DrJ™ CERTIFICATION

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17065 PRODUCT CERTIFICATION BODY

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

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Technical Evaluation Report

TER 1902-02

PUReWall™ by Hunter Panels

Hunter Panels

Product:

Hunter PW-CG and Hunter PW-STR

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Subject to Renewal:

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COMPANY INFORMATION:

Hunter Panels

15 Franklin St
Portland, ME 04101-4169

888-746-1114

hunterpanels.com

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 21 00 - Thermal Insulation

SECTION: 07 25 00 - Water-Resistive Barriers/Weather Barriers

1 PRODUCTS EVALUATED[1]

1.1 Hunter PW-CG

1.2 Hunter PW-STR

1.2.1 Throughout this TER, wherever PUReWall™ is cited, the provisions are applicable to Hunter PW-CG and Hunter PW-STR.

2 APPLICABLE CODES AND STANDARDS[2,3]

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 *IECC— 12, 15, 18: International Energy Conservation Code®*

[1] 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 ANAB-Accredited Product Certification Body – Accreditation #1131.

Through ANAB 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 or call us at 608-310-6748.

[2] 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.

[3] All terms defined in the applicable building codes are italicized.

2.2 *Standards and Referenced Documents*

2.2.1 *AAMA 711: Voluntary Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products*

2.2.2 *ACC: Guidance on Best Practices for the Installation of Spray Polyurethane Foam*

2.2.3 *ACC: Ventilation Considerations for Spray Polyurethane Foam*

2.2.4 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*

2.2.5 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

2.2.6 *ASHRAE Handbook - Fundamentals: Heat, Air, and Moisture Control in Building Assemblies - Material Properties*

2.2.7 *ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

2.2.8 *ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics*

2.2.9 *ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics*

2.2.10 *ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics*

2.2.11 *ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging*

2.2.12 *ASTM D2842: Standard Test Method for Water Absorption of Rigid Cellular Plastics*

2.2.13 *ASTM D6226: Standard Test Method for Open Cell Content of Rigid Cellular Plastics*

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

2.2.15 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*

2.2.16 *ASTM E283: Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen*

2.2.17 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

2.2.18 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

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

2.2.20 *ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*

2.2.21 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*

2.2.22 *ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials*

2.2.23 *NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*

2.2.24 *SBCA: Guide for Handling, Installing & Temporary Bracing of Wall Panels*

3 PERFORMANCE EVALUATION

3.1 The PUReWall™ was evaluated to determine:

3.1.1 Structural performance under lateral load conditions for use as an alternative to the *IRC* Continuous Wall Bracing provisions of *IRC* Section R602.10.4 Method CS-WSP (continuously sheathed wood structural panel) and CS-PF (continuously sheathed portal frame).

3.1.2 Structural performance under lateral load conditions for use as an alternative to the Conventional Wall Bracing provisions of *IBC* Section 2308.6.3, Method 3, for Type V construction.

3.1.3 Structural performance under lateral load conditions for both wind and seismic loading for use with the performance-based provisions of *IBC* Section 2306.1 and 2306.3 for light-frame wood wall assemblies.

3.1.3.1 Table 5 provides seismic design coefficients (SDC) that conform to the requirements in *ASCE 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 7* (i.e., all SDC).

3.1.3.2 The basis for equivalency testing is outlined in Section 12.2.1 of *ASCE 7*:

> Seismic force-resisting systems not contained in Table 12.2-1 are permitted provided analytical and test data are submitted to the authority having jurisdiction for approval that establish their dynamic characteristics and demonstrate their lateral force resistance and energy dissipation capacity to be equivalent to the structural systems listed in Table 12.2-1 for equivalent values of response modification coefficient, R, over strength factor, Ω_o, and deflection amplification factor, C_d.

3.1.3.3 The SDC evaluation uses the approach found in documentation entitled "Equivalency Characteristics and Parameters for Proprietary Shear Walls Used in Wood Framed or Cold-formed Steel Construction"[4] and "Seismic Design Coefficients: How they are determined for light-frame components"[5] using code-defined accepted engineering procedures, experience, and technical judgment.

3.1.4 Structural performance under lateral load conditions for use as an alternative to *ANSI/AWC SDPWS* Section 4.3 Wood-Frame Shear Walls.

3.1.5 Structural performance under transverse load conditions for use as an exterior wall covering in accordance with *IBC* Chapter 14 and *IRC* Chapter 7.

3.1.6 Continuous insulated sheathing requirements for thermal resistance (R-value) complying with the provisions of *IRC* Section N1102 and *IECC* Section C402.

3.1.7 Performance for use as a component of the air barrier in accordance with *IRC* Section N1102.4.1 and *IECC* Section R402.4.1.1 and C402.1.1[6].

3.1.8 Surface burn characteristics complying with the provisions of *IBC* Section 2603.3 and *IRC* Section R316.3.

3.1.9 Performance of the PUReWall™ for use as a water-resistive barrier (WRB) in accordance with *IBC* Section 1402.2[7] and *IRC* Section R703.2.

