Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2403-06

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Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, Defend-R CI Foil (286), Defend-R CI Coated Glass (Class A) and Defend-R CI Ply (Class A) Air Barrier, Water-Resistive Barrier, and Fire Performance in Exterior and Interior Walls of Buildings of Type I-V Construction

Trade Secret Report Holder:

Drexel Metals, Inc.

Phone: 888-321-9630 Website: www.drexmet.com

CSI Designations:

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation Section: 07 27 23 - Board Product Air Barriers Section: 07 48 00 - Exterior Wall Assemblies

1 Innovative Products Evaluated[1]

1.1 Defend-R CI Products:

1.1.1 Defend-R CI Foil (Class A)

1.1.2 Defend-R CI Foil (Class A) PLUS

1.1.3 Defend-R CI Foil (286)

1.1.4 Defend-R CI Coated Glass (Class A)

1.1.5 Defend-R CI Ply (Class A)

2 Product Description and Materials

2.1 Defend-R CI Products are proprietary Foam Plastic Insulating Sheathing (FPIS) products.

2.1.1 Defend-R CI Foil (Class A) is a composite board consisting of an ASTM E84 Class A closed cell polyisocyanurate insulation foam core with a 15 mil reinforced foil facer adhered on both sides.

2.1.2 Defend-R CI Foil (Class A) PLUS is a composite board consisting of an ASTM E84 Class A closed cell polyisocyanurate insulation foam core with increased fire-retardant adhered with an impermeable, tri laminate foil facers on both sides.

2.1.3 Defend-R CI Foil (286) is a composite board consisting of an ASTM E84 Class A closed cell polyisocyanurate insulation foam core with a 15 mil glass fiber reinforced foil facer adhered on both sides.

2.1.4 Defend-R CI Coated Glass (Class A) is a composite board consisting of an ASTM E84 Class A closed cell polyisocyanurate insulation board adhered to coated glass facers.

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2.1.5 Defend-R CI Ply (Class A) is a composite board consisting of an ASTM E84 Class A closed cell polyisocyanurate insulation board bonded to a $^{5}/_{8}$" or $^{3}/_{4}$" APA-TECO Exposure 1, fire-treated plywood on one side and a coated glass facer on the other.

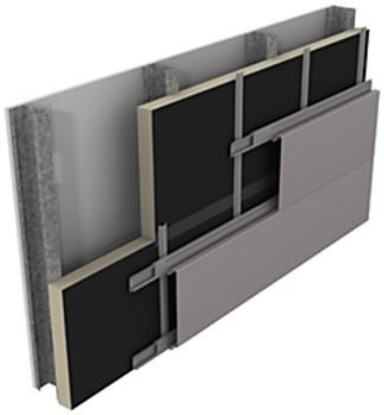
2.2 Application examples of some of the innovative products evaluated in this report are shown in Figure 1.



Defend-R CI Coated Glass (Class A)



Defend-R CI Foil (Class A)



Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286)



Defend-R CI Ply (Class A)

Figure 1. Application Example of Defend-R CI Products

2.3 The foam core of Defend-R CI Products is manufactured in accordance with ASTM C1289.

2.3.1 Defend-R CI Foil (Class A) is ASTM C1289 Type I, Grade 2 or Grade 3 compliant.

2.3.2 Defend-R CI Foil (Class A) PLUS is ASTM C1289 Type I, Class 1 and Class 2, Grade 3 compliant.

2.3.3 Defend-R CI Foil (286) is ASTM C1289 Type I, Class 2, Grade 2 or Grade 3 compliant.

2.3.4 Defend-R CI Coated Glass (Class A) is ASTM C1289 Type II, Class 2 Grade 3 compliant.

2.3.5 Defend-R CI Ply (Class A) is ASTM C1289 Type V compliant with Type II, Class 2 foam.

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2.4 *Material Availability*

2.4.1 *Thickness:*

2.4.1.1 *Defend-R CI Coated Glass (Class A), Defend-R CI Foil (Class A) and Defend-R CI Foil (286)*:

2.4.1.1.1 From 1" (25.4 mm) through 4" (102 mm).

2.4.1.2 *Defend-R CI Foil (Class A) PLUS*:

2.4.1.2.1 Available in thicknesses from 1" (25.4 mm) through 3" (76 mm).

2.4.1.3 *Defend-R CI Ply (Class A)*:

2.4.1.3.1 Either a $^{5}/_{8}$" or a $^{3}/_{4}$" fire treated plywood with 1" (25.4 mm) through 4" (102 mm) coated glass polyiso:

2.4.1.3.1.1 Total thickness with $^{5}/_{8}$" substrate: 1.6" (41 mm) through 4.6" (117 mm)

2.4.1.3.1.2 Total thickness with $^{3}/_{4}$" substrate: 1.7" (43 mm) through 4.7" (119 mm)

2.4.2 *Standard Product Width*:

2.4.2.1 48" (1,219 mm)

2.4.3 *Standard Length*:

2.4.3.1 *Defend-R CI Ply (Class A)*:

2.4.3.1.1 96" (2,438 mm)

2.4.3.2 *Defend-R CI Coated Glass (Class A), Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286)*:

2.4.3.2.1 96" (2,438 mm)

2.4.3.2.2 120" (3,048 mm)

2.4.3.2.3 144" (3,658 mm)

2.4.4 Custom widths, lengths and thicknesses are available upon request.

2.5 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.

3 Definitions[2]

3.1 New Materials[3] are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[4] The design strength and permissible stresses shall be established by tests[5] and/or engineering analysis.[6]

3.2 Duly authenticated reports[7] and research reports[8] are test reports and related engineering evaluations that are written by an approved agency[9] and/or an approved source.[10]

3.2.1 These reports utilize intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

3.2.1.1 This report protects confidential Intellectual Property and trade secretes under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[11]

3.3 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.

3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[12]

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3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.

3.5.1 The Center for Building Innovation (CBI) is ANAB[13] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[14] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[15] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[16]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.[17] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[18] and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/

3.9 Approval equity is a fundamental commercial and legal principle.[19]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[20]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, Texas Department of Insurance, and Wichita.[21]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[22]

4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[23] and Part 3280[24] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 *Standards*

4.2.1 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

4.2.2 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*

4.2.3 *ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials*

4.2.4 *ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials*

4.2.5 *ASTM E136: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*

4.2.6 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

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

4.2.8 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*

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4.2.9 *ASTM E2357: Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies*

4.2.10 *NFPA 259: Standard Test Method for Potential Heat of Building Materials*

4.2.11 *NFPA 285-19: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components*

4.2.12 *NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*

4.2.13 *UL 263: Standard for Fire Tests of Building Construction and Materials*

4.2.14 *UL 723: Test for Surface Burning Characteristics of Building Materials*

4.2.15 *UL 1715: Fire Test of Interior Finish Material*

4.3 *Regulations*

4.3.1 *IBC – 18, 21, 24: International Building Code®*

4.3.2 *IRC – 18, 21, 24: International Residential Code®*

4.3.3 *IECC – 18, 21, 24: International Energy Conservation Code®*

5 Listed[25]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), an approved agency (i.e., CBI and DrJ), and/or an approved source (i.e., DrJ), or other organization(s) concerned with product evaluation (i.e., DrJ), that maintains periodic inspection (i.e., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *General*

6.1.1 Defend-R CI Products are FPIS products complying with IBC Section 2603 and IRC Section R303.

6.1.2 Defend-R CI Products are used in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R303.5.12.

6.1.3 Environmental Product Declarations (EPD) for Defend-R CI Products are available at www.polyiso.org.

6.1.4 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

6.2 *Vapor-Retarding Insulated Sheathing*

6.2.1 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, and Defend-R CI Foil (286) were evaluated in accordance with ASTM E96, Method B (water method) as specified in IBC Section 1404.3 and IRC Section R702.7.

6.2.1.1 Water vapor permeance of Defend-R CI Products are as shown in **Table 1**.

6.2.2 Per IBC Section 1404.3 and IRC Section R702.7, a vapor retarder should be provided on the interior side of frame walls in accordance with the climate zone and the specifics laid out in IBC Table 1404.3(2), IBC Table 1404.3(3), IRC Table R702.7(2), and IRC Table R702.7(3).

6.2.2.1 Exceptions are made for basement walls, the below-grade portion of any wall and construction where accumulation, condensation or freezing of moisture will not damage the materials.

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Table 1. Water Vapor Permeance[1]

Product	ASTM E96 B (Water Method)	Classification
Defend-R CI Foil (Class A)	≤ 0.1 perms	Class I
Defend-R CI Foil (Class A) PLUS		
Defend-R CI Foil (286)		

SI: 1 perm = 57.78 ng/(Pa·s·m²)

1. Results for 1" thickness board

6.3 *Air Barrier*

6.3.1 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, Defend-R CI Foil (286) and Defend-R CI Coated Glass (Class A) meet the requirements of IECC Section C402.6.2.3.2[26] for use as part of an air barrier assembly when installed in accordance with the manufacturer installation instructions, this report and with all seams (including the top and bottom edges) taped. See **Table 2**.

6.3.1.1 As an alternative to the tape specified in **Section 6.3.1**, Defend-R CI Foil (286) sheathing joints and penetrations are permitted to be sealed with Hunter Panels Xci BarriBond Liquid Flashing and Detail Sealant.

Table 2. Air Barrier Performance

Product	ASTM E2178	ASTM E2357
Defend-R CI Foil (Class A)	≤0.00012 L/(s.m²) @ 75 Pa [0.000024 cfm/ft² @ 1.57 psf]	≤ 0.020 L/(s.m²) @ 75 Pa [0.0004 cfm/ft² @ 1.57 psf][1, 2]
Defend-R CI Foil (Class A) PLUS		
Defend-R CI Foil (286)		
Defend-R CI Coated Glass (Class A)		

1. All seams and joints between boards shall be covered by 4" wide Carlisle® Coatings & Waterproofing Foil-Grip™ 1402 pressure sensitive foil-faced flashing tape.
2. All fenestrations and penetrations shall be sealed with 9" wide Carlisle® Coatings & Waterproofing Aluma-Grip™ 701 foil-faced self-adhering flashing tape with the top of the flashing sealed with a butyl-based sealant.

6.4 *Water-Resistive Barrier (WRB)*

6.4.1 Defend-R CI Foil (Class A), and Defend-R CI Foil (Class A) PLUS are approved for use as a WRB as prescribed in IBC Section 1403.2[27] and IRC Section R703.2[28] when installed on exterior walls as described in this section.

6.4.2 Defend-R CI Foil (Class A), and Defend-R CI Foil (Class A) PLUS shall be installed horizontally or vertically with board joints placed directly over exterior framing spaced a maximum of 24″ (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with **Section 9**.

