

Technical Evaluation Report™

TER 1709-07

Thermo-Brace® Green Structural Insulated Board (SIB™), Thermo-Brace® Green SIB™ Guard, PermaBrace Green SIB™ and PermaBrace Green SIB™ Guard

INDEVCO Building Products

Product:

Thermo-Brace® Green 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 Innovative Product Evaluated^{1,2}

1.1 Thermo-Brace® Green SIB™

1.2 Thermo-Brace® Green SIB™ Guard

1.3 PermaBrace Green SIB™

1.4 PermaBrace Green SIB™ Guard

1.4.1 Unless otherwise noted, where Thermo-Brace® Green SIB™ is called out, the provisions apply equally to Thermo-Brace® Green SIB™ Guard, PermaBrace Green SIB™ and PermaBrace Green SIB™ Guard.

2 Applicable Codes and Standards^{3,4}

2.1 Codes

2.1.1 IBC—15, 18, 21: International Building Code®

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

² **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the [building official](#) and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled.** Equipment, materials or products to which has been affixed a [label](#), seal, symbol or other identifying mark of a nationally recognized testing laboratory, [approved agency](#) or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

³ This Listing is a code defined [research report](#), which is also known as a [duly authenticated report](#), provided by an [approved agency](#) (see [IBC Section 1703.1](#)) and/or an [approved source](#) (see [IBC Section 1703.4.2](#)). An approved agency is "approved" when it is ANAB accredited. DrJ Engineering, LLC (DrJ) is listed in the [ANAB directory](#). A professional engineer is "approved" as an [approved source](#) when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an [approved source](#), (i.e., [Registered Design Professional](#)). DrJ is an ANAB accredited [product certification body](#).

⁴ Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.

- 2.1.2 *IRC—15, 18, 21: International Residential Code®*
- 2.1.3 *IECC—15, 18, 21: International Energy Conservation Code®*

2.2 Standards and Referenced Documents

- 2.2.1 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*
- 2.2.2 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
- 2.2.3 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 2.2.4 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*
- 2.2.5 *ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

3 Performance Evaluation

- 3.1 Tests, testing, test reports, research reports, [duly authenticated reports](#) and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by [Defend Trade Secrets Act 2016](#) (DTSA).⁵
- 3.2 Testing and/or inspections conducted for this TER were performed an [ISO/IEC 17025 accredited testing laboratory](#),⁶ an [ISO/IEC 17020 accredited inspection body](#),⁷ which are internationally recognized accreditations through [International Accreditation Forum](#) (IAF), and/or a licensed [Registered Design Professional](#) (RDP).
 - 3.2.1 Structural performance for shear wall assemblies used as lateral force resisting systems in Seismic Design Categories A through F, have been tested and evaluated in accordance with the following standards:
 - 3.2.1.1 ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
 - 3.2.1.2 ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels
 - 3.2.1.3 ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
 - 3.2.1.4 ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings
 - 3.2.1.5 ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings
 - 3.2.2 Lateral force resisting systems for use in both wind and seismic applications follow the performance-based provisions of [IBC Section 2306.1](#), [IBC Section 2306.3](#), and/or [Section 4.3 SDPWS](#) for light-frame wood wall assemblies.

⁵ <https://www.law.cornell.edu/uscode/text/18/part-II/chapter-90>. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The [federal government](#) and each state have a [public records act](#). As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of [Listings](#), [certified reports](#), [technical evaluation reports](#), [duly authenticated reports](#) and/or [research reports](#) prepared by [approved agencies](#) and/or [approved sources](#). For more information, please review this website: [Intellectual Property and Trade Secrets](#).

⁶ Internationally recognized accreditations are performed by members of the [International Accreditation Forum](#) (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

⁷ Ibid.

