DrJ CERTIFICATION

Technical Evaluation Report™

TER 1306-02

OX ISO RED CI®, ISO RED CI® XS, ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, & ISO RED MAX® HD Foam Plastic Insulating Sheathing

OX Engineered Products, LLC

Products:

ISO RED Polyiso Foam Insulated Sheathing Products

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DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION	SECTION: 07 22 00 - Roof and Deck Insulation
SECTION: 07 20 00 - Thermal Protection	SECTION: 07 25 00 - Water-Resistive Barriers/Weather Barriers
SECTION: 07 21 00 - Thermal Insulation	SECTION: 07 27 00 - Air Barriers

1 Innovative Products Evaluated[1,2]

1.1 ISO RED Polyiso Foam Insulated Sheathing Products

1.1.1 ISO RED CI® Polyiso Foam Insulated Sheathing

1.1.2 ISO RED CI® XS Polyiso Foam Insulated Sheathing

1.1.3 ISO RED MAX® Polyiso Foam Insulated Sheathing

1.1.4 ISO RED MAX® WF Polyiso Foam Insulated Sheathing

1.1.5 ISO RED MAX® GF Polyiso Foam Insulated Sheathing

1.1.6 ISO RED MAX® LD Polyiso Foam Insulated Sheathing

1.1.7 ISO RED MAX® HD Polyiso Foam Insulated Sheathing

2 Applicable Codes and Standards[3,4]

2.1 *Codes*

2.1.1 *IBC—15, 18, 21: International Building Code®*

2.1.2 *IRC—15, 18, 21: International Residential Code®*

2.1.3 *CBC—16, 19: California Building Code*

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

[2] **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection 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. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled**. Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

[3] This Listing is a code defined research report, which is also known as a duly authenticated report, provided by an approved agency (see IBC Section 1703.1) and/or an approved source (see IBC Section 1703.4.2). An approved agency is "approved" when it is ANAB accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory). A professional engineer is "approved" as an approved source when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an approved source. (i.e., Registered Design Professional). DrJ is an ANAB accredited product certification body.

[4] Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.

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2.1.4 *FBC-B—20, 23: Florida Building Code – Building*[5] *(FL 28290)*

2.1.5 *FBC-R—20, 23: Florida Building Code – Residential*[5] *(FL 28290)*

2.2 *Standards and Referenced Documents*

2.2.1 *ANSI/ABTG-FS 100: Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies*

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

2.2.3 *ASTM C203: Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation*

2.2.4 *ASTM C209: Standard Test Methods for Cellulosic Fiber Insulating Board*

2.2.5 *ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

2.2.6 *ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging*

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

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

2.2.9 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

2.2.10 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain*

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

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

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

2.2.14 *NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components*[6]

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

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[5] All references to FBC-B and FBC-R are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the Supplement at the end of this TER

[6] References to NFPA 285-12 in this TER are code compliant through the 2018 version of the IBC.

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3 Performance Evaluation

3.1 Tests, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2016 (DTSA).[7]

3.2 Testing and/or inspections conducted for this TER were performed an ISO/IEC 17025 accredited testing laboratory,[8] an ISO/IEC 17020 accredited inspection body,[9] which are internationally recognized accreditations through International Accreditation Forum (IAF), and/or a licensed Registered Design Professional (RDP).

3.3 ISO RED CI® and ISO RED CI® XS have been evaluated to determine:

3.3.1 Wind pressure resistance performance for use as part of an exterior wall covering assembly in accordance with IBC Section 1403.8,[10] IRC Section R703.3, and ANSI/FS100

3.3.2 Performance in accordance with the foam plastic requirements of IBC Section 2603 and IRC Section R316

3.3.3 Performance for use as continuous insulating sheathing in accordance with IRC Section N1102 and IECC Section C402

3.3.4 Performance for use as a Water-Resistive Barrier (WRB) in accordance with IBC Section 1403.2[11] and IRC Section R703.2

3.3.5 Performance for use as a vapor retarder in accordance with IBC Section 202, IBC Section 1404.3,[12] IRC Section R202 and IRC Section R702.7

3.3.6 Performance for use as an air barrier in accordance with IECC Section C402

3.3.7 Performance of ISO RED CI® and ISO RED CI® XS for vertical and lateral fire propagation is outside the scope of this TER

3.4 ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD have been evaluated to determine:

3.4.1 Performance in accordance with the foam plastic requirements of IBC Section 2603 and IRC Section R316

3.4.2 Performance for use as continuous insulating sheathing in accordance with IRC Section N1102 and IECC Section C402

3.4.3 Performance for use as a vapor retarder in accordance with IBC Section 202, IBC Section 1404.3,[8] IRC Section R202 and Section R702.7

3.4.4 Performance for use as an air barrier in accordance with IECC Section C402

3.4.5 Performance for use without a thermal barrier in accordance with NFPA 286 and the acceptance criteria of IBC Section 803.1.1[13]

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[7] https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. 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. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of Listings, certified reports, technical evaluation reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

[8] Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

[9] Ibid.

[10] 2015 IBC Section 1404.8

[11] 2015 IBC Section 1404.2

[12] 2015 IBC Section 1405.3

[13] 2015 IBC Section 803.1.2

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3.4.6 Performance for vertical and lateral fire propagation in accordance with NFPA 285 and 2018 IBC Section 2603.5.5

3.4.7 Performance for use as a WRB in accordance with IBC Section 1403.2[7] and IRC Section R703.2

3.4.8 Performance of ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD for wind pressure resistance is outside the scope of this TER

3.5 When used as over-sheathing[14] on light-frame, masonry, or concrete exterior walls, ISO RED is not required to meet the wind pressure resistance requirements of this TER.

3.6 This TER does not address wind pressure resistance requirements for ISO RED CI® or ISO RED CI® XS used as part of an Exterior Insulation Finish System (EIFS). Refer to the EIFS manufacturer installation instructions for building code compliance.

3.7 These products shall comply with the material standards listed in Section 4 and shall be applied to exterior wall construction in accordance with the general requirements of Section 6. ISO RED CI® and ISO RED CI® XS shall also comply with the prescriptive wind pressure resistance requirements of Section 5.2.

