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# Technical Evaluation Report

# TER 1812-01

Thermo-Ply® Blue & Thermo-Ply® Blue AMG Structural Sheathing – Canada – Limit States Design

## Ox Engineered Products, LLC

## Product:

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

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COMPANY INFORMATION:

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 12 00 - Structural Panels

SECTION: 06 12 19 - Shear Wall Panels

SECTION: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

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

SECTION: 07 27 00 - Air Barriers

## 1 PRODUCT EVALUATED[1,2]

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

## 2 APPLICABLE CODES AND STANDARDS[3,4]

2.1 *Codes*

2.1.1 *NBC—10, 15: National Building Code of Canada*

2.1.2 *NECB—17: National Energy Code of Canada for Buildings*

2.2 *Standards and Referenced Documents*

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

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

2.2.3 *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*

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

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

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[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 2015 version of the *NBC*. This *alternative solution* is also approved for use with the 2010 *NBC* and the standards referenced therein.

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

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

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

2.2.8 *CAN/ULC-S102: Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies*

2.2.9 *CSA O86: Engineering Design in Wood*

2.2.10 *CWC: Engineering Guide for Wood Frame Construction*

## 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) in accordance with *NBC* Division B Subsection 9.23.13 and Subsection 4.1.8.

3.1.1.1 Table 2 provides seismic design coefficients (SDC) that conform to the requirements in *NBC* Division B Subsection 4.1.8 for design of wall assemblies in buildings that require seismic design in accordance with NBC.

3.1.1.2 The basis for equivalency testing is outlined in Sentence 4.1.8.9.(5) of *NBC*:

> If it can be demonstrated through testing, research and analysis that the seismic performance of a structural system is at least equivalent to one of the types of SFRS mentioned in Table 4.1.8.9., then such structural system will qualify for values of $R_d$ and $R_o$ corresponding to the equivalent type in that Table. (See Note A-4.1.8.9.(5).)

3.1.2 Structural performance under transverse loads for use to resist factored external wind loads in accordance with *NBC* Division B Subsection 4.1.7.

3.1.3 Structural performance under uplift and gravity loads for use with single top plates in accordance with *NBC* Division B Article 9.23.11.3.

3.1.4 Performance for use as a water-resistive barrier (WRB) in accordance with *NBC* Division B Note A-5.6.2.1.

3.1.5 Performance for use as an air barrier in accordance with *NBC* Division B Section 5.4 and Subsection 9.25.3 and *NECC* Division B Subsection 3.2.4.

3.1.6 Performance of surface burning characteristics in accordance with *NBC* Division B Subsection 3.1.12 and 9.10.3.2.

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

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

## 4 Product Description and Materials

4.1 Thermo-Ply® Blue Structural Sheathing (Figure 1) 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.


FIGURE 1. THERMO-PLY® BLUE STRUCTURAL SHEATHING

4.1.1 Thermo-Ply® Blue Structural Sheathing panels have a nominal thickness of 3.4 mm (0.135") and nominal weight of 24.13 Pa (0.504 psf).

4.2 *Material Availability*

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

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

4.2.3 Other custom widths and lengths can be manufactured.

## 5 APPLICATIONS

5.1 *General*

5.1.1 Thermo-Ply® Blue Structural Sheathing panels are used in the following applications as:

5.1.1.1 Wall sheathing in buildings constructed in accordance with the *NBC* Division B Section 9.23 for wood frame construction;

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

5.1.1.3 Structural wall sheathing to provide resistance to transverse loads for wall assemblies used in light frame wood construction;

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

5.1.1.5 An approved alternative WRB when installed in accordance with Section 5.3 and Section 6; and

5.1.1.6 An approved air-barrier material when installed in accordance with Section 5.4 and Section 6.

5.2 *Structural Applications*

5.2.1 *General Structural Provisions:*

5.2.1.1 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).

5.2.1.2 Thermo-Ply® Blue Structural Sheathing is permitted to be designed in accordance with *NBC* Division B Part 9 Articles 9.23.13.1, 9.23.13.2 and 9.23.13.3 for the design of lateral-load-resisting systems using the methods and conditions set forth therein.

5.2.1.3 Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall in accordance with *NBC* Division B Subsection 9.23.6.

