



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1808-06

Strong-R® Structural Insulation –
Canada – Limit States Design

Ox Engineered Products, LLC

Product:

Strong-R® Structural Insulation

Issue Date:

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Revision Date:

June 11, 2021

Subject to Renewal:

April 1, 2022



COMPANY
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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 21 00 - Thermal Insulation

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

SECTION: 07 27 00 - Air Barriers

1 PRODUCT EVALUATED¹

1.1 Strong-R® Structural Insulation

2 APPLICABLE CODES AND STANDARDS^{2,3}

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 C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

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

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

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

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

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

² Unless otherwise noted, all references in this TER are from the 2015 version of the NBC. This *alternative solution* is also approved for use with the 2010 NBC and the standards referenced therein.

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

- 2.2.6 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 2.2.7 *CWC: Engineering Guide for Wood Frame Construction*
- 2.2.8 *CSA O86: Engineering Design in Wood*
- 2.2.9 *CAN/ULC-S102: Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies*
- 2.2.10 *CAN/CSA S136: North American Specification of Cold-Formed Steel Structural Members*

3 PERFORMANCE EVALUATION

3.1 Strong-R® Structural Insulation was evaluated to determine:

- 3.1.1 Structural performance under lateral load conditions (wind and seismic) in accordance with *NBC* Division B Subsection 4.1.8.
- 3.1.2 Structural performance under lateral load conditions for both wind and seismic loading in accordance with *NBC* Division B Part 4 Structural Loads and Procedures and the *CWC Engineering Guide for Wood Frame Construction*.
 - 3.1.2.1 Table 2 and Table 6 provide 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).
 - 3.1.2.2 The basis for equivalency testing is outlined in Sentence 4.1.8.9.(5) of *NBC*, Division B:

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)].

- 3.1.3 Resistance to transverse loads for wall assemblies used in light-frame wood and steel construction in accordance with *NBC* Division B Subsection 4.1.7.
 - 3.1.4 Performance for use as foam plastic insulation in accordance with *NBC* Division B Article 3.1.5.15 and *NECC* Division B Article 3.2.1.2.
 - 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 use as a water-resistive barrier (WRB) in accordance with *NBC* Division B Note A-5.6.2.1.
- 3.2 Uplift performance is out of scope of this TER.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.4 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. STRONG-R® STRUCTURAL INSULATION

4.2 Strong-R® Structural Insulation is a structural, rigid insulation sheathing product consisting of a proprietary fibrous sheathing board laminated to one side of a proprietary rigid foam plastic insulation.

4.2.1 The proprietary fibrous sheathing is made of specially treated plies that are pressure-laminated with a water-resistant adhesive. The surface finish consists of a facer on one or both side using a 2.9 mm (0.113") nominal thickness fibrous sheathing board.

4.2.2 The rigid foam plastic insulation is a Class A proprietary polyisocyanurate, which can have facings on one or both sides. The facers are designed with a base foil layer (0.0009 mil).

4.3 Material Availability

4.3.1 Thickness: up to 54 mm (2 $\frac{1}{8}$ ")

4.3.2 Standard product width: 1219 mm (48")

4.3.3 Standard lengths: 2438 mm, 2743 mm and 3048 mm (96", 108" and 120")

5 APPLICATIONS

5.1 General

5.1.1 Strong-R® Structural Insulation is used in the following applications:

5.1.1.1 Wall sheathing in buildings constructed in accordance with the *NBC* for light-frame wood and steel 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 and steel construction.

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

5.1.1.4 Insulating sheathing applied as in-fill to portions of walls that are not designed as braced wall panels or shear walls.

5.1.1.5 Insulated sheathing in accordance with the *NBC* Division B Article 3.1.5.15, and *NECC* Division B Article 3.2.1.2.

5.1.1.6 An approved WRB in accordance with *NBC* Division B Article 5.6.2.1, when installed with approved Construction Tape on all sheathing seams, see Section 5.3.3. See the manufacturer's product information for further details.

