Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2403-03

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Air Barrier, Water-Resistive Barrier, and Fire Performance of Defend-R Products 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: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 10 00 - Rough Carpentry

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation

Section: 07 48 00 - Exterior Wall Assemblies

1 Innovative Products Evaluated[1]

1.1 Defend-R Products:

1.1.1 Defend-R CI Foil

1.1.2 Defend-R CI Foil (Class A)

1.1.3 Defend-R CI Foil (Class A Plus)

1.1.4 Defend-R CI Foil (286)

1.1.5 Defend-R CI Coated Glass

1.1.6 Defend-R CI Coated Glass (Class A)

1.1.7 Defend-R CI Ply

1.1.8 Defend-R CI Ply (Class A)

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2 Product Description and Materials

2.1 Examples of the innovative products evaluated in this report are shown in **Figure 1**.

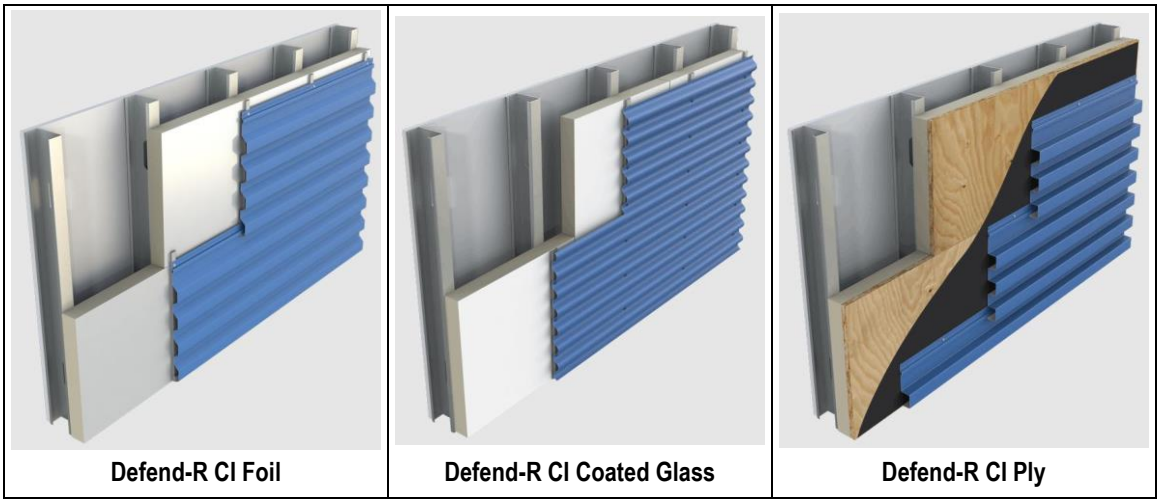


Figure 1. Defend-R Products

2.2 Defend-R products are proprietary Foam Plastic Insulating Sheathing (FPIS) products.

2.2.1 Defend-R CI Coated Glass (Class A) is a rigid insulation panel composed of a closed cell polyisocyanurate foam core with coated glass facers adhered on both sides.

2.2.1.1 Defend-R CI Coated Glass (Class A) conforms to ASTM C1289 Type II, Class 2, Grade 3.

2.2.2 Defend-R CI Ply (Class A) is a composite rigid insulation panel composed of a closed cell polyisocyanurate foam core with a coated glass facer adhered to one side and fire treated plywood (either $^{5}/_{8}$" or $^{3}/_{4}$") on the other side.

2.2.2.1 Defend-R CI Ply (Class A) conforms to ASTM C1289, Type V. The foam core conforms to ASTM C1289, Type II, Class 2, Grade 3.

2.2.3 Defend-R CI Foil (Class A) and Defend-R CI Foil (286) are rigid insulation panels composed of a 20-psi or 25-psi closed cell polyisocyanurate insulation foam core with glass-backed aluminum foil facers adhered to both sides.

2.2.3.1 Defend-R CI Foil (Class A) and Defend-R CI Foil (286) conform to ASTM C1289, Type I, Grade 2 (20-psi) or Grade 3 (25-psi).

2.2.4 Defend-R CI Foil (Class A Plus) is a rigid insulation panel composed of a 25-psi closed cell polyisocyanurate insulation foam core with foil facers adhered on both sides.

2.2.4.1 Defend-R CI Foil (Class A Plus) conforms to ASTM C1289, Type I, Class 1 and Class 2, Grade 3.

2.2.5 Defend-R CI Foil is a polyisocyanurate insulation board core adhered to foil facers.

2.2.5.1 Defend-R CI Foil conforms to ASTM C1289, Type I, Class 1 and Class 2, Grade 2 or Grade 3.

2.2.6 Defend-R CI Coated Glass is a polyisocyanurate insulation board adhered to coated glass facers.

2.2.6.1 Defend-R CI Coated Glass conforms to ASTM C1289, Type II, Class 2, Grade 2 or Grade 3.

2.2.7 Defend-R CI Ply is a composite rigid insulation panel composed of a closed cell polyisocyanurate foam core with a coated glass facer adhered to one side and fire treated plywood (either $^{5}/_{8}$" or $^{3}/_{4}$") on the other side.

2.2.7.1 Defend-R CI Ply conforms to ASTM C1289, Type V with Type II, Class 2 foam.

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2.3 *Material Availability*

2.3.1 Material availability for the Defend-R Products is shown in **Table 1**.

Table 1. Material Availability[1]

Product	Facers	Core	Thickness	Standard Width	Standard Length
Defend-R CI Foil (286)	Foil	Polyiso	1" (25.4 mm) Through 4" (102 mm)	48" (1,219 mm)	96" (2,438 mm), 120" (3,048 mm), 144" (3,657 mm)
Defend-R CI Coated Glass	CGF	Polyiso			
Defend-R CI Coated Glass (Class A)	CGF	Polyiso			
Defend-R CI Foil	Foil	Polyiso			
Defend-R CI Foil (Class A)	Foil	Polyiso			
Defend-R CI Foil (Class A Plus)	Foil	Polyiso			
Defend-R CI Ply	CGF	Polyiso	1" (25.4 mm) Through 4" (102 mm) Polyiso Over $^{5}/_{8}$" or $^{3}/_{4}$" Fire-Treated Plywood		96" (2,438 mm)
Defend-R CI Ply (Class A)	CGF	Polyiso			

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

2.4 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 This report utilizes 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 secrets 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]

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.

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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, St. Louis County, 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 *Regulations*

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

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

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

4.3 *Standards*

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

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

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

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

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

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

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

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

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

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4.3.10 *FM 4880: Approval Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials*

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

4.3.12 *NFPA 268: Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source*

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

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

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

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

4.3.17 *UL 1040: Fire Test of Insulated Wall Construction*

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

5 Listed[25]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or an approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., 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 *Vapor-Retarding Insulated Sheathing*

6.1.1 Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), and Defend-R CI Foil (286) were evaluated for use as a vapor retarder in accordance with ASTM E96 per IBC Section 202, IBC Section 1404.3, IRC Section R202, and IRC Section R702.7, and achieved Vapor Retarder Class I (≤ 0.1 perm).

6.1.1.1 Per IBC Section 1404.3.1, only Class III vapor retarders shall be used on the interior side of walls framed with insulated sheathing with < 1 perm installed on the exterior side of the framed wall.

6.1.2 Water vapor permeance of Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), and Defend-R CI Foil (286) is provided in **Table 2**.