6.4.3 All seams and joints between boards shall be covered by 4" wide Carlisle Coatings & Waterproofing Foil Grip 1402 pressure sensitive foil-faced flashing tape.

6.4.4 A separate WRB may also be provided. If a separate WRB method is used, taping of the sheathing joints is not required.

6.4.5 Flashing of penetrations is required and shall comply with the applicable code.

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6.5 *Fire Safety Performance*

6.5.1 *Surface Burning Characteristics*:

6.5.1.1 Defend-R CI Products were evaluated to assess performance with regard to flame spread and smoke developed index in accordance with ASTM E84 as shown in **Table 3**.

Table 3. Surface Burning Characteristics[1]

Product Name	Flame Spread Index	Smoke-Developed Index	Classification
Defend-R CI Foil (Class A)	≤ 25	< 450	Class A
Defend-R CI Foil (Class A) PLUS			
Defend-R CI Foil (286)			
Defend-R CI Coated Glass (Class A)			
Defend-R CI Ply (Class A)			

1. Foam core tested in accordance with ASTM E84 (UL 723). Flame spread and smoke-developed indexes are shown for comparison purposes only and are not intended to represent the performance under actual fire conditions.

6.5.2 *Ignition*:

6.5.2.1 Defend-R CI Products were evaluated to assess performance with regard to ignition in accordance with IBC Section 2603.5.7.

6.5.2.2 Defend-R CI Products comply with this section when the exterior side of the sheathing is protected with one of the following materials:

6.5.2.2.1 A thermal barrier complying with IBC Section 2603.4.

6.5.2.2.2 A minimum 1" (25.4 mm) thickness of concrete or masonry.

6.5.2.2.3 Glass fiber reinforced concrete panels with a minimum thickness of $^{3}/_{8}$" (9.5 mm).

6.5.2.2.4 Metal faced panels having a minimum 0.019" (0.48 mm) thick aluminum or 0.016" (0.41 mm) thick corrosion resistant steel outer facings.

6.5.2.2.5 A minimum $^{7}/_{8}$" (22.2 mm) thickness of stucco complying with IBC Section 2510.

6.5.2.2.6 A minimum $^{1}/_{4}$" (0.4 mm) thickness of fiber cement siding complying with IBC Section 1404.17[29] and IBC Section 1404.17.1,[30] or IBC Section 1404.17.2.[31]

6.5.3 *Potential Heat*:

6.5.3.1 Defend-R CI Products were evaluated in accordance with NFPA 259 to assess the potential heat generated by the FPIS in accordance with IBC Section 2603.5.3 and IRC Section R303.5.7, as shown in **Table 4**.

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Table 4. Potential Heat

Product	Potential Heat (Btu/lb)[1]
Defend-R CI Coated Glass (Class A)	11,503
Defend-R CI Ply (Class A)	11,503
Defend-R CI Foil (Class A)	11,587
Defend-R CI Foil (Class A) PLUS	11,587
Defend-R CI Foil (286)	11,587

SI: 1 Btu/lb. = 0.0023 MJ/kg

1. Tested in accordance with NFPA 259.

6.5.4 *Vertical and Lateral Fire Propagation*:

6.5.4.1 Defend-R CI Products were evaluated to assess their performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and IBC Section 1402.5.

6.5.4.2 Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.

6.5.4.3 The wall assemblies listed in **Appendix A** are approved for use in buildings of Type I-IV construction.

6.5.4.3.1 For building codes based on 2018 IBC or earlier, **Appendix B** may be used instead of **Appendix A** throughout the rest of this document.

6.5.5 *Special Approval*:

6.5.5.1 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286), up to 3 1/2" (89 mm) thick, have been evaluated for use as a thermal barrier on walls only or ceilings only, to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section 303.6, and met the criteria of IBC Section 803.1.1.[32] Therefore, Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) require no thermal barrier or ignition barrier protection.

6.5.5.2 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286), up to 3 1/2" (89 mm) thick, have been evaluated for use as an ignition barrier on walls and/or ceilings in attics and crawl spaces to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section 303.6, and met the criteria of IBC Section 803.1.1.[33] Therefore, Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) require no ignition barrier protection in attics and crawl spaces.

6.5.5.3 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286), up to 8" (203 mm) thick, have been evaluated to UL 1715 in accordance with IBC Section 2603.9 and IRC Section 303.6, and met the requirements of the standard. Therefore, Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286), up to 8" thick are approved for use on ceilings and floors without a thermal barrier.

6.5.5.4 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, and Defend-R Foil (286) are not recommended for applications requiring an aesthetic or wear resistant surface.

6.6 Where the application falls outside of the performance evaluation, conditions of use, and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

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7 Certified Performance[34]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[35]

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.[36]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Defend-R CI Products comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Performance for use in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R303.5.12.

8.1.2 Performance in accordance with ASTM E84 for flame spread and smoke-development index ratings are in accordance with IBC Section 2603.5.4 and IRC Section R303.3.

8.1.3 Performance for use without a thermal barrier in accordance with IBC Section 2603.5.2 and IRC Section R303.4.

8.1.4 Performance with regard to the potential heat generated by the FPIS in accordance with IBC Section 2603.5.3 and IRC Section R303.4.

8.1.5 Performance with regard to vertical and lateral fire propagation in accordance with IBC Section 1402.5.

8.1.6 Performance with regard to ignition in accordance with IBC Section 2603.5.7.

8.1.7 Performance for use in exterior walls of buildings as a WRB in accordance with IBC Section 1403.2 and IRC Section R703.2.

8.1.8 Performance for use in exterior walls of buildings as Continuous Insulation (ci) in accordance with IECC Section C402.1.3.

8.1.9 Performance in exterior walls of buildings as vapor retarding FPIS in accordance with IBC Section 1404.3 and IRC Section R702.7.

8.1.10 Performance for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.6.1.

8.1.11 Other structural requirements in accordance with IBC Chapter 16 are outside the scope of this report.

8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[37] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[38] respectively.

8.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which is also its areas of professional engineering competence.

8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.

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9 Installation

9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.

9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.

9.3 *Installation Procedure*

9.3.1 Protect surrounding areas and surfaces from damage.

9.3.2 If wall assembly design calls for WRB installed over the base wall, ensure that the WRB is one of those identified in **Table 11** in **Appendix A**, and that the WRB is installed correctly and in good condition before covering with FPIS.

9.3.3 For installation of FPIS on interior, over air/water resistive barrier on base wall: ensure that the WRB is one of those identified in **Table 11** in **Appendix A**, and that the WRB is installed correctly and in good condition before covering with FPIS.

9.3.4 FPIS shall not be applied over walls while they are vulnerable to water intrusion from above or behind.

9.3.5 Do not block flashing, weeps or other drainage paths with FPIS.

9.3.6 Do not span expansion joints with FPIS.

9.3.7 During installation, take precautions to minimize moisture intrusion behind insulation.

9.3.8 Beginning at the base of the wall, apply horizontally using maximum board lengths to minimize number of joints.

9.3.9 Offset FPIS board joints in neighboring rows a minimum of 6". Do not form four-corner intersections.

9.3.10 Form a "*corner lock*" pattern by staggering vertical joints at inside and outside corners.

9.3.11 FPIS may be applied vertically, as required.

9.3.12 Pre-cut FPIS to fit openings and penetrations.

9.3.13 Cut with a knife using a square to guide the cut, or use a table saw.

9.3.14 Abut all joints tightly and ensure an overall flush, level surface.

9.3.15 Mechanically fasten using the fastening pattern as indicated.

9.3.15.1 Space fasteners 12" o.c (305 mm) at the perimeter and 16" o.c. (406 mm) in the field.

9.3.15.2 Set back perimeter fasteners $^{3}/_{8}$" (9.5 mm) from board edges.

9.3.15.3 ***Note for Exterior Application***: Where Defend-R CI Foil (Class A) and Defend-R CI Foil (Class A) PLUS are installed by the same trade as the cladding, or in close cooperation with that trade, cladding attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Cladding fasteners fulfilling the Defend-R CI Foil (Class A) and Defend-R CI Foil (286) attachment function shall be designed for this function. If the cladding attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.

9.3.15.4 ***Note for Interior Application***: Where Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, and Defend-R CI Foil (286) are installed by the same trade as the interior drywall, or in close cooperation with that trade, drywall attachment hardware can supplement or replace the insulation fasteners and insulation adhesive. Drywall fasteners fulfilling the Defend-R CI Foil (Class A) and Defend-R CI Foil (286) attachment function shall be designed for this function. If the drywall attachment is 16" o.c. (406 mm) or closer and it tightly secures the insulation, no additional fastening or adhesive is required.

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9.3.16 When an approved adhesive is used, periodically verify adhesion. Properly installed adhesively applied Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, and Defend-R CI Foil (286) will cohesively break the adhesive while still wet and destroy the substrate when dry.

9.3.16.1 Consult the detailed manufacturer installation instructions for the proper adhesive pattern to maintain the drainage plane.

9.3.16.2 When used in a NFPA 285 approved assembly, adhesives must be one of those listed in the tables found in **Appendix A**.

9.3.17 Fill gaps greater than $^1/_8$" (3 mm) between FPIS boards with expanding spray foam or butter edge of board with approved sealant and strike flush. Expanding spray foam may also be applied onto the FPIS board edges during installation.

9.3.18 Verify all materials are installed in accordance with current Drexel Metals, Inc. published literature and local code requirements.

9.3.19 Additional information on the installation and detailing of Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) can be found at www.drexmet.com.

9.4 *Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) as an Air and Water Resistive Barrier*

9.4.1 When used in a NFPA 285 approved assembly as an air/water resistive barrier, see also **Section 6.3** and **Table 11** in **Appendix A**.

9.4.2 When used in a NFPA 285 approved assembly as a WRB, see also **Section 6.4** and **Table 11** in **Appendix A**, with all notes.

9.4.3 Use minimum 1" (25.4 mm) thickness Defend-R CI Foil (Class A) and Defend-R CI Foil (286).

9.4.4 Install directly over wood or steel studs or over exterior sheathing fastened to wood or steel studs.

9.4.5 Fasten Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) boards with corrosion-resistant screws or HeckMann™ Pos-I-Tie®, either fitted with Thermal-Grip CI plastic washers by Rodenhouse or equivalent. Space fasteners 16" o.c. (406 mm) in the field and 12" o.c. (305 mm) at the perimeter.

9.4.5.1 Other fastening used shall be installed 16" o.c. (406 mm) in the field and 12" o.c. (305 mm) at the perimeter. Other fastening shall be verified as air and watertight through ASTM E2357 and ASTM E331 testing, or it shall be sealed with caulk or flashing tape.

