Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 1507-08

Issue Date: April 4, 2016

Revision Date: July 22, 2025

Subject to Renewal: July 1, 2026

Thermo-Brace® Red, Thermo-Brace® Red Guard, Perma "R" Brace™ Red, and Perma "R" Brace™ Red Guard Structural Sheathings

Trade Secret Report Holder:

INDEVCO Building Products
PO Box 2002
10351 Verdon Rd
Doswell, VA 23047-1600
Phone: 804-876-9176
Website: www.indevconorthamerica.com

Additional Listees:

Barricade® Building Products
10351 Verdon Rd
Doswell, VA 23047-1600
Phone: 804-876-3135
Website: www.barricadebp.com

Perma "R" Building Products
2604 Sunset Loop
Grenada, MS 38901-2845
Phone: 800-647-6130
Website: www.permarproducts.com

CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 12 00 - Structural Panels

Section: 06 12 19 - Shear Wall Panels

Section: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 25 00 - Water-Resistive Barriers/Weather Barriers

Section: 07 27 00 - Air Barriers

1 Innovative Products Evaluated[1]

1.1 Thermo-Brace Red Structural Sheathing

1.2 Thermo-Brace Red Guard Structural Sheathing

1.3 Perma "R" Brace Red Structural Sheathing

1.4 Perma "R" Brace Red Guard Structural Sheathing

1.4.1 Unless otherwise noted, where Thermo-Brace Red Structural Sheathing is cited in this report, the provisions apply equally to Thermo-Brace Red Guard Structural Sheathing, Perma "R" Brace Red Structural Sheathing, and Perma "R" Brace Red Guard Structural Sheathing.

2 Product Description and Materials

2.1 The innovative products evaluated in this report are shown in **Figure 1** and **Figure 2**.

BARRICADE® THERMO-BRACE®
BARRICADEBP.COM
STRUCTURAL INSULATIVE SHEATHING
WATER RESISTANT BARRIER
MOLD RESISTANT
PERMABRACE™
LIGHTWEIGHT STRUCTURAL SHEATHING

Figure 1. Thermo-Brace Red Structural Sheathing and Perma "R" Brace Red Structural Sheathing

Figure 2. Thermo-Brace Red Guard Structural Sheathing

2.2 Thermo-Brace Red Structural Sheathings are composed of pressure-laminated plies consisting of high strength cellulosic fibers. These fibers are specially treated to be water-resistant and are bonded with a proprietary water-resistive adhesive. A protective polymer layer is applied on both sides of the panel and, additionally, foil facings may be applied on one or both faces.

2.2.1 Thermo-Brace Red Structural Sheathing panels have a nominal thickness of 0.095" and a nominal weight of 0.348 lbs. per square foot.

2.3 Thermo-Brace Red Guard is comprised of the same material and has the same structural properties as the Thermo-Brace Red Structural Sheathing. The center and edges of the Guard panels are scored in order to apply the Guard panels to the corner of a building without disturbing the air and water barriers.

2.4 *Material Availability*

2.4.1 *Thermo-Brace Red Structural Sheathing and Perma "R" Brace Red Structural Sheathing:*

2.4.1.1 *Thickness:*

2.4.1.1.1 0.095" (2.4 mm)

2.4.1.2 *Standard Widths:*

2.4.1.2.1 48" (1,219 mm)

2.4.1.2.2 48 3/4" (1,238 mm)

2.4.1.3 *Standard Lengths:*

2.4.1.3.1 96" (2,438 mm)

2.4.1.3.2 108" (2,743 mm)

2.4.1.3.3 120" (3,048 mm)

2.4.1.4 Other custom widths and lengths can be manufactured.

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

3 Definitions[2]

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

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

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

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

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

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

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

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

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

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

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

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

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

4.1 *Local, State, and Federal*

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

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

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

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

4.2 *Standards*

4.2.1 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*

4.2.2 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

4.2.3 *ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels*

4.2.4 *ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*

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

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

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

4.2.8 *ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

4.2.9 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*

4.2.10 *ASTM E2178: Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials*

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

4.3 *Regulations*

4.3.1 *IBC – 15, 18, 21, 24: International Building Code®*

4.3.2 *IRC – 15, 18, 21, 24: International Residential Code®*

4.3.3 *IECC – 15, 18, 21, 24: International Energy Conservation Code®*

4.3.4 *CBC—16, 19: California Building Code[25] (Title 24, Part 2)*

4.3.5 *CRC—16, 19: California Residential Code[25] (Title 24, Part 2.5)*

4.3.6 *FBC-B—20, 23: Florida Building Code[26] – Building (FL 20358)*

4.3.7 *FBC-R—20, 23: Florida Building Code[26] – Residential (FL 20358)*

4.3.8 *FBC-EC—20, 23: Florida Building Code – Energy Conservation*

5 Listed[27]

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

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 Thermo-Brace Red Structural Sheathing panels are used in the following applications:

6.1.1 Wall sheathing in buildings constructed in accordance with the IBC and IRC for light-frame wood construction.

6.1.2 Structural wall sheathing to provide lateral load resistance (wind and seismic) for braced wall panels used in light-frame wood construction.

6.1.3 Wall sheathing in buildings constructed in accordance with the IBC requirements for Type V light frame construction.

6.1.4 Structural wall sheathing to provide resistance to transverse loads for wall assemblies used in light frame wood construction.

6.2 *Structural Applications*

6.2.1 *General Structural Provisions:*

6.2.1.1 Except as otherwise described in this report, Thermo-Brace Red Structural Sheathings shall be installed in accordance with the applicable building codes listed in **Section 4**, using the provisions set forth herein for the design and installation of Wood Structural Panels (WSP).

6.2.1.1.1 Thermo-Brace Red Structural Sheathings are permitted to be designed in accordance with SDPWS for the design of shear walls using the methods set forth therein, including the perforated shear wall methodology, and subject to the SDPWS boundary conditions, except as specifically allowed in this report.

6.2.1.2 Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall. Shear wall anchorage shall be in accordance with the applicable codes referenced in **Section 4**.

6.2.1.3 Except as noted in **Section 6.2.2**, the maximum aspect ratio for Thermo-Brace Red Structural Sheathing shall be 4:1.

6.2.1.4 Except as noted in **Section 6.2.2**, the minimum full height panel width shall be 24".

6.2.1.5 Installation is permitted for single top plate or double top plate applications.

6.2.2 *Prescriptive IRC Bracing Applications:*

6.2.2.1 Thermo-Brace Red Structural Sheathing may be used on braced wall lines as an equivalent alternative to IRC Method WSP when installed in accordance with IRC Section R602.10 and this report.

6.2.2.2 For wind design, required braced wall panel lengths for Thermo-Brace Red Structural Sheathings shall be as shown in **Table 1** and shall be used in conjunction with IRC Table R602.10.3(2), which provides the required adjustments.

6.2.2.3 For seismic design, required braced wall panel lengths for Thermo-Brace Red Structural Sheathings shall be as shown in **Table 2** and shall be used in conjunction with IRC Table R602.10.3(4), which provides the required adjustments.

6.2.2.4 Use of Thermo-Brace Red Structural Sheathings with Method CS-PF is also permitted, in lieu of WSP specified in accordance with IRC Section R602.10.6.4.

6.2.2.5 Use of Thermo-Brace Red Structural Sheathings with Method PFH is also permitted in lieu of WSP specified in accordance with IRC Section R602.10.6.4.

