



**CERTIFICATION**



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## **Technical Evaluation Report**

**TER 1101-01**

OX-IS™, SI-Strong, IsoRED CI and  
Thermo-Ply® “Portal Frame with Hold-  
Down” (12” to 24” CI PFH)

**Ox Engineered Products, LLC**

### **Product:**

**OX-IS™, SI-Strong, IsoRED CI  
and Thermo-Ply® “Portal Frame  
with Hold-Down” (12” to 24” CI  
PFH)**

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 11 00 - Wood Framing

SECTION: 06 12 19 - Shear Wall Panels

## 1 PRODUCT EVALUATED<sup>1</sup>

- 1.1 OX-IST™, SI-Strong, IsoRED CI and Thermo-Ply® “Portal Frame with Hold-Down” (12” to 24” CI PFH)

## 2 APPLICABLE CODES AND STANDARDS<sup>2,3</sup>

### 2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IRC—12, 15, 18: International Residential Code®*
- 2.1.3 *CBC—16, 19: California Building 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 E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*
- 2.2.4 *ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

<sup>1</sup> Building codes require data from valid [research reports](#) be obtained from [approved sources](#). Agencies who are accredited through ISO/IEC 17065 have met the [code requirements](#) for approval by the [building official](#). DrJ is an ISO/IEC 17065 ANSI-Accredited Product Certification Body – Accreditation #1131.

Through ANSI accreditation and the [IAF MLA](#), DrJ certification 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.”

Building official approval of a licensed [registered design professional](#) (RDP) is performed by verifying the RDP and/or their business entity complies with all professional engineering laws of the relevant [jurisdiction](#). Therefore, the work of licensed RDPs is accepted by [building officials](#), except when plan (i.e. peer) review finds an error with respect to a specific section of the code. Where this TER is not approved, the [building official](#) responds in writing stating the reasons for [disapproval](#).

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, visit [drjcertification.org](http://drjcertification.org) or call us at 608-310-6748.

<sup>2</sup> Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein (e.g., *ASCE 7*, *NDS*, *ASTM*). This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

<sup>3</sup> All terms defined in the applicable building codes are italicized.

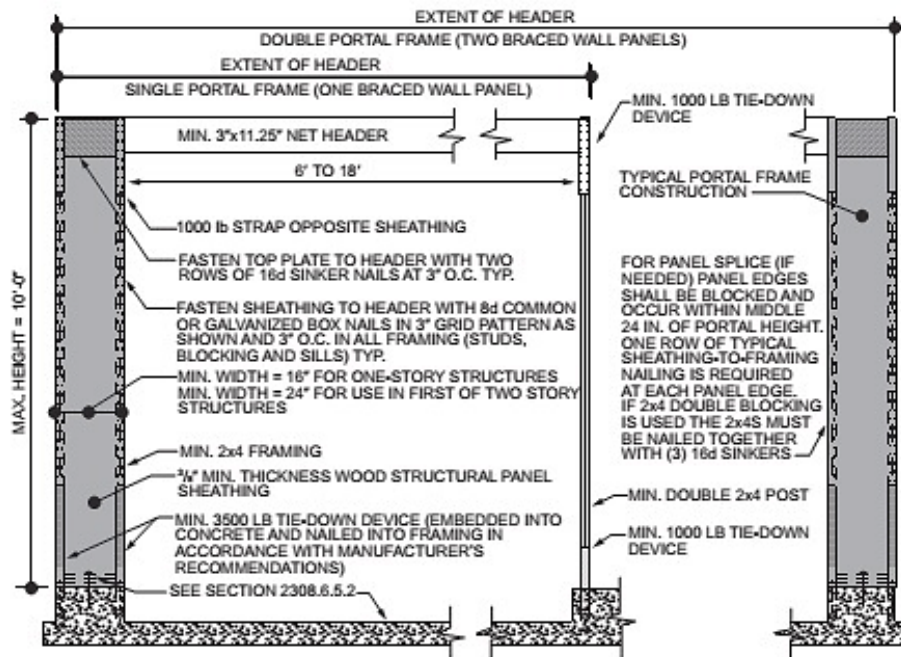
### 3 PERFORMANCE EVALUATION

3.1 The OX-IS™, SI-Strong, IsoRED CI, and Thermo-Ply® PFH were tested and evaluated for pier widths between 12” and 24” for equivalency to the following *IBC* requirement:

**2308.6.5 Alternative bracing.** An alternate braced wall (ABW) or a portal frame with hold-downs (PFH) described in this section is permitted to substitute for a 48-inch (1219 mm) braced wall panel of Method DWB, WSP, SFB, PBS, PCP or HPS. For Method GB, each 96-inch (2438 mm) section (applied to one face) or 48-inch (1219 mm) section (applied to both faces) or portion thereof required by Table 2308.6.1 is permitted to be replaced by one panel constructed in accordance with Method ABW or PFH.