Table 2. Water Vapor Permeance Performance

Product[1]	Water Vapor Permeance (perm)		
	ASTM E96 A (Desiccant Method)	ASTM E96 B (Water Method)	Vapor Retarder Class
Defend-R CI Foil	< 0.1	< 0.1	Class I
Defend-R CI Foil (Class A)			
Defend-R CI Foil (Class A Plus)			
Defend-R CI Foil (286)			

SI: 1 perm = 57.2 ng/(Pa·s·m^2)

1. Evaluated at a thickness of 1".

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6.2 *Air Barrier*

6.2.1 Defend-R CI Foil (286), Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) were evaluated in accordance with ASTM E2178 and met the requirements of IRC Section N1101.10.5, IECC Section R303.1.5, and IECC Section C402.6.2.3.1.[26]

6.2.1.1 Defend-R CI Foil (286), Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) are permitted for use as an air barrier material or a component 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.

6.2.2 Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus) , Defend-R CI Foil (286), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) were evaluated in accordance with ASTM E2357 and met the requirements of IECC Section C402.6.2.3.2.[27]

6.2.2.1 Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), Defend-R CI Foil (286), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) are permitted 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.

6.2.3 Air permeability values per test standard are provided in **Table 3**.

6.2.3.1 As an alternative to the tape noted in **Section 6.3.3**, Defend-R CI Coated Glass, Defend-R CI Coated Glass Class A, Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (286), and Defend-R CI Foil (Class A Plus) sheathing joints and penetrations are permitted to be sealed with Hunter Xci BarriBond HP Liquid Flashing and Detail Sealant.

Table 3. Air Barrier Properties of Defend-R CI Foil (286), Defend-R CI Foil, Defend-R CI Coated Glass, Defend-R CI Coated Glass Class A, Defend-R CI Foil Class A, and Defend-R CI Foil (Class A Plus)

Test Method	Product	Air Barrier Performance[3]
ASTM E2178	Defend-R CI Foil (286), Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), Defend-R CI Foil	≤ 0.00012 L/(s·m²) [0.000024 cfm/ft²]
	Defend-R CI Coated Glass, Defend-R CI Coated Glass Class A	< 0.02 L/(s·m²)
ASTM E2357	Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), Defend-R CI Coated Glass, Defend-R CI Coated Glass Class A, Defend-R CI Foil (286)	≤ 0.02 L/(s·m²) [0.0004 cfm/ft²][1,2]

Imperial: 1 L/(s·m²) = 0.2 cfm/ft², 1 Pa = 0.209-psf

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.
3. Air permeability reported under a pressure of 75 Pa (1.57-psf).

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6.3 *Water-Resistive Barrier (WRB)*

6.3.1 Defend-R CI Foil, Defend-R CI Foil Class A, Defend-R CI Foil (286), Defend-R CI Foil (Class A Plus) , Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) are approved for use as a WRB as prescribed in IBC Section 1403.2 and IRC Section R703.2[28] when installed on exterior walls as described in this section.

6.3.2 Defend-R CI Foil (286), Defend-R CI Coated Glass, Defend-R CI Coated Glass Class A, Defend-R CI Foil, 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**.

6.3.3 All seams and joints between boards shall be covered by 4" wide Carlisle Coatings & Waterproofing Foil Grip 1402 pressure sensitive foil-faced flashing tape, Carlisle Coatings and Waterproofing PS Flashing AlumaGrip 701 or BarriBond HP.

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

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

6.4 *Fire Safety Performance*

6.4.1 *Surface Burning Characteristics:*

6.4.1.1 Defend-R products were evaluated to assess performance with regard to flame spread and smoke developed indices in accordance with UL 723 as shown in **Table 4**.

Table 4. Surface Burning Characteristics[1]

Product Name	Flame Spread Index	Smoke-Developed Index	Classification
Defend-R CI Coated Glass Class A, Defend-R CI Ply Class A, Defend-R CI Foil Class A, Defend-R CI Foil (Class A Plus), Defend-R CI Foil (286)	≤ 25	< 450	Class A
Defend-R CI Foil, Defend-R CI Coated Glass, Defend-R CI Ply	≤ 75	< 450	Class B

1. Foam core tested in accordance with UL 723 (ASTM E84).

6.4.2 *Ignition:*

6.4.2.1 Defend-R products were evaluated to assess performance with regard to ignition in accordance with IBC Section 2603.5.7. Defend-R products comply with this section when the exterior side of the sheathing is protected with one of the following materials:

6.4.2.1.1 A thermal barrier complying with IBC Section 2603.4.

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

6.4.2.1.3 Glass fiber reinforced concrete panels with a minimum thickness of $^3/_8$" (9.5 mm).

6.4.2.1.4 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.

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6.4.2.1.5 A minimum 7/8" (22.2 mm) thickness of stucco complying with IBC Section 2510.

6.4.2.1.6 A minimum 1/4" (6.4 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]

6.4.3 *Potential Heat:*

6.4.3.1 Defend-R products were tested 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,[32] as provided in **Table 5**.

Table 5. Potential Heat

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

SI: 1 lb = 4.45 N

1. Tested in accordance with NFPA 259.

6.4.4 *Vertical and Lateral Fire Propagation:*

6.4.4.1 Defend-R products were tested to assess their performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and IBC Section 2603.5.5.[33]

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

6.4.4.3 The wall assemblies listed in **Appendix A** are approved for use in buildings of Type I-V.

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

6.4.5 *Special Approval:*

6.4.5.1 Defend-R CI Foil (Class A) and Defend-R CI Foil (286), up to 3 1/2" (88.9 mm) thick, have been tested for use without a thermal barrier on walls only or ceilings only to NFPA 286 in accordance with IBC Section 2603.9 and IRC Section R303.6,[34] and met the criteria of IBC Section 803.1.1. Therefore, Defend-R CI Foil (Class A) and Defend-R CI Foil (286) require no thermal barrier or ignition barrier protection.

6.4.5.2 Defend-R CI Foil (Class A) and Defend-R CI Foil (286), up to 3 1/2" (88.9 mm) thick, have been tested for use without 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 R303.6,[35] and has met the criteria of IBC Section 803.1.1. Therefore, Defend-R CI Foil (Class A) and Defend-R CI Foil (286) require no ignition barrier protection in attics and crawl spaces.

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6.4.5.3 Defend-R CI Foil (Class A) and Defend-R CI Foil (286), up to 8" (203 mm) thick, have been tested to UL 1715 in accordance with IBC Section 2603.9 and IRC Section R303.6,[36] and met the requirements of the standard. Therefore, Defend-R CI Foil (Class A) and Defend-R CI Foil (286), up to 8" thick, are approved for use on ceilings and floors without a thermal barrier.

6.4.5.4 Defend-R CI Foil, Defend-R CI Coated Glass, and Defend-R CI Ply meet the requirements of IBC Section 2603.9 when installed in accordance with the provisions of this report. While these products do not have a flame spread index of 25 or less as required by IBC Section 2603.5.4, they have met the intent of the code by demonstrating that their end-use configuration meets the requirements of the NFPA 285 assembly test.

6.5 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.