9.4.6 Tape over board joints with 4" (102 mm) width Aluma-GRIP 1402 tape by Carlisle Coatings & Waterproofing (CCW).

9.4.7 Cover inside and outside corners with Aluma-GRIP 701 by CCW. Aluma-GRIP 701 shall bear 3" (76 mm) minimum onto each side of angle.

9.4.8 Wrap window openings with Aluma-GRIP 701. Aluma-GRIP 701 shall wrap at least 3" (76 mm) onto wall and shall return far enough into the window opening to provide a continuous air/water seal to window frame.

9.4.9 Flash pipe and duct penetrations through Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) with Aluma-GRIP 701.

9.4.10 Consult Drexel Metals, Inc. details and instructions for complete information about installation of Defend-R CI Foil (Class A) and Defend-R CI Foil (Class A) PLUS as an air and water-resistive barrier.

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9.5 *Defend-R CI Ply (Class A)*

9.5.1 Refer to the manufacturer installation instructions and this report for complete details and requirements.

9.5.2 Provide separation of the edge of Defend-R CI Ply (Class A) from concrete at grade with pressure-treated lumber sill plate, sill gasket or non-permeable flashing material.

9.5.3 Begin at base of wall from firm, permanent support.

9.5.4 Fasten Defend-R CI Ply (Class A) with proper fasteners and spacing to accommodate design. Fasten Defend-R CI Ply (Class A) to the structure using SIP fasteners or similar hardware driven into steel studs, wood studs, concrete or CMU substrate. Fastening shall be approved by a structural engineer, as the fastening must be sufficient to support both the weight of the Defend-R CI Ply (Class A) and the weight of the cladding for the project conditions.

9.5.5 Allow a minimum $^{1}/_{8}$" (3.2 mm) and a maximum $^{1}/_{4}$" (6.4 mm) gap between Defend-R CI Ply (Class A) boards to accommodate hydric movement of wood. Fasten boards tightly to provide a flush, level surface.

9.5.6 Apply WRB over plywood side of Defend-R CI Ply (Class A) according to WRB manufacturer instructions.

10 Substantiating Data

10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

10.1.1 Flame spread and smoke developed rating testing in accordance with ASTM E84

10.1.2 Fire performance criteria testing in accordance with NFPA 285

10.1.3 Fire performance criteria testing in accordance with NFPA 286

10.1.4 Fire performance criteria testing in accordance with UL 1715

10.1.5 Potential heat testing in accordance with NFPA 259

10.1.6 Air barrier material testing in accordance with ASTM E2178

10.1.7 Air barrier assembly testing in accordance with ASTM E2357

10.1.8 Vapor impermeability testing in accordance with ASTM E96 Method B

10.1.9 Water-resistive barrier testing in accordance with ASTM E331

10.2 Engineering analysis comparing the fire resistance properties of Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, and Defend-R CI (286) from an approved source.

10.3 Engineering analysis assessing the substitution of products within the approved NFPA 285 tested wall assemblies from an approved source.

10.4 Engineering analysis comparing the fire resistance properties of Defend-R CI Foil, Defend-R CI Foil Plus, Defend-R CI Coated Glass and Defend-R CI Ply from an approved source.

10.5 Engineering analysis assessing the substitution of products within the approved NFPA 285 tested wall assemblies from an approved source.

10.6 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.

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10.7 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.8 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.

10.9 *Testing and Engineering Analysis*

10.9.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[39]

10.10 Where additional condition of use and/or regulatory compliance information is required, please search for Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, Defend-R CI Foil (286), Defend-R CI Coated Glass (Class A) or Defend-R CI Ply (Class A) on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Defend-R CI Products have performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, Defend-R CI Products shall be approved for the following applications:

11.2.1 Defend-R CI Products are approved for use in exterior walls of buildings of any height of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R303.5.12.

11.2.2 Defend-R CI Products are approved for use in wall assemblies meeting the requirements of NFPA 285 testing when constructed in accordance with the tables in **Appendix A**.

11.2.3 Defend-R CI Products described in this report comply with or are a suitable alternative to, the applicable sections of the codes listed in **Section 4**.

11.2.4 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286), up to 3$^1/_2$" (89 mm) thick, are approved as a thermal barrier on walls only or ceilings only to NFPA 286, in accordance with IBC Section 2603.9 and IRC Section R303.6, and meet the criteria of IBC Section 803.1.1.

11.2.4.1 Therefore, Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) may be left exposed and require no thermal barrier or ignition barrier protection.

11.2.5 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286), up to 3$^1/_2$" (89 mm) thick, are approved for use as an ignition barrier on walls and/or ceilings in attics and crawlspaces to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section R303.6, and meet the criteria of IBC Section 803.1.1.

11.2.5.1 Therefore, Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) require no ignition barrier protection in attics and crawlspaces.

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11.2.6 Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) are approved for use in exterior walls of buildings as a WRB in accordance with IBC Section 1403.2 and IRC Section R703.2, when constructed in accordance with **Table 11** in **Appendix A**.

11.2.7 Defend-R CI Coated Glass (Class A), Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) are approved for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.6.1 when constructed in accordance with the tables in **Appendix A**.

11.3 Unless exempt by state statute, when Defend-R CI Products are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Drexel Metals, Inc.

11.5 IBC Section 104.2.3[40] (IRC Section R104.2.2[41] and IFC Section 104.2.3[42] are similar) in pertinent part state:

> 104.2.3 Alternative Materials, Design and Methods of Construction and Equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

11.6 **Approved:**[43] Building regulations require that the building official shall accept duly authenticated reports.[44]

11.6.1 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited.

11.6.2 An approved source is *"approved"* when an RDP is properly licensed to transact engineering commerce.

11.6.3 Federal law, Title 18 US Code Section 242, requires that, where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB Accredited Product Certification Body – Accreditation #1131.

11.8 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[45]

12 Conditions of Use

12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.

12.2 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

12.3 As listed herein, Defend-R CI Products shall not be used:

12.3.1 To resist lateral loads. Walls shall be braced by other materials in accordance with the applicable code. In addition, the exterior wall covering shall be capable of resisting the full design wind pressure.

12.4 This report and the installation instructions, when required by a code official, shall be submitted at the time of permit application.

12.5 When the insulation boards are used in assemblies requiring compliance with NFPA 285, and are installed on the exterior side of exterior walls, construction must be as described in **Appendix A**.

12.6 When the insulation boards are used in assemblies requiring compliance with NFPA 285, and are installed on the interior side of exterior walls, construction must be as described in **Table 10** in **Appendix A**.

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12.7 Defend-R CI Ply (Class A) may be used as a nail base, provided cladding attachments are designed in accordance with IRC Section R703.3.3 or an approved design. Defend-R CI Coated Glass (Class A), Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS and Defend-R CI Foil (286) shall not be used as a nail base.

12.8 When installed in areas where the probability of termite infestation is "*very heavy*", the installation must meet the requirements of IBC Section 2603.8 and IRC Section R303.7.

12.9 Defend-R CI Products are available in Montgomery, New York; Tooele, Utah; Terrell, Texas; Smithfield, Pennsylvania; Franklin Park, Illinois; Puyallup, Washington and Lake City, Florida. Defend-R CI Products are manufactured in Smithfield, Pennsylvania; Franklin Park, Illinois and Puyallup, Washington under a quality control program with quality control inspections in accordance with IBC Section 110.3.10[46] and IBC Section 110.3.11,[47] and IRC Section R109.1.5.

12.10 The wall assemblies listed in **Appendix A** are based on compliance to the fire provisions of the codes listed in **Section 4**. Consideration of wall assembly performance with regard to other attributes, such as water vapor control, condensation and energy code requirements, are outside the scope of this report.

12.11 When required by adopted legislation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:

12.11.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.11.2 This report and the installation instructions shall be submitted at the time of permit application.

12.11.3 These innovative products have an internal quality control program and a third-party quality assurance program.

12.11.4 At a minimum, these innovative products shall be installed per **Section 9**.

12.11.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.

12.11.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.

12.11.7 The application of these innovative products in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.

12.12 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.2.3"*, all of IBC Section 104, and IBC Section 105.3.

12.13 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.14 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

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13 Identification

13.1 The innovative products listed in **Section 1.1** are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.drexmet.com .

14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

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Appendix A. NFPA 285-19

Table 5. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) or Xci 286 Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. Fire-Retardant Treated Wood (FRTW) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior 5. Bracing as required by code
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-6	1. None 2. 1 1/2" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero 3. Any noncombustible insulation per ASTM E136 4. Any mineral fiber (Board type faced or unfaced) 5. Any fiberglass (Batt type faced or unfaced) 6. 3 1/4" (max.) Carlisle SPI SealTite Pro, SealTite PRO Closed Cell, or SealTite PRO One Zero – only with Exterior Sheathing 2
Exterior Sheathing Use either 1, 2 or 3	1. None (only with cavity insulation 1, 2, 3, 4 or 5 and Cladding 1-6 and 3 1/2" (max.) Xci-Foil (Class A)) 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock® Exoair® 430 System – See note and Table 11 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints *Note:* Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRBs on base wall surface in Table 11
WRB Over Base Wall Surface	See Table 11
Exterior Insulation Use either 1 or 2 depending on cladding. *Note:* A construction which utilizes no exterior sheathing may not use spray foam cavity insulation	1. 3 1/2" thick (max.) Defend-R CI Foil (Class A) or Xci-286 for all claddings 2. 4" thick Defend-R CI Foil (Class A) or Xci-286 for claddings 1-6

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Table 5. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) or Xci 286 Exterior Insulation[1,4]

Wall Component	Materials
WRB Over Exterior Insulation	See Table 11 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear and the cladding. When CavClear is used, this may only be used with Cladding 1, 2, 3, 4, 5 or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any item 1-16 Max. Air Gap 2" for Claddings 1-6. Max. Air Gap 1 1/2" for Claddings 7-16. If Claddings 2, 3, 4, 5, 11, 12 or 14 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in Hunter assemblies	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (maximum). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath (with approved WRB over exterior insulation as listed above) 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any ACM or MCM that has passed NFPA 285 with foam of comparable thickness. 8. Uninsulated sheet metal building panels including steel, copper, aluminum. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 11. Thin brick/cultured stone set in thin set adhesive and metal lath. 12. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 13. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 14. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria. 15. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 16. AFC Terraslat by Tonality – Tonality Classic26 or Tonality Classic22

SI: 1 in = 25.4 mm

1. The assembly combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
3. Tign 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.

