



**CERTIFICATION**



Approved. Sealed. Code Compliant.

## **Technical Evaluation Report**

**TER 1507-07**

Thermo-Brace® Green Structural  
Sheathing

**Barricade® Building Products**

**Product:**

**Thermo-Brace® Green Structural  
Sheathing**

Issue Date:

April 15, 2016

Revision Date:

June 16, 2020

Subject to Renewal:

July 1, 2021





COMPANY  
INFORMATION:

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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<sup>1</sup>

1.1 Thermo-Brace® Green Structural Sheathing

2 APPLICABLE CODES AND STANDARDS<sup>2,3</sup>

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—15, 18: International Energy Conservation Code®*
- 2.1.4 *FBC-B—14, 17: Florida Building Code – Building*

<sup>1</sup> Building codes require data from valid [research reports](#) be obtained from [approved sources](#). Agencies who are accredited through ISO/IEC 17065 have met the [code requirements](#) for approval by the [building official](#). DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.

Through ANAB accreditation and the [IAF MLA](#), DrJ certification can be used to obtain product approval in any [jurisdiction](#) or country that has [IAF MLA Members & Signatories](#) to meet the [Purpose of the MLA](#) – “certified once, accepted everywhere.”

Building official approval of a licensed [registered design professional](#) (RDP) is performed by verifying the RDP and/or their business entity complies with all professional engineering laws of the relevant [jurisdiction](#). Therefore, the work of licensed RDPs is accepted by [building officials](#), except when plan (i.e., peer) review finds an error with respect to a specific section of the code. Where this TER is not approved, the [building official](#) responds in writing stating the reasons for [disapproval](#).

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, visit [drjcertification.org](http://drjcertification.org) or call us at 608-310-6748.

<sup>2</sup> 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.

<sup>3</sup> All terms defined in the applicable building codes are italicized.





- 2.1.5 *FBC-R—14, 17: Florida Building Code – Residential*
- 2.1.6 *FBC-EC—14, 17: Florida Building Code – Energy Conservation*
- 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 E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*
  - 2.2.8 *ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*
  - 2.2.9 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
  - 2.2.10 *UL 723: Test for Surface Burning Characteristics of Building Materials*

### 3 PERFORMANCE EVALUATION

- 3.1 Thermo-Brace® Green 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 (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).
  - 3.1.2 Structural performance under lateral load conditions for wind loading for use with the *IBC* performance-based provisions, [IBC Section 2306.1](#) and [IBC Section 2306.3](#), for light-frame wood wall assemblies.
  - 3.1.3 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](#) and [IECC Section R402.4.1.1](#) and [IECC Section C402.5.1.1](#).<sup>4</sup>
  - 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](#).

<sup>4</sup> [2012 IECC Section C402.4.1.1](#)

- 3.2 Any code compliance issues not specifically addressed in this section including the use of Thermo-Brace® Green Structural Sheathing in a portal frame with hold-down (PFH) or in a fire resistance rated assembly 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.

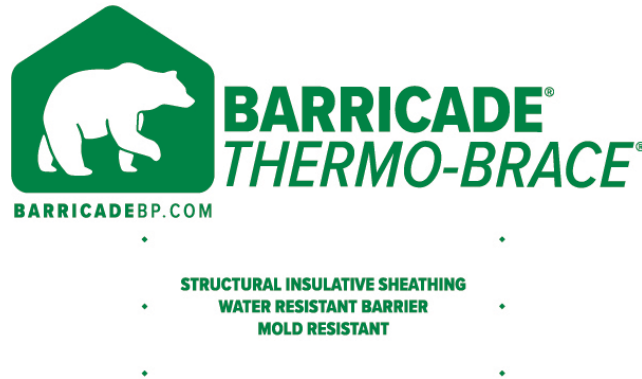


FIGURE 1. THERMO-BRACE® GREEN STRUCTURAL SHEATHING

- 4.2 Thermo-Brace® Green 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® Green Structural Sheathing panels have a nominal thickness of 0.075" and nominal weight of 0.278 lbs. per square foot.
- 4.3 *Material Availability*
  - 4.3.1 Standard widths include 48" (1219 mm) and 48<sup>3</sup>/<sub>4</sub>" (1238 mm).
  - 4.3.2 Standard lengths include 96" (2438 mm) and 108" (2743 mm).
  - 4.3.3 Other custom sizes up to 60" widths and 144" lengths can be manufactured.

