel edge, using the uncut facer sheet to act as a hinge so that the flat panels are formed into "pans." A $^3/_4$ moon-shaped groove is also cut into each return leg of the panels to facilitate panel interlock with the mounting bars described below. Spline angles must be shop-attached at the panel corners by the panel fabricator using pop-rivets. Additionally, the system's fabricator must install I-shaped extruded aluminum stiffeners on the back of the panels, running the full panel width, parallel to the panel span at a maximum spacing of 24 inches (610 mm) on center. The stiffeners must be adhered to the panels using an approved structural silicone sealant/adhesive complying with ASTM C1184; and secured to the top and bottom of the panels using No. 10 x 1¼-inch long (32 mm) buglehead, fine-thread, self-drilling screws at each stiffener location. The panel length measured in the direction parallel to the stiffeners shall not exceed 5 feet (1.52 m). See Figure 1.

4.3 Exterior Walls of Buildings of Type I, II, III or IV Construction:

Extruded aluminum mounting bars must be attached to the building walls at the jobsite. The panels are then attached to the mounting bars using extruded aluminum retainer

(92.1 mm), cold-formed steel C-shaped studs spaced a maximum of 16 inches (406 mm) on center.

2. The interior side of the wall must be covered with one layer of minimum $^5/_8$-inch-thick (15.9 mm), Type X gypsum wallboard, applied vertically with horizontal joints blocked. The wallboard must be fastened to the studs and blocking in accordance with the IBC. The interior wallboard joints must be taped and treated with paper tape and joint compound. The screw heads must be treated with joint compound.
3. The exterior side of the wall must be covered with one layer of minimum $^5/_8$-inch-thick (15.9 mm), Type X gypsum sheathing complying with ASTM C79, with horizontal joints blocked. The sheathing must be attached to studs and blocking in accordance with the IBC.
4. The wall cavity between the steel studs must be filled with $3^5/_8$-inch-thick (92 mm), R-11, foil-faced, glass-fiber insulation.
5. All openings in the wall construction must be framed with minimum 43-mil [0.0428 inch minimum base-metal thickness (1.09 mm)] galvanized steel framing.

The Alpolic®/fr panels must be installed on the exterior side of the wall in accordance with Section 4.2. The floor level cavity at the intersection of the floor slab and the exterior wall framing system must be completely filled with an approved material or system meeting the criteria specified in 2015 and 2012 IBC Section 715.4 or 2009 IBC Section 714.4.