7 Certified Performance[37]

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.[38]

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.[39]

8 Regulatory Evaluation and Accepted Engineering Practice

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

8.1.1 Performance of Defend-R CI Foil (286), Defend-R CI Coated Glass (Class A), Defend-R CI Foil (Class A), Defend-R CI Foil (Class A Plus), and Defend-R CI Ply (Class A), for use in exterior walls of buildings of any height and of Type I-IV construction in accordance with IBC Section 2603.5 and IRC Section R303.5.12.[40]

8.1.2 Performance Defend-R CI Coated Glass, Defend-R CI Foil, and Defend-R CI Ply for use in exterior walls of buildings of Type I-IV construction in accordance with IBC Section 2603.5.

8.1.3 Performance in accordance with ASTM E84 (UL 723) for flame spread and smoke-development index ratings in accordance with IBC Section 2603.3, IBC Section 2603.5.4, and IRC Section R303.3.[41]

8.1.4 Performance for use without a thermal barrier in accordance with IBC Section 2603.9, per IBC Section 2603.4, IBC Section 2603.5.2, and IRC Section R303.6,[42] per IRC Section R303.4.[43]

8.1.5 Performance with regard to the potential heat generated by the FPIS in accordance with IBC Section 2603.5.3.

8.1.6 Performance for use in exterior walls of buildings of Type V construction.

8.1.7 Performance with regard to vertical and lateral fire propagation in accordance with IBC Section 2603.5.5 and NFPA 285.

8.1.8 Performance with regard to ignition in accordance with IBC Section 2603.5.7 and NFPA 268.

8.1.9 Performance of Defend-R CI Foil (286), Defend-R CI Coated Glass, Defend-R CI Coated Glass (Class A), Defend-R CI Foil, Defend-R CI Foil (Class A), and Defend-R CI Foil (Class A Plus), for use in exterior walls of buildings as a WRB in accordance with IBC Section 1403.2 and IRC Section R703.2.

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

8.1.11 Performance in exterior walls of buildings as a vapor retarder in accordance with IBC Section 202, IBC Section 1404.3, IRC Section R202, and IRC Section R702.7.

8.1.12 Performance for use in exterior walls of buildings as an air barrier in accordance with IRC Section N1101.10.5, IECC Section R303.1.5, and IECC Section C402.6.2.3.1.[44]

8.1.13 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 (e.g., 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[45] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[46] 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.

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 12**, and that the WRB is installed correctly and in good condition before covering with FPIS.

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

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

9.3.5 Do not span expansion joints with FPIS.

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

9.3.7 Beginning at the base of the wall, apply FPIS horizontally or vertically using maximum board lengths to minimize the number of joints.

9.3.8 Pre-cut FPIS to fit openings and penetrations.

9.3.9 Offset FPIS board joints 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 Fill gaps greater than $^1/_8$" between FPIS boards with expanding spray foam or approved sealant, and strike flush. Expanding spray foam may also be applied onto the FPIS board edges during installation.

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

9.3.13 Additional information on the installation and detailing of Defend-R Products can be found at www.drexmet.com/products/insulation/defend-r-ci-wall-insulation.

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9.4 This section provides additional general guidelines for the installation of ***Defend-R CI Foil and Defend-R CI Coated Glass only***. Refer to the manufacturer installation instructions, in addition to this report, for complete details and requirements.

9.4.1 Cut with table saw or a knife using a square to guide the cut.

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

9.4.3 Mechanically fasten using the fastening pattern as indicated.

9.4.3.1 Space fasteners 12" o.c. at the perimeter and 16" o.c. in the field.

9.4.3.2 Set back perimeter fasteners $^{3}/_{8}$" from board edges.

9.4.3.3 ***Note:*** Where Defend-R CI Foil or Defend-R CI Coated Glass 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 or Defend-R CI Coated Glass attachment function shall be designed for this function. If the cladding attachment is 16" o.c. or closer, and it tightly secures the insulation, no additional fastening or adhesive is required.

9.4.4 When adhesive is used, periodically verify adhesion. Properly installed adhesively applied Defend-R CI Foil or Defend-R CI Coated Glass will cohesively break the adhesive while still wet and destroy the substrate when dry.

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

9.5 This section provides additional general guidelines for the installation of ***Defend-R CI Ply only***. Refer to the manufacturer installation instructions, in addition to this report, for complete details and requirements.

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

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

9.5.3 Fasten Defend-R CI Ply with proper fasteners and spacing to accommodate design. Fasten Defend-R CI Ply 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 and the weight of the cladding for the project conditions.

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

9.5.5 Apply WRB from approved list in **Table 12**, over plywood side of Defend-R CI Ply 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 (UL 723)

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

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10.1.7 Air barrier assembly testing in accordance with ASTM E2357

10.1.8 Vapor impermeability testing in accordance with ASTM E96 Method A and Method B

10.1.9 Water-resistive barrier testing in accordance with ASTM E331

10.2 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.

10.3 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.

10.4 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.

10.5 *Testing and Engineering Analysis*

10.5.1 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.[47]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Defend-R products on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Defend-R 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 products shall be approved for the following applications:

11.2.1 Defend-R CI Coated Glass (Class A), Defend-R CI Ply (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 of any height of Type I-IV construction in accordance with IBC Section 2603.5 and IRC Section R303.5.12.[48]

11.2.2 Defend-R CI Foil, Defend-R CI Coated Glass, and Defend-R CI Ply are approved for use in exterior walls of buildings of Type I-IV construction in accordance with IBC Section 2603.5.

11.2.3 Defend-R products are approved for use in exterior walls of buildings of Type V construction.

11.2.3.1 Defend-R 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**. (**Appendix B** may be used for local building codes based on 2018 IBC or earlier.)

11.2.3.2 Defend-R products comply with, or are a suitable alternative to, the applicable sections of the codes listed in **Section 4**.

11.2.3.3 Defend-R CI Foil (286) and Defend-R CI Foil (Class A), up to $3^1/_2$" (88.9 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,[49] and meet the criteria of IBC Section 803.1.1. Therefore, Defend-R CI Foil (286) and Defend-R CI Foil (Class A) may be left exposed and require no thermal barrier or ignition barrier protection.

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11.2.3.4 Defend-R CI Foil (Class A) and Defend-R CI Foil (286), up to $3^1/_2$" (88.9 mm) thick, are approved 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 R303.6,[50] and meet the criteria of IBC Section 803.1.1. Therefore, Defend-R CI Foil (Class A) and Defend-R CI Foil (286) require no ignition barrier protection in attics and crawl spaces.

11.2.3.5 Defend-R CI Foil, Defend-R CI Foil (Class A), Defend-R CI Foil (286), Defend-R CI Foil (Class A Plus), Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) 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 the manufacturer installation instructions and this report.

11.2.3.6 Defend-R CI Foil, Defend-R CI Foil (Class A), Defend-R CI Foil (286), Defend-R CI Foil (Class A Plus), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) 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 manufacturer installation instructions and this report.

11.3 Unless exempt by state statute, when Defend-R 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[51] (IRC Section R104.2.2[52] and IFC Section 104.2.3[53] 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:**[54] Building regulations require that the building official shall accept duly authenticated reports.[55]

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.[56]

12 Conditions of Use

12.1 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.

12.2 As listed herein, Defend-R products shall not be used to resist lateral loads. Walls shall be braced by other materials in accordance with the applicable code. The exterior wall covering shall be capable of resisting the full design wind pressure.

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

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12.4 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** or **Appendix B**, where applicable.

12.5 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 **Appendix A**.

12.6 Defend-R CI Ply (Class A) and Defend-R CI Ply may be used as a nail base, provided cladding attachments are designed in accordance with IRC Section R703.3.3, or an approved design.