Table 1. Required Bracing Lengths for Thermo-Brace Red Structural Sheathing (Studs 16" o.c.) – Wind[1,2,3,4,5]

Condition	Braced Wall Line Spacing (ft)	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line											
		Intermittent Sheathing						Continuous Sheathing					
		Ultimate Design Wind Speed, V_{ult} (mph)											
		< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140	< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.1	1.5	1.5	1.9	1.9	2.3	1.1	1.1	1.5	1.5	1.9	1.9
	20	1.9	2.6	2.6	3.0	3.8	4.1	1.9	2.3	2.6	2.6	3.0	3.8
	30	3.0	3.8	4.1	4.5	5.3	6.0	2.6	3.4	3.4	3.8	4.5	5.3
	40	3.8	4.9	5.3	6.0	6.8	7.9	3.0	4.1	4.5	4.9	5.6	6.8
	50	4.5	6.0	6.8	7.1	8.3	9.8	3.8	5.3	5.6	6.0	7.1	8.3
	60	5.3	7.1	7.9	8.6	9.8	11.3	4.5	6.0	6.8	7.1	8.3	9.8
First Story of Two Stories or Second Story of Three Stories	10	2.3	2.6	3.0	3.4	3.8	4.5	1.9	2.3	2.6	2.6	3.4	3.8
	20	3.8	4.9	5.6	6.0	7.1	8.3	3.4	4.1	4.9	5.3	6.0	6.8
	30	5.3	7.1	7.9	8.6	10.1	11.6	4.5	6.0	6.8	7.1	8.6	9.8
	40	7.1	9.4	10.1	11.3	13.1	15.0	6.0	7.9	8.6	9.4	11.3	12.8
	50	8.6	11.6	12.4	13.5	16.1	18.4	7.5	9.8	10.5	11.6	13.5	15.8
	60	10.1	13.5	15.0	16.1	18.8	21.8	8.6	11.6	12.8	13.9	16.1	18.8
First Story of Three Stories	10	3.0	4.1	4.5	4.9	5.6	6.4	2.6	3.4	3.8	4.1	4.9	5.6
	20	5.6	7.5	8.3	8.6	10.1	12.0	4.9	6.4	6.8	7.5	8.6	10.1
	30	7.9	10.5	11.6	12.8	14.6	17.3	6.8	9.0	9.8	10.9	12.8	14.6
	40	10.1	13.9	15.0	16.5	19.1	22.1	8.6	11.6	12.8	13.9	16.5	18.8
	50	12.8	16.9	18.4	20.3	23.6	27.4	10.9	14.3	15.8	17.3	19.9	23.3
	60	15.0	19.9	21.8	24.0	28.1	32.3	12.8	17.3	18.8	20.3	23.6	27.4

SI: 1 in = 25.4 mm, 1 mph = 1.61 km/h

1. Thermo-Brace Red Structural Sheathings shall be installed on 2 x 4 or 2 x 6 studs spaced 16" o.c. and fastened with minimum $^{15}/_{16}$" crown x 1$^{1}/_{4}$" leg 16-gauge galvanized staples or 0.120" x 1$^{1}/_{4}$" smooth shank roofing nails spaced 3":3" (edge:field) per **Section 6**. Joints may be butted or lapped.
2. Demonstrates equivalency to IRC Table R602.10.3(1). All adjustment factors from IRC Table R602.10.3(2) shall be applied, except when used with method CS-PF. When used with method CS-PF, a minimum of $^{1}/_{2}$" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum 5d cooler nails or 1$^{1}/_{4}$" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
3. Minimum $^{1}/_{2}$" gypsum wallboard must be installed as part of the wall assembly. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.8.
4. Bracing lengths are the results of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in **Section 4** that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which is the manufacturers of those products or the members of the associations that publish those design values.
5. Linear interpolation is permitted.

Table 2. Required Bracing Lengths for Thermo-Brace Red Structural Sheathing (Studs 16" o.c.) – Seismic[1,2,3,4,5,6,7]

Condition	Braced Wall Line Spacing (ft)	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line							
		Intermittent Sheathing				Continuous Sheathing			
		Seismic Design Category (SDC)							
		C	D_0	D_1	D_2	C	D_0	D_1	D_2
One Story or the Top of Two or Three Stories	10	1.2	1.3	1.5	1.9	1.1	1.2	1.3	1.6
	20	2.4	2.7	3.0	3.8	2.0	2.3	2.6	3.2
	30	3.6	4.1	4.5	5.7	3.1	3.4	3.8	4.8
	40	4.8	5.4	6.0	7.5	4.1	4.6	5.1	6.4
	50	6.0	6.7	7.5	9.4	5.1	5.7	6.4	8.0
First Story of Two Stories or Second Story of Three Stories	10	2.3	2.8	3.4	4.2	1.9	2.4	2.8	3.5
	20	4.5	5.7	6.7	8.2	3.8	4.8	5.7	7.1
	30	6.7	8.5	10.1	12.4	5.7	7.2	8.6	10.5
	40	9.0	11.2	13.5	16.5	7.7	9.6	11.5	14.0
	50	11.2	14.1	16.9	20.6	9.6	12.0	14.3	17.6
First Story of Three Stories	10	3.4	4.0	4.5	NP[1]	2.8	3.4	3.8	NP[1]
	20	6.7	7.9	9.0	NP[1]	5.7	6.7	7.7	NP[1]
	30	10.1	11.8	13.5	NP[1]	8.6	10.1	11.5	NP[1]
	40	13.5	15.7	18.0	NP[1]	11.5	13.4	15.3	NP[1]
	50	16.9	19.7	22.5	NP[1]	14.3	16.7	19.1	NP[1]

SI: 1 in = 25.4 mm

1. NP = Not Provided
2. Thermo-Brace Red Structural Sheathing shall be installed on 2 x 4 or 2 x 6 studs spaced 16" o.c. and fastened with minimum $^{15}/_{16}$" crown x $1^{1}/_{4}$" leg 16-gauge galvanized staples or 0.120" x $1^{1}/_{4}$" smooth shank roofing nails spaced 3":3" (edge:field) per **Section 6**. Joints may be butted or lapped.
3. Minimum $^{1}/_{2}$" gypsum wallboard must be installed as part of the wall assembly. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.8.
4. Demonstrates equivalency to IRC Table R602.10.3(3). All adjustment factors from IRC Table R602.10.3(4) shall be applied, except when used with method CS-PF. When used with method CS-PF, a minimum of $^{1}/_{2}$" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum 5d cooler nails or $1^{1}/_{4}$" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
5. Tabulated bracing lengths are based on the following:
   a. Soil Class D
   b. Wall height= 10'
   c. 10 psf floor dead load
   d. 15 psf roof/ceiling dead load
   e. Braced wall line spacing ≤ 25'
6. Linear interpolation is permitted.
7. Bracing lengths are the result of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in **Section 4** that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which is the manufacturer of those products or the members of the associations that publish those design values.

6.2.3 *Thermo-Brace Red Structural Sheathing CS-PF Portal Frame:*

6.2.3.1 Thermo-Brace Red Structural Sheathings were tested and evaluated for equivalency to the IRC Method CS-PF (Continuous Sheathed Portal Frame) in accordance with IRC Section R602.10.6.4 and IRC Table R602.10.5.

6.2.3.2 IRC Table R602.10.5 establishes the contributing length bracing of the CS-PF as equivalent to 1.5 times its actual length and that it contributes this length of bracing to that required by method CS-WSP.

6.2.3.3 The capacity of the Thermo-Brace Red Structural Sheathing CS-PF exceeds the capacity of the IRC Method CS-WSP and is permitted to be substituted for an equivalent length of bracing (i.e., 1.5 times its actual length).