3.8 ISO RED CI® and ISO RED CI® XS used in accordance with this TER that is required to resist wind pressure in exterior wall covering assemblies shall also comply with the product marking requirements of Section 10, and the conditions of use listed in Section 9.

3.9 Any building code and/or accepted engineering evaluations (i.e. research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDPs / approved sources. DrJ is qualified[15] to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.

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

3.11 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

4.1 *ISO RED CI® and ISO RED CI® XS*

4.1.1 ISO RED CI® and ISO RED CI® XS are Type I, Class 1 Dual Faced Rigid Cellular Polyisocyanurate Insulation Board products as defined in ASTM C1289.

4.1.2 ISO RED CI® and ISO RED CI® XS consist of a proprietary polyisocyanurate rigid board with facers on both sides. The facers are designed with a base foil layer combined with layers of other material(s).

4.2 *ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, ISO RED MAX® HD*

4.2.1 These products are Type I, Class 2 Dual Faced Rigid Cellular Polyisocyanurate Insulation Board products as defined in ASTM C1289.

4.2.2 These products consist of a proprietary polyisocyanurate rigid board with facers on both sides. The facers are designed with a base foil layer. Facer material thicknesses vary by product.

4.2.3 The products evaluated in this TER are shown in Figure 1, Figure 2, and Figure 3.

[14] As used in this TER, over-sheathing refers to the application of foam sheathing over and directly on the surface of wall sheathing material or solid wall construction, such as masonry or concrete, whereby the substrate is capable of resisting the full design transverse wind load required by the applicable building code or latest edition of the ASCE 7 standard. In addition, cladding is separately installed over foam sheathing in accordance with Section 5.1.5. An over-sheathing application of foam sheathing does not require that the foam sheathing resist wind pressure in accordance with this TER.

[15] 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.

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Figure 1. ISO RED CI®

Figure 2. ISO RED CI® XS

Figure 3. ISO RED MAX®

4.3 *Material Availability*

4.3.1 Thickness:

4.3.1.1 ISO RED CI® and ISO RED CI® XS – range from 0.5" (12.7 mm) up to 2.0" (50.8 mm)

4.3.1.2 ISO RED MAX® (including WF, GF, LD, and HD) – up to 4.0" (102 mm)

4.3.2 Standard product width: 48" (1219 mm)

4.3.3 Standard lengths: 96", 108", and 120" (2438 mm, 2743 mm, and 3048 mm)

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5 Applications

5.1 *General*

5.1.1 ISO RED CI® and ISO RED CI® XS are foam plastic insulating sheathing (FPIS) used as wall sheathing in accordance with IBC Section 2603 and IRC Section R316 for Type V construction.

5.1.2 ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD are foam plastic insulating sheathing (FPIS) used as wall sheathing in accordance with IBC Section 2603 for Types I, II, III, IV, and V construction.

5.1.3 Except as provided for in Section 5.6, ISO RED CI® and ISO RED CI® XS must be used with full protection from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4 and IRC Section R316.4.

5.1.4 ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD are approved for use without the protection of a thermal barrier in accordance with IBC Section 2603.10 and IRC Section R316.6, when applied to walls or ceilings.

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

5.2 *Transverse Loads*

5.2.1 ISO RED CI® and ISO RED CI® XS may be used to resist wind loads transverse to the face of the wall, as shown in Table 1.

5.2.2 Required component and cladding loads to be resisted are found in IBC Section 1609.1.1, IRC Table R301.2.1(1)[16] and Table R301.2.1(2).[17]

5.2.3 As stated in Section 3.4.8, performance of ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD for wind pressure resistance is outside the scope of this TER.

[16] 2018 IRC Table R301.2(2)

[17] 2018 IRC Table R301.2(3)

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Table 1. Summary of Transverse Wind Load Resistance of ISO RED CI® and ISO RED CI® XS[5]

ISO RED CI®/ISO RED CI® XS Nominal Thickness (in)	Maximum Stud Spacing (in o.c.)	Maximum Allowable Design Value[2,3,6] (psf)	Fastener Schedule[4]	Maximum Allowable Wind Speed[1] (mph)	
				Per ASCE 7-05 (V_{asd})	Per ASCE 7-10 and 7-16 (V_{ult})
1/2	16	20.6	2" x 0.113" galv. ring shank nail with 1" plastic cap spaced 6" along the edges and 12" in the field	90	120
1/2	24	30.3[7]	2" x 0.113" galv. ring shank nail with 1" plastic cap spaced 3" along the edges and 3" in the field	110	145
1	16	33.5	1 3/4" x 0.106 nail with 3/8" head spaced 12" along the edges and 12" in the field	120	150
1	24	51.8	2 1/2" x 0.113 galv. ring shank nail with 1" plastic cap spaced 3" along the edges and 3" in the field	150	190
1 1/2	16	65.3	2 3/8" x 0.113" galv. smooth shank, full head nail, 16" along the edges and 16" in the field	155	200

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m^2, 1 mph = 1.61 km/h

1. Allowable wind speeds are based on the following: components and cladding loads, Exposure B, mean roof height 30', wall zone 5 (corner), and 10 sq. ft wall area.
2. Any required adjustments to these loads for other site conditions shall be in accordance with the applicable building code.
3. Allowable design wind pressures are determined in accordance with ANSI/ABTG-FS100 with studs spaced a maximum distance as shown above.
4. Fastener schedule shows minimum size of fastener at maximum allowable spacing(s).
5. Tabulated values were determined in accordance with ANSI/ABTG FS 100 for a fully-blocked condition (i.e., all horizontal and vertical sheathing joints supported on blocking or framing members) using a Pressure Equalization Factor (PEF) of 0.9 where the allowable wind pressure is 30 psf or less.
6. Allowable wind pressures greater than 30 psf were determined using a PEF of 1.0.
7. Requires 1/2" gypsum conforming to ASTM C1396 to be installed on the interior side of the wall.

5.3 *Thermal Resistance*

5.3.1 ISO RED CI®, ISO RED CI® XS, ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD are FPIS panels used as thermal insulation in wall, roof, and ceiling assemblies.

