

Technical Evaluation Report™

TER 1608-04

Brace-Plate™

Fibre Converters, Inc.

Product:

Brace-Plate™

Issue Date:

September 21, 2016

Revision Date:

August 21, 2023

Subject to Renewal:

October 1, 2024



Use the QR code to access the most recent version or a sealed copy of this Technical Evaluation Report (TER) at drjcertification.org.



COMPANY
INFORMATION:

ADDITIONAL
LISTEES:

Fibre Converters, Inc.
1 Industrial Dr
Constantine, MI 49042-8735

P: 269-279-1700

fibreconverters.com

National Shelter Products, Inc
50 SE Bush St
Issaquah, WA 98027-3807

P: 425-557-7968

nationalshelter.com

support@nationalshelter.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 12 19 - Shear Wall Panels

SECTION: 06 12 00 - Structural Panels

SECTION: 06 16 00 - Sheathing

1 Innovative Product Evaluated^{1,2}

1.1 Brace-Plate™

2 Applicable Codes and Standards^{3,4}

2.1 Codes

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

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

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.

3 Performance Evaluation

- 3.1 Tests, 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 at 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).
- 3.3 Brace-Plate™ was evaluated to determine:
 - 3.3.1 Structural performance under lateral load conditions (wind) for use as an alternative to the IRC Intermittent Wall Bracing provisions of IRC Section R602.10 Method WSP (Wood Structural Panels).
 - 3.3.2 Structural performance under lateral load conditions for use as an alternative to the IRC Continuous Wall Bracing provisions of IRC Section R602.10.4 Method CS-WSP (Continuous Sheathing – Wood Structural Panels).
 - 3.3.3 Structural performance under lateral load conditions for use as an alternative to the IBC Conventional Wall Bracing provisions, IBC Section 2308.6, Method 3, for Type V construction.
 - 3.3.4 Structural performance under lateral load conditions for wind loading for use with the IBC performance-based provisions, IBC Section 2306.1 and IBC Section 2306.3 for light-frame wood wall assemblies.
 - 3.3.5 Structural performance under lateral load conditions for use as an alternative to SDPWS Section 4.3 Wood Frame Shear Walls.
- 3.4 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 qualified⁸ to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.
- 3.5 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope, which are also its areas of professional engineering competence.
- 3.6 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

- 4.1 Brace-Plate™, pictured in Figure 1, is a proprietary application of ThermoSheath™ and DRYline TSX® sheathing brands manufactured by Fibre Converters, Inc. The proprietary application consists of ThermoSheath™ combined with Polyisocyanurate Rigid Foam Insulation (polyiso) or Extruded Polystyrene Rigid Foam Insulation (XPS).

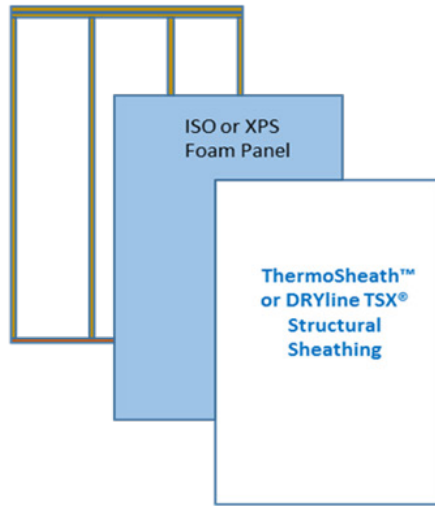
⁵ <https://www.law.cornell.edu/uscode/text/18/part-II/chapter-90>. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit 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.

⁸ 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.

Brace Plate Installation



1. **Framing**
 - 16" On-center stud spacing
 - Studs/Plates: nominal 2" x 4"
 - Framing fasteners: Typical
2. **ISO or XPS Foam panels**
Mechanically fasten ISO or XPS Foam panel securely against framing with enough fasteners to secure to framing (Do not pin the corners).
3. **Structural ThermoSheath™ or DRYline TSX® Sheathing**
Install the ThermoSheath™ or DRYline TSX® Sheathing over the top of the Foam Panels with 1 3/4" ring-shank Galvanized Coil roofing nails. Seat the nail head flush with the Sheathing surface, ensuring that the nail shank is embedded into the framing. Fasten the nails 3" on-center, a minimum of 3/8" from the edge of the sheathing.

