



**CERTIFICATION**



Approved. Sealed. Code Compliant.

## **Technical Evaluation Report**

### **TER 1808-03**

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

**Ox Engineered Products, LLC**

#### **Product:**

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

Issue Date:

November 19, 2018

Revision Date:

March 19, 2020

Subject to Renewal:

April 1, 2021

**COMPANY  
INFORMATION:**

---

Ox Engineered Products, LLC

22260 Haggerty Rd Ste 365  
Northville, MI 48167-8970

989-798-5923

[oxengineeredproducts.com](http://oxengineeredproducts.com)

700 Centreville St  
Constantine, MI 49042-1273

269-435-2425

---

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 12 00 - Structural Panels

SECTION: 06 12 19 - Shear Wall Panels

SECTION: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

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

SECTION: 07 27 00 - Air Barriers

---

**1 PRODUCT EVALUATED<sup>1,2</sup>**

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

**2 APPLICABLE CODES AND STANDARDS<sup>3,4</sup>****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*

---

<sup>1</sup> Building codes require data from valid certification, evaluation, and qualification reports be obtained from accredited third-party organizations. An accredited certifying organization (a type of accredited third-party organization) is a certification body that performs "certification of a product, process, or system." An accredited third-party organization is accomplished via accreditation using ISO/IEC 17065 evaluation procedures meeting code requirements of independence, accredited testing, and professional personnel. DrJ is an ISO/IEC 17065 [ANSI-Accredited Product Certification Body](#) – [Accreditation #1131](#).

Through ANSI accreditation, DrJ certification can be used to obtain product approval in any country that is an [IAF MLA Signatory](#), such as Canada, and covered by an [IAF MLA Evaluation](#) per the [Purpose of the MLA](#) – "certified once, accepted everywhere." Manufacturers can go to jurisdictions in any IAF MLA Signatory Country and have their products readily approved by *authorities having jurisdiction* using DrJ's ANSI accreditation. For more information about DrJ's accreditation, refer to this [letter](#) from the Standards Council of Canada (SCC).

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, see [drjcertification.org](#).

<sup>2</sup> Throughout this TER, wherever Thermo-Ply® Red is cited, the provisions are applicable to Thermo-Ply® Red AMG as well.

<sup>3</sup> 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 (e.g., *CAN/CSA*, *CAN/ULC*). Where this TER is not approved, the AHJ shall respond in writing stating the reasons this TER was not approved. For any variations in provincial, territorial, and local codes, see Section 8.

<sup>4</sup> All terms defined in the applicable building codes are italicized.

- 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*
- 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® Red 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* (i.e., all seismic design categories).
  - 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 for 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 The product evaluated in this TER is shown in Figure 1.



FIGURE 1. THERMO-PLY® RED STRUCTURAL SHEATHING

4.2 Thermo-Ply® Red 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-resistant adhesive. A protective polymer layer is applied on both sides of the panel, and foil facings may be additionally applied on one or both faces.

4.2.1 Thermo-Ply® Red Structural Sheathing panels have a nominal thickness of 2.9 mm (0.113") and nominal weight of 19.82 Pa (0.414 psi).

### 4.3 *Material Availability*

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

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

4.3.3 Other custom widths and lengths can be manufactured.

## 5 APPLICATIONS

### 5.1 *General*

5.1.1 Thermo-Ply® Red 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.

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 TER, Thermo-Ply® Red Structural Sheathing shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth therein for the design and installation of wood structural panels (WSP).
  - 5.2.1.1.1 Thermo-Ply® Red 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
- 5.2.1.2 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.
- 5.2.1.3 The maximum aspect ratio for Thermo-Ply® Red Structural Sheathing shall be 4:1.
- 5.2.1.4 The minimum full height panel width shall be 610 mm (24").
- 5.2.1.5 Installation is permitted for single top plate or double top plate applications.
- 5.2.1.6 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and good technical judgment.