6.2.3.4 The Thermo-Brace Red Structural Sheathing CS-PF is shown in **Figure 3**.

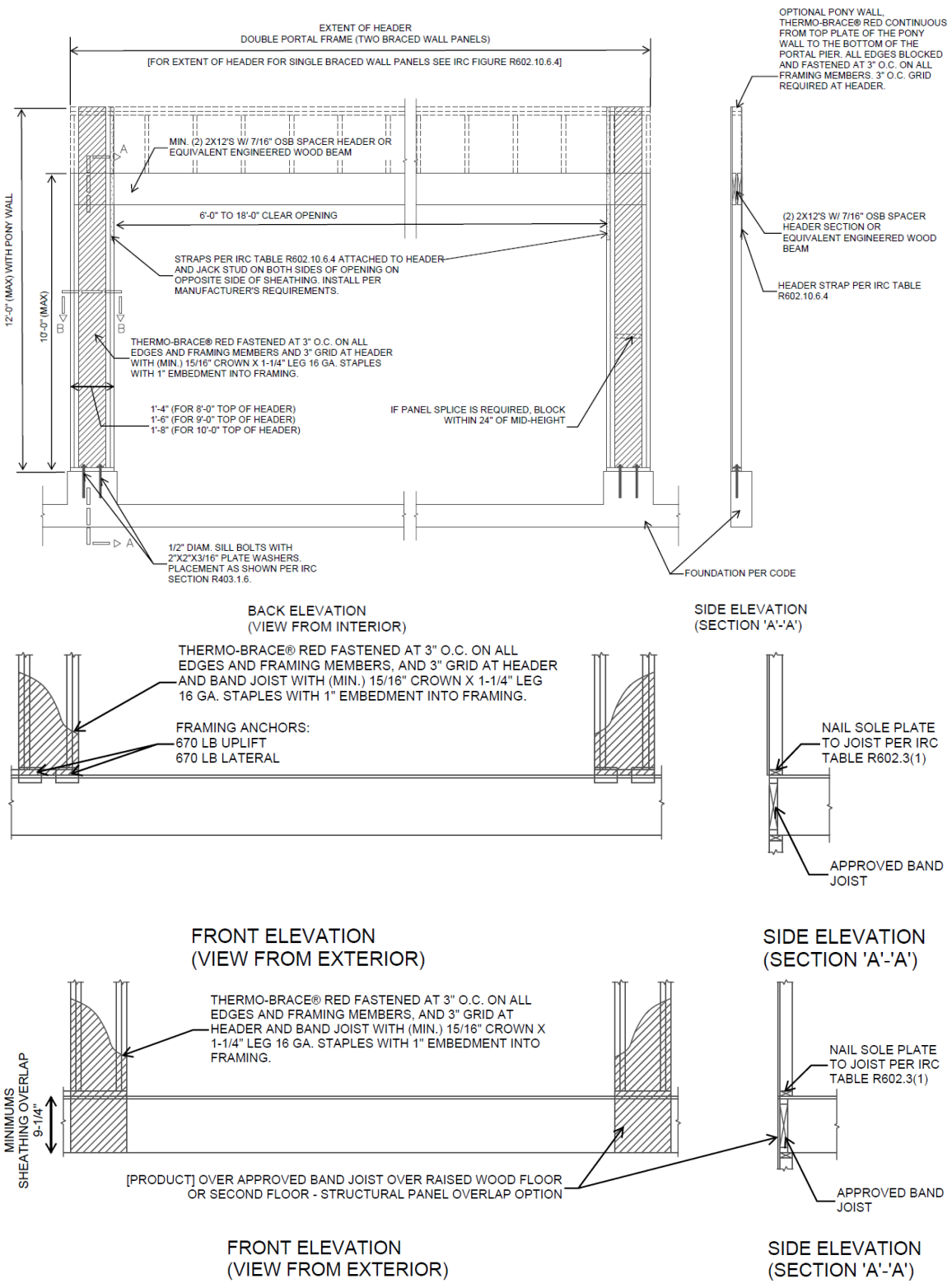


Figure 3. Thermo-Brace Red Structural Sheathing CS-PF

6.2.4 *Thermo-Brace Red Structural Sheathing Method PFH:*

6.2.4.1 In accordance with the IRC Section R602.10.6.2, the PFH referenced in the IRC is permitted to be an equivalent replacement for a 4' length of Method WSP bracing.

6.2.4.2 Testing of the Thermo-Brace Red Structural Sheathing PFH assemblies was conducted and compared to testing of Method WSP braced wall panel assemblies using Oriented Strand Board (OSB) to determine whether equivalence could be achieved for the Thermo-Brace PFH.

6.2.4.3 The portal frames were tested in accordance with ASTM E2126 testing procedures. Testing determined their lateral resistance within an identical braced wall line using Method WSP braced wall panels so that a direct performance comparison could be made between the two series of tests.

6.2.4.4 A comparison of the WSP braced wall lines and the Thermo-Brace Red Structural Sheathing 12" PFH and 24" PFH is shown in **Table 3**.

Table 3. Design values for PFH[1,2,3]

Test Name	Sheathing Method	Fastener Size and Spacing	Total Bracing Width (in)	Maximum Wall Height (ft)	ASD Allowable Design Value per Panel/Pier[4,5] (lbs)
IBC/IRC Benchmark	3/8" OSB, Isolated 4' x 8' panels	(min) 2 3/8" x 0.113Ø nails, 6:12 spacing	96	10	700
12" PFH	Thermo-Brace Red Structural Sheathing	See **Figure 4** To **Figure 7**	12	8	1,280
				10	960
24" PFH	Thermo-Brace Red Structural Sheathing	See **Figure 4** To **Figure 7**	24	8	2,560
				10	1,920

SI: 1 in = 25.4 mm, 1 lb. = 4.45 N

1. Capacity derived from multiple full-scale tests, showing the capacity of OSB sheathing in buildings constructed in accordance with the minimum requirements of the IRC.
2. The PFH bracing type in the IRC/IBC is defined as equivalent to a 4' BWP using 3/8" WSP. Equivalent capacity is based on comparison testing of the PFH and 3/8" OSB as compared to the published capacities as defined in the IBC and SDPWS.
3. For seismic design, reduce capacities by a factor of 1.4.
4. Interpolation between the wall heights and pier widths for the 12" PFH and 24" PFH is permitted.
5. 10' high wall design values are provided here that use a seventy five percent (75%) factor to reduce the 8' high wall design values generated by test data.

6.2.4.5 The test data and subsequent engineering analysis provides confirmation that the performance of the Thermo-Brace Red Structural Sheathing 12" PFH and 24" PFH provide comparable equivalence to the Method WSP braced wall panels.

6.2.4.6 As detailed in **Figure 4** through **Figure 7**, the maximum allowable compressive strength of the Thermo-Brace Red Structural Sheathing 12" to 24" PFH is 11,156 lbs per pier. Additional compressive capacity may be engineered into each pier.

6.2.4.7 *PFH Assembly:*

6.2.4.7.1 The Thermo-Brace Red Structural Sheathing 12" PFH and 24" PFH is constructed in accordance with **Figure 4** through **Figure 7**.

6.2.4.7.2 The piers in the PFH Assembly are made of 7/16" OSB sandwiched between nominal 2 x 4 studs installed flatwise with additional 2 x 4 studs framing the outside corner (see **Figure 7**).

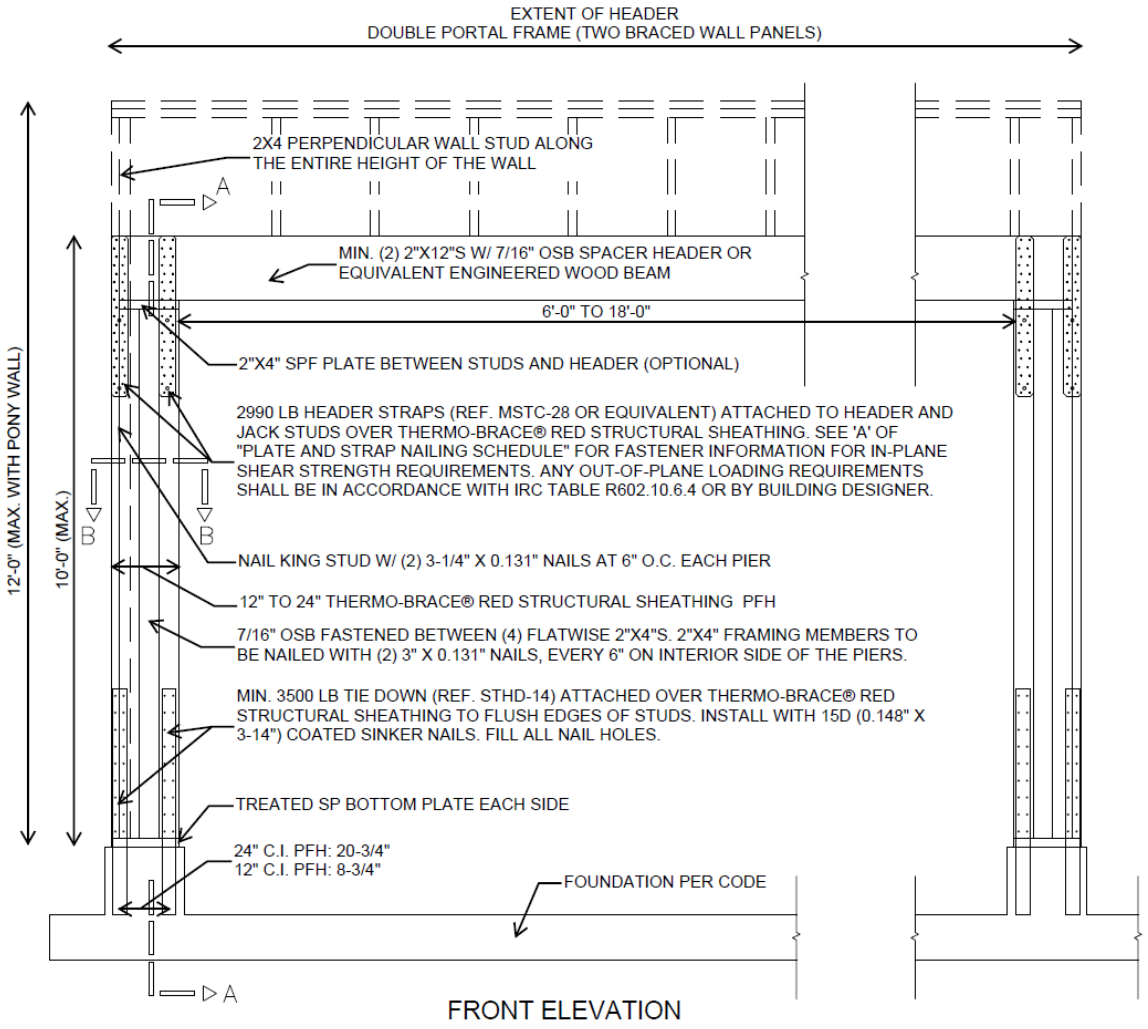


Figure 4. Construction Details of Thermo-Brace Red Structural Sheathing 12" to 24" PFH

