Technical Evaluation Report
TER 1507-08
Thermo-Brace® Red Structural Sheathing

Barricade® Building Products

Product:
Thermo-Brace® Red Structural Sheathing

Issue Date:
April 4, 2016

Revision Date:
June 13, 2019

Subject to Renewal:
July 1, 2020
COMPANY INFORMATION:

Barricade® Building Products

P.O. Box 2002
10351 Verdon Rd.
Doswell, VA 23047
804-876-3135
barricadebp.com

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 PRODUCT EVALUATED
1.1 Thermo-Brace® Red Structural Sheathing

2 APPLICABLE CODES AND STANDARDS
2.1 Codes

2.1.1 IBC—12, 15, 18: International Building Code®
2.1.2 IRC—12, 15, 18: International Residential Code®
2.1.3 IECC—12, 15, 18: International Energy Conservation Code®
2.1.4 FBC-B—14, 17: Florida Building Code – Building
2.1.5 FBC-R—14, 17: Florida Building Code – Residential
2.1.6 FBC-EC—14, 17: Florida Building Code – Energy Conservation

1 Building codes require data from valid research reports be obtained from approved sources. An approved agency, which is an approved source, is defined as “an established and recognized agency that is regularly engaged in...furnishing product certification where such agency has been approved...” Being approved, defined as “acceptable to the building official,” is accomplished via accreditation using ISO/IEC 17065 evaluation procedures meeting code requirements of independence, adequate equipment, and experienced personnel. DrJ is an ISO/IEC 17065 ANSI-Accredited Product Certification Body – Accreditation #1131.

Through ANSI accreditation, DrJ certification can be used to obtain product approval in any country that is an IAF MLA Signatory and covered by an IAF MLA Evaluation per the Purpose of the MLA – “certified once, accepted everywhere.” Manufacturers can go to jurisdictions in any IAF MLA Signatory Country and have their products readily approved by authorities having jurisdiction using DrJ’s ANSI accreditation.

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, see drjcertification.org.

2 Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein (e.g., ASCE 7, NDS, ASTM). This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein. As required by code, where this TER is not approved, the building official shall respond in writing stating the reasons this TER was not approved. For any variations in state and local codes, see Section 8.

3 All terms defined in the applicable building codes are italicized.
2.2 Standards and Referenced Documents

2.2.1 ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic
2.2.2 ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
2.2.3 ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings
2.2.4 ASTM E2178: Standard Test Method for Air Permeance of Building Materials
2.2.5 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
2.2.6 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
2.2.7 ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
2.2.8 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
2.2.9 UL 723: Test for Surface Burning Characteristics of Building Materials

3 PERFORMANCE EVALUATION

3.1 Thermo-Brace® Red Structural Sheathing has been evaluated to determine:

3.1.1 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, and the IRC Continuous Wall Bracing provisions of IRC Section R602.10.4, method CS-PF.

3.1.2 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.

3.1.2.1 Table 3 provides seismic design coefficients (SDC) that conform to the requirements in ASCE 7 Section 12.2.1 and Table 12.2-1 for design of wall assemblies in buildings that require seismic design in accordance with ASCE 7 (i.e., all seismic design categories).

3.1.2.2 The basis for equivalency testing is outlined in ASCE 7 Section 12.2.1:

Seismic force-resisting systems not contained in Table 12.2-1 are permitted provided analytical and test data are submitted to the authority having jurisdiction for approval that establish their dynamic characteristics and demonstrate their lateral force resistance and energy dissipation capacity to be equivalent to the structural systems listed in Table 12.2-1 for equivalent values of response modification coefficient, R, overstrength factor, Ωo, and deflection amplification factor, Cd.

3.1.2.3 The SDC evaluation uses the approach found in documentation entitled “Equivalency Characteristics and Parameters for Proprietary Shearwalls Used in Wood Framed or Cold-formed Steel Construction” using code defined accepted engineering procedures, experience, and good technical judgment.