5.1.1.6.1 Where the joints are not taped, a separate WRB shall be installed in accordance with the WRB manufacturer's installation instructions.

- 5.1.1.7 An air barrier material as part of an air barrier assembly in accordance with *NBC* Division B Section 5.4 and *NECC* Division B Subsection 3.2.4, in accordance with the manufacturer's installation instructions and this TER.
- 5.1.2 Strong-R® Structural Insulation contains foam plastics complying with *NBC* Division B, Article 3.1.5.15.
- 5.2 *Structural Applications*
- 5.2.1 *General Provisions:*
- 5.2.1.1 Except as otherwise described in this TER, Strong-R® Structural Insulation shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth therein for light-frame wood and steel construction.
- 5.2.1.2 Anchorage for in-plane shear shall be designed to transfer the induced shear force into and out of each shear wall. In no case shall the anchorage spacing exceed the following limits:
- 5.2.1.2.1 For wind design, anchor bolt spacing shall not exceed 1.8 m (6') o.c.
- 5.2.1.2.2 For seismic design, anchor bolt spacing shall not exceed 1.2 m (4') o.c.
- 5.2.1.3 The maximum aspect ratio for Strong-R® Structural Insulation shall be 4:1.
- 5.2.1.4 The minimum full height panel width shall be 610 mm (24").
- 5.2.1.5 All panel edges shall be supported by framing.
- 5.2.1.6 Fasteners may be countersunk beneath the outer surface of the foam plastic sheathing layer.
- 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 *Steel-Framed Construction:*
- 5.2.2.1 Strong-R® Structural Insulation panels used in wall assemblies designed as shear walls:
- 5.2.2.2 Are permitted to be designed in accordance with the methodology used in *CAN/CSA S136* for cold form steel using the capacities shown in Table 1 and Table 2.
- 5.2.2.3 Resist lateral wind load forces using the factored shear resistance set forth in Table 1.
- 5.2.2.4 Resist seismic loads using the factored shear resistance set forth in Table 2 when seismic design is required in accordance with *NBC* Division B Subsection 4.1.8.
- 5.2.2.4.1 The ductility response modification factor and, R_d , over strength-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.
- 5.2.2.5 Strong-R® Structural Insulation panels are permitted to resist transverse wind load forces using the specified transverse loads set forth in Table 3. Required component and cladding loads to be resisted are found in *NBC* Division B Subsection 4.1.7 (See Sentence 4.1.7.1[5]).

TABLE 1. FACTORED SHEAR RESISTANCE FOR LIMIT STATES DESIGN FOR STRONG-R® STRUCTURAL INSULATION WITH COLD FORMED STEEL STUD FRAMING FOR LATERAL WIND LOADS

Structural Sheathing Product	Thickness mm (in)	Fastener Spacing (edge/field) mm (in)	Maximum Stud Spacing mm (in)	Gypsum Wallboard (GWB) mm (in)	Gypsum Wallboard Fastener Spacing ³ (edge/field) mm (in)	Factored Shear Resistance kN/m (plf)	Fastener Schedule
Strong-R® Structural Insulation Light-Frame Cold Form Steel ¹	32 (1¼)	76/76 (3/3)	640 (24) o.c.	12.7 (½) GWB	203/203 (8/8)	6.5 (450)	See Note 4
		76/76 (3/3)			203/305 (8/12)	6.8 (465)	
		76/76 (3/3)			152/305 (6/12)	7.6 (520)	
		76/76 (3/3)		No GWB ²	-	5.5 (375)	See Note 5
		305/305 (12/12)				2.5 (170)	
		152/305 (6/12)				4.6 (310)	
		76/76 (3/3)				3.3 (225)	
		76/305 (3/12)		9.2 (630)	See Note 6		
	54 (2⅞)	76/76 (3/3)	6.1 (415)				

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

- 20 gage 345 MPa (50 ksi) 92 mm (3-5/8") metal studs @ 610 mm (24") o.c.
- Mid height horizontal brace installed every other cavity space.
- Gypsum attached with minimum #6 type S screws (32 mm) 1-¼" long with a minimum edge distance of 9.5 mm (3/8").
- #8 x 1-5/8" (41 mm) Self Drilling Modified Truss Head Screw (Head flush w/ exterior of foam board).
- #8 x 1-5/8" (41 mm) Self Drilling Modified Truss Head Screw (Head driven down to paperboard).
- #8 x 2-½" (64 mm) Self Drilling Modified Truss Head Screw (Head driven down to paperboard).
- 2.5 mm (0.100") Diameter x 38 mm (1-½") Length Pins (Bostitch® C4S100 BG).

