Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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

Trade Secret Report Holder:

OX Engineered Products, LLC

Phone: 269-435-2425 Website: www.oxengineeredproducts.com

CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 12 00 - Structural Panels

Section: 06 12 19 - Shear Wall Panels

Section: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

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

Section: 07 27 00 - Air Barriers

1 Innovative Products Evaluated[1]

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

1.1.1 Throughout this report, wherever Thermo-Ply Blue Structural Sheathing is cited, the provisions are also applicable to Thermo-Ply Blue AMG Structural Sheathing.

2 Product Description and Materials

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

Figure 1. Thermo-Ply Blue Structural Sheathing and Logo

2.2 Thermo-Ply Blue 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.

2.2.1 Thermo-Ply Blue Structural Sheathing panels have a nominal thickness of 0.135" (3.4 mm) and nominal weight of 0.504 lb. per square foot (2.46 kg per square meter).

2.3 *Material Availability*

2.3.1 *Standard Widths Include:*

2.3.1.1 48" (1219 mm)

2.3.1.2 48 3/4" (1238 mm)

2.3.2 *Standard Lengths Include:*

2.3.2.1 96" (2438 mm)

2.3.2.2 108" (2743 mm)

2.3.2.3 120" (3048 mm)

2.3.3 Other custom widths and lengths can be manufactured.

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

3 Definitions

3.1 New Materials[2] are defined as building materials, equipment, appliances, systems, or methods of construction not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[3] The design strengths and permissible stresses shall be established by tests[4] and/or engineering analysis.[5]

3.2 Duly Authenticated Reports[6] and Research Reports[7] are test reports and related engineering evaluations, which are written by an approved agency[8] and/or an approved source.[9]

3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).[10]

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

3.4 An approved source is “approved” when a professional engineer (i.e., Registered Design Professional) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[11]

3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).

3.5.1 The Center for Building Innovation (CBI) is ANAB[12] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[13] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[14] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept Duly Authenticated Reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[15]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.[16] Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[17]

3.9 Approval equity is a fundamental commercial and legal principle.[18]

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation[19]

4.1 *Standards*

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

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

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

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

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

4.1.6 *ASTM E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*

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

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

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

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

4.1.11 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*

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

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

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

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

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

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

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

4.2.5.1 ASTM D7989 is accepted engineering practice used to establish Seismic Design Coefficients (SDCs). Test data generated by ISO/IEC 17025 approved agencies and/or professional engineers and all associated professional engineering evaluations that use ASTM D7989 as their basis, are defined as intellectual property and/or trade secrets, and are also defined as an Independent Design Review (i.e., Listings, certified reports, Duly Authenticated Reports from approved agencies, and/or research reports prepared by approved agencies and/or approved sources).

4.3 *Regulations*

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

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

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

4.3.4 *FBC-B—20, 203: Florida Building Code – Building[20] (FL 16391)*

4.3.5 *FBC-R—20, 23: Florida Building Code – Residential[20] (FL 16391)*

4.3.6 *CBC—19, 22: California Building Code*

4.3.7 *CRC—19, 22: California Residential Code*

5 Listed[21]

5.1 A nationally recognized testing laboratory such as CBI, states that the materials, designs, methods of construction, and/or equipment have met nationally recognized standards and/or have been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 Thermo-Ply Blue Structural Sheathing panels are used in the following applications:

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

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

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

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

6.1.5 Structural wall sheathing to provide resistance to uplift loads for wall assemblies used in light-frame wood construction.

6.1.6 An approved alternative WRB when installed in accordance with **Section 6.3** and **Section 9**.

6.1.7 An approved air barrier material when installed in accordance with **Section 6.4** and **Section 9**.

6.1.8 An approved draftstop material when installed in accordance with **Section 6.5** and **Section 9**.

6.2 *Structural Applications*

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

6.2.1.1 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 report.

6.2.2 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 4**.

6.2.3 Except as provided for in **Section 6.2.8**, the maximum aspect ratio for Thermo-Ply Blue Structural Sheathing shall be 4:1.

6.2.4 The minimum full height panel width shall be 24", except as allowed by **Section 8.2**, **Section 6.2.8**, or **Section 6.2.9**.