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Table 6. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by building code
Fire-Stopping at Floor Lines Use Item 1 or 2	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-6	1. None 2. 1 1/2" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero 3. Any noncombustible insulation per ASTM E136 4. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 5. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 6. 3 1/4" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero – only with Sheathing 2
Exterior Sheathing Use either 1, 2 or 3	1. None (only with claddings 1-6, and cavity insulation 1, 3, 4, or 5). 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing & WRB Products Use 1 or 2	1. USG Securock Exoair 430 System – See note and Table 11 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. *Note:* Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRBs on base wall surface in Table 11.
WRB Over Base Wall Surface	1. See Table 11
Exterior Insulation Use either 1 or 2 depending on cladding.	1. 4" thick (max.) Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) for claddings 1-6. 2. 3 1/2" thick (max.) Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) for claddings 7-16 (with special Opening Perimeter).
WRB Over Exterior Insulation	See Table 11 The exterior insulation may be used with or without CavClear Masonry Mat over the insulation with a maximum 1" air gap between the CavClear and the cladding. When CavClear is used, this may only be used with Cladding 1, 2, 3, 4, 5, or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" minimum.

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Table 6. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Exterior Cladding Use any Item 1-16 Cladding 1-6 for 4" (max.) insulation thickness Cladding 7-16 for 3 1/2" (max.) insulation thickness with special opening perimeter Max. Air Gap 2" for Claddings 1-6. Max. Air Gap 1 1/2" for Claddings 7-16. If Claddings 2, 3, 4, 5, 11, 12 or 14 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in Hunter assemblies	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (maximum). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath (with approved WRB over exterior insulation as listed above) 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any ACM or MCM that has passed NFPA 285 with foam of comparable thickness. 8. Uninsulated sheet metal building panels including steel, copper, aluminum. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 11. Thin brick/cultured stone set in thin set adhesive and metal lath. 12. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 13. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 14. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria. 15. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 16. AFC Terraslat by Tonality – Tonality Classic26 or Tonality Classic22
Special Opening Perimeter Use with Claddings 7-16	1. Tested Opening – 2 layers 5/8" gypsum, with 18-gauge > steel flashing at header and 1 layer 5/8" and 18-gauge Galv. Steel Flashing at jambs and still. 2. 2" mineral wool 4 lb density 3. 1 1/2" thick FRT wood buck 4. Two layers of 3/4" FRT Plywood

SI: 1 in = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

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Table 7. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by building code
Fire-Stopping at Floor Lines Use Item 1 or 2	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-6	1. None 2. 1 1/2" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero 3. Any noncombustible insulation per ASTM E136 4. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 5. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 6. 3 1/4" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero – only with Sheathing 2
Exterior Sheathing Use either 1, 2 or 3	1. None (only with claddings 1-6, and cavity insulation 1, 3, 4, or 5). 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing & WRB Products Use 1 or 2	1. USG Securock Exoair 430 System – See note and Table 11 2. 5/8" Georgia Pacific DensElement flashed with Prosoco R-Guard FastFlash on sheathing joints. *Note:* Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRBs on base wall surface in Table 11.
WRB Over Base Wall Surface	See Table 11
Exterior Insulation Use either 1 or 2 depending on cladding.	1. 4" thick (max.) Defend-R CI Foil for claddings 1-6. 2. 3 1/2" thick (max.) Defend-R CI Foil for claddings 7-16 (with special Opening Perimeter).
WRB Over Exterior Insulation Only with Claddings 1-6	See Table 11 The exterior insulation may be used with or without CavClear Masonry Mat over the insulation with a maximum 1" air gap between the CavClear and the cladding. When CavClear is used, this may only be used with Cladding 1, 2, 3, 4, 5 or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" minimum.

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Table 7. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil Exterior Insulation[1,4]

Wall Component	Materials
Exterior Cladding Use any Item 1-16 Cladding 1-6 for 4" (max.) insulation thickness Cladding 7-16 for 3 1/2" (max.) insulation thickness with special opening perimeter Max. Air Gap 2" for Claddings 1-6. Max. Air Gap 1 1/2" for Claddings 7-16. If Claddings 2, 3, 4, 5, 11, 12 or 14 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in Hunter assemblies	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (maximum). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath (with approved WRB over exterior insulation as listed above) 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any ACM or MCM that has passed NFPA 285 with foam of comparable thickness. 8. Uninsulated sheet metal building panels including steel, copper, aluminum. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 11. Thin brick/cultured stone set in thin set adhesive and metal lath. 12. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 13. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 14. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria. 15. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 16. AFC Terraslat by Tonality – Tonality Classic26 or Tonality Classic22
Special Opening Perimeter Use with Claddings 7-16	1. Tested Opening – 2 layers 5/8" gypsum, with 18-gauge > steel flashing at header and 1 layer 5/8" and 18-gauge Galv. Steel Flashing at jambs and still. 2. 2" mineral wool 4 lb density 3. 1 1/2" thick FRT wood buck 4. Two layers of 3/4" FRT Plywood

SI: 1 in = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

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Table 8. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply or Defend-R CI Ply (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-6	1. None 2. 1 1/2" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero 3. Any noncombustible insulation per ASTM E136 4. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 5. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 6. 3 1/4" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero – only with Sheathing 2
Exterior Sheathing Use either 1, 2 or 3	1. None (only with Claddings 1-6 and cavity insulation 1, 3, 4, or 5). Also see note for Cavity Insulation 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction.
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock Exoair 430 System – See note and Table 11. 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. *Note:* Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRBs on base wall surface Table 11.
WRB Over Base Wall Surface	See Table 11
Exterior Insulation Use either 1 or 2 depending on cladding.	1. 4 1/4" thick (max.) Defend-R CI Ply (Class A) (3 1/2" foam max., 3/4" FR Plywood max.) with Claddings 7-16 (with special Opening Perimeter). 2. 4 3/4" thick (max.) Defend-R CI Ply (Class A) (4" foam max., 3/4" FR Plywood max.) may be used with claddings 1-6.
WRB Over Exterior Insulation Only with Claddings 1-6	See Table 11 The exterior insulation may be used with or without CavClear Masonry Mat over the insulation with a maximum 1" air gap between the CavClear and the cladding. When CavClear is used, this may only be used with Cladding 1-6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any Item 1-16 Cladding 1-6 for 4" (max.) insulation thickness	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (maximum). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath (with approved WRB over exterior insulation as listed above) 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap.

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Table 8. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply or Defend-R CI Ply (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Cladding 7-16 for 3 1/2" (max.) insulation thickness with special opening perimeter Max. Air Gap 2" for Claddings 1-6. Max. Air Gap 1 1/2" for Claddings 7-16. If Claddings 2, 3, 4, 5, 11, 12 or 14 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in Hunter assemblies	4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any ACM or MCM that has passed NFPA 285 with foam of comparable thickness. 8. Uninsulated sheet metal building panels including steel, copper, aluminum. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 11. Thin brick/cultured stone set in thin set adhesive and metal lath. 12. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 13. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 14. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria. 15. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 16. AFC Terraslat by Tonality – Tonality Classic26 or Tonality Classic22
Special Opening Perimeter Use with Claddings 7-16	1. Tested Opening – 2 layers 5/8" gypsum, with 18-gauge > steel flashing at header and 1 layer 5/8" and 18-gauge Galv. Steel Flashing at jambs and still. 2. 2" mineral wool 4 lb density 3. 1 1/2" thick FRT wood buck 4. Two layers of 3/4" FRT Plywood

SI: 1 in = 25.4 mm

1. The assembly combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

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Table 9. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) PLUS Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-6	1. None 2. 1 1/2" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero 3. Any noncombustible insulation per ASTM E136 4. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 5. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 6. 3 1/4" (max.) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero – only with Sheathing 2
Exterior Sheathing Use either 1, 2 or 3	1. None (only with cavity insulation 1, 2, 3, 4, 5 or 6) 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock Exoair 430 System – See note and Table 11 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints *Note:* Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 11
WRB Over Base Wall Surface	See Table 11
Exterior Insulation	1. 4" thick (max.) Defend-R CI Foil (Class A) PLUS for all claddings listed
WRB Over Exterior Insulation Only with Claddings 1-6	See Table 11 The exterior insulation may be used with or without CavClear Masonry Mat over the insulation with a maximum 1" air gap between the CavClear and the cladding. When CavClear is used, this may only be used with Cladding 1, 2, 3, 4, 5 or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.

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Table 9. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) PLUS Exterior Insulation[1,4]

Wall Component	Materials
Exterior Cladding Use any Item 1-16 Cladding 1-6 for 4" (max.) insulation thickness Cladding 7-16 for 3 1/2" (max.) insulation thickness with special opening perimeter Max. Air Gap 2" for Claddings 1-6. Max. Air Gap 1 1/2" for Claddings 7-16. If Claddings 2, 3, 4, 5, 11, 12 or 14 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in Hunter assemblies	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (maximum). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath (with approved WRB over exterior insulation as listed above) 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any ACM or MCM that has passed NFPA 285 with foam of comparable thickness. 8. Uninsulated sheet metal building panels including steel, copper, aluminum. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 11. Thin brick/cultured stone set in thin set adhesive and metal lath. 12. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 13. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 14. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria. 15. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 16. AFC Terraslat by Tonality – Tonality Classic26 or Tonality Classic22
Special Opening Perimeter Use with Claddings 7-16	1. Tested Opening – 2 layers 5/8" gypsum, with 18-gauge > steel flashing at header and 1 layer 5/8" and 18-gauge Galv. Steel Flashing at jambs and still. 2. 2" mineral wool 4 lb density 3. 1 1/2" thick FRT wood buck 4. Two layers of 3/4" FRT Plywood

SI: 1 in = 25.4 mm

1. The assembly combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

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Table 10. NFPA 285 Approved Mass Wall Assemblies with Defend-R CI as Interior Insulation[1]

Wall Component	Materials
Base Wall System Use either 1 or 2	1. Cast concrete walls (min. 2" thick) 2. CMU concrete walls (min. 4" thick)
Exterior Coating Use either 1, 2, 3 or 4	1. Portland cement or lime stucco 2. Any ASTM E84 Class A Paint or Elastomeric Coating 3. Any ASTM E84 Class A Clear Sealer 4. None
Air/Vapor Barrier Membrane Position 1 Over Base Wall Interior *Note:* Some WRBs are only allowed with specific systems.	See Table 11 - WRB over Base Wall Surface.
Continuous Insulation Use 1, 2 or 3	1. Defend-R CI Foil (Class A) or Xci 286, $3^1/_2$" thick (max.) 2. Defend-R CI Coated Glass (Class A) or Defend-R CI Coated Glass, $3^1/_2$" thick (max.) 3. Defend-R CI Foil, $3^1/_2$" thick (max.)
Air/Vapor Barrier Membrane Position 2 Over Insulation *Note:* Some WRBs are only allowed with specific systems	See Table 11 - WRB over Base Wall Surface. *Note:* Insulation Joints may be taped with Foil-Grip 1402, 4" width (max.)
Interior Cladding	$^5/_8$" type X interior gypsum sheathing installed directly over the insulation or installed to $3^5/_8$" (max. depth) studs or Metal Hat or Z Furring directly (no gap between stud/hat/Z and insulation). If an air gap between the stud/hat/Z and insulation is created, fire blocking with mineral wool per IBC Section 718 shall be installed. Mass wall designs are assumed to use platform construction (concrete floor line intersects exterior concrete creating a firestop at floor lines). If the floor line is separated from the exterior concrete, fireblocking with mineral wool must be installed to prevent uncontrolled vertical flame spread.