12.6.1 Defend-R CI Foil, Defend-R CI Foil (Class A), Defend-R CI Foil (286), Defend-R CI Foil (Class A Plus), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) shall not be used as a nail base.

12.7 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.[57]

12.8 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.

12.9 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:

12.9.1 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.

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

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

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

12.9.5 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.

12.9.6 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.

12.10 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.

12.11 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).

12.12 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 Defend-R products [Defend-R CI Foil, Defend-R CI Foil (Class A), Defend-R CI Foil (Class A Plus), Defend-R CI Foil (286), Defend-R CI Coated Glass, Defend-R CI Coated Glass (Class A), Defend-R CI Ply, and Defend-R CI Ply (Class A)], as 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/products/insulation/defend-r-ci-wall-insulation

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
For Compliance with NFPA 285-19 and NFPA 285-23

Table 6. NFPA 285 Approved Wall Assemblies with
Defend-R CI Foil (Class A) or Defend-R CI Foil (286) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast Concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. Fire-Retardant Treated Wood (FRTW) studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) 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 items 1 - 11	1. None 2. 1 1/2" (maximum) 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" (maximum) Carlisle SPI SealTite Pro, SealTite PRO Closed Cell or SealTite PRO One Zero - only with Exterior Sheathing 2 7. Carlisle SealTite PRO HFO, SealTite PRO Open Cell, SealTite PRO High yield, SealTite PRO No Mix, SealTite PRO No Trim 21, SealTite PRO OCX. 3 5/8" maximum; Use with 1/2" exterior sheathing 8. JM Corbond III or IV - 3 5/8"; Use with 5/8" exterior sheathing 9. BASF WALLTITE Max - 3 5/8" maximum; Use with 1/2" exterior sheathing 10. Huntsman HeatLok HFO Pro; Huntsman HeatLok HFO High Lift 3 5/8" maximum; Use with 5/8" exterior sheathing 11. SWD Urethane Quik-Shield Goblin or Yeti - 1" to 3 5/8" thick for use in 3 5/8" studs (maximum); Use with 5/8" exterior sheathing
Exterior Sheathing Use 1, 2, or 3	1. None (only with Cavity Insulation 1, 2, 3, 4, or 5); When using Cavity Insulation 2 with no sheathing, only use and Claddings 1 - 6 and a maximum 3 1/2" Defend-R CI Foil Class A 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (minimum) FRTW structural panels in Type III construction

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Table 6. NFPA 285 Approved Wall Assemblies with
Defend-R CI Foil (Class A) or Defend-R CI Foil (286) Exterior Insulation[1,2]

Wall Component	Materials
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock Exoair 430 System - See ***Note*** and **Table 12** 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 on base wall surface in **Table 12**
WRB Over Base Wall Surface	1. See **Table 12** 2. 4" thick (maximum) Defend-R CI Foil (Class A) or Defend-R CI Foil (286) for all claddings listed
Exterior Insulation	1. 4" thick (maximum) Defend-R CI Foil (Class A) or Defend-R CI Foil (286) for all claddings listed
WRB Over Exterior Insulation	See **Table 12** ***Note:*** 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.
Exterior Cladding Use any item 1 - 17 Maximum Air Gap 2" for Claddings 1 - 6. Maximum Air Gap 2 1/8" for Claddings 7 - 17. If Claddings 2, 3, 4, or 5, 11, 12, and 14 are on a 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 butyl-based self-adhering membranes, but may be asphalt or butyl-based slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in assemblies Strongirt (Mix U) horizontal fiberglass Z Girt may be used for all claddings listed, including ACM or MCM	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" (minimum) 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 (minimum 1/2" thick) with ventilated shiplap 14. 3/8" or 1/2" Stucco - Any one-coat stucco (1/2" minimum) that meets AC11 acceptance criteria 15. Natural Stone Veneer - minimum 1 1/4" thick using any standard installation technique

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Table 6. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A) or Defend-R CI Foil (286) Exterior Insulation[1,2]

Wall Component	Materials
Exterior Cladding Continued	16. AFC Terraslat by Tonality - Tonality Classic26 or Tonality Classic22 17. 8 mm (minimum) or 5/16" (minimum) SwissPearl Fiber Cement cladding
Special Opening Perimeter Use any item 1 - 5 Is only required when the wall design has no exterior sheathing on the exterior side of the studs for Claddings 7 - 17.	1. Tested Opening - 2 layers 5/8" gypsum, with 18-gauge steel flashing at header and one (1) layer 5/8" and 18-gauge galvanized steel flashing at jambs and sill 2. 2" mineral wool 4 lb density 3. 1 1/2" thick FRT wood buck 4. Two layers of 3/4" FRT plywood 5. Tested Opening - 18-gauge steel opening perimeter for all cladding besides ACM

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 by Priest and Associates.
2. .Acceptance criteria for ASTM E1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.

Table 7. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: Minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by building code
Fire-Stopping at Floor Lines Use items 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 items 1 - 11	1. None 2. 1 1/2" (maximum) 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" (maximum) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero - only with Sheathing 2

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Table 7. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Cavity Insulation Continued	7. Carlisle SealTite PRO HFO, SealTite PRO Open Cell, SealTite PRO High yield, SealTite PRO No Mix, SealTite PRO No Trim 21, SealTite PRO OCX. 3 5/8" maximum; Use with 1/2" exterior sheathing 8. JM Corbond III or IV - 3 5/8"; Use with 5/8" exterior sheathing 9. BASF WALLTITE Max - 3 5/8" maximum; Use with 1/2" exterior sheathing 10. Huntsman HeatLok HFO Pro; Huntsman HeatLok HFO High Lift; 3 5/8" maximum; Use with 5/8" exterior sheathing 11. SWD Urethane Quik-Shield Goblin or Yeti - 1" to 3 5/8" thick for use in 3 5/8" studs (maximum); Use with 5/8" exterior sheathing
Exterior Sheathing Use 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" (minimum) 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 12** 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 on base wall surface in **Table 12**
WRB Over Base Wall Surface	1. See **Table 12**
Exterior Insulation Use either 1 or 2, depending on cladding	1. 4" thick (maximum) Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) for claddings 1 – 6 2. 3 1/2" thick (maximum) Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) for claddings 7 - 17 (with special opening perimeter)
WRB Over Exterior Insulation	1. See **Table 12** ***Note:*** 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.
Exterior Cladding Use any item 1 - 17 Cladding 1 - 6 for 4" (maximum) insulation thickness Claddings 7 - 17 for 3 1/2" (maximum) insulation thickness with special opening perimeter Maximum Air Gap 2" for Claddings 1 - 6. Maximum Air Gap 1 1/2" for Claddings 7 - 17. If Claddings 2, 3, 4, or 5, 11, 12, or 14 are on a 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	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

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Table 7. NFPA 285 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

Wall Component	Materials
coverage asphalt or butyl-based self-adhering membranes, but may be asphalt or butyl-based slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in assemblies Strongirt (Mix U) horizontal fiberglass Z Girt may be used for all claddings listed, including ACM or MCM	8. Uninsulated sheet metal building panels including steel, copper, aluminum 9. 1/4" (minimum) 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 (minimum 1/2" thick) with ventilated shiplap 14. 1/2" Stucco - Any one-coat stucco (1/2" minimum) 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 17. 8 mm (minimum) or 5/16" (minimum) SwissPearl Fiber Cement cladding
Special Opening Perimeter Use with Claddings 7 - 17 Use any items 1 - 4	1. Tested Opening - 2 layers 5/8" gypsum, with 18-gauge steel flashing at header and one (1) layer 5/8" and 18-gauge Galvanized 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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.	