3.2 The portal frame that is directly referenced in the code is shown in Figure 1 and adopted into the code in *IBC* Section 2308.6.5.2<sup>4</sup> as follows:

**2308.6.5.2 Portal frame with hold-downs (PFH).** A PFH shall be constructed in accordance with this section and *IBC* Figure 2308.6.5.2. The adjacent door or window opening shall have a full-length header...<sup>5,6</sup>



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N.

FIGURE 1. PORTAL FRAME WITH HOLD-DOWNS AS DEPICTED IN *IBC* FIGURE 2308.6.5.2.

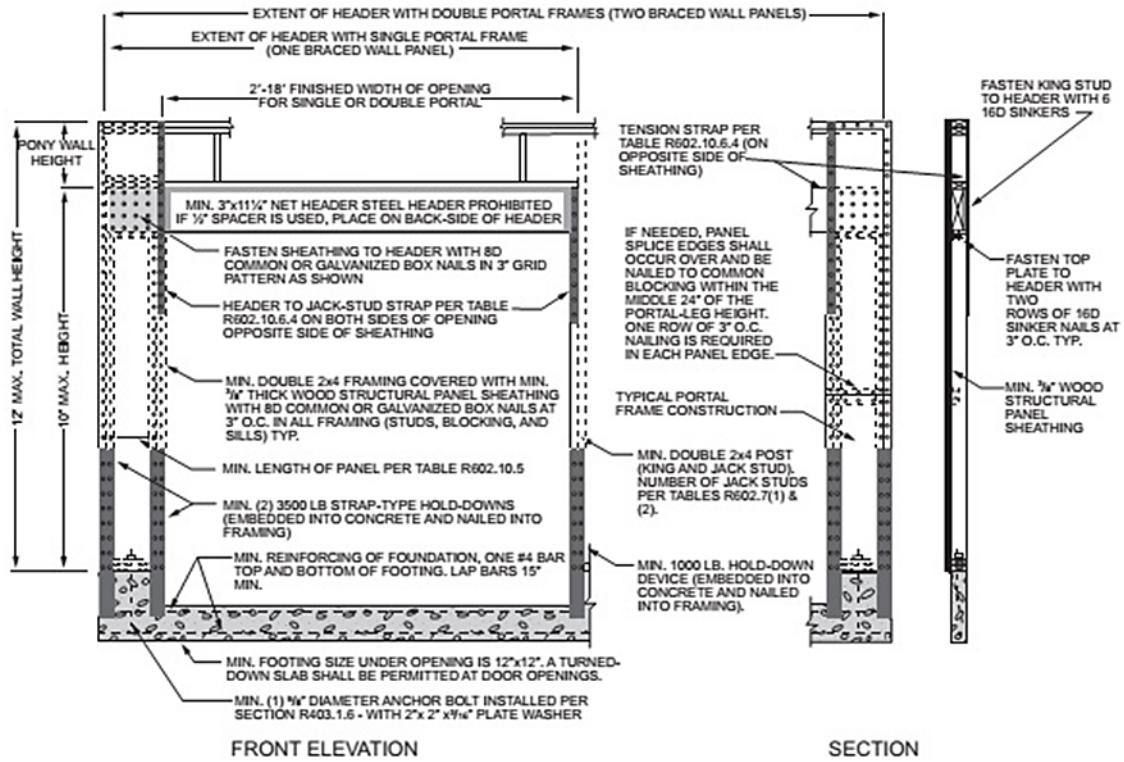
3.3 The *IRC* defines the PFH detail in *IRC* Figure R602.10.6.2 (Figure 2) and identifies it as an equivalent replacement to the capacity of a 4' x 8' sheet of 3/8" WSP sheathing in *IRC* Table R602.10.5 (Table 1) through the use of the following language of *IRC* Section R602.10.6.2:

<sup>4</sup> 2012 *IBC* Section 2308.9.3.2

<sup>5</sup> Note that the 2015 and 2018 versions of the *IBC* Figure differ from the 2012 version in that the capacity of the required hold-down straps is reduced from 4200 lbs to 3500 lbs.

<sup>6</sup> Wood structural panel sheathing with a thickness not less than 3/8" (9.5 mm) for 16" (406 mm) or 24" (610 mm) stud spacing in accordance with Table 2308.6.3(2) and 2308.6.3(3).

Method PFH: Portal frame with hold-downs. Method PFH braced wall panels shall be constructed in accordance with Figure R602.10.6.2.<sup>7</sup>



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 2. METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS AS DEPICTED IN *IRC* FIGURE R602.10.6.2

<sup>7</sup> Note that the 2015 and 2018 versions of the *IRC* Figure R602.10.6.2 differ from the 2012 version in that the capacity of the required hold-down straps is reduced from 4,200 lbs to 3,500 lbs.