## 5 APPLICATIONS

- 5.1 Thermo-Brace® Green Structural Sheathing panels are used in the following applications:
  - 5.1.1 Wall sheathing in buildings constructed in accordance with the *IBC* and *IRC* for light frame wood construction.
  - 5.1.2 Structural wall sheathing to provide lateral load resistance (wind) for braced wall panels used in light frame wood construction.
  - 5.1.3 Wall sheathing in buildings constructed in accordance with the *IBC* requirements for Type V light frame construction.
  - 5.1.4 Structural wall sheathing to provide resistance to transverse loads for wall assemblies used in light frame wood construction.
- 5.2 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.



### 5.3 Structural Applications

#### 5.3.1 General Structural Provisions:

- 5.3.1.1 Except as otherwise described in this TER, Thermo-Brace® Green 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).
  - 5.3.1.1.1 Thermo-Brace® Green 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.
- 5.3.1.2 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.
- 5.3.1.3 Except as provided for in Section 5.3.2, the maximum aspect ratio for Thermo-Brace® Green Structural Sheathing shall be 4:1.
- 5.3.1.4 The minimum full height panel width shall be 24", except as allowed by Section 5.3.2.
- 5.3.1.5 Installation is permitted for single top plate or double top plate applications.

#### 5.3.2 Prescriptive IRC Bracing Applications:

- 5.3.2.1 Thermo-Brace® Green 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.
- 5.3.2.2 For wind design, required braced wall panel lengths for Thermo-Brace® Green Structural Sheathing 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.
- 5.3.2.3 For seismic design, required braced wall panel lengths for Thermo-Brace® Green Structural Sheathing 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.
- 5.3.2.4 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*.



TABLE 1. REQUIRED BRACING LENGTHS FOR THERMO-BRACE® GREEN – WIND

Condition	Braced Wall Line Spacing (ft)	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line									
		Intermittent Sheathing <sup>2</sup>					Continuous Sheathing <sup>2</sup>				
		Wind Speeds (mph)									
		≤ 110	≤ 115	≤ 120	≤ 130	≤ 140	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.8	1.8	2.3	2.3	2.7	1.4	1.8	1.8	2.3	2.3
	20	3.2	3.2	3.6	4.6	5.0	2.7	3.2	3.2	3.6	4.6
	30	4.6	5.0	5.5	6.4	7.3	4.1	4.1	4.6	5.5	6.4
	40	5.9	6.4	7.3	8.2	9.6	5.0	5.5	5.9	6.8	8.2
	50	7.3	8.2	8.6	10.0	11.8	6.4	6.8	7.3	8.6	10.0
	60	8.6	9.6	10.5	11.8	13.7	7.3	8.2	8.6	10.0	11.8
First Story of Two Stories or Second Story of Three Stories	10	3.2	3.6	4.1	4.6	5.5	2.7	3.2	3.2	4.1	4.6
	20	5.9	6.8	7.6	8.6	10.0	5.0	5.9	6.4	7.3	8.2
	30	8.6	9.6	10.5	12.3	14.1	7.3	8.2	8.6	10.5	11.8
	40	11.4	12.3	13.7	15.9	18.2	9.6	10.5	11.4	13.7	15.5
	50	14.1	15.0	16.4	19.6	22.3	11.8	12.7	14.1	16.4	19.1
	60	16.4	18.2	19.6	22.8	26.4	14.1	15.5	16.8	19.6	22.8
First Story of Three Stories	10	5.0	5.5	5.9	6.8	7.7	4.1	4.6	5.0	5.9	6.8
	20	9.1	10.0	10.5	12.3	14.6	7.7	8.2	9.1	10.5	12.3
	30	12.7	14.1	15.5	17.7	20.9	10.9	11.8	13.2	15.5	17.7
	40	16.8	18.2	20.0	23.2	26.8	14.1	15.5	16.8	20.0	22.8
	50	20.5	22.3	24.6	28.7	33.2	17.3	19.1	20.9	24.1	28.2
	60	24.1	26.4	29.1	34.1	39.1	20.9	22.8	24.6	28.7	33.2