5.2.1.4 The maximum aspect ratio for Thermo-Ply® Blue Structural Sheathing shall be 4:1.

5.2.1.5 The minimum full height panel width shall be 610 mm (24").

5.2.1.6 Installation is permitted for single-top-plate or double-top-plate applications.

5.2.1.7 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.2.2 *Performance-Based Wood-Framed Construction:*

5.2.2.1 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 *CAN/CSA-O86* for WSP using the capacities shown in Table 1, Table 2, and Table 3.

5.2.2.2 Thermo-Ply® Blue Structural Sheathing shear walls are permitted to resist horizontal wind load forces using the specified shear strengths set forth in Table 1.

5.2.2.3 Thermo-Ply® Blue Structural Sheathing shear walls that require seismic design in accordance with *NBC* Division B Subsection 4.1.8 shall use the seismic specified shear strengths set forth in Table 2.

5.2.2.4 The ductility response modification factor, $R_d$, and overstrength-related force modification factor, $R_o$, indicated in Table 2, shall be used to determine the base shear, element design forces, and design storey drift in accordance with *NBC* Division B Subsection 4.1.8.

5.2.2.5 Thermo-Ply® Blue Structural Sheathing panels are permitted to resist uplift load forces using the factored uplift resistances set forth in Table 3.

5.2.2.6 Thermo-Ply® Blue Structural Sheathing panels are permitted to resist transverse wind loads using the specified transverse resistances set forth in Table 4.

TABLE 1. SPECIFIED SHEAR RESISTANCES FOR LIMIT STATES DESIGN FOR THERMO-PLY® BLUE STRUCTURAL SHEATHING - WIND

| Product | Joint[3] Condition | Maximum Stud Spacing mm (in) | Gypsum Wallboard (GWB)[2] | Gypsum Wallboard Fastener Spacing [edge/field] mm (in) | Specified Shear Strength kN/m (plf) |
|---|---|---|---|---|---|
| Themo-Ply® Blue Structural Sheathing[1,4] | Lapped or Butted | 406 (16) o.c. | 12.7 mm (½") GWB | 102/406 (4/16) | 11.2 (765) |
| | | | | 203/203 (8/8) | 10.0 (685) |
| | | | | 203/406 (8/16) | 9.6 (660) |
| | | | | 406/406 (16/16) | 8.9 (605) |
| | Lapped | 406 (16) o.c. | No GWB | - | 8.2 (560) |
| | | 610 (24) o.c. | | | 7.5 (515) |
| | Butted | 406 (16) o.c. | | | 7.7 (530) |
| | | 610 (24) o.c. | | | 7.1 (490) |

SI: 25.4 mm = 1 in, 1 kN/m = 737.6 lb/ft

1. Thermo-Ply® Blue sheathing attached with staples of minimum 16 gauge and a crown of 24 mm (15/16"). Staples shall penetrate a minimum of 25.4 mm (1") into the stud. Fasteners are to be installed with the crown parallel to the framing and spaced a maximum of 76 mm (3") o.c. at the panel edges and 76 mm (3") o.c. in the field. Fastener edge distance shall be a minimum 9 mm (0.35"). Fastener head shall be in contact with the Thermo-Ply® surface. Roofing nails [minimum 3 mm (0.120") x 32 mm (1¼") with a 9 mm (0.35") head] are a permitted alternative fastener.
2. Gypsum attached with minimum #6 type W or S screws 32 mm (1¼") long with a minimum edge distance of 9.5 mm (0.375").
3. Where lapped joints are used, the panels shall be overlapped nominally 19 mm (¾").
4. Straight-line interpolations between fastening patterns is acceptable.