TABLE 1. MINIMUM LENGTH OF BRACED WALL PANELS AS DEPICTED IN *IRC* TABLE R602.10.5

METHOD (See Table R602.10.4)		MINIMUM LENGTH* (inches)					CONTRIBUTING LENGTH (inches)
		Wall Height					
		8 feet	9 feet	10 feet	11 feet	12 feet	
DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP		48	48	48	53	58	Actual <sup>b</sup>
GB		48	48	48	53	58	Double sided = Actual Single sided = 0.5 × Actual
LIB		55	62	69	NP	NP	Actual <sup>b</sup>
ABW	SDC A, B and C, wind speed < 110 mph	28	32	34	38	42	48
	SDC D <sub>1</sub> , D <sub>2</sub> and D <sub>3</sub> , wind speed < 110 mph	32	32	34	NP	NP	
PFH	Supporting roof only	16	16	16	18 <sup>c</sup>	20 <sup>c</sup>	48
	Supporting one story and roof	24	24	24	27 <sup>c</sup>	29 <sup>c</sup>	48

- 3.4 While the PFH referenced in the code is one alternate method of compliance, other methods of compliance are permissible, provided they can show equivalence to the code in accordance with *IBC* Section 104.11 and *IRC* Section R104.11.
- 3.5 It is clear from *IBC* Section 2308.6.5.2<sup>8</sup> and *IRC* Figure R602.10.6.2 that the performance requirement is to be an equivalent replacement to the capacity of a 4' x 8' sheet of 3/8" WSP sheathing.
- 3.6 Testing conducted by the SBC Research Institute (SBCRI) compares the performance of an alternative PFH to replace a 4' x 8' Method WSP braced wall panel using 3/8" WSP sheathing.
- 3.7 Since deflection limits are neither a consideration of the *IRC* nor a consideration of the light-frame provisions of the *IBC*, they are not a consideration of this assessment.
- 3.8 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.9 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within Dr.J's professional scope of work.

#### 4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 OX-IST™, SI-Strong, IsoRED CI, and Thermo-Ply® PFH assemblies differ from the PFH details in the *IBC* and *IRC* in that the intent is to allow the use of these sheathing materials in place of the WSP shown in the code-prescribed details to facilitate use of continuous insulation or carry through the proprietary sheathing materials without the need to change the sheathing thickness at the portal frame.
  - 4.1.1 OX-IST™ and SI-Strong are structural insulated sheathing (SIS) products and, therefore, are also referred to as SIS in this TER.
- 4.2 Details of the construction are as follows:
  - 4.2.1 *Piers*
    - 4.2.1.1 The piers are made up of 7/16" OSB sandwiched between nominal 2" x 4" studs installed flatwise with additional 2" x 4" studs framing the outside corner (see Figure 5). This pier is then attached to the adjoining full-height studs and the opening header.
  - 4.2.2 *Header*
    - 4.2.2.1 The header is made up of a minimum of two (2) 2" x 12"s with a 7/16" OSB spacer or an equivalent engineered wood beam.

<sup>8</sup> [2012 IBC Section 2308.9.3.2](#)



- 4.2.2.2 The header extends over the top of the pier(s) and is fastened to the pier(s) using straps, plates, and fasteners, as shown in Figure 3, Figure 4, and Figure 5.
- 4.2.3 The maximum PFH height is 10'. Where needed, a pony wall may be built above the header to extend the framing to a maximum of 12'.
- 4.2.4 *Sheathing Options*
  - 4.2.4.1 OX-IST™ or SI-Strong Structural Insulation:
    - 4.2.4.1.1 For other sheathing performance characteristics that may be required in an exterior wall assembly, please refer to [TER 0804-01](#).
  - 4.2.4.2 IsoRED CI Polyiso Insulation:
    - 4.2.4.2.1 For other sheathing performance characteristics that may be required in an exterior wall assembly, please refer to [TER 1306-02](#).
  - 4.2.4.3 Thermo-Ply® Structural Sheathing: Green, Red, or Blue Grade.
    - 4.2.4.3.1 For other sheathing performance characteristics that may be required in an exterior wall assembly, please refer to one of the following:
      - 4.2.4.3.1.1 Thermo-Ply®: Green ([TER 1004-03](#))
      - 4.2.4.3.1.2 Thermo-Ply®: Red ([TER 1004-01](#))
      - 4.2.4.3.1.3 Thermo-Ply®: Blue ([TER 1004-02](#))