- 3.3 Thermo-Brace® Green SIB™ has been evaluated to determine the following:
- 3.3.1 Structural performance under lateral load conditions (wind) for use as an alternative to the intermittent wall bracing provisions of [IRC Section R602.10](#) Method WSP (wood structural panel) and the continuous wall bracing provisions of [IRC Section R602.10.4](#) Methods CS-WSP (continuously sheathed wood structural panel) and CS-PF (continuously sheathed portal frame).
 - 3.3.2 Structural performance under lateral load conditions (wind) for use as an alternative to the conventional wall bracing provisions of [IBC Section 2308.6](#), Method WSP for Type V construction.
 - 3.3.3 Structural performance under lateral load conditions (wind) for use under the performance-based provisions of [IBC Section 2306.1](#) and [IBC Section 2306.3](#) for light-frame wood wall assemblies.
 - 3.3.4 Structural performance under lateral load conditions (wind) for use as an alternative to SDPWS Section 4.3 Wood-Frame Shear Walls.
 - 3.3.5 Performance for use as foam plastic insulation in accordance with [IBC Section 2603](#) and [IRC Section R316](#).
 - 3.3.6 Performance for use as a water-resistive barrier (WRB) in accordance with [IBC Section 1403.2](#)⁸ and [IRC Section R703.2](#).
 - 3.3.7 Performance as an air barrier material in accordance with [IRC Section N1102.4.1.1](#), [IECC Section R402.4.1.1](#) and [IECC Section C402.5.1.1](#).
- 3.4 The use of Thermo-Brace® Green SIB™ on steel studs is outside the scope of this TER.
- 3.5 Performance with regard to thermal resistance (R-value) is outside the scope of this TER.
- 3.6 The use of Thermo-Brace® Green SIB™ in a fire resistance rated assembly is outside the scope of this TER.
- 3.7 Any building code and/or accepted engineering evaluations (i.e. research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an [ISO/IEC 17065 accredited certification body](#) and a professional engineering company operated by RDPs / [approved sources](#). DrJ is qualified⁹ to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.
- 3.8 Engineering evaluations are conducted with DrJ's ANAB [accredited ICS code scope](#), which are also its areas of professional engineering competence.
- 3.9 Any regulation specific issues not addressed in this section are outside the scope of this TER.

⁸ [2015 IBC Section 1404.2](#)

⁹ Qualification is performed by a legislatively defined [Accreditation Body](#). [ANSI National Accreditation Board \(ANAB\)](#) is the largest independent accreditation body in North America and provides services in more than 75 countries. [DrJ](#) is an ANAB accredited [product certification body](#).

4 Product Description and Materials

4.1 The products evaluated in this TER are shown in Figure 1 and Figure 2.



Figure 1. Thermo-Brace® Green SIB™



Figure 2. Thermo-Brace® SIB™ Guard

- 4.2 Thermo-Brace® Green SIB™ and PermaBrace Green SIB™ are 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.
 - 4.2.1 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.
 - 4.2.2 The rigid foam plastic insulation is a proprietary graphite polystyrene (GPS) foam plastic insulating sheathing (FPIS). Polyolefin facings are permitted to be applied to the exterior face or both faces of the GPS prior to lamination to the cellulosic fiber sheathing board but are not required.
- 4.3 Thermo-Brace® Green SIB™ Guard and PermaBrace Green SIB™ Guard are comprised of the same material as the Thermo-Brace® Green SIB™. The center and edges of the Guard panels are scored in order to apply the Guard panels to the corner of a building without disturbing the air and water barriers.
- 4.4 *Material Availability*
 - 4.4.1 *Thermo-Brace® Green SIB™ and PermaBrace Green SIB™:*
 - 4.4.1.1 Thickness: ¾" (19mm) and 1⅛" (29 mm).
 - 4.4.1.2 Standard product width: 48" (1219 mm) and 64" (1626 mm).
 - 4.4.1.3 Standard lengths: 96" (2438 mm), 108" (2743 mm), and 120" (3048 mm).
 - 4.4.1.4 Other custom widths and lengths can be manufactured
 - 4.4.2 *Thermo-Brace® Green SIB™ Guard and PermaBrace Green SIB™ Guard:*
 - 4.4.2.1 Standard width on each side past the corner is 32" (813 mm).
 - 4.4.2.2 Standard lengths: 96" (2438 mm), 108" (2743 mm), and 120" (3048 mm).