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

6.2.6 *Simplified IRC Bracing Provisions*

6.2.6.1 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 Protective 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 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-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

Table 1. Thermo-Ply Blue Structural Protective 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 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

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 IRC Table R702.3.5.

6.2.7 *Prescriptive IRC Bracing Applications:*

6.2.7.1 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 except where modified by this report.

6.2.7.2 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) through IRC Table R602.10.3(4) including all footnotes.

6.2.7.2.1 The braced wall line length equivalency factors in **Table 2** are based on equivalency testing and are used to comply with Method WSP and CS-WSP of the IRC.

6.2.7.2.2 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 IRC Table R602.10.3(3), as modified by all applicable factors in IRC Table R602.10.3(2) and IRC Table R602.10.3(4), respectively.

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

6.2.7.4 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[5]

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 IRC 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 $1^{1}/_{4}$" 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-WSP columns in IRC Table R602.10.3(1) and IRC Table R602.10.3(3), as modified by all applicable factors in IRC Table R602.10.3(2) and IRC Table R602.10.3(4), respectively.
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 IRC Table R602.10.3(3), as modified by all applicable factors in IRC Table R602.10.3(2) and IRC Table R602.10.3(4), 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

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

6.2.8.1 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 IRC Table R602.10.5.

6.2.8.2 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.

6.2.8.3 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.