3.2 Performance of the PUReWall™ or any of its component materials as used in the normal construction process is outside the scope of this TER.

3.2.1 This includes storage, weather conditions, durability considerations, handling, installing, restraining and bracing of the PUReWall™ through the shipping, storing and construction means and methods process.

3.3 Use of the PUReWall™ in a portal frame with hold-downs (PFH) is outside the scope of this TER.

3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

3.5 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within DrJ's professional scope of work.

[4] http://www.structuremag.org/wp-content/uploads/2014/08/C-StructuralPerformance-Nelson-Aug081.pdf

[5] http://www.sbcmag.info/article/2014/seismic-design-coefficients-how-they-are-determined-light-frame-components

[6] 2012 *IBC* Section C402.4.1.1

[7] 2015 *IBC* Section 1403.2

4 PRODUCT DESCRIPTION AND MATERIALS

4.1 PUReWall™ is a proprietary wall system consisting of Hunter PW-STR Spray Polyurethane Foam (SPF) combined with rigid Foam Plastic Insulated Sheathing (FPIS).

4.1.1 PUReWall™ described in this TER and shown in Figure 1 and Figure 2 contains a combination of the following materials:

4.1.1.1 1½" to 2" Hunter PW-STR SPF Structural Wall Insulation

4.1.1.2 1" to 2" Hunter Panel PW-CG Polyiso FPIS product

4.1.2 PUReWall™ may be manufactured with a 28-gage galvannealed steel sheathing option, where steel sheathing is attached to the exterior face of the studs, underneath the FPIS. Steel is not shown in the following figures.

