



Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2304-01



Issue Date: April 7, 2023

Revision Date: June 9, 2025

Subject to Renewal: July 1, 2026

DRYline® TSX+ Red Structural Sheathing

Trade Secret Report Holder:

Fibre Converters, Inc.

PO Box 130
Constantine, MI 49042-0130
Phone: 269-279-1700
Email: sales@fibreconverters.com
Website: www.fibreconverters.com

Additional Listee:

National Shelter Products, Inc.
50 SE Bush St
Issaquah, WA 98027-3807
Phone: 425-557-7968
Email: support@nationalshelter.com
Website: www.nationalshelter.com

CSI Designations:

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

Section: 07 27 00 - Air Barriers

1 Innovative Product Evaluated¹

1.1 DRYline TSX+ Red Structural Sheathing

2 Product Description and Materials

2.1 The innovative product evaluated in this report is shown in **Figure 1**.



Figure 1. DRYline TSX+ Red Structural Sheathing



2.2 DRYline TSX+ Red Structural Sheathing is a proprietary wall sheathing consisting of a proprietary fibrous sheathing board laminated with a water-resistance adhesive to facers on one or both sides. Facers may consist of aluminum foil, polyolefin film, aluminized polyolefin or kraft paper.

2.3 Material Availability

2.3.1 Thickness:

2.3.1.1 0.108" (2.67 mm)

2.3.2 Standard Product Width:

2.3.2.1 48" (1,219 mm)

2.3.2.2 48³/₄" (1,238 mm)

2.3.3 Standard Lengths:

2.3.3.1 96" (2,438 mm)

2.3.3.2 108" (2,743 mm)

2.3.3.3 120" (3,048 mm)

2.3.4 Other sizes are available by request.

2.4 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.

3 Definitions²

3.1 New Materials³ are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.⁴ The design strength and permissible stresses shall be established by tests⁵ and/or engineering analysis.⁶

3.2 Duly authenticated reports⁷ and research reports⁸ are test reports and related engineering evaluations that are written by an approved agency⁹ and/or an approved source.¹⁰

3.2.1 These reports utilize intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.U.S.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).¹¹

3.3 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.

3.4 An approved source is "approved" when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.¹²

3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.

3.5.1 The Center for Building Innovation (CBI) is ANAB¹³ ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce¹⁴ the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing¹⁵ stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.¹⁶



- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.¹⁷ Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,¹⁸ and can be used in any country that is an MLA signatory found at this link: <https://iaf.nu/en/recognised-abs/>
- 3.9 Approval equity is a fundamental commercial and legal principle.¹⁹

4 Applicable Local, State, and Federal Approvals; Standards; Regulations²⁰

4.1 Local, State, and Federal

- 4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes the following featured local jurisdictions and is not limited to: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, Texas Department of Insurance, and Wichita.²¹
- 4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes the following featured states, and is not limited to: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.²²
- 4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14²³ and Part 3280²⁴ pursuant to the use of ISO/IEC 17065 duly authenticated reports.
- 4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 Standards

- 4.2.1 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*
- 4.2.2 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
- 4.2.3 *ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels*
- 4.2.4 *ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*
- 4.2.5 *ASTM E96: Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials*
- 4.2.6 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*
- 4.2.7 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*
- 4.2.8 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 4.3 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:
- 4.3.1 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
- 4.3.2 *ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels*
- 4.3.2.1 ASTM D7989 is accepted engineering practice used to establish Seismic Design Coefficients (SDC).
- 4.3.2.2 Tested data generated by ISO/IEC 17025 approved agencies and/or professional engineers, which use ASTM D7989 as their basis, are defined as intellectual property and/or trade secrets.



4.3.2.3 All professional engineering evaluations are defined as an independent design review (i.e., listings, certified reports, duly authenticated reports from approved agencies, and/or research reports, are prepared independently by approved agencies and/or approved sources, when signed and sealed by licensed professional engineer pursuant to registration law.

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

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

4.4 Regulations

4.4.1 *IBC – 15, 18, 21, 24: International Building Code®*

4.4.2 *IRC – 15, 18, 21, 24: International Residential Code®*

4.4.3 *IECC – 15, 18, 21, 24: International Energy Conservation Code®*

4.4.4 *FBC-B—20, 23: Florida Building Code – Building²⁵*

4.4.5 *FBC-R—20, 23: Florida Building Code – Residential²⁵*

5 Listed²⁶

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), an approved agency (i.e., CBI and DrJ), and/or an approved source (i.e., DrJ), or other organization(s) concerned with product evaluation (i.e., DrJ), that maintains periodic inspection (i.e., CBI) 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.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 General

- 6.1.1 DRYline TSX+ Red Structural Sheathing is used as wall sheathing in buildings constructed in accordance with the IRC and IBC for light-frame wood construction.
- 6.1.2 DRYline TSX+ Red Structural Sheathing is used as structural wall sheathing to provide lateral load resistance (wind and seismic) for braced wall panels used in light-frame wood construction.
- 6.1.3 DRYline TSX+ Red Structural Sheathing panels are permitted to be used as wall sheathing in buildings constructed in accordance with the IBC requirements for Type V light-frame construction.
- 6.1.4 DRYline TSX+ Red Structural Sheathing panels are used as structural wall sheathing to provide resistance to transverse loads for wall assemblies used in light-frame wood construction.
- 6.1.5 DRYline TSX+ Red Structural Sheathing is used to provide resistance to uplift loads for wall assemblies used in light-frame wood construction.
- 6.1.6 DRYline TSX+ Red Structural Sheathing is used as a non-structural wall sheathing applied as infill to portions of walls that are not designed as shear walls.
- 6.1.7 DRYline TSX+ Red Structural Sheathing is an approved alternative WRB in accordance with IBC Section 1403.2²⁷ and IRC Section R703.2 when installed in accordance with **Section 6.3** and **Section 9**.
- 6.1.8 DRYline TSX+ Red Structural Sheathing is an approved air barrier material when it is installed in accordance with **Section 6.4** and **Section 9**.



6.2 Structural Applications

6.2.1 General Structural Provisions:

- 6.2.1.1 Except as otherwise described in this report, DRYline TSX+ Red Structural Sheathing shall be installed in accordance with the applicable building codes listed in **Section 4** using the provisions set forth herein for the design and installation of Wood Structural Panels (WSP).
 - 6.2.1.1.1 DRYline TSX+ Red Structural Sheathing is permitted to be designed in accordance with ANSI/AWC SDPWS for the design of shear walls using the methods set forth therein. This includes the perforated shear wall methodology and is subject to the ANSI/AWC SDPWS boundary conditions, except as specifically allowed in this report.
- 6.2.1.2 Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall.
 - 6.2.1.2.1 For wind design, anchor bolt spacing shall not exceed 6' o.c. (1,829 mm).
 - 6.2.1.2.2 For seismic design, anchor bolt spacing shall not exceed 4' o.c. (1,219 mm).
- 6.2.1.3 The maximum aspect ratio for DRYline TSX+ Red Structural Sheathing shall be 4:1.
- 6.2.1.4 The minimum full height panel width shall be 24" (610 mm).
- 6.2.1.5 All panel edges shall be supported with a minimum 2" (51 mm) nominal lumber.
- 6.2.1.6 Staples shall have a minimum 16-gauge, ¹⁵/₁₆" crown and penetrate a minimum of 1" into the stud.
- 6.2.1.7 Installation is permitted for single top plate (advanced framing method) or double top plate applications.
 - 6.2.1.7.1 Top plate shall be designed in accordance with IBC Section 2308.9.2²⁸ or IRC Section R602.3.2.
- 6.2.1.8 Where the sheathing from an upper story extends over the rim joist and overlaps a lower story, the sheathing shall be fastened along the sole plate of the story above at 3" o.c. Further, one row of fasteners spaced 12" o.c. shall be located along the bottom third of the rim joist. The sheathing from the story above shall overlap the sheathing on the story below by a minimum of 2". Fastening along the bottom edge of the sheathing from the story above is not required.
- 6.2.1.9 When an I-Joist is used as the rim joist and where the sheathing from an upper story extends over the rim joist and overlaps a lower story, the sheathing shall be fastened along the sole plate of the story above at 3" o.c. Further, one row of fasteners spaced 12" o.c. shall be located along the bottom flange of the rim joist or along the top plate of the lower story. The sheathing from the story above shall overlap the sheathing on the story below by a minimum of 2".

6.2.2 Prescriptive IRC Bracing Applications:

- 6.2.2.1 DRYline TSX+ Red Structural Sheathing 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 report.
- 6.2.2.2 For wind design, required braced wall panel lengths for DRYline TSX+ Red Structural Sheathing shall be as shown in **Table 1**, and shall be used in conjunction with IRC Table R602.10.3(2), which provides the required adjustments.
- 6.2.2.3 For seismic design, required braced wall panel lengths for DRYline TSX+ Red Structural Sheathing shall be as shown in **Table 2**, and shall be used in conjunction with IRC Table R602.10.3(4), which provides the required adjustments.
- 6.2.2.4 Use of DRYline TSX+ Red Structural Sheathing with Method CS-PF is permitted in accordance with **Section 6.2.3** in lieu of WSP specified in accordance with IRC Section R602.10.6.4.



- 6.2.2.5 Use of DRYline TSX+ Red Structural Sheathing with Method PFH is permitted in accordance with **Section 6.2.4** in lieu of WSP specified in accordance with IRC Section R602.10.6.4.
- 6.2.2.6 Where a building, or portion thereof, does not comply with one or more of the bracing requirements within the prescriptive section of the IRC, those portions shall be designed and constructed in accordance with IRC Section R301.1.