6.2.8.4 The Thermo-Ply Blue Structural Sheathing CS-PF is depicted in **Figure 2**.

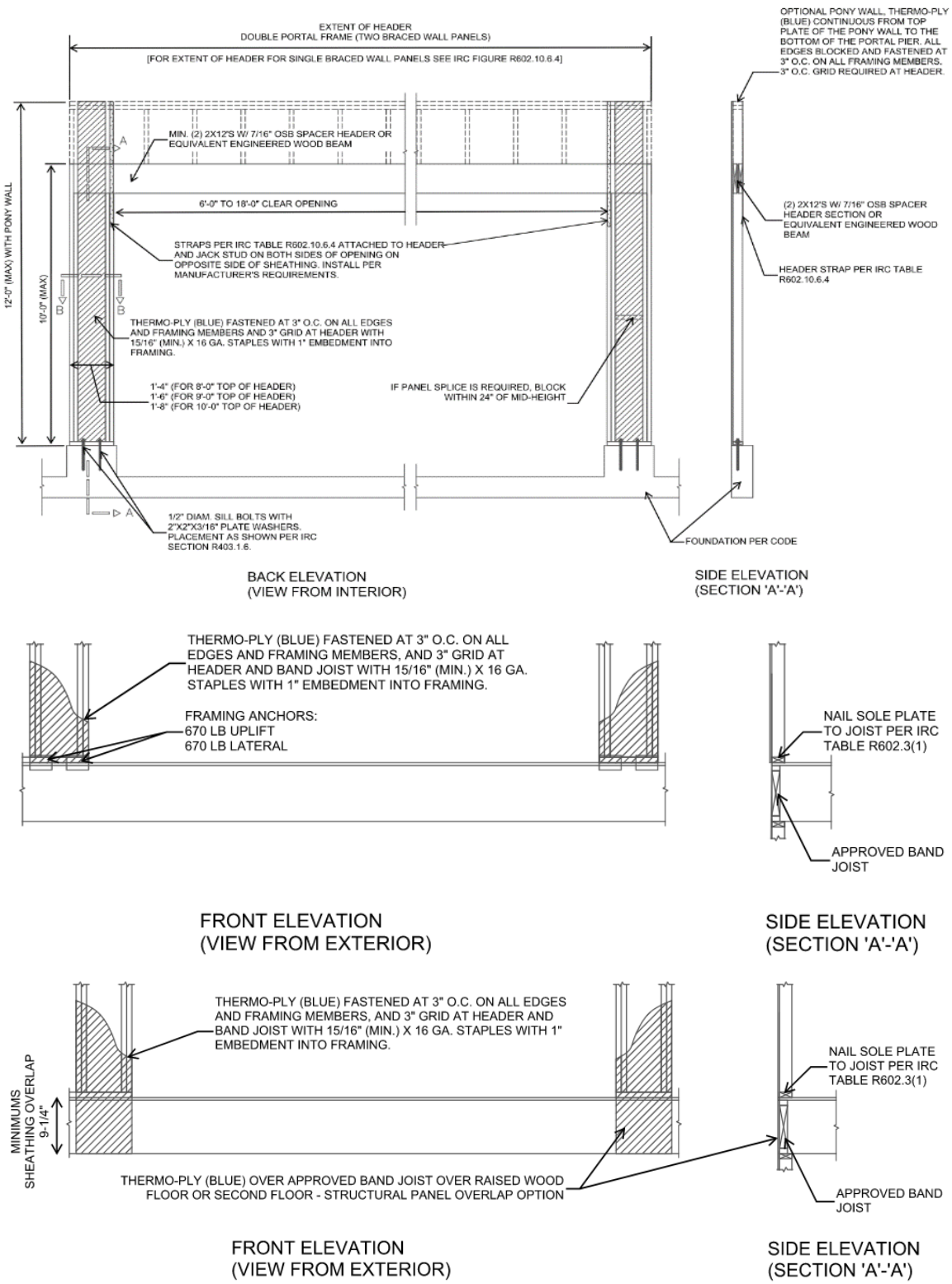

Figure 2. Thermo-Ply Blue Structural Sheathing CS-PF

6.2.9 *Prescriptive IBC Conventional Light-Frame Wood Construction*

6.2.9.1 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 and this report.

6.2.10 *Performance-Based Wood-Framed Construction*

6.2.10.1 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**.

6.2.10.2 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**.

6.2.10.3 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**.

6.2.10.3.1 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.

6.2.10.4 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**.

6.2.10.5 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

Product	Joint Condition[3]	Maximum Stud Spacing (in)	Gypsum Wallboard[2] (GWB)	Gypsum Wallboard Fastener Spacing[4] (edge:field)	Allowable Unit Shear Capacity (plf)

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

1. Thermo-Ply Blue Structural Sheathing attached with a minimum 16-gauge, $^{15}/_{16}$" crown staples shall penetrate a minimum of 1" into the stud. Fasteners are to be installed with the crown parallel to the framing and spaced a maximum of 3" o.c. at the panel edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of $^{3}/_{8}$". Fastener head shall be in contact with the Thermo-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 Structural Sheathing may be installed on either the interior or the exterior side of the wall.

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 Over-strength 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 Structural Sheathing	$^{1}/_{2}$" 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

1. 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 $^{3}/_{8}$". 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 spaced 16" o.c. at panel edges and in the field with a minimum edge distance of $^{3}/_{8}$".
3. All seismic design parameters follow the equivalency as defined in Section **8** of this report.
4. Response modification coefficient, R, for use throughout ASCE 7. Note: R reduces forces to a strength level, not an allowable stress level.
5. 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.
6. Deflection amplification factor, C_d, for use with ASCE 7 Section 12.8.6, 12.8.7, and 12.9.1.2.
7. NL = Not Limited. Heights are measured from the base of the structure as defined in ASCE 7 Section 11.2.
8. Thermo-Ply Blue Structural Sheathing may be installed with either lapped joints or butted joints.
9. Thermo-Ply Blue Structural Sheathing 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 Structural Sheathing Single Top or Bottom Plate	275	16 o.c.	Minimum $^{15}/_{16}$" crown, $1^{1}/_{4}$" leg 16-gauge galvanized staples[1] OR 0.120" x $1^{1}/_{4}$" roofing nails with a $^{3}/_{8}$" head, 3" o.c. to perimeter/field.
Thermo-Ply Blue Structural Sheathing Double Top or Bottom Plate	540		

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

1. 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 7-16 and 7-22 (mph)
Thermo-Ply Blue Structural Sheathing (0.135")	16 o.c.	120	Minimum 15/16" crown, 1 1/4" leg 16-gauge galvanized staples[3] OR 0.120" x 1 1/4" roofing nails with a 3/8" 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

1. Design wind load capacity shall be in accordance with IBC Section 1609.1.1.
2. Capacities assume minimum 1/2" gypsum wallboard installed on the interior side of the wall. Where gypsum wallboard in not installed on the interior side of the wall, a 40% reduction in wind pressure resistance shall be applied (V_{asd} wind speed less than 90 mph, V_{ult} less than 120 mph).
3. Staple crowns shall be installed parallel to framing.
4. Allowable wind speeds are based on the following: Components and Cladding wind loads, Mean roof height 30', Exposure C, 10 sq. ft. effective wind area. See the applicable building code for any adjustment needed for specific building location and configuration.