SI: 1 in = 25.4 mm

1. The assembly combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
2. Position 1 – Air vapor barrier installed directly on interior side of the base wall system.
3. Position 2 – Air vapor barrier installed over continuous insulation on interior side of the wall assembly.
4. CCW Membrane used in Position 1 or 2, not both.
5. Defend-R CI Foil (Class A) or Xci 286 insulation can be tacked in place with CAV-Grip or Travel-Tack during installation. Follow instructions on product data sheet.

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Table 11. NFPA 285 Allowable WRB Materials

Wall Component	Materials
WRB Over Base Wall Surface Use any of Items 1-32 or None. *Note:* Some WRBs are only allowed with specific systems. Item 22 (Securock Exoair 430) or 25 (DensElement with FastFlash) replaces the exterior sheathings in Tables 5-9. When either of these items are used, do not use exterior sheathings listed in Tables 5-9 or WRBs on base wall surface in this table.	1. Hunter Xci VP-SA WRB 2. Carlisle Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP, Fire Resist 705 FR-A, Fire Resist Barritech NP (or NP LT), Fire Resist Barritech VP (or VP LT). Fire Resist 705 VP may be used with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives. Fire Resist 705 FR-A may be used with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel-Tack adhesives. 3. CCW-705 (with 702 LV, 702 WB, Cav-Grip, Low VOC Travel-Tack, or 702 adhesives may) 4. GE Momentive SEC 2500 SilShield, Elemax 2600 5. VaproShield Wrapshield SA, RevealShield SA, BlockShield SA, PanelShield SA 6. WR Grace Perm-A-Barrier® VPS, Perm-A-Barrier NPL (AKA, PAB NP20), Perm-A-Barrier VPL, Perm-A-Barrier Aluminum Wall Membrane (AWM), Perm-A-Barrier VPL LT, Perm-A-Barrier NPL 10, Perm-A-Barrier VPL 50. 7. StoGuard® VaporSeal 8. 3M 3015 (with Hold Fast 70 adhesive @ 6 mils) or 3M 3015 NP or 3015 VP 9. Henry Air-Bloc® 17MR, 21S, All Weather STPE, Blueskin SA, Air-Bloc 16MR, Blueskin VP 160, Henry Blueskin MetalClad. 10. Tyvek CommercialWrap or CommercialWrap D, StuccoWrap, Fluid Applied WB [only with Defend-R CI Ply, Defend-R CI Ply (Class A) or Defend-R CI Foil (Class A)]. 11. PolyGuard Spray-N-Roll (STPE), Air Lok Sheet UV400NP, Air Lok Flex VP, FlexGuard, Stretch Flex 12. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 13. Dryvit Backstop NT 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR or Air-Shield SMP 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx, Delta Stratus SA 16. Soprema Sopraseal Stick VP, Soprasolin HD, LM 204 VP, Stick 1100T with Elastacool 600c Primer 17. Pecora XL Perm Ultra VP, XL-Perm Ultra NP, ProPerm VP 18. Siga Majvest or Majvest 500 SA 19. Sto Gold Coat or Emerald Coat 20. Tremco ExoAir 230 and ExoAir 130 21. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable, WeatherSmart Commercial or Super Jumbo Tex 60 22. USG Securock Exoair 430 System – see note on left and Air/Vapor System sections in Tables 5-8. 23. $^{5}/_{8}$" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. 24. Dow Corning Dowsil DefendAir200 (or LT version) or DefendAir 200C (Charcoal) 25. Hohmann & Barnard Enviro Barrier and Enviro Barrier VP 26. STS FW100 or FW100A 27. Karnak 321 K-NRG 28. NaturaSeal AirSeal NS-A-250LP, AirSeal NS-A-250HP 29. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 30. Master Wall Rollershield 31. Parex WeatherSeal Spray & Roll-On 32. Protecto Wrap, Protecto Wall VP or Universal Primer Free Membrane

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Table 11. NFPA 285 Allowable WRB Materials

Wall Component	Materials
WRB Over Exterior Insulation Use any Item 1-28 or None *Note:* Some WRBs are only allowed with specific systems	1. Hunter Xci VP-SA WRB 2. Carlisle Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP (with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives), Fire Resist 705 FR-A (with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel Tack Adhesives), Fire Resist Barritech VP (or VP LT), Fire Resist Barritech NP (or NP LT) 3. GE Momentive SEC 2500 SilShield, Elemax 2600 4. VaproShield WrapShield SA, RevealShield SA, PanelShield SA 5. Grace Perm-A-Barrier NPL (AKA, PAB NP20), Perm-A-Barrier VPL, Perm-A-Barrier Aluminum Wall Membrane (AWM), Perm-A-Barrier VPL LT, Perm-A-Barrier VPS. 6. Henry Air-Bloc 17MR, Air-Bloc 21S, Blueskin VP160 (only with Defend-R CI Ply), All Weather STPE, and Air-Bloc 16MR. 7. Tyvek CommercialWrap, StuccoWrap, or CommercialWrap D 8. Polyguard Air Lok Sheet UV400 NP, Stretch Flex (only with claddings 1-6), Air Lok Flex VP (over Defend-R CI Ply with any cladding listed or over the other Xci foams listed with claddings 1-6) 9. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 10. Sto Gold coat or Emerald Coat (only with Xci-Ply) 11. Dryvit Backstop NT 12. Any WRB that has been tested per ASTM E1354 (at a minimum of 50 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than those listed above 13. 3" Aluma-GRIP 701 or 4" FG-1402 joint tape may be interchanged. (Hardcast AFT is a rebrand of Aluma-GRIP 701). 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR or Air-Shield SMP 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx. 16. Soprema Sopraseal Stick VP (with Claddings 1-6, not with Defend-R CI Foil), Soprasolin HD 17. Pecora XL Perm Ultra VP, XL-Perm Ultra NP, ProPerm VP 18. Siga Majvest (for all claddings) or Majvest 500 SA (only with Claddings 1-6) 19. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable or WeatherSmart Commercial 20. Dow Chemical DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) 21. Hohmann & Barnard Enviro Barrier VP 22. STS FW100A 23. Karnak 321 K-NRG 24. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 25. Master Wall Rollershield 26. Parex WeatherSeal Spray & Roll-On 27. 3M 3015 VP 28. Protecto Wrap Protecto Wall VP or Universal Primer Free Membrane

SI: 1 in. = 25.4 mm

1. The following adhesives may be used for attachment of the polyisocyanurate (polyiso) insulation:
   a. Adhesive applied discontinuously at a rate of $^3/_8$" x 3" dabs, 16" o.c.: LM 800 XL or BarriBond or BarriBond XL
   b. Aerosol adhesive at the application rate as per mfg. instructions: CAV-Grip™ or Low VOC Travel-Tack
2. The following may be used as gap filler between insulation panels: FOMO HandiFoam FireBlock and TVM FireBlock.
3. These CCW detailing materials may be used over the base wall assembly. The detailing materials can be used alone or with any approved WRB for the construction.
   a. Board Joint Treatments:
      i. 2" x 40 mil ribbon of BarriBond or BarriBond XL
      ii. 4" DCH Reinforcing Rabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP

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Table 11. NFPA 285 Allowable WRB Materials

Wall Component	Materials
	iii. 4" Foil-GRIP 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) iv. 4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Termination Mastic for Flashing/Membrane: 1" x 40 mil ribbon or tooled 3/8" bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BarriBond, or BarriBond XL c. Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions, and Angle Changes. i. CCW-705/XLT, CCW-705 TWF/XLT, or Fire Resist 705 FR-A/XLT (all with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) ii. SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) iii. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT iv. 40 mil application of BarriBond, BarriBond XL or Barrithane VP 4. These CCW detailing materials may be used over the polyiso insulation and can be use alone or with any approved WRB for the assembly. a. Board Joint Treatments: i. 2" x 40 mil ribbon of BarriBond or BarriBond XL ii. 4" DCH Reinforcing Rabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP iii. 4" Foil-GRIP 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) iv. 4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Termination Mastic for Flashing/Membrane: 1" x 40 mil ribbon or tooled 3/8" bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond or BarriBond XL c. Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions and Angle Changes. i. Fire Resist 705 FR-A/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) ii. SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) iii. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT iv. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP 5. In the NFPA 285 test, flashing for fenestration, including Through-Wall Flashing (TWF), are not considered part of the WRB (ref: 2015 IBC Section 1405.4). TWF is permitted for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill, and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following TWF products may be used: a. CCW TWF/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-8-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive c. Metal TWF by others 6. BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB or Low VOC Travel-Tack to promote adhesion of BRT-801. 7. Fire-Resist 705 RS may be used in the following applications: a. Over the exterior insulation, while another approved WRB is used over the base wall assembly. b. Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below: i. CC Fire Resist 705 FR-A ii. Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m^2. 8. Insulating coating applied over noncombustible substrate can be used for mitigating thermal bridging at wall assembly terminations and penetrations. Coating applied in these conditions cover a small percentage of the total wall surface area. The following products are allowed: a. Aerolon 945 tape with primer by Tnemec b. Aerolon 971 coating with primer by Tnemec

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Table 12. Table Notes

Note 1: The following adhesives may be used to attach the polyisocyanurate (polyiso) insulation.

1) Adhesive applied discontinuously at a rate of $^{3}/_{8}$" x 3" dabs, 16" OC: LM 800 XL or BarriBond or BarriBond XL
2) Aerosol adhesive at the application rate as per mfg. instructions: CAV-GRIP or Low VOC Travel-Tack

Note 2: The following may be used as a gap-filler between insulation panels: FOMO HandiFoam Fireblock or TVM Fireblock

Note 3: These CCW detailing materials may be used over the base wall assembly and alone or with any approved WRB for the construction.