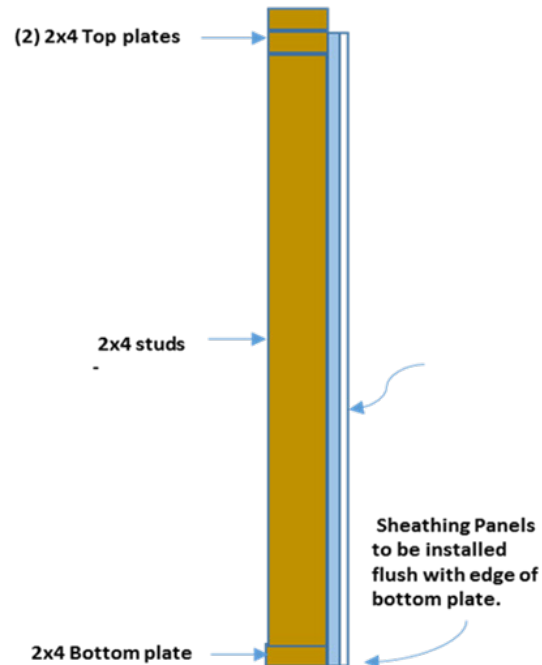
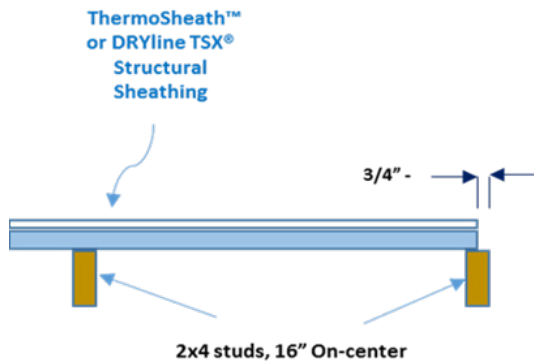


Figure 1. Brace-Plate™ Structural Sheathing

4.1.1 Brace-Plate™ described in this TER and shown in Figure 1 contains a combination of the following materials:

4.1.1.1 Fibre Converters Red or Blue ThermoSheath™ or DRYline TSX®

4.1.1.2 One of the following insulation products:

4.1.1.2.1 3/4" or thinner Rmax® ThermoSheath® Foam Plastic Insulating Sheathing (FPIS)

4.1.1.2.2 1" or thinner Dow® STYROFOAM™ Brand (Square Edge or Tongue and Groove) XPS

4.1.2 *Material Availability:*

4.1.2.1 Standard product width: 48" (1219 mm) or 48 3/4" (1238 mm)

4.1.2.2 Standard lengths: 96" (2438 mm), 108" (2743 mm), 120" (3048 mm), and other sizes are available by request.

5 Applications

5.1 General

5.1.1 Brace-Plate™ is used as wall sheathing in buildings constructed in accordance with the IRC and IBC for light frame wood construction.

5.1.2 Brace-Plate™ is used as structural wall sheathing to provide lateral load resistance (wind) for braced wall panels used in light-frame wood construction.

5.1.3 Brace-Plate™ panels are permitted to be used as wall sheathing in buildings constructed in accordance with the IBC requirements for Type V light-frame construction.

5.2 Structural Applications

5.2.1 General Structural Provisions

5.2.1.1 Except as otherwise described in this TER, Brace-Plate™ shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth herein for the design and installation of WSP.

5.2.1.1.1 Brace-Plate™ is permitted to be designed in accordance with SDPWS for the design of shear walls using the methods set forth therein, including the perforated shear wall methodology, and subject to the SDPWS boundary conditions, except as specifically allowed in this TER.

5.2.1.2 Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall.