4.4 Interior Wall Covering:

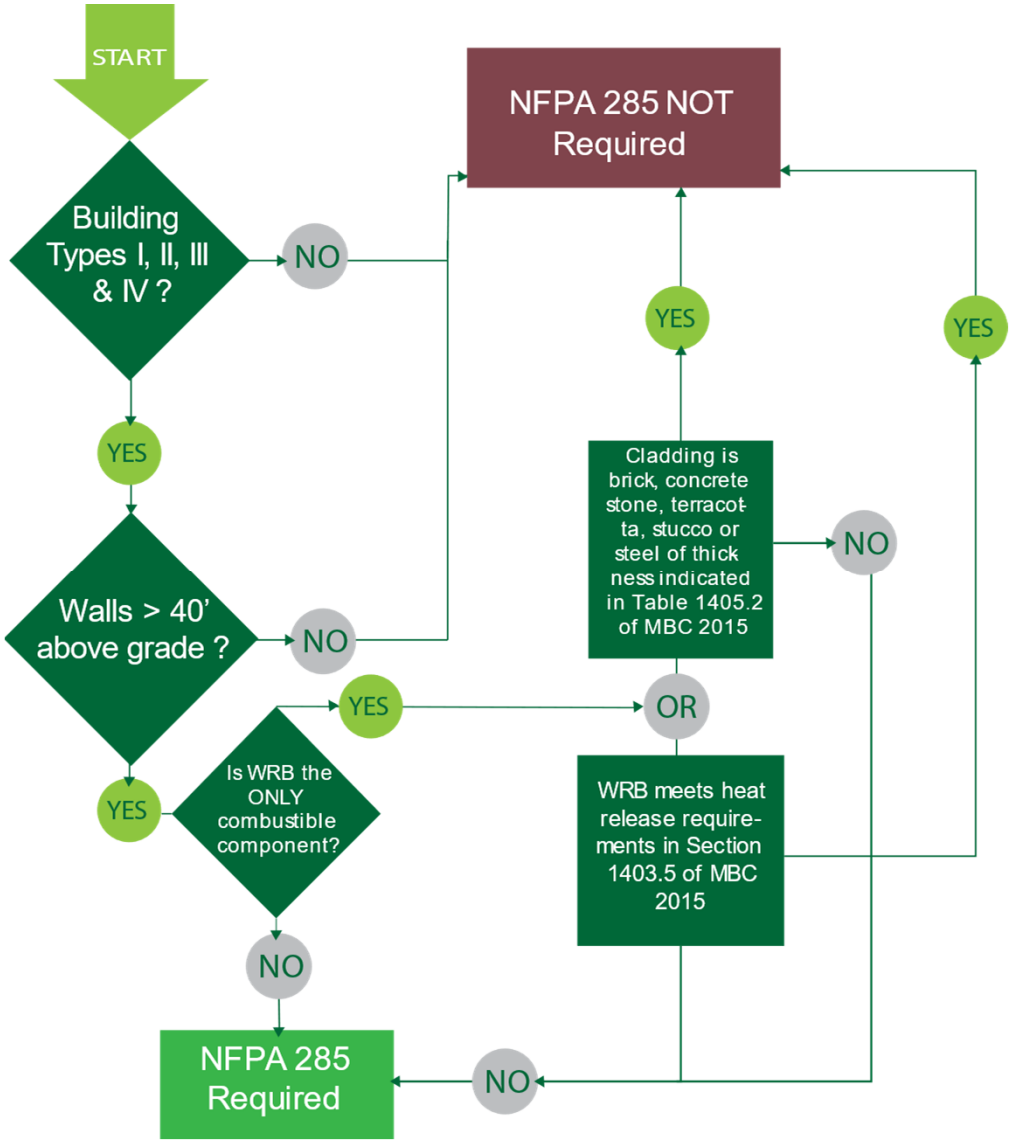
The Alpolic®/fr panels may be used as an interior wall finish in compliance with IBC Chapter 8. The panels must be installed on the interior side of the wall in accordance with Section 4.2. The panels have a Class A interior finish classification.

4.5 Fire-resistance Rated Wall Assemblies:

The Alpolic®/fr wall panels used in fire-resistance-rated walls must be in accordance with the following:

4.5.1 Two-hour Fire-resistance Rated, Nonload-bearing Wall Assembly:

1. Minimum 43-mil [0.0428 inch minimum base-metal thickness (1.09 mm)], $3^5/_8$-inch-deep (92.1 mm), cold-formed steel C-shaped studs spaced a maximum of 16 inches (406 mm) on center.
2. The interior side of the wall must be covered with two layers of $^5/_8$-inch-thick (16 mm), Type X gypsum wallboard applied vertically. Horizontal joints of the first layer of wallboard must be blocked unless horizontal joints of the adjacent wallboard layers are staggered a minimum of 12 inches (305 mm). The first layer must be attached to the steel studs and blocking with $1^5/_8$-inch-long (41 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center along the wallboard perimeter and joints and 12 inches (305 mm) on center in the field of the wallboard. The second layer must be attached to the steel studs and blocking with $2^1/_4$-inch-long (57 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center at the perimeter, and 12 inches



Combustible Water Resistive Barrier (WRB)

Types of WRB

- Vapor Permeable
- Vapor Barrier
- Air Barriers
- Fluid Applied
- Sheet Applied

ES ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-4191

Reissued February 2020

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 25 00—Water-resistive Barriers/Weather Barriers
Section: 07 27 00—Air Barriers

REPORT HOLDER:

PROSOCO, INC.

EVALUATION SUBJECT:

R-GUARD SPRAY WRAP MVP AIR & WATER-RESISTIVE BARRIER SYSTEM

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018 and 2015 *International Building Code®* (IBC)
- 2018 and 2015 *International Residential Code®* (IRC)
- 2018 and 2015 *International Energy Conservation Code®* (IECC)

Properties evaluated:

- Water resistance
- Air barrier material
- Surface-burning characteristics
- Fire-resistance-rated construction

1.2 Evaluation to the following green code(s) and/or standards:

- 2019 *California Green Building Standards Code* (CALGreen), Title 24, Part 11
- 2015 and 2012 *International Green Construction Code®* (IgCC)
- 2014 and 2011 ANSI/ASHRAE/USGBC/IES Standard 189.1–Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings
- 2015, 2012 and 2008 ICC 700 *National Green Building Standard™* (ICC 700-2015, ICC 700-2012 and ICC 700-2008)

Attributes verified:

See Section 3.1.