Table 1. Required Bracing Lengths for DRYline TSX+ Red Structural Sheathing Installed with 1/2" Gypsum Wallboard at 24" o.c. Stud Spacing – Wind (Vult)^{1,2,3,4,5,6,7}

Condition	Braced Wall Line Spacing	DRYline TSX+ Red Structural Sheathing Intermittent Sheathing					DRYline TSX+ Red Structural Sheathing Continuous Sheathing				
		Nails or Staples 3" o.c. Edges and in the Field									
		Length of Wall Line to be Braced (ft)					Length of Wall Line to be Braced (ft)				
		≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph	≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph
One Story or the Top of Two or Three Stories	10	1.7	1.7	2.2	2.2	2.6	1.3	1.7	1.7	2.2	2.2
	20	3.0	3.0	3.5	4.4	4.8	2.6	3.0	3.0	3.5	4.4
	30	4.4	4.8	5.2	6.1	7.0	3.9	3.9	4.4	5.2	6.1
	40	5.7	6.1	7.0	7.8	9.1	4.8	5.2	5.7	6.5	7.8
	50	7.0	7.8	8.3	9.6	11.3	6.1	6.5	7.0	8.3	9.6
	60	8.3	9.1	10.0	11.3	13.1	7.0	7.8	8.3	9.6	11.3
First Story of Two Stories or Second Story of Three Stories	10	3.0	3.5	3.9	4.4	5.2	2.6	3.0	3.0	3.9	4.4
	20	5.7	6.5	7.0	8.3	9.6	4.8	5.7	6.1	7.0	7.8
	30	8.3	9.1	10.0	11.7	13.5	7.0	7.8	8.3	10.0	11.3
	40	10.9	11.7	13.1	15.2	17.4	9.1	10.0	10.9	13.1	14.8
	50	13.5	14.4	15.7	18.7	21.3	11.3	12.2	13.5	15.7	18.3
	60	15.7	17.4	18.7	21.8	25.2	13.5	14.8	16.1	18.7	21.8
First Story of Three Stories	10	4.8	5.2	5.7	6.5	7.4	3.9	4.4	4.8	5.7	6.5
	20	8.7	9.6	10.0	11.7	13.9	7.4	7.8	8.7	10.0	11.7
	30	12.2	13.5	14.8	17.0	20.0	10.4	11.3	12.6	14.8	17.0
	40	16.1	17.4	19.1	22.2	25.7	13.5	14.8	16.1	19.1	21.8
	50	19.6	21.3	23.5	27.4	31.8	16.5	18.3	20.0	23.1	27.0
	60	23.1	25.2	27.8	32.6	37.4	20.0	21.8	23.5	27.4	31.8



Table 1. Required Bracing Lengths for DRYline TSX+ Red Structural Sheathing Installed with 1/2" Gypsum Wallboard at 24" o.c. Stud Spacing – Wind (Vult)^{1,2,3,4,5,6,7}

Condition	Braced Wall Line Spacing	DRYline TSX+ Red Structural Sheathing Intermittent Sheathing					DRYline TSX+ Red Structural Sheathing Continuous Sheathing				
		Nails or Staples 3" o.c. Edges and in the Field									
		Length of Wall Line to be Braced (ft)					Length of Wall Line to be Braced (ft)				
		≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph	≤ 110 mph	≤ 115 mph	≤ 120 mph	≤ 130 mph	≤ 140 mph

SI: 1 in = 25.4 mm

- Where GWB is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.6.
- DRYline TSX+ Red Structural Sheathing shall be installed with minimum 0.120" x 1/4" galvanized roofing nail or minimum 15/16" crown x 1/4" leg 16-gauge galvanized staples.
- This table assumes DRYline TSX+ Red Structural Sheathing panels are installed with lapped joints at vertical panel edges. Where panel joints are not lapped, bracing lengths shall be multiplied by a factor of 1.1.
- 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. 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 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. Where gypsum is attached with fasteners spaced 16" o.c. at panel edges and 16" o.c. in the field of the panels, multiply the bracing lengths above by a factor of 1.3.
- DRYline TSX+ Red Structural Sheathing shall be installed with minimum 0.120" x 1/4" galvanized roofing nail or minimum 15/16" crown x 1/4" leg 16-gauge galvanized staples.
- Linear interpolation is permitted.
- Wind speeds shown are V_{ult} in accordance with ASCE 7. Allowable stress design wind speed shall be determined in accordance with [IBC Section 1609.3.1](#): $V_{asd} = V_{ult} \sqrt{0.6}$

Table 2. Required Bracing Lengths for DRYline TSX+ Red Structural Sheathing with 1/2" Gypsum Wallboard at 24" o.c. Stud Spacing – Seismic^{1,2,3,4,5,6}

Condition	Braced Wall Line Spacing	DRYline TSX+ Red Structural Sheathing Intermittent Sheathing				DRYline TSX+ Red Structural Sheathing Continuous Sheathing			
		Nails or Staples 3" o.c. Edges and in the Field							
		Minimum Length of Braced Wall Panels Required Along Each Braced Wall Line (ft)				Minimum Length of Braced Wall Panels Required Along Each Braced Wall Line (ft)			
		SDC C ⁷	SDC D ₀	SDC D ₁	SDC D ₂	SDC C ⁷	SDC D ₀	SDC D ₁	SDC D ₂
One Story or the Top of Two or Three Stories	10	1.4	1.5	1.7	2.2	1.2	1.4	1.5	1.8
	20	2.8	3.1	3.5	4.4	2.4	2.7	3.0	3.7
	30	4.2	4.7	5.2	6.6	3.6	4.0	4.4	5.5
	40	5.5	6.3	7.0	8.7	4.7	5.3	5.9	7.4
	50	7.0	7.8	8.7	10.9	5.9	6.7	7.4	9.2



Table 2. Required Bracing Lengths for DRYline TSX+ Red Structural Sheathing with 1/2" Gypsum Wallboard at 24" o.c. Stud Spacing – Seismic^{1,2,3,4,5,6}

Condition	Braced Wall Line Spacing	DRYline TSX+ Red Structural Sheathing Intermittent Sheathing				DRYline TSX+ Red Structural Sheathing Continuous Sheathing			
		Nails or Staples 3" o.c. Edges and in the Field							
		Minimum Length of Braced Wall Panels Required Along Each Braced Wall Line (ft)				Minimum Length of Braced Wall Panels Required Along Each Braced Wall Line (ft)			
		SDC C ⁷	SDC D ₀	SDC D ₁	SDC D ₂	SDC C ⁷	SDC D ₀	SDC D ₁	SDC D ₂
First Story of Two Stories or Second Story of Three Stories	10	2.6	3.3	3.9	4.8	2.3	2.8	3.3	4.1
	20	5.2	6.6	7.8	9.5	4.4	5.5	6.7	8.2
	30	7.8	9.8	11.7	14.3	6.7	8.4	10.0	12.2
	40	10.5	13.0	15.7	19.1	8.9	11.1	13.3	16.3
	50	13.0	16.4	19.6	23.9	11.1	13.9	16.6	20.4
First Story of Three Stories	10	3.9	4.6	5.2	NP	3.3	3.9	4.4	NP
	20	7.8	9.1	10.5	NP	6.7	7.8	8.9	NP
	30	11.7	13.7	15.7	NP	10.0	11.7	13.3	NP
	40	15.7	18.2	20.9	NP	13.3	15.6	17.7	NP
	50	19.6	22.9	26.1	NP	16.6	19.4	22.2	NP

SI: 1 in = 25.4 mm

- Where GWB is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.6.
- This table assumes DRYline TSX+ Red Structural Sheathing panels are installed with lapped joints at vertical panel edges. Where panel joints are not lapped, bracing lengths shall be multiplied by a factor of 1.1.
- Demonstrates equivalency to [IRC Table R602.10.3\(3\)](#). All adjustment factors from [IRC Table R602.10.3\(4\)](#) shall be applied, except when used with method CS-PF. 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 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. Where gypsum is attached with fasteners spaced 16" o.c. at panel edges and 16" o.c. in the field of the panels, multiply the bracing lengths above by a factor of 1.3.
- DRYline TSX+ Red Structural Sheathing shall be installed with minimum 0.120" x 1 1/4" galvanized roofing nail or minimum 15/16" crown x 1 1/4" leg 16-gauge galvanized staple.
- Tabulated bracing lengths are based on the following:
 - Soil Class D
 - Wall height= 10'
 - 10 psf floor dead load
 - 15 psf roof/ceiling dead load
 - Braced wall line spacing ≤ 25'
- Linear interpolation is permitted.
- Townhouses only

6.2.3 DRYline TSX+ Red Structural Sheathing CS-PF Portal Frame:

- 6.2.3.1 DRYline TSX+ Red Structural Sheathing CS-PF was tested and evaluated for equivalency to the IRC Method CS-PF (Continuous Sheathed Portal Frame) in accordance with IRC Section R602.10.6.4 and IRC Table R602.10.6.4.
- 6.2.3.2 IRC Section R602.10.5 establishes the contributing length of bracing of the CS-PF. IRC Table R602.10.5 shall be used to determine the equivalent bracing length for the DRYline TSX+ Red Structural Sheathing CS-PF. The capacity of DRYline TSX+ Red Structural Sheathing CS-PF exceeds the capacity of the IRC Method CS-WSP and is therefore, permitted to be substituted for an equivalent length of bracing.
- 6.2.3.3 The DRYline TSX+ Red Structural Sheathing CS-PF is shown in **Figure 2**.

