



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1004-02

Thermo-Ply® Blue & Thermo-Ply®
Blue AMG Structural Sheathing

Ox Engineered Products, LLC

Product:

**Thermo-Ply® Blue and
Thermo-Ply® Blue AMG
Structural Sheathing**

Issue Date:

November 18, 2013

Revision Date:

June 11, 2021

Subject to Renewal:

April 1, 2022



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^{1,2}

1.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing

2 APPLICABLE CODES AND STANDARDS^{3,4}

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—17, 20: Florida Building Code – Building (FL 16391)⁵*

2.1.5 *FBC-R—17, 20: Florida Building Code – Residential (FL 16391)⁵*

2.1.6 *CBC—16, 19: California Building Standards Code*

2.1.7 *CRC—16, 19: California Residential Code*

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*

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

² Throughout this TER, wherever Thermo-Ply® Blue is cited, the provisions are applicable to Thermo-Ply® Blue AMG as well.

³ Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

⁴ All terms defined in the applicable building codes are italicized.

⁵ All references to the *FBC-B* and *FBC-R* are the same as the 2018 *IBC* and *IRC* unless otherwise noted in the Florida Supplement.

- 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-Ply® Blue 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* and the *IRC* Continuous Wall Bracing provisions of *IRC Section R602.10.4* Method CS-WSP and CS-PF.
- 3.1.2 Structural performance under lateral load conditions for both wind and seismic loading for use with the performance-based provisions of *IBC Section 2306.1* and *Section 2306.3* for light-frame wood wall assemblies.
 - 3.1.2.1 Table 4 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 Section 12.2.1 of *ASCE 7*:

12.2.1.1 Alternative Structural Systems. Use of seismic force-resisting systems not contained in Table 12.2-1 shall be permitted contingent on submittal to and approval by the Authority Having Jurisdiction and independent structural design review of an accompanying set of design criteria and substantiating analytical and test data. The design criteria shall specify any limitations on system use, including Seismic Design Category and height; required procedures for designing the system's components and connections; required detailing; and the values of the response modification coefficient, R ; overstrength factor, Ω_o ; and deflection amplification factor, C_d .
 - 3.1.2.3 The SDC evaluation uses the approach found in documentation entitled "Establishing Seismic Equivalency for Proprietary Prefabricated Shear Panels"⁶ 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*

⁶ <http://www.structuremag.org/C-StructuralPerformance>

- 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 1403.2⁷ 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 C402.5.1⁸
- 3.1.8 Performance for use as a draftstop in accordance with IBC Section 708.4.2⁹, 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 803.1.2¹⁰ and IRC Section R302.9
- 3.2 Use of Thermo-Ply® Blue Structural Sheathing in a portal frame with hold-down (PFH) is outside the scope of this evaluation. For this application, see TER 1101-01.
- 3.3 Use of Thermo-Ply® Blue Structural Sheathing in a fire resistance rated assembly is outside the scope of this evaluation. For this application, see TER 1510-04.
- 3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.5 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 product evaluated in this TER is shown in Figure 1.



FIGURE 1. THERMO-PLY® BLUE STRUCTURAL SHEATHING

- 4.2 Thermo-Ply® Blue Structural Sheathing is composed of pressure-laminated plies consisting of high-strength cellulosic fibers placed in proprietary orientation(s) to provide a given set of strength properties. 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-Ply® Blue Structural Sheathing panels have a nominal thickness of 0.135" and nominal weight of 0.504 lbs. per square foot.

⁷ 2015 IBC Section 1404.2

⁸ 2012 IECC Section C402.4.1

⁹ 2015 IBC Section 708.4

¹⁰ 2015 IBC Section 803.1.1

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 Thermo-Ply® Blue 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 and seismic) 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.
- 5.1.5 Structural wall sheathing to provide resistance to uplift loads for wall assemblies used in light-frame wood construction.
- 5.1.6 An approved alternative WRB when installed in accordance with Section 5.3 and Section 6.
- 5.1.7 An approved air barrier material when installed in accordance with Section 5.4 and Section 6.
- 5.1.8 An approved draftstop material when installed in accordance with Section 5.5 and Section 6.