## 5 APPLICATIONS

### 5.1 *IBC/IRC Method WSP:*

- 5.1.1 To establish the baseline for equivalency, a full scale 12' x 30' building was constructed in accordance with the minimum requirements of the *IRC* and *IBC*.
- 5.1.2 In the first series of tests, two 4' braced wall panels (BWP) were placed in each of the 30' walls.
- 5.1.3 Each BWP was placed 6' from each end of each braced wall line.
- 5.1.4 Anchor bolts were placed every 4' along the base of the wall. No other hold down devices were used as they are not required by the *IRC* or the prescriptive provisions of the *IBC*.
- 5.1.5 The roof of the structure was constructed with trusses, and dead loads were applied to simulate typical dead loads on a single story roof.
- 5.1.6 All other wall construction details are per [IRC Table R602.3\(1\)](#).
- 5.1.7 The walls were tested in accordance with the provisions of *ASTM E564*.
- 5.1.8 Testing with the OSB in various positions in the wall was assessed as well as fully-sheathed walls and walls with window and door openings.
- 5.1.9 23' walls were constructed and tested in accordance with *ASTM E2126* to understand the performance of these walls under cyclic loading conditions.
- 5.1.10 The results of the testing were then compared to the capacity of the OSB sheathing as defined in the provisions of the *IBC* and *IRC*, and an equivalent capacity was derived such that comparisons can be made on an equivalency basis.

### 5.2 *Alternate PFH Portal Frame:*

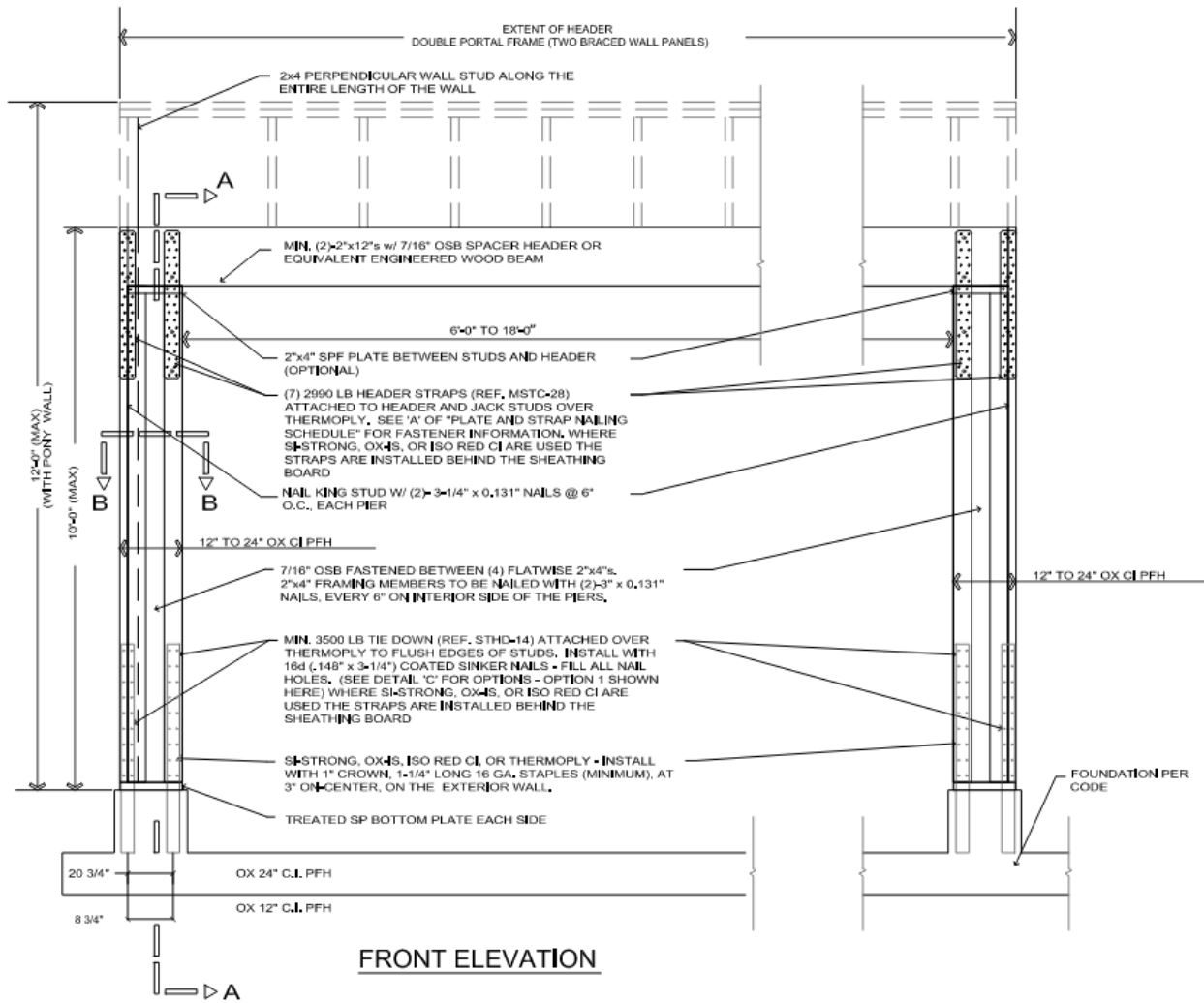
- 5.2.1 An alternate PFH Portal Frame was developed to see if an equivalent replacement of the 4' x 8' Method WSP Braced Wall Panel could be achieved (see Figure 3, Figure 4, and Figure 5).
- 5.2.2 Two (2) 23' braced wall lines were framed using standard code-complying framing techniques with SPF top plate, sill plate and studs from stud grade lumber.