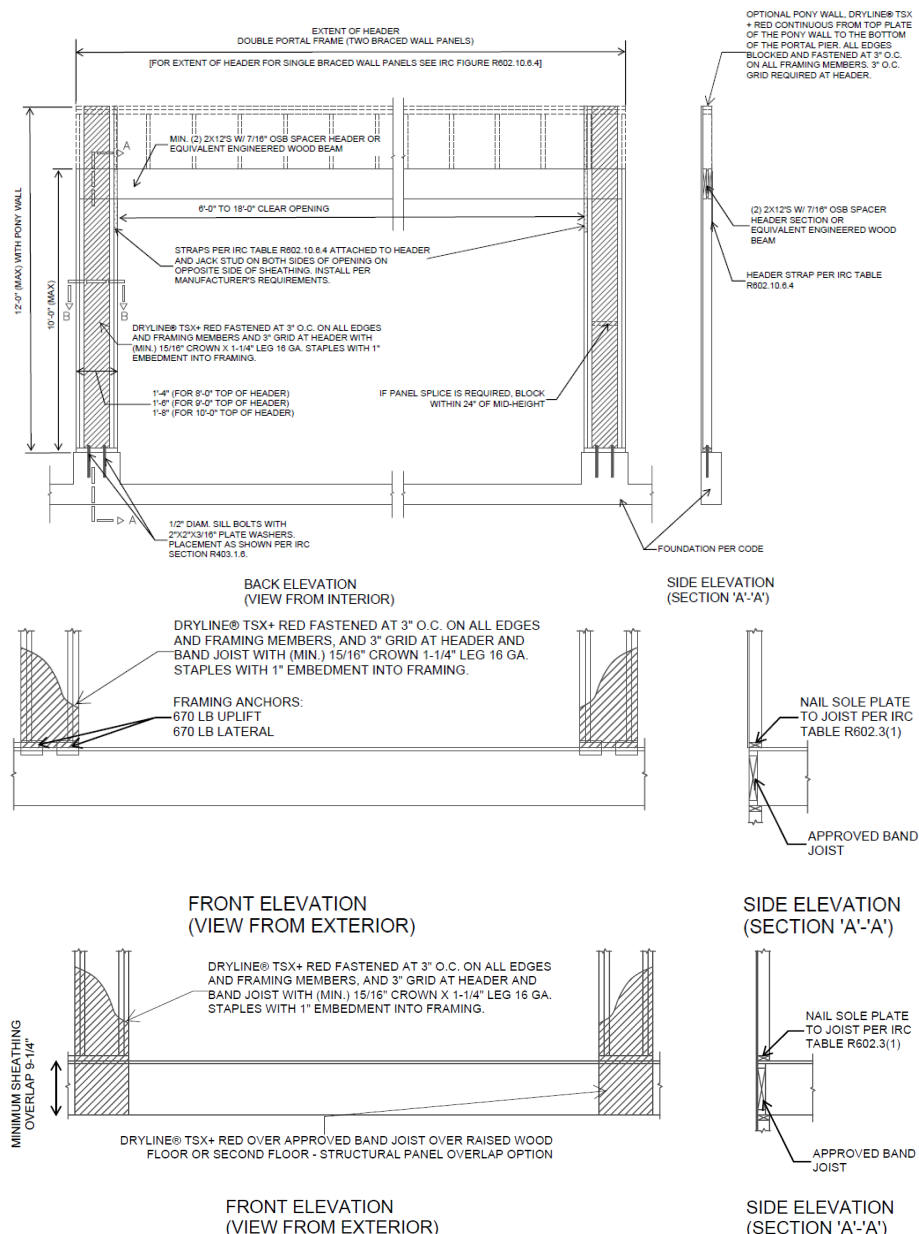


Figure 2. DRYline TSX+ Red Structural Sheathing CS-PF



6.2.4 DRYline TSX+ Red Structural Sheathing Method PFH:

- 6.2.4.1 In accordance with the IRC Section R602.10.6.2, the PFH referenced in the IRC is permitted to be an equivalent replacement for a 4' length of Method WSP bracing.
- 6.2.4.2 Testing of the DRYline TSX+ Red Structural Sheathing PFH assemblies was conducted and compared to testing of Method WSP braced wall panel assemblies using Oriented Strand Board (OSB) to determine whether equivalence could be achieved for the DRYline TSX+ Red Structural Sheathing PFH.
- 6.2.4.3 The portal frames were tested in accordance with ASTM E2126 testing procedures. Testing determined their lateral resistance within an identical braced wall line using Method WSP braced wall panels so that a direct performance comparison could be made between the two series of tests.
- 6.2.4.4 A comparison of the WSP braced wall lines and the DRYline TSX+ Red Structural Sheathing 12" PFH and 24" PFH, is shown in **Table 3**.

Table 3. Design Values for PFH Option 1 or Option 2^{1,2,3}

Test Name	Sheathing Method	Option	Fastener Size and Spacing	Total Bracing Width (in)	Maximum Wall Height (ft)	ASD Allowable Design Value per Panel/Pier ^{4,5} (lbs)
IBC/IRC Benchmark	3/8" OSB, Isolated 4'x8' Panels	N/A	2 3/8" x 0.113" nails, 6:12 spacing	96	Up to 10	700
12" PFH	DRYline TSX+ Red Structural Sheathing	Option 1	See Figure 3 to Figure 6	12	8	1,280
12" PFH	DRYline TSX+ Red Structural Sheathing	Option 2	See Figure 7 to Figure 9	12	10	960
24" PFH	DRYline TSX+ Red Structural Sheathing	Option 1 or 2	See Figure 3 to Figure 9	24	8	1,410

SI: 1 in = 25.4 mm, 1 lb. = 4.45 N

1. Capacity derived from multiple full-scale tests, showing the capacity of OSB sheathing in buildings constructed in accordance with the minimum requirements of the IRC.
2. The PFH bracing type in the IRC/IBC is defined as equivalent to a 4' BWP using 3/8" WSP. Equivalent capacity is based on comparison testing of the PFH and 3/8" OSB as compared to the published capacities as defined in the IBC and SDPWS.
3. For seismic design, reduce capacities by a factor of 1.4.
4. Interpolation between the wall heights and pier widths for the 12" PFH and 24" PFH is permitted.
5. 10' high wall design values are provided here that use a seventy-five percent (75%) factor to reduce the 8' high wall design values generated by test data.

- 6.2.4.5 The test data and subsequent engineering analysis provides confirmation that the performance of the DRYline TSX+ Red Structural Sheathing 12" PFH and 24" PFH provide comparable equivalence to the Method WSP braced wall panels.
- 6.2.4.6 As detailed in **Figure 3** through **Figure 9**, the maximum allowable compressive strength of the DRYline TSX+ Red Structural Sheathing 12" to 24" PFH is 11,156 lbs. per pier. Additional compressive capacity may be engineered into each pier.

6.2.4.7 There are two construction options for the PFH with DRYline TSX+ Red Structural Sheathing:

6.2.4.7.1 *PFH Assembly – Option 1:*

6.2.4.7.1.1 The DRYline TSX+ Red Structural Sheathing Option 1, 12" PFH and 24" PFH is constructed in accordance with **Figure 3** through **Figure 6**.

6.2.4.7.1.2 In PFH Assembly Option 1, the piers are made up of $\frac{7}{16}$ " OSB sandwiched between nominal 2 x 4 studs installed flatwise, with additional 2 x 4 studs framing the outside corner (see **Figure 6**).