5.2.1.2.1 For wind design, anchor bolt spacing shall not exceed 6' o.c. (1829 mm).

5.2.1.3 The maximum aspect ratio for Brace-Plate™ shall be 4:1.

5.2.1.4 The minimum full height panel width shall be 24" (610 mm).

5.2.1.5 All panel edges shall be blocked with a minimum 2" (51 mm) nominal lumber.

5.2.1.6 Installation is permitted for single top plate (advanced framing method) or double top plate applications.

5.2.2 Prescriptive IRC Bracing Applications

5.2.2.1 The following provisions are permitted:

5.2.2.1.1 Brace-Plate™ may be used on braced wall lines as an equivalent alternative to Method WSP of the IRC, when installed in accordance with [IRC Section R602.10](#) and this TER.

5.2.2.1.2 Brace-Plate™ may be used to brace walls of buildings as an alternative to the Continuous Wall Bracing provisions of [IRC Section R602.10.4](#).

- 5.2.2.1.3 Required braced wall panel lengths for Brace-Plate™ shall be as determined by the equivalency factor shown in Table 1 and IRC Table R602.10.3(1) and IRC Table R602.10.3(2), including all footnotes. Brace-Plate™ tested equivalency factors in Table 1 allow the user to determine the length of bracing required by multiplying the factor from Table 1 by the length shown in the WSP or CS columns in IRC Table R602.10.3(1), as modified by all applicable factors in IRC Table R602.10.3(2).

Table 1. Brace-Plate™ Braced Wall Line Length Equivalency Factors
Based on Equivalency Testing for Use with the IRC

Products ^{2,3}	Maximum Stud Spacing (in)	Fastener Type	Fastener Spacing	Wind
				SPF Framing
				Brace-Plate™ Tested Equivalency Factors ¹ to IRC WSP or CS-WSP
Brace-Plate™ (Blue ThermoSheath™ or Blue DRYline TSX® installed over 3/4" or thinner Rmax Thermasheath® or 1" or thinner Dow® STYROFOAM™ Square Edge or Tongue and Groove Foam)	16 o.c.	1 3/4" x 0.120" Ring Shank Galvanized Roofing Nail	3:3	0.98
Brace-Plate™ (Red ThermoSheath™ or Red DRYline TSX® installed over 1/2" or thinner Rmax Thermasheath®)	16 o.c.	1 3/4" x 0.120" Ring Shank Galvanized Roofing Nail	3:3	1.02

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

1. Demonstrates equivalency to IRC Table R602.10.3(1). All adjustment factors from IRC Table R602.10.3(2) shall be applied. A minimum of 1/2" gypsum sheathing shall be applied to the interior side of the wall assembly and fastened with a minimum 5d cooler nails or #6 x 1 1/4" Type W or S screws spaced 8" o.c. at panel edges and 8" o.c. in the field of the panels.
2. Brace-Plate™ attached with 1 3/4" x 0.120 ring shank galvanized roofing nail. Fasteners are to be spaced a maximum of 3" o.c. at the edges and 3" o.c. in the field with a minimum edge distance of 3/8".
3. Brace-Plate™ joints shall be butted at framing members, and a single row of fasteners must be applied to each panel framing.

- 5.2.2.1.3.1 These braced wall line length equivalency factors are based on equivalency testing and are used to comply with Method WSP and CS-WSP of the IRC.

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

- 5.2.2.1.5 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

5.2.3 Performance-Based Wood-Framed Construction

- 5.2.3.1 Brace-Plate™ 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 2.
- 5.2.3.2 Brace-Plate™ panel shear walls are permitted to resist horizontal wind load forces using the allowable shear loads (in pounds per linear foot) set forth in Table 2.