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

1. Thermo-Brace® Green shall be installed on 2x4 or 2x6 studs spaced 16" o.c. and fastened with minimum 15/16" crown x 1 1/4" leg 16 gauge galvanized staples or nails spaced 3":3" (edge:field) per Section 6. Joints may be butted or lapped.
2. Where studs are spaced 24" o.c., bracing lengths shall be multiplied by a factor of 1.4.
3. 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 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.
4. 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 2.0.
5. 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.
6. Linear interpolation is permitted.
7. Wind speeds shown are  $V_{ult}$  in accordance with *ASCE 7-16*. Use the following equation to convert to equivalent  $V_{asd}$  wind speed for use with the *2012 IBC* in accordance with *IBC Section 1609.3.1*:  $V_{asd} = V_{ult} \sqrt{0.6}$ .



TABLE 2. REQUIRED BRACING LENGTHS FOR THERMO-BRACE® GREEN (STUDS 16" O.C.) – SEISMIC

Condition	Braced Wall Line Length (ft)	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line							
		Intermittent Sheathing <sup>2</sup>				Continuous Sheathing <sup>2</sup>			
		Seismic Design Category (SDC)							
		C	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	C	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>
One Story or Top of Two Stories or Top of Three Stories	10	1.5	1.6	1.8	2.3	1.3	1.5	1.5	1.9
	20	2.9	3.3	3.6	4.6	2.5	2.8	3.1	3.9
	30	4.4	4.9	5.5	6.9	3.8	4.2	4.6	5.8
	40	5.8	6.5	7.3	9.1	4.9	5.6	6.2	7.7
	50	7.3	8.1	9.1	11.4	6.2	7.0	7.7	9.6
First Story of Two Stories or Second Story of Three Stories	10	2.7	3.4	4.1	5.0	2.4	2.9	3.4	4.3
	20	5.5	6.9	8.1	10.0	4.6	5.8	7.0	8.6
	30	8.1	10.3	12.3	15.0	7.0	8.7	10.5	12.8
	40	10.8	13.6	16.4	20.0	9.3	11.6	13.9	17.0
	50	13.6	17.1	20.5	25.0	11.6	14.6	17.4	21.3
First Story of Three Stories	10	4.1	4.8	5.5	NP	3.4	4.1	4.6	NP
	20	8.1	9.5	10.9	NP	7.0	8.1	9.3	NP
	30	12.3	14.4	16.4	NP	10.5	12.2	13.9	NP
	40	16.4	19.1	21.8	NP	13.9	16.3	18.5	NP
	50	20.5	23.9	27.3	NP	17.4	20.3	23.2	NP