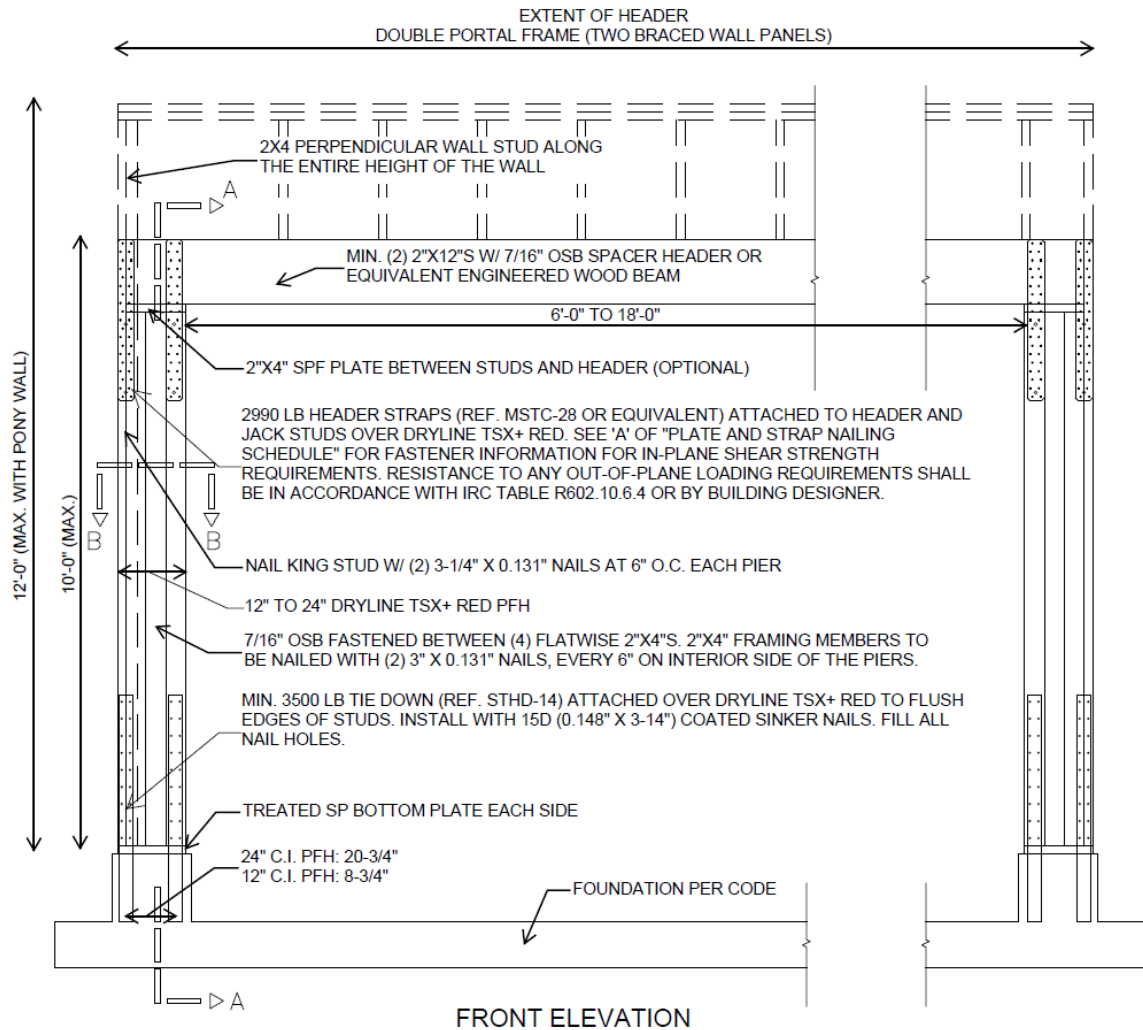


Figure 3. Construction Details of DRYline TSX+ Red Structural Sheathing 12" to 24" PFH – Option 1

STRAP NAILING SCHEDULE

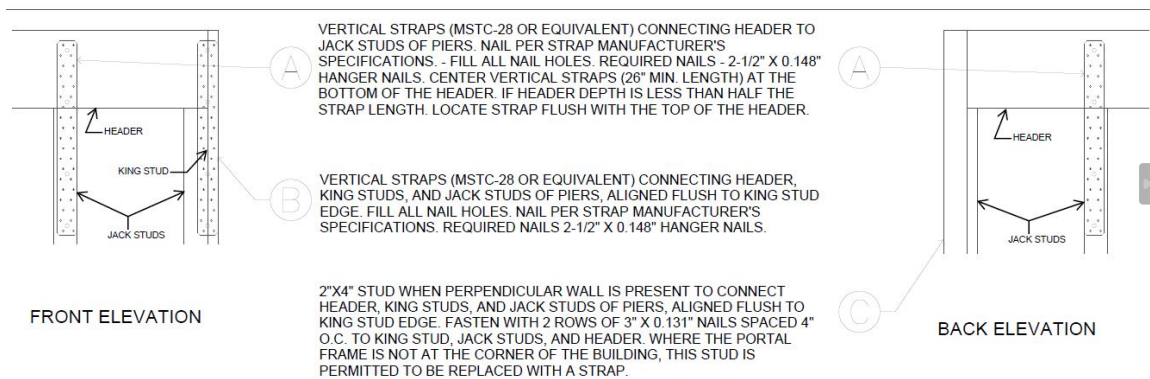


Figure 4. Header Connection Detail – Option 1

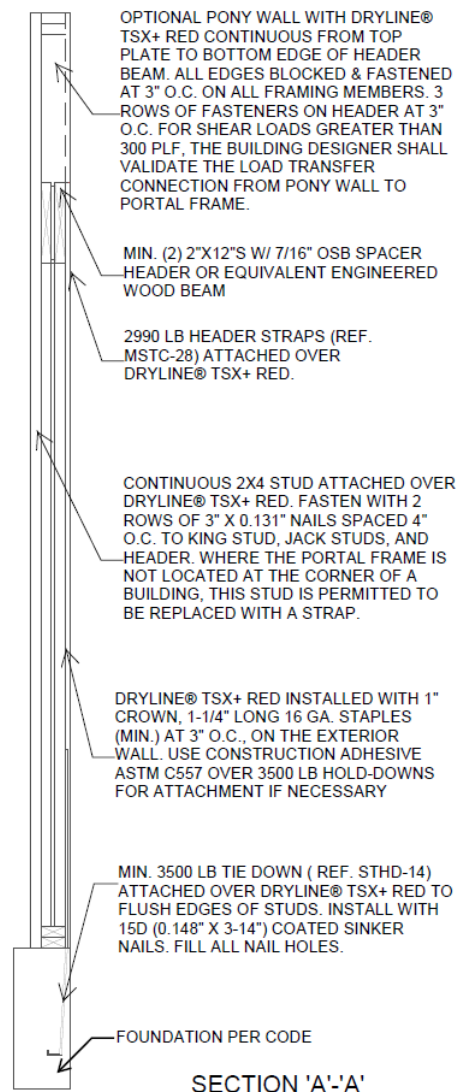


Figure 5. PFH Option 1 Section A-A

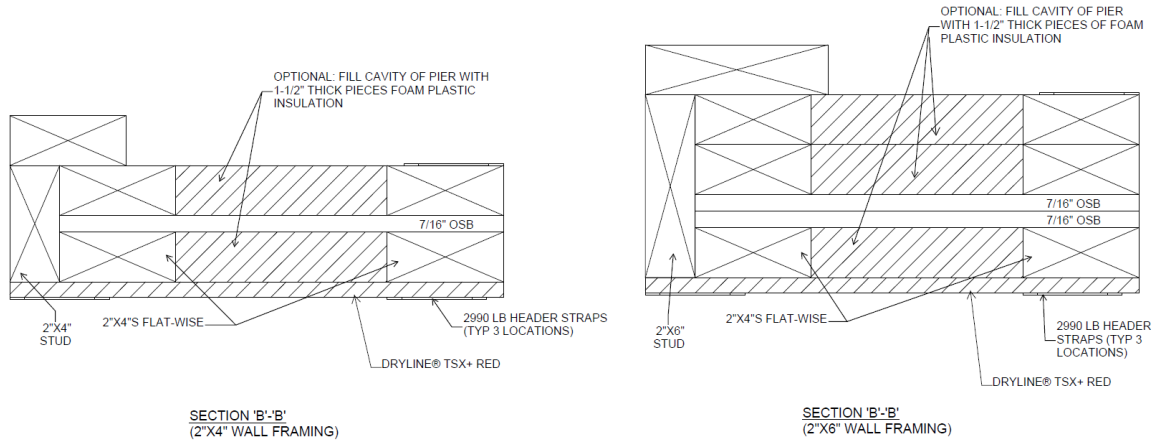


Figure 6. PFH Option 1 Section B-B

6.2.4.7.2 PFH Assembly – Option 2:

6.2.4.7.2.1 The DRYline TSX+ Red Structural Sheathing Option 2, 12" PFH and 24" PFH is constructed in accordance with **Figure 7** through **Figure 9**.

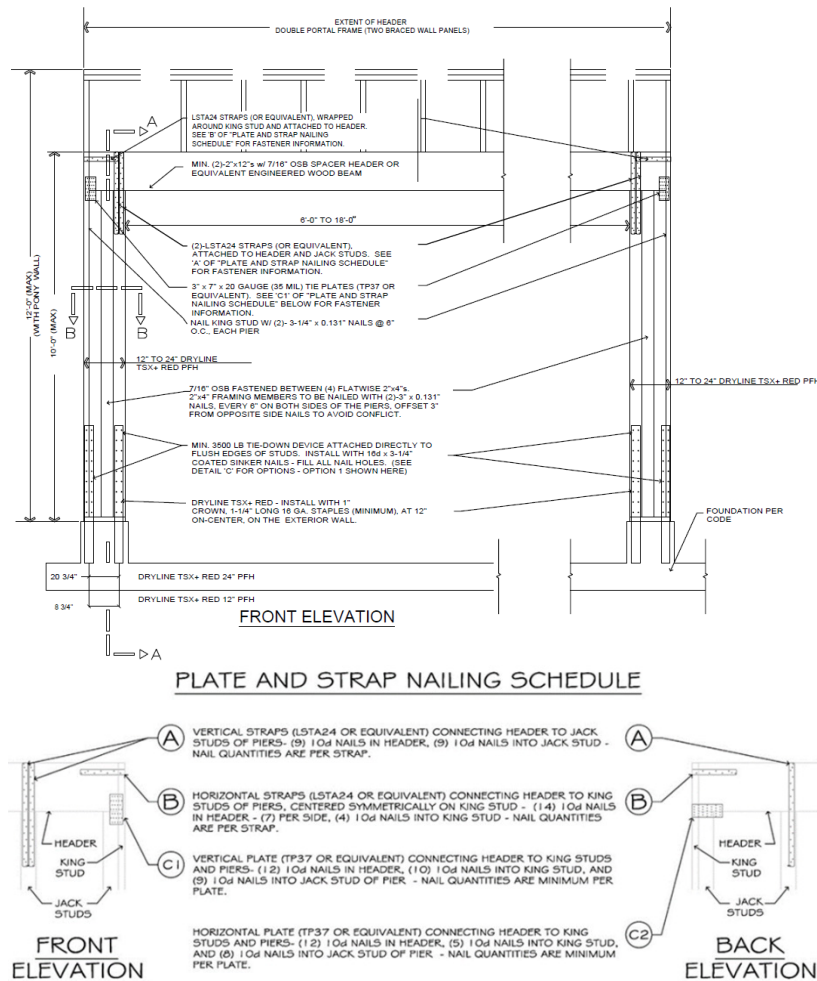


Figure 7. Construction Details of DRYline TSX+ Red Structural Sheathing 12" to 24" PFH – Option 2