2.0 USES

The R-Guard Spray Wrap MVP Air & Water-resistive Barrier specified in Section 1403.2 of the 2018 IBC (Section 1404.2 of the 2015 IBC) and Section R703.2 of the IRC when installed over wood and glass-mat faced gypsum-based sheathing in exterior walls of any construction type. The system may also be used as an air barrier material in accordance with IRC Section N1102.4, and IECC Sections C402.5 and R402.4.

The R-Guard Spray Wrap MVP Air & Water-resistive Barrier System complying with ASTM E2570 is used over sheathing where EIFS cladding is to be used in accordance with 2018 IBC Section 1407.4.1 (2015 IBC Section 1408.4.1) and IRC Section R703.9.

For exterior walls of buildings of Types I, II, III, and IV construction that are greater than 40 feet (12.2 meters) above grade plane, R-Guard Spray Wrap MVP Air & Water-resistive Barrier System may be used in accordance with Exception 1 of the 2018 IBC Section 1402.5 (2015 IBC Section 1403.5).

3.0 DESCRIPTION

3.1 General:

The R-Guard Spray Wrap MVP Air & Water-resistive Barrier System consists of: R-Guard Spray Wrap MVP, R-Guard Joint & Seam Filler, R-Guard FastFlash®, and R-Guard PorousPrep.

The attributes of the R-Guard Spray Wrap MVP Air & Water-resistive Barrier System have been verified as conforming to the requirements of (i) CALGreen Section 5.407.1 for water-resistive barriers and Section A4.407.5 for air barriers; (ii) 2015 and 2012 IgCC Section 605.1.2.1 for air barriers; (iii) 2014 ASHRAE 189.1 Section 7.3.1.1 and 2011 ASHRAE 189.1 Section 7.4.2.9 for air barriers; (iv) ICC 700-2015 Section 602.1.8, 11.602.1.8 and 12.6.602.1.8; (v) ICC 700-2012 Section 602.1.8, 11.602.1.8 and 12.5.602.1.8; and (vi) ICC 700-2008 Section 602.9 for water resistive barriers. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.1.1 R-Guard Spray Wrap MVP: R-Guard Spray Wrap MVP is a fluid-applied air and water-resistive barrier that is a ready-mixed, water-based, roller and spray-applied liquid coating material. It is packaged in 5-gallon (18.9 liter) and 55-gallon (208.2 liter) buckets weighing 57.15 pounds