5.2 *Structural Applications*

- 5.2.1 Except as otherwise described in this Technical Evaluation Report (TER), Thermo-Ply® Blue 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 Thermo-Ply® Blue 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.
- 5.2.2 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.
- 5.2.3 Except as provided for in Section 5.2.8, the maximum aspect ratio for Thermo-Ply® Blue Structural Sheathing shall be 4:1.
- 5.2.4 The minimum full height panel width shall be 24", except as allowed by Section 3.2 or Section 5.2.8.
- 5.2.5 Installation is permitted for single top plate or double top plate applications.
- 5.2.6 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.



5.2.7 **Simplified IRC Bracing Provisions:**

5.2.7.1 Thermo-Ply® Blue Structural Sheathing is permitted to be used in accordance with the *IRC* simplified bracing method of *IRC Section R602.12* and Table 1.

TABLE 1. THERMO-PLY® BLUE STRUCTURAL SHEATHING SIMPLIFIED BRACING TABLE^{1,2,3,4,5,6,7,8}

Structural Sheathing Product	Ultimate Design Wind Speed (mph)	Story Level	Eave to Ridge Height (ft)	Minimum Bracing Units Required (long side)						Minimum 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-Ply® Blue Structural Sheathing	115	One Story or Top of Two or Three Story	10	1	1	2	2	2	3	1	1	2	2	2	3
		First of Two Story or Second of Three Story		1	2	3	4	4	5	1	2	3	4	4	5
		First of Three Story		2	3	4	5	6	7	2	3	4	5	6	7
		One Story or Top of Two or Three Story	15	1	2	2	3	3	3	1	2	2	3	3	3
		First of Two Story or Second of Three Story		2	2	3	4	5	6	2	2	3	4	5	6
		First of Three Story		2	3	4	5	6	7	2	3	4	5	6	7
	130	One Story or Top of Two or Three Story	10	1	2	2	2	3	3	1	2	2	2	3	3
		First of Two Story or Second of Three Story		2	3	3	4	5	6	2	3	3	4	5	6
		First of Three Story		2	3	5	6	7	9	2	3	5	6	7	9
		One Story or Top of Two or Three Story	15	1	2	2	3	4	5	1	2	2	3	4	5
		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	9	2	4	5	7	8	9

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

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-Ply® 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 24" o.c.
7. Thermo-Ply® Blue Structural Sheathing shall be attached with minimum 15/16" crown x 1 1/4" leg staples fastened 3" o.c. at panel edges and 3" o.c. in the field. Roofing nails (minimum 0.120" x 1 1/4" with a 3/8" head) are a permitted alternate fastener.
8. Minimum 1/2" gypsum wallboard attached to the interior side of the wall in accordance with *IRC Section R702.3.5* and *Table R702.3.5*.

5.2.8 **Prescriptive IRC Bracing Applications:**

5.2.8.1 Thermo-Ply® Blue Structural Sheathing may be used on braced wall lines as an equivalent alternative to Method WSP and CS-WSP of the *IRC* when installed in accordance with *IRC Section R602.10* and this TER.

5.2.8.2 Required braced wall panel lengths for Thermo-Ply® Blue Structural Sheathing shall be as determined by the equivalency factor shown in Table 2 and *IRC Table R602.10.3(1-4)* including all footnotes.

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

5.2.8.2.2 Thermo-Ply® Blue Structural Sheathing tested equivalency factors in Table 2 allow the user to determine the length of bracing required, by multiplying the factor from Table 2 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 *Table R602.10.3(2 and 4)*, respectively.

- 5.2.8.3 All *IRC* prescriptive bracing minimums, spacing requirements, and rules must still be met.
- 5.2.8.4 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 2. *IRC* BRACED WALL PANEL EQUIVALENCY FOR THERMO-PLY® BLUE STRUCTURAL SHEATHING

Product	Maximum Stud Spacing (in)	Fastener ^{1,2}	Maximum Fastener Spacing (edge/field) (in)	Gypsum Wallboard ^{4,5} Fastening Spacing (blocked or unblocked)	Wind
					SPF Framing
					Equivalency Factors ³ to <i>IRC</i> WSP or CS-WSP
Thermo-Ply® Blue Structural Sheathing	16 o.c.	Minimum 15/16" Crown x 1 1/4" Leg Staples	3:3	16:16	0.84
	24 o.c.				0.87