SI: 1 in = 25.4 mm

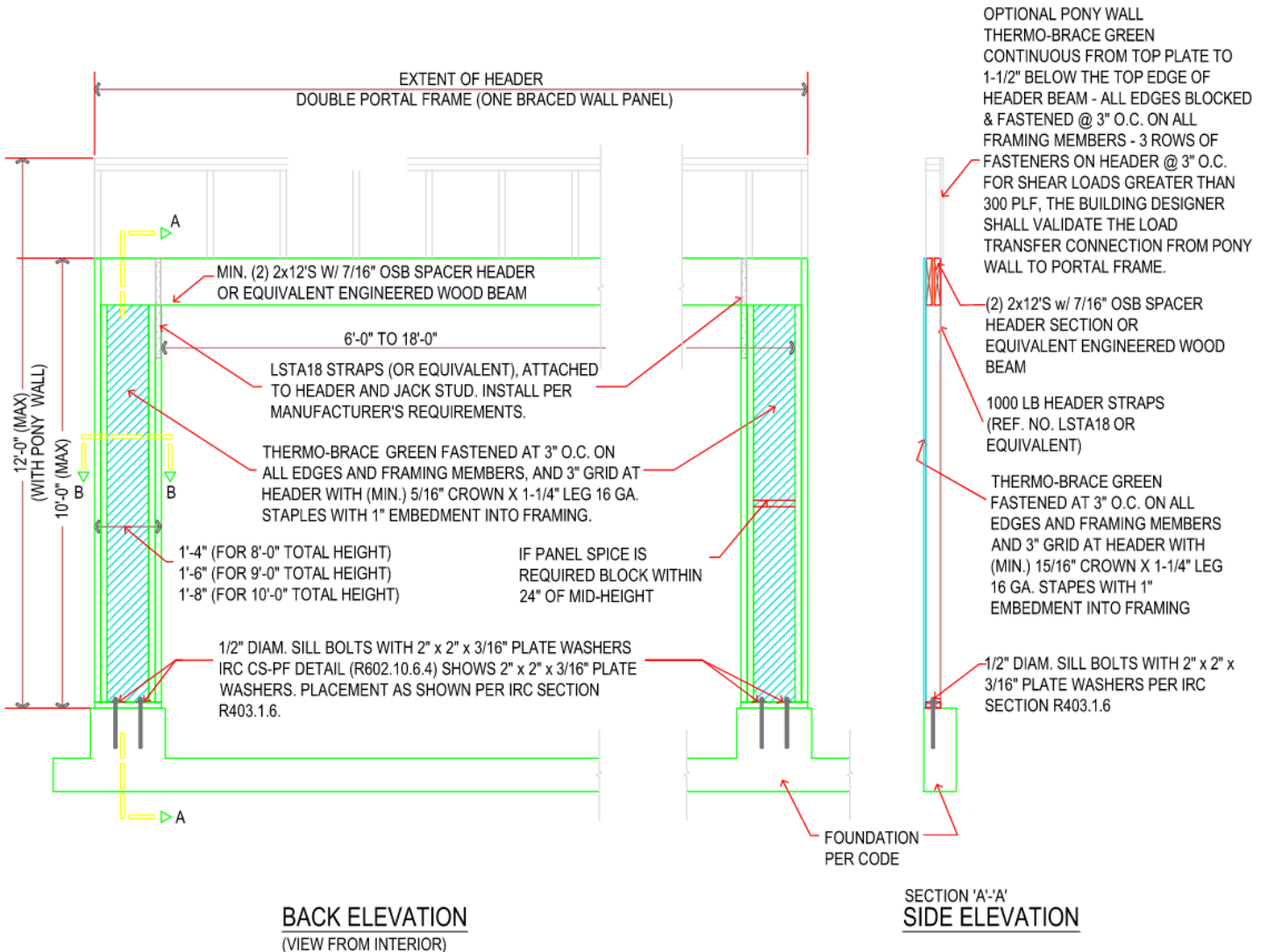
NP = Not Provided

- Thermo-Brace® Green to be installed on 2x4 or 2x6 studs spaced 16" o.c. and fastened with nails or minimum 1<sup>5</sup>/<sub>16</sub>" crown x 1<sup>1</sup>/<sub>4</sub>" leg 16 gauge galvanized staples or nails spaced 3":3" (edge:field) per Section 6. Joints may be butted or lapped.
- Minimum ½" 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 2.0.
- 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 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.
- Tabulated bracing lengths are based on the following:
  - Soil Class D
  - Wall height= 10'
  - 10 psf floor dead load
  - 15 psf roof/ceiling dead load
  - Braced wall line spacing ≤ 25'
- Linear interpolation is permitted.
- 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.



5.3.3 *Thermo-Brace® Green CS-PF Portal Frame:*

- 5.3.3.1 A “Thermo-Brace® Green 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*.
- 5.3.3.2 *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.
- 5.3.3.3 The capacity of the Thermo-Brace® Green 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).
- 5.3.3.4 The Thermo-Brace® Green Structural Sheathing CS-PF is shown in Figure 2.