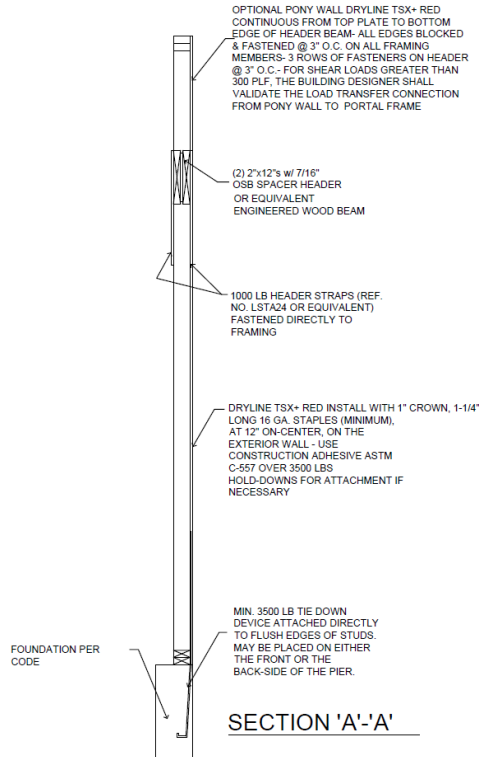
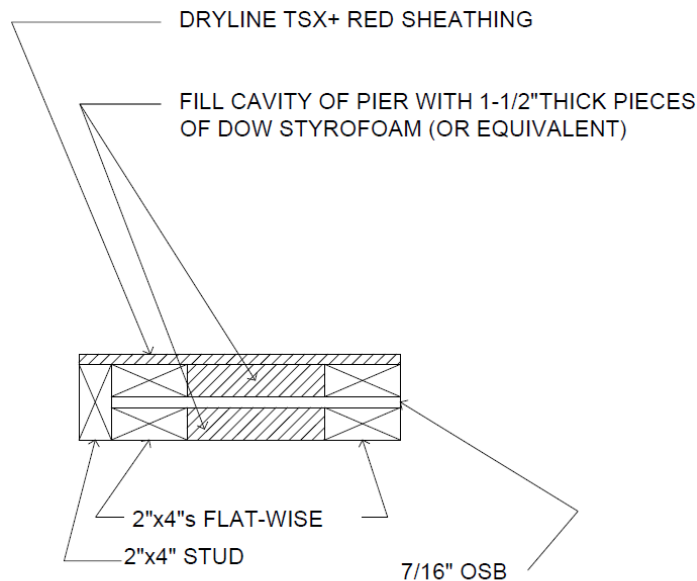


Figure 8. PFH Option 2 Section A-A



SECTION 'B'-B' OPTIONAL INSULATION OF JOIST CAVITIES

Figure 9. PFH Option 2 Section B-B



6.2.5 Alternative Prescriptive IRC Bracing Applications:

6.2.5.1 As an alternative to **Section 6.2.3**, the following provisions are permitted:

- 6.2.5.1.1 DRYline TSX+ Red Structural Sheathing 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 report.
- 6.2.5.1.2 DRYline TSX+ Red Structural Sheathing may be used to brace walls of buildings as an alternative to the Continuous Wall Bracing provisions of [IRC Section R602.10.4](#).
- 6.2.5.1.3 Required braced wall panel lengths for DRYline TSX+ Red Structural Sheathing shall be as determined by the equivalency factor shown in **Table 4**, [IRC Table R602.10.3\(1\)](#) and [IRC Table R602.10.3\(2\)](#), including all footnotes.
- 6.2.5.1.4 Bracing lengths in these tables for Method WSP or CS-WSP shall be multiplied by the equivalency factor listed in **Table 4**. 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. DRYline TSX+ Red Structural Sheathing tested equivalency factors in **Table 4** allow the user to determine the length of bracing required, by multiplying the factor from **Table 4** 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\(2\)](#). All IRC prescriptive bracing minimums, spacing requirements and rules must also be met.

Table 4. DRYline TSX+ Red Structural Sheathing Braced Wall Line Length Equivalency
Factors Based on Equivalency Testing for Use with the IRC^{1,2,5}

Structural Sheathing	Joint Treatment	Maximum Stud Spacing (in)	Fastener ³	Fastener Spacing (edge:field) (in. o.c.)	Gypsum Wallboard (GWB)		Wind
					GWB Fastener	GWB Fastener Spacing (edge:field) (in)	SPF Framing
DRYline TSX+ Red Structural Sheathing	Lapped	24 o.c.	¹⁵ / ₁₆ " Crown x 1 ¹ / ₄ " Leg, 16-gauge Galvanized Staples or 0.120" x 1 ¹ / ₄ " Galvanized Roofing Nail	3:3	5d cooler nails or #6 x 1 ¹ / ₄ " Type W or S Screws	8:8	0.87

SI: 1 in = 25.4 mm

- Where GWB is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.6.
- Factors are based on SPF framing materials.
- Fastener heads shall be installed flush to the surface of the sheathing. Staples shall be a minimum 16-gauge.
- Multiply the bracing lengths in [IRC Table R602.10.3\(1\)](#) and [IRC Table R602.10.3\(2\)](#) Method WSP or CS-WSP (continuous sheathing) as applicable, including all footnotes, by the factors shown here to establish the required bracing length.
- Valid for single top plate (advanced framing method) wall installations or double top plate wall installations.



6.2.6 Prescriptive IBC Conventional Light-Frame Wood Construction:

- 6.2.6.1 DRYline TSX+ Red Structural Sheathing may be used to brace exterior walls of buildings as an equivalent alternative to Method WSP of the IBC when installed with 1/2" (13 mm) gypsum fastened with a minimum 5d cooler nail or #6 Type W or S screw spaced a maximum of 8" o.c. (203 mm) at panel edges and 8" o.c. in the field. Bracing shall be in accordance with the conventional light-frame construction method of IBC Section 2308.10²⁹ and this report.

6.2.7 Performance-Based Wood-Framed Construction:

- 6.2.7.1 DRYline TSX+ Red Structural Sheathing 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 5**, **Table 6**, and **Table 7**.
- 6.2.7.2 DRYline TSX+ Red Structural Sheathing 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 5**.
- 6.2.7.3 DRYline TSX+ Red Structural Sheathing shear walls that require seismic design in accordance with IBC Section 1613 shall use the seismic allowable unit shear capacities set forth in **Table 6**.
- 6.2.7.3.1 The response modification coefficient, R, system overstrength factor, Ω_0 , and deflection amplification factor, C_d , indicated in **Table 6** shall be used to determine the base shear, element design forces and design story drift in accordance with ASCE/SEI 7 Chapter 12 and Section 14.5.
- 6.2.7.4 DRYline TSX+ Red Structural Sheathing panels are permitted to resist transverse wind load forces using the allowable transverse loads (in pounds per linear foot) set forth in **Table 7** and the wind speeds shown in **Table 8**.

Table 5. Allowable Unit Shear Design Values for DRYline TSX+ Red Structural Sheathing – Wind

Structural Sheathing	Fastener ¹	Joint Treatment ³	Maximum Stud Spacing (in)	Gypsum Wallboard ² (GWB)	GWB Fastener Spacing ⁴ (edge:field) (in)	Allowable Unit Shear Capacity (plf)
DRYline TSX+ Red Structural Sheathing	15/16" Crown x 1 1/4" Leg, 16-gauge Staple	Lapped	24 o.c.	1/2" GWB	8:8	480
				None	-	295

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/ft = 0.0146 kN/m

1. DRYline TSX+ Red Structural Sheathing attached with a minimum 16-gauge, 15/16" crown x 1 1/4" leg staples or 0.120" x 1 1/4" 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".
2. Gypsum attached with minimum 5d cooler nail or #6 type W or S screws 1 1/4" long. Fastener spacing shall be as required above.
3. DRYline TSX+ Red Structural Sheathing joints shall be butted at framing members and a single row of fasteners must be applied to each panel edge into the stud below. Alternately, joints may be lapped 3/4" with a single row of fasteners along each framing member.
4. Linear interpolation between fastening patterns is permitted.