- 5.2.3 The assembly was constructed with  $\frac{7}{16}$ "-thick OSB sheathing ( $10\frac{1}{2}$ " wide for the 12" PFH and  $22\frac{1}{2}$ " wide for the 24" PFH) fastened between four (4) flatwise SPF 2" x 4"s attached to a SPF king stud.
- 5.2.4 Bottom plate is treated Southern Pine (SP) 2" x 4"s. Single or double bottom plates may be used.
- 5.2.5 Interior gypsum was not applied.
- 5.2.6 The portal frames were tested in accordance with *ASTM E2126* testing procedures. Testing determined their lateral resistance within an identical braced wall line so that a direct performance comparison could be made with respect to the tests performed on the isolated braced wall panel assemblies.





### STRAP NAILING SCHEDULE

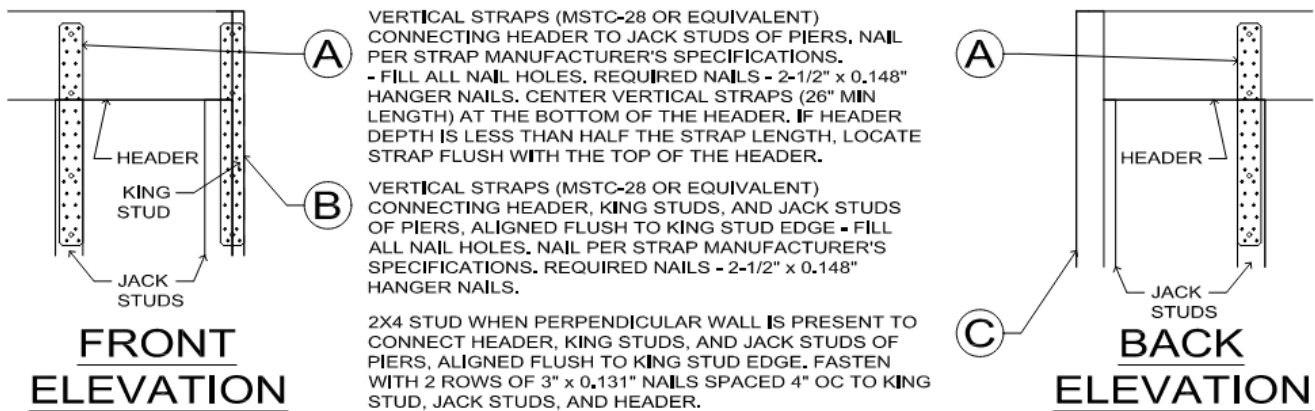