1) Board Joint Treatments:
   a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
   b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
   c. 4" Foil-GRIP 1402*
   d. 4" AlumaGRIP 701*
2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $^{3}/_{8}$" bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BarriBond, or BarriBond XL
3) Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions and Angle Changes.
   a. CCW-705/XLT*, CCW-705 TWF/XLT* or Fire Resist 705 FR-A/XLT*
   b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
   c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
   d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP

* Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet.

Note 4: These CCW detailing materials may be used over the polyiso insulation and alone or with any approved WRB for the assembly.

1) Board Joint Treatments:
   a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
   b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
   c. 4" Foil-GRIP 1402*
   d. 4" AlumaGRIP 701*
2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $^{3}/_{8}$" bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond or BarriBond XL

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3) Detail Flashing, 3" on each side at Openings, Terminations, Penetrations, Transitions and Angle Changes
   a. Fire Resist 705 FR-A/XLT*
   b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
   c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
   d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP

* Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer or Low VOC EPDM Primer per instructions on Product Data Sheet.

Note 5: In the NFPA 285 test, flashings for fenestration, including Through-Wall Flashing (TWF), are not considered part of the WRB (Ref: 2015 IBC Section 1403.5, 2021 IBC Section 1402.5). Therefore, suitable combustible or noncombustible flashings are permitted in wall assemblies as required in Building Code (Ref: 2015 IBC Sec. 1405.4), 2021 IBC Section 1404.4). TWF is allowed for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill, and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following TWF products may be used:

1) CCW-705 TWF/XLT*
2) Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-8-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive
3) Metal TWF by others

Note 6: BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB or Low VOC Travel-Tack to promote adhesion of BRT-801.

Note 7: Fire-Resist 705 RS may be used in the following applications:

1) Over the exterior insulation, while another approved WRB is used over the base wall assembly.
2) Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below:
   a. CC Fire Resist 705 FR-A
   b. Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m^2.

Note 8: Insulating coating over a noncombustible substrate can mitigate thermal bridging at wall assembly terminations and penetrations. Coating in these conditions covers a small percentage of the total wall surface area. The following products are allowed:

1) Aerolon 945 tape with primer by Tnemec
2) Aerolon 971 coating with primer by Tnemec

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Appendix B. NFPA 285-12

Table 13. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8, 9, 10, 11, 12, 13, 14 or 15 may be used with Exterior Sheathing 2 or the sheathing thickness specified	1. None 2. 1 1/2" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 3. 1 1/2" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per ASTM E136 5. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK. HRR) than Covestro EcoBay CC or BASF Walltite 8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5 1/2" (only with 1/2" [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" (max.) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (min.) Thermoseal 2000 (up to full cavity thickness) 12. Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with 1/2" (min.) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3 1/2" (max.) for use with 5/8" Exterior Gypsum Sheathing 14. JM Corbond III or Corbond IV – Full stud cavity depth or less for use with 5/8" exterior gypsum sheathing 15. Huntsman ProSeal HFO (8" max. thickness with no air gap, 6" max. thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	1. None (only with cavity insulation 1, 2, 3, 4, 5 or 6) 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock® Exoair® 430 System – See note and Table 18 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints *Note*: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 18

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Table 13. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) Exterior Insulation[1,4]

Wall Component	Materials
WRB Over Base Wall Surface	See Table 18
Exterior Insulation Use either 1 or 2 depending on cladding. *Note*: A construction which utilizes no exterior sheathing may not use spray foam cavity insulation	1. 3 1/2" thick (max.) Defend-R CI Foil (Class A) or Defend-R CI Foil (286) for all claddings 2. 4" thick Defend-R CI Foil (Class A) or Defend-R CI Foil (286) for claddings 1-6
WRB Over Exterior Insulation	See Table 18 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5 or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any item 1-17 Item 7 may use any tested/approved installation technique. Items 8, 9 or 12 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15 or 16 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip sheet between the WRB/exterior insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip-sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique

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Table 13. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) Exterior Insulation[1,4]

Wall Component	Materials
SI: 1 in = 25.4 mm 1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis. 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. 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.	

Table 14. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by building code
Fire-Stopping at Floor Lines Use Item 1 or 2	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8-15 may only be used with exterior sheathing 2 or the specified thickness	1. None 2. 1 1/2" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or SealTite PRO One Zero (up to full cavity thickness for each) 3. 1 1/2" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per ASTM E136 5. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK. HRR) than Covestro EcoBay CC or BASF Walltite 8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5 1/2" (only with 1/2" [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" in 6" (max.) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (min.) Thermoseal 2000 (up to full cavity thickness) 12. Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with 1/2" (min.) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3 1/2" (max.) for use with 5/8" Exterior Gypsum Sheathing 14. JM Corbond III or Corbond IV – Full stud cavity depth or less for use with 5/8" exterior gypsum sheathing 15. Huntsman ProSeal HFO (8" max. thickness with no air gap, 6" max. thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing

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Table 14. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Exterior Sheathing Use either 1, 2 or 3	1. None (only with claddings 1-6, and cavity insulation 1, 2, 3, 4, 5, 6 or 11). 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing & WRB Products Use 1 or 2	1. USG Securock® Exoair® 430 System – See note and Table 18 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. *Note*: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRBs on base wall surface in Table 18.
WRB Over Base Wall Surface	See Table 18
Exterior Insulation Use either 1 or 2 depending on cladding.	1. 3 1/2" thick (max.) Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) for all claddings. 2. 4" thick (max.) Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) for claddings 1-6.
WRB Over Exterior Insulation	See Table 18 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5 or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any Item 1-17 Item 7 may use any tested/approved installation technique. Items 8, 9 or 12 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15 or 16 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip sheet between the WRB/exterior insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum (or zinc only with Defend-R CI Coated Glass [Class A]) 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes.

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Table 14. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass (Class A) Exterior Insulation[1,4]

Wall Component	Materials
	14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip-sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax M.Look – minimum 1/4" thick using any standard installation technique

SI: 1 in = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

Table 15. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply (Class A) Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 3, 8, 9, 10, 11, 12, 13, 14 or 15 may only be used with exterior sheathing 2 or the specified thickness	1. None 2. 1 1/2" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell or SealTite PRO One Zero (up to full cavity thickness for each) 3. 1 1/2" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per ASTM E136 5. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK. HRR) than Covestro EcoBay CC or BASF Walltite

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Table 15. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply (Class A) Exterior Insulation[1,4]

Wall Component	Materials
	8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5 1/2" (only with 1/2" [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" in 6" (max.) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (min.) Thermoseal 2000 (up to full cavity thickness) 12. Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with 1/2" (min.) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3 1/2" (max.) for use with 5/8" Exterior Gypsum Sheathing 14. JM Corbond III or Corbond IV – Full stud cavity depth or less for use with 5/8" exterior gypsum sheathing 15. Huntsman ProSeal HFO (8 in. max. thickness with no air gap, 6 inch max. thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	1. None (only with cavity insulation 1, 2, 4, 5 or 6). Also see note for Cavity Insulation 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction.
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock® Exoair® 430 System – See note and Table 18. 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. *Note*: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRBs on base wall surface in Table 18.
WRB Over Base Wall Surface	See Table 18
Exterior Insulation Use either 1 or 2 depending on cladding.	1. 4 1/4" thick (max.) Defend-R CI Ply (Class A) (3 1/2" foam max., 3/4" FR Plywood max.) with all claddings. 2. 4 3/4" thick (max.) Defend-R CI Ply (Class A) (4" foam max., 3/4" FR Plywood max.) may be used with claddings 1-6.
WRB Over Exterior Insulation	See Table 18 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1-6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any Item 1-17 Item 9 may use any tested/approved installation technique. Items 10, 11 and 14 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15 or 16 are on	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip sheet between the WRB/exterior insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap.

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Table 15. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply (Class A) Exterior Insulation[1,4]

Wall Component	Materials
stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip sheet between the WRB/AVP and the lath. 8. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 9. Any MCM that has passed NFPA 285. 10. Uninsulated sheet metal building panels including steel, copper, aluminum (or zinc only with Defend-R CI Ply [Class A]) 11. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 12. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 13. Autoclaved-Aerated-Concrete (AAC) panels that have successfully passed NFPA 285 criteria. 14. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 15. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax m.Look – minimum 1/4" thick using any standard installation technique

SI: 1 in = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

Table 16. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) PLUS Exterior Insulation[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge min. 3 5/8" (min.) steel studs spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW (fire-retardant-treated wood) studs: min. nominal 2"x4" dimension, spaced 24" o.c. (max.) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by code

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Table 16. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) PLUS Exterior Insulation[1,4]

Wall Component	Materials
Fire-Stopping at Floor Lines	1. Any approved mineral-fiber-based safing insulation in each stud cavity at floor line. Safing thickness must match stud cavity depth. 2. Solid FRTW fire blocking at floor line in accordance with building code requirements for Type III construction.
Cavity Insulation Use any Item 1-15 Items 8, 9, 10, 11, 12, 13, 14 or 15 may be used with Exterior Sheathing 2 or the sheathing thickness specified	1. None 2. 1 1/2" (min.) of Carlisle® SPI SealTite PRO (up to full cavity thickness), SealTite PRO Closed Cell, or Seal Tite PRO One Zero (up to full cavity thickness for each) 3. 1 1/2" (min.) of BASF Walltite SPF (up to full cavity thickness) 4. Any noncombustible insulation per ASTM E136 5. Any mineral fiber (Board type Class A ASTM E84 faced or unfaced) 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced) 7. Any foam plastic insulation (SPF or board type) that has been tested per ASTM E1354 (at a min. of 20 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, PK. HRR) than Covestro EcoBay CC or BASF Walltite 8. NCFI InsulBloc SPF (up to full cavity thickness) 9. Icynene MD-C-200v3 (Proseal) up to 5 1/2" (only with 1/2" [min.] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" (max.) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (min.) Thermoseal 2000 (up to full cavity thickness) 12. Carlisle SealTite PRO High Yield, SealTite PRO Open Cell, SealTite PRO No Mix, SealTite PRO No Trim 21, or SealTite PRO OCX – up to full cavity thickness with 1/2" (min.) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 – 3 1/2" (max.) for use with 5/8" Exterior Gypsum Sheathing 14. JM Corbond III or Corbond IV – Full stud cavity depth or less for use with 5/8" exterior gypsum sheathing 15. Huntsman ProSeal HFO (8" max. thickness with no air gap, 6" max. thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use either 1, 2 or 3	1. None (only with cavity insulation 1, 2, 3, 4, 5 or 6) 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (min.) FRTW structural panels in Type III construction
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock® Exoair® 430 System – See note and Table 18 2. 5/8" Georgia Pacific DensElement, flashed with Prosoco R-Guard FastFlash on sheathing joints *Note*: Item 1 or 2 replaces the exterior sheathings above. When either of these items are used, do not use exterior sheathings or WRB's on base wall surface in Table 18
WRB Over Base Wall Surface	See Table 18
Exterior Insulation	1. 4" thick (max.) Defend-R CI Foil (Class A) PLUS for all claddings listed

