



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:

March 19, 2020

Subject to Renewal:

April 1, 2021

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 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*

¹ 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.

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 (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.

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

- 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*
- 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)	See Note 5	
		152/305 (6/12)				4.6 (310)	See Note 6	
		76/76 (3/3)				3.3 (225)	See Note 7	
		76/305 (3/12)				9.2 (630)	See Note 6	
	54 (2⅛)	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 (¾").
- #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 LOAD PERFORMANCE OF STRONG R STRUCTURAL INSULATION

Summary of Specified Pressures for Strong R Structural Insulation Resisting Out-of-Plane Wind Loads		
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

1. 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.

2. All seismic design parameters follow the equivalency as defined in Section 3 of this TER.

3. Response modification coefficient, R_d, for use throughout NBC.

4. 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.

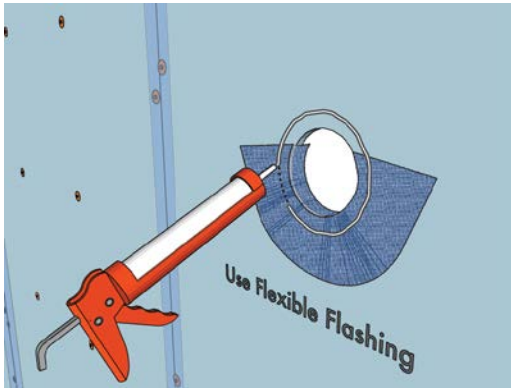
5. Work this table with additional system restrictions in Article 4.1.8.10 of NBC Division B.

6. Heights are maximum height limits above grade, as defined in NBC Division B Table 4.1.8.9.

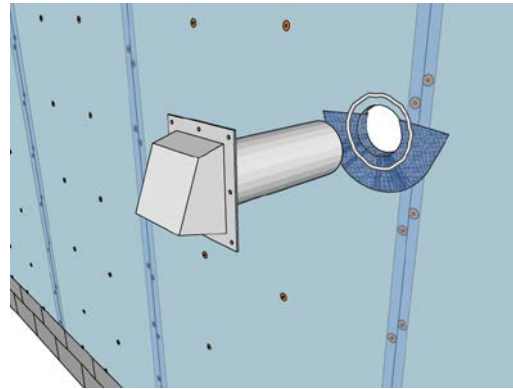
7. NP = Not Permitted

5.3 Water-Resistive Barrier

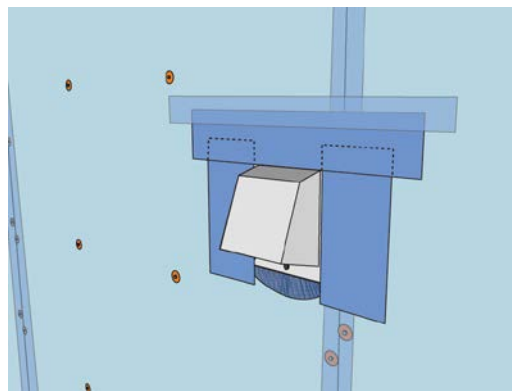
- 5.3.1 Strong-R may be used as a WRB as prescribed in NBC Division B Note A-5.6.2.1 when installed on exterior walls as described in this section.
- 5.3.2 Strong R shall be installed with board joints placed directly over exterior framing spaced a maximum of 610 mm (24") o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- 5.3.3 A separate WRB may also be provided. If a separate WRB method is used, taping of the sheathing joints is not required.
- 5.3.4 Flashing of penetrations shall comply with the applicable code and must be installed at all sheathing penetrations. Use qualified flashing material such as self-adhered flashing tape meeting AAMA 711 (3M All Weather Flashing Tape 8067 or equivalent). See Figure 2, Figure 3, and Figure 4 for typical penetration flashing details.
- 5.3.5 Flashing Details – Typical Flanged and Unflanged Penetration and Flanged Window