FIGURE 3. CONSTRUCTION DETAILS OF OX-IS™, SI-STRONG, ISORED CI, AND THERMO-PLY® 12” TO 24” CI PFH



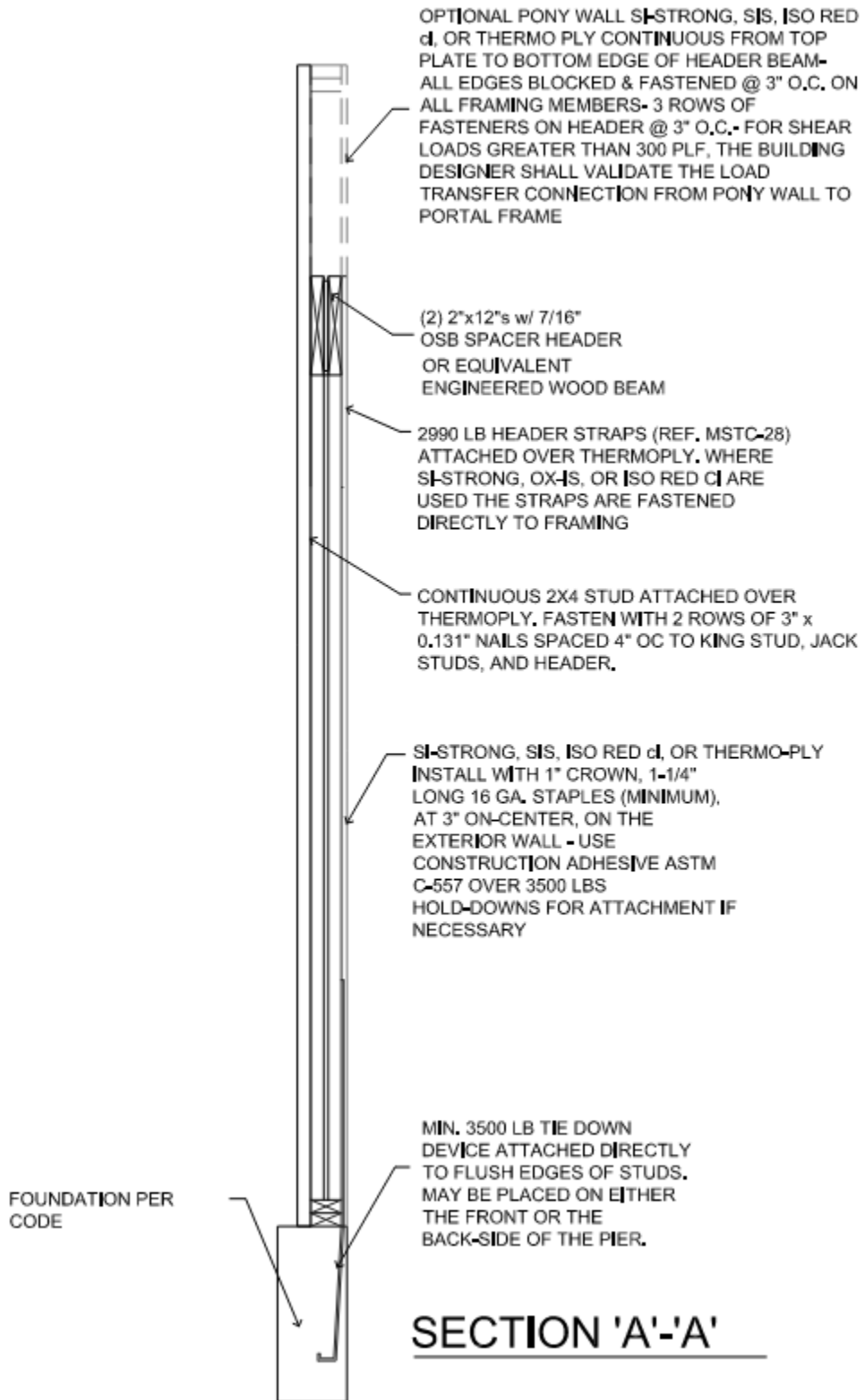
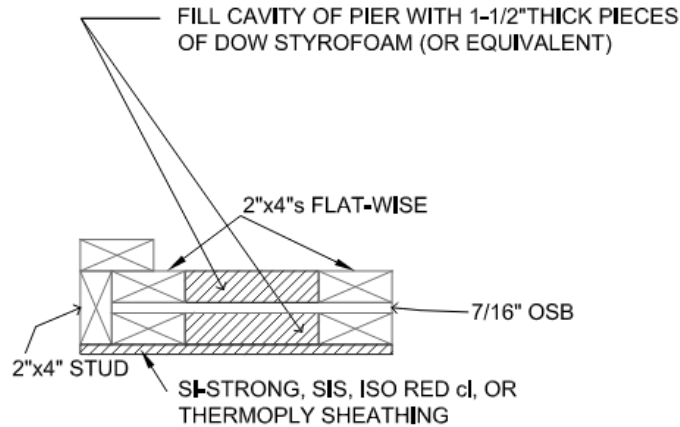


FIGURE 4. PFH SECTION A-A.



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

FIGURE 5. PFH SECTION B-B.

### 5.3 Equivalency Results

- 5.3.1 A comparison of the 3/8" WSP braced wall lines and the OX-IS™, SI-Strong, IsoRED CI, and Thermo-Ply® 12" CI PFH and 24" CI PFH is shown in Table 2.
- 5.3.2 The test data and subsequent engineering analysis provides confirmation that the performance of the OX-IS™, SI Strong, IsoRED CI, and Thermo-Ply® 12" CI PFH and 24" CI PFH provide comparable equivalence to the 3/8" BWP.