Table 2. Allowable Unit Shear Design Values for Brace-Plate™ Structural Sheathing - Wind

Brace-Plate™ Design Values ³	Brace-Plate™ Fastener ¹ (Spaced 3":3" o.c. edge:field)	Maximum Stud Spacing (in)	Gypsum Wallboard ² (GWB)	Gypsum Wallboard Fastener Spacing (edge:field) (in)	Allowable Unit Shear Capacity (plf)
Brace-Plate™ (Blue ThermoSheath™ or Blue DRYline TSX® over 3/4" or thinner Rmax ThermoSheath® Foam)	1 3/4" x 0.120 Ring Shank Galvanized Roofing Nail	16	1/2" GWB	8:8	400
Brace-Plate™ (Blue ThermoSheath™ or DRYline TSX® over 1" or thinner Dow® STYROFOAM™ SE or Tongue and Groove Insulation)	1 3/4" x 0.0120 Ring Shank Galvanized Roofing Nail	16	1/2" GWB	8:8	395
Brace-Plate™ (Red ThermoSheath™ or DRYline TSX® over 1/2" or thinner Rmax ThermoSheath® Foam)	1 3/4" x 0.120 Ring Shank Galvanized Roofing Nail	16	1/2" GWB	8:8	375

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

- Brace-Plate™ attached with 1 3/4" x 0.120 ring shank galvanized roofing nail. Fasteners are to be spaced a maximum of 3" o.c. at the edges and 3" o.c. in the field with a minimum edge distance of 3/8".
- Gypsum attached with minimum 5d cooler nail or #6 x 1 1/4" Type W or S screws. Fastener spacing shall be as required above.
- Brace-Plate™ joints shall be butted at framing members, and a single row of fasteners must be applied to each panel edge into the stud below.

- 5.3 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

- Installation shall comply with the approved construction documents, the manufacturer installation instructions, this TER and the applicable building code.
- In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.
- A copy of the manufacturer published installation instructions shall be available at all times on the jobsite during installation.
- Orientation**
 - Brace-Plate™ must be installed vertically or horizontally with all panel edges supported by framing or blocking.
 - Brace-Plate™ must be installed over studs with framing that has a nominal thickness of not less than 2" (51 mm) and a spacing of not more than 16" (406 mm) o.c.
- Fastener Type**
 - Brace-Plate™:**
 - Minimum 0.120" x 1 3/4" (3 mm x 44 mm) ring shank galvanized roofing nail installed with the underside of the head flush with the surface of the sheathing.



6.5.2 Gypsum Wallboard:

6.5.2.1 Gypsum wallboard shall be installed with a minimum:

6.5.2.1.1 #6 x 1¹/₄" (32 mm) Type W or S screws

6.5.2.1.2 5d cooler nails

6.6 Fastener Spacing

6.6.1 Brace-Plate™:

6.6.1.1 Maximum of 3" o.c. (76 mm) along the edge and 3" o.c. in the field.

6.6.2 Gypsum Wallboard:

6.6.2.1 For IRC and IBC prescriptive applications, gypsum fasteners shall be spaced 8" (203 mm) o.c. at panel edges and 8" o.c. at intermediated framing. For engineered design, see Table 2.

6.7 Fastener Edge Distance

6.7.1 Fastener edge distance is a minimum of ³/₈" (10 mm) for both Brace-Plate™ and gypsum.

6.8 Treatment of Joints

6.8.1 Brace-Plate™ joints shall be butted at framing members, and a single row of fasteners must be applied to each panel edge into the stud below.

6.8.2 Do not tack Brace-Plate™ to framing but fasten each panel completely once fastening begins.

7 Substantiating Data

7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

7.1.1 Lateral load testing in accordance with ASTM E564

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.⁹

7.6 Where additional condition of use and/or code compliance information is required, please search for Brace-Plate™ on the DrJ Certification website.

⁹ See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

8 Findings

- 8.1 As delineated in Section 3, Brace-Plate™ has 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, Brace-Plate™ shall be approved for the following applications:
- 8.2.1 Lateral load resistance due to wind loads carried by shear walls
- 8.3 Unless exempt by state statute, when the Brace-Plate™ 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 Fibre Converters, Inc.
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10¹⁰ 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:**¹¹ Building codes require that the building official shall accept duly authenticated reports¹² or research reports¹³ 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 Acceptance 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 Acceptance 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.*”¹⁴

¹⁰ 2018 IFC Section 104.9

¹¹ 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.