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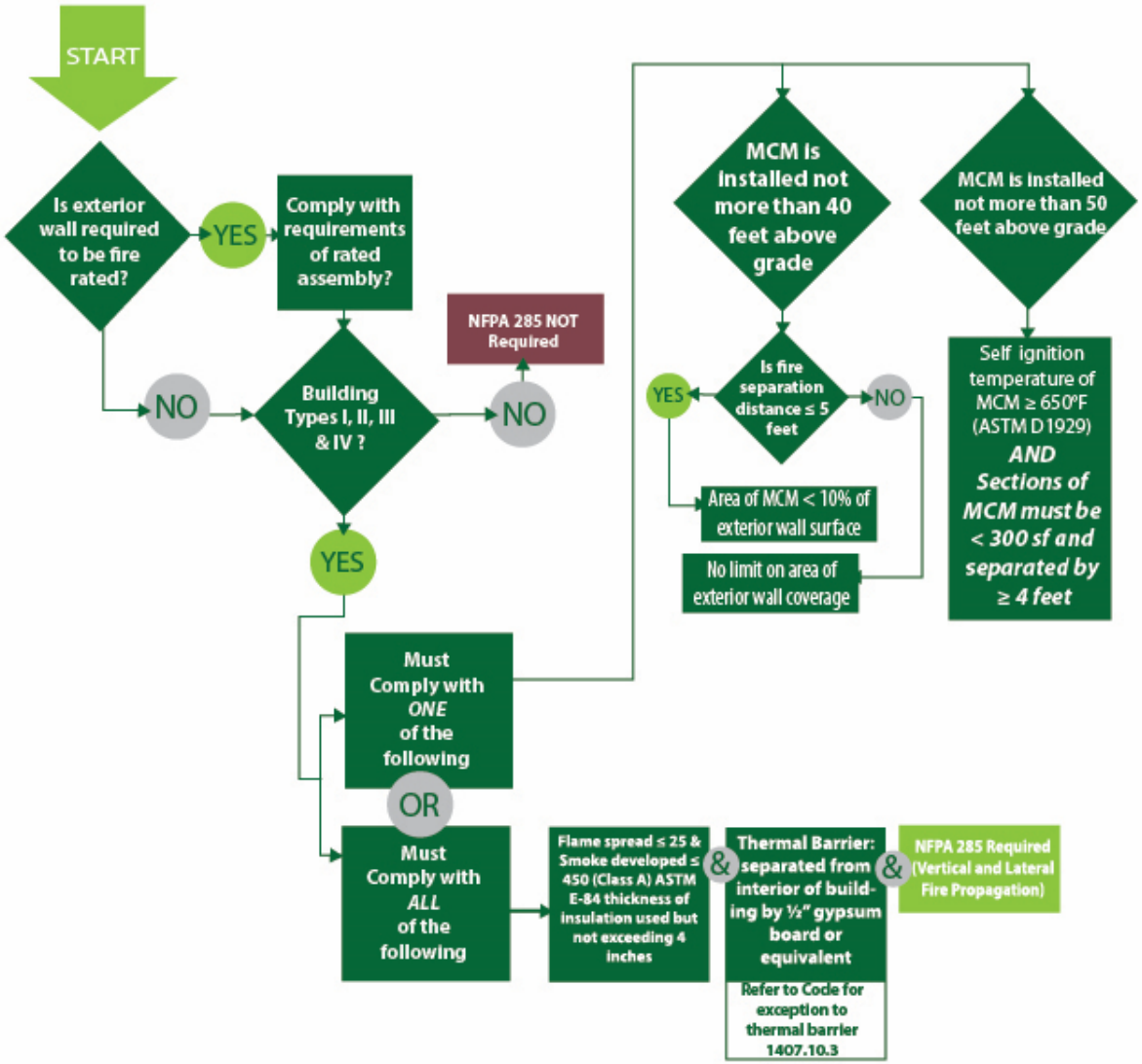
1403.5 Vertical and lateral flame propagation. Exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and contain a combustible *water-resistive barrier* shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. For the purposes of this section, fenestration products and flashing of fenestration products shall not be considered part of the *water-resistive barrier*.

Exceptions:

1. 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 minimum thicknesses in accordance with Table 1405.2.
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/m^2, a total heat release of less than 20 MJ/m^2 and an effective heat of combustion of less than 18 MJ/kg as determined in accordance with ASTM E1354 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 E84 or UL 723. The ASTM E1354 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/m^2

High Pressure Decorative Exterior Grade Compact laminates (HPL) As An Exterior Wall Finish



Examples of HPL

- Trespa
- Prodema
- Parklex

4.3 Installation:

4.3.1 General: The ProdEX IGN Wall Panel Cladding System (panels and substructure) must be installed over wall assemblies complying with 2018 IBC Section 1402.3 [2015, 2012, 2009 and 2006 IBC Section 1403.3], capable of supporting the imposed loads, including the weight of the cladding system and the transverse wind loads. The substructure must be securely connected to the supporting wall with corrosion-resistant fasteners that are compatible

When installed on the interior of buildings, the ProdEX IGN panels are installed in accordance with Sections 4.2 and 4.3.3.

4.5 Exterior Walls of Types I through IV Construction—Exposed Fastening System with 8-millimeter-thick Panels Installed Using Aluminum J-channels and hat channels:

When installed as described in this (Section 4.5), the ProdEX IGN exposed fastening system panels may be

used on the exterior face of exterior walls of buildings required to be of Type I, II, III or IV construction.