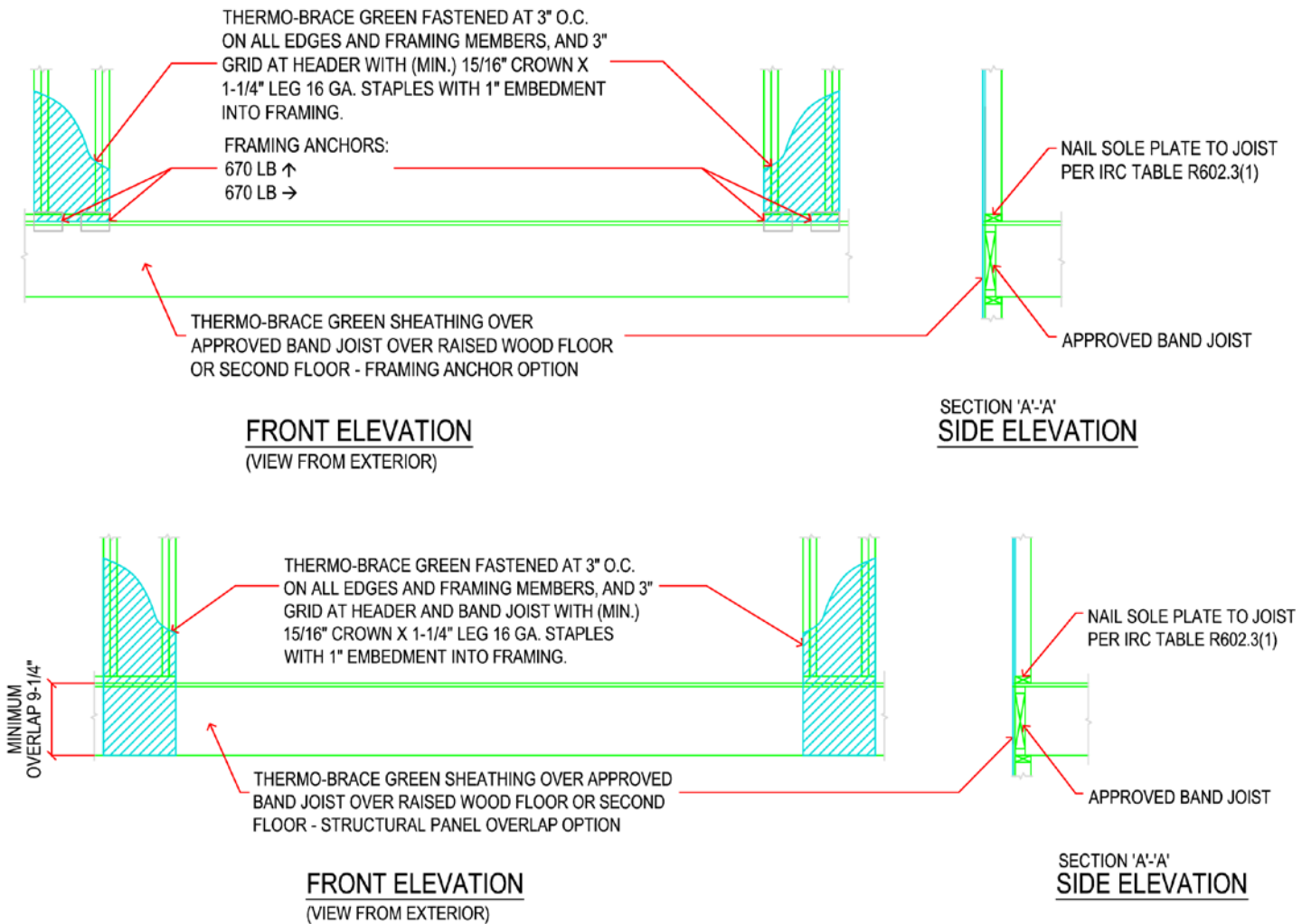


FIGURE 2. THERMO-BRACE® GREEN STRUCTURAL SHEATHING CS-PF

5.3.4 *Alternative to Prescriptive IRC Bracing Applications:*

5.3.4.1 As an alternative to the requirements of Section 5.3.2 of this TER, the following provisions are permitted:

- 5.3.4.1.1 Thermo-Brace® Red SIB 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 TER.
- 5.3.4.1.2 Thermo-Brace® Red SIB 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.
- 5.3.4.1.3 Required braced wall panel lengths for Thermo-Brace® Green Structural Sheathing shall be as determined by the equivalency factor shown in Table 3 and IRC Table R602.10.3(1-4) including all footnotes.
  - 5.3.4.1.3.1 Bracing lengths in the *IRC* tables for the WSP or CS-WSP methods shall be multiplied by the equivalency factors listed in Table 3 below.