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

3.1.4 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.

3.1.5 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.

3.1.6 Performance for use as a water-resistive barrier (WRB) in accordance with IBC Section 1404.2 and IRC Section R703.2.

3.1.7 Performance for use as an air barrier in accordance with IRC Section N1102.4.1.1, IECC Section C402.5.1.1, and IECC Section R402.4.1.1.

4 structurmag.org
5 2012 IECC Section C402.4.1.1
3.1.8 Performance for use as a draftstop in accordance with IBC Section 708.4.2, 718.3, and 718.4 and IRC Section R302.12.

3.1.9 Performance of surface burn characteristics in accordance with IBC Section 2603.3.

3.2 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

3.3 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within DrJ’s professional scope of work.

4 PRODUCT DESCRIPTION AND MATERIALS

4.1 The product evaluated in this TER is shown in Figure 1.

![Thermo-Brace® Red Structural Sheathing](image)

**FIGURE 1. THERMO-BRACE® RED STRUCTURAL SHEATHING**

4.2 Thermo-Brace® Red Structural Sheathing is 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 foil facings may be additionally applied on one or both faces.

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

4.3 Material Availability

4.3.1 Standard widths include 48" (1219 mm) and 48¾" (1238 mm).

4.3.2 Standard lengths include 96" (2438 mm), 108" (2743 mm), and 120" (3048 mm).

4.3.3 Other custom widths and lengths can be manufactured.

5 APPLICATIONS

5.1 General

5.1.1 Thermo-Brace® Red Structural Sheathing panels are used in the following applications as:

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

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

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

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

5.2.1 General Structural Provisions:

5.2.1.1 Except as otherwise described in this TER, Thermo-Brace® Red Structural Sheathing shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth therein for the design and installation of wood structural panels (WSP).

5.2.1.1.1 Thermo-Brace® Red Structural Sheathing is 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 TER.

5.2.1.2 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 code referenced in Section 2.

5.2.1.3 Except as provided for in Section 5.2.2, the maximum aspect ratio for Thermo-Brace® Red Structural Sheathing shall be 4:1.

5.2.1.4 The minimum full height panel width shall be 24", except as allowed by Section 5.2.2.

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

5.2.2 Prescriptive IRC Bracing Applications:

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

5.2.2.2 For wind design, required braced wall panel lengths for Thermo-Brace® Red Structural Sheathing shall be as shown in Table 1, and shall be used in conjunction with IRC Table R602.10.3(2),\(^6\) which provides the required adjustments.

5.2.2.3 For seismic design, required braced wall panel lengths for Thermo-Brace® Red Structural Sheathing shall be as shown in Table 2 and shall be used in conjunction with IRC Table R602.10.3(4),\(^7\) which provides the required adjustments.

5.2.2.4 Use of Thermo-Brace® with Method CS-PF is also permitted, in lieu of WSP specified in accordance with IRC Section R602.10.6.4.

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\(^6\) 2009 IRC Table R602.10.1.2(1) including all footnotes

\(^7\) 2009 IRC Table R602.10.1.2(2) including all footnotes
### TABLE 1. REQUIRED BRACING LENGTHS FOR THERMO-BRACE® RED IN ACCORDANCE WITH IRC WIND BRACING PROVISIONS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Braced Wall Line Spacing (ft)</th>
<th>Length of Wall Line to be Braced (ft)</th>
<th>Wind Speeds (mph)</th>
<th>Wind Speeds (mph)</th>
<th>Wind Speeds (mph)</th>
<th>Wind Speeds (mph)</th>
<th>Wind Speeds (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Intermittent Sheathing¹</td>
<td>Continuous Sheathing¹</td>
<td>Intermittent Sheathing¹</td>
<td>Continuous Sheathing¹</td>
<td>Intermittent Sheathing¹</td>
<td>Continuous Sheathing¹</td>
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<tr>
<td>One Story or the Top of Two or Three Stories</td>
<td>10</td>
<td>1.5</td>
<td>1.5</td>
<td>1.9</td>
<td>1.9</td>
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<tr>
<td>First Story of Two Stories or Second Story of Three Stories</td>
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<td>24.0</td>
<td>17.3</td>
<td>18.8</td>
</tr>
</tbody>
</table>