6.3 *Water-Resistive Barrier (WRB)*

6.3.1 Thermo-Ply Blue Structural Sheathing may be used as a WRB as prescribed in IBC Section 1403.2[22] and IRC Section R703.2, when installed on exterior walls as described in this section.

6.3.2 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 9**.

6.3.3 All seams and joints between boards shall be butt jointed and sealed with an approved construction tape or overlapped in accordance with **Section 9**. Use approved construction tape, such as 2 7/8" OX SeamTape®.

6.3.4 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.

6.3.5 Flashing must be installed at all sheathing penetrations and shall comply with all applicable code sections. Approved flashing tapes include Arctic Flash Synthetic Flashing, Flexible Butyl Flashing, and HomeGuard RA-Plus Flashing.

6.3.6 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 6.3.3**.

6.4 *Air Barrier*

6.4.1 Thermo-Ply Blue Structural Sheathing may be used as an air barrier assembly as prescribed in IRC Section N1102.4.1.1, IECC Section R402.4.1.1, and IECC Section C402.5.1.

6.4.2 Thermo-Ply Blue Structural Sheathing was evaluated in accordance with ASTM E2178 and results met the requirement specified in IECC Section C402.5.1.3.

6.4.2.1 Thermo-Ply Blue Structural Sheathing has an air permeability < 0.02 L/(s·m²) under a pressure differential of 75 Pa.

6.4.3 All seams and joints between boards shall be butt jointed and sealed with an approved construction tape listed in **Section 6.3.3** or overlapped in accordance with **Section 9**.

6.5 *Draftstop*

6.5.1 Thermo-Ply Blue Structural Sheathing may be used as a draftstop material in accordance with IBC Section 708.4.2, IBC Section 718.3, IBC Section 718.4, and IRC Section R302.12.

6.5.2 When installed as a draftstop, Thermo-Ply Blue Structural Sheathing shall be installed in accordance with **Section 9**.

6.6 *Surface Burn Characteristics*

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

Table 7. Flame spread and Smoke Developed Rating[1]

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

6.7 *Non-Structural Applications*

6.7.1 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 wall functions when installed in accordance with this section.

6.7.1.1 The sheathing panels are applied to wall framing with minimum 0.120" x $1^{1}/_{4}$" galvanized roofing nails or 16-gauge galvanized staples having a $^{15}/_{16}$" crown and $1^{1}/_{4}$" leg lengths.

6.7.1.2 Fastener spacing shall be a maximum of 6" at the edges and 12" on intermediate members.

6.7.1.3 Stud spacing shall be a maximum of 24" o.c.

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

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

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

6.7.2 Incidental tears or penetrations of Thermo-Ply Blue Structural Sheathing must be repaired with an approved construction tape. See **Section 6.3.3**.

6.7.3 All joints must be installed in one of the following methods:

6.7.3.1 Joints overlap nominally $^{3}/_{4}$" (19 mm).

6.7.3.2 Butted joints are sealed with approved construction tape. See **Section 6.3.3**.

6.8 *Thermal Barrier Requirements – Attic, Crawlspace or Other Uninhabitable Space Applications*

6.8.1 When installed in an attic, crawlspace, or other uninhabitable spaces, Thermo-Ply Blue Structural Sheathing is approved for use without a thermal barrier or ignition barrier. This includes, but is not limited to, knee and gable end walls.

6.9 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

7 Certified Performance[23]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[24]

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.[25]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Thermo-Ply Blue Structural Sheathing comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 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 (continuously sheathed wood structural panel) and CS-PF (continuously sheathed portal frame).

8.1.2 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 IBC Section 2306.3 for light-frame wood wall assemblies.

8.1.2.1 **Table 4** provides Seismic Design Coefficients (SDCs) that conform to the requirements in ASCE 7 Section 12.2.1.1 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).