5.3.2 These products meet the continuous insulating sheathing requirements complying with the provisions of IRC Section N1102 and IECC Section C402.

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5.3.3 These products have the thermal properties shown in Table 2.

Table 2. Thermal Resistances of ISO RED Polyiso Foam Insulated Sheathing Products

Product	Nominal Thickness (in)	R-Value[1]
ISO RED CI® and ISO RED CI® XS	2	13.0
	1½	10.0
	1	6.5
	½	3.3
ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD	4	25.2
	3½	22.1
	3	19.0
	2½	16.0
	2	13.0
	1½	10.0
	1	6.5
	¾	5.0
	½	3.3

SI: 1 in = 25.4 mm

1. Thermal values are determined using the ASTM C518 test method at 75°F mean temperature on material conditioned according to ASTM C1289 Section 11.1 (°F·ft²·hr/Btu)

5.4 *Air Barrier*

5.4.1 Wall and ceiling assemblies constructed with ISO RED CI®, ISO RED CI® XS, ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD are used to meet air barrier requirements in accordance with IECC Section C402.

5.4.2 All penetrations shall be flashed and sealed in accordance with the flashing manufacturer installation instructions. Self-adhered flashing tape shall meet AAMA 711 (FortiFlash Butyl or equivalent).

5.4.3 These products are defined as air barrier materials having an air permeance of less than 0.02 L/m*ft^2, in accordance with IECC Section C402.5.

5.5 *Water Resistive Barrier*

5.5.1 ISO RED CI®, ISO RED CI® XS, ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD are approved WRBs in accordance with IBC Section 1403.2[18] and IRC Section R703.2 when installed with 2$^7/_8$″ OX Commercial Seam Tape, 2$^7/_8$″ ISO RED WF Seam Tape, or 2$^7/_8$″ ISO RED GF Seam Tape. Flashing tape with release liner may be required for effective taping of inside and outside corners. See the manufacturer product information for further details.

5.5.2 ISO RED CI® and ISO RED CI® XS shall be installed 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 6.

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

[18] 2015 IBC Section 1404.2

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5.5.4 Flashing of penetrations shall comply with the applicable code and must be installed at all sheathing penetrations. Use qualified flashing tape such as Arctic Flash Synthetic Flashing, Flexible Butyl Flashing, or Home Guard RA-Plus Flashing. See Figure 4, Figure 5, and Figure 6 for typical penetration flashing details.