TABLE 2. SPECIFIED SHEAR RESISTANCES FOR LIMIT STATES DESIGN & SEISMIC DESIGN FACTORS FOR THERMO-PLY® BLUE STRUCTURAL SHEATHING[1,3,7]

| Seismic Force-Resisting System (SFRS) | Joint Condition[4,9] | Gypsum[2,10] Wallboard (edge/field) mm | Max. Stud Spacing mm (in) | Specified Shear Strength kN/m (plf) | Ductility Factor $R_d$[5,6] | Overstrength Force Modification Factor $R_o$[6] | Structural System Limitations & Building Height Limit[8] m (ft) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | $I_E F_a S_a(0.2)$ | | | | $I_E F_a S_a(1.0)$ |
| | | | | | | | < 0.2 | ≥ 0.2 to < 0.35 | ≥ 0.35 to ≤ 0.75 | > 0.75 | > 0.3 |
| Light-Frame (Wood) Walls Sheathed with Thermo-Ply® Blue | Lapped or Butted | 12.7 mm Gypsum-Fasteners Spaced 203/203 | 406 (16) o.c. | 10.0 (685) | 2.0 | 1.7 | NL | NL | 20 (65.6) | 20 (65.6) | 20 (65.6) |
| | | No GWB | 406 (16) o.c. | 7.7 (530) | 3.0 | 1.7 | NL | NL | 30 (98.4) | 20 (65.6) | 20 (65.6) |

SI: 25.4 mm = 1 in, 1 kN/m = 737.6 lb/ft

1. Thermo-Ply® Blue sheathing attached with staples of minimum 16 gauge and a crown of 24 mm (15/16"). Staples shall penetrate a minimum of 25.4 mm (1") into the stud. Fasteners are to be installed with the crown parallel to the framing and spaced a maximum of 76 mm (3") o.c. at the panel edges and 76 mm (3") o.c. in the field. Fastener edge distance shall be a minimum 9.5 mm (0.375"). Fastener head shall be in contact with the Thermo-Ply® surface. Roofing nails [minimum 3 mm (0.120") x 32 mm (1¼") with a 9.5-mm (0.375") head] are a permitted alternative fastener.
2. Gypsum attached with minimum #6 type W or S screws 32 mm (1¼") long with a minimum edge distance of 9 mm (0.35").
3. All seismic design parameters follow the equivalency as defined in Section 3 of this TER.
4. Where lapped joints are used, the panels shall be overlapped nominally 19 mm (¾").
5. Response modification coefficient, $R_d$, for use throughout *NBC*.
6. For combinations of different types of SFRS acting in the same direction in the same storey, $R_dR_o$ shall be taken as the lowest value of $R_dR_o$ corresponding to these systems. See *NBC* Division B Subsection 4.1.8.9.
7. Consider the additional system restrictions in Subsection 4.1.8.10 of *NBC* Division B.
8. NL = Not Limited. Heights are maximum height limits above grade, as defined in *NBC* Division B Table 4.1.8.9.
9. Thermo-Ply® Blue sheathing may be installed with either lapped joints or butted joints.
10. *NBC* Table 9.23.13.6 requires 15.9 mm (⅝") thick gypsum with framing 610 mm (24") o.c.

TABLE 3. UPLIFT PERFORMANCE OF THERMO-PLY® BLUE STRUCTURAL SHEATHING – SINGLE TOP PLATE

| Type of Thermo-Ply® Structural Sheathing | Specified Uplift Resistance[1] kN/m (lbs/ft) | Maximum Stud Spacing mm (in) | Fastener Schedule |
|---|---|---|---|
| Thermo-Ply® Blue: Single Top Plate | 5.6 (385) | 406 (16) o.c. | Galvanised 16-gauge staples of minimum 24-mm (15/16") crown, 32-mm (1¼") legs, or 3-mm (0.120") x 32-mm (1¼") roofing nails, 76 mm (3") o.c. perimeter and field. Staple crowns shall be installed parallel to framing. |
| Thermo-Ply® Blue: Double Top Plate | 11.0 (755) | | |

SI: 25.4 mm = 1 in, 1 kN/m = 737.6 lb/ft

1. The resistances shown are for the purpose of providing information on the hold-down capacity of the sheathing to the top plate connection independent of lateral loading. Where combined shear and uplift loading is needed, consult a professional engineer.