**Table 6.** Seismic Performance of DRYline TSX+ Red Structural Sheathing¹

Seismic Force-Resisting System	Maximum Stud Spacing (in)	GWB ⁷	Seismic Allowable Unit Shear Capacity ² (plf)	Apparent Shear Stiffness G_a (kips/in)	Response Modification Factor, R^3	System Over-Strength Factor, Ω_0^4	Deflection Amplification Coefficient, C_d^5	Structural System Limitations and Building Height Limit ⁶ (ft)				
								Seismic Design Category				
								B	C	D	E	F
Light-Frame (Wood) Walls Sheathed with DRYline TSX+ Red Structural Sheathing	24 o.c.	No GWB	155	7.4	6.5	3	4	NL	NL	65	65	65

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/ft = 0.0146 kN/m

- All seismic design coefficients follow the equivalency procedures as defined in **Section 8** of this report.
- Allowable Unit shear capacity is based on a safety factor of 2.5 in accordance with ASCE/SEI 7 Chapter 12.
- Response modification coefficient, R , for use throughout ASCE/SEI 7. Note R reduces forces to a strength level, not an allowable stress level.
- The tabulated value of the overstrength factor, Ω_0 , is permitted to be reduced by subtracting one-half (0.5) for structures with flexible diaphragms.
- Deflection amplification factor, C_d , for use with ASCE/SEI 7 Sections 12.8.6, 12.8.7, and 12.9.2.
- NL = Not Limited. Heights are measured from the base of the structure as defined in ASCE/SEI 7 Section 11.2.
- Gypsum attached with minimum #6 type W or S screws 1 $\frac{1}{4}$ " long spaced 8" o.c. at panel edges and in the field. Maximum stud spacing is 24" o.c. Gypsum attached with minimum #6 type W or S screws 1 $\frac{1}{4}$ " long spaced 8" o.c. at panel edges and in the field. Maximum stud spacing is 24" o.c.

Table 7. Transverse Load Performance of DRYline TSX+ Red Structural Sheathing¹

Structural Sheathing	Transverse Wind Load Resistance ¹		
	Allowable Design Value (psf)	Maximum Stud Spacing (in)	Fastener Schedule
DRYline TSX+ Red Structural Sheathing	120	16 o.c.	¹⁵ / ₁₆ " Crown x 1 $\frac{1}{4}$ " Leg, 16-gauge galvanized staples, 3" o.c. in the edge and field. Staple crowns to be installed parallel to grain

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 0.0479 kN/m²

- Design wind load shall be in accordance with IBC Section 1609.1.1.

Table 8. Allowable Components and Cladding Basic Wind Speed (mph) for DRYline TSX+ Red Structural Sheathing Used in Exterior Wall Covering Assemblies^{1,2}

Product	Basic Wind Speed V_{asd} (mph)	Basic Wind Speed V_{ult} (mph)
	16" o.c. Framing	16" o.c. Framing
DRYline TSX+ Red Structural Sheathing	155	200

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

- Allowable wind speeds are based on the following: Mean roof height 30', Exposure B, 10 sq. ft effective wind area. See the applicable building code for any adjustment need for specific building location and configuration.
- Studs spaced 16" o.c.



6.2.8 Uplift Resistance:

- 6.2.8.1 DRYline TSX+ Red Structural Sheathing panels are permitted to resist uplift load forces using allowable uplift loads (in pounds per linear foot) set forth in **Table 9**.

Table 9. Uplift Resistance for DRYline TSX+ Red Structural Sheathing

Product	GWB	Maximum Stud Spacing (in)	Fastener ¹	Fastener Spacing (edge:field) (in)	Allowable Unit Uplift Capacity ² (plf)
DRYline TSX+ Red Structural Sheathing	None	16 o.c.	¹⁵ / ₁₆ " Crown x 1 ¹ / ₄ " Leg, 16-gauge galvanized staple	3:3	310
	¹ / ₂ " GWB				370

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

1. Staple crowns to be installed parallel to grain.

2. GWB on the back (interior) side of the wall attached with 1¹/₄" long #6 Type W screws spaced 8:8 (edge:field) (in).

6.3 Water-Resistive Barrier (WRB)

- 6.3.1 DRYline TSX+ Red Structural Sheathing may be used as a WRB as prescribed in IBC Section 1403.2³⁰ and IRC Section R703.2 when installed on exterior walls as described in this section.
- 6.3.2 DRYline TSX+ Red Structural Sheathing shall be installed in the vertical or horizontal orientation with board joints placed directly over exterior framing (i.e., studs, plates, or blocking) spaced a maximum of 16" (406 mm) o.c. The fasteners used to attach the board shall be installed in accordance with **Section 6**.
- 6.3.3 All seams and joints between boards shall be overlapped ³/₄" (19 mm) or covered by minimum 1¹/₂" (38 mm) wide DRYline Sheathing Tape or equivalent.
- 6.3.4 DRYline TSX+ Red Structural Sheathing may be installed as a WRB in a non-structural capacity with the fasteners used to attach the board installed in accordance with **Section 6.5**. All butt joints between sheathing panels shall be sealed with minimum 1¹/₂" (38 mm) wide DRYline Sheathing Tape or equivalent.
- 6.3.5 Flashing must be installed at all sheathing penetrations and shall comply with the all applicable code sections.
- 6.3.6 Where DRYline TSX+ Red Structural Sheathing is used intermittently along a braced wall line, DRYline TSX+ Green Structural Sheathing may be used as infill between the DRYline TSX+ Red Structural Sheathing panels. In this application, the WRB is maintained, provided all seams and joints between boards are overlapped ³/₄" (19 mm) or covered by an approved construction tape.
- 6.3.7 DRYline TSX+ Red Structural Sheathing has water-resistance properties as shown in **Table 10**.

Table 10. DRYline TSX+ Red Structural Sheathing Water-Resistance Properties

Property	Test Method	Value
Water Vapor Transmission	ASTM E96	< 0.3 Perm



6.4 Air Barrier

- 6.4.1 DRYline TSX+ Red Structural Sheathing is qualified as an air barrier material as prescribed in IRC Section N1102.5.1.1,³¹ IECC Section R402.5.1.1,³² IECC Section C402.6.1,³³ and IECC Section C402.6.2.3.1,³⁴ in accordance with ASTM E2178.
- 6.4.2 When used as part of a continuous air barrier assembly in a structural application, DRYline TSX+ Red Structural Sheathing shall be installed in accordance with **Section 9**. When installed as part of a continuous air barrier in a non-structural application the fasteners used to attach the board may be installed in accordance with **Section 6.5**.
- 6.4.2.1 Additionally, all sheathing panel edges at the top and bottom of the wall assemblies and all joints between sheathing panels shall be sealed in accordance with IRC Section N1102.5.1.1,³⁵ IECC Section R402.5.1.1,³⁶ and IECC Section C402.6.1.³⁷
- 6.4.2.2 DRYline TSX+ Red Structural Sheathing has the air permeability as shown in **Table 11**.

Table 11. Air Barrier Material Properties

Product	Air Permeability (L/s·m ²)
DRYline TSX+ Red Structural Sheathing	< 0.02
1. Tested in accordance with ASTM E2178.	

6.5 Non-Structural Applications

- 6.5.1 DRYline TSX+ Red Structural Sheathing may be used where other means of wall bracing are provided or are not required, and an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing.
- 6.5.2 The sheathing panels are applied to wall framing with minimum 0.120" x 1¹/₄" (3 mm x 32 mm) galvanized roofing nails or 16-gauge galvanized staples having a ¹⁵/₁₆" (11 mm) crown and 1¹/₄" (32 mm) leg lengths.
- 6.5.3 Fastener spacing shall be a maximum of 6" (152 mm) at the edges and 12" (305 mm) on intermediate members.
- 6.5.3.1 Stud spacing shall be a maximum of 24" (610 mm) o.c.
- 6.5.3.2 Minimum fastener penetration into the framing members is ³/₄" (19 mm).
- 6.6 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.

7 Certified Performance³⁸

- 7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.³⁹
- 7.2 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.⁴⁰



8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 DRYline TSX+ Red Structural Sheathing complies with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
- 8.1.1 Structural performance under lateral load conditions (wind and seismic) for use as an alternative to the IRC Intermittent Wall Bracing provisions of [IRC Section R602.10](#) Method WSP (Wood Structural Panel).
 - 8.1.2 Structural performance under lateral load conditions for use as an alternative to the IRC Continuous Wall Bracing provisions of [IRC Section R602.10.4](#) Methods CS-WSP (Continuously Sheathed Wood Structural Panel) and CS-PF (Continuously Sheathed Portal Frame).
 - 8.1.3 Structural performance under lateral load conditions for use as an alternative to the IRC Continuous Wall Bracing provisions of [IRC Section R602.10.6.2](#) Method PFH (Portal Frame with Hold-Down).
 - 8.1.4 Structural performance under lateral load conditions for use as an alternative to the IBC Conventional Wall Bracing provisions, [IBC Section 2308.10](#),⁴¹ Method WSP for Type V construction.
 - 8.1.5 Structural performance under lateral load conditions for both wind and seismic loading for use with the IBC performance-based provisions, [IBC Section 2306.1](#) and [IBC Section 2306.3](#) for light-frame wood wall assemblies.
 - 8.1.5.1 The basis of the seismic evaluation performed as part of this report is based on ASTM D7989 and testing per ASTM E2126 to establish SDCs that conform to the requirements of ASCE/SEI 7 Section 12.2.1.1.
 - 8.1.5.2 **Table 6** provides Seismic Design Coefficients (SDC) that conform to the requirements in ASCE/SEI 7 Section 12.2.1 and Table 12.2-1 for design of wall assemblies in buildings that require seismic design in accordance with ASCE/SEI 7 (i.e., all seismic design categories).
 - 8.1.5.3 The basis for equivalency testing is outlined in Section 12.2.1.1 of ASCE/SEI 7.