5 Applications

- 5.1 Thermo-Brace® Green SIB™ panels are used in the following applications:
 - 5.1.1 Wall sheathing in buildings constructed in accordance with IBC and IRC provisions for light-frame wood construction.
 - 5.1.2 Structural wall sheathing to provide lateral load resistance (wind) for braced wall panels used in light-frame wood construction.
 - 5.1.3 Wall sheathing in buildings constructed in accordance with IBC requirements for Type V light-frame construction.
- 5.2 When Thermo-Brace® Green SIB™ panels are installed with an approved construction tape on sheathing seams, they are an approved WRB in accordance with [IBC Section 1403.2¹⁰](#) and [IRC Section R703.2](#). See the manufacturer product information for further details.
 - 5.2.1 Where Thermo-Brace® Green SIB™ joints are not taped, a separate WRB shall be installed in accordance with the WRB manufacturer installation instructions.
- 5.3 *Structural Applications*
 - 5.3.1 *General Structural Provisions:*
 - 5.3.1.1 Except as otherwise described in this TER, Thermo-Brace® Green SIB™ shall be installed in accordance with the applicable building codes listed in Section 2 of this TER using the provisions set forth herein for the design and installation of wood structural panels (WSP).
 - 5.3.1.1.1 Thermo-Brace® Green SIB™ is permitted to be used for the design of shear walls in accordance with SDPWS and using the methods set forth therein.

¹⁰ 2015 IBC Section 1404.2



- 5.3.1.2 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.
- 5.3.1.3 Except as noted in Section 5.3.2, the maximum aspect ratio for Thermo-Brace® Green SIB™ shall be 4:1.
- 5.3.1.4 Except as noted in Section 5.3.2, the minimum full height panel width shall be 24" (610 mm).
- 5.3.1.5 Installation is permitted for single top plate or double top plate applications.

5.3.2 *Prescriptive IRC Bracing Applications:*

- 5.3.2.1 Thermo-Brace® Green SIB™ may be used on braced wall lines as equivalent to the WSP method when installed in accordance with [IRC Section R602.10](#) and this TER.
- 5.3.2.2 When Thermo-Brace® Green SIB™ satisfies the required bracing lengths on braced wall lines, the use of Neopor® only on the remaining wall line is permitted provided cladding is installed directly in contact with Neopor® and is capable of resisting the full design wind load. Use in this manner also meets the requirements of a water-resistive barrier (WRB) when installed in accordance with Section 5.4.
- 5.3.2.3 For wind design, required braced wall panel lengths for Thermo-Brace® Green 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\(2\)](#), which provides the required adjustments.
- 5.3.2.4 Thermo-Brace® Green 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\(2\)](#).
- 5.3.2.5 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](#).

**Table 1.** Required Bracing Lengths for Thermo-Brace® Green SIB™ (R3 or R5; FPIS Outward) – Wind^{1,2,3,4,5,6}

Condition	Braced Wall Line Spacing (ft)	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line											
		Intermittent Sheathing						Continuous Sheathing					
		Ultimate Design Wind Speed, Vult (mph)											
		< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140	< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.4	1.9	1.9	2.4	2.4	2.9	1.4	1.4	1.9	1.9	2.4	2.4
	20	2.4	3.4	3.4	3.8	4.8	5.3	2.4	2.9	3.4	3.4	3.8	4.8
	30	3.8	4.8	5.3	5.8	6.7	7.7	3.4	4.3	4.3	4.8	5.8	6.7
	40	4.8	6.2	6.7	7.7	8.6	10.1	3.8	5.3	5.8	6.2	7.2	8.6
	50	5.8	7.8	8.6	9.1	10.6	12.5	4.8	6.7	7.2	7.7	9.1	10.6
	60	6.7	9.1	10.1	11.0	12.5	14.4	5.8	7.7	8.3	9.1	10.6	12.5
First Story of Two Stories or Second Story of Three Stories	10	2.9	3.4	3.8	4.3	4.8	5.8	2.4	2.9	3.4	3.4	4.3	4.8
	20	4.8	6.2	7.2	7.7	9.1	10.6	4.3	5.3	6.2	6.7	7.7	8.6
	30	6.7	9.1	10.1	11.0	13.0	14.9	5.8	7.7	8.6	9.1	11.0	12.5
	40	9.1	12.0	13.0	14.4	16.8	19.2	7.7	10.1	11.0	12.0	14.4	16.3
	50	11.0	14.9	15.8	17.3	20.6	23.5	9.6	12.5	13.4	14.9	17.3	20.2
	60	13.0	17.3	19.2	20.6	24.0	27.8	11.0	14.9	16.3	17.8	20.6	24.0
First Story of Three Stories	10	3.8	5.3	5.8	6.2	7.2	8.2	3.4	4.3	4.8	5.3	6.2	7.2
	20	7.2	9.6	10.6	11.0	13.0	15.4	6.2	8.2	8.6	9.6	11.0	13.0
	30	10.1	13.4	14.9	16.3	18.7	22.1	8.6	11.5	12.5	13.9	16.3	18.7
	40	13.0	17.8	19.2	21.1	24.5	28.3	11.0	14.9	16.3	17.8	21.1	24.0
	50	16.3	21.6	23.5	25.9	30.2	35.0	13.9	18.2	20.2	22.1	25.4	29.8
	60	19.2	25.4	27.8	30.7	36.0	41.3	16.3	22.1	24.0	25.9	30.2	35.0