5.5.5 Flashing Details – Typical Flanged (Figure 4) and Unflanged (Figure 5) Penetration and Flanged Window (Figure 6).

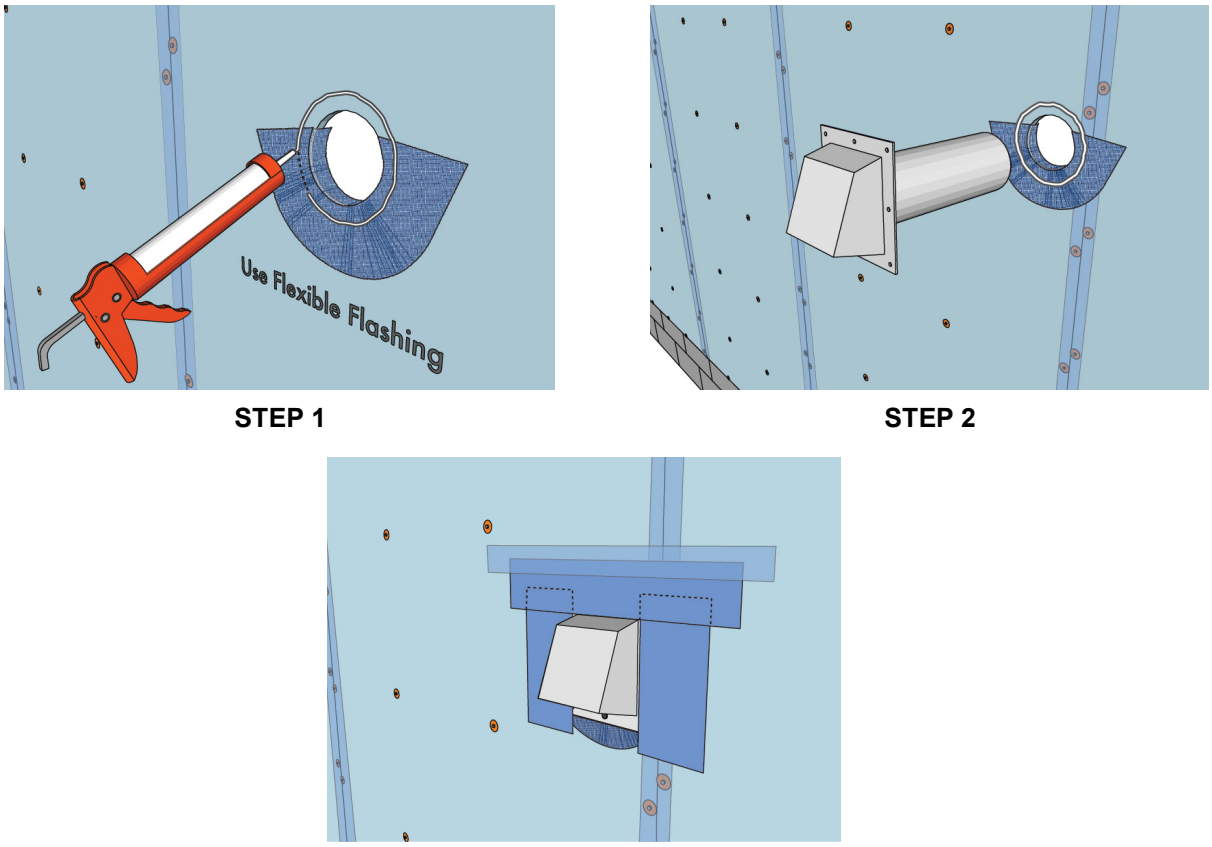

Figure 4. Typical Penetration Flashing Detail – Flanged

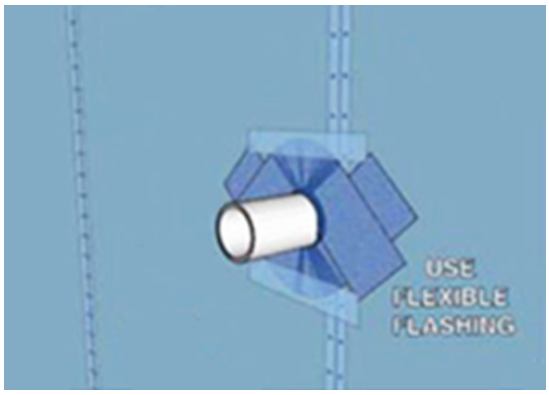

Figure 5. Typical Penetration Flashing Detail – Unflanged

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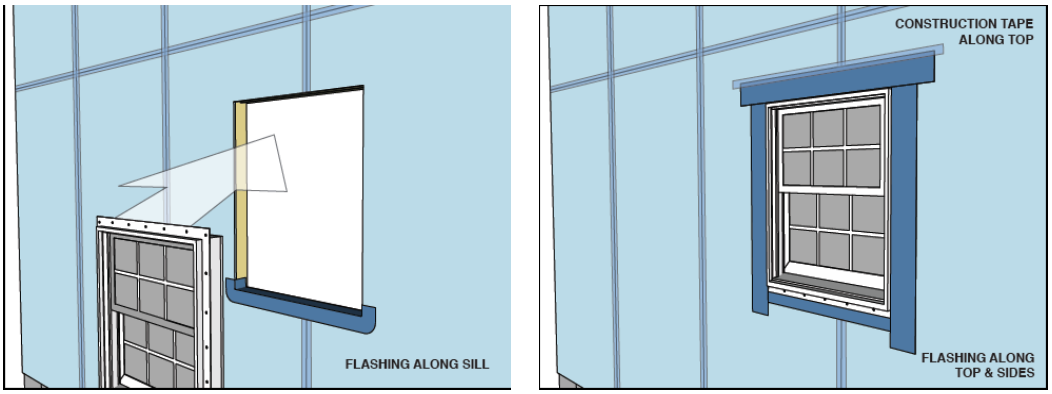

Figure 6. Typical Window Flashing Detail

5.6 *Fire Safety Performance*

5.6.1 *Surface Burn Characteristics:*

5.6.1.1 ISO RED CI®, ISO RED CI® XS, ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD have the flame spread and smoke developed ratings as shown in Table 3 when tested in accordance with ASTM E84 per IBC Section 2603.3 and IRC Section R316.3.

Table 3. Fire Performance of ISO RED CI®, ISO RED CI® XS, ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD and ISO RED MAX®HD

Product	Flame Spread	Smoke Developed
ISO RED CI® and ISO RED CI® XS[1]	< 75	< 450
ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD[2]	< 25	< 450

1. Tested in accordance with ASTM E84, with maximum foam thickness of 2".
2. Tested in accordance with ASTM E84, with maximum foam thickness of 4".

5.6.2 *Vertical and Lateral Fire Propagation:*

5.6.2.1 ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD were tested to assess performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and 2018 IBC Section 2603.5.5.

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

5.6.2.3 The wall assemblies listed in Table 4 and Table 5 are approved for use in buildings of Type I-IV construction.

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Table 4. Approved NFPA 285 Wall Assemblies – Brick Cladding[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4. Note: May use 4 optionally when FRTW framing is allowed by code.	1. Cast Concrete Wall 2. Concrete Masonry Wall 3. 20-gauge (min.) 3⁵/₈" (min.) steel studs spaced 24" o.c. (max) a. 1 layer – ⁵/₈" thick Type X gypsum wallboard on interior b. Lateral bracing every 4' 4. Where allowed in Types I-IV construction, FRTW (Fire Retardant Treated Wood) studs complying with IBC Section 2303.2, minimum nominal 2x4 spaced at a maximum 16" o.c. a. ⁵/₈" (min.) Type X gypsum wallboard interior. b. Wall braced at mid-height and fire-stopped at top and bottom.
Fire-Stopping in Stud Cavities at Floor Lines. Use item 1 or 2. As an option, use 2 with FRTW framing.	1. Any approved 4 pcf 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 when Base Wall System, Item 4 is used.
Cavity Insulation Use any option 1-13.	1. None 2. 1½" (min.) BASF Wallite™ 2 pcf SPF (or equivalent) up to full cavity fill. 3. 1½" (min.) Premium Spray Products Foamsulate 20 up to full cavity fill. 4. Any noncombustible insulation per ASTM E136. 5. Any mineral fiber (Batt or board type Class A ASTM E84 faced or unfaced). 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced). 7. Icynene Classic, Classic Plus, Classic Ultra or Classic Ultra Select; MD-R-210; MD-C-200; or Proseal. Partial cavity fill with a max. air space of 2" or full cavity fill not exceeding 7⁵/₈". Use with ½" exterior gypsum sheathing (min.). 8. NCFI Polyurethanes, full cavity depth or less of InsulBloc, InsulStar, InsulStar Plus or ThermalStop™ closed cell (2.0 lb/ft^3) spray polyurethane foam applied using sheathing as substrate and covering the width of the cavity. Use with ½" exterior gypsum sheathing (min.). 9. SWD Urethane Quik-Shield 112 spray polyurethane foam applied using ⁵/₈" Type X sheathing as substrate. Air gap must not exceed 2½". 10. Demilec Sealection 500 or HeatLok Soy 200, up to full cavity fill. Use with ⁵/₈" Type X exterior gypsum sheathing. 11. Accella Polyurethane Bayseal® OC and OCX or Bayseal® CC, up to full cavity fill using minimum ½" exterior gypsum sheathing. 12. Lapolla™ Foam-Lok™ FL 2000 with ⁵/₈" Type X exterior sheathing in 3⁵/₈" studs (max.) 13. Any cavity insulation which has been tested per ASTM E1354 (at a min. of 20 kw/m^2 heat flux) and shown by analysis to be of equivalent or lesser flammability (based on T_{ign}, Pk. HRR) than the foam tested in Item 2 or 3 above.
Exterior Sheathing Use either 1, 2 or 3 (with limitations noted in Cavity Insulation Allowances) Note: Exterior FRTW sheathing or gypsum wallboard is optional for Base Walls 1 and 2.	1. None (only with Cavity Insulations 1, 2, 4, 5, or 6) 2. Minimum ¹/₂" exterior gypsum sheathing (unless ⁵/₈" Type X exterior sheathing is otherwise specified with cavity insulations). 3. ¹/₂" (min.) FRTW structural panels complying with IBC Section 2303.2 and installed in accordance with the code requirements for Types I-IV construction.