Table 8. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply and Defend-R CI Ply (Class A) Exterior Insulation[1,2]

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

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Table 8. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply and Defend-R CI Ply (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Cavity Insulation Use any item 1 - 11	1. None 2. 1 1/2" (maximum) 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" (maximum) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero - only with Sheathing 2 7. Carlisle SealTite PRO HFO, SealTite PRO Open Cell, SealTite PRO High yield, SealTite PRO No Mix, SealTite PRO No Trim 21, SealTite PRO OCX; 3 5/8" maximum; Use with 1/2" exterior sheathing 8. JM Corbond III or IV - 3 5/8"; Use with 5/8" exterior sheathing 9. BASF WALLTITE Max - 3 5/8" maximum; Use with 1/2" exterior sheathing 10. Huntsman HeatLok HFO Pro, Huntsman HeatLok HFO High Lift; 3 5/8" maximum; Use with 5/8" exterior sheathing 11. SWD Urethane Quik-Shield Goblin or Yeti - 1" to 3 5/8" thick for use in 3 5/8" studs (maximum); Use with 5/8" exterior sheathing
Exterior Sheathing Use 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" (minimum) 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 12** 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 on base wall surface in **Table 12**
WRB Over Base Wall Surface	1. See **Table 12**
Exterior Insulation Use either 1 or 2, depending on cladding	1. 4 1/4" thick (maximum) Defend-R CI Ply and Defend-R CI Ply (Class A) (3 1/2" foam maximum, 3/4" FR Plywood maximum) with Claddings 7 - 17 (with special opening perimeter) 2. 4 3/4" thick (maximum) Defend-R CI Ply and Defend-R CI Ply (Class A) (4" foam maximum, 3/4" FR Plywood maximum) may be used with claddings 1 - 6
WRB Over Exterior Insulation	1. See **Table 12** ***Note:*** 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 Claddings 1 - 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 8. NFPA 285 Approved Wall Assemblies with Defend-R CI Ply and Defend-R CI Ply (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Exterior Cladding Use any item 1 - 17 Cladding 1 - 6 for 4 3/4" (maximum) insulation thickness Claddings 7 - 17 for 4 1/4" (maximum) insulation thickness with special opening perimeter Maximum Air Gap 2" for Claddings 1 - 6. Maximum Air Gap 1 1/2" for Claddings 7 - 17. If Claddings 2, 3, 4, or 5, 11, 12, and 14 are on a 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 butyl-based self-adhering membranes, but may be asphalt or butyl-based slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in assemblies Strongirt (Mix U) horizontal fiberglass Z Girt may be used for all claddings listed, including ACM or MCM	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" (minimum) 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 (minimum 1/2" thick) with ventilated shiplap 14. 1/2" Stucco - Any one-coat stucco (1/2" minimum) 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 17. 8 mm (minimum) or 5/16" (minimum) SwissPearl Fiber Cement cladding
Special Opening Perimeter Use any item 1 - 4 Use with Claddings 7 - 17	1. Tested Opening - 2 layers 5/8" gypsum, with 18-gauge > steel flashing at header and one (1) layer 5/8" and 18-gauge Galvanized 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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.

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Table 9. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A Plus) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by 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 - 11	1. None 2. 1 1/2" (maximum) 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" (maximum) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero - only with Sheathing 2 7. Carlisle SealTite PRO HFO, SealTite PRO Open Cell, SealTite PRO High yield, SealTite PRO No Mix, SealTite PRO No Trim 21, SealTite PRO OCX. 3 5/8" maximum; Use with 1/2" exterior sheathing 8. JM Corbond III or IV - 3 5/8"; Use with 5/8" exterior sheathing 9. BASF WALLTITE Max - 3 5/8" maximum; Use with 1/2" exterior sheathing 10. Huntsman HeatLok HFO Pro; Huntsman HeatLok HFO High Lift; 3 5/8" maximum; Use with 5/8" exterior sheathing 11. SWD Urethane Quik-Shield Goblin or Yeti - 1 to 3 5/8" thick for use in 3 5/8" studs (maximum); Use with 5/8" exterior sheathing
Exterior Sheathing Use 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" (minimum) 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 12** 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 on base wall surface in **Table 12**
WRB Over Base Wall Surface	1. See **Table 12**
Exterior Insulation Use either 1 or 2, depending on cladding	1. 4" thick (maximum) Defend-R CI Foil (Class A Plus) for all claddings listed

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Table 9. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil (Class A Plus) Exterior Insulation[1,2]

Wall Component	Materials
WRB Over Exterior Insulation	1. See **Table 12** ***Note:*** 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" minimum.
Exterior Cladding Use any item 1 - 17 Maximum Air Gap 2" for Claddings 1 - 6. Maximum Air Gap 2 1/8" for Claddings 7 - 17. If Claddings 2, 3, 4, or 5, 11, 12, and 14 are on a 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 butyl-based self-adhering membranes, but may be asphalt or butyl-based slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in assemblies Strongirt (Mix U) horizontal fiberglass Z Girt may be used for all claddings listed, including ACM or MCM	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 open or 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" (minimum) 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 (minimum 1/2" thick) with ventilated shiplap 14. 1/2" Stucco - Any one-coat stucco (1/2" minimum) 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 17. 8 mm (minimum) or 5/16" (minimum) SwissPearl Fiber Cement cladding
Special Opening Perimeter Use any item 1 - 5 Only required when the wall design has no exterior sheathing on the exterior side of the studs for Claddings 7 – 17.	1. Tested Opening - 2 layers 5/8" gypsum, with 18-gauge > steel flashing at header and one (1) layer 5/8" and 18-gauge Galvanized 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 5. Tested Opening - 18-gauge steel opening perimeter for all cladding besides ACM

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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.

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Table 10. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil Exterior Insulation[1]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' optional or as required by code 4. FRTW studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) 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 - 11	1. None 2. 1 1/2" (maximum) 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" (maximum) of Carlisle SPI SealTite PRO, SealTite PRO Closed Cell, or SealTite PRO One Zero - only with Sheathing 2 7. Carlisle SealTite PRO HFO, SealTite PRO Open Cell, SealTite PRO High Yield, SealTite PRO No Mix, SealTite PRO No Trim 21, SealTite PRO OCX. 3 5/8" maximum; Use with 1/2" exterior sheathing 8. JM Corbond III or IV - 3 5/8" maximum; Use with 5/8" exterior sheathing 9. BASF WALLTITE Maximum - 3 5/8" maximum; Use with 1/2" exterior sheathing 10. Huntsman HeatLok HFO Pro, Huntsman HeatLok HFO High Lift. 3 5/8" maximum; Use with 5/8" exterior sheathing 11. SWD Urethane Quik-Shield Goblin or Yeti - 1" to 3 5/8" thick for use in 3 5/8" studs (maximum); Use with 5/8" exterior sheathing
Exterior Sheathing Use 1, 2, or 3	1. None - only with Claddings 1 - 6 and Cavity Insulations 1, 3, 4, or 5 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (minimum) 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 is used, do not use exterior sheathings or WRB on base wall surface in **Table 11**
WRB Over Base Wall Surface	1. See **Table 11**