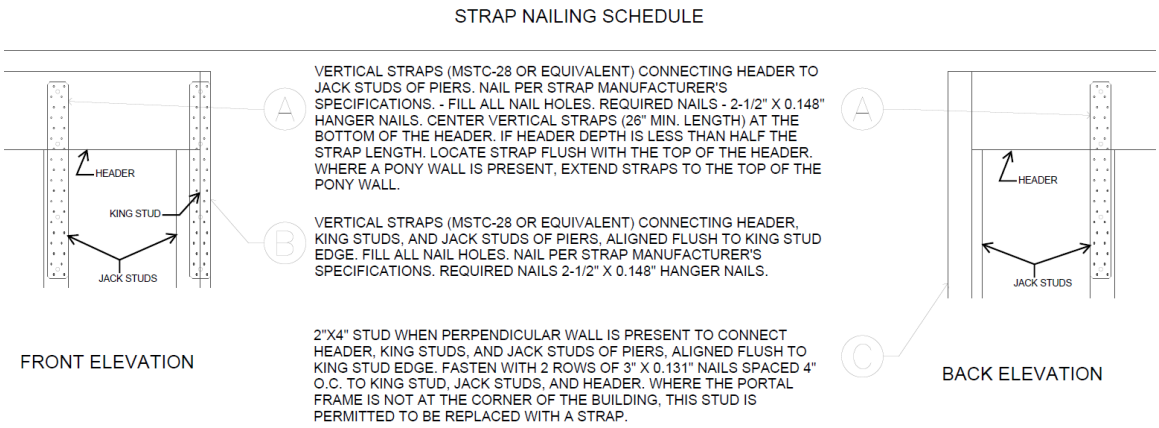


Figure 5. Header Connection Detail

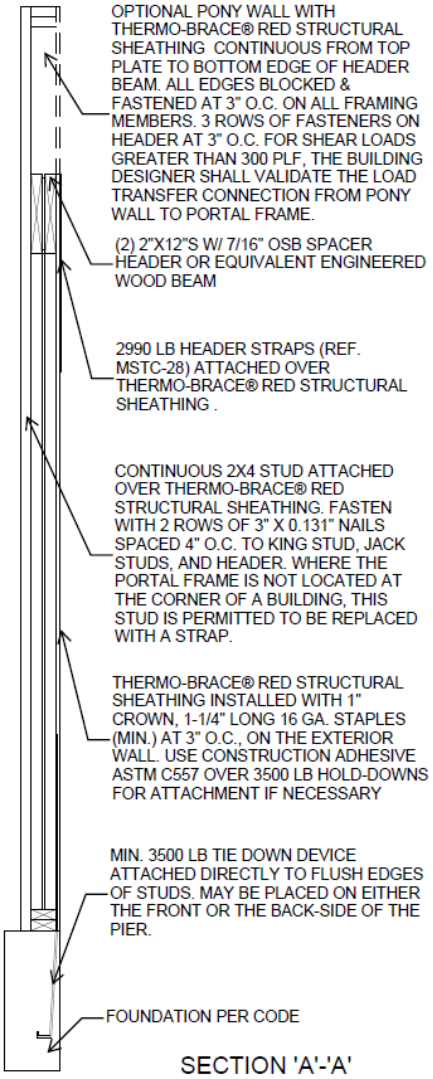


Figure 6. PFH Section A-A

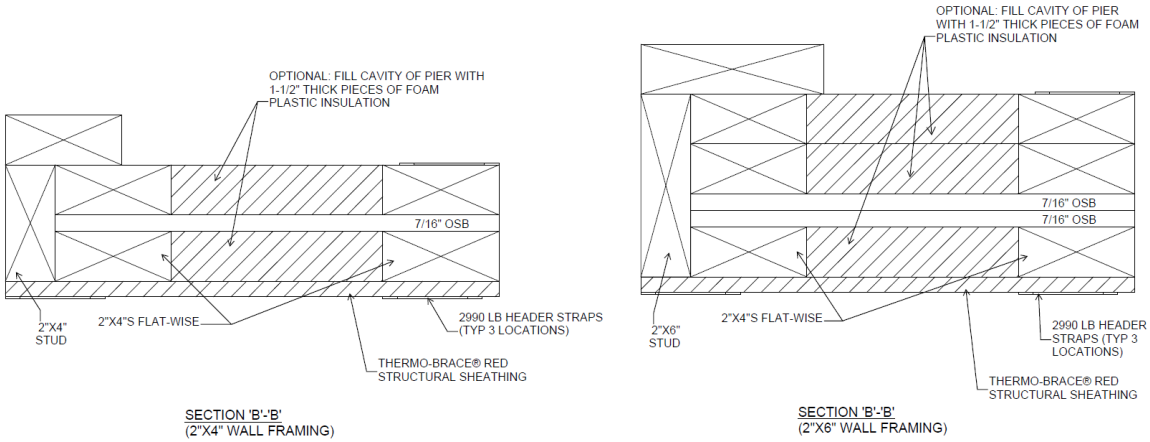


Figure 7. PFH Section B-B

6.2.5 *Alternative to Prescriptive IRC Bracing Applications:*

6.2.5.1 As an alternative to the requirements of **Section 6.2.2** of this report, the following provisions are permitted:

6.2.5.1.1 Thermo-Brace Red Structural Sheathings may be used on braced wall lines as an equivalent alternative to the WSP method when installed in accordance with IRC Section R602.10 and this report.

6.2.5.1.2 Thermo-Brace Red Structural Sheathings may be used to brace the walls of buildings as an alternative to the continuous wall bracing provisions of the CS-WSP method described in IRC Section R602.10.4.

6.2.5.1.3 Required braced wall panel lengths for Thermo-Brace Red Structural Sheathings shall be as determined by the equivalency factor shown in **Table 4**, IRC Section R602.10.3 and IRC Table R602.10.3(1) through IRC Table R602.10.3(4), including all footnotes.

6.2.5.1.3.1 Bracing lengths in the IRC tables for the WSP or CS-WSP methods shall be multiplied by the equivalency factors listed in **Table 4**.

Table 4. Braced Wall Line Length Equivalency Factors[1,2,3,5]

Product	Fastener	Fastener Spacing (edge:field) (in)	Maximum Stud Spacing (in)	Gypsum Wallboard (GWB)	GWB Fastener Spacing[4] (edge:field) (in)	Equivalency Factors to IRC WSP or CS-WSP
Thermo-Brace Red Structural Sheathing	15/16" Crown x 1 1/4" Leg 16-gauge Staple (min) or 0.120" x 1 1/4" smooth shank roofing nails (min)	3:3	16 o.c.	1/2" GWB	8:8	0.75
					16:16	0.91

SI: 1" = 25.4 mm

1. Factors based on SPF framing materials.
2. Multiply the bracing lengths indicated for the WSP or CS-WSP continuous sheathing methods in IRC Table R602.10.3(1) and IRC Table R602.10.3(3), and as modified by all applicable factors in IRC Tables 602.10.3(2) and IRC Table R602.10.3(4), shown here to establish the required bracing length.
3. These equivalency factors are valid for single top plate (advanced framing method) wall installations or double top plate wall installations.
4. Gypsum wallboard shall be installed according to the provisions listed in IRC Table R702.3.5.
5. Equivalency factors are the results of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in **Section 4** of this report that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which belongs to the manufacturers of those products or the members of the associations that publish those design values.

6.2.5.1.3.2 The braced wall line length equivalency factors in **Table 4** are based on equivalency testing and are used to comply with Method WSP and Method CS-WSP of the IRC.

6.2.5.1.3.3 The length of bracing required shall be determined by multiplying the Thermo-Brace Red Structural Sheathing tested equivalency factors in **Table 4** by the length shown in the WSP or CS WSP methods in IRC Table R602.10.3(1) and IRC Table R602.10.3(3), as modified by all applicable factors in IRC Table R602.10.3(2) and IRC Table R602.10.3(4), respectively.