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Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4. Note: May use 4 optionally when FRTW framing is allowed by code.	1. Cast Concrete Wall 2. Concrete Masonry Wall 3. 20-gauge (min.) 3 5/8" (min.) steel studs spaced 24" o.c. (max) a. 1 layer – 5/8" thick Type X gypsum wallboard on interior b. Lateral bracing every 4' 4. Where allowed in Types I-IV construction, FRTW (Fire Retardant Treated Wood) studs complying with IBC Section 2303.2, minimum nominal 2x4 spaced at a maximum 16" o.c. a. 5/8" (min.) Type X gypsum wallboard interior. b. Wall braced at mid-height and fire-stopped at top and bottom.
Water-Resistive Barrier Over Base Wall Use either 1, 2, or 3 Note: Item 3 applies when exterior gypsum sheathing is used.	1. None 2. WRB's over Steel Framing: a. Kingspan GreenGuard® Max Building Wrap b. Dupont Tyvek (Various per ESR 2375) c. Dow Weathermate™ d. Dow Weathermate™ Plus e. OX ThermoPly 3. WRBs over exterior sheathing: a. Henry Air Bloc 32MR b. Henry Foilskin c. Henry MetalClad d. CCW 705 FR-A e. Kingspan GreenGuard® Max Building Wrap f. Dupont Tyvek (various per ESR-2375) g. Dow Weathermate™ h. Dow Weathermate™ Plus i. Any WRB that has been tested per ASTM E1354 (at a min. of 20 kw/m^2 heat flux) and shown by analysis to be of equivalent or lesser flammability (based on T_{ign}, Pk. HRR) than the exterior insulation foam core or baseline Item 3a above.
Exterior Insulation	Up to 4" thick OX ISO RED MAX®, consisting of a single panel or multiple thinner panels
WRB Over Exterior Insulation Use either 1 or 2	1. Aluminum construction tape as tested (or equivalent), max. 6" wide over staggered insulation joints. 2. For use with all Exterior Cladding options as written below: a. Henry Foilskin b. Henry MetalClad c. CCW 705 FR-A d. Kingspan GreenGuard® Max Building Wrap e. Dupont Tyvek (various per ESR-2375) f. Dow Weathermate™ g. Dow Weathermate™ Plus h. Any WRB which has been tester per ASTM E1354 (at a min. of 20 kw/m^2 heat flux) and shown by analysis to be of equivalent or lesser flammability (based on T_{ign}, Pk. HRR) than those listed above.
Exterior Cladding Use 1 through 6 Note: Masonry cladding items 2-6 do not employ an air gap or open joints.	1. Brick – Nominal 4" clay brick or veneer with max. 2" air gap behind the brick. Brick ties/anchors 24" o.c. (max.). 2. Stucco – Minimum 3/4" thick exterior cement plaster and lath with approved WRB over insulation. 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. 5. Terracotta Cladding – Minimum 1 1/4" thick (solid or equivalent by weight) using any standard non-open joint installation technique such as shiplap. 6. Cast Artificial Stone – Minimum 1 1/2" thick complying with ICC-ES AC51 installed using any standard non-joint installation technique such as shiplap.

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Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4. Note: May use 4 optionally when FRTW framing is allowed by code.	1. Cast Concrete Wall 2. Concrete Masonry Wall 3. 20-gauge (min.) 3$^5/_8$" (min.) steel studs spaced 24" o.c. (max) a. 1 layer – $^5/_8$" thick Type X gypsum wallboard on interior b. Lateral bracing every 4' 4. Where allowed in Types I-IV construction, FRTW (Fire Retardant Treated Wood) studs complying with IBC Section 2303.2, minimum nominal 2x4 spaced at a maximum 16" o.c. a. $^5/_8$" (min.) Type X gypsum wallboard interior. b. Wall braced at mid-height and fire-stopped at top and bottom.

SI: 1 in = 25.4 mm, 1 Btu/(hr-ft^2) = 0.0032 kW/m^2

3. The assembly combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis by Priest & Associates Consulting, LLC.
4. Acceptance criteria for ASTM E1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis by Priest & Associates.
5. T_{ign} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test.
6. Compliant through the 2018 IBC.

Table 5. Approved NFPA 285 Wall Assemblies - ACM Cladding[1,4]

Wall Component	Materials
Base Wall System Use either 1, 2, 3 or 4 Note: May use 4 optionally when FRTW framing is allowed by code	1. Cast Concrete Wall 2. Concrete Masonry Wall 3. 20-gauge (min.) 3$^5/_8$" (min.) steel studs spaced 24" o.c. (max) a. 1 layer – $^5/_8$" thick Type X gypsum wallboard on interior b. Lateral bracing every 4' 4. Where allowed in Types I-IV construction, FRTW (Fire Retardant Treated Wood) studs complying with IBC Section 2303.2, minimum nominal 2x4 spaced at a maximum 16″ o.c. a. $^5/_8$" (min.) Type X gypsum wallboard interior. b. Wall braced at mid-height and fire-stopped at top and bottom
Fire-Stopping in Stud Cavities at Floor Lines. Use either 1 or 2. As an option, use 2 with FRTW framing	1. Any approved 4 pcf 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 when Base Wall System, Item 4 is used.