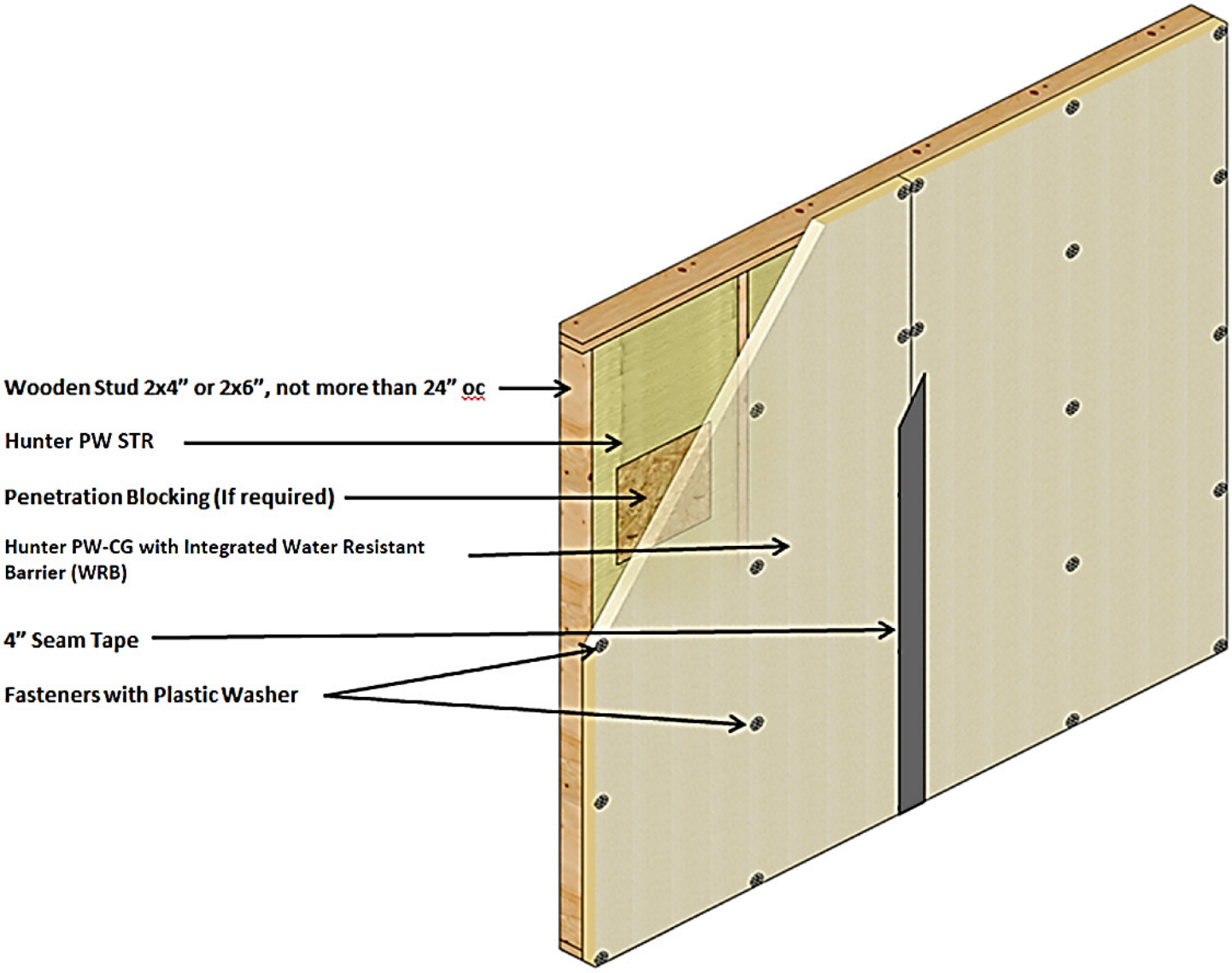


FIGURE 1. ILLUSTRATION OF THE PUREWALL™

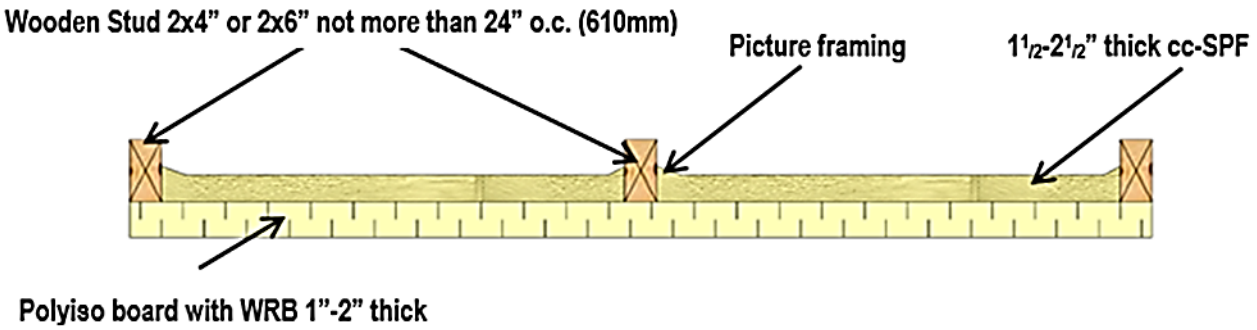


FIGURE 2. CROSS SECTION OF PUREWALL™

5 APPLICATIONS

5.1 *General*

5.1.1 PUReWall™ is used in buildings constructed in accordance with the *IRC* requirements for light-frame wood construction.

5.1.2 PUReWall™ is used in buildings constructed in accordance with the *IBC* requirements for Type V light-frame construction.

5.1.3 PUReWall™ is used to provide:

5.1.3.1 Lateral load resistance (wind and seismic) for braced wall panels and shear walls.

5.1.3.2 Transverse load resistance (wind positive and negative pressure).

5.1.3.3 Thermal resistance in the exterior wall component of the building thermal envelope.

5.1.3.4 Water resistant barrier.

5.1.3.5 Air barrier.

5.2 *Structural Applications*

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

5.2.2 *General Structural Provisions:*

5.2.2.1 Except as otherwise described in this TER, the PUReWall™ shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth therein for the design and installation of wood structural panels (WSP) and shear walls.

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

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

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

5.2.2.2.2 For seismic design, anchor bolt spacing shall not exceed 4' o.c. (1219 mm).

5.2.2.3 The maximum aspect ratio for full height PUReWall™ braced wall segments shall be 4:1.

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

5.2.2.5 Minimum panel widths shall satisfy the requirements of *IRC* Table R602.10.5.

5.2.2.6 All Hunter PW-CG panel edges shall be supported with dimensional lumber or blocking a minimum 2" (51 mm) nominal in the least dimension.

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

5.2.3 *Prescriptive IRC Bracing Applications:*

5.2.3.1 PUReWall™ may be used to brace walls of buildings as an alternative to the *IRC* Continuous Wall Bracing provisions, *IRC* Section R602.10.4 (CS-WSP), in accordance with the bracing amounts shown in Table 1, as adjusted in accordance with *IRC* Table R602.10.3(2) for wind design.

5.2.3.2 Use of PUReWall™ with Method CS-PF is also permitted in lieu of WSP specified in accordance with *IRC* Section R602.10.6.4.

TABLE 1. PUREWALL™ (1″ FPIS) REQUIRED BRACING LENGTHS FOR INSTALLATION WITH ½" GYPSUM WALLBOARD @ MAXIMUM 24" O.C. STUD SPACING IN ACCORDANCE WITH THE *IRC* BRACING PROVISIONS – WIND

Condition	Braced Wall Line Spacing (ft)	Length of Wall Line to be Braced[2] (ft)				
		Wind Speed, V_{asd} (mph)				
		≤ 110	≤115	≤ 120	≤ 130	≤ 140
One Story or the Top of Two or Three Stories	10	1.2	1.5	1.5	1.9	1.9
	20	2.3	2.7	2.7	3.1	3.9
	30	3.5	3.5	3.9	4.6	5.4
	40	4.2	4.6	5.0	5.8	6.9
	50	5.4	5.8	6.2	7.3	8.5
	60	6.2	6.9	7.3	8.5	10.0
First Story of Two Stories or Second Story of Three Stories	10	2.3	2.7	2.7	3.5	3.9
	20	4.2	5.0	5.4	6.2	6.9
	30	6.2	6.9	7.3	8.9	10.0
	40	8.1	8.9	9.6	11.6	13.1
	50	10.0	10.8	11.9	13.9	16.2
	60	11.9	13.1	14.2	16.6	19.3
First Story of Three Stories	10	3.5	3.9	4.2	5.0	5.8
	20	6.5	6.9	7.7	8.9	10.4
	30	9.2	10.0	11.2	13.1	15.0
	40	11.9	13.1	14.2	16.9	19.3
	50	14.6	16.2	17.7	20.4	23.9
	60	17.7	19.3	20.8	24.3	28.1