6.2.5.1.4 All IRC prescriptive bracing minimums, spacing requirements, and rules must also be met.

6.2.5.1.5 Where a building, or portion thereof, does not comply with one or more of the bracing requirements within the prescriptive section of the IRC, those portions shall be designed and constructed in accordance with IRC Section R301.1.

6.2.6 *Prescriptive IBC Conventional Light-Frame Wood Construction:*

6.2.6.1 Thermo-Brace Red Structural Sheathings may be used to brace exterior walls of buildings as an equivalent alternative to Method 3 of the IBC when installed with blocked or unblocked $^1/_2$" gypsum fastened with a minimum 5d cooler nail or #6 type W or S screw spaced a maximum of 16" o.c. at panel edges and 16" o.c. in the field. Bracing shall be in accordance with the conventional light-frame construction method of IBC Section 2308.10[28] and this report.

6.2.7 *Performance-Based Wood-Framed Construction:*

6.2.7.1 Thermo-Brace Red Structural Sheathing panels used in wall assemblies designed as shear walls are permitted to be designed in accordance with the methodology used in SDPWS for WSP using the capacities shown in **Table 5**, **Table 6**, and **Table 7**.

6.2.7.2 Thermo-Brace Red Structural Sheathing shear walls are permitted to resist horizontal wind load forces using the allowable shear loads (in pounds per linear foot) set forth in **Table 5**.

Table 5. Allowable Stress Design (ASD) Capacity – Wind

Product	Joint Condition	Fastener[1,2]	Fastener Spacing (edge:field) (in)	Maximum Stud Spacing (in)	Gypsum Wallboard[3] (GWB)	GWB Fastener Spacing[4] (edge:field) (in)	Allowable Unit Shear Capacity (plf)
Thermo-Brace Red Structural Sheathing	Butted	$^{15}/_{16}$" Crown x 1$^1/_4$" Leg 16-gauge Staple (min) or 0.120" x 1$^1/_4$" smooth shank roofing nails (min)	3:3	16 o.c.	None	-	330
					$^1/_2$" GWB	8:8	475
						16:16	400
	Lapped				None	-	355
					$^1/_2$" GWB	8:8	500
						16:16	430

SI: 1" = 25.4 mm, 1 lb/ft = 0.0146 kN/m

1. Thermo-Brace Red staples shall penetrate a minimum of 1" into the stud. Fasteners are to be installed with the crown parallel to the framing and spaced a maximum of 3" o.c. at the panel edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of $^3/_8$". Fastener head shall be in contact with the Thermo-Brace Red Structural Sheathing surface.
2. Thermo-Brace Red Structural Sheathing may be attached with a minimum 0.120" x 1$^1/_4$" smooth shank roofing nails. Fasteners are to be spaced a maximum of 3" o.c. at the panel edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of $^3/_8$". Fastener head shall be in contact with the Thermo-Brace Red Structural Sheathing surface.
3. Gypsum attached with minimum #6 type W or S screws 1$^1/_4$" long or 5d cooler nails with a minimum edge distance of $^3/_8$".
4. Straight-line interpolation between fastening patterns is acceptable.

6.2.8 *Seismic Design:*

6.2.8.1 Thermo-Brace Red Structural Sheathing shear walls that require seismic design in accordance with IBC Section 1613 shall use the seismic allowable unit shear capacities set forth in **Table 6**.

6.2.8.1.1 The response modification coefficient, R, system overstrength factor, Ω_0, and deflection amplification factor, C_d, indicated in **Table 6**, shall be used to determine the base shear, element design forces and design story drift in accordance with ASCE 7 Chapter 12 and Section 14.5.

Table 6. Seismic Allowable Unit Shear Capacity and Seismic Design Coefficients[1,2,4]

Seismic Force-Resisting System	Joint Condition[5]	GWB[3]	Maximum Stud Spacing (in)	Seismic Allowable Unit Shear Capacity (plf)	Apparent Shear Stiffness, G_a (kips/in)	Response Modification Factor, R[6]	System Over-strength Factor, Ω_0[7]	Deflection Amplification Coefficient C_d[8]	Structural System Limitations and Building Height (ft) Limit[9]				
									SDC				
									B	C	D	E	F
Light-Frame (Wood) Walls Sheathed with Thermo-Brace Red Structural Sheathing	Butted or Lapped	1/2" GWB	16 o.c.	380	12.0	6.5	3	4	NL	NL	65	65	65
		None	16 o.c.	265	6.8	6.5	3	4	NL	NL	65	65	65

SI: 1" = 25.4 mm, 1 lb = 4.45 N, 1 lb/ft = 0.0146 kN/m

1. Thermo-Brace Red Structural Sheathing attached with a minimum 16-gauge, 15/16" crown staples shall penetrate a minimum of 1" into the stud. Fasteners are to be installed with the crown parallel to the framing and spaced a maximum of 3" o.c. at the panel edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8". Fastener head shall be in contact with the Thermo-Brace Red Structural Sheathing surface.
2. As an alternate to staples, Thermo-Brace Red Structural Sheathing may be attached with a minimum 0.120" x 1 1/4" smooth shank roofing nails. Fasteners are to be spaced a maximum of 3" o.c. at the panel edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8". Fastener head shall be in contact with the Thermo-Brace Red Structural Sheathing surface.
3. Gypsum attached with minimum #6 type W or S screws 1 1/4" long with a minimum edge distance of 3/8", spaced 8" o.c. on the edge and 8" o.c. in the field.
4. All seismic design parameters follow the equivalency as defined in **Section 8**.
5. Thermo-Brace Red Structural Sheathing may be installed with either lapped joints or butted joints.
6. Response modification coefficient, R, for use throughout ASCE 7. ***Note:*** R reduces forces to a strength level, not an allowable stress level.
7. The tabulated value of the overstrength factor, Ω_0, is permitted to be reduced by subtracting one-half (0.5) for structures with flexible diaphragms.
8. Deflection amplification factor, C_d, for use with ASCE 7 Section 12.8.6, 12.8.7, and 12.9.2
9. NL = Not Limited. Heights are measured from the base of the structure as defined in ASCE 7 Section 11.2.

6.2.9 *Uplift Resistance:*

6.2.9.1 Thermo-Brace Red Structural Sheathing panels are permitted to resist uplift load forces using the allowable uplift loads (in pounds per linear foot) set forth in **Table 7**.

Table 7. Uplift Performance

Product	Maximum Stud Spacing (in)	Fastener[2]	Fastener Spacing (edge:field) (in)	Interior GWB Sheathing[1]	Allowable Unit Uplift Capacity (plf)
Thermo-Brace Red Structural Sheathing: Single Bottom Plate	16 o.c.	$^{15}/_{16}$" Crown x 1$^{1}/_{4}$" Leg 16-gauge galvanized Staple (min) or 0.120" x 1$^{1}/_{4}$" Roofing Nail (min)	3:3	Yes	400
				No	310

SI: 1 in = 25.4 mm, 1 lb/ft = 0.0146 kN/m

1. Gypsum wallboard on the back (interior) side of the wall attached with minimum #6 type W or S screws 1$^{1}/_{4}$" long spaced 8" o.c. on the edge and 8" o.c. in the field.
2. Staple crowns to be installed parallel to grain.

6.2.10 *Transverse Wind Loading:*

6.2.10.1 Thermo-Brace Red Structural Sheathing panels are permitted to resist transverse wind load forces using the allowable transverse loads (in pounds per linear foot) set forth in **Table 8** and **Table 9**.

Table 8. Transverse (Out-Of-Plane) Wind Load Resistance[1,4]

Product	Maximum Stud Spacing (in)	Fastener[4]	Fastener Spacing (edge:field) (in)	Allowable Design[2,3] Value (psf)
Thermo-Brace Red Structural Sheathing	16 o.c.	$^{15}/_{16}$" Crown x 1$^{1}/_{4}$" Leg 16-gauge galvanized Staple (min) or 0.120" x 1$^{1}/_{4}$" Roofing Nail (min)	3:3	100

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m^2

1. Tested in accordance with ASTM E330.
2. Applies to both negative and positive wind load.
3. Design wind load capacity shall be in accordance with IBC Section 1609.1.1.
4. Staple crowns shall be installed parallel to grain.