TABLE 3. BRACED WALL LINE LENGTH EQUIVALENCY FACTORS<sup>1,3,5</sup>

Product	Fastener <sup>2</sup>	Fastener Spacing (edge:field) (in)	Maximum Stud Spacing (in)	Gypsum Wallboard (GWB)	GWB Fastening Spacing (blocked or unblocked) (edge:field) (in)	Equivalency Factors to IRC WSP or CS-WSP
Thermo-Brace® Green	<sup>15</sup> / <sub>16</sub> " Crown x 1 <sup>1</sup> / <sub>4</sub> " Leg 16 ga Staple	3:3	16 o.c.	½" GWB	8:8	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 *Section R602.10.3(3)*, and as modified by all applicable factors in *IRC Tables 602.10.3(2)* and *Section R602.10.3(4)*, by the factors shown here to establish the required bracing length.
3. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 2.0 for gypsum fastened 8:8.
4. These equivalency factors are 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*.
6. 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 2 of this TER 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 manufacturer of those products or the members of the associations that publish those design values.

5.3.4.1.3.2 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*.

5.3.4.1.3.3 Thermo-Brace® Green 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.

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

5.3.4.1.5 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*.

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

5.3.5.1 Thermo-Brace® Green 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 ½" 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 2308.6*<sup>5</sup> and this TER.

5.3.6 *Performance-Based Wood-Framed Construction:*

5.3.6.1 Thermo-Brace® Green 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 and Table 5.

5.3.6.2 Thermo-Brace® Green 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.

<sup>5</sup> *2012 IBC Section 2308.9.3*

TABLE 4. ALLOWABLE STRESS DESIGN (ASD) CAPACITIES – WIND

Product	Joint Condition	Fastener	Fastener Spacing (edge:field) (in)	Maximum Stud Spacing (in)	Gypsum Wallboard <sup>2</sup> (GWB)	GWB Fastener Spacing (edge:field) (in)	Allowable Unit Shear Capacity (plf)
Thermo-Brace® Green	Butted or Lapped	<sup>15</sup> / <sub>16</sub> " Crown x 1 <sup>1</sup> / <sub>4</sub> " Leg 16 ga Staple	3:3	16 o.c.	None	-	245
					<sup>1</sup> / <sub>2</sub> " GWB	8:8	395

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

1. Thermo-Brace® Green attached with a minimum 16 gauge, <sup>15</sup>/<sub>16</sub>" 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 <sup>3</sup>/<sub>8</sub>". Fastener head shall be in contact with the Thermo-Brace® surface.
2. Gypsum attached with minimum #6 type W or S screws 1<sup>1</sup>/<sub>4</sub>" long or 5d cooler nails with a minimum edge distance of <sup>3</sup>/<sub>8</sub>".

### 5.3.7 Uplift Resistance:

5.3.7.1 Thermo-Brace® Green Structural Sheathing panels are permitted to resist uplift load forces using the allowable uplift loads (in pounds per linear foot) set forth in Table 5.