8.1.2.2 The basis for equivalency testing is outlined in Section 12.2.1.1 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.

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

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

8.1.4 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.

8.1.5 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.

8.1.6 Performance for use as a Water-Resistive Barrier (WRB) in accordance with IBC Section 1403.2[26] and IRC Section R703.2.

8.1.7 Performance for use as an air barrier in accordance with IRC Section N1102.4.1.1, IECC Section R402.4.1.1, and IECC Section C402.5.1.

8.1.8 Performance for use as a draftstop in accordance with IBC Section 708.4.2,[27] IBC Section 718.3, IBC Section 718.4, and IRC Section R302.12.

8.1.9 Surface burn characteristic performance for use as a Class C interior finish material in accordance with IBC Section 803.1.2[28] and IRC Section R302.9.

8.2 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 Report Number 1101-01.

8.3 Use of Thermo-Ply Blue Structural Sheathing in a fire resistance rated assembly is outside the scope of this evaluation. For this application, see Report Number 1510-04.

8.4 Use of this report is designated for Allowable Stress Design (ASD). For Limit States Design (LSD), see Report Number 1812-01.

8.5 For limitations for allowable size of holes in walls sheathed with Thermo-Ply Blue Structural Sheathing, see Report Number 2302-41.

8.6 Any building code, regulation, and/or accepted engineering evaluations (i.e., research reports, Duly Authenticated Reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified[29] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

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

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

9 Installation

9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.

9.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.

9.3 *General for Structural and WRB Applications*

9.3.1 Installation shall comply with the manufacturer installation instructions and this report. In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern. Basic instructions are printed on every Thermo-Ply panel as well.

9.3.2 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.

9.3.3 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 installation instructions.

9.4 *Orientation*

9.4.1 Thermo-Ply Blue Structural Sheathing may be installed in either the vertical or the horizontal orientation.

9.4.2 To be recognized for the structural values listed in this report, or as a water or air barrier, all joints must be backed by studs, plates, or blocks and fastened.

9.5 *Fastener Type*

9.5.1 *Thermo-Ply Blue Structural Sheathing:*

9.5.1.1 Minimum 0.120" x 1¼" galvanized roofing nail.

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

9.5.1.3 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.

9.5.1.4 See **Table 8** for fastening spacing.

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 (in)
Lateral Shear	3	3
Transverse loads		
Uplift loads		
Water-Resistive Barrier	6	12
Air Barrier		
Draftstop		
SI: 1 in = 25.4 mm		

9.5.2 *Gypsum Wallboard*

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

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

9.5.2.1.2 5d cooler nails

9.6 *Fastener Edge Distance*

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

9.7 *Treatment of Joints*

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

9.7.1.1 Lapped joints shall be overlapped by $^{3}/_{4}$" (19 mm) nominally and fastened with a single row of fasteners. Always run staples parallel with framing.

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

9.8 *Window Jamb Adjustments*

9.8.1 If windows are made to accommodate traditional $^{1}/_{2}$" (12 mm) sheathing materials, order windows with adjustable nailing fins from the supplier. Door brick moldings may be planed or routed $^{3}/_{8}$" in order to accommodate the different sheathing thickness, either at the jobsite or by the millwork supplier.

9.8.2 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 installation instructions.