Table 9. Basic Wind Speed for Use in Exterior Wall Covering Assemblies[1]

Product	Allowable Components and Cladding Basic Wind Speed (mph)	
	ASCE 7-05 (V_{asd})	ASCE 7-10 and 7-16 (V_{ult})
Thermo-Brace Red Structural Sheathing	175	225

SI: 1 mph = 1.61 km/h

1. Allowable wind speeds are based on the following: Components and Cladding wind loads, Mean roof height 30', Exposure B, 10 sq. ft. effective wind area, Zone 5. See the applicable building code for any adjustment needed for specific building location and configuration.

6.2.11 *Perforated Shear Walls:*

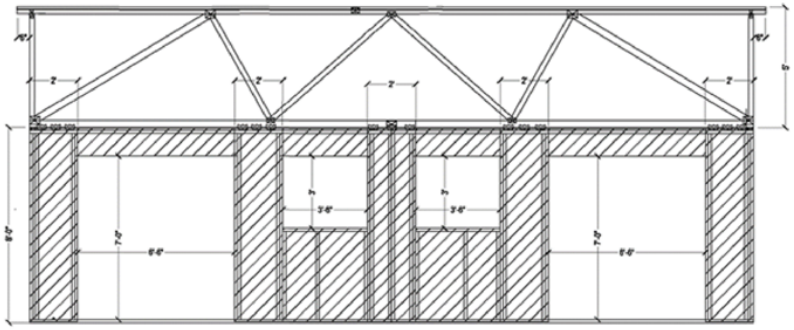
6.2.11.1 Thermo-Brace Red Structural Sheathing is permitted to be designed in accordance with the methodology found in SDPWS Section 4.3.3.5 with the following exceptions:

6.2.11.1.1 SDPWS Equation 4.3-5 for C_o shall be replaced with the equation from **Table 10**.

Table 10. C_o for Use with SDPWS Perforated Shear Wall Methodology

Wall Assembly	Replace SDPSW Equation 4.3-5 with the Following
Thermo-Brace Red Structural Sheathing	$C_o = \frac{r}{(2-r)} * \frac{L_{tot}}{\sum L_i}$
SI: 1 in = 25.4 mm	

6.2.11.1.2 **Figure 8** shows how to calculate the capacity of a perforated shear wall with Thermo-Brace Red Structural Sheathing using **Table 10**.



$L_{tot} := 30\ ft$	Total length of the perforated shear wall
$h := 8\ ft$	Height of the perforated shear wall
$b_s := 2\ ft$	Length of base of shear wall segment
$L_i := 2\ ft \cdot \left(\frac{2 \cdot b_s}{h}\right) = 1\ ft$	Length of shear wall segment with aspect ratios greater than 2:1 adjusted in accordance with SDPWS Section 4.3.4.3
$\Sigma L_i := L_i \cdot 5 = 5\ ft$	Summation of the five perforated shear wall segments
$A_o := (2 \cdot (7\ ft \cdot 6.5\ ft)) + (2 \cdot (3\ ft \cdot 3.5\ ft)) = 112\ ft^2$	Total area of all four openings
$r := \frac{1}{\left(1 + \frac{A_o}{h \cdot \Sigma L_i}\right)} = 0.263$	Sheathing area ratio, SDPWS Eq. 4.3-6
$C_o := \left(\frac{r}{2-r}\right) \cdot \frac{L_{tot}}{\Sigma L_i} = 0.909$	Shear capacity adjustment factor (replaces SDPWS Eq. 4.3-5)
$v := 330\ \frac{lb}{ft}$	Allowable unit shear capacity for wind
$V_{perforated} := v \cdot \Sigma L_i \cdot C_o = 1500\ lb$	Shear capacity of perforated shear wall, SDPWS Section 4.3.3.5

Figure 8. Example of a Perforated Shear Wall Calculation

6.3 *Water-Resistive Barrier (WRB)*

6.3.1 Thermo-Brace Red Structural Sheathings may be used as a WRB as prescribed in IBC Section 1403.2[29] and IRC Section R703.2, when installed on exterior walls as described in this section of the report.

6.3.2 Thermo-Brace Red Structural Sheathings shall be installed with board joints placed directly over exterior framing spaced a maximum of 16" (406 mm) o.c. The fasteners used to attach the board shall be installed in accordance with **Section 9**.

6.3.3 Where seams and joints between boards are overlapped nominally $^{3}/_{4}$" (19 mm) and fastened in accordance with **Section 9**, seam tape is not required for approval as a WRB.

6.3.4 Where seams and joints between boards are butt jointed, they shall be sealed with Barricade® Construction Seam Tape, or equivalent, in accordance with **Section 9**. A slight gap of approximately $^{1}/_{8}$" between panels is allowed.

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

6.3.6 Flashing must be installed at all sheathing penetrations and shall comply with all applicable code sections.

6.4 *Air Barrier*

6.4.1 Thermo-Brace Red Structural Sheathings may be used as an air barrier material as prescribed in IRC Section N1102.5.1.1,[30] IECC Section R402.5.1.1,[31] and IECC Section C402.6.1.1[32] in accordance with ASTM E2178.

6.5 *Draftstop*

6.5.1 Thermo-Brace Red Structural Sheathings may be used as draftstop material in accordance with IBC Section 708.4.3,[33] IBC Section 718.3, IBC Section 718.4, and IRC Section R302.12.

6.5.2 When installed as of a draftstop, Thermo-Brace Red Structural Sheathings shall be installed in accordance with **Section 9**.

6.6 *Surface Burn Characteristics*

6.6.1 Thermo-Brace Red Structural Sheathings may be used as a Class C interior finish material in accordance with IBC Section 803.1.2[34] and IRC Section R302.9.

6.6.2 Thermo-Brace Red Structural Sheathings have the flame spread characteristics shown in **Table 11**.

Table 11. Surface Burn Characteristics[1]

Product	Flame Spread	Smoke Developed
Thermo-Brace Red Structural Sheathing	< 200	< 450
1. Tested in accordance with ASTM E84 and UL 723		

6.7 *Minimum Fastening Requirements for Non-Structural Applications*

6.7.1 Where other means of wall bracing are provided or are not required, any grade of Thermo-Brace Red Structural Sheathing may be used to provide other wall functions when installed in accordance with this section.

6.7.1.1 The sheathing panels are applied to wall framing with 16-gauge, galvanized staples having a minimum $^{15}/_{16}$" crown and $1^{1}/_{4}$" leg lengths.

6.7.1.2 Fastener spacing shall be a maximum of 6" o.c in the field and 3" o.c. around the perimeter.

6.7.1.3 Stud spacing shall be a maximum of 16" o.c.

6.7.1.4 Minimum fastener penetration into the framing members is 1".

6.7.1.5 Fasten all staples parallel to the framing member, with an edge spacing of 3/8" (9.5 mm) minimum.

6.7.1.6 All panels are installed vertically or horizontally, with all joints backed by studs, plates, or blocks when water or air barrier functionality is desired.

6.7.1.7 When used as a WRB, joints shall overlap nominally 3/4" (19 mm) or be butted and covered with Barricade Seam Tape or equivalent. Overlapped joints are not required to the covered with Barricade Seam Tape.

6.8 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.

7 Certified Performance[35]

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.[36]

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.[37]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Thermo-Brace Red Structural Sheathings comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Structural performance for shear wall assemblies used as lateral force resisting systems in Seismic Design Categories A through F, have been tested and evaluated in accordance with the following standards:

8.1.1.1 ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

8.1.1.2 ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels

8.1.1.3 ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction

8.1.1.4 ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings

8.1.1.5 ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings

8.1.2 Lateral force resisting systems for use in both wind and seismic applications follow the performance-based provisions of IBC Section 2306.1, IBC Section 2306.3, and/or Section 4.3 SDPWS for light-frame wood wall assemblies.

8.1.2.1 **Table 6** provides Seismic Design Coefficients (SDC) that conform to the requirements in ASCE 7 Section 12.2.1, 12.2.1.1, and Table 12.2-1 for design of wall assemblies in buildings that require seismic design.

8.1.2.1.1 ASTM D7989 is accepted engineering practice used to establish SDC. Test data generated by ISO/IEC 17025 approved agencies and/or professional engineers, and all associated professional engineering evaluations, which use ASTM D7989 as their basis, are defined as intellectual property and/or trade secrets and are also defined as an independent design review, e.g., Listings, certified reports, duly authenticated reports from approved agencies, and/or research reports prepared by approved agencies and/or approved sources.