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

1. Installation with ½" gypsum wallboard at maximum 24" o.c. stud spacing. PUReWall™ fastened using #9 screw, 2-½" long SCRAIL® fasteners from Fasco®, or 0.148" diameter nails, with minimum 1" plastic washers spaced 24" o.c. along the edges and 48" o.c. in the field.
2. Demonstrates equivalency to *IRC* Table R602.10.3(1). Design assumptions in this table are the same as those found in the *IRC* bracing tables (e.g., Exposure B, 30' mean roof height, etc.). All adjustment factors from *IRC* Table R602.10.3(2) shall be applied. Except when used with method CS-PF, a minimum of ½" gypsum sheathing shall be applied to the interior side of the PUReWall™ assembly and fastened with minimum 5d cooler nails or 1¼" #6 type W or S screws spaced 16" o.c. at panel edges and 16" o.c. in the field of the panels.
3. Where gypsum wallboard is not applied to the interior side of the PUReWall™ assembly, bracing lengths shall be multiplied by a factor of 1.5.
4. Bracing lengths are the result of comparative equivalency testing and analysis using both tested and published design values as points of comparison.
5. Wind speeds shown are Vult in accordance with *ASCE 7*. To convert to equivalent V_{asd} wind speed, $V_{asd} = V_{ult}/1.26$.

5.2.3.3 For seismic design, required braced wall panel lengths for PUReWall™ 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.

TABLE 2. PUREWALL™ (1" MIN FPIS) REQUIRED BRACING LENGTHS FOR THE *IRC* BRACING PROVISIONS[1] – SEISMIC

Condition	Braced Wall Line Length (ft)	Length of Wall Line to be Braced[2] (ft)			
		SDC C (townhouses only)	SDC D_0	SDC D_1	SDC D_2
One Story or the Top of Two or Three Stories	10	1.1	1.3	1.3	1.6
	20	2.1	2.4	2.6	3.3
	30	3.2	3.5	3.9	4.9
	40	4.2	4.7	5.3	6.5
	50	5.3	5.9	6.5	8.2
First Story of Two Stories or Second Story of Three Stories	10	2.0	2.4	2.9	3.6
	20	3.9	4.9	5.9	7.3
	30	5.9	7.4	8.9	10.8
	40	7.9	9.9	11.8	14.4
	50	9.9	12.3	14.7	18.0
First Story of Three Stories	10	2.9	3.4	3.9	NP
	20	5.9	6.9	7.9	NP
	30	8.9	10.3	11.8	NP
	40	11.8	13.8	15.7	NP
	50	14.7	17.1	19.6	NP

SI: 1 in = 25.4 mm

1. Installation with ½" gypsum wallboard at maximum 24" o.c. stud spacing. PUReWall™ fastened using #9 screw or 0.148" diameter nails, with minimum 1" plastic washers spaced 24" o.c. along the edges and 48" o.c. in the field. Minimum 1" penetration into the framing.
2. Demonstrates equivalency to *IRC* Table R602.10.3(3). Design assumptions in this table are the same as those found in the *IRC* bracing tables. All adjustment factors from *IRC* Table R602.10.3(4) shall be applied. Except when used with method CS-PF, a minimum of ½" gypsum sheathing shall be applied to the interior side of the PUReWall™ assembly and fastened with minimum 5d cooler nails or 1-¼" #6 type W or S screws spaced 16" o.c. at panel edges and 16" o.c. in the field of the panels.
3. Tabulated bracing lengths are based on the following:
   a. Soil Class D
   b. 10 psf floor dead load
   c. 15 psf roof/ceiling dead load
   d. Braced PUReWall™ line spacing ≤ 25' and PUReWall™ height = 10'
4. Linear interpolation is permitted.
5. Bracing lengths are the result of comparative equivalency testing and analysis using both tested and published design values as points of comparison.

5.2.3.4 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.

5.2.1 *PUReWall™ CS-PF Portal Frame:*

5.2.1.1 The PUReWall™ CS-PF consists of 28 gauge sheet steel sheathing (fastened as specified in Figure 3) and 1½" SPF insulation in the cavity.

5.2.1.2 The PUReWall™ CS-PF was tested and evaluated for equivalency to the *IRC* Method CS-PF in accordance with *IRC* Section R602.10.6.4 and *IRC* Table R602.10.5.

5.2.1.3 *IRC* Table R602.10.5 establishes the contributing length of bracing of the CS-PF as equivalent to 1.5 times its actual length and that it contributes this length of bracing to that required by method CS-WSP.