SI: 1 in = 25.4 mm

1. Staples shall be a minimum 16 gauge.
2. Roofing nails (minimum 0.120" x 1/4" with a 3/8" head) are a permitted alternate fastener.
3. Thermo-Ply® Blue 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 Table R602.10.3(2 and 4) respectively.
4. 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 Table R602.10.3(2 and 4), shall be used, except the factor for omitting the gypsum wallboard shall be 1.4. 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 provision listed in *IRC* Table R702.3.5

5.2.9 *Thermo-Ply® Blue Structural Sheathing CS-PF Portal Frame:*

- 5.2.9.1 A "Thermo-Ply® Blue Structural Sheathing CS-PF" was tested and evaluated for equivalency to the *IRC* Method CS-PF (Continuous Sheathed Portal Frame) in accordance with *IRC* Section R602.10.6.4 and Table R602.10.5.
- 5.2.9.2 *IRC* Table R602.10.5 establishes the contributing length of 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.
- 5.2.9.3 The capacity of the Thermo-Ply® Blue 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.
- 5.2.9.4 The Thermo-Ply® Blue Structural Sheathing CS-PF is detailed in Figure 2.

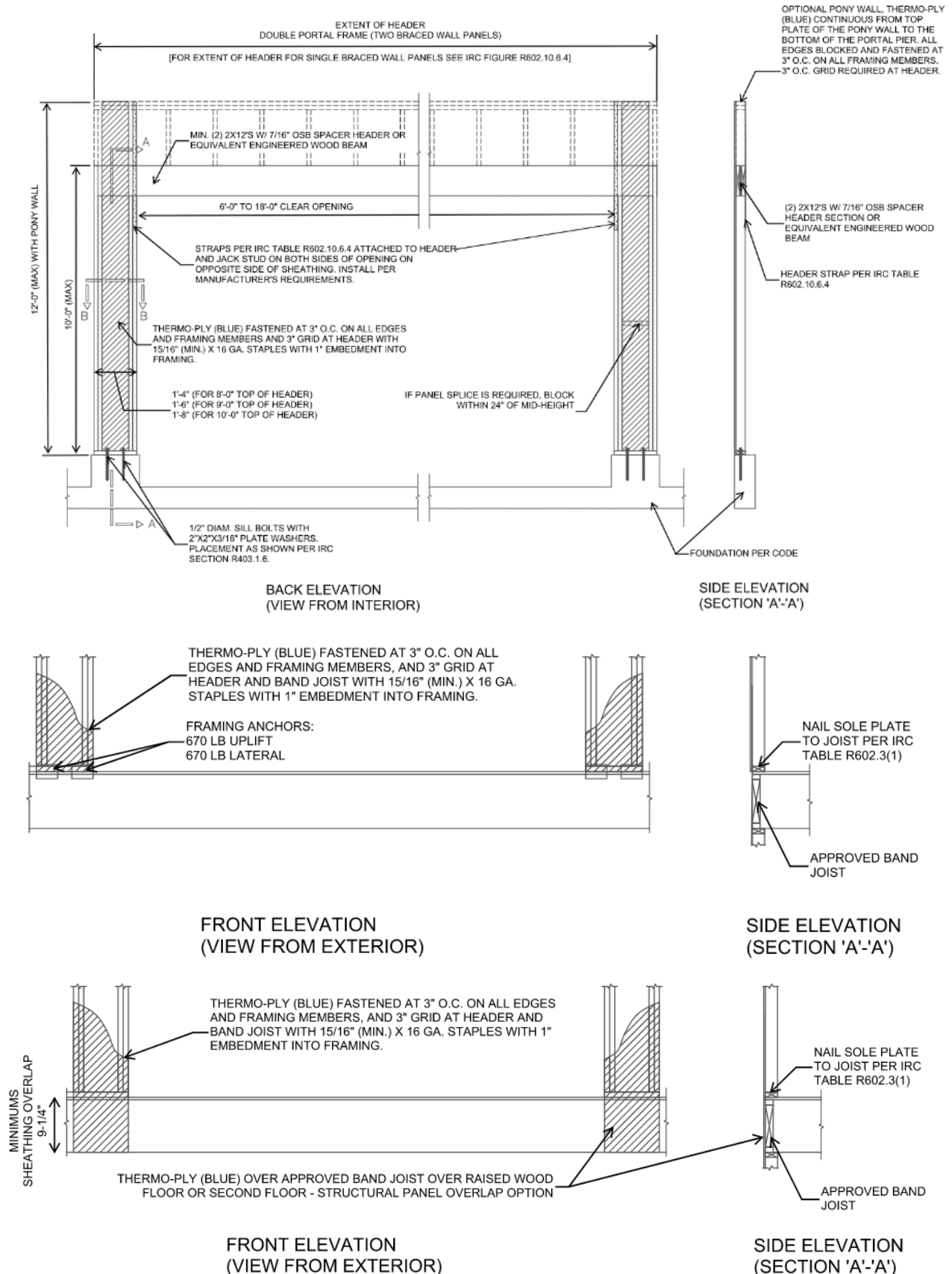


FIGURE 2. THERMO-PLY® BLUE STRUCTURAL SHEATHING CS-PF FRONT ELEVATION 2

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

5.2.10.1 Thermo-Ply® Blue 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 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*¹¹ and this TER.

5.2.11 *Performance-Based Wood-Framed Construction:*

- 5.2.11.1 Thermo-Ply® Blue 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 3, Table 4, and Table 5.
- 5.2.11.2 Thermo-Ply® Blue 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 3.
- 5.2.11.3 Thermo-Ply® Blue 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 4.
 - 5.2.11.3.1 The response modification coefficient, R; system overstrength factor, Ω_0 ; and deflection amplification factor, C_d , indicated in Table 4 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.