8.1.3 Thermo-Brace Red Structural Sheathings have been evaluated to determine the following:

8.1.3.1 Structural performance under lateral load conditions (wind and seismic) for use as an alternative to the IRC intermittent wall bracing provisions of IRC Section R602.10, Method WSP (Wood Structural Panel) and the IRC continuous wall bracing provisions of IRC Section R602.10.4, Methods CS-WSP (Continuously Sheathed Wood Structural Panel) and CS-PF (Continuously Sheathed Portal Frame).

8.1.3.2 Structural performance under lateral load conditions for use as an alternative to the IRC Continuous Wall Bracing provisions of IRC Section R602.10.6.2 Method PFH (Portal Frame with Hold-down).

8.1.3.3 Structural performance under lateral load conditions (wind and seismic) for use with the IBC performance based provisions, IBC Section 2306.1 and IBC Section 2306.3, for light-frame wood wall assemblies.

8.1.3.3.1 The basis for equivalency testing is outlined in ASCE 7 Section 12.2.1.1:

> **12.2.1.1 Alternative Structural Systems.** Use of seismic force-resisting systems not contained in Table 12.2-1 shall be permitted contingent on submittal to and approval by the Authority Having Jurisdiction and independent structural design review of an accompanying set of design criteria and substantiating analytical and test data. The design criteria shall specify any limitations on system use, including Seismic Design Category and height; required procedures for designing the system's components and connections; required detailing; and the values of the response modification coefficient, R; overstrength factor, Ω_0; and deflection amplification factor, C_d.

8.1.3.3.2 The cornerstone of the seismic evaluation performed as part of this report, is based on ASTM D7989 and testing per ASTM E2126 to establish SDC that conform to the requirements of ASCE 7, Section 12.2.1.1.

8.1.3.4 Structural performance under lateral load conditions for use as an alternative to Section 4.3 SDPWS Wood Frame Shear Walls.

8.1.3.5 Resistance to transverse loads for wall assemblies used in light-frame wood construction in accordance with IBC Section 1609.1.1 and IRC Section R301.2.1.

8.1.3.6 Resistance to uplift loads for wall assemblies used for light-frame wood construction in accordance with IBC Section 1609 and IRC Section R301.2.1.

8.1.3.7 Performance for use as a WRB in accordance with IBC Section 1403.2[38] and IRC Section R703.2.

8.1.3.8 Performance for use as an air barrier in accordance with IRC Section N1102.5.1.1,[39] IECC Section R402.5.1.1,[40] and IECC Section C402.6.1.1.[41]

8.1.3.9 Performance for use as a draftstop in accordance with IBC Section 708.4.2, IBC Section 718.3, IBC Section 718.4, and IRC Section R302.12.

8.1.3.10 Surface burn characteristic performance for use as a Class C interior finish material in accordance with IBC Section 803.1.2[42] and IRC Section R302.9.

8.1.4 Use of Thermo-Brace Red Structural Sheathings in fire resistance rated assemblies is outside the scope of this report.

8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[43] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[44] respectively.

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

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

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 Basic instructions are printed on every Thermo-Brace Red Structural Sheathing pallet or insert.

9.4 *Orientation*

9.4.1 Thermo-Brace Red Structural Sheathings and Perma "R" Brace Red Structural Sheathings shall be installed in either the vertical or the horizontal orientation. To be recognized for the structural values listed in this report or as a water barrier, all joints must be backed by studs, plates, or blocking, and fastened.

9.4.2 Perma "R" Brace Red Guard and Thermo-Brace Red Guard must be installed vertically, centered on the corner of the building. To be recognized as a water barrier, all joints must be backed by studs, plates, or blocking and fastened in accordance with **Section 6.3**.

9.5 *Fastener Type*

9.5.1 *Thermo-Brace Red Structural Sheathing:*

9.5.1.1 Minimum $^{15}/_{16}$" crown x $1^{1}/_{4}$" leg, 16-gauge galvanized staples shall be installed per the staple manufacturer instructions.

9.5.1.2 Where permitted in **Section 6**, minimum 0.120" x $1^{1}/_{4}$" roofing nails shall be installed per the nail manufacturer instructions.

9.5.1.3 Fasteners shall be driven so that the crown of the fastener is in contact with the surface of the Thermo-Brace Red Structural Sheathing. Do not overdrive fasteners.

9.5.2 *Gypsum Wallboard (GWB):*

9.5.2.1 Where required, GWB shall be a minimum $^{1}/_{2}$" thickness and shall be attached at a minimum, with one of the following:

9.5.2.1.1 #6 x $1^{1}/_{4}$" type W or S screws

9.5.2.1.2 5d cooler nails

9.6 *Fastener Edge Distance*

9.6.1 Fasteners shall be installed with a nominal edge distance of $^{3}/_{8}$" (9.5 mm) for Thermo-Brace Red Structural Sheathing and gypsum.

9.7 *Treatment of Joints*

9.7.1 Thermo-Brace Red Structural Sheathing joints may be either butted or overlapped.

9.7.1.1 Butted joints shall be placed over framing members and fastened with a single row of fasteners at each panel edge. A slight gap of approximately $^{1}/_{8}$" between panels is allowed. Seal butted seams with Barricade Seam Tape, or equivalent, when finished with attaching the wall panels and all fasteners in the wall line.

9.7.1.2 Lapped joints shall be overlapped by nominally $^{3}/_{4}$" (19 mm) and fastened with a single row of fasteners. Always run staples parallel to framing. Overlapped joints do not require Barricade Seam Tape.

9.7.2 Thermo-Brace Red Structural Sheathing must be installed with appropriate flashing and counter-flashing, in conformance with accepted building standards and in compliance with local building codes and the flashing manufacturer installation 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 Lateral load testing in accordance with ASTM E564 and ASTM E2126, and analysis per ASTM D7989

10.1.2 Transverse load testing in accordance with ASTM E330

10.1.3 Uplift load testing in accordance with ASTM E72

10.1.4 Water-resistive barrier testing in accordance with ASTM E331

10.1.5 Air barrier material testing in accordance with ASTM E2178

10.1.6 Flame spread and smoke developed ratings in accordance with ASTM E84

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.[45]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Thermo-Brace Red Structural Sheathing on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Thermo-Brace Red Structural Sheathings 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, Thermo-Brace Red Structural Sheathings shall be approved for the following applications:

11.2.1 Lateral load resistance due to wind and seismic loads carried by shear walls.

11.2.2 Use as equivalent to the CS-PF as described in IRC Section R602.10.5 and IRC Section R602.10.6.4.

11.2.3 Use as an equivalent alternative to Method PFH as described in IRC Section R602.10.6.2.

11.2.4 Transverse load resistance due to components and cladding wind pressures on building surfaces.

11.2.5 Uplift load resistance due to wind uplift loads carried by the walls.

11.2.6 Performance for use as a WRB in accordance with IBC Section 1403.2[46] and IRC Section R703.2.

11.2.7 Performance for use as an air barrier in accordance with IRC Section N1102.5.1.1, IECC Section R402.5.1.1,[47] and IECC Section C402.6.1.1.[48]

11.2.8 Performance for use as a draftstop in accordance with IBC Section 708.4.3,[49] IBC Section 718.3, IBC Section 718.4 and IRC Section R302.12.

11.2.9 Performance for use as a Class C interior finish material in accordance with IBC Section 803.1.2[50] and IRC Section R302.9.

11.3 Unless exempt by state statute, when Thermo-Brace Red Structural Sheathings 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 INDEVCO Building Products.

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

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

12.3 As listed herein, Thermo-Brace Red Structural Sheathing shall not be used:

12.3.1 As a nailing base for claddings, trim, windows, or doors. Fastening through the Thermo-Brace Red Structural Sheathing into the framing is acceptable.

12.3.2 To resist horizontal loads from concrete and masonry walls.

12.4 When Thermo-Brace Red Structural Sheathing is installed as a wall sheathing, but is not installed per structural requirements, light-framed walls shall be braced by other means. When used as a WRB, installation shall be in accordance with **Section 6.3**.

12.4.1 When Thermo-Brace Red Structural Sheathing is not installed as a WRB, other means of providing a WRB shall be required, as per the code.

12.5 When used in accordance with the IBC in Seismic Design Categories C, D, E, or F, special inspections shall comply with IBC Section 1705.13.[57]

12.6 When used in accordance with the IBC in high wind areas, special inspections shall comply with IBC Section 1705.12.[58]

12.7 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

12.7.1 Allowable shear loads shall not exceed values in **Table 5** for wind loads and **Table 6** for seismic loads.

12.7.2 Allowable uplift loads shall not exceed values in **Table 7**.

12.8 Transverse design loads and wind speeds shall not exceed those described in **Table 8** and **Table 9**, respectively, unless an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing.