5.2.1.4 The capacity of the PUReWall™ CS-PF exceeds the capacity of the *IRC* Method CS-WSP and is therefore permitted to be substituted for an equivalent length of bracing (i.e. 1.5 times its actual length).

5.2.1.5 The PUReWall™ CS-PF is shown in Figure 3, Figure 4, and Figure 5.

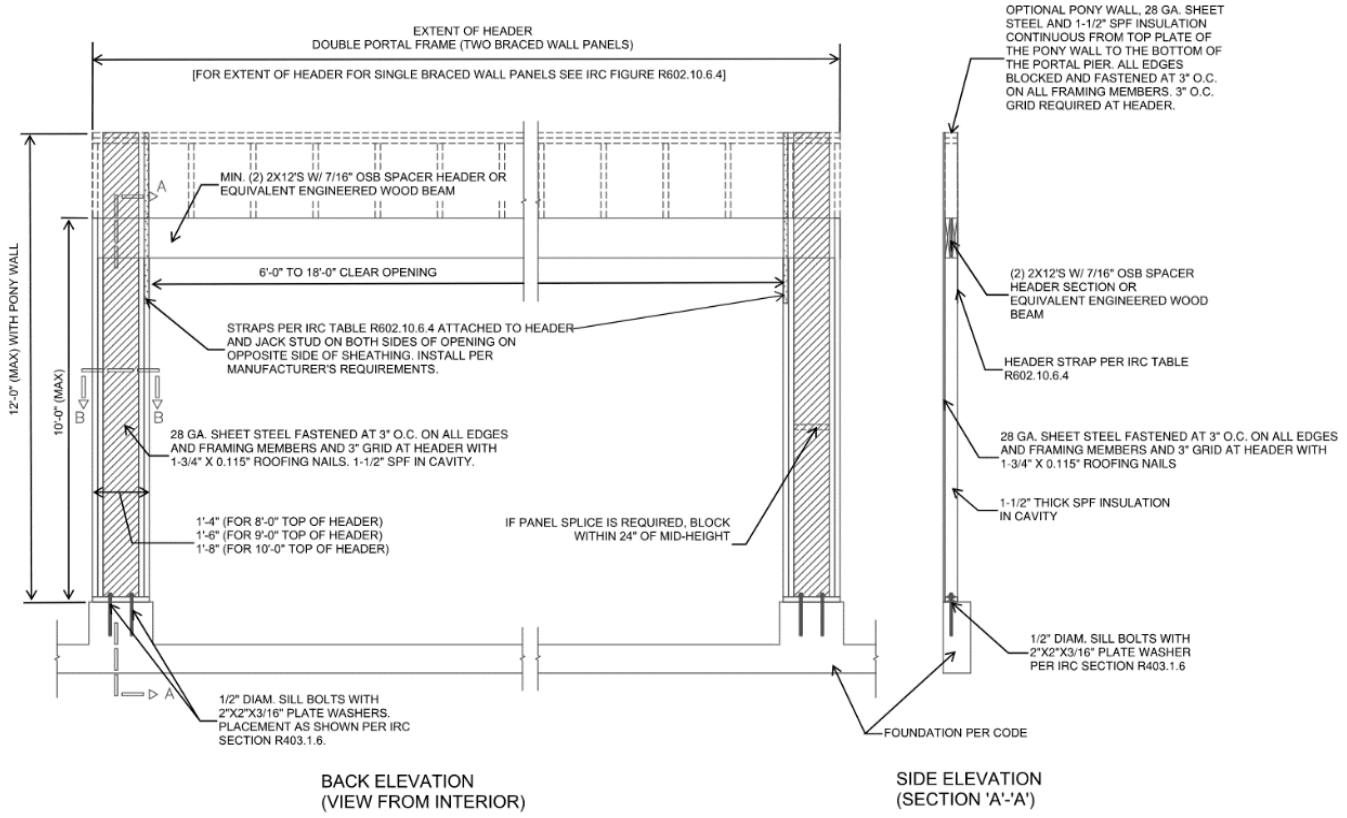


FIGURE 3. CS-PF DETAIL – FRONT FROM INTERIOR

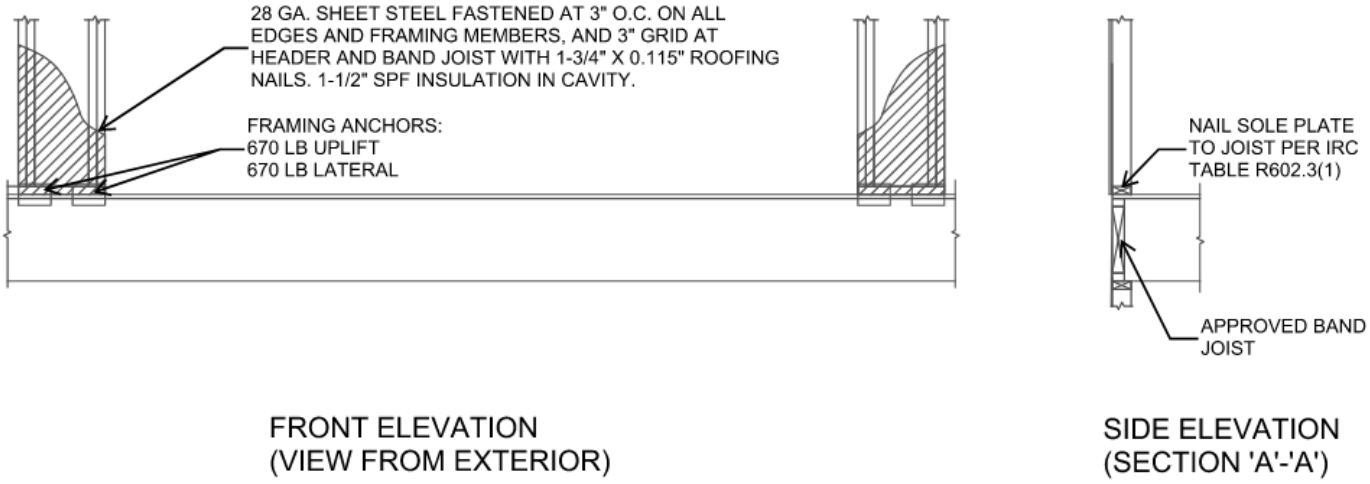


FIGURE 4. CS-PF DETAIL – FRAMING ANCHOR OPTION

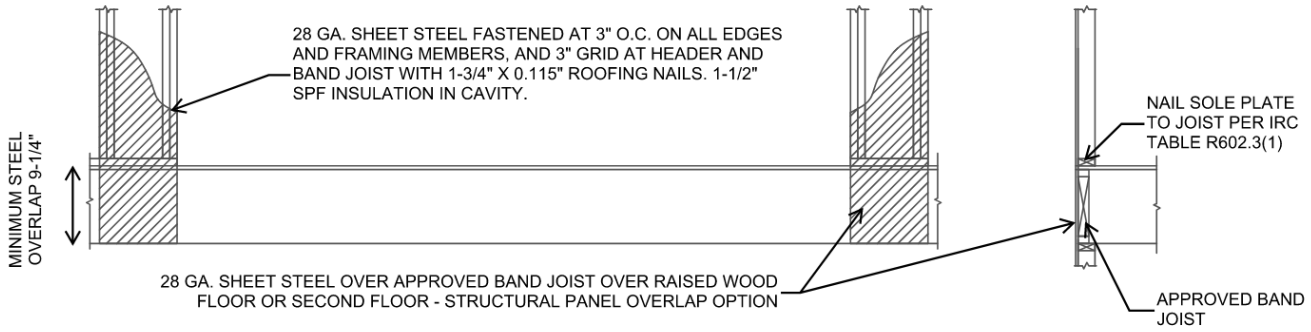


FIGURE 5. CS-PF DETAIL – PANEL OVERLAP OPTION

5.2.2 *Alternative Prescriptive IRC Bracing Applications*:

5.2.2.1 As an alternative to Section 5.2.3, the following provisions are permitted:

5.2.2.1.1 PUReWall™ may be used to brace walls of buildings as an alternative to the Continuous Wall Bracing provisions of *IRC* Section R602.10.4, when installed in accordance with this TER.

5.2.2.1.2 Required braced wall panel lengths for PUReWall™ shall be as determined by the equivalency factor shown in Table 3 and *IRC* Table R602.10.3(1) including all footnotes.

5.2.2.1.2.1 Bracing lengths in these tables for Method CS-WSP shall be multiplied by the equivalency factor listed in Table 3.

TABLE 3. PUREWALL™ (1" MIN FPIS) BRACED WALL LINE LENGTH EQUIVALENCY FACTORS – WIND

Wall Assembly	Gypsum Sheathing (16:16)	Maximum Stud Spacing (in)	FPIS Fastener	Fastener Spacing	PUReWall™ Tested Equivalency Factors to *IRC* CS-WSP[1]
1" FPIS	Yes	24 o.c.	#9 Screw with plastic washer or Minimum 0.148 diameter nail	24:48	0.77

SI: 1 in = 25.4 mm

1. SPF framing
2. Fastener heads shall be installed flush to the surface of the sheathing, fastened using a #9 screw, a 2-½" SCRAIL® fastener or 0.148" diameter nails, with minimum 1" plastic washers spaced 24" o.c. along the edges and 48" o.c. in the field. Minimum 1" penetration into the framing.
3. 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.
4. Where gypsum wallboard is not applied to the interior side of the PUReWall™ assembly, bracing lengths shall be multiplied by a factor of 1.5.
5. Valid for double top plate PUReWall™ installations.

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

5.2.2.1.2.3 PUReWall™ tested equivalency factors in Table 3 allow the user to determine the length of bracing required, by multiplying the factor from Table 3 by the length shown in the CS column in *IRC* Table R602.10.3(1), as modified by all applicable factors in Table R602.10.3(2).