STEP 1



STEP 2



STEP 3

FIGURE 2. TYPICAL PENETRATION FLASHING DETAIL – FLANGED

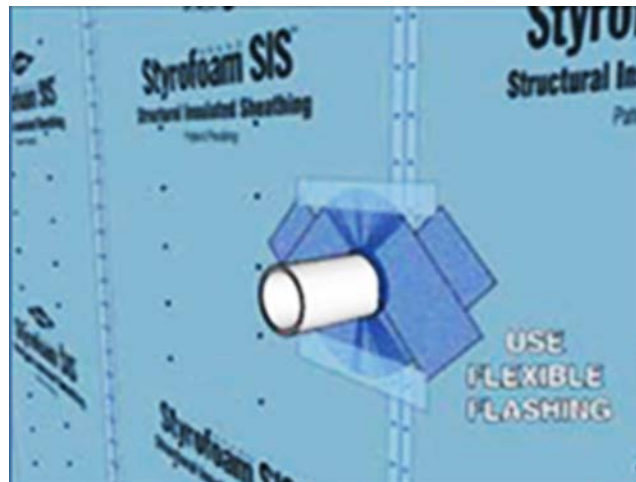


FIGURE 3. TYPICAL PENETRATION FLASHING DETAIL – UNFLANGED

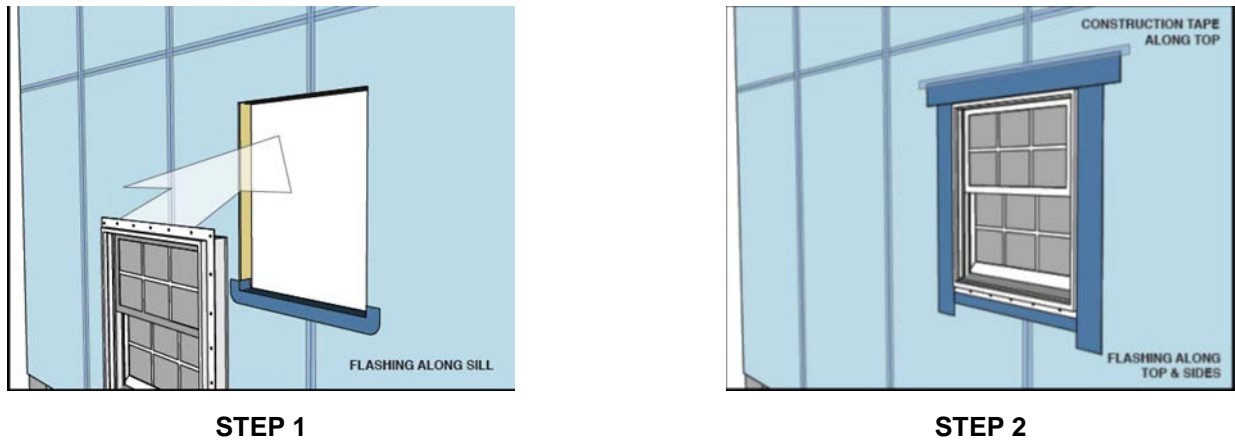


FIGURE 4. TYPICAL WINDOW FLASHING DETAIL

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*m ² /W (h*ft ² *°F/Btu)
51 (2.0)	2.3 (13.0)
32 (1.25)	1.3 (7.5)

SI: 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/m*ft², 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
SI: 25.4 mm = 1 in 1. Foam plastic core tested in accordance with <i>CAN/ULC S-102</i> , 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 6.2.7.

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 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 Lateral load testing and data in accordance with *ASTM E564* and *E2126*
- 7.2 Transverse load testing in accordance with *ASTM E330*
- 7.3 Test reports and data for determining use as a WRB material, in accordance with *ASTM E331*
- 7.4 Test reports and data for determining use as a component of an air barrier, in accordance with *ASTM E2178*
- 7.5 Test reports and data for determining surface burning characteristic in accordance with *CAN/ULC S102*
- 7.6 Test reports and data for determining comparative equivalency for use as an alternative material in accordance with *NBC Division A Section 1.2*
- 7.7 Manufacturer installation recommendations for structural sheathing on exterior walls
- 7.8 Quality Control Manual in accordance with a third-party quality control program with inspections conducted by an approved agency
- 7.9 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.
- 7.10 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 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 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 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 Specified uplift loads shall not exceed values in Table 3.
- 9.7 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.
- 9.8 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.
- 9.9 When installed as a wall sheathing but not installed per structural requirements, light-framed walls shall be braced by other means.
- 9.10 When used as a WRB, installation shall be in accordance with Section 5.3.
- 9.11 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.
- 9.12 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.13 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*).
- 9.14 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.15 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.

- 9.16 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.
- 9.17 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.

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.
- 11.2 For information on the current status of this TER, contact [DrJ Certification](#).