TABLE 4. TRANSVERSE LOAD PERFORMANCE OF THERMO-PLY® BLUE STRUCTURAL SHEATHING

| Structural Sheathing Product | Maximum Stud Spacing mm (in) | Hourly 1-in-50 Wind Pressure[2] kPa |
|---|---|---|
| Thermo-Ply® Blue (3.4 mm)[1] | 406 (16) o.c. | 8.2 |
| | 610 (24) o.c. | 6.5 |

SI: 25.4 mm = 1 in, 1 kN/m² = 20.9 psf, 1 MPa = 145 psi

1. Fastener Schedule: Galvanised 16-gauge staples of minimum 24-mm (15/16") crown, 32-mm (1¼") legs, or 3-mm (0.120") x 32-mm (1¼") roofing nails, 76 mm (3") o.c. perimeter and field. Staple crowns shall be installed parallel to framing.
2. Hourly Wind Pressure (1-in-50) for selected locations can be located in *NBC* Division B, Appendix C, Table C-2
3. Resistances assume minimum 12.7-mm (½") 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.

5.3 *Water-Resistive Barrier*

5.3.1 Thermo-Ply® Blue Structural Sheathing may be used as a WRB as prescribed in with *NBC* Division B Note A-5.9.4.1.(1), 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 610 mm (24") 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. Approved construction tapes include 48 mm (1⅞") minimum width 3M (8087), Venture White 1585 CW-W Sheathing 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 all applicable code sections.

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 *NBC* Division B Section 5.4 and Subsection 9.25.3, and *NECC* Division B Subsection 3.2.4 in accordance with *ASTM E2178*.

5.5 *Fire Safety Performance*

5.5.1 Thermo-Ply® Blue Structural Sheathing has the flame-spread ratings as shown in Table 5 when tested in accordance with *CAN/ULC S102* per *NBC* Division B Subsection 3.1.12 and 9.10.3.2.

TABLE 5. SURFACE BURN CHARACTERISTICS OF THERMO-PLY® RED STRUCTURAL SHEATHING

| Product | Flame Spread | Smoke Developed |
|---|---|---|
| Thermo-Ply® Blue[1] | 180 | 110 |

1. Tested in accordance with *CAN/ULC S102*.

5.6 *Non-Structural Applications*

5.6.1 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.

5.6.1.1 The sheathing panels are applied to wall framing with minimum 3-mm (0.120") x 32-mm (1¼") galvanized roofing nails or No.16 gauge galvanized staples having a 24-mm (15/16") crown and 32-mm (1¼") leg lengths.

5.6.1.2 Fastener spacing shall be a maximum of 152 mm (6") at the edges and 305 mm (12") on intermediate members.

5.6.1.3 Stud spacing shall be a maximum of 610 mm (24") o.c..

5.6.1.4 Minimum fastener penetration into the framing members is 25.4 mm (1").

5.6.1.5 Fasten all staples parallel to the framing member, with an edge spacing of 9 mm (0.35") minimum.

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

5.6.2 Incidental tears or penetrations of Thermo-Ply® Blue Structural Sheathing must be repaired with an approved construction tape. See Section 5.3.3.

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

5.6.3.1 Joints overlap nominally 19 mm (¾").

5.6.3.2 Butted joints are sealed with 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 *Installation Procedure*

6.2.1 General for Structural and WRB Applications

6.2.1.1 Thermo-Ply® Blue Structural Sheathing shall be installed in accordance with the manufacturer's published installation instructions and this TER. Basic instructions are printed on every Thermo-Ply® panel as well.

6.2.1.2 If there are any conflicts between the manufacturer's instructions and this TER, the more restrictive shall apply.

6.2.1.3 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, or fasten tightly with one fastener every 305 mm (12") to smooth out, if necessary.

6.2.2 Orientation and Backing

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

6.2.2.2 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.

6.3 Fastener Type

6.3.1 Thermo-Ply® Blue Structural Sheathing

6.3.1.1 Minimum 3-mm (0.120") x 32-mm (1¼") galvanized roofing nail.

6.3.1.2 Minimum 16-gauge staples with a 24-mm (15/16") crown and 32-mm (1¼") leg length shall be installed per the staple manufacturer's instructions.

6.3.1.3 Fasteners (spaced as prescribed in Table 6) 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 6. FASTENER SPACING OF THERMO-PLY® BLUE STRUCTURAL SHEATHING

| Thermo-Ply® Blue Structural Sheathing Application | Maximum Panel Edge Fastener Spacing mm (in) | Maximum Panel Intermediate Fastener Spacing mm (in) |
|---|---|---|
| Lateral Shear | 76 (3) | 76 (3) |
| Transverse loads | | |
| Uplift loads | | |
| Water-Resistive Barrier | 152 (6) | 305 (12) |
| Air Barrier | | |

6.3.2 *Gypsum Wallboard:*

6.3.2.1 Where required, gypsum wallboard shall be a minimum 12.7 mm (½") thickness and shall be attached with #6 x 32 mm (1¼") type W or S screws, diameter 3.3 mm (0.13").