1. Nails or Staples 3" o.c. Edges & in the Field
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, a minimum of ½" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum 5d cooler nails or 1¼" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
3. Demonstrates equivalency to 2009 IRC Table R602.10.1.2(1). All adjustment factors from 2009 IRC Table R602.10.1.2(1) shall be applied. Except when used with method CS-PF, a minimum of ½" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum 5d cooler nails or 1¼" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
4. Thermo-Brace® Red shall be installed with minimum 5/16" crown x 1¼" leg 16 gauge galvanized staple. Joints may be butted or lapped.
5. 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.
6. 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 2 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.
### Table 2. Required Bracing Lengths for Thermo-Brace® Red in Accordance with IRC Seismic Bracing Provisions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Braced Wall Line Spacing (ft)</th>
<th>Minimum Length of Braced Wall Panels Required Along Each Braced Wall Line¹ (ft)</th>
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<td>SDC D₁</td>
<td>SDC D₂</td>
<td>SDC C (townhouses only)</td>
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<td>One Story or the Top of Two or Three Stories</td>
<td>10</td>
<td>1.2</td>
<td>1.3</td>
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<td>1.9</td>
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<td>16.9</td>
<td>19.7</td>
<td>22.5</td>
<td>NP</td>
<td>14.3</td>
</tr>
</tbody>
</table>

SI: 1 in = 25.4 mm
NP = Not Provided
1. Installed with 1/2" gypsum wallboard at 16” o.c. stud spacing
2. Nails or Staples 3” o.c. Edges & in the Field
3. 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, 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 11/4" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
4. Demonstrates equivalency to 2009 IRC Table R602.10.1.2(2). All adjustment factors from 2009 IRC Table R602.10.1.2(3) shall be applied. Except 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 11/4" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
5. Thermo-Brace® Red shall be installed with minimum 1/2" crown x 11/4" leg 16 gauge galvanized staple. Joints may be butted or lapped.
6. 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'
7. 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.
8. Linear interpolation is permitted.
9. 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 2 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.

5.2.3 Thermo-Brace® Red CS-PF Portal Frame:

5.2.3.1 A “Thermo-Brace® Red Structural Sheathing CS-PF” was evaluated for equivalency to the IRC Method CS-PF (Continuous Sheathed Portal Frame) in accordance with IRC Section R602.10.6.4 and Table R602.10.5.
5.2.3.2 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.

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

5.2.3.4 The Thermo-Brace® Red Structural Sheathing CS-PF is described as follows (Figure 2):
5.2.3.5 Required braced wall panel lengths for Thermo-Brace® Red Structural Sheathing shall be as determined by the equivalency factor shown in Table 3 and IRC Table R602.10.3(1-4)\(^8\) including all footnotes.

5.2.3.5.1 The braced wall line length equivalency factors in Table 3 are based on equivalency testing and are used to comply with Method WSP and Method CS-WSP of the IRC.

5.2.3.5.2 Thermo-Brace® Red Structural Sheathing tested equivalency factors in Table 3 allow the user to determine the length of bracing required, by multiplying the factor from Table 3 by the length shown in the WSP or CS columns in IRC Table R602.10.3(1 and 3), as modified by all applicable factors in IRC Table R602.10.3(2 and 4), respectively.

5.2.3.6 All IRC prescriptive bracing minimums, spacing requirements, and rules must still be met.

5.2.3.7 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.