The supporting wall assembly must consist of minimum No. 18 gage, 3⅝-inch (92 mm), galvanized steel studs spaced at a maximum of 16 inches (406 mm) on center. At each floor line, the stud cavities must be fire-stopped according to the code. The studs must be covered with ⅝-inch-thick (15.9 mm) Type X gypsum wallboard complying with ASTM C36 on the interior side, and ½-inch-thick (12.7 mm) gypsum sheathing complying with ASTM C1177 on the exterior side, installed with the long dimensions perpendicular to the studs. The gypsum board must be fastened to steel framing using No. 6 by 1¼-inch-long (31.8 mm), Type S, bugle head screws at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on in the field.

Under the 2018, 2015 and 2012 IBC, VaproShield Reveal Shield SA self-adhered water-resistive barrier must be installed over the exterior sheathing for buildings greater than 40 feet (12.2 m) in height above grade plane. Under the 2018, 2015 and 2012 IBC, for buildings 40 feet (12.2 m) in height or less, the exterior side of the sheathing must be covered with VaproShield Reveal Shield SA or a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 or UL 723. Under the 2009 and 2006 IBC the exterior side of the sheathing must be covered with VaproShield Reveal Shield SA or a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 or UL 723. The water-resistive barrier must be installed in accordance with the manufacturer's installation instructions.

Aluminum L-profile rails must be installed horizontally to aluminum wall brackets at a maximum of 24 inches (610 mm) on center using No. 14 by 1½-inch (38.1 mm) self-drilling hex-head screws fastened through the exterior sheathing. Rock wool insulation 2½ inches (64 mm) thick and with a density of 4.5 pcf (72 kg/m³), must be installed to fill the cavity between the Aluminum L-profile rail. The panels must be installed as described in Section 4.3.3.1. See Figures 6 and 7 for Type I-IV Construction details

4.6 Exterior Walls of Types I through IV Construction—Exposed Fastening System with 10-millimeter-thick Panels Installed Using 20 Gage Galvanized Z-Girts:

When installed as described in this section (Section 4.6), the ProdEX IGN exposed fastening system panels may be used on the exterior face of exterior walls of buildings required to be of Type I, II, III or IV construction.

The supporting wall assembly must consist of minimum No. 18 gage, 3⅝-inch (92 mm), galvanized steel studs spaced at a maximum of 24 inches (610 mm) on center. At each floor line, the stud cavities must be fire-stopped according to code. The studs must be covered with ⅝-inch-thick (15.9 mm) Type X gypsum wallboard complying with ASTM C36 on the interior side, and ½-inch-thick (12.7 mm) Type X gypsum sheathing complying with ASTM C36 on the exterior side, installed with the long dimensions perpendicular to the studs. The gypsum board must be fastened to the steel framing using No. 6 by 1¼-inch-long (31.8 mm), Type S, bugle head screws at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on center in the field. The gypsum board must be brought to a Level 2 finish in accordance with GA-214. Fiberglass insulation batts must be installed to fill the stud cavities.

Under the 2018, 2015 and 2012 IBC, Self-adhesive WrapShield water-resistive barrier must be installed over the exterior sheathing for buildings greater than 40 feet (12.2 m) in height above grade plane. Under the 2018, 2015 and 2012 IBC for buildings 40 feet (12.2 m) in height or less, the exterior side of the sheathing must be covered with Self-adhesive WrapShield or a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 or UL 723. Under the 2006 and 2009 IBC, the exterior side of the sheathing must be covered with Self-adhesive WrapShield or a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 or UL 723. The water-resistive barrier must be installed in accordance with the manufacturer's installation instructions.