Use of seismic force-resisting systems not contained in Table 12.2-1 shall be permitted contingent on submittal to and approval by the Authority Having Jurisdiction and independent structural design review of an accompanying set of design criteria and substantiating analytical and test data. The design criteria shall specify any limitations on system use, including Seismic Design Category and height; required procedures for designing the system's components and connections; required detailing; and the values of the response modification coefficient, R ; overstrength factor Ω_0 ; and deflection amplification factor, C_d .
 - 8.1.5.4 The SDC evaluation uses the approach found in documentation entitled *“Establishing Seismic Equivalency for Proprietary Prefabricated Shear Panels: An Introduction to the Process”*, using code defined accepted engineering procedures, experience and technical judgment.
 - 8.1.6 Structural performance under lateral load conditions for use as an alternative to ANSI/AWC SDPWS Section 4.3 Wood Frame Shear Walls.
 - 8.1.7 Resistance to transverse loads for wall assemblies used in light-frame wood construction in accordance with [IBC Section 1609.1.1](#) and [IRC Section R301.2.1](#).
 - 8.1.8 Resistance to uplift loads for wall assemblies used in light-frame wood construction in accordance with [IBC Section 1609](#) and [IRC Section R301.2.1](#).
 - 8.1.9 Performance for use as a WRB in accordance with [IBC Section 1403.2](#)⁴² and [IRC Section R703.2](#).
 - 8.1.10 Performance for use as an air barrier material in accordance with [IRC Section N1102.5.1.1](#),⁴³ [IECC Section R402.5.1.1](#),⁴⁴ and [IECC Section C402.6.1.1](#).⁴⁵



- 8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified⁴⁶ to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,⁴⁷ respectively.
- 8.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which is also its areas of professional engineering competence.
- 8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.

9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.
- 9.3 *General*
- 9.3.1 DRYline TSX+ Red Structural Sheathing shall be installed in accordance with the manufacturer published installation instructions and this report (See **Figure 10**).
- 9.3.2 A copy of the manufacturer published installation instructions shall be available at all times on the jobsite during installation.
- 9.3.3 Where required, gypsum wallboard shall be a minimum 1/2" (13 mm) thickness.
- 9.4 *Orientation*
- 9.4.1 DRYline TSX+ Red Structural Sheathing must be installed vertically or horizontally with all panel edges supported by framing or blocking.
- 9.4.2 DRYline TSX+ Red Structural Sheathing must be installed over studs, with framing that has a nominal thickness of not less than 2" (51 mm) and spaced a maximum of 16" (406 mm) o.c.
- 9.5 *Fastener Type*
- 9.5.1 *DRYline TSX+ Red Structural Sheathing:*
- 9.5.1.1 Minimum 15/16" crown x 1 1/4" leg, 16-gauge galvanized staples installed with the underside of the crown flush with the surface of the sheathing.
- 9.5.1.2 Minimum 0.120" x 1 1/4" (3 mm x 32 mm) galvanized roofing nail installed with the underside of the head flush with the surface of the sheathing.
- 9.5.2 *Gypsum Wallboard:*
- 9.5.2.1 Where required, GWB shall be installed with a minimum:
- 9.5.2.1.1 #6 x 1 1/4" (32 mm) Type W or S screws
- 9.5.2.1.2 5d cooler nails
- 9.6 *Fastener Spacing*
- 9.6.1 *DRYline TSX+ Red Structural Sheathing:*
- 9.6.1.1 Maximum of 3" o.c. (76 mm) along the edge and 3" o.c. in the field.
- 9.6.2 *Gypsum Wallboard:*
- 9.6.2.1 For IRC and IBC prescriptive applications, gypsum fasteners shall be spaced in accordance with **Figure 4**. For engineered design, see **Figure 5**.



9.7 Fastener Edge Distance

- 9.7.1 Fastener edge distance is a minimum of $\frac{3}{8}$ " (10 mm) for both DRYline TSX+ Red Structural Sheathing and gypsum.
- 9.7.2 Always fasten staples parallel to the framing member.

9.8 Treatment of Joints

- 9.8.1 DRYline TSX+ Red Structural Sheathing joints shall be lapped $\frac{3}{4}$ " (19 mm) with a single row of fasteners along each framing member.
 - 9.8.1.1 Alternately, joints may be butted at framing members, and a single row of fasteners must be applied to each panel edge into the stud below.
- 9.8.2 Do not tack DRYline TSX+ Red Structural Sheathing to framing but fasten each panel completely once fastening begins.

9.9 Window Treatments

- 9.9.1 If windows are made to accommodate traditional $\frac{1}{2}$ " (13 mm) sheathing materials, order windows with adjustable nailing fins from the supplier. Door brick moldings may be planed or routed $\frac{3}{8}$ " (10 mm), in order to accommodate the different sheathing thickness, either at the jobsite or by the millwork supplier.
- 9.9.2 DRYline TSX+ Red Structural Sheathing 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.

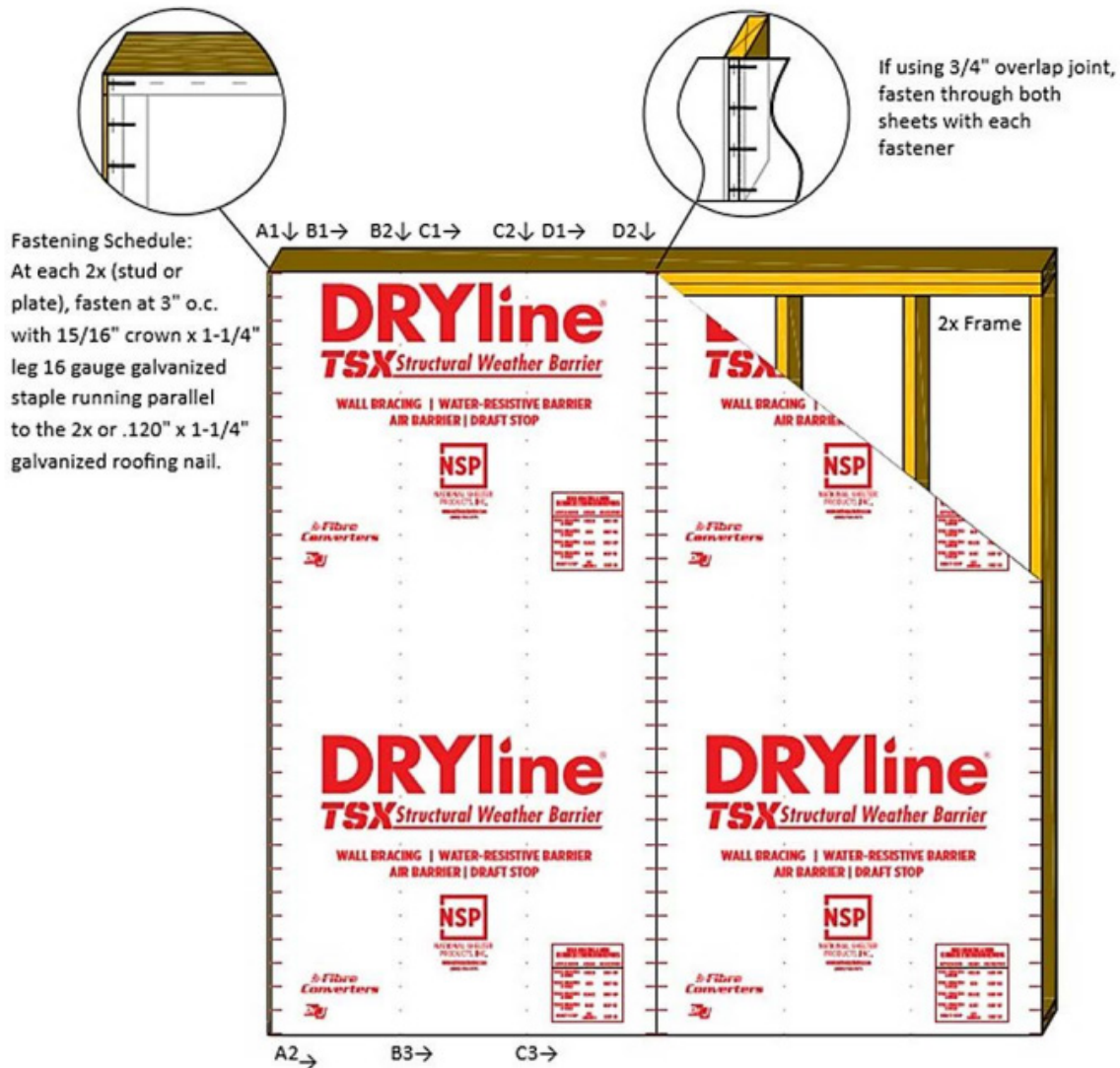


Figure 10. Installation Instructions



10 Substantiating Data

- 10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
- 10.1.1 Lateral load testing in accordance with ASTM E2126 and analysis per ASTM D7989
 - 10.1.2 Transverse load testing in accordance with ASTM E330
 - 10.1.3 Uplift load testing in accordance with ASTM E72
 - 10.1.4 Water-resistive barrier testing in accordance with ASTM E331
 - 10.1.5 Water vapor transmission testing in accordance with ASTM E96
 - 10.1.6 Air barrier material testing in accordance with ASTM E2178
- 10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.
- 10.3 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 10.4 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, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.
- 10.5 *Testing and Engineering Analysis:*
- 10.5.1 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.⁴⁸
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for DRYline TSX+ Red Structural Sheathing on the DrJ Certification website.