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Table 10. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil Exterior Insulation[1]

Wall Component	Materials
Exterior Insulation Use any item 1, 2, 3, 4, 5, or 6, depending on product and cladding	1. 4" thick (maximum) Defend-R CI Foil for Claddings 1 – 6 2. 3 1/2" thick (maximum) Defend-R CI Foil for Claddings 7 - 17 (with special opening perimeter)
WRB Over Exterior Insulation	1. See **Table 11** ***Note:*** 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.
Exterior Cladding Use any item 1 - 17 Cladding 1 - 6 for 4" (maximum) insulation thickness Claddings 7 - 17 for 3 1/2" (maximum) insulation thickness with special opening perimeter Maximum Air Gap 2" for Claddings 1 - 6. Maximum Air Gap 1 1/2" for Claddings 7 - 17. If Claddings 2, 3, 4, or 5, 11, 12, and 14 are on a 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 butyl-based self-adhering membranes, but may be asphalt or butyl-based slip sheet (stapled) with no adhesive. Armatherm Z Girts may be used horizontally in assemblies Strongirt (Mix U) horizontal fiberglass Z Girt may be used for all claddings listed, including ACM or MCM.	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 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" (minimum) 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 (minimum 1/2" thick) using any installation technique with ventilated shiplap 14. 3/8" or 1/2" Stucco - Any one-coat stucco (1/2" minimum) 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 17. 8 mm (minimum) or 5/16" (minimum) SwissPearl Fiber Cement cladding
Special Opening Perimeter Use with Claddings 7 - 17	1. Tested Opening - 2 layers 5/8" gypsum, with 18-gauge steel flashing at header and one (1) layer 5/8" gypsum and 18-gauge galvanized steel flashing at jambs and sill 2. 2" mineral wool 4 lb/ft^3 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.

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Table 11. NFPA 285 Approved Mass Wall Assemblies with Defend-R CI as Interior Insulation[1,2,3]

Wall Component	Materials
Base Wall System Use either 1, 2, 3, or 4	1. Cast concrete walls (minimum 2" thick) 2. CMU concrete walls (minimum 4" thick)
Exterior Coating Use item 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[2] Over Base Wall Interior ***Note:*** Some WRB are only allowed with specific systems	1. See **Table 12** - 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 (maximum)[5] 2. Defend-R CI Coated Glass (Class A) or Defend-R CI Coated Glass, 3 1/2" thick (maximum) 3. Defend-R CI Foil, 3 1/2" thick (maximum)
Air/Vapor Barrier Membrane Position 2[3] Over Insulation ***Note:*** Some WRB are only allowed with specific systems	1. See **Table 12** - WRB over Base Wall Surface ***Note:*** Insulation joints may be taped with Foil-Grip 1402, 4" width (maximum)
Interior Cladding	1. 5/8" type X interior gypsum sheathing installed directly over the insulation or installed to 3 5/8" (maximum 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 2. 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. Position 2 - Air vapor barrier installed over continuous insulation on interior side of the wall assembly. CCW Membrane used in Position 1 or 2, not both.
3. 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 12. NFPA 285 Allowable WRB Materials[1-10]

Wall Component	Materials
WRB Over Base Wall Surface Use any of items 1 - 33 or none ***Note:*** Some WRB are only allowed with specific systems. Item 22 (Securock Exoair 430) or item 23 (DensElement w/ 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 WRB 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 at 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 – 9 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

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Table 12. NFPA 285 Allowable WRB Materials[1-10]

Wall Component	Materials
WRB Over Base Wall Surface Continued	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 33. Sika SikaGard 535 or SikaGard AWB 660
WRB Over Exterior Insulation Only any item 1 - 28 or none ***Note:*** Some WRB 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 Defend-R CI 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 Defend-R CI 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

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Table 12. NFPA 285 Allowable WRB Materials[1-10]

Wall Component	Materials
WRB Over Exterior Insulation Continued	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 29. NaturaSeal AirSeal NS-A-250-HP

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 HP
   b. Aerosol adhesive at the application rate as per manufacturer instructions: CAV-Grip, Blueskin LVC Spray Primer, or Blueskin Spray Prep
2. The following may be used as gap filler between insulation panels:
   a. FOMO HandiFoam FireBlock
   b. TVM FireBlock
3. These Henry 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 HP, Air-Bloc LF, 925BES, or Moistop Sealant
      ii. 4" Blueskin Butyl Flash
      iii. 4" Blueskin ZeroFlash
      iv. 4" CCW-705/XLT
      v. 4" Blueskin SA
      vi. 4" Metal Clad 705FR
4. *Termination Mastic for Flashing/Membrane:* 1" x 40 mil ribbon or tooled 3/8" bead of SURE-SEAL Lap Sealant, LM 800 XL, BarriBond HP, Air-Bloc LF, 925BES, or Moistop Sealant
5. Detail Flashing, 3" on each side at Openings, Terminations, Penetrations, Transitions and Angle Changes
   a. CCW-705/XLT, Blueskin SA/LT, CCW-705 TWF, Blueskin TWF or Metal Clad 705FR/LT
   b. Blueskin Butyl Flash, Blueskin Zero Flash, or Fortiflash Butyl
   c. SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip
   d. LiquiFiber embedded in Barritech VP/NP/LT or Air-Bloc 16 MR/17MR
   e. Up to 40 mil applications of BarriBond HP, Air-bloc LF or Air-Bloc All Weather STPE
6. Prepare the surface as Henry recommends using Blueskin Adhesive, CCW-702, Blueskin LVC Adhesive, CCW-702 LV, CCW-702 WB, Aquatac Primer, Blueskin Spray Prep, CAV-GRIP, Blueskin LVC Spray Primer, Low VOC Bonding Adhesive 1168, or Low VOC EPDM Primer per instructions on the Product Data Sheet
7. These Henry detailing materials may be used over the polyiso insulation. 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 HP, Air-Bloc LF, 925BES, or Moistop Sealant
      ii. 4" Blueskin Butyl Flash
      iii. 4" Blueskin ZeroFlash
      iv. 4" Metal Clad 705FR
   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 HP, Air-Bloc LF, 925BES, or Moistop Sealant
   c. Detail Flashing, 3" on each side at Openings, Terminations, Penetrations, Transitions and Angle Changes
      i. Metal Clad 705FR/LT
      ii. Blueskin Butyl Flash, Blueskin Zero Flash, or Fortiflash Butyl
      iii. SURE-SEAL P/S Elastoform or SURE-SEAL P/S Cover Strip
      iv. LiquiFiber embedded in Barritech VP/NP/LT or Air-Bloc 16 MR/17MR
      v. Up to 40 mil applications of BarriBond HP, Air-bloc LF or Air-Bloc All Weather STPE
   d. Prepare the surface as Henry recommends using Blueskin Adhesive, CCW-702, Blueskin LVC Adhesive, CCW-702 LV, CCW-702 WB, Aquatac Primer, Blueskin Spray Prep, CAV-GRIP, Blueskin LVC Spray Primer, Low VOC Bonding Adhesive 1168, or Low VOC EPDM Primer per instructions on the Product Data Sheet

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Table 12. NFPA 285 Allowable WRB Materials[1-10]