- 5.2.11.4 Thermo-Ply® Blue 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.
- 5.2.11.5 Thermo-Ply® Blue 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.

TABLE 3. ALLOWABLE STRESS DESIGN (ASD) CAPACITY FOR THERMO-PLY® BLUE STRUCTURAL SHEATHING - WIND

Product	Joint Condition ³	Maximum Stud Spacing (in)	Gypsum Wallboard ² (GWB)	Gypsum Wallboard Fastener Spacing ⁴ (edge:field)	Allowable Unit Shear Capacity (plf)
Thermo-Ply® Blue Structural Sheathing ^{1,5}	Lapped or Butted	16 o.c.	1/2" GWB	4:16	580
				8:8	520
				8:16	500
				16:16	460
	24 o.c.	1/2" GWB	8:8	480	
			16:16	420	
	Lapped	16 o.c.	No GWB	-	425
		24 o.c.			390
	Butted	16 o.c.			400
		24 o.c.			370

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

1. Thermo-Ply® Blue 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-Ply® surface. Roofing nails (minimum 0.120" x 1 1/4" with a 3/8" head) are a permitted alternate fastener.
2. Gypsum attached with minimum #6 type W or S screws 1 1/4" long or 5d cooler nails with a minimum edge distance of 3/8".
3. Where lapped joints are used, the panels shall be overlapped nominally 3/4".
4. Straight-line interpolations between fastening patterns is acceptable.
5. Thermo-Ply® Blue may be installed on either the interior or exterior side of the wall.

¹¹ 2012 *IBC* Section 2308.3

TABLE 4. SEISMIC PERFORMANCE OF THERMO-PLY® BLUE STRUCTURAL SHEATHING^{1,3}

Seismic Force Resisting System ^{8,9}	Gypsum Wallboard ²	Seismic Allowable Unit Shear Capacity (plf)	Apparent Shear Stiffness, Ga (kips/in)	Response Modification Factor, R ⁴	System Overstrength Factor, Ω_0 ⁵	Deflection Amplification Coefficient, C _d ⁶	Structural System Limitations and Building Height Limit ⁷ (ft)				
							Seismic Design Category				
							B	C	D	E	F
Light-Frame (Wood) Walls Sheathed with Thermo-Ply® Blue	½" Gypsum	365	12.5	6.5	3	4	NL	NL	65	65	65
	No Gypsum	335	8.6	6.5	3	4	NL	NL	65	65	65