11 Findings

- 11.1 As outlined in **Section 6**, DRYline TSX+ Red Structural Sheathing has performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.
- 11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, DRYline TSX+ Red Structural Sheathing shall be approved for the following applications:
- 11.2.1 Lateral load resistance due to wind and seismic loads carried by shear walls.
 - 11.2.2 Use as an equivalent alternative to the CS-PF as described in IRC Section R602.10.5 and IRC Section R602.10.6.4.
 - 11.2.3 Use as an equivalent alternative to Method PFH as described in IRC Section R602.10.6.2.
 - 11.2.4 Transverse load resistance due to components and cladding pressures on building surfaces.
 - 11.2.5 Uplift load resistance due to wind uplift loads carried by the walls.



- 11.2.6 Performance for use as a WRB in accordance with IBC Section 1403.2⁴⁹ and IRC Section R703.2.
- 11.2.7 Performance for use as an air barrier material in accordance with IRC Section N1102.5.1.1,⁵⁰ IECC Section R402.5.1.1,⁵¹ IECC Section C402.6.1,⁵² and IECC Section C402.6.2.3.1.⁵³
- 11.3 Unless exempt by state statute, when DRYline TSX+ Red Structural Sheathing 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.
- 11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Fibre Converters, Inc.
- 11.5 IBC Section 104.2.3 (IRC Section R104.2.2 and IFC Section 104.2.3⁵⁴ are similar) in pertinent part state:
- 104.2.3 Alternative Materials, Design and Methods of Construction and Equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.
- 11.6 **Approved:**⁵⁵ Building regulations require that the building official shall accept duly authenticated reports.⁵⁶
- 11.6.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited.
- 11.6.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce.
- 11.6.3 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. Denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB Accredited Product Certification Body – Accreditation #1131.
- 11.8 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.⁵⁷

12 Conditions of Use

- 12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.
- 12.2 As defined in **Section 6**, 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.
- 12.3 As listed herein, DRYline TSX+ Red Structural Sheathing shall not be used:
- 12.3.1 As a nailing base, nor
- 12.3.2 To resist horizontal loads from concrete and masonry walls.
- 12.4 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:
- 12.4.1 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.
- 12.4.2 This report and the installation instructions shall be submitted at the time of permit application.
- 12.4.3 This innovative product has an internal quality control program and a third-party quality assurance program.
- 12.4.4 At a minimum, this innovative product shall be installed per **Section 9**.



- 12.4.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.
- 12.4.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.
- 12.4.7 The application of this innovative product in the context of this report 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.
- 12.5 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or 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 104.2.3", all of IBC Section 104, and IBC Section 105.3.*
- 12.6 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 12.7 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

- 13.1 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, this report number, and other information to confirm code compliance.
- 13.2 Additional technical information can be found at www.fibreconverters.com or www.nationalshelter.com .

14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.
- 14.2 For information on the status of this report, please contact [DrJ Certification](#).



Issue Date: April 7, 2023
Subject to Renewal: July 1, 2026

FBC Supplement to Report Number 2304-01

REPORT HOLDER: Fibre Converters, Inc.

1 Evaluation Subject

- 1.1 DRYline TSX+ Red Structural Sheathing

2 Purpose and Scope

2.1 Purpose

- 2.1.1 The purpose of this Report Supplement is to show DRYline TSX+ Red Structural Sheathing, recognized in Report Number 2304-01, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 Applicable Code Editions

- 2.2.1 *FBC-B—20, 23: Florida Building Code – Building*
- 2.2.2 *FBC-R—20, 23: Florida Building Code – Residential*

3 Conclusions

- 3.1 DRYline TSX+ Red Structural Sheathing, described in Report Number 2304-01, complies with the FBC-B and FBC-R and is subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this report, they are listed here:
 - 3.2.1 FBC-B Section 104 is reserved.
 - 3.2.2 FBC-B Section 110.4 is reserved and replaces IBC Section 110.4.
 - 3.2.3 FBC-B Section 104.6 is reserved and replaces IBC Section 104.4.
 - 3.2.4 FBC-B Section 104.11 replaces IBC Section 104.2.3 and Section 104.2.3.2.
 - 3.2.5 FBC-B Section 105.3 replaces IBC Section 105.3.
 - 3.2.6 FBC-B Section 105.3.1 replaces IBC Section 105.3.1.
 - 3.2.7 FBC-B Section 110.3 replaces IBC Section 110.3.
 - 3.2.8 FBC-B Section 1404.2 replaces IBC Section 1403.2.
 - 3.2.9 FBC-B Section 1609.1.1 replaces IBC Section 1609.1.1.
 - 3.2.10 FBC-B Section 1609.3.1 replaces IBC Section 1609.3.1.
 - 3.2.11 FBC-B Section 1613 is reserved and replaces IBC Section 1613.
 - 3.2.12 FBC-B Section 1707.1 replaces IBC Section 1707.1.
 - 3.2.13 FBC-B Section 2306.1 replaces IBC Section 2306.1.
 - 3.2.14 FBC-B Section 2306.3 replaces IBC Section 2306.3.
 - 3.2.15 FBC-B Section 2308 is reserved and replaces IBC Section 2308.9.3.2 and IBC Section 2308.10.
 - 3.2.16 FBC-R Section R104 and Section R109 are reserved.



- 3.2.17 FBC-R Section R301.1 replaces IRC Section R301.2.1.
- 3.2.18 FBC-R Section R301.2.1 replaces IRC Section R301.1.
- 3.2.19 FBC-R Section R602.3.2 is reserved and replaces IRC Section R602.3.2.
- 3.2.20 FBC-R Section R602.10 is reserved and replaces IRC Section R602.10.
- 3.2.21 FBC-R Table R602.10.3(1), Table R602.10.3(2), Table R602.10.3(3), and Table R602.10.3(4) are reserved and replace IRC Table R602.10.3(1), Table R602.10.3(2), Table R602.10.3(3), and Table R602.10.3(4).
- 3.2.22 FBC-R Section R602.10.4 is reserved and replaces IRC Section R602.10.4.
- 3.2.23 FBC-R Section R602.10.5 is reserved and replaces IRC Section R602.10.5.
- 3.2.24 FBC-R Section R602.10.6.2 is reserved and replaces IRC Section R602.10.6.2.
- 3.2.25 FBC-R Section R602.10.6.4 is reserved and replaces IRC Section R602.10.6.4.
- 3.2.26 FBC-R Section R703.2 replaces IRC Section R703.2.
- 3.2.27 FBC-R Section N1101.1 replaces IRC Section N1102.5.1.1.

4 Conditions of Use

- 4.1 DRYline TSX+ Red Structural Sheathing, described in Report Number 2304-01, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in Report Number 2304-01.
 - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.



For more information, visit [dricertification.org](https://www.dricertification.org) or call us at 608-310-6748.

Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI 1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law, Qualtim External Appendix A: Definitions/Commentary, Qualtim External Appendix B: Project/Deliverables, Qualtim External Appendix C: Intellectual Property and Trade Secrets, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702>

Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review <https://www.justice.gov/atr/mission> and <https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3>

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2> ~:~text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. <https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1> ~:~text=Conformance%20to%20Standards~.The%20design%20strengths%20and%20permissible%20stresses~of%20any%20structural

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1> ~:~text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.2.3.

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2>

https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

<https://www.law.cornell.edu/uscode/text/18/1832> (b) 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. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: [Intellectual Property and Trade Secrets](https://www.intellectualpropertyandtradesecrets.gov/).

<https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional> AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>

<https://www.cbiteest.com/accreditation/>

<https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1> ~:~text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

<https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3> AND <https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1>

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1>

<https://iaf.nu/en/about-iaf-mla/#> ~:~text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

<https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>

Unless otherwise noted, the links referenced herein use un-amended versions of the [2024 International Code Council \(ICC\)](https://www.internationalcodecouncil.org/) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the [IBC 2024](https://www.milestones.com/) and the [IRC 2024](https://www.milestones.com/) are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

See [Adoption by Publisher](https://www.adoptionbypublisher.com/) for the latest adoption of a non-amended or amended model code by the local jurisdiction. <https://up.codes/codes/general>

See [Adoption by Publisher](https://www.adoptionbypublisher.com/) for the latest adoption of a non-amended or amended model code by state. <https://up.codes/codes/general>

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

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

All references to the FBC-B and FBC-R are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the Florida Supplement at the end of this report.

<https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2> (Listed%20or%20certified); <https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed> AND <https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled>

2015 IBC Section 1404.2

2021 IBC Section 2308.5.2

2021 IBC Section 2308.6

2015 IBC Section 1404.2

2021 IRC Section N1102.4.1.1

2021 IECC Section R402.4.1.1

2021 IECC Section C402.5.1



2021 IECC Section C402.5.1.3 and 2018 IECC Section C402.5.1.2.1

2021 IRC Section N1102.4.1.1

2021 IECC Section R402.4.1.1

2021 IECC Section C402.5.1

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4>

<https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades>

<https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur>

2021 IBC Section 2308.6

2015 IBC Section 1404.2

2021 IRC Section N1102.4.1.1

2021 IECC Section R402.4.1.1

2021 IECC Section C402.5.1

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.

<https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH>

See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

2015 IBC Section 1404.2

2021 IRC Section N1102.4.1.1

2021 IECC Section R402.4.1.1

2021 IECC Section C402.5.1

2021 IECC Section C402.5.1.3

2018: <https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9> AND 2021: <https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11>

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 (<https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4>) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

<https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1>

Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.