### 5.2.2 Performance-Based Wood-Framed Construction:

- 5.2.2.1 Thermo-Ply® Red 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® Red 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® Red 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.
  - 5.2.2.3.1 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 story drift in accordance with *NBC* Division B Subsection 4.1.8.
- 5.2.2.4 Thermo-Ply® Red Structural Sheathing panels are permitted to resist uplift load forces using the factored uplift loads set forth in Table 3.
- 5.2.2.5 Thermo-Ply® Red Structural Sheathing panels are permitted to resist transverse wind load forces using the specified transverse loads set forth in Table 4.

TABLE 1. THERMO-PLY® RED STRUCTURAL SHEATHING – SPECIFIED SHEAR CAPACITY FOR LIMIT STATES DESIGN – WIND<sup>1,4</sup>

Product	Joint <sup>3</sup> Condition	Maximum Stud Spacing mm (in)	Gypsum Wallboard (GWB) <sup>2</sup>	Gypsum Wallboard Fastener Spacing [edge/field] mm (in)	Specified Shear Strength kN/m (plf)		
Thermo-Ply® Red Structural Sheathing	Lapped or Butted	406 (16) o.c.	12.7 mm (½") GWB	102/406 (4/16)	10.2 (700)		
				203/203 (8/8)	8.6 (585)		
				203/406 (8/16)	8.2 (560)		
				406/406 (16/16)	7.1 (485)		
				203/203 (8/8)	8.4 (575)		
				406/406 (16/16)	7.0 (480)		
	Lapped	406 (16) o.c.	No GWB	-	6.2 (420)		
					610 (24) o.c.	5.7 (390)	
					Butted	406 (16) o.c.	5.8 (395)
						610 (24) o.c.	5.3 (360)

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

1. Thermo-Ply® Red sheathing attached with staples of minimum 16 gauge, 24-mm (15/16") crown. 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 9.5-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 10 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. SEISMIC PERFORMANCE OF THERMO-PLY® RED STRUCTURAL SHEATHING<sup>1,3,7</sup>

Seismic Force-Resisting System (SFRS)	Joint Condition <sup>4,9</sup>	Gypsum <sup>2,10</sup> 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 <sup>8</sup> 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® Red	Lapped or Butted	12.7 mm Gypsum-Fasteners Spaced 203/203	406 (16) o.c.	8.6 (585)	2.0	1.7	NL	NL	20 (65.6)	20 (65.6)	20 (65.6)
	Lapped	15.9 Gypsum-Fasteners Spaced 406/406	610 (24) o.c.	7.0 (480)	2.0	1.7	NL	NL	20 (65.6)	20 (65.6)	20 (65.6)
	Lapped or Butted	No GWB	406 (16) o.c.	5.8 (395)	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

- Thermo-Ply® Red sheathing attached with staples of minimum 16 gauge, 24-mm (15/16") crown. 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 10 mm (0.375"). Fastener head shall be in contact with the Thermo-Ply® surface. Roofing nails (minimum 3 mm (0.120") x 31.8 mm (1¼") with a 9.5-mm (0.375") head) are a permitted alternative fastener.
- Gypsum attached with minimum #6 type W or S screws 32 mm (1¼") long with a minimum edge distance of 9 mm (0.35").
- All seismic design parameters follow the equivalency as defined in Section 3 of this TER.
- Where lapped joints are used, the panels shall be overlapped nominally 19 mm (¾").
- Response modification coefficient,  $R_d$ , for use throughout *NBC*.
- For combinations of different types of SFRS acting in the same direction in the same storey,  $R_d R_o$  shall be taken as the lowest value of  $R_d R_o$  corresponding to these systems. See *NBC* Division B Subsection 4.1.8.9.
- Consider the additional system restrictions in Subsection 4.1.8.10 of *NBC* Division B.
- NL = Not Limited. Heights are maximum height limits above grade, as defined in *NBC* Division B Table 4.1.8.9.
- Thermo-Ply® Red sheathing may be installed with either lapped joints or butted joints.
- NBC* Table 9.23.13.6 requires 15.9 mm (¾") thick gypsum with framing 610 mm (24") o.c.

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

Type of Thermo-Ply® Structural Sheathing	Specified Uplift Capacity kN/m (plf)	Maximum Stud Spacing mm (in)	Fastener Schedule
Thermo-Ply® Red: Single Top Plate	4.5 (310)	406 (16) o.c.	Minimum 24-mm (15/16") crown, 32-mm (1¼") leg 16-gauge galvanized staples or 3-mm (0.120") x 32-mm (1¼") roofing nails, 76 mm (3") o.c. to perimeter/field

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

- The capacities 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. SUMMARY OF SPECIFIED PRESSURES FOR THERMO-PLY® RED STRUCTURAL SHEATHING RESISTING TRANSVERSE WIND LOADS<sup>1,3</sup>

Structural Sheathing Product	Transverse Wind Load Resistance	
	Maximum Stud Spacing mm (in)	Hourly 1-in-50 Wind Pressure <sup>2</sup> kPa
Thermo-Ply® Red (2.9 mm)	406 (16) o.c.	8.2
	610 (24) o.c.	6.5

SI: 25.4 mm = 1 in, 1 kN/m<sup>2</sup> = 20.9 psf

- Fastener Schedule: Minimum 24-mm (15/16") crown, 32-mm (1¼") leg 16-gauge galvanized staples or 3-mm (0.120") x 32-mm (1¼") roofing nails, 76 mm (3") o.c. to perimeter / field. Staple crowns shall be installed parallel to framing.
- Hourly Wind Pressure (1-in-50) for selected locations can be located in *NBC* Division B, Appendix C, Table C-2
- Capacities assume minimum 12.7 mm (½") gypsum wallboard installed on the interior side of the wall. Where gypsum wallboard is not installed on the interior side of the wall, a 40% reduction in wind pressure resistance shall be applied.

5.3 *Water-Resistive Barrier*

- 5.3.1 Thermo-Ply® Red 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® Red 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 Where Thermo-Ply® Red Structural Sheathing is used in the intermittent bracing method along a braced wall line, Thermo-Ply® Green Structural Sheathing may be used as the infill panels between the Thermo Ply® Red Structural Sheathing braced wall panels. 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® Red 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 *Surface Burn Characteristics:*

- 5.5.1.1 Thermo-Ply® Red 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® Red <sup>1</sup>	120	60

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® Red 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 19.1 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® Red 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:*
    - 6.2.2.1 Thermo-Ply® Red Structural Sheathing may be installed in either the vertical or horizontal orientation. 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.
  - 6.2.3 *Fastener Type:*
    - 6.2.3.1 *Thermo-Ply® Red Structural Sheathing*
      - 6.2.3.1.1 Minimum 3-mm (0.120") x 32-mm (1¼") galvanized roofing nail.
      - 6.2.3.1.2 Minimum 24-mm (15/16") crown by 32-mm (1¼") leg, 16-gauge staples shall be installed per the staple manufacturer's instructions.
      - 6.2.3.1.3 Fasteners shall be driven such that the head of the fastener is in contact with the surface of the Thermo-Ply® Structural Sheathing. Do not overdrive fasteners.

TABLE 6. FASTENER SPACING OF THERMO-PLY® RED STRUCTURAL SHEATHING

Thermo-Ply® Red 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		
SI: 25.4 mm = 1 in		

6.2.3.2 *Gypsum Wallboard:*

6.2.3.2.1 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").

6.2.4 *Fastener Edge Distance:*

6.2.4.1 For NBC Division B Part 9 applications, fastener edge distance is a minimum of 10 mm (.375") for both Thermo-Ply® Structural Sheathing and gypsum in accordance with Division B, Article 9.29.5.8.

6.2.5 *Treatment of Joints:*

6.2.5.1 Thermo-Ply® Red Structural Sheathing joints may be either butted or overlapped.

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

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

6.2.6 *Window Jamb Adjustments:*

6.2.6.1 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.

6.2.6.2 Thermo-Ply® Red 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.

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



## STEPS 1 & 2

1. Starting at the #1 indicated on the face of the panel, begin fastening from the top of the panel to the bottom. (Refer to installation instructions on the front side of the panel for proper fastener spacing.)

2. Moving across the panel, attach fasteners at the top and bottom of the panel until you reach #2 (the next stud). It is important when using staples to fasten them in a parallel direction to the stud.

FIGURE 2. INSTALLATION INSTRUCTIONS – WRB INSTALLATION PROCEDURE

- 6.2.7.1 Overlapped Joint – Install the first panel per Figure 2.
- 6.2.7.1.1 Overlap the next panel 19 mm ( $\frac{3}{4}$ " ) over the first panel, and fasten the joint with a common line of fasteners.
- 6.2.7.1.2 For Thermo-Ply® Red 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.
- 6.2.7.2 Butted Joint with Flashing – Install panels per Figure 2 with joints butted (no overlap).
- 6.2.7.3 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 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 Transverse load testing, based on *ASTM E330*.
- 7.2 Uplift load testing, based on *ASTM E72*.
- 7.3 Test reports and data for determining use as a water-resistive barrier material, based on *ASTM E331*.
- 7.4 Test reports and data for determining use as an air barrier, based on *ASTM E283*.
- 7.5 Lateral load testing and data for determining comparative equivalency for use as an alternative material, based on *ASTM E2126*.
- 7.6 Test reports and data for determining surface burning characteristics in accordance with *CAN/ULC S102*.
- 7.7 Test reports and data for determining comparative equivalency for use as an alternative material in accordance with *NBC Division A Section 1.2*.
- 7.8 Some information contained herein is the result of testing and/or data analysis by other sources which conform to *NBC Volume I* commentary on Conformity Assessment and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.

- 7.9 Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., *NBC*, *NECB*, *CAN/CSA*). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

## 8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
- 8.1.1 Lateral (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 *NBC* Article 1.2.1.1. states:
- 1.2.1.1. **Compliance with this Code**
    - 1) Compliance with this Code shall be achieved by
      - a) complying with the applicable acceptable solutions in Division B (see Note A-1.2.1.1.(1)(a)), or
      - b) using alternative solutions that will achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions (see Note A-1.2.1.1.(1)(b)).
    - 2) For the purposes of compliance with this Code as required in Clause 1.2.1.1.(1)(b), the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements referred to in Subsection 1.1.2. of Division B.
- 8.3 *NBC* Division C Section 2.3 includes additional guidance for *alternative solutions*.
- 8.4 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 evaluation, they are listed here.
- 8.4.1 No known variations

## 9 CONDITIONS OF USE

- 9.1 Thermo-Ply® Red Structural Sheathing shall not be used as a nailing base for claddings, trim, windows and doors. Fastening through the Thermo-Ply® Red Structural Sheathing into the framing is acceptable.
- 9.2 Walls sheathed with Thermo-Ply® Red Structural Sheathing shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.3 When Thermo-Ply® Red 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.
- 9.3.1 When Thermo-Ply® Structural Sheathing is not installed as a WRB, other means of providing a WRB may be required, as per the relevant code.

- 9.4 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).
- 9.5 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.
  - 9.5.1 Specified shear strengths shall not exceed values in Table 1 for wind loads and Table 2 for seismic loads.
  - 9.5.2 Factored uplift loads shall not exceed values in Table 3.
  - 9.5.3 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.
- 9.6 Thermo-Ply® Red 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.
- 9.7 Where required by the *authority having jurisdiction* in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.8 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.9 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*).
- 9.10 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.11 This product is manufactured under a third-party quality control program with quality control inspections established by the governing legislation of the adopting province or territory, as described in *NBC* Volume 1 commentary on Conformity Assessment.
- 9.12 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the AHJ for acceptance.
- 9.13 The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the AHJ's inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

## 10 IDENTIFICATION

- 10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at [oxengineeredproducts.com](http://oxengineeredproducts.com).

## 11 REVIEW SCHEDULE

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