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

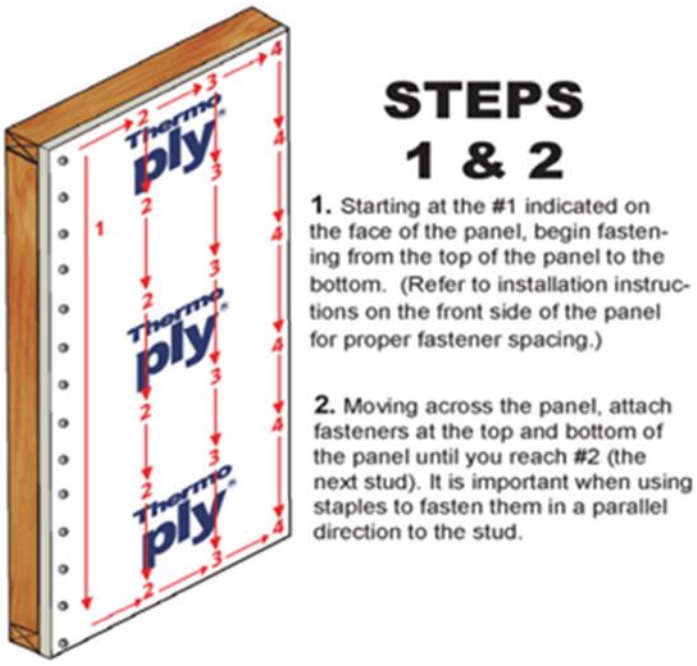

Figure 3. Installation Instructions - WRB Installation Procedure

9.8.4 Overlapped Joint – Install the first panel per **Figure 3**.

9.8.4.1 Overlap the next panel 3/4" over the first panel and fasten the joint with a common line of fasteners.

9.8.4.2 For Thermo-Ply Blue AMG Structural Sheathing, 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.

9.8.5 Butted Joint with Flashing – Install panels per **Figure 3** with joints butted (no overlap).

9.8.6 Seal butted seams with approved construction tape (see **Section 6.3.3**), when finished with attaching the wall panels and all fasteners in the wall line.

10 Substantiating Data

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

10.1.1 Transverse load testing in accordance with ASTM E330.

10.1.2 Uplift load testing in accordance with ASTM E72.

10.1.3 Water-resistive barrier material testing in accordance with ASTM E331.

10.1.4 Air barrier material testing in accordance with ASTM E2178.

10.1.5 Lateral load testing and data for determining comparative equivalency for use as an alternative material in accordance with ASTM D564 and ASTM E2126, and analysis per ASTM D7989.

10.1.6 Surface burn characteristics testing in accordance with ASTM E84.

10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.

10.3 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or Duly Authenticated Reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this Duly Authenticated Report, may be dependent upon published design properties by others.

10.5 Testing and engineering analysis: The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[30]

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

11 Findings

11.1 As outlined in **Section 6**, Thermo-Ply Blue Structural Sheathings have performance characteristics that were tested and/or meet applicable regulations and are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this Duly Authenticated Report and the manufacturer installation instructions, Thermo-Ply Blue Structural Sheathing shall be approved for the following applications:

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

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

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

11.2.4 Performance for use as a WRB in accordance with IBC Section 1403.2[31] and IRC Section R703.2.

11.2.5 Performance for use as an air barrier in accordance with IRC Section N1102.4.1.1, IECC Section R402.4.1.1, and IECC Section C402.5.1.

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

11.2.7 Performance for use as a Class C interior finish material in accordance with IBC Section 803.1.2[32] and IRC Section R302.9

11.3 Unless exempt by state statute, when Thermo-Ply Blue Structural Sheathing are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from OX Engineered Products, LLC.

11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[33] are similar) in pertinent part 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.

11.6 **Approved**:[34] Building regulations require that the building official shall accept Duly Authenticated Reports.[35]

11.6.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited.

11.6.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce.

11.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.

11.8 Through the IAF Multilateral Agreements (MLA), this Duly Authenticated Report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 Duly Authenticated Reports are equivalent.[36]

12 Conditions of Use

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

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

12.3 As listed herein, Thermo-Ply Blue Structural Sheathing shall not be used:

12.3.1 As a nailing base for claddings, trim, windows, and doors.

12.3.2 To resist horizontal loads from concrete and masonry walls when used as wall sheathing.

12.4 When Thermo-Ply Blue Structural Sheathing is not installed for use as wall bracing as described in this report, the stud walls shall be braced by other materials, in accordance with the applicable code.

12.5 When used as a WRB, installation shall be in accordance with **Section 6.3**.

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

12.6 When used in accordance with the IBC in Seismic Design Categories C, D, E, or F, special inspections shall comply with IBC Section 1705.13.[37]

12.6.1 When used in accordance with the IBC in high wind areas, special inspections shall comply with IBC Section 1705.12.[38]

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

12.7.1 Allowable shear loads shall not exceed values in **Table 3** for wind loads and **Table 4** for seismic loads.

12.7.2 Allowable uplift loads shall not exceed values in **Table 5**.

12.7.3 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.