Wall Component	Materials
8. In the NFPA 285 test, flashing for fenestration, including Through-Wall Flashing (TWF), are not considered part of the WRB (ref: 2021 IBC Section 1402.5). 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-705 TWF b. Blueskin TWF c. Pre-Kleened EPDM TWF loose-laid or adhered with Low VOC Bonding Adhesive 1168 d. Metal TWF by others 9. Up to 40 mils of BarriBond HP may be used over CCW-705RS at membrane splices, terminations, and penetrations. Membrane splice and terminations may be adhered with CAV-GRIP, Blueskin LVC Spray Primer, or Blueskin Spray Prep. 10. CCW-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. Metal Clad 705FR ii. Other WRB that produce no ignition when tested per ASTM E1354 at a heat flux of 50 kW/m^2. 11. 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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Appendix B
For Compliance with NFPA 285-12

Table 13. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Foil (Class A) or Defend-R CI Foil (286) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Bracing as required by 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	1. None 2. 1 1/2" (minimum) 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); Any noncombustible insulation per ASTM E136 3. 1 1/2" (minimum) 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 minimum 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" [minimum] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" (maximum) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (minimum) 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" (minimum) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 - 3 1/2" (maximum) 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" maximum thickness with no air gap, 6" maximum thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing

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Table 13. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Foil (Class A) or Defend-R CI Foil (286) Exterior Insulation[1,2]

Wall Component	Materials
Exterior Sheathing Use 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" (minimum) 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 19** 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 on base wall surface in **Table 19**.
WRB Over Base Wall Surface	1. See **Table 19**
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 (maximum) 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 Only with Claddings 1 - 6	1. See **Table 19** ***Note:*** 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" minimum.
Exterior Cladding Use any item 1 - 17 Claddings 7 - 17 for 3 1/2" (maximum) insulation thickness with special opening perimeter. Maximum Air Gap 2" for Cladding 1 - 6. Claddings 7 - 17 for 3 1/2" (maximum) insulation thickness with special opening perimeter Maximum Air Gap 2" for Claddings 1 - 6. Maximum Air Gap 1 1/2" for Claddings 7 - 17. 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 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; 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 19**) 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 ACM or MCM that has passed NFPA 285 with foam of comparable thickness 8. Uninsulated sheet metal building panels including steel, copper, aluminum, or zinc 9. 1/4" (minimum) 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

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Table 13. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Foil (Class A) or Defend-R CI Foil (286) Exterior Insulation[1,2]

Wall Component	Materials
Exterior Cladding Continued	12. Terra Cotta Cladding - Any Rain-screen Terra Cotta (minimum 1/2" thick) with ventilated shiplap 13. 1/2" Stucco - Any one-coat stucco (1/2" minimum) 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 19**) 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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.	

Table 14. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) 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

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Table 14. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Cavity Insulation Use any items 1 - 15 Items 8 - 15 may only be used with exterior sheathing 2 or the specified thickness	1. None 2. 1 1/2" (minimum) 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" (minimum) 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 minimum 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" [minimum] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" in 6" (maximum) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (minimum) 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" (minimum) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 - 3 1/2" (maximum) 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" maximum thickness with no air gap, 6" maximum thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use 1, 2, or 3	1. None 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (minimum) 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 19** 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 on base wall surface in **Table 19**
WRB Over Base Wall Surface	1. See **Table 19**
Exterior Insulation Use 1 or 2, depending on cladding	1. 3 1/2" thick (maximum) Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) for all claddings 2. 4" thick (maximum) Defend-R CI Coated Glass or Defend-R CI Coated Glass (Class A) for claddings 1 - 6

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Table 14. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

Wall Component	Materials
WRB Over Exterior Insulation	1. See **Table 19** ***Note:*** 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.
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. (maximum) 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 19**) 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" (minimum) 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. AAC panels that have successfully passed NFPA 285 criteria 12. Terra Cotta Cladding - Any Rain-screen Terra Cotta (minimum 1/2" thick) with ventilated shiplap 13. 1/2" Stucco - Any one coat stucco (1/2" minimum) 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 19**) 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 14. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) Exterior Insulation[1,2]

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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.	

Table 15. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Ply and Defend-R CI Ply (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) 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" (minimum) 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" (minimum) 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 minimum 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" [minimum] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" in 6" (maximum) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (minimum) 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" (minimum) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 - 3 1/2" (maximum) for use with 5/8" Exterior Gypsum Sheathing

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Table 15. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Ply and Defend-R CI Ply (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Cavity Insulation Continued	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" maximum thickness with no air gap, 6" maximum thickness with air gap) for use with $^{1}/_{2}$" or thicker exterior gypsum sheathing
Exterior Sheathing Use 1, 2, or 3	1. None - only with cavity insulation 1, 2, 4, 5, or 6; see ***Note*** for Cavity Insulation 2. $^{1}/_{2}$" or thicker exterior gypsum sheathing 3. $^{1}/_{2}$" (minimum) 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 19** 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 on base wall surface **Table 19**.
WRB Over Base Wall Surface	1. See **Table 19**
Exterior Insulation Use 1 or 2, depending on cladding	1. 4$^{1}/_{4}$" thick (maximum) Defend-R CI Ply and Defend-R CI Ply (Class A) (3$^{1}/_{2}$" foam maximum, $^{3}/_{4}$" FR Plywood maximum) with all claddings 2. 4$^{3}/_{4}$" thick (maximum) Defend-R CI Ply and Defend-R CI Ply (Class A) (4" foam maximum, $^{3}/_{4}$" FR Plywood maximum may be used with claddings 1 - 6
WRB Over Exterior Insulation	1. See **Table 19** ***Note:*** 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 $^{3}/_{4}$" minimum.
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 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. (maximum) 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 19**) 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

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Table 15. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Ply and Defend-R CI Ply (Class A) Exterior Insulation[1,2]

Wall Component	Materials
Exterior Cladding Continued	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 an 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 19**) 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" (minimum) 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. AAC panels that have successfully passed NFPA 285 criteria. 14. Terra Cotta Cladding - Any Rain-screen Terra Cotta (minimum 1/2" thick) with ventilated shiplap 15. 1/2" Stucco - Any one-coat stucco (1/2" minimum) 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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.

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Table 16. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Foil (Class A Plus) Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: minimum nominal 2" x 4" dimension, spaced 24" o.c. (maximum) 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" (minimum) 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" (minimum) 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 minimum 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" [minimum] exterior gypsum sheathing) 10. SWD Urethane Quik-Shield 112 up to 6" (maximum) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (minimum) 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" (minimum) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, F1880 - 3 1/2" (maximum) 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" maximum thickness with no air gap, 6" maximum thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing
Exterior Sheathing Use 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" (minimum) FRTW structural panels in Type III construction

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Table 16. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Foil (Class A Plus) Exterior Insulation[1,2]

Wall Component	Materials
Multi-Function Sheathing and WRB Products Use 1 or 2	1. USG Securock Exoair 430 System - See ***Note*** and **Table 19** 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 19**.
WRB Over Base Wall Surface	1. See **Table 19**
Exterior Insulation	1. 4" thick (maximum) Defend-R CI Foil (Class A Plus) for all claddings listed
WRB Over Exterior Insulation	1. See **Table 19** ***Note:*** 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.
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. (maximum) 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 19**) 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" (minimum) 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. AAC panels that have successfully passed NFPA 285 criteria 12. Terra Cotta Cladding - Any Rain-screen Terra Cotta (minimum 1/2" thick) with ventilated shiplap 13. 1/2" Stucco - Any one coat stucco (1/2" minimum) 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 16. NFPA 285-12 Approved Wall Assemblies with Defend-R CI Foil (Class A Plus) Exterior Insulation[1,2]

Wall Component	Materials
Exterior Cladding Continued	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 19**) 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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.	