TABLE 2. PORTAL FRAME DESIGN VALUES<sup>1,2,3</sup>

Test Name	Sheathing Material	Fastener Size & Spacing	Total Bracing Width (in.)	Maximum Wall Height (ft.)	Design Value per Panel/Pier <sup>4,5</sup> (lbs.)
IBC/IRC Benchmark	3/8" OSB, Isolated 4'x8' panels, 6' from corners	2 3/8" x 0.113" nails, 6:12 spacing	96	Up to 10	1,000
12" CI PFH	OX-ISTM, SI-Strong, IsoRED CI, or Thermo-Ply® (Green, Red, or Blue Grade)	See Figure 3	12	8	1,280
				10	960
24" CI PFH	OX-ISTM, SI-Strong, IsoRED CI, or Thermo-Ply® (Green, Red, or Blue Grade)	See Figure 3	24	8	2,560
				10	1,920

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

- Capacity derived from multiple full-scale tests at SBCRI, as well as testing from other labs, showing the capacity of OSB sheathing in buildings constructed in accordance with the minimum requirements of the IRC.
- 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 of SBCRI testing of the PFH and 3/8" OSB as compared to the published capacities as defined in the IBC and SDPWS.
- For seismic design, reduce capacities by a factor of 1.4.
- Interpolation between the wall heights and pier widths for the 12" CI PFH & 24" CI PFH is permitted.
- 10'-high wall design values are provided here that use a 75% factor to reduce the 8'-high wall design values generated by the SBCRI test data.

- 5.3.3 Based on the SBCRI test results using the equivalency principle as defined in IBC Section 104.11 and IRC Section R104.11, the IsoRED CI, and Thermo-Ply® 12" to 24" CI PFH are assigned the recommended design values for designs controlled by wind or gravity loading conditions as provided in Table 2.
- 5.3.4 The design values for the OX-ISTM, SI-Strong, IsoRED CI, and Thermo-Ply® 12" to 24" CI PFH are based on SBCRI testing and the evaluation of the test data compared to 3/8" OSB braced wall panel test data using Method WSP.
- 5.3.5 As detailed in Figure 3 through Figure 5, the maximum allowable compressive strength of the Ox 12" to 24" CI PFH is 11,156 lbs. per pier. Additional compressive capacity may be engineered into each pier. Structurally attaching full-height framing members within the pier cavity is one possible engineered option.
- 5.3.6 The design values in Table 2 show that the OX-ISTM, SI-Strong, IsoRED CI, and Thermo-Ply® PFH provide equivalent or better shear resistance to the code-compliant benchmark (IBC/IRC 3/8" OSB).
- 5.4 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

6 INSTALLATION:

- 6.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.
- 6.2 General Applications
- 6.2.1 OX-ISTM, SI-Strong, IsoRED CI and Thermo-Ply® shall be installed in accordance with the manufacturer’s published installation instructions and this TER as defined in Figure 3, Figure 4, and Figure 5.
- 6.2.2 In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.
- 6.3 Orientation
- 6.3.1 OX-ISTM, SI-Strong, IsoRED CI





- 6.3.1.1 OX-IST™, SI-Strong and IsoRED CI may be installed vertically or horizontally over studs with framing that has a nominal thickness of not less than 2” (50.8 mm) and spaced a maximum of 24” (610 mm) o.c.
- 6.3.1.2 Sheathing joints must be butted at framing members, and all panel edges shall be blocked with framing that has a nominal thickness of not less than 2” (50.8 mm) and spaced a maximum of 24” (610 mm) o.c. A single row of fasteners must be applied to each panel edge into the stud or blocking below. Do not tack product to framing, but fasten each panel completely after fastening begins.
- 6.3.2 Thermo-Ply®
  - 6.3.2.1 Thermo-Ply® may be installed in either the vertical or horizontal orientation. To be recognized for the structural values listed in this TER, or as a water or air barrier, all joints must be backed by studs, plates, or blocks and fastened.
- 6.4 *Fastener Type*
  - 6.4.1 OX-IST™, SI-Strong, IsoRED CI and Thermo-Ply®
    - 6.4.1.1 Minimum <sup>15</sup>/<sub>16</sub>” crown, 16 ga. staples or minimum 0.120” x galvanized roofing nail. Length of fastener to provide 1” embedment into framing.
    - 6.4.1.2 Fasteners shall be installed with a nominal edge distance of <sup>3</sup>/<sub>8</sub>” (9.5 mm).
    - 6.4.1.3 Where used, always fasten staples parallel to the framing member.
    - 6.4.1.4 Fasteners for Thermo-Ply® shall be driven such that the head of the fastener is in contact with the surface of the sheathing. Do not overdrive fasteners.
- 6.5 *Treatment of Joints*
  - 6.5.1 OX-IST™, SI-Strong and IsoRED CI
    - 6.5.1.1 OX-IST™, SI-Strong and IsoRED CI sheathing joints must be butted at framing members, and a single row of fasteners must be applied to each panel edge into the stud below. Run staples parallel to framing.
  - 6.5.2 Thermo-Ply®
    - 6.5.2.1 Lapped joints shall be overlapped <sup>3</sup>/<sub>4</sub>” (19 mm) (nominal) and fastened with a single row of fasteners. Always run staples parallel with framing.
    - 6.5.2.2 Butt joints shall be placed over framing members and fastened with a single row of fasteners at each panel edge and shall be installed with a small gap (<sup>1</sup>/<sub>16</sub>” to <sup>1</sup>/<sub>8</sub>”) between panels.
- 6.6 *Structural Applications*
  - 6.6.1 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

