DrJ™ CERTIFICATION

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17065 PRODUCT CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1912-06

Thermo-Brace® ECO (Red) and
Thermo-Brace® ECO (Green) Structural
Sheathing

Barricade® Building Products

Products:

Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing

Issue Date:
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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 Products Evaluated[1]

1.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing

2 Applicable Codes and Standards[2,3]

2.1 *Codes*

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

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

2.1.3 *IECC—12, 15, 18: International Energy Conservation Code®*

2.1.4 *FBC-B—17, 20: Florida Building Code – Building*[4]

2.1.5 *FBC-R—17, 20: Florida Building Code – Residential*[4]

2.1.6 *FBC-EC—17, 20: Florida Building Code – Energy Conservation*[4]

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 System for Buildings*

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

[2] Unless otherwise noted, all references in this TER are from the 2021 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2018 versions of the referenced codes and the standards referenced therein.

[3] All terms defined in the applicable building codes are italicized.

[4] All references to the *FBC-B*, *FBC-R*, and *FBC-EC* are the same as the 2018 *IBC*, *IRC*, and *IECC* unless otherwise noted in the Florida Supplement found at the end of this TER.

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*

3 Performance Evaluation

3.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing have been evaluated to determine:

3.1.1 Structural performance under lateral load conditions (wind) 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 Method CS-WSP (continuously sheathed wood structural panel).

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

3.1.5 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.

3.1.6 Performance for use as a water-resistive barrier (WRB) in accordance with *IBC* Section 1403.2[5] 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 Section C402.5.1.1.

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

3.1.9 Surface burn characteristic performance for use as a Class C interior finish material in accordance with *IBC* Section 803.1.2[6] and *IRC* Section R302.9.

3.2 Use in seismic design category (SDC) A and B is allowed. Structural performance under lateral load conditions (seismic) in seismic design category C and greater is outside the scope of this evaluation.

3.3 Use of Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing in a portal frame with hold-down (PFH) is outside the scope of this TER.

3.4 Use of Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing in a fire resistance rated assembly is outside the scope of this TER.

[5] 2015 *IBC* Section 1404.2

[6] 2015 *IBC* Section 803.1.1

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

3.6 Any engineering evaluation conducted for this TER was performed within DrJ's ANAB accredited ICS code scope and/or the defined professional engineering scope of work on the dates provided herein.

4 Product Description and Materials

4.1 The products evaluated in this TER are shown in Figure 1 and Figure 2.

Figure 1. Thermo-Brace® ECO (Red) Structural Sheathing

Figure 2. Thermo-Brace® ECO (Green) Structural Sheathing

4.2 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing 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 foil facings may be additionally applied on one or both faces.

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

4.2.2 Thermo-Brace® ECO (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 3/4″ (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 up to 144″ can be manufactured.

5 Applications

5.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth herein for the design and installation of wood structural panels (WSP).

5.3.1.1.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 5.3.2.

5.3.1.3 Except as provided for in Section 5.3.2, the maximum aspect ratio for Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 *Simplified IRC Bracing Applications:*

5.3.2.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) are permitted to be used in accordance with the *IRC* simplified bracing method of *IRC* Section R602.12 as modified by Table 1 and Table 2 respectively. All other provisions of the *IRC* simplified bracing method shall be met.

Table 1. Thermo-Brace® ECO (Red) Simplified Bracing[1,2,3,4,5,6,7,8]