6.4 *Fastener Edge Distance*

6.4.1 For *NBC* Division B Part 9 applications, fastener edge distance is a minimum of 10 mm (0.375") for both Thermo-Ply® Structural Sheathing and gypsum in accordance with *NBC* Division B, Articles 9.29.5.8. and 9.29.5.9.

6.5 *Treatment of Joints*

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

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

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

6.6 *Window Jamb Adjustments*

6.6.1 If windows are made to accommodate traditional 12.7 mm (½") sheathing materials, order windows with adjustable nailing fins from the supplier. Door brick moldings may be planed or routed 9 mm (0.35") in order to accommodate the different sheathing thickness, either at the jobsite or by the millwork supplier.

6.6.2 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.

6.7 The structural installation procedure shall be in accordance with Figure 2.

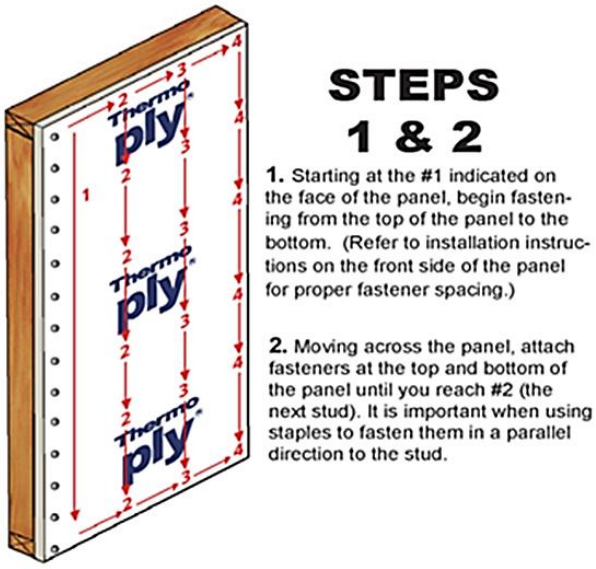


FIGURE 2. INSTALLATION INSTRUCTIONS – WRB INSTALLATION PROCEDURE

6.7.1 Overlapped Joint – Install the first panel per Figure 2.

6.7.1.1 Overlap the next panel 19 mm (¾") over the first panel, and fasten the joint with a common line of fasteners.

6.7.1.2 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.

6.7.2 Butted Joint with Flashing – Install panels per Figure 2 with joints butted (no overlap).

6.7.3 Seal butted seams with approved construction tape (see Section 5.3.3), after attachment of 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 Test reports and data for determining use as a WRB material in accordance with *ASTM E331*

7.1.4 Test reports and data for determining use as an air barrier, 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 Test reports and data for determining surface burning characteristics in accordance with *CAN/ULC S102*

7.1.7 Test reports and data for determining comparative equivalency for use as an alternative material in accordance with *NBC* Division A Section 1.2

7.2 Information contained herein is the result of testing and/or data analysis by sources which conform to the evaluation requirements of *NBC* Volume 1 Relationship of the *NBC* to Standards Development and Conformity Assessment 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 provincial, territorial, 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 (in-plane) load resistance due to wind and seismic loads carried by shear walls

8.1.2 Transverse (perpendicular-to-plane) load resistance due to components and cladding pressures on building surfaces

8.1.3 Resistance to uplift loads in single-top-plate applications

8.1.4 Performance for use as a WRB in accordance with *NBC* Division B Note A-5.6.2.1

8.1.5 Performance for use as an air barrier in accordance with *NBC* Division B Section 5.4 and Subsection 9.25.3.

8.1.6 Surface burn characteristics in accordance with Table 5

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

8.2.1 No known variations

8.3 *NBC* Volume 1 Relationship of the NBC to Standards Development and Conformity Assessment:

> **Certification**
> Certification is the confirmation by an independent organization that a product or service meets a requirement…Certification bodies publish lists of certified products and companies.
>
> **Evaluation**
> An evaluation is a written opinion by an independent professional organization that a product will perform its intended function in a building. An evaluation is very often done to determine the ability of an innovative product, for which no standards exist, to satisfy the intent of the Code requirement...Several organizations, including the Canadian Construction Materials Centre (CCMC), offer such evaluation services.