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

- Thermo-Ply® Blue Structural Sheathing attached to maximum 16" o.c. framing 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 ¾". Fastener head shall be in contact with the Thermo-Ply® surface. Roofing nails (minimum 0.120" x 1¼" with a ¾" head) are a permitted alternate fastener.
- Gypsum attached with minimum #6 type W or S screws 1¼" long spaced 16" o.c. at panel edges and in the field with a minimum edge distance of ¾".
- All seismic design parameters follow the equivalency as defined in Section 3 of this TER.
- Response modification coefficient, R, for use throughout ASCE 7. Note: R reduces forces to a strength level, not an allowable stress level.
- The tabulated value of the overstrength factor, Ω_0 , is permitted to be reduced by subtracting one-half (0.5) for structures with flexible diaphragms.
- Deflection amplification factor, C_d, for use with ASCE 7 Section 12.8.6, 12.8.7, and 12.9.2.
- NL = Not Limited. Heights are measured from the base of the structure as defined in ASCE 7 Section 11.2.
- Thermo-Ply® Blue Structural Sheathing may be installed with either lapped joints or butted joints.
- Thermo-Ply® Blue may be installed on either the interior or exterior side of the wall.

TABLE 5. UPLIFT PERFORMANCE OF THERMO-PLY® BLUE STRUCTURAL SHEATHING

Product	Allowable Unit Capacity (plf)	Maximum Stud Spacing (in)	Fastener Schedule
Thermo-Ply® Blue: Single Top or Bottom Plate	275	16 o.c.	Minimum 15/16" crown, 1¼" leg 16 gage galvanized staples ¹ OR 0.120" x 1¼" roofing nails with a ¾" head, 3" o.c. to perimeter/field.
Thermo-Ply® Blue: Double Top or Bottom Plate	540		

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

- Staple crowns to be installed parallel to grain.

 TABLE 6. LOAD CAPACITY (PSF) FOR THERMO-PLY® BLUE STRUCTURAL SHEATHING RESISTING TRANSVERSE WIND LOADS^{1,2,4}

Product	Maximum Stud Spacing (in)	Allowable Design Value (psf)	Fastener Schedule	Basic Wind Speed V _{asd} per ASCE 7-05 (mph)	Basic Wind Speed V _{ult} per ASCE 7-10 and 7-16 (mph)
Thermo-Ply® Blue (0.135")	16 o.c.	120	Minimum 15/16" crown, 1¼" leg 16 gage galvanized staples ³ OR 0.120" x 1¼" roofing nails with a ¾" head, 3" o.c. to perimeter/field	≤ 155	≤ 200
	24 o.c.	95			

 SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m², 1 mph = 1.61 km/h

- Design wind load capacity shall be in accordance with *IBC Section 1609.1.1*.
- Capacities assume minimum ½" gypsum wallboard installed on the interior side of the wall. Where gypsum wallboard is not installed on the interior side of the wall, a 40% reduction in wind pressure resistance shall be applied (V_{asd} windspeed less than 90 mph, V_{ult} less than 120 mph).
- Staple crowns shall be installed parallel to grain.
- 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 Water-Resistive Barrier (WRB)

- 5.3.1 Thermo-Ply® Blue Structural Sheathing may be used as a WRB as prescribed in IBC Section 1403.2¹² and IRC Section R703.2, when installed on exterior walls as described in this section.
- 5.3.2 Thermo-Ply® Blue Structural Sheathing shall be installed with board joints placed directly over exterior framing spaced a maximum of 24" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- 5.3.3 All seams and joints between boards shall be butt jointed and sealed with an approved construction tape or overlapped in accordance with Section 6. Use approved construction tape, such as 27/8" OX Seam Tape or equivalent construction tape.
- 5.3.4 A separate WRB system may also be provided. If a separate WRB system is used, overlapping or taping of the sheathing joints is not required.
- 5.3.5 Flashing must be installed at all sheathing penetrations and shall comply with the all applicable code sections. Approved flashing tapes include Arctic Flash Synthetic Flashing, Flexible Butyl Flashing, and Home Guard RA-Plus Flashing.
- 5.3.6 Different Thermo-Ply® Structural Sheathing grades may be used adjacent to one another on the same wall line. In this application, the WRB, air barrier, and transverse load resistance is maintained, provided all seams and joints between boards are overlapped or sealed by the approved construction tapes listed in Section 5.3.3.

5.4 Air Barrier

- 5.4.1 Thermo-Ply® Blue 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 C402.5.1¹³ in accordance with ASTM E2178.