**TABLE 3. THERMO-BRACE® RED BRACED WALL LINE LENGTH EQUIVALENCY FACTORS BASED ON EQUIVALENCY TESTING FOR USE WITH THE IRC WIND OR SEISMIC**

<table>
<thead>
<tr>
<th>Wall Bracing Factors</th>
<th>Maximum Stud Spacing (in)</th>
<th>Fastener</th>
<th>Fastener Spacing (edge/field)</th>
<th>Interior Sheathing</th>
<th>GWB Fastening</th>
<th>SPF Framing with Thermo-Brace® Red</th>
<th>Tested Equivalency Factors to IRC WSP or CS-WSP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-Brace® Red Structural Sheathing</td>
<td>16 o.c.</td>
<td>15/16&quot; Crown x 1 1/4&quot; Leg Staples</td>
<td>3/3</td>
<td>1/2&quot; GWB</td>
<td>8:8</td>
<td>0.75</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16:16</td>
<td>0.91</td>
<td></td>
</tr>
</tbody>
</table>

St. 1" = 25.4 mm
1. Staples shall be a minimum 16 gauge.
2. Thermo-Brace® Red Structural Sheathing tested equivalency factors allow the user to determine the length of bracing required, by multiplying the factor by the length of bracing shown in the WSP or CS columns in IRC Table R602.10.3(1 and 3), as modified by all applicable factors in IRC Table R602.10.3(2 and 4) respectively.
3. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths in IRC Table R602.10.3(1 and 3), as modified by all applicable factors in IRC Table R602.10.3(2 and 4), shall be used, except the factor for omitting the gypsum wallboard shall be 1.8 for gypsum fastened 8:8.
4. Valid for single top plate (advanced framing method) wall installations or double top plate wall installations
5. Gypsum wallboard shall be installed according to the provisions listed in IRC Table R702.3.5.

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

5.2.4.1 Thermo-Brace® Red Structural Sheathing 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.

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\(^8\) 2009 IRC Table R602.10.1.2(1) and Table R602.10.1.2(2)
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 2308.6 and this TER.

5.2.5 Performance-Based Wood-Framed Construction:

5.2.5.1 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 4, Table 5, and Table 6.

5.2.5.2 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 4.

5.2.5.3 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 5.

---

**Table 4. Thermo-Brace® Allowable Stress Design (ASD) Capacity – Wind**

<table>
<thead>
<tr>
<th>Joint Condition</th>
<th>Maximum Stud Spacing (in)</th>
<th>Gypsum Wallboard (GWB)</th>
<th>Gypsum Wallboard Fastener Spacing (edge/field)</th>
<th>Allowable Unit Shear Capacity (plf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-Brace® Red Structural Sheathing</td>
<td>16 o.c.</td>
<td>No GWB</td>
<td>-</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¼&quot; GWB</td>
<td>8/8</td>
<td>475</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16/16</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No GWB</td>
<td>-</td>
<td>355</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¼&quot; GWB</td>
<td>8/8</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>16/16</td>
<td>430</td>
</tr>
</tbody>
</table>

SI: 1" = 25.4 mm, 1 lb/ft = 0.0146 kN/m
1. Gypsum wallboard on the back (interior) side of the wall.
2. Thermo-Brace® Red attached with a minimum 16 gauge, ¾" 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 5" o.c. in the field. Fastener edge distance shall be a minimum of ¾".
3. Gypsum attached with minimum #6 type W or S screws 1¼" long or 5d cooler nails with a minimum edge distance of ¾".

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² 2015 IBC Section 2308.9.3
TABLE 5. SEISMIC ALLOWABLE UNIT SHEAR CAPACITY & SEISMIC DESIGN COEFFICIENTS FOR THERMO-BRACE® RED STRUCTURAL SHEATHING¹, ³