SI: 1 in = 25.4 mm, 1 mph = 1.61 km/h

1. Minimum ¾"-thick Thermo-Brace® Green SIB™ to be installed on 2x4 or 2x6 studs spaced 16" o.c. and fastened with staples spaced 3":3" (edge:field) per Section 6.
2. Demonstrates equivalency to [IRC Table R6 02.10.3\(1\)](#). All adjustment factors from [IRC Table R602.10.3\(2\)](#) 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. Minimum ½" gypsum wallboard must be installed as part of the wall assembly. 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.
6. Linear interpolation is permitted.

**Table 2.** Required Bracing Lengths for Thermo-Brace® Green SIB™ (R3 or R5; FPIS Inward) – Wind^{1,2,3,4,5,6}

Condition	Braced Wall Line Spacing (ft)	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line											
		Intermittent Sheathing						Continuous Sheathing					
		Ultimate Design Wind Speed, V_{ult} (mph)											
		< 95	≤ 110	≤ 115	≤ 120	≤ 130	≤ 140	< 95	≤ 110	≤ 115	≤ 12	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.7	2.3	2.3	2.8	2.8	3.4	1.7	1.7	2.3	2.3	2.8	2.8
	20	2.8	4.0	4.0	4.5	5.7	6.2	2.8	3.4	4.0	4.0	4.5	5.7
	30	4.5	5.7	6.2	68	7.9	9.0	4.0	5.1	5.1	5.7	6.8	7.9
	40	5.7	7.3	7.9	9.0	10.2	11.9	4.5	6.2	6.8	7.3	8.5	10.2
	50	6.8	9.0	10.2	10.7	12.4	14.7	5.7	7.9	8.5	9.0	10.7	12.4
	60	7.9	10.7	11.9	13.0	14.7	17.0	6.8	9.0	10.2	10.7	12.4	14.7
First Story of Two Stories or Second Story of Three Stories	10	3.4	4.0	4.5	5.1	5.7	6.8	2.8	3.4	4.0	4.0	5.1	5.7
	20	5.7	7.3	8.5	9.0	10.7	12.4	5.1	6.2	7.3	7.9	9.0	10.2
	30	7.9	10.7	11.9	13.0	15.3	17.5	6.8	9.0	10.2	10.7	13.0	14.7
	40	10.7	14.1	15.3	17.0	19.8	22.6	9.0	11.9	13.0	14.1	17.0	19.2
	50	13.0	17.5	18.6	20.3	24.3	27.7	11.3	14.7	15.8	17.5	20.3	23.7
	60	15.3	20.3	22.6	24.3	28.3	32.8	13.0	17.5	19.2	20.9	24.3	28.3
First Story of Three Stories	10	4.5	6.2	6.8	7.3	8.5	9.6	4.0	5.1	5.7	6.2	7.3	8.5
	20	8.5	11.3	12.4	13.0	15.3	18.1	7.3	9.6	10.2	11.3	13.0	15.3
	30	11.9	15.8	17.5	19.2	22.0	26.0	10.2	13.6	14.7	16.4	19.2	22.0
	40	15.3	20.9	22.6	24.9	28.8	33.3	13.0	17.5	19.2	20.9	24.9	28.3
	50	19.2	25.4	27.7	30.5	35.6	41.2	16.4	21.5	23.7	26.0	29.9	35.0
	60	22.6	29.9	32.8	36.2	42.4	48.6	19.2	26.0	28.3	30.5	35.6	41.2

SI: 1 in = 25.4 mm, 1 mph = 1.61 km/h

1. Minimum 3/4"-thick Thermo-Brace® Green SIB™ to be installed on 2x4 or 2x6 studs spaced 16" o.c. and fastened with staples spaced 3":3" (edge:field) per Section 6.
2. Demonstrates equivalency to [IRC Table R602.10.3\(1\)](#). All adjustment factors from [IRC Table R602.10.3\(2\)](#) shall be applied. Except when used with method CS-PF, a minimum of 1/2" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum of 5d cooler nails or 1 1/4" #6 types W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
3. Minimum 1/2" gypsum wallboard must be installed as part of the wall assembly. 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.
6. Linear interpolation is permitted.

5.3.3 Alternative to Prescriptive IRC Bracing Applications:

5.3.3.1 As an alternative to the requirements of Section 5.3.2 of this TER, the following provisions are permitted:

- 5.3.3.1.1 Thermo-Brace® Green 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.
- 5.3.3.1.2 Thermo-Brace® Green 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](#).
- 5.3.3.1.3 Required braced wall panel lengths for Thermo-Brace® Green SIB™ shall be as determined by the equivalency factors shown in Table 3 of this TER and [IRC Table R602.10.3\(1\)](#) and [IRC Table R602.10.3\(2\)](#), including all footnotes.
- 5.3.3.1.3.1 Bracing lengths in the IRC tables for the WSP or CS-WSP methods shall be multiplied by the equivalency factors listed in Table 3 below.

Table 3. Braced Wall Line Length Equivalency Factors⁷

Product ¹	Sheathing Direction ²	Fastener ⁸	Fastener Spacing (edge:field) (in)	Stud Spacing ³ (in)	Equivalency Factors ^{3,4,5,6} to IRC WSP or CS-WSP
Thermo-Brace® Green SIB™ R3	FPIS Outward	¹⁵ / ₁₆ " Crown x 1 ³ / ₄ " Leg 16 gauge Staples	3:3	16 o.c.	0.92
	FPIS Inward	1 ³ / ₄ " x 11 gauge Smooth Shank Roofing Nail	3:3	16 o.c.	1.09
Thermo-Brace® Green SIB™ R5	FPIS Outward	¹⁵ / ₁₆ " Crown x 2" Leg 16 gauge Staples	3:3	16 o.c.	0.96
	FPIS Inward	1 ³ / ₄ " x 11 gauge Ring Shank Roofing Nail	3:3	16 o.c.	1.13

SI: 1 in = 25.4 mm

1. Thermo-Brace® Green SIB™ to be a minimum ³/₄" thickness installed with staples or nails per Section 6.
2. Where the FPIS faces outward, fasteners may be countersunk beneath the surface of Thermo-Brace®. Where the FPIS faces inward, fasteners shall be driven flush with the face of Thermo-Brace®.
3. Factors based on SPF framing materials.
4. Multiply the bracing lengths indicated for the WSP or CS-WSP continuous sheathing methods in [IRC Table R602.10.3\(1\)](#) and [Table R602.10.3\(3\)](#) and as modified by all applicable factors in [IRC Table R602.10.3\(2\)](#) and [Table R602.10.3\(4\)](#) by the factors shown here to establish the required bracing length.
5. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.9.
6. These equivalency factors are valid for single top plate (advanced framing method) wall installations or double top plate wall installations.
7. 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.
8. Fasteners are minimum sizes.

5.3.3.1.3.2 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.

5.3.3.1.3.3 The length of bracing required shall be determined by multiplying the Thermo-Brace® Green SIB™ tested equivalency factors in Table 4 of this TER by the length indicated for the WSP or CS-WSP methods in [IRC Table R602.10.3\(1\)](#) and as modified by all applicable factors in [IRC Table R602.10.3\(2\)](#).

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

5.3.4 Prescriptive IBC Conventional Light-Frame Wood Construction:

- 5.3.4.1 Thermo-Brace® Green SIB™ may be used to brace exterior walls of buildings as an equivalent alternative to Method WSP of the IBC when installed with ½" gypsum in accordance with the conventional light-frame construction method of [IBC Section 2308.6](#) and this TER.

5.3.5 Performance-Based Wood-Framed Construction:

- 5.3.5.1 Thermo-Brace® Green 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.
- 5.3.5.2 Thermo-Brace® Green 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.

Table 4. Allowable Stress Design (ASD) Capacity – Wind

Product	Sheathing Direction	Fastener ^{1,3}	Maximum Fastener Spacing (edge:field) (in)	Maximum Stud Spacing (in)	Gypsum Wallboard (GWB)	GWB Fastener ² Spacing (edge:field) (in)	Allowable Unit Shear Capacity (plf)
Thermo-Brace® Green SIB™ R3	FPIS Outward	15/16" Crown x 1¾" Leg 16 gauge Staple	3:3	16 o.c.	None	-	290
					½"	8:8	450
	FPIS Inward	1¾" x 11 gauge (0.120" dia.) Smooth Shank Roofing Nail	3:3	16 o.c.	None	-	235
					½"	8:8	415
Thermo-Brace® Green SIB™ R5	FPIS Outward	15/16" Crown x 2" Leg 16 gauge Staple	3:3	16 o.c.	None	-	285
					½"	8:8	470
	FPIS Inward	1¾" x 11 gauge (0.120" dia.) Ring Shank Roofing Nail	3:3	16 o.c.	None	-	225
					½"	8:8	405

SI: 1 in = 25.4 mm, 1 lb/ft = 0.0146 kN/m

1. Fasteners are to be installed with the crown parallel to the framing. Fastener edge distance shall be a minimum of 3/8". Set fastener depth on driving tools to the maximum depth.

2. Gypsum wallboard attached with minimum #6 type W or S screws 1¼" long.

3. Fasteners are minimum sizes.

5.4 Water-Resistive Barrier

- 5.4.1 Thermo-Brace® Green SIB™ may be used as a WRB in accordance with ASTM E331 and as prescribed in [IBC Section 1403.2¹¹](#) and [IRC Section R703.2](#) when installed on exterior walls as described in this section.
- 5.4.2 Thermo-Brace® Green SIB™ installed with the Neopor® FPIS facing inward or outward is approved as a WRB provided the following conditions are met:
- 5.4.2.1 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 6.4.
- 5.4.2.2 All seams and joints between boards shall be covered by Barricade® Seam Tape or equivalent after fasteners are installed.
- 5.4.2.3 Flashing must be installed at all sheathing penetrations and shall comply with all applicable code sections.

¹¹ 2015 IBC Section 1404.2

- 5.4.3 When Thermo-Brace® Green 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 installation instructions.

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

5.5 Air Barrier

- 5.5.1 Thermo-Brace® Green SIB™ may be used as an air barrier material as prescribed in IRC Section N1102.4.1.1, IECC Section R402.4.1.1 and IECC Section C402.5.1 in accordance with ASTM E2178.

5.6 Minimum Fastening Requirements for Non-Structural Applications

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

5.6.1.1 The sheathing panels shall be applied to wall framing with 16 gauge, galvanized staples having a minimum $1\frac{5}{16}$ " 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.

5.6.1.2 Fastener spacing shall be a maximum of 3" o.c. in the field and 3" o.c. around the perimeter.

5.6.1.3 Stud spacing shall be a maximum of 16" o.c. (406 mm).

5.6.1.4 Minimum fastener penetration into the framing members shall be 1" for the R3 product and $\frac{3}{4}$ " for the R5 product.

5.6.1.5 All staples shall be fastened parallel to the framing member with a minimum edge spacing of $\frac{3}{8}$ " (9.5 mm).

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

- 5.7 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

6 Installation

- 6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER and the applicable building code.

- 6.2 In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.

6.3 Orientation

- 6.3.1 Thermo-Brace® Green SIB™ and PermaBrace Green 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 blocks.

- 6.3.2 Thermo-Brace® Green SIB™ Guard and PermaBrace Green SIB™ Guard must be installed vertically, centered on the corner of the building. To be recognized as a water barrier, all joints must be backed by studs, plates, or blocks and fastened in accordance with Section 6.6.

6.4 Fastener Type

6.4.1 Staples for Installation with FPIS Facing Outward:

- 6.4.1.1 For R3 Thermo-Brace® Green SIB™, minimum $\frac{15}{16}$ " crown by $1\frac{3}{4}$ " leg, 16 gauge galvanized staples shall be installed per the staple manufacturer instructions.
- 6.4.1.2 For R5 Thermo-Brace® Green SIB™, minimum $\frac{15}{16}$ " crown by 2" leg, 16 gauge galvanized staples shall be installed per the staple manufacturer instructions.
- 6.4.1.3 Fasteners shall be driven such that the head of the fasteners slightly overdriven beneath the surface of the Thermo-Brace® Green SIB™.

6.4.2 Nails for Installation with FPIS Facing Inward:

- 6.4.2.1 For R3 Thermo-Brace® Green SIB™, minimum $1\frac{3}{4}$ " x 11 gauge smooth shank roofing nails shall be installed per the nail manufacturer instructions.
- 6.4.2.2 For R5 Thermo-Brace® Green SIB™, minimum $1\frac{3}{4}$ " x 11 gauge ring shank roofing nails shall be installed per the nail manufacturer instructions.
- 6.4.2.3 Fasteners shall be driven such that the head of the fasteners are flush with the surface of the Thermo-Brace® Green SIB™. Do not overdrive fasteners.

6.4.3 Gypsum Wallboard:

- 6.4.3.1 Where required, interior gypsum wallboard shall be a minimum $\frac{1}{2}$ " thickness and shall be attached, at a minimum, with one of the following:
 - 6.4.3.1.1 #6 x $1\frac{1}{4}$ " type W or S screws
 - 6.4.3.1.2 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® Green SIB™ and gypsum.

6.6 Treatment of Joints

6.6.1 Thermo-Brace® Green 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 manufacturer installation instructions for use as a WRB. Alternately, a separate WRB may be installed.

- 6.6.2 Thermo-Brace® Green 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 installation instructions.

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 in accordance with ASTM E564
- 7.1.2 Water-resistive barrier testing in accordance with ASTM E331
- 7.1.3 Air barrier material testing in accordance with ASTM E2178

- 7.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 7.3 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 7.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.
- 7.5 Testing and engineering analysis: The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.¹²
- 7.6 Where additional condition of use and/or code compliance information is required, please search for Thermo-Brace® Green SIB™ on the DrJ Certification website.

8 Findings

- 8.1 As delineated in Section 3, Thermo-Brace® Green SIB™ have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, Thermo-Brace® Green SIB™ shall be approved for the following applications:
- 8.2.1 Lateral load resistance due to wind loads carried by shear walls
 - 8.2.2 Performance of foam plastics in accordance with IBC Section 2603 and IRC Section R316
 - 8.2.3 Performance for use as a WRB in accordance with IBC Section 1403.2¹³ and IRC Section R703.2
 - 8.2.4 Performance for use as an air barrier material as prescribed in IRC Section N1102.4.1.1, IECC Section R402.4.1.1 and IECC Section C402.5.1 in accordance with ASTM E2178.
- 8.3 Unless exempt by state statute, when the Thermo-Brace® Green SIB™ is to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 8.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from INDEVCO Building Products.

¹² See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

¹³ 2015 IBC Section 1404.2

8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10¹⁴ are similar) in pertinent part states:

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. 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.

- 8.6 **Approved:**¹⁵ Building codes require that the building official shall accept duly authenticated reports¹⁶ or research reports¹⁷ from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.
- 8.6.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
- 8.6.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 8.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved, as denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.
- 8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “*certified once, accepted everywhere.*” IAF specifically says, “*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.*”¹⁸

9 Conditions of Use

- 9.1 Material properties shall not fall outside the boundaries defined in Section 3.
- 9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 9.3 As listed herein, Thermo-Brace® Green SIB™ shall not be used:
- 9.3.1 As a nailing base for claddings, trim, windows, or doors. Fastening through the Thermo-Brace® Green SIB™ into the framing is acceptable.
- 9.3.2 To resist horizontal loads from concrete and masonry walls.
- 9.4 When used as part of a continuous air barrier assembly, all sheathing panel edges at the top and bottom of the wall assemblies and all joints between sheathing panels shall be sealed with an approved construction tape.