12.8 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:

12.8.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.8.2 This report and the installation instructions shall be submitted at the time of permit application.

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

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

12.8.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.

12.8.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.

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

12.9 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, "*the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11*," all of IBC Section 104, and IBC Section 105.4.

12.10 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.11 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

13.1 The innovative products listed in **Section 1.1** are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.oxengineeredproducts.com.

14 Review Schedule

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

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

15 Approved for Use Pursuant to U.S. and International Legislation Defined in Appendix A

15.1 Thermo-Ply Blue Structural Sheathing and Thermo-Ply Blue AMG Structural Sheathing are included in this report published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report meets the legislative intent and definition of being acceptable to the AHJ.

Appendix A

1 Legislation that Authorizes AHJ Approval

1.1 **Fair Competition**: State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies, and/or methods of construction that:

1.1.1 Advance innovation,

1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and

1.1.3 Benefit consumers through lower prices, better quality, and greater choice.

1.2 **Adopted Legislation**: The following local, state, and federal regulations affirmatively authorize these innovative products to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:

1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies, and/or methods of construction. The goal is to "*protect economic freedom and opportunity by promoting free and fair competition in the marketplace*."

1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies, and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.

1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),[39] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years[40] and/or a $5,000,000 fine or 3 times the value of[41] the Intellectual Property (IP) and Trade Secrets (TS).

1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, Duly Authenticated Reports, and/or research reports prepared by approved agencies and/or approved sources.

1.2.4 For new materials[42] that are not specifically provided for in any regulation, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.

1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.[43]

1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation have been violated by an individual registered PE.

1.2.7 The AHJ shall accept Duly Authenticated Reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.[44]

1.3 **Approved[45] by Los Angeles**: The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards that apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.[46] The Superintendent of Building Approved Testing Agency Roster is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a DrJ Listing are LAMC approved. In addition, the Superintendent of Building shall accept Duly Authenticated Reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.[47]

1.4 **Approved by Chicago**: The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly, and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).

1.5 **Approved by New York City**: The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed[48] an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement[49] (i.e., ANAB, International Accreditation Forum [IAF], etc.).

1.6 **Approved by Florida**: Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:

1.6.1 A certification mark or listing of an approved certification agency,

1.6.2 A test report from an approved testing laboratory,

1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or

1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.

1.6.5 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods:

1.6.5.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,

1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,

1.6.5.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,

1.6.5.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or

1.6.5.5 A statewide product approval issued by the Florida Building Commission.

1.6.6 The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA])**: A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.

1.8 **Approved by New Jersey**: Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,[50] it states: "*In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)*".[51] Furthermore N.J.A.C 5:23-3.7 states: "*Municipal approvals of alternative materials, equipment, or methods of construction*."

1.8.1 **Approvals**: Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability, and safety of those conforming with the requirements of the regulations.

1.8.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.

1.8.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.

1.8.2 The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide "*reports of engineering findings*."

1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards**: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[52] and Part 3280,[53] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:

1.9.1 "*All construction methods shall be in conformance with accepted engineering practices*."

1.9.2 "*The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur*."

1.9.3 "*The design stresses of all materials shall conform to accepted engineering practice*."

1.10 **Approval by US, Local and State Jurisdictions in General**: In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:

1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.[54]

1.10.2 For innovative alternatives and/or methods of construction, the building official shall accept Duly Authenticated Reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.[55]

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

1.10.2.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[56]

1.10.3 The design strengths and permissible stresses of any structural material…shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.[57]

1.11 **Approval by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, designs, services, and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:

1.11.1 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.

1.11.2 **Approved**: The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services, and/or methods of construction.

1.11.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.[58]

1.11.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[59]

1.12 Approval equity is a fundamental commercial and legal principle.[60]

Issue Date: January 6, 2021
Subject to Renewal: April 1, 2026

FBC Supplement to Report Number 1004-02

REPORT HOLDER: OX Engineered Products, LLC

1 Evaluation Subject

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

1.1.1 Wherever Thermo-Ply Blue Structural Sheathing is cited throughout this supplement, the provisions are also applicable to Thermo-Ply Blue AMG Structural Sheathing.