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

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

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

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

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

12.10 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.

13 Identification

13.1 The innovative products listed in **Section 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.indevconorthamerica.com, www.barricadebp.com, or www.permarproducts.com.

14 Review Schedule

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

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

Issue Date: February 18, 2021
Subject to Renewal: July 1, 2026

FBC Supplement to Report Number 1507-08

REPORT HOLDER: INDEVCO Building Products

1 Evaluation Subject

1.1 Thermo-Brace Red Structural Sheathing

1.2 Thermo-Brace Red Guard Structural Sheathing

1.3 Perma “R” Brace Red Structural Sheathing

1.4 Perma “R” Brace Red Guard Structural Sheathing

1.4.1 Unless otherwise noted, where Thermo-Brace Red Structural Sheathing is cited in this supplement, the provisions apply equally to Thermo-Brace Red Guard Structural Sheathing, Perma “R” Brace Red Structural Sheathing, and Perma “R” Brace Red Guard Structural Sheathing.

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Thermo-Brace Red Structural Sheathings, recognized in Report Number 1507-08, have 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 20358)*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential (FL 20358)*

3 Conclusions

3.1 Thermo-Brace Red Structural Sheathings, described in Report Number 1507-08, comply with the FBC-B and FBC-R and are 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 report, they are listed here:

3.2.1 FBC-B Section 104 is reserved.

3.2.2 FBC-B Section 110.4 is reserved and replaces IBC Section 110.4.

3.2.3 FBC-B Section 104.6 is reserved and replaces IBC Section 104.4.

3.2.4 FBC-B Section 104.11 replaces IBC Section 104.2.3 and Section 104.2.3.2.

3.2.5 FBC-B Section 105.3 replaces IBC Section 105.3.

3.2.6 FBC-B Section 105.3.1 replaces IBC Section 105.3.1.

3.2.7 FBC-B Section 110.3 replaces IBC Section 110.3.

3.2.8 FBC-B Section 718.3 replaces IBC Section 718.3.

3.2.9 FBC-B Section 718.4 replaces IBC Section 718.4.

3.2.10 FBC-B Section 803.1.1 replaces IBC Section 803.1.2.

3.2.11 FBC-B Section 1403.2 replaces IBC Section 1403.2.

3.2.12 FBC-B Section 1609.1.1 replaces IBC Section 1609.1.1.

3.2.13 FBC-B Section 1613 is reserved and replaces IBC Section 1613.

3.2.14 FBC-B Section 1705 is reserved and replaces IBC Section 1705.12 and IBC Section 1705.13.

3.2.15 FBC-B Section 1707.1 replaces IBC Section 1707.1.

3.2.16 FBC-B Section 2306.1 replaces IBC Section 2306.1.

3.2.17 FBC-B Section 2306.3 replaces IBC Section 2306.3.

3.2.18 FBC-B Section 2308 is reserved and replaces IBC Section 2308.10.

3.2.19 FBC-R N1101.1 replaces IRC Section N1102.5.1.1.

3.2.20 FBC-R Section R104 and Section R109 are reserved.

3.2.21 FBC-R Section R301.1 replaces IRC Section R301.1.

3.2.22 FBC-R Section R301.2.1 replaces IRC Section R301.2.1.

3.2.23 FBC-R Section R302.9 replaces IRC Section R302.9.

3.2.24 FBC-R Section R302.12 replaces IRC Section R302.12.

3.2.25 FBC-R Section R602.10 is reserved and replaces IRC Section R602.10.

3.2.26 FBC-R Section R602.10.3 is reserved and replaces IRC Section R602.10.3.

3.2.27 FBC-R Table R602.10.3(1), FBC-R Table R602.10.3(2), FBC-R Table R602.10.3(3), and FBC-R Table R602.10.3(4) are reserved and replace IRC Table R602.10.3(1), IRC Table R602.10.3(2), IRC Table R602.10.3(3), and IRC Table R602.10.3(4), respectively.

3.2.28 FBC-R Section R602.10.4 is reserved and replaces IRC Section R602.10.4.

3.2.29 FBC-R Section R602.10.5 is reserved and replaces IRC Section R602.10.5.

3.2.30 FBC-R Section R602.10.6.2 is reserved and replaces IRC Section R602.10.6.2.

3.2.31 FBC-R Section R602.10.6.4 is reserved and replaces IRC Section R602.10.6.4.

3.2.32 FBC-R Section R703.2 replaces IRC Section R703.2.

4 Conditions of Use

4.1 Thermo-Brace Red Structural Sheathing, described in Report Number 1507-08, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1507-08.

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

Issue Date: March 2, 2021
Subject to Renewal: July 1, 2026

CBC and CRC Supplement to Report Number 1507-08

REPORT HOLDER: INDEVCO Building Products

1 Evaluation Subject

1.1 Thermo-Brace Red Structural Sheathing

1.2 Thermo-Brace Red Guard Structural Sheathing

1.3 Perma “R” Brace Red Structural Sheathing

1.4 Perma “R” Brace Red Guard Structural Sheathing

1.4.1 Unless otherwise noted, where Thermo-Brace Red Structural Sheathing is cited in this supplement, the provisions apply equally to Thermo-Brace Red Guard Structural Sheathing, Perma “R” Brace Red Structural Sheathing, and Perma “R” Brace Red Guard Structural Sheathing.

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Thermo-Brace Red Structural Sheathings, recognized in Report Number 1507-08 have also been evaluated for compliance with the codes listed below.

2.2 *Applicable Code Editions*

2.2.1 *CBC—19, 22: California Building Code (Title 24, Part 2)*

2.2.2 *CRC—19, 22: California Residential Code (Title 24, Part 2.5)*

3 Conclusions

3.1 Thermo-Brace Red Structural Sheathings, described in Report Number 1507-08, comply with the CBC and CRC and are subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the CBC and CRC applicable to this report, they are listed here:

3.2.1 CBC Section 104.6 replaces IBC Section 104.4.

3.2.2 CBC Section 104.11 replaces IBC Section 104.2.3 and Section 104.2.3.2.

3.2.3 CBC Section 708.4.1 replaces IBC Section 708.4.2.

3.2.4 CBC Section 708.4.2 replaces IBC Section 708.4.3.

3.2.5 CBC Section 718.3 replaces IBC Section 718.3.

3.2.6 CBC Section 718.4 replaces IBC Section 718.4.

3.2.7 CBC Section 1403.2 replaces IBC Section 1403.2.

3.2.8 CBC Section 1609.1.1 replaces IBC Section 1609.1.1.

3.2.9 CBC Section 1705.12 replaces IBC Section 1705.12.

3.2.10 CBC Section 1707.1 replaces IBC Section 1707.1.

3.2.11 CBC Section 2306.3 replaces IBC Section 2306.3.

3.2.12 CBC Section 2308.6 replaces IBC Section 2308.10.

3.2.13 CRC Part IV Energy Conservation is not adopted and replaces N1102.5.1.1.

3.2.14 CRC Section R104.6 replaces IBC Section R104.4.

3.2.15 CRC Section R104.11 replaces IRC Section R104.2.2.

3.2.16 CRC Section R301.1 replaces IRC Section R301.1.

3.2.17 CRC Section R602.10 replaces IRC Section R602.10.

3.2.18 CRC Section R703.2 replaces IRC Section R703.2.

4 Conditions of Use

4.1 Thermo-Brace Red Structural Sheathing, described in Report Number 1507-08, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1507-08.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of CBC and CRC, as applicable.

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 All references to the CBC and CRC are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the California Supplement at the end of this report.

26 All references to the FBC-B and FBC-R are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the Florida Supplement at the end of this report.

27 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

28 2021 IBC Section 2308.6

29 2015 IBC Section 1404.2

30 2021 IRC Section N1102.4.1.1

31 2021 IECC Section R402.4.1.1

32 2021 IECC Section C402.5.1.1

33 2021 IBC Section 708.4.2

34 2015 IBC Section 803.1.1

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

36 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

37 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

38 2015 IBC Section 1404.2

39 2021 IRC Section N1102.4.1.1

40 2021 IECC Section R402.4.1.1

41 2021 IECC Section C402.5.1.1

42 2015 IBC Section 803.1.1

43 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.

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

45 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

46 2015 IBC Section 1404.2

47 2021 IECC Section R402.4.1.1

48 2021 IECC Section C402.5.1.1

49 2021 IBC Section 708.4.2

50 2015 IBC Section 803.1.1

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 2018 IBC Section 1705.12

58 2018 IBC Section 1705.11