TABLE 2. SEISMIC PERFORMANCE OF STRONG-R® STRUCTURAL INSULATION WITH COLD FORMED STEEL STUD FRAMING^{1,2,5,8}

Seismic Force Resisting System (SFRS)	Thickness mm (in)	Gypsum Wallboard Fastening Schedule ^{4,10} mm (in)	Maximum Stud Spacing mm (in)	Factored Shear Resistance kN/m (plf)	Ductility Factor ^{6,7} , R_d	Overstrength Force Modification Factor ⁷ , R_o	Structural System Limitations and Building Height Limit ⁹ 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 Cold Formed Steel Walls Sheathed with Strong-R® Structural Insulation	32 (1¼)	No GWB ³	610 (24) o.c.	5.5 (375)	2.5	1.7	20 (65.6)	20 (65.6)	20 (65.6)	20 (65.6)	20 (65.6)
		203:203 (8:8)		6.5 (450)	1.5	1.7	20 (65.6)	20 (65.6)	20 (65.6)	20 (65.6)	20 (65.6)

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

- Strong-R® Structural Insulation attached with a minimum #8 x 1-5/8" Self Drilling Modified Truss Head Screw. Fasteners 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 of 9.5 mm (3/8"). Fastener head shall be in contact with the panel surface. Alternately, fastener heads are permitted to be overdriven into foam portion of the panel with no reduction in shear capacities.
- 20 gage 345 MPa (50 ksi) 92 mm (3-5/8") metal studs @ 610 mm (24") o.c.
- Mid height horizontal brace installed every other cavity space.
- Walls installed with minimum 12.7 mm (1/2") Gypsum wallboard attached with minimum #6 type S screws 32 mm (1¼") long. Fasteners shall maintain a minimum edge distance of 9.5 mm (3/8").
- All seismic design parameters follow the equivalency as defined in Section 3 of this TER.
- 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, Article 4.1.8.9.
- Work this table with additional system restrictions in Article 4.1.8.10 of NBC Division B.
- Heights are maximum height limits above grade, as defined in NBC Division B Table 4.1.8.9.
- NBC Table 9.23.13.6 requires 15.9 mm (5/8") thick gypsum with framing 610 mm (24") o.c.

TABLE 3. TRANSVERSE (OUT-OF-PLANE) LOAD PERFORMANCE OF STRONG-R® STRUCTURAL INSULATION

Structural Sheathing Product	Maximum Stud Spacing mm (in)	Hourly 1-in-50 Wind Pressure ² kPa
Strong-R®	610 (24) o.c.	1.8

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

- #8 x 2-1/2" Zinc Coated Self-Drilling Modified Truss Head Screw, 152 mm (6") o.c. in perimeter and 305 mm (12") o.c. in field.
- Hourly Wind Pressure (1-in-50) for selected locations can be located in NBC Division B, Appendix C, Table C-2.

5.2.3 Performance-Based Wood-Framed Construction

5.2.3.1 Strong-R® Structural Insulation 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:

5.2.3.1.1 Using the capacities shown in Table 4 for wind load forces.

5.2.3.1.2 To resist seismic load forces using the seismic specified shear strengths set forth in Table 5 when seismic design is required in accordance with NBC Division B Subsection 4.1.8.