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Wall Component	Materials
Cavity Insulation Use any option 1-13	1. None 2. 1½" (min.) BASF Wallite™ 2 pcf SPF (or equivalent) up to full cavity fill. 3. 1½" (min.) Premium Spray Products Foamsulate 220 up to full cavity fill. 4. Any noncombustible insulation per ASTM E136. 5. Any mineral fiber (Batt or board type Class A ASTM E84 faced or unfaced). 6. Any fiberglass (Batt type Class A ASTM E84 faced or unfaced). 7. Icynene Classic, Classic Plus, Classic Ultra or Classic Ultra Select; MD-R-210; MD-C-200; or Proseal. Partial cavity fill with a max. air space of 2" or full cavity fill not exceeding 7⁵/₈". Use with ½" exterior gypsum sheathing (min.). 8. NCFI Polyurethanes, full cavity depth or less of InsulBloc, InsulStar, InsulStar Plus or ThermalStop™ closed cell (2.0 lb/ft^3) spray polyurethane foam applied using sheathing as substrate and covering the width of the cavity. Use with ⁵/₈" Type X exterior gypsum sheathing (min.). 9. SWD Urethane Quik-Shield 112 spray polyurethane foam applied using ⁵/₈" Type X sheathing as substrate. Air gap must not exceed 2½". 10. Demilec Sealection 500 or HeatLok Soy 200, up to full cavity fill. Use with ⁵/₈" Type X exterior gypsum sheathing. 11. Accella Polyurethane Bayseal® OC and OCX or Bayseal® CC, up to full cavity fill using minimum ½" exterior gypsum sheathing. 12. Lapolla™ Foam-Lok™ FL 2000 with ⁵/₈" Type X exterior sheathing in 3⁵/₈" studs (max.) 13. Any cavity insulation which has been tested per ASTM E1354 (at a min. of 20 kw/m^2 heat flux) and shown by analysis to be of equivalent or lesser flammability (based on T_{ign}, Pk. HRR) than the foam tested in Item 2 or 3 above.
Exterior Sheathing Use either 1 or 2 Note: Exterior FRTW sheathing or gypsum wallboard is optional for Base Walls 1 and 2.	1. Minimum ¹/₂" exterior gypsum sheathing (⁵/₈" Type X exterior gypsum sheathing required when SPF in cavity). 2. ¹/₂" (min.) FRTW structural panels complying with IBC Section 2303.2 and installed in accordance with the code requirements for Types I-IV construction.
Water-Resistive Barrier Over Base Wall Use any item 1-8	1. None 2. Any WRB that has been tested per ASTM E1354 (at a min. of 20 kw/m^2) and shown by analysis to be of equivalent or lesser flammability (based on T_{ign}, Pk. HRR) than the exterior insulation foam core or baseline Item 3 below. 3. Henry Air Bloc 32MR 4. Kingspan GreenGuard® Max Building Wrap 5. Dupont Tyvek (Various per ESR-2375) 6. Dow Weathermate™ 7. Dow Weathermate™ Plus 8. WRBs over exterior sheathing: a. Henry Foilskin b. Henry MetalClad c. CCW 705 FR-A d. Kingspan GreenGuard® Max Building Wrap e. Dupont Tyvek (various per ESR-2375) f. Dow Weathermate™ g. Dow Weathermate™ Plus
Exterior Insulation	Up to 4" thick OX ISO RED MAX®, consisting of a single panel or multiple thinner panels

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Wall Component	Materials
WRB Over Exterior Insulation Use any item 1-5	1. None 2. Aluminum construction tape as tested (or equivalent), max. 6" wide over staggered insulation joints. 3. Henry Foilskin 4. Henry MetalClad 5. CCW 705 FR-A
Exterior Cladding Use any item 1-11	1. Brick – Nominal 4" clay brick or veneer with max. 2" air gap behind the brick. Brick ties/anchors 24" o.c. (max.). 2. Stucco – Minimum $^3/_4$" thick exterior cement plaster and lath with an optional secondary water resistive barrier between the exterior insulation and lath. The secondary barrier shall not be full coverage asphalt or self-adhered butyl membrane. 3. Limestone – Minimum 2" thick, using any standard installation technique. 4. Natural Stone Veneer – Minimum 2" thick using any standard installation technique. 5. Cast Artificial Stone – Minimum $1^1/_2$" thick complying with ICC-ES AC51 installed using any standard installation technique. 6. Terracotta Cladding – Minimum $1^1/_4$" thick, using any standard installation technique. 7. Any MCM, ACM (aluminum, steel, copper, zinc) (w/ $1^1/_2$" ± $^1/_2$" air gap) that has successfully passed NFPA 285 using any standard installation technique. 8. Uninsulated sheet metal building panels including aluminum, steel or copper using any standard installation technique. 9. Uninsulated Fiber-cement siding using any standard installation technique. 10. Stone/Aluminum honeycomb composite building panels that have passed NFPA 285 or equivalent (StoneLite Wall Panels by Stone Panels – ESR-1500) 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 using any standard installation technique.

SI: 1 in = 25.4 mm, 1 Btu/(hr-ft^2) = 0.0032 kW/m^2

1. The assemblies' combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis by Priest & Associates Consulting, LLC.
2. Acceptance criteria for ASTM E1354 testing have not been well established in the referenced building codes and foam sheathing related sections. The criteria stated here for substitution of products is based on testing and professional thermal engineering analysis by Priest & Associates.
3. T_{ign} is the time to ignition from the start of the test until the sheathing ignites. Pk. HRR is the peak heat release rate during the test.
4. Compliant through the 2018 IBC.

5.6.3 *Thermal Barrier:*

5.6.3.1 SO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD boards with a maximum thickness of 4" were tested in accordance with NFPA 286 and have met the acceptance criteria of IBC Section 803.1.1.1[19] for use on walls or ceilings without a thermal barrier, in accordance with IBC Section 2603.4 and IBC Section 2603.5.2.

5.6.3.2 ISO RED CI® and ISO RED CI® XS shall be fully protected from the interior of the building by an approved 15-minute thermal barrier or ignition barrier as required by IBC Section 2603.4 and IRC Section R316.4, except as follows:

5.6.3.2.1 When installed in an attic, crawlspace, or other uninhabitable space, ISO RED CI® and ISO RED CI® XS at a maximum thickness of 2", are approved for use without a thermal barrier or ignition barrier. This includes, but is not limited to, knee and gable end walls.