5.5 Draftstop

- 5.5.1 Thermo-Ply® Blue 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.
- 5.5.2 When installed as a draftstop, Thermo-Ply® Blue Structural Sheathing shall be installed in accordance with Section 6.

5.6 Surface Burn Characteristics

- 5.6.1 Thermo-Ply® Blue Structural Sheathing panels have the flame spread characteristics shown in Table 7.

TABLE 7. FLAME SPREAD AND SMOKE DEVELOPED RATING

Product	Flame Spread	Smoke Developed
Thermo-Ply® Blue Structural Sheathing	< 200	< 450
1. Tested in accordance with <u>ASTM E84</u> and <u>UL 723</u> .		

5.7 Non-Structural Applications

- 5.7.1 Where other means of wall bracing are provided, or are not required, any grade of Thermo-Ply® Structural Sheathing may be used to provide other approved wall functions when installed in accordance with this section.
 - 5.7.1.1 The sheathing panels are applied to wall framing with minimum 0.120" x 1¼" galvanized roofing nails or No.16 gage galvanized staples having a 15/16" crown and 1¼" leg lengths.
 - 5.7.1.2 Fastener spacing shall be a maximum of 6" at the edges and 12" on intermediate members.
 - 5.7.1.3 Stud spacing shall be a maximum of 24" o.c.
 - 5.7.1.4 Minimum fastener penetration into the framing members is 1".

¹² 2015 IBC Section 1404.2

¹³ 2012 IECC Section C402.4.1



- 5.7.1.5 Fasten all staples parallel to the framing member, with an edge distance of 3/8" (9.5 mm) minimum.
- 5.7.1.6 All panels are vertically or horizontally installed with all joints backed by studs, plates, or blocks when water or air barrier functionality is desired.
- 5.7.2 Incidental tears or penetrations of Thermo-Ply® Structural Sheathing must be repaired with an approved construction tape. See Section 5.3.3.
- 5.7.3 All joints must be installed in one of the following methods:
 - 5.7.3.1 Joints overlap nominally 3/4" (19.1 mm).
 - 5.7.3.2 Butted joints are sealed with an approved construction tape. See Section 5.3.3.

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 *General for Structural and WRB Applications*
 - 6.2.1 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. Basic instructions are printed on every Thermo-Ply® panel as well.
 - 6.2.2 Where the Thermo-Ply® Structural Sheathing extends beyond the bottom of a wall and overlaps the band joist below, fasten the bottom edge of the Thermo-Ply® to the wall bottom plate where it meets the band joist. Due to possible shrinkage of the band joist, do not fasten the sheathing to the band joist. Instead, fasten tightly with one fastener every 12" to smooth out if necessary.
 - 6.2.3 Where hold-down straps are used, install Thermo-Ply® Blue Structural Sheathing first, then install the strap over the face of the structural sheathing and attach per the manufacturer’s installation instructions.
- 6.3 *Orientation and Backing*
 - 6.3.1 Thermo-Ply® Blue Structural Sheathing may be installed in either the vertical or horizontal orientation.
 - 6.3.2 To be recognized for the structural values listed in this TER, or as a water- or air-barrier, all joints must be backed by studs, plates, or blocks and fastened.
- 6.4 *Fastener Type*
 - 6.4.1 *Thermo-Ply® Blue Structural Sheathing:*
 - 6.4.1.1 Minimum 0.120" x 1¼" galvanized roofing nail.
 - 6.4.1.2 Minimum 15/16" crown by 1¼" leg, 16 ga staples shall be installed per the staple manufacturer's instructions.
 - 6.4.1.3 Fasteners shall be driven such that the head of the fastener is in contact with the surface of the Thermo-Ply® Structural Sheathing. Do not overdrive fasteners.

TABLE 8. FASTENER SPACING OF THERMO-PLY® BLUE STRUCTURAL SHEATHING

Thermo-Ply® Blue Structural Sheathing Application	Maximum Panel Edge Fastener Spacing (in)	Maximum Panel Intermediate Fastener Spacing
Lateral Shear	3	3
Transverse Loads		
Uplift Loads		
Water-Resistive Barrier	6	12
Air Barrier		
Draftstop		
SI: 1 in = 25.4 mm		

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

6.5 *Fastener Edge Distance*

6.5.1 Fasteners shall be installed with a nominal edge distance of ¾" (9.5 mm) for Thermo-Ply® Blue Structural Sheathing and gypsum.