5.2.3.1.2.1 The ductility response modification factor and, R_d , over strength-related force modification factor, R_o , indicated in Table 5 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

TABLE 4. SPECIFIED SHEAR CAPACITY FOR LIMIT STATES DESIGN FOR STRONG-R® STRUCTURAL INSULATION WITH WOOD STUD FRAMING - WIND

Structural Sheathing Product	Thickness mm (in)	Fastener Spacing ¹ [edge/field] mm (in)	Maximum Stud Spacing mm (in)	Gypsum Wallboard (GWB)	Specified Shear Strength kN/m (plf)
Strong-R® Structural Insulation	32 (1¼)	76/305 (3/12)	610 (24)	No GWB	10.1 (690)
		152/305 (6/12)			5.0 (345)
	54 (2⅞)	76/305 (3/12)	610 (24)	No GWB	10.1 (690)
		152/305 (6/12)			5.0 (345)

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

1. Strong-R® Structural Insulation attached with a minimum #8 x 1-¼" (32 mm) wafer head. Fastener edge distance shall be a minimum of 9 mm (0.35"). Fastener head shall be in contact with the panel surface. Alternately, fastener heads are permitted to be overdriven into foam portion of the panel with no reduction in shear capacities.

TABLE 5. SPECIFIED SHEAR CAPACITY FOR LIMIT STATES DESIGN FOR STRONG-R® STRUCTURAL INSULATION WITH WOOD STUD FRAMING – SEISMIC^{1,2,5}

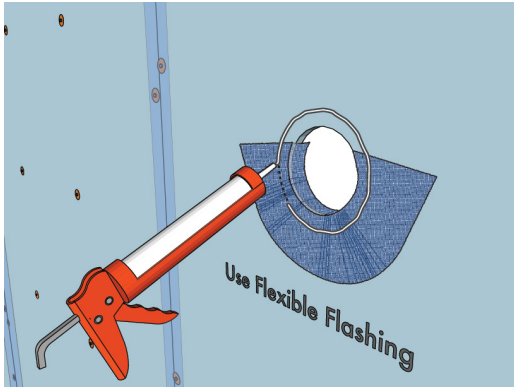
Seismic Force Resisting System (SFRS)	Thickness mm (in)	Gypsum Wallboard Fastening Schedule mm (in)	Maximum Stud Spacing mm (in)	Specified Shear Strength kN/m (plf)	Ductility Factor ^{3,4} , R _d	Overstrength Force Modification Factor ⁴ , R _o	Structural System Limitations and Building Height Limit ^{6,7} 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
Strong-R® Structural Insulation	32 (1¼)	No GWB	610 (24)	5.0 (345)	1.7	1.7	15	15	NP	NP	NP

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

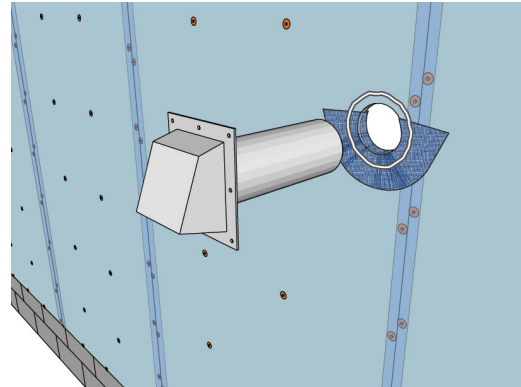
- Strong-R® Structural Insulation attached with a minimum #8 x 1-¼" (32 mm) wafer head screw and spaced a maximum of 152 mm (6") o.c. at the panel edges and 305 mm (12") o.c. in the field. Fastener edge distance shall be a minimum of 9 mm (0.35"). Fastener head shall be in contact with the panel surface. Alternately, fastener heads are permitted to be overdriven into foam portion of the panel with no reduction in shear capacities.
- All seismic design parameters follow the equivalency as defined in Section 3 of this TER.
- 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_dR_o shall be taken as the lowest value of R_dR_o corresponding to these systems. See NBC Division B, Article 4.1.8.9.
- Work this table with additional system restrictions in Article 4.1.8.10 of NBC Division B.
- Heights are maximum height limits above grade, as defined in NBC Division B Table 4.1.8.9.
- NP = Not Permitted