[19] 2015 IBC Section 803.1.2.1

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5.6.3.2.2 Use without an approved thermal barrier or ignition barrier is limited to areas where:

5.6.3.2.2.1 ISO RED CI® and ISO RED CI® XS are installed on the walls only.

5.6.3.2.2.2 Access to the space is required by IRC Section R807.1 or IRC Section R408.4.

5.6.3.2.2.3 Entry is made only for the purposes of repairs or maintenance

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

6 Installation

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

6.2 In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.

6.2.1 See The Foam Sheathing Committee (FSC) Best Practices guide for further details.

6.3 *Installation Procedure*

6.3.1 These products may be cut to size with a utility knife, handsaw, or power saw.

6.3.2 Attachment information is provided in Table 6.

Table 6. Attachment Information

Application[1]	Stud Spacing[2]	Attachment Method	Fastener Spacing[3]
Wood Framing	16" or 24"	Capped nails, capped staples, or roofing nails (~1" framing embedment)	12" perimeter 12" field
Metal Framing	16" or 24"	Corrosion-resistant self-tapping screws with 1" diameter cap or washer (~1" framing embedment)	12" perimeter 12" field
Interior Masonry or Concrete	N/A	Suitable construction adhesive or masonry fastener with 1" diameter cap or washer or combination of adhesive & mechanical fasteners (~1" embedment into substrate)	Adhesive beads spaced 16" horizontally & full perimeter Mechanical fasteners 12" perimeter and 12" field spaced 16" horizontally
Exterior Masonry or Concrete Below Grade	N/A	Granular water-draining fill	Only as required to ensure intimate contact to masonry surface or water proofed surface

SI: 1 in = 25.4 mm

1. Butt panels tightly and seal all joints where intrusion of bulk moisture or moisture vapor is undesirable with sealant and/or approved tape.
2. Panels used to resist transverse wind pressure or used as a WRB shall be installed on studs spaced a maximum of 16" o.c and all panel edges shall be located on framing or blocking.
3. For required attachments in fire rated construction, consult the manufacturer approved fire rated assembly details and refer to Table 4.

6.3.3 Windows and doors shall be installed in accordance with the manufacturer installation instructions.

6.3.4 Windows, door openings, and other penetrations shall be flashed in accordance with IBC Section 1404.4[20] and IRC Section R703.4.

6.3.5 Follow the manufacturer instructions for installation of claddings and rain screens over these products.

[20] 2015 IBC Section 1405.4

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7 Substantiating Data

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

7.1.1 Thermal properties testing in accordance with ASTM C518

7.1.2 Material properties testing in accordance with ASTM C1289

7.1.3 Surface burning characteristics testing in accordance with ASTM E84

7.1.4 Fire resistance testing in accordance with ASTM E119

7.1.5 Transverse wind pressure testing in accordance with ASTM E330

7.1.6 Water penetration testing in accordance with ASTM E331

7.1.7 Air permeance testing in accordance with ASTM E2178

7.1.8 Use in attics and crawlspaces without a thermal barrier or ignition barrier testing in accordance with NFPA 286

7.1.9 Vertical and lateral fire propagation properties testing in accordance with NFPA 285

7.2 ISO RED CI® and ISO RED CI® XS Quality Control Manuals in accordance with a third-party quality control program with inspections conducted by an approved agency.

7.3 Engineering analysis on NFPA 285 testing performed by Priest & Associates Consulting, LLC.

7.4 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.

7.5 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

7.6 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, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.

7.7 Testing and engineering analysis: 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.[21]

7.8 Where additional condition of use and/or code compliance information is required, please search for ISO RED Polyiso Foam Insulated Sheathing Products on the DrJ Certification website.

[21] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

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8 Findings

8.1 As delineated in Section 3, ISO RED Polyiso Foam Insulated Sheathing Products have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.

8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, ISO RED Polyiso Foam Insulated Sheathing Products shall be approved for the following applications:

8.2.1 Wind pressure resistance performance for use as part of an exterior wall covering assembly in accordance with IBC Section 1403.8,[22] IRC Section R703.3, and ANSI/FS100

8.2.2 Performance in accordance with the foam plastic requirements of IBC Section 2603 and IRC Section R316

8.2.3 Performance for use as continuous insulating sheathing in accordance with IRC Section N1102 and IECC Section C402

8.2.4 Performance for use as a WRB in accordance with IBC Section 1403.2[23] and IRC Section R703.2

8.2.5 Performance for use as a vapor retarder in accordance with IBC Section 202, IBC Section 1404.3,[24] IRC Section R202 and IRC Section R702.7

8.2.6 Performance for use as an air barrier in accordance with IECC Section C402

8.3 When used and installed in accordance with this TER and the manufacturer installation instructions, the ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD products are approved for the following:

8.3.1 Performance in accordance with the foam plastic requirements of IBC Section 2603 and IRC Section R316

8.3.2 Performance for use as continuous insulating sheathing in accordance with IRC Section N1102 and IECC Section C402

8.3.3 Performance for use as a vapor retarder in accordance with IBC Section 202, IBC Section 1404.3,[17] IRC Section R202 and IRC Section R702.7

8.3.4 Performance for use as an air barrier in accordance with IECC Section C402

8.3.5 Performance for use without a thermal barrier in accordance with NFPA 286 and the acceptance criteria of IBC Section 803.1.1[25]

8.3.6 Performance for vertical and lateral fire propagation in accordance with NFPA 285 and 2018 IBC Section 2603.5.5

8.3.7 Performance for use as a WRB in accordance with IBC Section 1403.2[16] and IRC Section R703.2

8.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from OX Engineered Products, LLC.

8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[26] are similar) in pertinent part states:

> **104.11 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. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

[22] 2015 IBC Section 1404.8
[23] 2015 IBC Section 1404.2
[24] 2015 IBC Section 1405.3
[25] 2015 IBC Section 803.1.2
[26] 2018 IFC Section 104.9

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8.6 **Approved**:[27] Building codes require that the building official shall accept duly authenticated reports[28] or research reports[29] from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.

8.6.1 Acceptance of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).

8.6.2 Acceptance of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

8.6.3 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, as denial without written reason deprives a protected right to free and fair competition in the marketplace.

8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.