6.6 *Treatment of Joints*

6.6.1 Thermo-Ply® Blue Structural Sheathing joints may be either butted or overlapped.

6.6.1.1 Lapped joints shall be overlapped nominally ¾" (19 mm) and fastened with a single row of fasteners. Always run staples parallel with framing.

6.6.1.2 Butt joints shall be placed over framing members and fastened with a single row of fasteners at each panel edge.

6.7 *Window Jamb Adjustments*

6.7.1 If windows are made to accommodate traditional ½" sheathing materials, order windows with adjustable nailing fins from the supplier. Door brick moldings may be planed or routed ¾" in order to accommodate the different sheathing thickness, either at the jobsite or by the millwork supplier.

6.7.2 Thermo-Ply® Blue 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.

6.8 The structural installation procedure shall be in accordance with Figure 3.

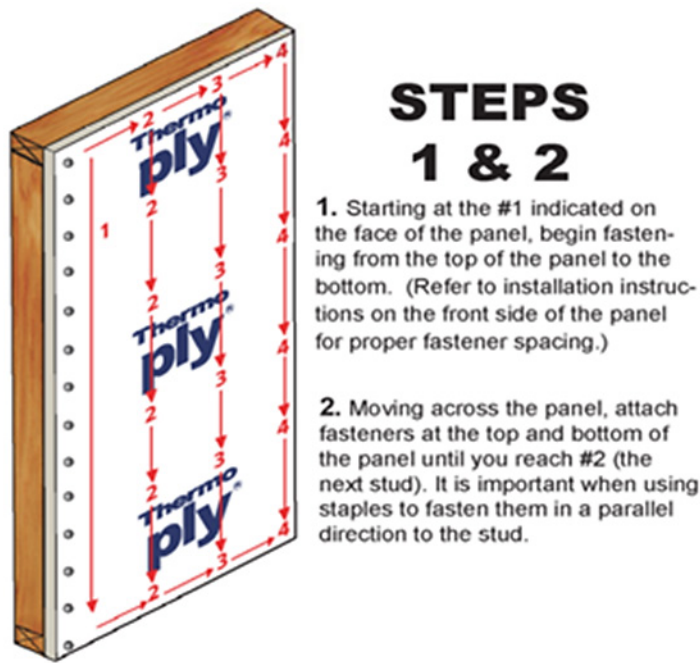


FIGURE 3. INSTALLATION INSTRUCTIONS – WRB INSTALLATION PROCEDURE

- 6.8.1 Overlapped Joint – Install the first panel per Figure 3.
 - 6.8.1.1 Overlap the next panel $\frac{3}{4}$ " over the first panel and fasten the joint with a common line of fasteners.
 - 6.8.1.2 For Thermo-Ply® Blue AMG, ensure the panel is properly positioned on the wall prior to removal of the adhesive release liners on vertical edges. Fasten the overlapped joint with a common line of fasteners.
- 6.8.2 Butted Joint with Flashing – Install panels per Figure 3 with joints butted (no overlap).
- 6.8.3 Seal butted seams with approved construction tape (see Section 5.3.3), when finished with attaching the wall panels and all fasteners in the wall line.

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 Transverse load testing in accordance with *ASTM E330*
 - 7.1.2 Uplift load testing in accordance with *ASTM E72*
 - 7.1.3 Water-resistive barrier material testing in accordance with *ASTM E331*
 - 7.1.4 Air barrier material testing in accordance with *ASTM E2178*
 - 7.1.5 Lateral load testing and data for determining comparative equivalency for use as an alternative material in accordance with *ASTM E2126*
 - 7.1.6 Surface burn characteristics testing 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 and seismic 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 1403.2¹⁴ and IRC Section R703.2
 - 8.1.5 Performance for use as an air barrier material in accordance with IRC Section N1102.4.1.1 and IECC Section R402.4.1.1
 - 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 803.1.2¹⁵ and IRC Section R302.9