5.3 Water-Resistive Barrier

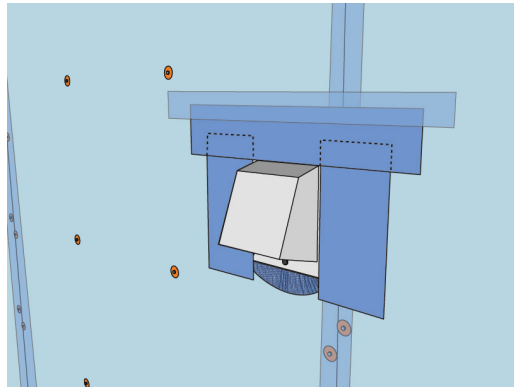
- Strong-R® may be used as a WRB as prescribed in NBC Division B Note A-5.6.2.1 when installed on exterior walls as described in this section.
- Strong-R® shall be installed with board joints placed directly over exterior framing spaced a maximum of 610 mm (24") o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- A separate WRB may also be provided. If a separate WRB method is used, taping of the sheathing joints is not required.
- Flashing of penetrations shall comply with the applicable code and must be installed at all sheathing penetrations. Use qualified flashing tape, such as Arctic Flash Synthetic Flashing, Flexible Butyl Flashing, or Home Guard RA-Plus Flashing. See Figure 2, Figure 3, and Figure 4 for typical penetration flashing details.
- Flashing Details – Typical Flanged and Unflanged Penetration and Flanged Window