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Table 16. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) PLUS Exterior Insulation[1,4]

Wall Component	Materials
WRB Over Exterior Insulation	See Table 18 The exterior insulation may be used with or without CavClear® Masonry Mat over the insulation with a maximum 1" air gap between the CavClear® and the cladding. When CavClear® is used, this may only be used with Cladding 1, 2, 3, 4, 5 or 6 or with thin brick/thin stone adhered to stucco as long as the total thickness is 3/4" min.
Exterior Cladding Use any item 1-17 Item 7 may use any tested/approved installation technique. Items 8, 9 or 12 may use any standard installation technique. If Claddings 2, 3, 4, 5, 13, 14, 15 or 16 are on stucco base with 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 self-adhering membranes, but may be slip sheet (stapled) with no adhesive.	1. Brick – Nominal 4" thick, clay or concrete brick or veneer with maximum 2" air gap behind the brick. Brick ties/Anchors 24" o.c. (max.). 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. For systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip sheet between the WRB/exterior insulation and the lath. 3. Limestone – Minimum 2" thick using any standard non-open joint installation technique such as shiplap. 4. Natural stone veneer – Minimum 2" thick using any standard non-open joint installation technique such as grouted/mortared stone. 5. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC 51 using any standard non-open joint installation technique such as shiplap. 6. Terra Cotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard open or non-open joint installation technique such as shiplap. 7. Any MCM that has passed NFPA 285. 8. Uninsulated sheet metal building panels including steel, copper, aluminum or zinc. 9. 1/4" (min.) uninsulated fiber-cement siding, or porcelain or ceramic tile mechanically attached. 10. Stone, porcelain, ceramic/aluminum honeycomb composite building panels that have successfully passed NFPA 285 criteria. 11. Autoclaved-Aerated-Concrete (AAC) panels that have successfully passed NFPA 285 criteria. 12. Terra Cotta Cladding – Any Rain-screen Terra Cotta (min. 1/2" thick) with ventilated shiplap. 13. 1/2" Stucco – Any one coat stucco (1/2" min.) that meets AC11 acceptance criteria or is approved for use in Type I-IV construction or has been tested per NFPA 285 or stays in place when tested per ASTM E119 (stucco exposed to fire) for at least 30 minutes. 14. Thin brick/cultured stone set in thin set adhesive and metal lath that has been tested to ASTM E119 (brick exposed to furnace) and remains in place for a minimum of 30 minutes, or has passed a NFPA 285 test. Minimum 3/4". For these systems that require a more durable WRB system, any building wrap or 15# felt that meets requirement #12 in WRB Over Exterior Insulation (Table 18) can be used as a slip sheet between the WRB/AVP and the lath. 15. Glen Gery Thin Tech Elite Series Masonry Veneer or TABS II Panel System with 1/2" thick bricks using TABS Wall Adhesive. 16. Natural Stone Veneer – minimum 1 1/4" thick using any standard installation technique. 17. FunderMax m.Look – minimum 1/4" thick using any standard installation technique

SI: 1 in = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
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.
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.

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Table 17. NFPA 285 Approved Mass Wall Assemblies with Defend-R CI Products as Interior Insulation[1]

Wall Component	Materials
Base Wall System Use either 1 or 2	1. Cast concrete walls (min. 2" thick) 2. CMU concrete walls (min. 4" thick)
Exterior Coating Use either 1, 2, 3 or 4	3. Portland cement or lime stucco 4. Any ASTM E84 Class A Paint or Elastomeric Coating 5. Any ASTM E84 Class A Clear Sealer 6. None
Air/Vapor Barrier Membrane Position 1[1] Over Base Wall Interior *Note*: Some WRBs are only allowed with specific systems.	See Table 18 - WRB over Base Wall Surface.
Continuous Insulation Use 1, 2 or 3	1. Defend-R CI Foil (Class A) or Defend-R CI Foil (286), 3 1/2" thick (max.) 2. Defend-R CI Coated Glass (Class A) or Defend-R CI Coated Glass, 3 1/2" thick (max.) 3. Defend-R CI Foil, 3 1/2" thick (max.)
Air/Vapor Barrier Membrane Position 2[2] Over Insulation *Note*: Some WRBs are only allowed with specific systems	See Table 18 - WRB over Base Wall Surface. *Note*: Insulation Joints may be taped with Foil-Grip™ 1402, 4" width (max.)
Interior Cladding	5/8" type X interior gypsum sheathing installed directly over the insulation or installed to 3 5/8" (max. depth) studs or Metal Hat or Z Furring directly (no gap between stud/hat/Z and insulation). If an air gap between the stud/hat/Z and insulation is created, fire blocking with mineral wool per IBC Section 718, shall be installed. Mass wall designs are assumed to use platform construction (concrete floor line intersects exterior concrete creating a firestop at floor lines). If the floor line is separated from the exterior concrete, fireblocking with mineral wool must be installed to prevent uncontrolled vertical flame spread.

SI: 1 in = 25.4 mm

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis.
2. Position 1 – Air vapor barrier installed directly on interior side of the base wall system.
3. Position 2 – Air vapor barrier installed over continuous insulation on interior side of the wall assembly.
4. CCW Membrane used in Position 1 or 2, not both.
5. Defend-R CI Foil (Class A) or Defend-R CI Foil (286) insulation can be tacked in place with CAV-Grip or Travel-Tack during installation. Follow instructions on product data sheet.

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Table 18. NFPA 285 Allowable WRB Materials

Wall Component	Materials
WRB Over Base Wall Surface Use either 1, 2, 3, 4, 5, 6 7, 8, 9, 10, 11, 12 or 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33 or None. *Note*: Some WRBs are only allowed with specific systems. Item 24 (Securock® Exoair® 430) or 25 (DensElement w/ FastFlash) replaces the exterior sheathings in Tables 5-8. When either of these items are used, do not use exterior sheathings listed in Tables 5-8 or WRBs on base wall surface in this table.	1. Hunter Xci VP-SA WRB 2. Carlisle® Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP, Fire Resist 705 FR-A, Fire Resist Barritech NP, Fire Resist Barritech VP (or VP LT). Fire Resist 705 VP may be used with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives. Fire Resist 705 FR-A may be used with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel-Tack adhesives. 3. CCW-705 (with 702 LV, 702 WB, Cav-Grip, Low VOC Travel-Tack, or 702 adhesives may) be used with Defend-R CI Foil (Class A) or Defend-R CI Foil (286), or unfaced noncombustible insulation and cladding options 1-6 (Table 3) 4. GE Momentive SEC 2500 SilShield, Elemax 2600 5. VaproShield Wrapshield SA, RevealShield SA 6. WR Grace Perm-A-Barrier® VPS, Perm-A-Barrier® NPL (AKA, PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier® VPL LT. The following may only be used with claddings 1-6 - Perm-A-Barrier® NPL 10, Perm-A-Barrier® VPL 50. 7. StoGuard Vaporseal 8. 3M 3015 (with Hold Fast 70 adhesive @ 6 mils) 9. Henry Air-Bloc® 17MR, 21S, 31MR, 32MR (only with Defend-R CI Ply (Class A) [Class A]), 33MR, Blueskin SA (only with Defend-R CI Ply [Class A] and claddings 1-6), Air-Bloc® 16MR, Blueskin VP 160. 10. Tyvek CommercialWrap or CommercialWrap D, Fluid Applied WB (only with Defend-R CI Ply [Class A] or Defend-R CI Foil [Class A]). 11. PolyGuard Spray-N-Roll (STPE), Air Lok Sheet UV400NP, Air Lok Flex VP, FlexGuard, Air Lok Flex, Air Lok Sheet 400 NP (Only with Cladding 1-6) (Table 3) 12. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 13. Dryvit Backstop NT 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx, Delta Stratus SA 16. Any WRB that 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 17. BASF Enershield HP or Enershield I 18. Soprema Sopraseal Stick VP, Soprasolin HD, LM 204 VP, Stick 1100T with Elastacool 600c Primer (for use with Defend-R CI Coated Glass (Class A), Defend-R CI Foil (Class A), Defend-R CI Foil (Class A) PLUS, or Defend-R CI Ply (Class A) [Class A]) 19. Pecora XL Perm Ultra VP 20. Siga Majvest or Majvest 500 SA 21. Sto Gold Coat or Emerald Coat 22. Tremco ExoAir 230 and ExoAir 130 23. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable, WeatherSmart Commercial or Super Jumbo Tex 60 24. USG Securock® Exoair® 430 System – see note on left and Air/Vapor System sections in Tables 5-8. 25. 5/8" Georgia Pacific DenElement, flashed with Prosoco R-Guard FastFlash on sheathing joints. 26. Dow Corning Dowsil DefendAir200 (or LT version) or DefendAir 200C (Charcoal) 27. Hohmann & Barnard Enviro Barrier and Enviro Barrier VP 28. STS FW100 or FW100A 29. Karnak 321 K-NRG 30. NaturaSeal AirSeal NS-A-250LP, AirSeal NS-A-250HP 31. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 32. Master Wall Rollershield 33. Parex WeatherSeal Spray & Roll-On

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Table 18. NFPA 285 Allowable WRB Materials