¹⁴ 2015 IBC Section 1404.2

¹⁵ 2015 IBC Section 803.1.1

- 8.2 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.
- 8.2.1 No known variations
- 8.3 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
- 8.3.1 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.
- 8.4 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.
- 8.5 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.”
- 8.6 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...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 This report and the installation instructions shall be available to the jurisdiction in which the project is to be constructed.
- 9.2 Thermo-Ply® Blue Structural Sheathing shall not be used as a nailing base for claddings, trim, windows, and doors.
- 9.3 Walls sheathed with Thermo-Ply® Blue Structural Sheathing shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.4 When Thermo-Ply® Blue Structural Sheathing is not installed for use as wall bracing, as described in this TER, the stud walls shall be braced by other materials, in accordance with the applicable code. When used as a WRB, installation shall be in accordance with Section 5.3.
- 9.4.1 When Thermo-Ply® Structural Sheathing is not installed as a WRB, other means of providing a WRB shall be required, as per the code.
- 9.5 When used in accordance with the *IBC* in Seismic Design Categories C, D, E, or F, special inspections shall comply with IBC Section 1705.12¹⁶.
- 9.6 When used in accordance with the *IBC* in high wind areas, special inspections shall comply with IBC Section 1705.11¹⁷.
- 9.7 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.7.1 Allowable shear loads shall not exceed values in Table 3 for wind loads and Table 4 for seismic loads.
- 9.7.2 Allowable uplift loads shall not exceed values in Table 5.
- 9.7.3 Transverse design loads shall not exceed those described in Table 6 unless an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing.

¹⁶ 2012 *IBC* Section 1705.11

¹⁷ 2012 *IBC* Section 1705.10



- 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 RDP).
- 9.11 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.12 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.
- 9.13 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.
- 9.14 This TER shall be reviewed for code compliance by the AHJ in concert with IBC Section 104.
- 9.15 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 www.oxengineeredproducts.com.

11 REVIEW SCHEDULE

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact [DrJ Certification](#).

Issue Date: January 6, 2021
Subject to Renewal: April 1, 2022

FBC Supplement to TER 1004-02

REPORT HOLDER: Ox Engineered Products, LLC

1 EVALUATION SUBJECT

- 1.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG 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-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing, recognized in TER 1004-02, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 Applicable Code Editions

- 2.2.1 *FBC-B—17, 20: Florida Building Code – Building (FL 16391)*
- 2.2.2 *FBC-R—17, 20: Florida Building Code – Residential (FL 16391)*

3 CONCLUSIONS

- 3.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing, described in TER 1004-02, comply with the *FBC-B* and *FBC-R* and are subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the *IBC* and *IRC* and the *FBC-B* and *FBC-R* applicable to this 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, Table R602.10.5, Section R602.10.6.4, 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 2308 replaces *IBC* Section 2308.6 and is reserved.
 - 3.2.6 *FBC-B* Section 1404.2 replaces *IBC* Section 1403.2.
 - 3.2.7 *FBC-B* Section 1705 replaces *IBC* Section 1705.12 and Section 1705.11 and is reserved.

4 CONDITIONS OF USE

- 4.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing, described in TER 1004-02, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in TER 1004-02
 - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of *FBC-B* Chapter 16 and Chapter 17, as applicable.



Issue Date: December 22, 2020
Subject to Renewal: April 1, 2022

CBC and CRC Supplement to TER 1004-02

REPORT HOLDER: Ox Engineered Products, LLC

1 EVALUATION SUBJECT

1.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG 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-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing, recognized in TER 1004-02, has also been evaluated for compliance with the codes listed below.

2.2 Applicable Code Editions

2.2.1 *CBC—16, 19: California Building Code (Title 24, Part 2)*

2.2.2 *CRC—16, 19: California Residential Code (Title 24, Part 2.5)*

3 CONCLUSIONS

3.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing, described in Sections 2.0 through 11.0 of TER 1004-02, complies with *CBC* and *CRC* and is subject to the conditions of use described in this supplement.

4 CONDITIONS OF USE

4.1 Thermo-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing, described in TER 1004-02, must comply with all of the following conditions:

4.1.1 All applicable sections in TER 1004-02

4.1.2 The design, installation, conditions of use, and identification of Thermo-Ply® Blue and Thermo-Ply® Blue AMG Structural Sheathing are in accordance with the 2018 *International Building Code (IBC)* provisions noted in TER 1004-02.

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