8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*." IAF specifically says, "*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope*."[30]

9 Conditions of Use

9.1 Material properties shall not fall outside the boundaries defined in Section 3.

9.2 As defined in Section 3, 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.

9.3 As listed herein, ISO RED Polyiso Foam Insulated Sheathing Products shall not be used:

9.3.1 As a structural nailing base for claddings.

9.3.2 To resist horizontal loads from concrete or masonry walls.

9.4 ISO RED CI® and ISO RED CI® XS shall be fully protected from the interior of the building by an approved 15-minute thermal barrier or ignition barrier where required by the applicable code, except where installed in attics and uninhabited spaces as described in Section 5.6.3.2. ISO RED MAX®, ISO RED MAX® WF, ISO RED MAX® GF, ISO RED MAX® LD, and ISO RED MAX® HD are not required to be protected by a thermal barrier when installed in accordance with Section 5.6.3.

9.5 In areas where the probability of termite infestation is very heavy in accordance with IBC Section 2603.9 or IRC Section R318.4, these products must not be placed on exterior walls located within 6" (152 mm) of the ground.

9.6 When using these products, the stud walls shall be braced by other materials in accordance with the applicable code.

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[27] 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 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[28] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1

[29] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2

[30] https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise

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9.7 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:

9.7.1 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.

9.7.2 This TER and the installation instructions shall be submitted at the time of permit application.

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

9.7.4 At a minimum, these innovative products shall be installed per Section 6 of this TER.

9.7.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.

9.7.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.

9.7.7 The application of these innovative products in the context of this TER are 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.

9.8 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, "*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 104.11*", all of IBC Section 104, and IBC Section 105.4.

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

9.10 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.

10 Identification

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

10.2 Additional technical information can be found at oxengineeredproducts.com.

11 Review Schedule

11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.

11.2 For information on the status of this TER, contact DrJ Certification.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

12.1 ISO RED Polyiso Foam Insulated Sheathing Products are included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.

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Appendix A

1 Legislation that Authorizes AHJ Approval

1.1 **Fair Competition**: State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:

1.1.1 Advance Innovation,

1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and

1.1.3 Benefit consumers through lower prices, better quality, and greater choice.

1.2 **Adopted Legislation**: The following local, state, and federal regulations affirmatively authorize ISO RED Polyiso Foam Insulated Sheathing Products to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:

1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to "protect economic freedom and opportunity by promoting free and fair competition in the marketplace."

1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.

1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),[31] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years[32] and/or a $5,000,000 fine or 3 times the value of[33] the Intellectual Property (IP) and Trade Secrets (TS).

1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.

1.2.4 For new materials[34] that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.

1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.[35]

1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence, provided in writing, that specific legislation has been violated by an individual registered PE.

1.2.7 The AHJ 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 IBC Section 104.11.[36]

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[31] http://www.drjengineering.org/AppendixC and https://www.drjcertification.org/cornell-2016-protection-trade-secrets.

[32] https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years

[33] https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided

[34] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2

[35] IBC 2021, Section 1706.1 Conformance to Standards

[36] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

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1.3 **Approved**[37] **by Los Angeles**: The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.[38] The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building 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 the California Building Code (CBC) Section 1707.1.[39]

1.4 **Approved by Chicago**: The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).

1.5 **Approved by New York City**: The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed[40] an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement[41] (i.e., ANAB, International Accreditation Forum (IAF), etc.).

[37] See Section 8 for the distilled building code definition of **Approved**

[38] Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

[39] https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

[40] New York City, The Rules of the City of New York, § 101-07 Approved Agencies

[41] New York City, The Rules of the City of New York, § 101-07 Approved Agencies

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1.6 **Approved by Florida**: Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA])**: A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.

1.8 **Approved by New Jersey**: Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,[42] it states: "In the absence of approved rules or other approved standards, 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 the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)".[43] Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals**: Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide "reports of engineering findings".

[42] https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

[43] https://www.nj.gov/dca/divisions/codes/codreg/ucc.html

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1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards**: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[44] and Part 3280,[45] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) "All construction methods shall be in conformance with accepted engineering practices"; 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."; and 3) "The design stresses of all materials shall conform to accepted engineering practice."

1.10 **Approval by US, Local, and State Jurisdictions in General**: In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:

1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.[46]

1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards…the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.[47] A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum[48] or equivalent.

1.10.3 The design strengths and permissible stresses of any structural material…shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.[49] An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.

1.11 **Approval by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:

1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,

1.11.2 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.

1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

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

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

[46] IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

[47] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

[48] Please see the ANAB directory for building official approved agencies.

[49] IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.

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1.11.4 **Approved**: The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

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Issue Date: December 10, 2020

Subject to Renewal: October 1, 2024

FBC Supplement to TER 1306-02

REPORT HOLDER: OX Engineered Products, LLC

1 Evaluation Subject

1.1 ISO RED Polyiso Foam Insulated Sheathing Products

1.1.1 ISO RED CI® Polyiso Foam Insulated Sheathing

1.1.2 ISO RED CI® XS Polyiso Foam Insulated Sheathing

1.1.3 ISO RED MAX® Polyiso Foam Insulated Sheathing

1.1.4 ISO RED MAX® WF Polyiso Foam Insulated Sheathing

1.1.5 ISO RED MAX® GF Polyiso Foam Insulated Sheathing

1.1.6 ISO RED MAX® LD Polyiso Foam Insulated Sheathing

1.1.7 ISO RED MAX® HD Polyiso Foam Insulated Sheathing

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show ISO RED Polyiso Foam Insulated Sheathing Products, recognized in TER 1306-02, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—20, 23: Florida Building Code – Building (FL 28290)*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential (FL 28290)*

3 Conclusions

3.1 ISO RED Polyiso Foam Insulated Sheathing Products, described in TER 1306-02, complies with the FBC-B and FBC-R and is subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this TER, they are listed here:

3.2.1 FBC-B Section 104.4 and Section 110.4 are reserved.

3.2.2 FBC-B Section 1404.2 replaces IBC Section 1403.2.

4 Conditions of Use

4.1 ISO RED Polyiso Foam Insulated Sheathing Products, described in TER 1306-02, must comply with all of the following conditions:

4.1.1 All applicable sections in TER 1306-02.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.

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