STEP 1



STEP 2



STEP 3

FIGURE 2. TYPICAL PENETRATION FLASHING DETAIL – FLANGED

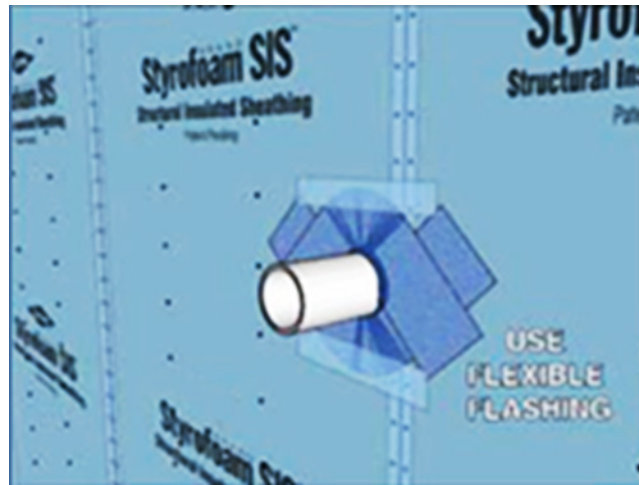


FIGURE 3. TYPICAL PENETRATION FLASHING DETAIL – UNFLANGED

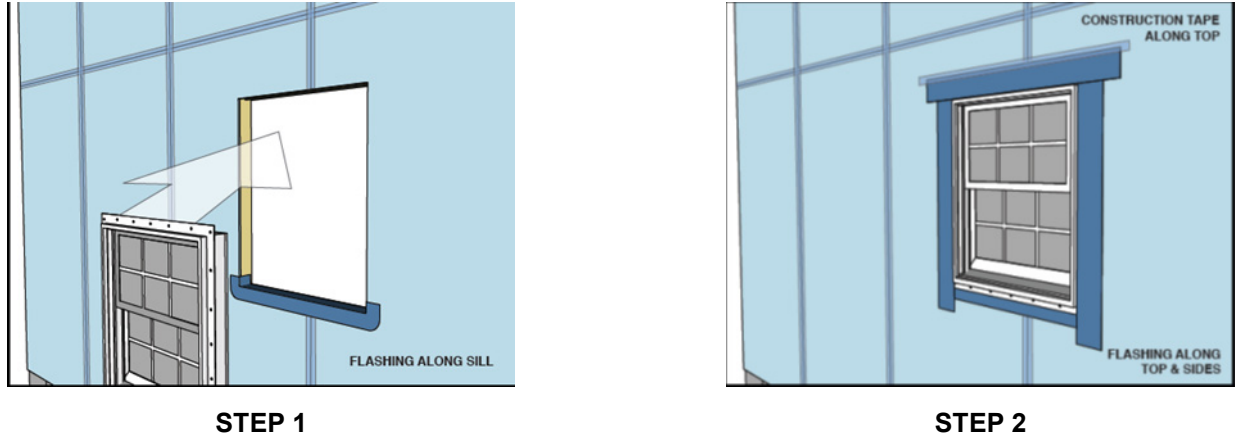


FIGURE 4. TYPICAL WINDOW FLASHING DETAIL

5.4 Thermal Resistance (RSI-Value)

- 5.4.1 Strong-R® is a foam plastic insulation panel (FPIS) used as thermal insulation in wall, roof and ceiling assemblies.
- 5.4.2 Strong-R® meets the continuous insulating sheathing requirements complying with the provisions of NECC Division B Part 3.
- 5.4.3 Strong-R® Structural Insulation has the thermal resistance shown in Table 6.

TABLE 6. STRONG-R® STRUCTURAL INSULATION THERMAL RESISTANCE PROPERTIES

Thickness mm (in)	RSI/R-Value °K*m²/W (h*ft²*°F/Btu)
51 (2.0)	2.3 (13.0)
32 (1.25)	1.3 (7.5)
St: 25.4 mm = 1 in 1. Thermal values are determined using the ASTM C518 test method at 23.9°C (75°F) mean temperature on material conditioned according to ASTM C1289 Section 11.1 (Degrees F.ft².h/Btu).	

5.5 Air Barrier

- 5.5.1 Strong-R® meets the requirements of NECC Division B Part 3 for use as a component of the air barrier system when installed in accordance with the manufacturer’s installation instructions and this TER with all seams, including the top and bottom edges, taped.
- 5.5.2 All penetrations shall be flashed and sealed in accordance with the flashing manufacturer’s installation instructions. Self-adhered flashing tape shall meet AAMA 711 (FortiFlash Butyl or equivalent).
- 5.5.3 Strong-R® is defined as an air barrier material having an air permeance of less than 0.02 L/m²ft², in accordance with NBC Division B, Article 5.4.1.2.

5.6 Surface Burn Characteristics

- 5.6.1 Strong-R® have the flame spread ratings as shown in Table 7, when tested in accordance with CAN/ULC S102 per NBC Division B Subsection 3.1.12.

TABLE 7. SURFACE BURN CHARACTERISTICS OF STRONG-R®

Product	Flame Spread	Smoke Developed
Strong-R® ¹	20	125
St: 25.4 mm = 1 in 1. Foam plastic core tested in accordance with CAN/ULC S-102, with maximum foam thickness of 102 mm (4").		

5.7 Thermal Barrier

- 5.7.1 Installation shall be fully protected from the interior of the building by an approved thermal barrier as required by *NBC* Division B Article 3.1.5.15.

5.8 Non-Structural Applications

- 5.8.1 Where other means of wall bracing are provided, or are not required, and an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing, Strong-R® Structural Insulation may be installed in accordance with Section 6.2.6.1.

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

- 6.2.1.1 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.

6.2.2 Orientation

- 6.2.2.1 Strong-R® Structural Insulation may be installed vertically or horizontally over studs, with framing not less than 20 ga. 50 ksi 92 mm (3-5/8") and spaced a maximum of 610 mm (24") o.c.
- 6.2.2.2 Sheathing joints must be butted at framing members, and all panel edges shall be blocked. A single row of fasteners must be applied to each panel edge into the stud or blocking below. Do not tack product to framing, but fasten each panel completely after fastening begins.

6.2.3 Attachment

6.2.3.1 Strong-R® Structural Insulation

- 6.2.3.1.1 Minimum #8 x 41 mm (1-5/8") self-drilling modified truss head screw or 2.5 mm (0.100") diameter x 38 mm (1-1/2") length pins (Bostitch® C4S100 BG).
- 6.2.3.1.2 Fastener spacing shall be a maximum of 76 mm (3") o.c. along the edge and 76 mm (3") o.c. in the field or as required in Section 5 for the application selected.