<table>
<thead>
<tr>
<th>Seismic Force-Resisting System</th>
<th>Joint Condition</th>
<th>Gypsum Wallboard² (GWB)</th>
<th>Maximum Stud Spacing (in)</th>
<th>Seismic Allowable Unit Shear Capacity (plf)</th>
<th>Apparent Shear Stiffness, Gₛ (kips/in)</th>
<th>Response Modification Factor, R⁵</th>
<th>System Overstrength Factor, Ω₀⁶</th>
<th>Deflection Amplification Coefficient, C_d⁷</th>
<th>Structural System Limitations &amp; Building Height (ft) Limit⁸</th>
<th>Seismic Design Category</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-Frame (Wood) Walls Sheathed with Thermo-Brace® Red</td>
<td>Butted or Lapped</td>
<td>½&quot; GWB</td>
<td>16 o.c.</td>
<td>380</td>
<td>12.0</td>
<td>6.5</td>
<td>3</td>
<td>4</td>
<td>NL</td>
<td>NL</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No GWB</td>
<td>16 o.c.</td>
<td>265</td>
<td>6.8</td>
<td>6.5</td>
<td>3</td>
<td>4</td>
<td>NL</td>
<td>NL</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Thermo-Brace® Red sheathing attached with a minimum 16 gauge, ⅛" 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 surface.

2. Gypsum attached with minimum #6 type W or S screws 1¼" long with a minimum edge distance of ⅛", spaced 8" o.c. on the edge and 8" o.c. in the field.

3. All seismic design parameters follow the equivalency as defined in Section 3 of this TER.

4. Thermo-Brace® Red sheathing may be installed with either lapped joints or butted joints.

5. Response modification coefficient, R, system overstrength factor, Ω₀, and deflection amplification factor, C_d, indicated in Table 5 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.

6. 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 6.

TABLE 6. UPLIFT PERFORMANCE OF THERMO-BRACE® RED STRUCTURAL SHEATHING

<table>
<thead>
<tr>
<th>Type of Structural Sheathing</th>
<th>Allowable Unit Uplift Capacity (plf)</th>
<th>Max Stud Spacing (in)</th>
<th>Fastener Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-Brace® Red: Single Bottom Plate</td>
<td>400¹</td>
<td>16&quot; o.c.</td>
<td>⅛&quot; crown, 1½&quot; leg 16 gage galvanized staples or 0.120&quot; x 1½&quot; roofing nails, 3&quot; o.c. to perimeter/field. Staple crowns to be installed parallel to grain.</td>
</tr>
</tbody>
</table>

1. Gypsum wallboard on the back (interior) side of the wall

5.2.5.5 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 7.
### Table 7. Allowable Uniform Load Capacities (psf) for Thermo-Brace® Red Structural Sheathing Transverse Wind Load Resistance

<table>
<thead>
<tr>
<th>Thermo-Brace® Grade</th>
<th>Maximum Stud Spacing (in)</th>
<th>Allowable Design Value (psf)</th>
<th>Fastener Schedule</th>
<th>Basic Wind Speed $V_{wds}$ per ASCE 7-05 (mph)</th>
<th>Basic Wind Speed $V_{wdt}$ per ASCE 7-10 (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-Brace® Red (0.095”)</td>
<td>16 o.c.</td>
<td>80</td>
<td>$\frac{1}{16}$&quot; crown, $\frac{1}{4}$&quot; leg 16 gage galvanized staples or 0.120&quot; x $\frac{1}{4}$&quot; roofing nails, 3&quot; o.c. to perimeter/field</td>
<td>$\leq 139$</td>
<td>$\leq 180$</td>
</tr>
</tbody>
</table>

SI: 1” = 25.4 mm, 1 psf = 0.0479 kN/m², 1 mph = 1.61 km/h
1. Design wind load capacity shall be in accordance with IBC Section 1609.1.1.
2. Staple crowns shall be installed parallel to grain.
3. 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. See the applicable building code for any adjustment needed for specific building location and configuration.

### 5.3 Perforated Shear Walls

5.3.1 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:

5.3.1.1 *SDPWS* Equation 4.3-5 for $C_o$ shall be replaced with the equation from Table 8.