TABLE 5. UPLIFT PERFORMANCE

Product	Maximum Stud Spacing (in)	Fastener	Fastener Spacing (edge:field) (in)	Allowable Unit Uplift Capacity <sup>1</sup> (plf)
Thermo-Brace® Green: Single Bottom Plate	16 o.c.	<sup>15</sup> / <sub>16</sub> " Crown x 1 <sup>1</sup> / <sub>4</sub> " Leg 16 ga galvanized Staple or 0.120" x 1 <sup>1</sup> / <sub>4</sub> " Roofing Nail	3:3	400

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

1. Gypsum wallboard on the back (interior) side of the wall
2. Staple crowns to be installed parallel to grain.

### 5.3.8 Transverse Wind Loading:

5.3.8.1 Thermo-Brace® Green 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 6 and Table 7.

TABLE 6. TRANSVERSE (OUT-OF-PLANE) WIND LOAD RESISTANCE

Product	Maximum Stud Spacing (in)	Fastener	Fastener Spacing (edge:field) (in)	Allowable Design Value (psf)
Thermo-Brace® Green	16 o.c.	<sup>15</sup> / <sub>16</sub> " crown, 1 <sup>1</sup> / <sub>4</sub> " leg 16 gage galvanized staples or 0.120" x 1 <sup>1</sup> / <sub>4</sub> " roofing nails	3:3	80

 SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>, 1 mph = 1.61 km/h

1. The ASD allowable uniform load capacities to be used for wind design are determined by dividing the ultimate uniform load capacities by an ASD reduction factor of 1.6, per SDPWS Section 3.2.1 for determining the ASD allowable uniform load capacity.
2. Design wind load capacity shall be in accordance with IBC Section 1609.1.1.
3. Staple crowns shall be installed parallel to grain.

TABLE 7. BASIC WIND SPEED FOR USE IN EXTERIOR WALL COVERING ASSEMBLIES

Product	Allowable Components & Cladding Basic Wind Speed (mph)	
	ASCE 7-05 ( $V_{asd}$ )	ASCE 7-10 and 7-16 ( $V_{ult}$ )
Thermo-Brace® Green	93	120
SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/ft = 0.0146 kN/m, 1 psf = 0.0479 kN/m <sup>2</sup> , 1 psi = 0.00689 MPa, 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. See the applicable building code for any adjustment needed for specific building location and configuration.		

5.4 Water-Resistive Barrier

- 5.4.1 Thermo-Brace® Green 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 Section 5.4 of this TER.
- 5.4.2 Thermo-Brace® Green Structural Sheathing shall be installed with board joints placed directly over exterior framing spaced a maximum of 16" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- 5.4.3 Where seams and joints between boards overlap nominally 3/4" (19 mm) and are fastened in accordance with Section 6, seam tape is not required for approval as a WRB.
- 5.4.4 Where seams and joints between boards are butt jointed, they shall be sealed with Barricade® Seam Tape or equivalent in accordance with Section 6.
- 5.4.5 A separate WRB system may also be provided. If a separate WRB system is used, taping of the sheathing joints is not required.
- 5.4.6 Flashing must be installed at all sheathing penetrations and shall comply with all applicable code sections.

5.5 Air Barrier

- 5.5.1 Thermo-Brace® Green 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 Section C402.5.1<sup>6</sup> in accordance with ASTM E2178.

5.6 Draftstop

- 5.6.1 Thermo-Brace® Green Structural Sheathing may be used as a draftstop material in accordance with IBC Section 708.4.2, Section 718.3, and Section 718.4 and IRC Section R302.12.
- 5.6.2 When installed as of a draftstop, Thermo-Brace® Green Structural Sheathing shall be installed in accordance with Section 6.

5.7 Surface Burn Characteristics

- 5.7.1 Thermo-Brace® Green Structural Sheathing panels have flame spread characteristics shown in Table 8.

TABLE 8. SURFACE BURN CHARACTERISTICS

Product	Flame Spread	Smoke Developed
Thermo-Brace® Green	< 200	< 450
1. Tested in accordance with <u>ASTM E84</u>		

5.8 Minimum Fastening Requirements for 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.

<sup>6</sup> 2012 IECC Section C402.4.1



- 5.8.1.1 The sheathing panels are applied to wall framing with 16 ga galvanized staples having a  $15/16$ " crown and  $1\frac{1}{4}$ " 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).
- 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  $3/4$ " (19.1 mm), or be butted and covered with Barricade® Seam Tape or equivalent. Overlapped joints are not required to be covered with Barricade® Seam Tape.