Structural Sheathing Product	Ultimate Design Wind Speed, V_{ult} (mph)	Story Level[2]	Eave to Ridge Height (ft)	Minimum Number of Bracing Units Required (Long Side)						Minimum Number of Bracing Units Required (Short Side)					
				Length of Short Side (ft)						Length of Long Side (ft)					
				10	20	30	40	50	60	10	20	30	40	50	60
Thermo-Brace® ECO (Red)	115	One Story or Top of Two or Three Story	10	1	1	2	2	3	3	1	1	2	2	3	3
		First of Two Story or Second of Three Story		1	2	3	4	5	5	1	2	3	4	5	5
		First of Three Story		2	3	4	5	7	8	2	3	4	5	7	8
		One Story or Top of Two or Three Story	15	1	1	3	3	4	4	1	1	3	3	4	4
		First of Two Story or Second of Three Story		1	2	3	5	6	6	1	2	3	5	6	6
		First of Three Story		2	3	4	6	8	9	2	3	4	6	8	9
	130	One Story or Top of Two or Three Story	10	1	2	2	3	3	4	1	2	2	3	3	4
		First of Two Story or Second of Three Story		2	3	4	5	6	7	2	3	4	5	6	7
		First of Three Story		2	4	5	7	8	10	2	4	5	7	8	10
		One Story or Top of Two or Three Story	15	1	3	3	4	4	5	1	3	3	4	4	5
		First of Two Story or Second of Three Story		2	3	5	6	7	8	2	3	5	6	7	8
		First of Three Story		2	4	6	8	9	11	2	4	6	8	9	11

SI: 1 in. = 25.4 mm

1. This simplified bracing table is based on the provisions of *IRC* Section R602.12. All provisions therein shall be observed, except that this table shall replace *IRC* Table R602.12.4, and Thermo-Brace® ECO (Red) shall replace the sheathing material.
2. Interpolation shall not be permitted.
3. Cripple walls or wood-framed basement walls in a walk-out condition shall be designated as the first story and the stories above shall be re-designated as the second and third stories, respectively, and shall be prohibited in a three-story structure.
4. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.
5. For Exposure Category C, multiply bracing units by a factor of 1.20 for a one-story building, 1.30 for a two-story building, and 1.40 for a three-story building.
6. Maximum stud spacing is 16" o.c.
7. Thermo-Brace® ECO (Red) installed with butted or lapped joints on 2"x4" studs spaced 16" o.c. and fastened with 16ga, galvanized, smooth shank staples with $^{15}/_{16}$" crown x 1¼" leg installed 3" o.c. along the edges and 3" o.c. in the field.
8. Minimum ½" gypsum wallboard attached to the interior side of the wall in accordance with *IRC* Section R702.3.5 and Table R702.3.5.

Table 2. Thermo-Brace® ECO (Green) Simplified Bracing[1,2,3,4,5,6,7,8]

Structural Sheathing Product	Ultimate Design Wind Speed, V_{ult} (mph)	Story Level[2]	Eave to Ridge Height (ft)	Minimum Number of Bracing Units Required (Long Side)						Minimum Number of Bracing Units Required (Short Side)					
				Length of Short Side (ft)						Length of Long Side (ft)					
				10	20	30	40	50	60	10	20	30	40	50	60
Thermo-Brace® ECO (Green)	115	One Story or Top of Two or Three Story	10	1	2	2	3	3	4	1	2	2	3	3	4
		First of Two Story or Second of Three Story		2	3	4	4	5	6	2	3	4	4	5	6
		First of Three Story		2	4	5	6	8	9	2	4	5	6	8	9
		One Story or Top of Two or Three Story	15	1	3	3	4	4	5	1	3	3	4	4	5
		First of Two Story or Second of Three Story		2	3	5	5	6	7	2	3	5	5	6	7
		First of Three Story		2	4	6	7	9	10	2	4	6	7	9	10
	130	One Story or Top of Two or Three Story	10	1	2	3	3	4	4	1	2	3	3	4	4
		First of Two Story or Second of Three Story		2	3	4	6	7	8	2	3	4	6	7	8
		First of Three Story		3	4	6	8	10	12	3	4	6	8	10	12
		One Story or Top of Two or Three Story	15	1	3	4	4	5	5	1	3	4	4	5	5
		First of Two Story or Second of Three Story		2	3	5	7	8	9	2	3	5	7	8	9
		First of Three Story		3	4	7	9	11	13	3	4	7	9	11	13

SI: 1 in. = 25.4 mm

1. This simplified bracing table is based on the provisions of *IRC* Section R602.12. All provisions therein shall be observed, except that this table shall replace *IRC* Table R602.12.4, and Thermo-Brace® ECO (Green) shall replace the sheathing material.
2. Interpolation shall not be permitted.
3. Cripple walls or wood-framed basement walls in a walk-out condition shall be designated as the first story and the stories above shall be re-designated as the second and third stories, respectively, and shall be prohibited in a three-story structure.
4. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.
5. For Exposure Category C, multiply bracing units by a factor of 1.20 for a one-story building, 1.30 for a two-story building, and 1.40 for a three-story building.
6. Maximum stud spacing is 16" o.c.
7. Thermo-Brace® ECO (Green) installed with butted or lapped joints on 2"x4" studs spaced 16" o.c. and fastened with 16ga, galvanized, smooth shank staples with $^{15}/_{16}$" crown x 1¼" leg installed 3" o.c. along the edges and 3" o.c. in the field.
8. Minimum ½" gypsum wallboard attached to the interior side of the wall in accordance with *IRC* Section R702.3.5 and Table R702.3.5.

5.3.3 *Prescriptive IRC Bracing Applications:*

5.3.3.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing may be used on braced wall lines as an equivalent alternative to Methods WSP and CS-WSP of the *IRC*, when installed in accordance with *IRC* Section R602.10 and this TER.

5.3.3.2 For wind design, required braced wall panel lengths for Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing shall be as shown in Table 3 and Table 4, and shall be used in conjunction with *IRC* Table R602.10.3(2), which provides the required adjustments.

Table 3. Required Bracing Lengths for Thermo-Brace® ECO (Red)[1,2,3,4,5]

Condition	Braced Wall Line Spacing (ft)	Length of Wall Line to be Braced (ft)											
		Intermittent Sheathing						Continuous Sheathing					
		Wind Speeds[6] (mph)											
		< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140	< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.5	2.0	2.0	2.5	2.5	3.0	1.5	1.5	2.0	2.0	2.5	2.5
	20	2.5	3.4	3.4	3.9	4.9	5.4	2.5	3.0	3.4	3.4	3.9	4.9
	30	4.0	4.9	5.4	5.9	6.9	7.9	3.5	4.4	4.4	4.9	5.9	6.9
	40	5.0	6.4	6.9	7.9	8.9	10.3	4.0	5.4	5.9	6.4	7.4	8.9
	50	5.9	7.9	8.9	9.4	10.8	12.8	5.0	6.9	7.4	7.9	9.4	10.8
	60	6.9	9.4	10.3	11.3	12.8	14.8	5.9	7.9	8.9	9.4	10.8	12.8
First Story of Two Stories or Second Story of Three Stories	10	3.0	3.4	3.9	4.4	4.9	5.9	2.5	3.0	3.4	3.4	4.4	4.9
	20	5.0	6.4	7.4	7.9	9.4	10.8	4.5	5.4	6.4	6.9	7.9	8.9
	30	6.9	9.4	10.3	11.3	13.3	15.3	5.9	7.9	8.9	9.4	11.3	12.8
	40	9.4	12.3	13.3	14.8	17.2	19.7	7.9	10.3	11.3	12.3	15.3	16.7
	50	11.4	15.3	16.3	17.7	21.2	24.1	9.9	12.8	13.8	15.3	17.7	20.7
	60	13.4	17.7	19.7	21.2	24.6	28.6	11.4	15.3	16.7	18.2	21.2	24.6
First Story of Three Stories	10	4.0	5.4	5.9	6.4	7.4	8.4	3.5	4.4	4.9	5.4	6.4	7.4
	20	7.4	9.9	10.8	11.3	13.3	15.8	6.4	8.4	8.9	9.9	11.3	13.3
	30	10.4	13.8	15.3	16.7	19.2	22.7	8.9	11.8	12.8	14.3	16.7	19.2
	40	13.4	18.2	19.7	21.7	25.1	29.1	11.4	15.3	16.7	18.2	21.7	24.6
	50	16.8	22.2	24.1	26.6	31.0	36.0	14.4	18.7	20.7	22.7	26.1	30.5
	60	19.8	26.1	28.6	31.5	36.9	42.4	16.8	22.7	24.6	26.6	31.0	36.0

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

1. Linear interpolation is permitted.
2. Thermo-Brace® ECO (Red) installed with butted or lapped joints on 2x4 studs spaced 16" o.c. and fastened with 16ga, galvanized, smooth shank staples with $^{15}/_{16}$" crown x 1¼" leg installed 3" o.c. along the edges and 3" o.c. in the field.
3. Demonstrates equivalency to *IRC* Table R602.10.3(1). All adjustment factors from *IRC* Table R602.10.3(2) shall be applied.
4. Minimum ½" gypsum wallboard spaced 8" o.c. along the edges and 8" o.c. in the field shall 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 2.2.
5. 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.
6. Wind speeds are V_{ult} in accordance with *ASCE 7-16*. Convert to equivalent V_{asd} wind speed per *IBC* Section 1609.3.1.

Table 4. Required Bracing Lengths for Thermo-Brace® ECO (Green)[1,2,3,4,5]

Condition	Braced Wall Line Spacing (ft)	Length of Wall Line to be Braced (ft)											
		Intermittent Sheathing						Continuous Sheathing					
		Wind Speeds[6] (mph)											
		< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140	< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.8	2.4	2.4	3.0	3.0	3.5	1.8	1.8	2.4	2.4	3.0	3.0
	20	3.0	4.1	4.1	4.7	5.9	6.5	3.0	3.5	4.1	4.1	4.7	5.9
	30	4.7	5.9	6.5	7.1	8.3	9.5	4.1	5.3	5.3	5.9	7.1	8.3
	40	5.9	7.7	8.3	9.5	10.6	12.4	4.7	6.5	7.1	7.7	8.9	10.6
	50	7.1	9.5	10.6	11.2	13.0	15.4	5.9	8.3	8.9	9.5	11.2	13.0
	60	8.3	11.2	12.4	13.6	15.4	17.7	7.1	9.5	10.6	11.2	13.0	15.4
First Story of Two Stories or Second Story of Three Stories	10	3.5	4.1	4.7	5.3	5.9	7.1	3.0	3.5	4.1	4.1	5.3	5.9
	20	5.9	7.7	8.9	9.5	11.2	13.0	5.3	6.5	7.7	8.3	9.5	10.6
	30	8.3	11.2	12.4	13.6	16.0	18.3	7.1	9.5	10.6	11.2	13.6	15.4
	40	11.2	14.8	16.0	17.7	20.7	23.6	9.4	12.4	13.6	14.8	18.3	20.1
	50	13.6	18.3	19.5	21.3	25.4	29.0	11.8	15.4	16.5	18.3	21.3	24.8
	60	15.9	21.3	23.6	25.4	29.5	34.3	13.6	18.3	20.1	21.9	25.4	29.5
First Story of Three Stories	10	4.7	6.5	7.1	7.7	8.9	10.0	4.1	5.3	5.9	6.5	7.7	8.9
	20	8.9	11.8	13.0	13.6	16.0	18.9	7.7	10.0	10.6	11.8	13.6	16.0
	30	12.4	16.5	18.3	20.1	23.0	27.2	10.6	14.2	15.4	17.1	20.1	23.0
	40	15.9	21.9	23.6	26.0	30.1	34.9	13.6	18.3	20.1	21.9	26.0	29.5
	50	20.1	26.6	29.0	31.9	37.2	43.1	17.1	22.5	24.8	27.2	31.3	36.6
	60	23.6	31.3	34.3	37.8	44.3	50.8	20.1	27.2	29.5	31.9	37.2	43.1

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

1. Linear interpolation is permitted.
2. Thermo-Brace® ECO (Green) installed with butted or lapped joints on 2x4 studs spaced 16" o.c. and fastened with 16ga, galvanized, smooth shank staples with $^{15}/_{16}$" crown x 1¼" leg installed 3" o.c. along the edges and 3" o.c. in the field.
3. Demonstrates equivalency to *IRC* Table R602.10.3(1). All adjustment factors from *IRC* Table R602.10.3(2) shall be applied.
4. Minimum ½" gypsum wallboard spaced 8" o.c. along the edges and 8" o.c. in the field shall 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 2.6.
5. 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.
6. Wind speeds are V_{ult} in accordance with *ASCE 7-16*. Convert to equivalent V_{asd} wind speed per *IBC* Section 1609.3.1.

5.3.3.3 Required braced wall panel lengths for Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing shall be as determined by the equivalency factors shown in Table 5 and *IRC* Tables R602.10.3(1-4) including all footnotes.

5.3.3.3.1 The braced wall line length equivalency factors in Table 5 are based on equivalency testing and are used to comply with Method WSP and Method CS-WSP of the *IRC*.

5.3.3.3.2 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing tested equivalency factors in Table 5 allow the user to determine the length of bracing required by multiplying the factor from Table 5 by the length shown in the WSP or CS-WSP columns in *IRC* Tables R602.10.3(1 and 3), as modified by all applicable factors in *IRC* Tables R602.10.3(2 and 4), respectively.

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

5.3.3.5 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.

Table 5. Braced Wall Line Length Equivalency Factors[1,7]

Product	Maximum Stud Spacing[2] (in)	Fastener[3]	Fastener Spacing (edge:field) (in)	½" Gypsum Wallboard Fastening Schedule (blocked or unblocked) (edge:field) (in)	Equivalency Factor[4,5,6] to *IRC* WSP or CS-WSP
Thermo-Brace® ECO (Red)	16 o.c.	15/16" crown x 1¼" leg staple	3:3	8:8	0.99
Thermo-Brace® ECO (Green)					1.18

SI: 1 in. = 25.4 mm

1. Based on equivalency testing for use with the *IRC*
2. Framing shall be SPF, at a minimum
3. Staples shall be a minimum 16 gauge.
4. Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) 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-WSP 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. 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 as follows:
   a. Thermo-Brace® ECO (Red): 2.2
   b. Thermo-Brace® ECO (Green): 2.6
6. Gypsum shall be installed according to the provisions listed in *IRC* Table R702.3.5.
7. Valid for single top plate (advanced framing method) wall installations or double top plate wall installations

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

5.3.4.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 #6 type W or S screw or 5d cooler nail spaced a maximum of 8″ o.c. at panel edges and 8″ 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.

5.3.5 *Performance-Based Wood-Framed Construction:*

5.3.5.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 6 and Table 7.

5.3.5.2 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 6.

Table 6. Allowable Stress Design (ASD) Capacity for Wind

Product[1]	Joint Condition	Maximum Stud Spacing (in)	Gypsum Wallboard (GWB)	Gypsum Wallboard Fastener Spacing[2] (edge:field) (in)	Allowable Unit Shear Capacity (plf)
Thermo-Brace® ECO (Red)	Butted or Lapped	16 o.c.	None	-	210
			½" GWB	8:8	365
Thermo-Brace® ECO (Green)			None	-	145
			½" GWB	8:8	305

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

1. Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) 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® ECO (Red) or Thermo-Brace® ECO (Green) surface.
2. Gypsum attached with minimum #6 type W or S screws 1¼" long or 5d cooler nails with a minimum edge distance of $^{3}/_{8}$".

5.3.6 *Uplift Resistance:*

5.3.6.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 7.

Table 7. Uplift Performance

Product	Maximum Stud Spacing (in)	Fastener	Fastener Spacing (edge:field) (in)	Allowable Unit Uplift Capacity[1,2] (plf)
Thermo-Brace® ECO (Red)	16 o.c.	$^{15}/_{16}$" crown, 1¼" leg, 16 gauge galvanized staples	3:3	245
Thermo-Brace® ECO (Green)				

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

1. Tested in accordance with *ASTM E72*
2. Gypsum wallboard on the back (interior) side of the wall

5.3.7 *Transverse Load Resistance:*

5.3.7.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing panels are permitted to resist transverse wind load forces using the allowable transverse loads (in pounds per linear foot) in Table 8 and the basic wind speeds in Table 9.

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

Product	Maximum Stud Spacing (in)	Fastener[4]	Fastener Spacing (edge:field) (in)	Allowable Design Value[2,3] (psf)
Thermo-Brace® ECO (Red)	16 o.c.	$^{15}/_{16}$" crown, 1¼" leg, 16 gauge galvanized staples	3:3	95
Thermo-Brace® ECO (Green)				

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

Product	Allowable Components & Cladding Basic Wind Speed[1,2,3] (mph)	
	ASCE 7-05 (V_{asd})	ASCE 7-10 and 7-16 (V_{ult})
Thermo-Brace® ECO (Red)	≤ 155	≤ 200
Thermo-Brace® ECO (Green)		

SI: 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, wall Zone 5. 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® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing may be used as a WRB as prescribed in *IBC* Section 1403.2[7] and *IRC* Section R703.2, when installed on exterior walls as described in Section 6 of this TER.

5.4.2 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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 All seams and joints between boards shall be sealed with Barricade® Seam Tape or equivalent in accordance with Section 6. A slight gap of approximately $^1/_8$" between panels is allowed.

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

5.4.4 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® ECO (Red) and Thermo-Brace® ECO (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 in accordance with *ASTM E2178*.

5.6 *Draftstop*

5.6.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing shall be installed in accordance with Section 6.

5.7 *Surface Burn Characteristics*

5.7.1 Thermo-Brace® Blue Structural Sheathing may be used as a Class C interior finish material in accordance with *IBC* Section 803.1.2[8] and *IRC* Section R302.9.

5.7.2 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing panels have the flame spread characteristics shown in Table 10.

[7] 2015 *IBC* Section 1404.2

[8] 2015 *IBC* Section 803.1.1

Table 10. Surface Burn Characteristics[1]

Product	Flame Spread	Smoke Developed
Thermo-Brace® ECO (Red)	< 200	< 450
Thermo-Brace® ECO (Green)		

1. Tested in accordance with *ASTM E84*

5.8 *Non-Structural Applications*

5.8.1 Where other means of wall bracing are provided, or are not required, Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) 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 either 16 gauge, galvanized staples having a $^{15}/_{16}$″ crown and 1¼″ leg lengths or 1″ cap nails.

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 be either butted or overlapped nominally ¾″ (19.1 mm) and covered with Barricade® Seam Tape or equivalent.

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® ECO (Red) and Thermo-Brace® ECO (Green) pallet or insert.

6.3 *Orientation*

6.3.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (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® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing:*

6.4.1.1 For structural applications, minimum $^{15}/_{16}$″ crown by 1¼″ leg, 16 gauge galvanized staples shall be installed per the staple manufacturer's instructions. Fasteners shall be spaced per Section 5.3 and the applicable tables.

6.4.1.2 For non-structural applications, minimum $^{15}/_{16}$″ crown by 1¼″ leg, 16 gauge, galvanized staples or 1″ cap nails shall be installed per the staple manufacturer's instructions. Fasteners shall be spaced per Section 5.8.

6.4.1.3 Fasteners shall be driven such that the head of the fastener is in contact with the surface of the Thermo-Brace® ECO (Red) or Thermo-Brace® ECO (Green) Structural Sheathing. Do not overdrive fasteners.

6.4.2 *Gypsum Wallboard:*

6.4.2.1 Where required, gypsum wallboard shall be a minimum ½″ thickness and shall be attached with one of the following:

6.4.2.1.1 #6 x 1¼″ type W or S screws

6.4.2.1.2 5d cooler nails

6.4.2.2 Fasteners shall be spaced per Section 5.3 and the applicable tables.

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® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing and gypsum wallboard.

6.6 *Treatment of Joints*

6.6.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing joints may be either butted or overlapped.

6.6.1.1 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 attaching the wall panels and all fasteners in the wall line.

6.6.1.2 Lapped joints shall be overlapped by nominally ¾″ (19 mm) and fastened with a single row of fasteners. Always run staples parallel with framing. Seal overlapped 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® ECO (Red) and Thermo-Brace® ECO (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 Substantiating Data

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

7.1.1 Lateral load resistance testing in accordance with *ASTM E564*

7.1.2 Uplift resistance testing in accordance with *ASTM E72*

7.1.3 Transverse load resistance testing in accordance with *ASTM E330*

7.1.4 Water-resistive barrier testing in accordance with *ASTM E331*

7.1.5 Air permeance testing in accordance with *ASTM E2178*

7.1.6 Flame spread and smoke developed ratings in accordance with *ASTM E84*

7.2 Information contained herein is the result of testing and/or data analysis by sources which conform to *IBC* Section 1703 and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.

7.3 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, *strength*, effectiveness, *fire resistance*, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.

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

8.1.3 Transverse load resistance due to components and cladding pressures on building surfaces

8.1.4 Performance for use as a WRB in accordance with *IBC* Section 1403.2[9] 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

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 R302.12

8.1.7 Performance for use as a Class C interior finish material in accordance with *IBC* Section 803.1.2[10] and *IRC* Section R302.9.

8.2 Building codes require data from valid *research reports* be obtained from *approved sources* (i.e., licensed *registered design professionals* [RDPs]).

8.2.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant *jurisdiction*.

8.3 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 and employs RDPs.

8.4 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."

8.5 *IBC* Section 104.11 (*IRC* Section R104.11 and *IFC* Section 104.10[11] 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...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*.

9 Conditions of Use

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

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

9.3 When Thermo-Brace® ECO (Red) or Thermo-Brace® ECO (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® ECO (Red) or Thermo-Brace® ECO (Green) Structural Sheathing is not installed as a WRB, other means of providing a WRB shall be required, as per the code.

[9] 2015 *IBC* Section 1404.2

[10] 2015 *IBC* Section 803.1.1

[11] 2018 *IFC* Section 104.9

9.4 When used in accordance with the *IBC* in high wind areas, special inspections shall comply with *IBC* Section 1705.11.

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 6 for wind loads.

9.5.2 Allowable uplift loads shall not exceed values in Table 7.

9.5.3 Transverse design loads shall not exceed those described in Table 8, 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 RDP).

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

9.10 This product has an internal quality control program and a third-party quality assurance program in accordance with *IBC* Section 104.4 and Section 110.4 and *IRC* Section R104.4 and Section R109.2.

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.

9.12 This TER shall be reviewed for code compliance by the AHJ in concert with *IBC* Section 104.

9.13 The implementation of this TER for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by *IBC* Section 110.3, and any other code or regulatory requirements that may apply.

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, visit drjcertification.org.

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

Issue Date: July 12, 2021
Subject to Renewal: March 24, 2023

FBC Supplement to TER 1912-06

REPORT HOLDER: Barricade® Building Products

1 Evaluation Subject

1.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing

2 Purpose and Scope

2.1 *Purpose*

2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing, recognized in TER 1912-06, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—17, 20: Florida Building Code – Building*

2.2.2 *FBC-R—17, 20: Florida Building Code – Residential*

2.2.3 *FBC-EC—17, 20: Florida Building Code – Energy Conservation*

3 Conclusions

3.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing, described in TER 1912-06, complies with the *FBC-B, FBC-R*, and *FBC-EC* and is subject to the conditions of use described in this supplement.

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

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

3.2.2 *FBC-R* Section R104, Section R109, Section R602.10, Section R602.10.3, Table R602.10.3(1), Table R602.10.3(2), Table R602.10.3(3), Table R602.10.3(4), Section R602.10.4, Section R602.12, and Table R602.12.4 are reserved.

3.2.3 *FBC-R* Section N1101 replaces *IRC* Section N1102.4.1.1.

3.2.4 *FBC-B* Section 708.4 replaces *IBC* Section 708.4.2.

3.2.5 *FBC-B* Section 803.1.1 replaces *IBC* Section 803.1.2.

3.2.6 *FBC-B* Section 2308 replaces *IBC* Section 2308.6 and is reserved.

3.2.7 *FBC-B* Section 1404.2 replaces *IBC* Section 1403.2.

3.2.8 *FBC-B* Section 1705 replaces both *IBC* Section 1705.12 and Section 1705.11 and is reserved.

4 Conditions of Use

4.1 Thermo-Brace® ECO (Red) and Thermo-Brace® ECO (Green) Structural Sheathing, described in TER 1912-06, must comply with all of the following conditions:

4.1.1 All applicable sections in TER 1912-06

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