## 7 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 OX-IST™, SI-Strong, IsoRED CI and Thermo-Ply® 12” CI PFH Braced Wall Panel Testing in a 23’ wall using a PFH Double Portal Frame Under Laterally Applied Cyclic Loading, conducted by SBCRI, based on *ASTM E2126*
- 7.2 OX-IST™, SI-Strong, IsoRED CI and Thermo-Ply® 24” CI PFH Braced Wall Panel Testing in a 23’ wall using a PFH Double Portal Frame Under Laterally Applied Cyclic Loading, conducted by SBCRI, based on *ASTM E2126*
- 7.3 OX-IST™, SI-Strong, IsoRED CI and Thermo-Ply® 12” CI PFH and 24” CI PFH Braced Wall Panel Testing in a 12’ x 30’ Full Scale Building Double Portal Frame Performance Under Laterally Applied Monotonic Loading, conducted by SBCRI, based on *ASTM E564*
- 7.4 Comparison Braced Wall Panel testing using Method WSP with <sup>3</sup>/<sub>8</sub>” OSB. Multiple tests conducted using *ASTM E2126* cyclic loading protocols and *ASTM E564* for Monotonic testing. Multiple tests conducted providing continued confirmation of the capacity of <sup>3</sup>/<sub>8</sub>” OSB performance in a braced wall line. Testing conducted by SBCRI.





- 7.5 *ASTM E2126* Cyclic Lateral Wall Testing of Portal Frames with Southern Pine Bottom Plates conducted by SBCRI
- 7.6 Some information contained herein is the result of testing and/or data analysis by other sources which conform to *IBC Section 1703* and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.
- 7.7 Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., *IBC*, *IRC*, *NDS®*, and *SDPWS*). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

## 8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
  - 8.1.1 The testing and generally accepted engineering analysis performed provides the basis for the use of the OX-IS™, SI Strong, IsoRED CI and Thermo-Ply® 12” to 24” CI PFH as a substitution for a 4' braced wall panel using 3/8” OSB, fastened 6:12 with 23/8” x 0.113” diameter nails, and have the relative performance as defined in Table 2.
  - 8.1.2 The testing and engineering analysis performed provides the basis for the use of the OX-IS™, SI-Strong, IsoRED CI and Thermo-Ply® 12” to 24” CI PFH in all locations that require the use of a 4' BWP within the *IBC* and *IRC*.
- 8.2 *IBC Section 104.11* (*IRC Section R104.11* and *IFC Section 104.9* are similar) 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, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code...Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.
- 8.3 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.
  - 8.3.1 No known variations

## 9 CONDITIONS OF USE

- 9.1 The OX-IS™, SI-Strong, IsoRED CI and Thermo-Ply® 12” to 24” CI PFH described in this TER comply with, or are suitable alternatives to, the applicable sections of the *IBC* and the *IRC* listed in Section 2 and are subject to the following conditions:
  - 9.1.1 This TER and the installation instructions, when required by a code official, shall be submitted at the time of permit application.





- 9.1.2 Where required by the statutes of the jurisdiction where the building is to be constructed, the design drawings shall be prepared by a Registered Design Professional licensed in the jurisdiction.
- 9.1.3 Sheathing material located on the exterior side of the portal frame shall be one of the following:
  - 9.1.3.1 ½” minimum OX-IS™, SI-Strong, or IsoRED CI
  - 9.1.3.2 Green, Red, or Blue grade Thermo-Ply®
- 9.1.4 Each portal frame may replace 4' of braced wall panel. All other braced wall provisions shall be followed per the applicable code.
- 9.2 Where required by the *building official*, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of *permit* application.
- 9.3 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.4 *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 (e.g., *owner* or *registered design professional*).
- 9.5 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.6 This product is manufactured under a third-party quality control program in accordance with *IBC Section 104.4* and *110.4* and *IRC Section R104.4* and *R109.2*.
- 9.7 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the *owner* or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the *building official* for acceptance.
- 9.8 The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the *building official's* inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

## 10 IDENTIFICATION

- 10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at [oxengineeredproducts.com](http://oxengineeredproducts.com).

## 11 REVIEW SCHEDULE

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