¹⁴ 2018 IFC Section 104.9

¹⁵ Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

¹⁶ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

¹⁷ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>

¹⁸ <https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise>

- 9.5 When Thermo-Brace® Green 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 5.4 of this TER.
- 9.5.1 When Thermo-Brace® Green SIB™ is not installed as a WRB, other means of providing a WRB are code required.
- 9.6 When used in accordance with the IBC in high wind areas, special inspections shall comply with IBC Section 1705.11. When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
- 9.6.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when requirements of adopted legislation are met.
- 9.6.2 This TER and the installation instructions shall be submitted at the time of permit application.
- 9.6.3 These products have an internal quality control program and a third-party quality assurance program.
- 9.6.4 At a minimum, these products shall be installed per Section 6 of this TER.
- 9.6.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.
- 9.6.6 These products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
- 9.6.7 The application of these products in the context of this TER is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 9.7 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
- 9.7.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when requirements of adopted legislation are met.
- 9.7.2 This TER and the installation instructions shall be submitted at the time of permit application.
- 9.7.3 These products have an internal quality control program and a third-party quality assurance program.
- 9.7.4 At a minimum, these products shall be installed per Section 6 of this TER.
- 9.7.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.
- 9.7.6 These products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
- 9.7.7 The application of these products in the context of this TER is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 9.8 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, *"the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.11", all of IBC Section 104, and IBC Section 105.4.*
- 9.9 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 9.10 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.



10 Identification

- 10.1 The products listed in Section 1.1 through Section 1.4 are identified by a label on the board or packaging material bearing the manufacturer name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at indevconorthamerica.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 status of this TER, contact [DrJ Certification](#).

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 12.1 Thermo-Brace® Green Structural Insulated Board (SIB™), Thermo-Brace® Green SIB™ Guard, PermaBrace Green SIB™ and PermaBrace Green SIB™ Guard are included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER meets the legislative intent and definition of being acceptable to the AHJ.

Appendix A

1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
 - 1.1.1 Advance Innovation,
 - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
 - 1.1.3 Benefit consumers through lower prices, better quality, and greater choice.
- 1.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize Thermo-Brace® Green SIB™ to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
 - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to “protect economic freedom and opportunity by promoting free and fair competition in the marketplace.”
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation, and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2018 (DTSA).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials¹⁹ that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.²⁰
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence, provided in writing, that specific legislation has been violated by an individual registered PE.
 - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.²¹

¹⁹ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

²⁰ IBC 2021, Section 1706.1 Conformance to Standards

²¹ IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

- 1.3 **Approved²² Gby Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.²³ The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.²⁴
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed²⁵ an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement²⁶ (i.e., ANAB, International Accreditation Forum (IAF), etc.).

²² See Section 8 for the distilled building code definition of Approved

²³ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

²⁴ <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>

²⁵ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

²⁶ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).
- 1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.
- 1.8 **Approved by New Jersey:** Pursuant to Building Code 2018 of New Jersey in IBC Section 1707.1 General,²⁷ it states: “In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)”.²⁸ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide “reports of engineering findings”.

²⁷ https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

²⁸ <https://www.nj.gov/dca/divisions/codes/codereg/ucc.html>

- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14²⁹ and Part 3280,³⁰ the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) “All construction methods shall be in conformance with accepted engineering practices”; 2) “The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.”; and 3) “The design stresses of all materials shall conform to accepted engineering practice.”
- 1.10 **Approval by US, Local, and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.³¹
 - 1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards...the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.³² A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum³³ or equivalent.
 - 1.10.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.³⁴ An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.
- 1.11 **Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,
 - 1.11.2 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
 - 1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

²⁹ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

³⁰ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

³¹ IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

³² IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

³³ Please see the ANAB directory for building official approved agencies.

³⁴ IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.



- 1.11.4 **Approved:** The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.