¹² <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

¹³ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>

¹⁴ <https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise>

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, Brace-Plate™ shall not be used:
 - 9.3.1 As a nailing base
 - 9.3.2 To resist horizontal loads from concrete and masonry walls
- 9.4 When Brace-Plate™ is not installed for use as wall bracing, as described in this TER, the walls shall be braced by other materials in accordance with the applicable code.
- 9.5 When used in accordance with the IBC in high wind areas, special inspections shall comply with [IBC Section 1705.12](#).¹⁵
- 9.6 Loads applied shall not exceed those recommended by the manufacturer as follows:
 - 9.6.1 Allowable shear loads do not exceed values in Table 2 for wind loads.
- 9.7 The manufacturer installation instructions shall be available on the jobsite for inspection.
- 9.8 All panel edges shall be supported by wall framing or solid blocking a minimum of 2" (51 mm) nominal in thickness.
- 9.9 Brace-Plate™ is manufactured in Constantine, Michigan, under a quality control program with quality control inspections in accordance with [IRC Section R109.2](#), [IBC Section 110.3.10](#)¹⁶ and [IBC Section 110.4](#).
- 9.10 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:
 - 9.10.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an [approved source](#), shall be approved when signed and sealed.
 - 9.10.2 This TER and the installation instructions shall be submitted at the time of [permit](#) application.
 - 9.10.3 This innovative product has an internal quality control program and a third-party quality assurance program.
 - 9.10.4 At a minimum, this innovative product shall be installed per Section 6 of this TER.
 - 9.10.5 The review of this TER, by the AHJ, shall be in compliance with [IBC Section 104](#) and [IBC Section 105.4](#).
 - 9.10.6 This innovative product has 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](#).
 - 9.10.7 The application of this innovative product 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.
- 9.11 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](#).
- 9.12 [Design loads](#) shall be determined in accordance with the building code adopted by the [jurisdiction](#) in which the project is to be constructed and/or by the building designer (i.e., [owner](#) or RDP).
- 9.13 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.

¹⁵ [2018 IBC Section 1705.11](#)

¹⁶ [2018 IBC Section 110.3.9](#), [2015 IBC Section 110.3.8](#)



10 Identification

- 10.1 The innovative product listed in Section 1.1 is 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 fibreconverters.com or nationalshelter.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 Brace-Plate™ is 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 Brace-Plate™ 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 2016 (DTSA),¹⁷ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years¹⁸ and/or a \$5,000,000 fine or 3 times the value of¹⁹ the Intellectual Property (IP) and Trade Secrets (TS).
 - 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 materials²⁰ 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.²¹
 - 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 104.11.²²

¹⁷ <http://www.drjengineering.org/AppendixC> and <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>.

¹⁸ <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>

¹⁹ <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>

²⁰ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

²¹ IBC 2021, Section 1706.1 Conformance to Standards

²² IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

- 1.3 **Approved²³ by 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.²⁴ 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 1707.1.²⁵
- 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 deemed²⁶ 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 agreement²⁷ (i.e., ANAB, International Accreditation Forum (IAF), etc.).
- 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).

²³ See Section 8 for the distilled building code definition of Approved

²⁴ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

²⁵ https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

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

²⁷ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

- 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](#),²⁸ 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 \(N.J.A.C. 5:23\)](#)”.²⁹ 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”.
- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, [Part 3282.14](#),³⁰ and [Part 3280](#),³¹ 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.³²
- 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](#).³³ A building official [approved agency](#) is deemed to be approved via certification from an [accreditation body](#) that is listed by the [International Accreditation Forum](#)³⁴ or equivalent.

²⁸ https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

²⁹ <https://www.nj.gov/dca/divisions/codes/codereg/ucc.html>

³⁰ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

³¹ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

³² [IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials](#). Adopted law pursuant to IBC model code language 1706.2.

³³ [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#). Adopted law pursuant to IBC model code language 1707.1.

³⁴ Please see the [ANAB directory](#) for building official approved agencies.

- 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.³⁵ 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.
 - 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.

³⁵ IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.