Horizontal 20 gage, galvanized steel Z-girts, measuring 2½ inches by 3½ inches by 1½ inches (63.5 mm by 88.9 mm by 38.1 mm), must be installed horizontally at a maximum of 24 inches (610 mm) on center using No.14 by 1½-inch (38.1 mm) self-drilling hex-head screws fastened through the 2½-inch (63.5 mm) leg to the steel studs. Rock wool insulation, 3½ inches (88.9 mm) thick and with a density of 4.5 pcf (72 kg/m³), must be installed to fill the cavities between the Z-girts. The vertical Z-girts described in Section 3.2.2 must be installed at 24 inches (610 mm) on center and fastened to the horizontal Z-girts using No.14 by 1½-inch-long (38.1 mm) self-drilling hex-head screws. Additionally, horizontal firestops using the 2½-inch-by-3½-inch–by-1½- inch (63.5 mm by 88.9 mm by 38.1 mm), 20 gage, galvanized steel Z-girts must be provided at a maximum of 27 inches (686 mm) above all openings. The firestops must be fastened to the 2½-inch-by-3½-inch-by- 1½-inch (63.5 mm by 88.9 mm by 38.1 mm) Z-girts that hold the rockwool in place, using No.14 by ¾-inch-long (19.1 mm) self-drilling hex screws. The panels must be installed as described in Section 4.3.3.1. Note: the firestops protrude past the exterior plane of the ProdEX IGN wall panels approximately 2 inches. See Figures 8 and 9 for Type I-IV Construction details.

4.7 Exterior Walls of Type V Construction—8-millimeter-, 10 millimeter- and 12-millimeter-thick Panels:

When installed as described in Section 4.3, the ProdEX IGN panels may be used on the exterior face of exterior walls of buildings required to be of Type V construction, with the exception that the Exposed Fastening System must only use a combination of aluminum J-channels and hat channels.

4.8 Exterior Walls of Type V Construction—10-millimeter- and 12-millimeter-thick Panels:

When installed as described in Section 4.3, the ProdEX IGN panels may be used on the exterior face of exterior walls of buildings required to be of Type V construction, with the exception that the Exposed Fastening System must only use 20-gage galvanized Z-Girts, both horizontal and vertical.

5.0 CONDITIONS OF USE

The ProdEX IGN Wall Panel Cladding System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

used on the exterior face of exterior walls of buildings required to be of Type I, II, III or IV construction.

The supporting wall assembly must consist of minimum No. 18 gage, 3⅝-inch (92 mm), galvanized steel studs spaced at a maximum of 16 inches (406 mm) on center. At each floor line, the stud cavities must be fire-stopped according to the code. The studs must be covered with ⅝-inch-thick (15.9 mm) Type X gypsum wallboard complying with ASTM C36 on the interior side, and ½-inch-thick (12.7 mm) gypsum sheathing complying with ASTM C1177 on the exterior side, installed with the long dimensions perpendicular to the studs. The gypsum board must be fastened to steel framing using No. 6 by 1¼-inch-long (31.8 mm), Type S, bugle head screws at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on in the field.

Under the 2018, 2015 and 2012 IBC, VaproShield Reveal Shield SA self-adhered water-resistive barrier must be installed over the exterior sheathing for buildings greater than 40 feet (12.2 m) in height above grade plane. Under the 2018, 2015 and 2012 IBC, for buildings 40 feet (12.2 m) in height or less, the exterior side of the sheathing must be covered with VaproShield Reveal Shield SA or a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 or UL 723. Under the 2009 and 2006 IBC the exterior side of the sheathing must be covered with VaproShield Reveal Shield SA or a water-resistive barrier recognized in a current ICC-ES evaluation report, that has a flame-spread rating of 25 or less and a smoke developed rating of 450 or less in accordance with ASTM E84 or UL 723. The water-resistive barrier must be installed in accordance with the manufacturer's installation instructions.