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Thermo-Ply Blue Structural Sheathing, recognized in Report Number 1004-02, have also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—20, 23: Florida Building Code – Building (FL 16391)*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential (FL 16391)*

3 Conclusions

3.1 Thermo-Ply Blue Structural Sheathing, described in Report Number 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 report, 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 R602.10.6.4, Section R602.10.6.5, Table R602.10.6.5, Section R602.12, and Section R602.12.4 are reserved.

3.2.3 FBC-B Section 708.4 replaces IBC Section 708.4.2.

3.2.4 FBC-B Section 718.3 replaces IBC Section 718.3.

3.2.5 FBC-B Section 718.4 replaces IBC Section 718.4.

3.2.6 FBC-B Section 803.1.1 replaces IBC Section 803.1.2.

3.2.7 FBC-B Section 1404.2 replaces IBC Section 1403.2.

3.2.8 FBC-B Section 1609.1.1 replaces IBC Section 1609.1.1.

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

3.2.10 FBC-B Section 2306.1 replaces IBC Section 2306.1.

3.2.11 FBC-B Section 2306.3 replaces IBC Section 2306.3.

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

3.2.13 FBC-R Section R301.1 replaces IRC Section 301.1.

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

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

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

3.2.17 FBC-R Section R702.3.5 replaces IRC Section R702.3.5.

3.2.18 FBC-R Table R702.3.5 replaces IRC Table R702.3.5

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

3.2.20 FBC-R Section N1101 replaces IRC Section N1102.4.1.1.

4 Conditions of Use

4.1 Thermo-Ply Blue Structural Sheathing described in Report Number 1004-02 must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 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, 2026

CBC and CRC Supplement to Report Number 1004-02

REPORT HOLDER: OX Engineered Products, LLC

1 Evaluation Subject

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

1.1.1 Wherever Thermo-Ply Blue Structural Sheathing is cited throughout this supplement, the provisions are also applicable to Thermo-Ply Blue AMG Structural Sheathing.

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Thermo-Ply Blue Structural Sheathing, recognized in Report Number 1004-02 , have also been evaluated for compliance with the codes listed below.

2.2 *Applicable Code Editions*

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

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

3 Conclusions

3.1 Thermo-Ply Blue Structural Sheathing, described in Report Number 1004-02, comply 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 Structural Sheathing, described in Report Number 1004-02, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1004-02.

4.1.2 The design, installation, conditions of use, and identification of Thermo-Ply Blue Structural Sheathing are in accordance with the 2021 International Building Code (IBC) provisions noted in Report Number 1004-02.

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

Notes

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

2 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702

3 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11

4 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as

5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice

6 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies

7 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2

8 https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency

9 https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source

10 https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

11 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

12 https://www.cbitest.com/accreditation/

13 https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104:~:text=to%20enforce%20the%20provisions%20of%20this%20code

14 https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11:~:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1:~:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore

15 https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11

16 https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

17 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

18 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

19 Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.

20 All references to the FBC-B and FBC-R are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the Florida Supplement at the end of this report.

21 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#listed AND https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled

22 2015 IBC Section 1404.2

23 https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4

24 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

25 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

26 2015 IBC Section 1404.2

27 2015 IBC Section 708.4

28 2015 IBC Section 803.1.1

29 Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

30 See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

31 2015 IBC Section 1404.2

32 2015 IBC Section 803.1.1

33 2018 IFC Section 104.9

34 Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

35 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1

36 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.

37 2018 IBC Section 1705.12

38 2018 IBC Section 1705.11

39 http://www.drjengineering.org/AppendixC AND https://www.drjcertification.org/cornell-2016-protection-trade-secrets

40 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years

41 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided

42 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2

43 IBC 2021, Section 1706.1 Conformance to Standards

44 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

45 See Section 11.6 for the distilled building code definition of **Approved**.

46 Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

47 https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

48 New York City, The Rules of the City of New York, § 101-07 Approved Agencies

49 New York City, The Rules of the City of New York, § 101-07 Approved Agencies

50 https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

51 https://www.nj.gov/dca/divisions/codes/codreg/ucc.html

52 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14

53 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

54 IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

55 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

56 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

57 IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.

58 https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

59 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

60 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission