

Thermo-Brace® Red Structural Insulated Board (SIB)

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DIVISION: 06 00 00 – WOOD, PLASTICS, AND COMPOSITES

Section: 06 12 00 – Structural Panels

Section: 06 12 19 – Shear Wall Panels

Section: 06 16 00 – Sheathing

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION

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

1. Products Evaluated:

- 1.1. For the most recent version of this Technical Evaluation Report (TER), visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.
- 1.2. This TER can be used to obtain product approval in any country that is an IAF MLA Signatory (all countries found [here](#)) and covered by an [IAF MLA Evaluation](#) per the [Purpose of the MLA](#) (as an example, see [letter to ANSI](#) from the Standards Council of Canada). Manufacturers can go to jurisdictions in the U.S., Canada and other [IAF MLA Signatory Countries](#) and have their products readily approved by authorities having jurisdiction using [DrJ's ANSI accreditation](#).
- 1.3. Building code regulations require that evaluation reports are provided by an approved agency meeting specific requirements, such as those found in [IBC Section 1703](#). Any agency accredited in accordance with ANSI ISO/IEC 17065 meets this requirement within ANSI's scope of accreditation. For a list of accredited agencies, visit ANSI's [website](#). For more information, see drjcertification.org.

DrJ is a Professional Engineering Approved Source

 **Learn more about DrJ's Accreditation**

- DrJ is an ISO/IEC 17065 accredited product certification body through ANSI Accreditation Services.
- DrJ provides certified evaluations that are signed and sealed by a P.E.
- DrJ's work is backed up by professional liability insurance.
- DrJ is fully compliant with IBC Section 1703.

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- 1.4. Requiring an evaluation report from a specific private company (i.e. ICC-ES, IAPMO, CCMC, DrJ, etc.) can be viewed as discriminatory and is a violation of international, federal, state, provincial and local anti-trust and free trade regulations.
- 1.5. DrJ's code compliance work:
 - 1.5.1. Conforms to code language adopted into law by individual states and any relevant consensus based standard such as an ANSI or ASTM standard.
 - 1.5.2. Complies with accepted engineering practice, all professional engineering laws and by providing an engineer's seal DrJ takes professional responsibility for its specified scope of work.

2. Applicable Codes and Standards:¹

- 2.1. 2012, 2015 and 2018 International Residential Code (IRC)
- 2.2. 2012, 2015 and 2018 International Building Code (IBC)
- 2.3. 2012, 2015 and 2018 International Energy Conservation Code (IECC)
- 2.4. ASCE 7 – Minimum Design Loads for Buildings and Other Structures
- 2.5. ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- 2.6. ASTM E564 – Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings
- 2.7. AWC Wind & Seismic – Special Design Provisions for Wind and Seismic (SDPWS)

3. Performance Evaluation:

- 3.1. Thermo-Brace[®] Red SIB has been evaluated to determine:
 - 3.1.1. Structural performance under lateral load conditions (wind) for use as an alternative to the intermittent wall bracing provisions of [IRC Section R602.10](#) and the continuous wall bracing provisions of the [IRC Section R602.10.4](#) CS-WSP and CS-PF methods.
 - 3.1.2. Structural performance under lateral load conditions (wind) for use as an alternative to the conventional wall bracing provisions of [IBC Section 2308.6²](#), Method WSP for Type V construction.
 - 3.1.3. Structural performance under lateral load conditions (wind) for use under the performance-based provisions of [IBC Sections 2306.1 and 2306.3](#) for light-frame wood wall assemblies.
 - 3.1.4. Structural performance under lateral load conditions (wind) for use as an alternative to SDPWS Section 4.3 Wood-Frame Shear Walls.
 - 3.1.5. Performance for use as foam plastic insulation in accordance with [IRC Section R316](#) and [IBC Section 2603](#).
 - 3.1.6. Performance for use as a water-resistive barrier (WRB) in accordance with [IRC Section R703.2](#) and [IBC Section 1404.2](#).
 - 3.1.7. Performance for use as an air barrier material in accordance with the [IECC Section C402.5.1.2.1](#).³
 - 3.1.8. Resistance to transverse loads for wall assemblies used in light-frame wood construction in accordance with [IRC Section R301.2.1](#) and [IBC Section 1609.1.1](#).
 - 3.1.9. Flame spread and smoke developed indexes for the TBrace Red SIB components.
- 3.2. Performance with regard to thermal resistance (R-value) is outside the scope of this TER.

¹ Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2018 version of the codes and the standards referenced therein, including, but not limited to, ASCE 7, SDPWS and WFCM. This product also complies with the 2000-2015 versions of the IBC and IRC and the standards referenced therein. As required by law, where this TER is not approved, the building official shall respond in writing, stating the reasons this TER was not approved. Unless otherwise noted, IBC/IRC reference numbers are the same as FBC/FRC references. For variations in state and local codes, if any, see [Section 8](#) of this TER.

² [2012 IBC Section 2308.9.3](#)

³ [2009 IECC Section 402.4.2](#), [2012 IECC Section C402.4.1.2.1](#)

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- 3.3. Any code compliance issues not specifically addressed in this section including, but not limited to, the use of Thermo-Brace® Red SIB in a portal frame or in a fire resistance rated assembly are outside the scope of this TER.

4. Product Description and Materials:



Figure 1: Thermo-Brace® Red SIB

- 4.1. Thermo-Brace® Red SIB is a structural, rigid insulation sheathing product consisting of a proprietary cellulosic fiber sheathing board laminated to one side of a proprietary rigid foam plastic insulation.
- 4.1.1. The proprietary cellulosic fiber sheathing board is composed of pressure-laminated plies consisting of high-strength cellulosic fibers with a protective polymer WRB layer on both sides.
- 4.1.2. The rigid foam plastic insulation is a proprietary graphite polystyrene (GPS) foam plastic insulated sheathing (FPIS). Polyolefin facings are applied to the exterior face or both faces of the GPS prior to lamination to the cellulosic fiber sheathing board.

4.2. Material Availability

- 4.2.1. Thickness: 3/4" (19mm) and 1 1/8" (29 mm)
- 4.2.2. Standard product width: 48" (1219 mm)
- 4.2.3. Standard lengths: 96" (2438 mm), 108" (2743 mm) and 120" (3048 mm)
- 4.2.4. Other custom widths and lengths can be manufactured

5. Applications:

5.1. General

- 5.1.1. Thermo-Brace® Red SIB panels are used in the following applications as:
- 5.1.1.1. Wall sheathing in buildings constructed in accordance with *IRC* and *IBC* provisions for light-frame wood construction.
- 5.1.1.2. Structural wall sheathing to provide lateral load resistance (wind only) for braced wall panels used in light-frame wood construction.

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

5.1.2. When Thermo-Brace® Red SIB panels are installed with an approved construction tape on sheathing seams, they are an approved WRB in accordance with [IRC Section R703.2](#) and [IBC Section 1404.2](#). See the manufacturer's product information for further details.

5.1.2.1. Where Thermo-Brace® Red SIB joints are not taped, a separate WRB shall be installed in accordance with the WRB manufacturer's installation instructions.

5.2. Structural

5.2.1. General Structural Provisions

5.2.1.1. Except as otherwise described in this TER, Thermo-Brace® Red SIB shall be installed in accordance with the applicable building codes listed in [Section 2](#) of this TER using the provisions set forth therein for the design and installation of wood structural panels (WSP).

5.2.1.1.1. Thermo-Brace® Red SIB is permitted to be used for the design of shear walls in accordance with *SDPWS* and using the methods set forth therein.

5.2.1.2. Anchorage for in-plane shear force resistance shall be provided to transfer the induced shear force into and out of each shear wall. Shear wall anchorage shall be in accordance with the applicable code referenced in [Section 2](#) of this TER.

5.2.1.3. Except as noted in [Section 5.2.2](#), the maximum aspect ratio for Thermo-Brace® Red SIB shall be 4:1.

5.2.1.4. Except as noted in [Section 5.2.2](#), the minimum full height panel width shall be 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 technical judgment.

5.2.2. Prescriptive *IRC* Bracing Applications

5.2.2.1. Thermo-Brace® Red SIB may be used on braced wall lines as an equivalent alternative to the WSP method when installed in accordance with [IRC Section R602.10](#) and this TER.

5.2.2.2. When used as intermittent bracing, Thermo-Brace® Red SIB may be used to satisfy the bracing lengths required on braced wall lines. NEOPOR®, which has been properly qualified as a WRB, is permitted to be used on the remaining portions of the braced wall line.

5.2.2.2.1. Where the NEOPOR® has not been qualified as a WRB, a separate WRB shall be installed.

5.2.2.2.2. The NEOPOR® shall also be qualified for wind pressure resistance in accordance with [IBC Section 2603.10](#) and [IRC Section 316.8](#).

5.2.2.3. For wind design, required braced wall panel lengths for Thermo-Brace® Red SIB shall be designed as indicated in [Table 1](#) and [Table 2](#) of this TER and shall be used in conjunction with [IRC Table R602.10.3\(2\)](#)⁴, which provides the required adjustments.

5.2.2.4. Thermo-Brace® Red SIB may be used to brace the walls of buildings as an alternative to the continuous wall bracing provisions of the CS-WSP method described in [IRC Section R602.10.4](#). Bracing shall be designed in accordance with the bracing amounts shown in [Table 1](#) and [Table 2](#) of this TER, as adjusted in accordance with [IRC Table R602.10.3\(2\)](#)³.

5.2.2.5. Where a building, or portion thereof, does not comply with one or more of the bracing requirements within the prescriptive sections of the *IRC*, those portions shall be designed and constructed in accordance with [IRC Section R301.1](#).

⁴ [2009 IRC Table R602.10.1.2\(1\)](#), including all footnotes

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Required Bracing Lengths for Thermo-Brace® Red SIB (R3 or R5; FPIS Outward) Installed with ½" Gypsum Wallboard at 16" o.c. Stud (2x4 or 2x6) Spacing – Wind											
Condition	Braced Wall Line Spacing	Thermo-Brace® Red SIB Intermittent Sheathing					Thermo-Brace® Red SIB Continuous Sheathing				
		Staples 3" o.c. at Edges & 3" o.c. in the Field					Staples 3" o.c. at Edges & 3" o.c. in the Field				
		Length of Wall Line to be Braced (ft.)					Length of Wall Line to be Braced (ft.)				
		≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph	≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph
One Story or the Top of Two or Three Stories	10	1.9	1.9	2.4	2.4	2.8	1.4	1.9	1.9	2.4	2.4
	20	3.3	3.3	3.8	4.7	5.2	2.8	3.3	3.3	3.8	4.7
	30	4.7	5.2	5.6	6.6	7.5	4.2	4.2	4.7	5.6	6.6
	40	6.1	6.6	7.5	8.5	9.9	5.2	5.6	6.1	7.1	8.5
	50	7.5	8.5	8.9	10.3	12.2	6.6	7.1	7.5	8.9	10.3
	60	8.9	9.9	10.8	12.2	14.1	7.5	8.5	8.9	10.3	12.2
First Story of Two Stories or Second Story of Three Stories	10	3.3	3.8	4.2	4.7	5.6	2.8	3.3	3.3	4.2	4.7
	20	6.1	7.1	7.5	8.9	10.3	5.2	6.1	6.6	7.5	8.5
	30	8.9	9.9	10.8	12.7	14.6	7.5	8.5	8.9	10.8	12.2
	40	11.8	12.7	14.1	16.5	18.8	9.9	10.8	11.8	14.1	16.0
	50	14.6	15.5	16.9	20.2	23.0	12.2	13.2	14.6	16.9	19.7
	60	16.9	18.8	20.2	23.5	27.3	14.6	16.0	17.4	20.2	23.5
First Story of Three Stories	10	5.2	5.6	6.1	7.1	8.0	4.2	4.7	5.2	6.1	7.1
	20	9.4	10.3	10.8	12.7	15.0	8.0	8.5	9.4	10.8	12.7
	30	13.2	14.6	16.0	18.3	21.6	11.3	12.2	13.6	16.0	18.3
	40	17.4	18.8	20.7	24.0	27.7	14.6	16.0	17.4	20.7	23.5
	50	21.2	23.0	25.4	29.6	34.3	17.9	19.7	21.6	24.9	29.1
	60	24.9	27.3	30.1	35.3	40.4	21.6	23.5	25.4	29.6	34.3

1. Thermo-Brace® Red SIB to be a minimum ¾" thickness installed with staples per [Section 6](#) of this TER.
2. Demonstrates equivalency to [IRC Table R602.10.3\(1\)](#) ([2009 IRC Table R602.10.1.2\(1\)](#)). All adjustment factors from [IRC Table R602.10.3\(2\)](#) ([2009 IRC Table R602.10.1.2\(1\)](#), including all footnotes) shall be applied. Except when used with method CS-PF, a minimum of ½" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum of 5d cooler nails or 1¼" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
3. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.7.
4. Bracing lengths are the results of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in [Section 2](#) of this TER that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which belongs to the manufacturer of those products or the members of the associations that publish those design values.
5. Bracing lengths are based on the worst case condition for the product thickness/orientation described.

Table 1: Required Bracing Lengths for Thermo-Brace® Red SIB Panels with FPIS Installed Inward in Accordance with the IRC Wind Bracing Provisions

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Required Bracing Lengths for Thermo-Brace® Red SIB (R3 or R5; FPIS Inward) Installed with ½" Gypsum Wallboard at 16" o.c. Stud (2x4 or 2x6) Spacing – Wind											
Condition	Braced Wall Line Spacing	Thermo-Brace® Red SIB Intermittent Sheathing					Thermo-Brace® Red SIB Continuous Sheathing				
		Nails 3" o.c. at Edges & 3" o.c. in the Field					Nails 3" o.c. at Edges & 3" o.c. in the Field				
		Length of Wall Line to be Braced (ft.)					Length of Wall Line to be Braced (ft.)				
		≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph	≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph
One Story or the Top of Two or Three Stories	10	1.9	1.9	2.4	2.4	2.9	1.5	1.9	1.9	2.4	2.4
	20	3.4	3.4	3.9	4.9	5.3	2.9	3.4	3.4	3.9	4.9
	30	4.9	5.3	5.8	6.8	7.8	4.4	4.4	4.9	5.8	6.8
	40	6.3	6.8	7.8	8.7	10.2	5.3	5.8	6.3	7.3	8.7
	50	7.8	8.7	9.2	10.7	12.6	6.8	7.3	7.8	9.2	10.7
	60	9.2	10.2	11.2	12.6	14.6	7.8	8.7	9.2	10.7	12.6
First Story of Two Stories or Second Story of Three Stories	10	3.4	3.9	4.4	4.9	5.8	2.9	3.4	3.4	4.4	4.9
	20	6.3	7.3	7.8	9.2	10.7	5.3	6.3	6.8	7.8	8.7
	30	9.2	10.2	11.2	13.1	15.0	7.8	8.7	9.2	11.2	12.6
	40	12.1	13.1	14.6	17.0	19.4	10.2	11.2	12.1	14.6	16.5
	50	15.0	16.0	17.5	20.9	23.8	12.6	13.6	15.0	17.5	20.4
	60	17.5	19.4	20.9	24.3	28.1	15.0	16.5	17.9	20.9	24.3
First Story of Three Stories	10	5.3	5.8	6.3	7.3	8.2	4.4	4.9	5.3	6.3	7.3
	20	9.7	10.7	11.2	13.1	15.5	8.2	8.7	9.7	11.2	13.1
	30	13.6	15.0	16.5	18.9	22.3	11.6	12.6	14.1	16.5	18.9
	40	17.9	19.4	21.3	24.7	28.6	15.0	16.5	17.9	21.3	24.3
	50	21.8	23.8	26.2	30.6	35.4	18.4	20.4	22.3	25.7	30.1
	60	25.7	28.1	31.0	36.4	41.7	22.3	24.3	26.2	30.6	35.4

1. Thermo-Brace® Red SIB to be a minimum ¾" thickness installed with nails per [Section 6](#) of this TER.
2. Demonstrates equivalency to [IRC Table R602.10.3\(1\) \(2009 IRC Table R602.10.1.2\(1\)\)](#). All adjustment factors from [IRC Table R602.10.3\(2\) \(2009 IRC Table R602.10.1.2\(1\)\)](#), including all footnotes) shall be applied. Except when used with method CS-PF, a minimum of ½" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum of 5d cooler nails or 1¼" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
3. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.7.
4. Bracing lengths are the results of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in [Section 2](#) of this TER that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which belongs to the manufacturer of those products or the members of the associations that publish those design values.
5. Bracing lengths are based on the worst case condition for the product thickness/orientation described.

Table 2: Required Bracing Lengths for Thermo-Brace® Red SIB Panels with FPIS Installed Inward in Accordance with the IRC Wind Bracing Provisions

5.2.3 Alternative to Prescriptive IRC Bracing Applications

5.2.3.1. As an alternative to the requirements of [Section 5.2.2](#) of this TER, the following provisions are permitted:

5.2.3.1.1. Thermo-Brace® Red SIB may be used on braced wall lines as an equivalent alternative to the WSP method when installed in accordance with [IRC Section R602.10](#) and this TER.

5.2.3.1.2. Thermo-Brace® Red SIB may be used to brace the walls of buildings as an alternative to the continuous wall bracing provisions of the CS-WSP method described in [IRC Section R602.10.4](#).

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5.2.3.1.3. Required braced wall panel lengths for Thermo-Brace® Red SIB shall be as determined by the equivalency factors shown in [Table 3](#) of this TER and [IRC Tables R602.10.3\(1\) and R602.10.3\(2\)](#)⁵, including all footnotes.

5.2.3.1.3.1. Bracing lengths in these tables for the WSP or CS-WSP methods shall be multiplied by the equivalency factors listed in [Table 3](#) of this TER.

Thermo-Brace® Red SIB Wall Bracing Factors per Comparative Equivalency Testing for <i>IRC</i> Prescriptive Wall Bracing Applications	Sheathing Direction	Fastener	Stud Spacing	Fastener Spacing	Thermo-Brace® Red SIB Tested Equivalency Factors to <i>IRC</i> WSP or CS-WSP for Wind loading
Thermo-Brace® Red SIB-R3	FPIS Outward	15/16" Crown x 1 3/4" Leg 16 ga. Staples	16" o.c.	3:3	0.94
Thermo-Brace® Red SIB-R5		15/16" Crown x 2" Leg 16 ga. Staples			0.86
Thermo-Brace® Red SIB-R3	FPIS Inward	1 3/4" x 11 ga. Smooth Shank Roofing Nail	16" o.c.	3:3	0.89
Thermo-Brace® Red SIB-R5		1 3/4" x 11 ga. Ring Shank Roofing Nail			0.97

1. Thermo-Brace® Red SIB to be a minimum 3/4" thickness installed with staples or nails per [Section 6](#) of this TER.
2. Where the FPIS faces outward, fasteners may be countersunk beneath the surface of Thermo-Brace®.
3. Where the FPIS faces inward, fasteners shall be driven flush with the face of Thermo-Brace®.
4. Factors based on SPF framing materials.
5. Multiply the bracing lengths indicated for the WSP or CS-WSP continuous sheathing methods in [IRC Tables R602.10.3\(1\) and R602.10.3\(3\)](#), and as modified by all applicable factors in [IRC Tables 602.10.3\(2\) and R602.10.3\(4\)](#) ([2009 IRC Tables R602.10.1.2\(1\) and R602.10.1.2\(2\)](#)), by the factors shown here to establish the required bracing length.
6. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.7.
7. These equivalency factors are valid for single top plate (advanced framing method) wall installations or double top plate wall installations.
8. Equivalency factors are the results of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in [Section 2](#) of this TER that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which belongs to the manufacturer of those products or the members of the associations that publish those design values.

Table 3: Thermo-Brace® Red SIB (R3 or R5) Braced Wall Line Length Equivalency Factors Based on Equivalency Testing for Use with the *IRC*

5.2.3.1.3.2. These braced wall line length equivalency factors are based on equivalency testing and are used to comply with the *IRC* WSP and CS-WSP methods.

5.2.3.1.3.3. The length of bracing required shall be determined by multiplying the Thermo-Brace® Red SIB tested equivalency factors in [Table 3](#) of this TER by the length indicated for the WSP or CS methods in [IRC Tables R602.10.3\(1\)](#) and as modified by all applicable factors in [IRC Tables R602.10.3\(2\)](#).⁵

5.2.3.1.4. All *IRC* prescriptive bracing minimums, spacing requirements and rules must still be met.

5.2.4 Prescriptive *IBC* Conventional Light-Frame Wood Construction

5.2.4.1. Thermo-Brace® Red SIB may be used to brace exterior walls of buildings as an equivalent alternative to Method WSP of the *IBC* when installed with 1/2" gypsum in accordance with the conventional light-frame construction method of [IBC Section 2308.6](#)⁶ and this TER.

5.2.5 Performance-Based Wood-Framed Construction

5.2.5.1 Thermo-Brace® Red SIB panels used in wall assemblies designed as shear walls are permitted to be designed in accordance with the methodology used in *SDPWS* for WSP using the capacities shown in [Table 4](#) of this TER.

⁵ [2009 IRC Tables R602.10.1.2\(1\) and R602.10.1.2\(2\)](#)

⁶ [2012 IBC Section 2308.9.3](#)

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5.2.5.2 Thermo-Brace® Red SIB shear walls are permitted to resist horizontal wind load forces using the allowable shear loads (in pounds per linear foot) set forth in [Table 4](#) of this TER.

Thermo-Brace® Red SIB Nominal Unit Shear Capacity (NUSC) & Allowable Strength Design (ASD) Capacity – Wind								
Structural Sheathing Product	Fastener Type	Thermo-Brace® Red SIB Fastener Spacing (edge/field)	Sheathing Direction	Maximum Stud Spacing (in.)	Gypsum Wallboard (GWB)	Gypsum Wallboard Fastener Spacing (edge/field) ²	Ultimate Unit Shear Capacity (plf)	Allowable Unit Shear Capacity (plf)
Thermo-Brace® Red SIB ¾"	16 ga. Staple 15/16" Crown x 1¾" Leg	3/3	FPIS Outward	16" o.c.	None	--	555	280
					½"	8":8"	880	440
Thermo-Brace® Red SIB 1 1/8"	16 ga. Staple 15/16" Crown x 2" Leg	3/3			None	--	670	335
					½"	8":8"	1055	530
Thermo-Brace® Red SIB ¾"	1¾" x 11 ga. (0.120" dia.) Smooth Shank Roofing Nail	3/3	FPIS Inward		None	--	640	320
					½"	8":8"	1025	515
Thermo-Brace® Red SIB 1 1/8"	1¾" x 11 ga. (0.120" dia.) Smooth Shank Roofing Nail	3/3			None	--	565	285
					½"	8":8"	940	470

1. Where staples are used, fasteners are to be installed with the crown parallel to the framing and spaced a maximum of 3" o.c. at the panel edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of ¾". Set fastener depth on driving tools to the maximum depth.
 2. Gypsum attached with minimum #6 type W or S screws 1¼" long.

Table 4: Nominal Unit Shear Capacity & Allowable Unit Shear Values for Thermo-Brace® Red SIB- Lateral Wind Load

5.3 Water-Resistive Barrier

- 5.3.1** Thermo-Brace® Red SIB may be used as a WRB in accordance with *ASTM E331* and as prescribed in [IRC Section R703.2](#) and [IBC Section 1404.2](#) when installed on exterior walls as described in this section.
- 5.3.2** Thermo-Brace® Red SIB installed with NEOPOR® FPIS facing inward or outward is approved as a WRB provided the following conditions are met:
- 5.3.2.1** All board joints are placed directly over exterior framing spaced a maximum of 16" o.c. (406 mm). The fasteners used to attach the board shall be installed in accordance with [Section 6](#) of this TER.
 - 5.3.2.2** All seams and joints between boards shall be covered by Barricade® Seam Tape or equivalent after fasteners are installed.
 - 5.3.2.3** Flashing must be installed at all sheathing penetrations and shall comply with all applicable code sections.
- 5.3.3** When Thermo-Brace® Red SIB is used as intermittent bracing, NEOPOR® FPIS alone, which has been properly qualified as a WRB, is permitted to be used on the remaining portions of the braced wall line with all joints taped in accordance with the NEOPOR® FPIS manufacturer's installation instructions.
- 5.3.3.1** Where the NEOPOR® has not been qualified as a WRB, a separate WRB shall be installed.

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5.4 Transverse Wind Loading

5.4.1 Thermo-Brace® Red Structural Sheathing panels are permitted to resist transverse wind load forces using the allowable transverse loads (in pounds per linear foot) set forth in [Table 5](#).

Nominal Uniform Load Capacities (psf) for TBrace® Red SIB Structural Sheathing Resisting Transverse Wind Loads									
TBrace® Grade	Transverse Wind Load Resistance						Fastener Schedule	Basic Wind Speed V_{asd} per ASCE 7-05 (mph)	Basic Wind Speed V_{ult} per ASCE 7-10 (mph)
	Maximum Stud Spacing (in.)	Negative		Positive					
		Ultimate Average Pressure (psf)	Allowable Design Value (psf)	Ultimate Average Pressure (psf)	Allowable Design Value (psf)				
TBrace® Red SIB	16" o.c.	128	80	116	72	$1\frac{5}{16}$ " crown, 1- $\frac{3}{4}$ " leg 16 gage galvanized staples or 0.120" x 1- $\frac{3}{4}$ " roofing nails, 3" o.c. to perimeter/field	≤ 139	≤ 180	

1. The ASD allowable uniform load capacities to be used for wind design are determined by dividing the ultimate uniform load capacities by an ASD reduction factor of 1.6, per SDPWS Section 3.2.1 for determining the ASD allowable uniform load capacity.
 2. Fastener lengths shall be a minimum of 2" for the R-5 Thermo-Brace® Red SIB.
 3. Design wind load capacity shall be in accordance with [IBC Section 1609.1.1](#).
 4. Staple crowns shall be installed parallel to grain.
 5. Allowable wind speeds are based on the following: Components and Cladding wind loads, Mean roof height 30', Exposure B, 10 sq. ft. effective wind area. See the applicable building code for any adjustment needed for specific building location and configuration.

Table 5: Transverse Load Performance of Thermo-Brace® Red SIB

5.4.2 When Thermo-Brace® Red SIB is used as intermittent bracing, the NEOPOR® used as infill on the non-structural portions of the wall shall also be qualified for wind pressure resistance in accordance with [IBC Section 2603.10](#) and [IRC Section 316.8](#).

5.5 Air Barrier

5.5.1 Thermo-Brace® Red SIB may be used as an air barrier material as prescribed in [IRC Section N1102.4.1.1](#), and [IECC Section R402.4.1.1](#) and [C402.5.1](#)⁷ in accordance with ASTM E2178.

5.6 Fire Resistance Properties

5.6.1. Surface Burn Characteristics

5.6.1.1. Thermo-Brace® Red SIB panels have the flame spread characteristics shown in [Table 6](#).

Flame Spread & Smoke Developed Indexes of Trace® Red SIB components		
Thermo-Brace® Red Structural Sheathing (structural Backing)	Flame Spread	Smoke Developed
	< 200	< 450
Neopor FPIS	< 25	< 450

1. Tested in accordance with ASTM E84 and UL 723.

Table 6: Flame Spread & Smoke Developed Indexes of Thermo-Brace® Red Structural Sheathing

5.7 Thermal Barrier Requirements

5.7.1. Installation shall be fully protected from the interior of the building by an approved 15-minute thermal barrier or ignition barrier as required by [IRC Section R316.4](#) and [IBC Section 2603.4](#).

5.8 Non-Structural

5.8.1 Where other means of wall bracing are provided, or are not required, any grade of Thermo-Brace® Red SIB may be used to provide other wall functions when installed in accordance with this section.

⁷ [2012 IECC Section 402.4.1](#)

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- 5.8.1.1 The sheathing panels shall be applied to wall framing with 16 ga galvanized staples having a $15/16$ " crown. Staples for the R3 panels shall be minimum $1\frac{3}{4}$ " leg length. Staples for R5 panels shall be minimum 2" in length.
- 5.8.1.2 Fastener spacing shall be a maximum of 3" o.c in the field and 3" o.c. around the perimeter.
- 5.8.1.3 Stud spacing shall be a maximum of 16" o.c.
- 5.8.1.4 Minimum fastener penetration into the framing members shall be 1" for the R3 product and $\frac{3}{4}$ " for the R5 product.
- 5.8.1.5 All staples shall be fastened parallel to the framing member with a minimum edge spacing of $\frac{3}{8}$ " (9.5 mm).
- 5.8.1.6 All panels are vertically or horizontally installed with all joints backed by studs, plates or blocks when water or air barrier functionality is desired.

6. Installation:

6.1 General for Structural and WRB Applications

- 6.1.1 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 Orientation

- 6.2.1 Thermo-Brace® Red SIB shall be installed in either the vertical or horizontal orientation. To be recognized for the structural values listed in this TER, all joints must be fastened and backed by studs, plates or blocking.

6.3 Fastener Type

6.3.1 Staples for Installation with FPIS Facing Outward

- 6.3.1.1 For R-3 Thermo-Brace® Red SIB, minimum $15/16$ " crown by $1\frac{3}{4}$ " leg, 16 ga galvanized staples shall be installed per the staple manufacturer's instructions.
- 6.3.1.2 For R-5 Thermo-Brace® Red SIB, minimum $15/16$ " crown by 2" leg, 16 ga galvanized staples shall be installed per the staple manufacturer's instructions.
- 6.3.1.3 Fasteners shall be driven such that the head of the fasteners slightly overdriven beneath the surface of the Thermo-Brace® Red SIB.

6.3.2 Nails for Installation with FPIS Facing Inward

- 6.3.2.1 For R-3 Thermo-Brace® Red SIB, minimum $1\frac{3}{4}$ " x 11 ga. roofing nails shall be installed per the nail manufacturer's instructions.
- 6.3.2.2 For R-5 Thermo-Brace® Red SIB, minimum $1\frac{3}{4}$ " x 11 ga. roofing nails shall be installed per the nail manufacturer's instructions.
- 6.3.2.3 Fasteners shall be driven such that the head of the fasteners are flush with the surface of the Thermo-Brace® Red SIB. Do not overdrive fasteners.

6.4 Gypsum Wallboard

- 6.4.1.1 Where required, interior gypsum wallboard shall be a minimum $\frac{1}{2}$ " thickness and shall be attached with one of the following.
 - 6.3.2.1.1. #6 x $1\frac{1}{4}$ " type W or S screws
 - 6.3.2.1.2. 5d cooler nails

6.5 Fastener Edge Distance

- 6.5.1 Fasteners shall be installed with a nominal edge distance of $\frac{3}{8}$ " (9.5 mm) for Thermo-Brace® Red SIB and gypsum.

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6.6 Treatment of Joints

6.6.1 Thermo-Brace® Red SIB joints must be butted.

- 6.6.1.1 Butt joints shall be placed over framing members and fastened with a single row of fasteners at each panel edge.
- 6.6.1.2 When used as a WRB with the NEOPOR® FPIS installed facing inward, seal all seams with Barricade® Seam Tape or equivalent after all fasteners have been installed.
- 6.6.1.3 When installed with the NEOPOR® FPIS facing outward, the NEOPOR® FPIS shall be qualified as a WRB and all seams shall be sealed with an approved tape in accordance with the NEOPOR® FPIS manufacturers installation instructions for use as a WRB. Alternately, a separate WRB may be installed.

6.6.2 Thermo-Brace® Red SIB 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.

7. Test and Engineering Substantiating Data:

- 7.1 Lateral load testing performed by SBCRI in accordance with *ASTM E564*.
- 7.2 Transverse Wind load testing performed by SBCRI in accordance with *ASTM E330*.
- 7.3 WRB testing performed by Intertek, in accordance with *ASTM E331*.
- 7.4 Test reports and data for determining use as an air barrier in accordance with *ASTM E2178*, performed by Intertek.
- 7.5 Test reports and data for determining flame spread and smoke developed indexes in accordance with *ASTM E84*.
- 7.6 Test reports and data compiled by SBCRI for determining comparative equivalency for use as an alternative material in accordance with [IRC Section R104.11](#) and [IBC Section 104.11](#).
- 7.7 The product(s) evaluated by this TER fall within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.
- 7.8 The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineering mechanics based means of compliance. This TER assesses compliance with defined standards, accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.
- 7.9 Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate, as it undertakes its engineering analysis.
- 7.10 DrJ has reviewed and found the data provided by other professional sources are credible. The information in this TER conforms with DrJ's procedure for acceptance of data from approved sources.
- 7.11 DrJ's responsibility for data provided by approved sources conforms with [IBC Section 1703](#) and any relevant professional engineering law.
- 7.12 Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC, WFCM, IBC, SDPWS, NDS, ACI, AISI, PS-20, PS-2*, etc.). 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, concrete, etc), DrJ relies upon grade/properties provided by the raw material supplier to be accurate and conforming to the mechanical properties defined in the relevant material standard.

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8. Findings:

- 8.1** When installed in accordance with the manufacturer installation instructions and this TER, Thermo-Brace® Red SIB complies with, or is a suitable alternative to, the applicable sections of the codes listed in [Section 2](#) of this TER for the following applications:
- 8.1.1** Lateral load resistance due to wind loads carried by shear walls.
 - 8.1.2** Transverse load resistance due to wind.
 - 8.1.3** Use as an air barrier material as prescribed in [IRC Section N1102.4.1.1](#), and [IECC Section R402.4.1.1](#) and [C402.5.1](#)⁸ in accordance with *ASTM E2178*.
 - 8.1.4** Performance for use as a WRB in accordance with [IRC Section R703.2](#) and [IBC Section 1404.2](#)
 - 8.1.5** Performance of foam plastics in accordance with [IRC Section R316](#) and [IBC Section 2603](#) except as noted herein.
- 8.2** [IRC Section R104.11](#) and [IBC Section 104.11](#) ([IFC Section 104.9](#) is similar) state:
- 104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code. ... Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.
- 8.3** This product has been evaluated with the codes listed in [Section 2](#) of this TER and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:
- 8.3.1** No known variations
- 8.4** This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state board of professional engineers when signed and sealed.

9. Conditions of Use:

- 9.1** 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.
- 9.2** Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.
- 9.3** Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.4** Thermo-Brace® Red SIB shall not be used as a nailing base for claddings, trim, windows or doors. Fastening through the Thermo-Brace® Red SIB into the framing is acceptable.
- 9.5** Walls sheathed with Thermo-Brace® Red SIB shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.6** When Thermo-Brace® Red SIB 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](#) of this TER.
- 9.6.1** When Thermo-Brace® SIB is not installed as a WRB, other means of providing a WRB are required, as per the code.

⁸ [2012 IECC Section 402.4.1](#)

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- 9.7 When used in accordance with the *IBC* in high wind areas, special inspections shall comply with [IBC Section 1705.11](#)^{9,10}.
- 9.8 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 9.8.1 Allowable shear loads shall not exceed the values in [Table 3](#) of this TER for wind loads.
- 9.9 Thermo-Brace® Red SIB is manufactured under a quality control program with quality control inspections in accordance with [IRC Section R109.2](#) and [IBC Sections 110.3.8 and 110.4](#).
- 9.10 Design
- 9.10.1 Building Designer Responsibility
- 9.10.1.1 Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer for the Building and shall be in accordance with [IRC Section R106](#) and [IBC Section 107](#).
- 9.10.1.2 The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with [IRC Section R301](#) and [IBC Section 1603](#).
- 9.10.2 Construction Documents
- 9.10.2.1 Construction documents shall be submitted to the building official for approval and shall contain the plans, specifications and details needed for the building official to approve such documents.
- 9.11 Responsibilities
- 9.11.1 The information contained herein is a product, material, detail, design and/or application TER evaluated in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering practice, experience and technical judgment.
- 9.11.2 DrJ TERs provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated sections.
- 9.11.3 The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.
- 9.11.4 This product is manufactured under a third-party quality control program in accordance with [IRC Section R104.4](#) and [R109.2](#) and [IBC Section 104.4](#) and [110.4](#).
- 9.11.5 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, and the TER shall be reviewed for code compliance by the Building Official.
- 9.11.6 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 Building Official's inspection and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.
10. Identification:
- 10.1 Each Thermo-Brace® Red SIB panel described in this TER is 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 barricadebp.com.

⁹ [2012 IBC Section 1705.10](#)

¹⁰ [2009 IBC Section 1706](#)

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11. Review Schedule:

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



- [Mission and Professional Responsibilities](#)
- [Product Evaluation Policies](#)
- [Product Approval – Building Code, Administrative Law and P.E. Law](#)