8.4 Valid *evaluations* are obtained from *independent professional organizations*, which include but are not limited to ISO/IEC 17065 accredited evaluation services and professional engineers.[5]

8.5 ISO/IEC 17065 accreditation bodies, including but not limited to SCC and ANAB, confirm that product certification bodies have the expertise to provide *evaluation* services within their scope of accreditation. All SCC and ANAB product certification bodies meet *NBC* requirements to offer *evaluation* services for *alternative solutions*.[6]

8.5.1 DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs professional engineers.[7]

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[5] *NBC* Division C Article 2.2.1.2

[6] *NBC* Division A Clause A-1.2.1.1.(1)(b) provides information on code compliance via alternative solutions and defines alternative solutions as "...achiev[ing] at least the minimum level of performance required by Division B." *NBC* Division C Section 2.3 includes additional guidance for documentation of alternative solutions.

[7] Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain material, product, design, or method of construction 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 Product certification organizations, accredited by the SCC and ANAB, are defined as equivalent *evaluation* services:

8.6.1 The Canada-United States-Mexico Agreement (CUSMA) Article 11.6 Conformity Assessment confirms mutual recognition by stating, "...each Party shall accord to conformity assessment bodies located in the territory of another Party treatment no less favorable than that it accords to conformity assessment bodies located in its own territory or in the territory of the other Party."

8.6.2 The SCC National Conformity Assessment Principles states, "SCC is a member of a number of international organizations developing voluntary conformity assessment agreements that help ensure the international acceptance of Canadian conformity assessment results. Signatories to these agreements (like SCC) recognize each other's accreditations as being equivalent to their own."[8]

8.7 Building official approval of a licensed professional engineer is performed by verifying the professional engineer and/or their business entity are listed by the licensing board of the relevant jurisdiction.

## 9 Conditions of Use

9.1 This TER 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. Fastening through the Thermo-Ply® Blue Structural Sheathing into the framing is acceptable.

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 installed as a wall sheathing but is not installed per structural requirements, light-framed walls shall be braced by other means. When used as a WRB, installation shall be in accordance with Section 5.3.

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 high-wind and high-seismic areas as defined in *NBC* Division B Article 9.23.13.2.(1), bracing to resist lateral loads shall be designed and constructed in accordance with *NBC* Division B part 4 or good engineering practice in accordance with *NBC* Division B Article 9.23.13.2 (2).

9.6 When used in extreme-wind and extreme-seismic areas as defined in *NBC* Division B Article 9.23.13.3.(1), bracing to resist lateral loads shall be designed and constructed in accordance with *NBC* Division B Article 9.23.13.3 (2). Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

9.6.1 Specified shear strengths shall not exceed values in Table 1 for wind loads and Table 2 for seismic loads.

9.6.2 Factored uplift loads shall not exceed values in Table 3.

9.6.3 Transverse design loads shall not exceed those described in Table 4, unless an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing.

9.7 Thermo-Ply® Blue Structural Sheathing is manufactured under a quality control program with quality control inspections established by the governing legislation of the adopting province or territory, as described in the *NBC* Volume 1 commentary on Conformity Assessment.

9.8 Where required by 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.

[8] The National Conformity Assessment Principles states, "Product regulations and standards may vary from country to country. If these are set arbitrarily, they could be deemed as protectionist. The World Trade Organization (WTO) Agreement on Technical Barriers to Trade (TBT Agreement) is intended to ensure that technical regulations, standards and conformity assessment procedures of member countries do not create unnecessary obstacles to trade. Under the TBT Agreement, members of the WTO agree to use international standards, including conformity assessment standards and guides, as a basis for their technical requirements."

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 *designer* (e.g., *owner*).

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 ISO/IEC 17065 certification procedures.

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 the duties and powers granted to the building official by the provincial regulations governing such duties and powers.

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, 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 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.