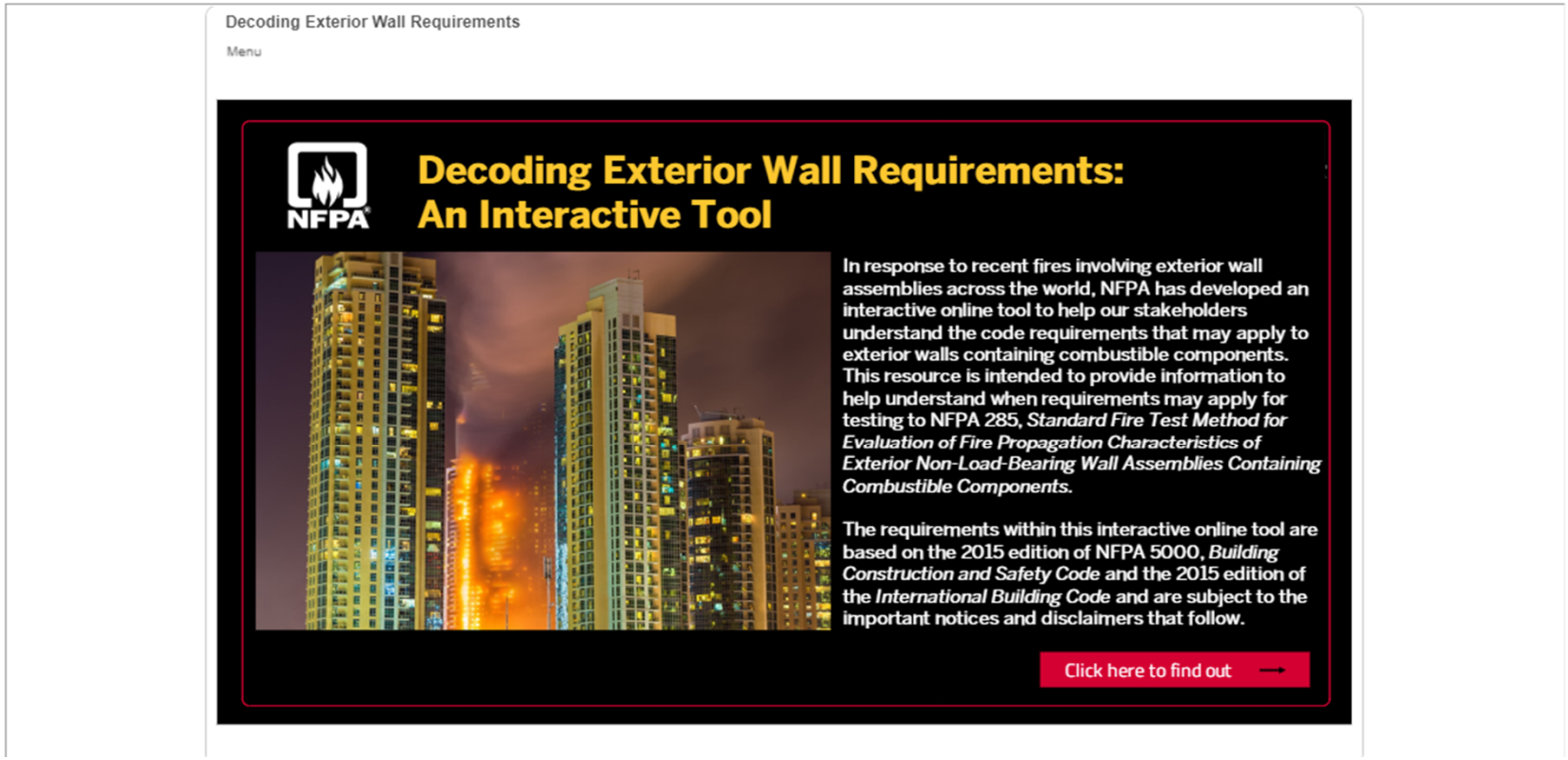
Aluminum L-profile rails must be installed horizontally to aluminum wall brackets at a maximum of 24 inches (610 mm) on center using No. 14 by 1½-inch (38.1 mm) self-drilling hex-head screws fastened through the exterior sheathing. Rock wool insulation 2½ inches (64 mm) thick and with a density of 4.5 pcf (72 kg/m³), must be installed

Additional Tools

https://www.nfpa.org/Codes-and-Standards/Resources/Standards-in-action/Code-requirements-for-exterior-walls-containing-combustible-components/Exterior-walls-interactive-tool

Exterior walls interactive tool

NFPA has developed this free interactive tool to help navigate the code requirements that apply to exterior walls containing combustible components. It also helps determine when those requirements apply for testing to NFPA 285, *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.* Requirements within the tool are based on the 2015 edition of NFPA 5000, *Building Construction and Safety Code*, and the 2015 *International Building Code*.



Summary

- Chapters 14 & 26 of the MBC and IBC 2015 contain the requirements reviewed today for wall assemblies and defines when compliance with NFPA 285 is required.
- Remember it is an *assembly* test. A single product cannot by itself comply with NFPA 285, it has to comply in concert with the other products in the assembly.
- ESR's, TER's and other Engineering reports, performed by third party testing agencies have made it easier for Design Professionals to vet materials for being able to be part of a wall assembly as well as making it clearer as to what materials can be specified to maintain competition.