#### Table 8. $C_o$ for Use with SDPWS Perforated Shear Wall Methodology

<table>
<thead>
<tr>
<th>Wall Assembly</th>
<th>Replace SDPWS Eq. 4.3-5 with the Following</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-Brace® Red (0.095”)</td>
<td>$C_o = \frac{r}{(2 - r)} \sum L_i$</td>
</tr>
</tbody>
</table>

5.3.1.2 Figure 3 shows how to calculate the capacity of a perforated shear wall with Thermo-Brace® Red Structural Sheathing using Table 8.
5.4 Fire Resistance Properties

5.4.1 Surface Burn Characteristics:

5.4.1.1 Thermo-Brace® Red Structural Sheathing panels have the flame spread characteristics shown in Table 9.

**TABLE 9. FLAME SPREAD & SMOKE DEVELOPED INDEXES OF THERMO-BRACE® RED STRUCTURAL SHEATHING**

<table>
<thead>
<tr>
<th>Structural Sheathing</th>
<th>Flame Spread</th>
<th>Smoke Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermo-Brace® Red</td>
<td>&lt; 200</td>
<td>&lt; 450</td>
</tr>
</tbody>
</table>

1. Tested in accordance with ASTM E84 and UL 723
5.5 Water-Resistive Barrier

5.5.1 Thermo-Brace® Red Structural Sheathing may be used as a WRB as prescribed in *IBC Section 1404.2* and *IRC Section R703.2* when installed on exterior walls as described in this section of the TER.

5.5.2 Thermo-Brace® Red Structural Sheathing 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 6.

5.5.3 Where seams and joints between boards are overlapped nominally ¾" (19 mm) and fastened in accordance with Section 6, seam tape is not required for approval as a WRB.

5.5.4 Where seams and joints between boards are butt jointed, they shall be sealed with Barricade® Seam Tape or equivalent in accordance with Section 6.

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

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

5.6 Air Barrier

5.6.1 Thermo-Brace® Red Structural Sheathing may be used as an air barrier material as prescribed in *IRC Section N1102.4.1.1*, and *IECC Section R402.4.1.1 and C402.5.110* in accordance with *ASTM E2178*.

5.7 Draftstop

5.7.1 Thermo-Brace® Red Structural Sheathing may be used as a draftstop material in accordance with *IBC Section 708.4.2, 718.3, and 718.4* and *IRC Section R302.12*.

5.7.2 When installed as of a draftstop, Thermo-Brace® Red Structural Sheathing shall be installed in accordance with Section 6.

5.8 Non-Structural Applications

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

5.8.1.1 The sheathing panels are applied to wall framing with 16 gauge, galvanized staples having a 15/16" crown and 1¼" leg lengths.

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

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

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

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

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

5.8.1.7 When used as a WRB, joints shall overlap nominally ¾" (19.1 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 INSTALLATION

6.1 General for Structural and WRB Applications

6.1.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.

6.1.2 Basic instructions are printed on every Thermo-Brace® pallet or insert.
6.2 Orientation

6.2.1 Thermo-Brace® Red Structural Sheathing shall be installed in either the vertical or the horizontal orientation. To be recognized for the structural values listed in this TER, or as a water barrier, all joints must be backed by studs, plates, or blocks and fastened.

6.3 Fastener Type

6.3.1 Thermo-Brace® Red Structural Sheathing:

6.3.1.1 Minimum $15/16\"$ crown by $1\frac{1}{4}\"$ leg, 16 gauge, galvanized staples shall be installed per the staple manufacturer's instructions.

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

6.3.2 Gypsum Wallboard:

6.3.2.1 Where required, gypsum wallboard shall be a minimum $\frac{1}{2}\"$ thickness and shall be attached with one of the following.

6.3.2.1.1 #6 x 1\frac{1}{4}\" type W or S screws

6.3.2.1.2 5d cooler nails

6.4 Fastener Edge Distance

6.4.1 Fasteners shall be installed with a nominal edge distance of $\frac{3}{8}\"$ (9.5 mm) for Thermo-Brace® Red Structural Sheathing and gypsum.

6.5 Treatment of Joints

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

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

6.5.1.2 Butt joints shall be placed over framing members and fastened with a single row of fasteners at each panel edge. Seal butted seams with Barricade® Seam Tape or equivalent when finished with attaching the wall panels and all fasteners in the wall line.

6.5.2 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's installation instructions.

7 TEST ENGINEERING SUBSTANTIATING DATA

7.1 Transverse load testing in accordance with ASTM E330, performed by SBCRI.

7.2 Uplift load testing in accordance with ASTM E72, performed by SBCRI.

7.3 Lateral load testing and data for determining comparative equivalency for use as an alternative material in accordance with ASTM E2126, performed by SBCRI.

7.4 Test reports and data for determining use as a water-resistive barrier material in accordance with ASTM E331, performed by Intertek.

7.5 Test reports and data for determining use as an air barrier in accordance with ASTM E2178, performed by Intertek.

7.6 Flame spread and smoke developed ratings in accordance with ASTM E84, performed by Intertek.

7.7 Test reports and data for determining comparative equivalency for use as an alternative material in accordance with IBC Section 104.11 and IRC Section R104.11.
7.8 Some information contained herein is the result of testing and/or data analysis by other sources which conform to IBC Section 1703 and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.

7.9 Where appropriate, DrJ’s analysis is based on design values that have been codified into law through codes and standards (e.g., IBC, IRC, NDS®, and SDPWS). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

8.1 When used and installed in accordance with this TER and the manufacturer’s installation instructions, the product(s) listed in Section 1.1 are approved for the following:

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

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

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

8.1.4 Performance for use as a WRB in accordance with IBC Section 1404.2 and IRC Section R703.2.

8.1.5 Performance for use as an air barrier in accordance with IRC Section N1102.4.1.1 and IECC Section R402.4.1.1 and Section C402.5.1.1.11

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

8.1.7 Surface burn characteristics in accordance IBC Section 2603.3.

8.2 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) 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, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in 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.

8.3 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this evaluation, they are listed here.

8.3.1 No known variations

9 CONDITIONS OF USE

9.1 Thermo-Brace® Red Structural Sheathing shall not be used as a nailing base for claddings, trim, windows, and doors. Fastening through the Thermo-Brace® Red Structural Sheathing into the framing is acceptable.

9.2 Walls sheathed with Thermo-Brace® Red Structural Sheathing shall not be used to resist horizontal loads from concrete and masonry walls.

11 2012 IECC Section 402.4.1.1
9.3 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 5.5.

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

9.4 When used in accordance with the IBC in Seismic Design Categories C, D, E, or F, special inspections shall comply with IBC Section 1705.12.12

9.5 When used in accordance with the IBC in high wind areas, special inspections shall comply with IBC Section 1705.11.13

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

9.6.1 Allowable shear loads shall not exceed values in Table 2 for wind loads and Table 3 for seismic loads.

9.6.2 Allowable uplift loads shall not exceed values in Table 4.

9.6.3 Transverse design loads shall not exceed those described in Table 7, unless an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing.

9.7 Thermo-Brace® Red Structural Sheathing is manufactured under a quality control program with quality control inspections in accordance with IBC Section 110.3.8 and IBC Section 110.4, and IRC Section R109.2.

9.8 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.

9.9 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.

9.10 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 (e.g., owner or registered design professional).

9.11 At a minimum, this product shall be installed per Section 6 of this TER.

9.12 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. Therefore, the TER shall be reviewed for code compliance by the building official for acceptance.

9.13 The use of this TER is dependent on the manufacturer’s in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer’s instructions, the building official’s inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10 IDENTIFICATION

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

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

11 REVIEW SCHEDULE

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

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

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12 2012 IBC Section 1705.11
13 2012 IBC Section 1705.10