## 6 INSTALLATION

- 6.1 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.
- 6.2 Basic instructions are printed on every Thermo-Brace® pallet or insert.
- 6.3 *Orientation*
  - 6.3.1 Thermo-Brace® Green Structural Sheathing may 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.
- 6.4 *Fastener Type*
  - 6.4.1 *Thermo-Brace® Green Structural Sheathing:*
    - 6.4.1.1 Minimum  $15/16$ " crown by  $1\frac{1}{4}$ " leg, 16 ga, galvanized staples shall be installed per the staple manufacturer's instructions.
    - 6.4.1.2 Fasteners shall be driven such that the head of the fastener is in contact with the surface of the Thermo-Brace® Structural Sheathing. Do not overdrive fasteners.
  - 6.4.2 *Gypsum Wallboard:*
    - 6.4.2.1 Where required, gypsum wallboard shall be a minimum  $1/2$ " thickness and shall be attached with one of the following:
      - 6.4.2.1.1 #6 x  $1\frac{1}{4}$ " type W or S screws
      - 6.4.2.1.2 5d cooler nails
- 6.5 *Fastener Edge Distance*
  - 6.5.1 Fasteners shall be installed with a nominal edge distance of  $3/8$ " (9.5 mm) for Thermo-Brace® Green Structural Sheathing and gypsum.
- 6.6 *Treatment of Joints*
  - 6.6.1 Thermo-Brace® Green Structural Sheathing joints may be either butted or overlapped.
    - 6.6.1.1 Lapped joints shall be overlapped by nominally  $3/4$ " (19 mm) and fastened with a single row of fasteners. Always run staples parallel with framing. Overlapped joints do not require Barricade® Seam Tape.
    - 6.6.1.2 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 attaching the wall panels and all fasteners in the wall line.



- 6.6.2 Thermo-Brace® Green 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 Lateral load testing in accordance with *ASTM E2126* conducted by SBCRI.
- 7.2 Transverse load testing in accordance with *ASTM E330* conducted by SBCRI.
- 7.3 Uplift load testing in accordance with *ASTM E72* conducted by SBCRI.
- 7.4 Test reports and data for determining use as a water-resistive barrier material in accordance with *ASTM E331* conducted by Intertek
- 7.5 Test reports and data for determining use as an air barrier in accordance with *ASTM E2178* conducted by Intertek
- 7.6 Flame spread and smoke developed ratings in accordance with *ASTM E84* conducted by Intertek
- 7.7 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.
- 7.8 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 loads carried by shear walls
- 8.1.2 Transverse load resistance due to components and cladding 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*<sup>7</sup>
- 8.1.6 Performance for use as a draftstop in accordance with *IBC Section 708.4.2*, *Section 718.3*, and *Section 718.4* and *IRC Section 302.12*
- 8.1.7 Surface burn characteristics in accordance *IBC Section 2603.3*

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<sup>7</sup> 2012 IECC Section C402.4.1

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 TER, they are listed here.

8.3.1 No known variations

## 9 CONDITIONS OF USE

- 9.1 Thermo-Brace® Green Structural Sheathing shall not be used as a nailing base for claddings, trim, windows, and doors. Fastening through the Thermo-Brace® Green Structural Sheathing into the framing is acceptable.
- 9.2 Walls sheathed with Thermo-Brace® Green Structural Sheathing shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.3 When Thermo-Brace® Green 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 5.4.
- 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 high wind areas, special inspections shall comply with IBC Section 1705.11.<sup>8</sup>
- 9.5 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.5.1 Allowable shear loads shall not exceed values in Table 4 for wind loads.
- 9.5.2 Allowable uplift loads shall not exceed values in Table 5.
- 9.5.3 Transverse design loads shall not exceed those described in Table 6 and 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.
- 9.6 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.
- 9.7 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.8 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*).
- 9.9 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.10 This product is manufactured under a third-party quality control program in accordance with IBC Section 104.4 and 110.4 and IRC Section R104.4 and R109.2.

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<sup>8</sup> 2012 IBC Section 1705.10



- 9.11 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.
- 9.12 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](http://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](http://drjcertification.org).
- 11.2 For information on the current status of this TER, contact [DrJ Certification](#).