6.2.4 Gypsum Wallboard

- 6.2.4.1 Where required, gypsum wallboard shall be a minimum 12.7 mm (1/2") thickness and shall be attached as follows:
- 6.2.4.1.1 #6 x 32 mm (1 1/4") Type S screws.
- 6.2.4.1.2 Fastener spacing shall be as shown in Section 5.

6.2.5 Treatment of Joints

- 6.2.5.1 Strong-R® Structural Insulation sheathing joints must be butted at framing members, and a single row of fasteners must be applied to each panel edge into the stud below.

6.2.6 Window Treatments

- 6.2.6.1 Strong-R® Structural Insulation 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 Non-Structural Applications

- 6.2.7.1 Install panels with minimum #8 x 41 mm (1-5/8") self-drilling modified truss head screw or 2.5 mm (0.100") diameter x 38 mm (1-1/2") length pins (Bostitch® C4S100 BG).
- 6.2.7.2 The fastener spacing shall be 76 mm (12") o.c. along the top, bottom and vertical panel edges and 76 mm (12") o.c. in the field. Do not tack product to framing, but fasten each panel completely after fastening begins.

7 SUBSTANTIATING DATA

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
 - 7.1.1 Lateral load testing and data in accordance with *ASTM E564* and *E2126*
 - 7.1.2 Transverse load testing in accordance with *ASTM E330*
 - 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 a component of an air barrier, in accordance with *ASTM E2178*
 - 7.1.5 Test reports and data for determining surface burning characteristic in accordance with *CAN/ULC S102*
 - 7.1.6 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 Manufacturer installation recommendations for structural sheathing on exterior walls
- 7.3 Quality Control Manual in accordance with a third-party quality control program with inspections conducted by an approved agency
- 7.4 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.
- 7.5 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 load resistance due to wind and seismic loads carried by shear walls
 - 8.1.2 Transverse load resistance due to components and cladding pressures on building surfaces
 - 8.1.3 Performance of the foamed plastic component for conformance to *NBC Division B Article 3.1.5.15*
 - 8.1.4 Performance for use as foamed plastic insulating sheathing in accordance with *NBC Division B Article 3.1.5.15*
 - 8.1.5 Performance for use as a WRB in accordance with *NBC Division B Article 5.6.2.1*
 - 8.1.6 Performance for use as an air barrier in accordance with *NBC Division B Section 5.4*, and *NECC Division B Subsection 3.2.4*

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.⁴

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*.⁵

8.5.1 DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs professional engineers.⁶

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."⁷

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.

⁴ *NBC* Division C Article 2.2.1.2

⁵ *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.

⁶ 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."

⁷ 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 CONDITIONS OF USE

- 9.1 Strong-R® shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.2 Strong-R® Structural Insulation shall not be used as a nailing base.
- 9.3 This product shall be fully protected from the interior of the building by an approved thermal barrier.
- 9.4 In areas where termites are known to occur and foundations are insulated or otherwise finished in a manner that could conceal a termite infestation, in accordance with *NBC* Division B Article 9.3.2.9, a metal or plastic barrier shall be installed through the insulation to control the passage of termites behind or through the insulation.
- 9.5 Allowable shear loads shall not exceed values in Table 1 and Table 5 for wind loads, and Table 2 and Table 6 for seismic loads.
- 9.6 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 Strong-R® Structural Insulation are manufactured under a 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 When installed as a wall sheathing but not installed per structural requirements, light-framed walls shall be braced by other means.
- 9.9 When used as a WRB, installation shall be in accordance with Section 5.3.
- 9.10 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.
- 9.11 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.12 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*).
- 9.13 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.14 This product has an internal quality control program and a third-party quality assurance program in accordance with ISO/IEC 17065 certification procedures.
- 9.15 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.
- 9.16 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.
- 9.17 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.