Table 17. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil as Exterior Insulation[1,2]

Wall Component	Materials
Base Wall System Use 1, 2, 3, or 4	1. Cast concrete walls 2. CMU concrete walls 3. 25-gauge minimum 3 5/8" (minimum) steel studs spaced 24" o.c. (maximum) a. 5/8" Type X gypsum wallboard interior b. Lateral bracing every 4' 4. FRTW studs: minimum nominal 2 x 4 dimension, spaced 24" o.c. (maximum) 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 - 16 Items 2, 3, 8, 9, 10, 11, 12, 13, 14, 15, or 16 may only be used with exterior sheathing 2 or the specified thickness.	1. None 2. 1 1/2" minimum Carlisle SPI SealTite PRO (up to full cavity thickness) 3. 1 1/2" minimum 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 minimum 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" [minimum] exterior gypsum sheathing)

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Table 17. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil as Exterior Insulation[1,2]

Wall Component	Materials
Cavity Insulation Continued	10. SWD Urethane Quik-Shield 112 up to 6" (maximum) stud cavities with an air gap not exceeding 2 1/2" 11. 1 1/2" (minimum) 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" (minimum) exterior gypsum sheathing 13. Gaco (Firestone) F6500R, 052N, F4500, 183M, F1850, or F1880 - 3 1/2" (maximum) 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" maximum thickness with no air gap, 6" maximum thickness with air gap) for use with 1/2" or thicker exterior gypsum sheathing 16. Huntsman HeatLok HFO High Lift - max 3 5/8" thickness for use with 5/8" exterior gypsum sheathing
Exterior Sheathing Use 1, 2, or 3	1. None - only with cavity insulation 1, 4, 5, or 6 2. 1/2" or thicker exterior gypsum sheathing 3. 1/2" (minimum) FRTW structural panels in Type III construction allowed in place of gypsum sheathing when combustible cavity insulation is not used
Multi-function Sheathing and WRB Products Use 1 or 2	1. USG Securock Exoair 430 System - See ***Note*** and **Table 19** 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 on base wall surface in **Table 19**.
WRB Over Base Wall Surface	1. See **Table 19**
Exterior Insulation	1. 4" (maximum) Defend-R CI Foil
WRB Over Exterior Insulation	1. See **Table 19** ***Note:*** 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, it 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.
Exterior Cladding Use 1, 2, 3, 4, 5, or 6 If Claddings 2, 3, 4, or 5 are on a 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 butyl based self-adhering membranes, but may be asphalt or butyl-based 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. (maximum) 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 #11 in WRB Over Exterior Insulation (**Table 19**) 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

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Table 17. NFPA 285 Approved Wall Assemblies with Defend-R CI Foil as Exterior Insulation[1,2]

Wall Component	Materials
Exterior Cladding Continued	5. Cast Artificial Stone - Minimum 1 1/2" thick complying with ICC-ES AC51 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 non open joint installation technique such as shiplap

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. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis.

Table 18. NFPA 285-12 Approved Mass Wall Assemblies with Defend-R CI as Interior Insulation[1,2,3]

Wall Component	Materials
Base Wall System Use 1 or 2	1. Cast concrete walls (minimum 2" thick) 2. CMU concrete walls (minimum 4" thick)
Exterior Coating Use 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[2] Over Base Wall Interior ***Note:*** Some WRB are only allowed with specific systems.	1. See **Table 19** - 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 (maximum)[5] 2. Defend-R CI Coated Glass (Class A) or Defend-R CI Coated Glass, 3 1/2" thick (maximum) 3. Defend-R CI Foil, 3 1/2" thick (maximum)
Air/Vapor Barrier Membrane Position 2[3] Over Insulation ***Note:*** Some WRB are only allowed with specific systems	1. See **Table 19** - WRB over Base Wall Surface ***Note:*** Insulation Joints may be taped with Foil-Grip 1402, 4" width (maximum)
Interior Cladding	1. 5/8" type X interior gypsum sheathing installed directly over the insulation or installed to 3 5/8" (maximum 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 2. 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. Position 2 - Air vapor barrier installed over continuous insulation on interior side of the wall assembly. CCW Membrane used in Position 1 or 2, not both.
3. 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 19. NFPA 285-12 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 WRB are only allowed with specific systems. Item 24 (Securock Exoair 430) or 25 (DensElement w/ FastFlash) replaces the exterior sheathings in Tables 13 - 16. When either of these items are used, do not use exterior sheathings listed in Tables 13 - 16 or WRB 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 (See **Table 4**) 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 at 6 mils) 9. Henry Air-Bloc 17MR, 21S, 31MR, 32MR (only with Defend-R CI Ply 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) (see **Table 4**) 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, Defend-R CI Coated Glass Class A, Defend-R CI Foil (Class A), Defend-R CI Ply or Defend-R CI Ply (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

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Table 19. NFPA 285-12 Allowable WRB Materials

Wall Component	Materials
WRB Over Base Wall Surface Continued	24. USG Securock Exoair 430 System - see ***Note*** on left and Air/Vapor System sections in Tables 13 – 16 25. $^{5}/_{8}$" Georgia Pacific DensElement, 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
WRB Over Exterior Insulation Use any Item 1 - 27 or None ***Note:*** Some WRB 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 foams detailed with claddings 1 - 6) (see **Table 4**) 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) 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)

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Table 19. NFPA 285-12 Allowable WRB Materials

Wall Component	Materials
WRB Over Exterior Insulation Continued	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 HP
   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 HP
      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" Aluma-GRIP 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 HP
   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 HP, 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 HP
      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" Aluma-GRIP 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 HP
   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 HP, or Barrithane VP

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Table 19. NFPA 285-12 Allowable WRB Materials

Wall Component	Materials
5. In the NFPA 285 test, flashing for fenestration, including through-wall flashing (TWF), are not considered part of the WRB. 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 WRB 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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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 2021 IECC Section C402.5.1.3 AND 2018 IECC Section C402.5.1.2.1

27 2021 IECC Section C402.5.1.4 AND 2018 IECC Section C402.5.1.2.2

28 WRB is not required for detached accessory buildings.

29 2021 IBC Section 1404.16

30 2021 IBC Section 1404.16.1

31 2021 IBC Section 1404.16.2

32 2021 IRC Section R316.5.7

33 2021 IBC Section 2603.5.5 AND 2018 IBC Section 2603.5.5

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34 2021 IRC Section R316.6

35 2021 IRC Section R316.6

36 2021 IRC Section R316.6

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

38 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

39 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

40 2021 IRC Section R316.5.12

41 2021 IRC Section R316.3

42 2021 IRC Section R316.6

43 2021 IRC Section R316.4

44 2021 IECC Section C402.5.1.3 AND 2018 IECC Section C402.5.1.2.1

45 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.

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

47 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

48 2021 IRC Section R316.5.12

49 2021 IRC Section R316.6

50 2021 IRC Section R316.6

51 2021 IBC Section 104.11

52 2021 IRC Section R104.11

53 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

54 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.

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

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

57 2021 IRC Section R316.7

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