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

5.2.3 *Prescriptive IBC Conventional Light-Frame Wood Construction*

5.2.3.1 PUReWall™ may be used to brace exterior walls of buildings as an equivalent alternative to Method 3 of the *IBC* when installed continuously along the length of the braced wall line with ½" (13 mm) gypsum on the interior fastened with a minimum 5d cooler nail or #6 type W or S screw spaced a maximum of 16" o.c. (406 mm) at panel edges and 16" o.c. in the field. Bracing shall be in accordance with the conventional light-frame construction method of *IBC* Section 2308.6[8] and this TER.

5.2.4 *Performance-Based Wood-Framed Construction*

5.2.4.1 PUReWall™ designed as shear walls are permitted to be designed in accordance with the methodology used in SDPWS for WSP using the capacities shown in Table 4 through Table 7.

5.2.4.2 PUReWall™ shear walls are permitted to resist horizontal wind load forces using the allowable shear loads (in pounds per linear foot) set forth in Table 4.

TABLE 4. PUREWALL™ (1"FPIS) ALLOWABLE STRESS DESIGN (ASD) CAPACITY – WIND

Wall Assembly	Fastener & Spacing (edge:field)[1,2]	Maximum Stud Spacing (in)	Gypsum Wallboard (GWB)	Allowable Unit Shear Capacity (plf)
PUReWall™	#9 Screw or minimum 0.148 diameter nail (24:48), 1 inch washer required[3]	24 o.c.	No GWB	380
			½" GWB	470
PUReWall™ w/ Steel Sheet[4]	1¾" x 0.120" roofing nails (3":6")	16 o.c.	No GWB	915

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

1. Minimum 1" penetration into the framing.
2. Sheathing used in the PUReWall™ shall have joints butted at framing members, and a single row of fasteners must be applied to each panel edge into the stud below.
3. Minimum fastener size and spacing are as shown with a minimum panel edge distance of ⅜".
4. The exterior face of the wall is sheathed with 28 ga. galvannealed sheet steel against the studs. Minimum edge distance of roofing nails is ¾" on the top and bottom of the panel and 3/8" along the sides.

5.2.4.3 PUReWall™ shear walls that require seismic design in accordance with *IBC* Section 1613 shall use the seismic allowable unit shear capacities set forth in Table 5.

5.2.4.3.1 The response modification coefficient, R, system overstrength factor, Ω_0, and deflection amplification factor, C_d, indicated in Table 5 shall be used to determine the base shear, element design forces, and design story drift in accordance with *ASCE 7* Chapter 12 and Section 14.5.

[8] 2012 *IBC* Section 2308.3

TABLE 5. PUREWALL™ (1" MIN FPIS) ALLOWABLE STRESS DESIGN (ASD) CAPACITY & SEISMIC DESIGN COEFFICIENTS

Seismic Force-Resisting System	Maximum Stud Spacing (in)	Gypsum Wallboard (GWB)[6]	Seismic Allowable Unit Shear Capacity[1]	Apparent Shear Stiffness, G_a (kips/in)	Response Modification Factor, R[2]	System Overstrength Factor, Ω_0[3]	Deflection Amplification Coefficient, C_d[4]	Structural System Limitations & Building Height Limit[5] (ft)				
								Seismic Design Category				
								B	C	D	E	F
PUReWall™	24 o.c.	No GWB	215	4.0	3	2.5	3	NL	NL	40	NP	NP
		½" GWB	280	5.6	3	2.5	3	NL	NL	40	NP	NP
PUReWall™ w/ Sheet Steel[7]	16 o.c.	No GWB	645	16.5	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

1. Allowable unit shear capacity is based on a safety factor of 2.5, in accordance with *ASCE 7* Chapter 12.
2. Response modification coefficient, R, for use throughout *ASCE 7*. Note: R reduces forces to a strength level, not an allowable stress level.
3. 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.
4. Deflection amplification factor, C_d, for use with *ASCE 7* Sections 12.8.6, 12.8.7, and 12.9.2.
5. NL = Not Limited. Heights are measured from the base of the structure as defined in *ASCE 7* Section 11.2.
6. Gypsum attached with minimum #6 type W or S screws 1¼" long spaced 16" o.c. at panel edges and in the field. Maximum stud spacing is 24" o.c.
7. The exterior face of the wall is sheathed with 28 ga. galvannealed sheet steel against the studs, and is attached with 1-¾" x 0.120" roofing nails spaced 3":6". Minimum edge distance of fasteners is ¾" on the top and bottom of the panel and 3/8" along the sides.