Wall Component	Materials
WRB Over Exterior Insulation Use any Item 1-27 or None *Note*: Some WRBs are only allowed with specific systems	1. Hunter Xci VP-SA WRB 2. Carlisle® Fire Resist 705 RS, Fire Resist Barrithane VP, Fire Resist 705 VP (with 702 WB, Cav-Grip, or Low VOC Travel-Tack adhesives), Fire Resist 705 FR-A (with CCW 702, 702LV, 702 WB, CAV-Grip, and Low VOC Travel Adhesives), Fire Resist Barritech NP 3. GE Momentive SEC 2500 SilShield, Elemax 2600 4. VaproShield WrapShield SA, RevealShield SA 5. Grace Perm-A-Barrier® NPL (AKA, PAB NP20), Perm-A-Barrier® VPL, Perm-A-Barrier® Aluminum Wall Membrane (AWM), Perm-A-Barrier® VPL LT, Perm-A-Barrier® VPS. 6. Henry Air-Bloc® 17MR, 21S, 31MR, Blueskin® VP160 (only with Defend-R CI Ply [Class A]), Air-Bloc® 33MR and 16MR. 7. Tyvek CommercialWrap or StuccoWrap 8. Polyguard Air Lok Sheet UV400 NP, Air Lok Flex (only with claddings 1-6), Air Lok Flex VP (over Defend-R CI Ply with any cladding listed or over the other Defend-R CI foam products listed with claddings 1-6) (Table 3) 9. Prosoco R-Guard Cat 5, R-Guard Cat 5 Rainscreen, R-Guard VB or R-Guard Spray Wrap MVP 10. Sto Gold coat or Emerald Coat (only with Defend-R CI Ply (Class A)) 11. Dryvit Backstop NT 12. Any WRB that 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 13. 3" Aluma-GRIP™ 701 or 4" FG-1402 joint tape may be interchanged. (Hardcast AFT is a rebrand of Aluma-GRIP™ 701). 14. WR Meadows Air Shield LMP (Gray), Air Shield LMP (Black), Air Shield TMP, Air Shield LSR 15. Dörken Systems, Inc., Delta-Vent SA, Delta-Vent S, Delta-Fassade S, Delta Maxx. 16. Soprema Sopraseal Stick VP (with Claddings 1-6, not with Defend-R CI Foil), Soprasolin HD 17. Pecora XL Perm Ultra VP 18. Siga Majvest (for all claddings) or Majvest 500 SA (only with Claddings 1-6) 19. Fortifiber Building Systems Group WeatherSmart Housewrap, WeatherSmart Drainable or WeatherSmart Commercial 20. Dow Chemical DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) 21. Hohmann & Barnard Enviro Barrier VP 22. STS FW100A 23. Karnak 321 K-NRG 24. Jumpstart HWW-65A, HWW-65B, HWHP-80A, HWMP-90A, HWD2-72A, HWHPT-92A, HWMPC-105A 25. Master Wall Rollershield 26. Parex WeatherSeal Spray & Roll-On 27. 3M 3015 VP

SI: 1 in. = 25.4 mm

1. The following adhesives may be used for attachment of the polyisocyanurate (polyiso) insulation:
   a. Adhesive applied discontinuously at a rate of $^3/_8$" x 3" dabs, 16" o.c.: LM 800 XL or BarriBond or BarriBond XL
   b. Aerosol adhesive at the application rate as per mfg. instructions: CAV-Grip™ or Low VOC Travel-Tack
2. The following may be used as gap filler between insulation panels: FOMO HandiFoam FireBlock and TVM FireBlock.
3. These CCW detailing materials may be used over the base wall assembly. The detailing materials can be used alone or with any approved WRB for the construction.
   a. Board Joint Treatments:
      i. 2" x 40 mil ribbon of BarriBond or BarriBond XL
      ii. 4" DCH Reinforcing Rabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP

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Table 18. NFPA 285 Allowable WRB Materials

Wall Component	Materials
	iii. 4" Foil-GRIP 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) iv. 4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Termination Mastic for Flashing/Membrane: 1" x 40 mil ribbon or tooled $^3/_8$" bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BarriBond, or BarriBond XL c. Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions and Angle Changes. i. CCW-705/XLT, CCW-705 TWF/XLT, or Fire Resist 705 FR-A/XLT (all with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) ii. SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) iii. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT iv. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP 4. These CCW detailing materials may be used over the polyiso insulation and can be use alone or with any approved WRB for the assembly. a. Board Joint Treatments: i. 2" x 40 mil ribbon of BarriBond or BarriBond XL ii. 4" DCH Reinforcing Rabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP iii. 4" Foil-GRIP 1402 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) iv. 4" AlumaGRIP 701 (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Termination Mastic for Flashing/Membrane: 1" x 40 mil ribbon or tooled $^3/_8$" bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond, or BarriBond XL c. Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions and Angle Changes. i. Fire Resist 705 FR-A/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) ii. SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip (both with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) iii. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT iv. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP 5. In the NFPA 285 test, flashing for fenestration, including through-wall flashing (TWF), are not considered part of the WRB (ref: 2015 IBC Section 1405.4). TWF is permitted for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following TWF products may be used: a. CCW TWF/XLT (with surface preparation as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-Grip, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet) b. Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-8-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive c. Metal TWF by others 6. BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB, or Low VOC Travel-Tack to promote adhesion of BRT-801. 7. Fire-Resist 705 RS may be used in the following applications: a. Over the exterior insulation, while another approved WRB is used over the base wall assembly. b. Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below: i. CC Fire Resist 705 FR-A ii. Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m^2. 8. Insulating coating applied over noncombustible substrate can be used for mitigating thermal bridging at wall assembly terminations and penetrations. Coating applied in these conditions cover a small percentage of the total wall surface area. The following products are allowed: a. Aerolon 945 tape with primer by Tnemec b. Aerolon 971 coating with primer by Tnemec

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Table 19. Table Notes

Note 1: The following adhesives may be used to attach the polyisocyanurate (polyiso) insulation.

1) Adhesive applied discontinuously at a rate of $^{3}/_{8}$" x 3" dabs, 16" OC: LM 800 XL or BarriBond or BarriBond XL
2) Aerosol adhesive at the application rate as per mfg. instructions: CAV-GRIP™ or Low VOC Travel-Tack

Note 2: The following may be used as a gap-filler between insulation panels: FOMO HandiFoam Fireblock or TVM Fireblock

Note 3: These CCW detailing materials may be used over the base wall assembly and alone or with any approved WRB for the construction.

1) Board Joint Treatments:
   a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
   b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
   c. 4" Foil-GRIP 1402*
   d. 4" AlumaGRIP 701*
2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $^{3}/_{8}$" bead of SURE-SEAL Lap Sealant, CCW-704, LM 800 XL, BarriBond or BarriBond XL
3) Detail Flashing, 3" on each side, at Openings, Terminations, Penetrations, Transitions and Angle Changes.
   a. CCW-705/XLT*, CCW-705 TWF/XLT* or Fire Resist 705 FR-A/XLT*
   b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*
   c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT
   d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP

* *Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.*

Note 4: These CCW detailing materials may be used over the polyiso insulation and alone or with any approved WRB for the assembly.

1) Board Joint Treatments:
   a. 2" x 40 mil ribbon of BarriBond or BarriBond XL
   b. 4" DCH Reinforcing Fabric embedded in Fire-Resist Barritech VP/NP/NP LT or embedded in Fire Resist Barrithane VP
   c. 4" Foil-GRIP 1402*
   d. 4" AlumaGRIP 701*
2) Termination Mastic for Flashing/Membrane: 1" X 40 mil ribbon or tooled $^{3}/_{8}$" bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond or BarriBond XL
3) Detail Flashing, 3" on each side at Openings, Terminations, Penetrations, Transitions and Angle Changes
   a. Fire Resist 705 FR-A/XLT*
   b. SURE-SEAL P/S Elastoform* or SURE-SEAL P/S Cover Strip*

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c. LiquiFiber or DCH Reinforcing Fabric embedded in Barritech VP/NP/NP LT

d. 40 mil application of BarriBond, BarriBond XL, or Barrithane VP

* *Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.*

Note 5: In the NFPA 285 test, flashings for fenestration, including Through-Wall Flashing (TWF), are not considered part of the WRB (Ref: 2015 IBC Section 1403.5). Therefore, suitable combustible or noncombustible flashings are permitted in wall assemblies as required in Building Code (Ref: 2015 IBC Section 1405.4). TWF is allowed for use in wall assemblies clad with masonry or stone at the base of wall, head of wall, relieving angle, window head, windowsill and at other interruptions in the exterior cavity. TWF shall be applied a maximum of 8" onto the back-up wall and terminate at daylight or onto a drip edge. The following TWF products may be used:

1) CCW-705 TWF/XLT*
2) Pre-Kleened EPDM TWF loose-laid or adhered with SURE-SEAL 90-8-30A bonding Adhesive or SURE-SEAL Low VOC Bonding Adhesive
3) Metal TWF by others

Note 6: BRT-801 tape may be used over Fire-Resist 705 RS at membrane splices, terminations, and penetrations. Fire-Resist 705 RS and the substrate may be treated with CCW-702, CCW-702 LV, CCW-702 WB, or Low VOC Travel-Tack to promote adhesion of BRT-801.

Note 7: Fire-Resist 705 RS may be used in the following applications:

1) Over the exterior insulation, while another approved WRB is used over the base wall assembly.
2) Over a WRB on the base wall assembly while no exterior insulation is used. Use only WRBs listed below:
   a. CC Fire Resist 705 FR-A
   b. Other WRBs that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m^2.

Note 8: Insulating coating over a noncombustible substrate can mitigate thermal bridging at wall assembly terminations and penetrations. Coating in these conditions covers a small percentage of the total wall surface area. The following products are allowed:

1) Aerolon 945 tape with primer by Tnemec
2) Aerolon 971 coating with primer by Tnemec

**Prepare the surface as recommended by CCW using CCW-702, CCW-702 LV, CCW-702 WB, CCW-715, Low VOC Travel-Tack, CAV-GRIP, HP 250 Primer, or Low VOC EPDM Primer per instructions on Product Data Sheet.*

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Notes

1 For more information, visit drjcertification.org or call us at 608-310-6748.

2 Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI 1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law, Qualtim External Appendix A: Definitions/Commentary, Qualtim External Appendix B: Project/Deliverables, Qualtim External Appendix C: Intellectual Property and Trade Secrets, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

3 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702

4 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3

5 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

6 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

7 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.2.3.

8 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2

9 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

10 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

11 https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

12 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

13 https://www.cbitest.com/accreditation/

14 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1:~:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

15 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3 AND https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1

16 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

17 https://iaf.nu/en/about-iaf-mla/#:~:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

18 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

19 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

20 Unless otherwise noted, the links referenced herein use un-amended versions of the 2024 International Code Council (ICC) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the IBC 2024 and the IRC 2024 are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

21 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by the local jurisdiction. https://up.codes/codes/general

22 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by state. https://up.codes/codes/general

23 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14

24 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

25 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed AND https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled

26 IECC Section C402.6.2.3.2

27 2015 IBC Section 1404.2

28 WRB is not required for detached accessory buildings.

29 2015 IBC Section 1405.16

30 2015 IBC Section 1405.16.1

31 2015 IBC Section 1405.16.2

32 2015 IBC Section 803.1.2

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[33] 2015 IBC Section 803.1.2

[34] https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4

[35] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

[36] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

[37] Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

[38] https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH

[39] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

[40] 2021 IBC Section 104.11

[41] 2021 IRC Section R104.11

[42] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

[43] Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[44] https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

[45] Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.

[46] 2018 IBC Section 110.3.9, 2015 IBC Section 110.3.8

[47] 2018 IBC Section 110.3.10, 2015 IBC Section 110.3.9

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