5.3 *Perforated Shear Walls*

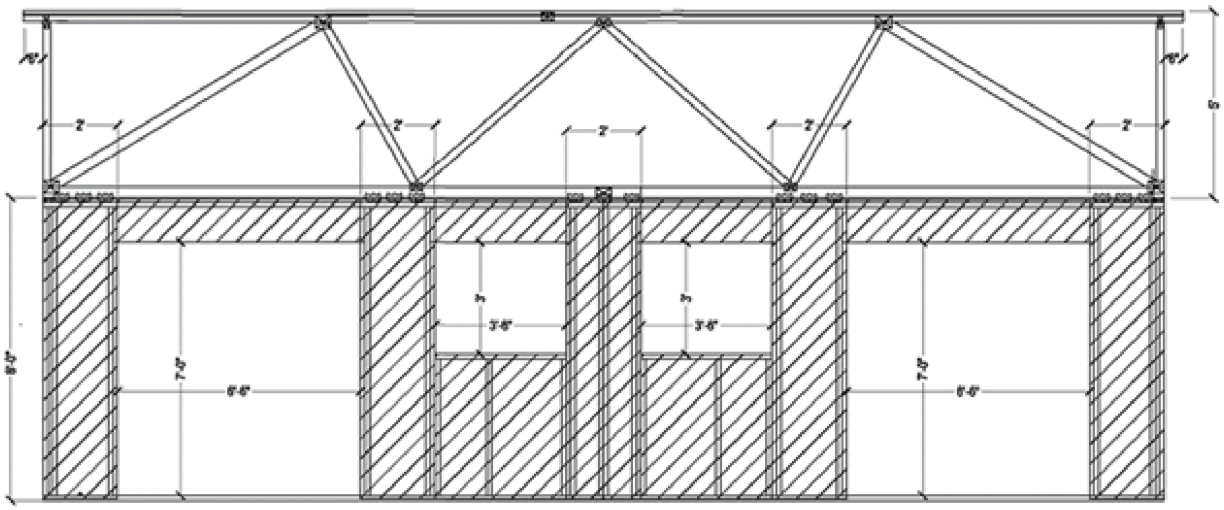
5.3.1 PUReWall™ shear walls are permitted to be designed in accordance with the methodology found in *SDPWS* Section 4.3.3.5. This section applies to the PUReWall™ without steel sheet. The following exceptions to SPDWS apply:

5.3.1.1 *SDPWS* Equation 4.3-5 for Co shall be replaced with the equation from Table 6.

TABLE 6. C_o FOR USE WITH *SDPWS* PERFORATED SHEAR WALL METHODOLOGY

Wall Assembly	Replacement for *SDPWS* Eq. 4.3-5
PUReWall™	$C_o = \frac{r}{(2.7 - 1.7 * r)} * \frac{L_{tot}}{\sum L_i}$

5.3.1.2 The following example shows how to calculate the capacity of a perforated shear wall (Figure 6) with the PUReWall™ assembly using Table 6.



$L_{tot} := 30\ ft$ — Total length of the perforated shear wall

$h := 8\ ft$ — Height of the perforated shear wall

$b_s := 2\ ft$ — Length of base of shear wall segment

$L_i := 2\ ft \cdot \left(\frac{2 \cdot b_s}{h}\right) = 1\ ft$ — Length of shear wall segment with aspect ratios greater than 2:1 adjusted in accordance with SDPWS Section 4.3.4.3

$\Sigma L_i := L_i \cdot 5 = 5\ ft$ — Summation of the five perforated shear wall segments

$A_o := \left(2 \cdot \left(7\ ft \cdot 6.5\ ft\right)\right) + \left(2 \cdot \left(3\ ft \cdot 3.5\ ft\right)\right) = 112\ ft^2$ — Total area of all four openings

$r := \frac{1}{\left(1 + \frac{A_o}{h \cdot \Sigma L_i}\right)} = 0.2632$ — Sheathing area ratio, SDPWS Eq. 4.3-6

$C_o := \left(\frac{r}{2.7 - 1.7 \cdot r}\right) \cdot \frac{L_{tot}}{\Sigma L_i} = 0.701$ — Shear capacity adjustment factor (replaces SDPWS Eq. 4.3-5)

$v := 380\ \frac{lb}{ft}$ — Allowable unit shear capacity for wind

$V_{perforated} := v \cdot \Sigma L_i \cdot C_o = 1332\ lb$ — Shear capacity of perforated shear wall, SDPWS Section 4.3.3.5

FIGURE 6. EXAMPLE OF A PERFORATED SHEAR WALL

5.4 *Transverse Wind Loading*

5.4.1 PUReWall™ installed over exterior framing spaced a maximum of 24" o.c. without an interior covering can resist allowable wind loads as shown in Table 7. Required components and cladding (C&C) loads to be resisted are found in *IBC* Section 1609.1.1 and *IRC* Table R301.2(2) and Section R301.2(3).

TABLE 7. SUMMARY OF TRANSVERSE LOAD RESISTANCE OF PUREWALL™ (1" MIN FPIS)

Wall Assembly	Allowable Design Value[4] (psf)	Allowable Components & Cladding Basic Wind Speed[2] (mph)	
		ASCE 7-05 (V_{asd})	*ASCE 7-10* and *7-16* (V_{ult})
PUReWall™ (1" FPIS)	105	160	210

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m2, 1 mph = 1.61 km/h

1. FPIS attached to wall framing at a maximum 24" at panel edges and 48" on intermediate studs using either a #9 screw or a minimum 0.148" diameter nail, with minimum 1" plastic washer. Minimum 1" penetration into the framing.
2. The attachment of the sheathing to the framing is primarily through the adhesion of the Hunter PW-STR SPF to the framing and FPIS. Average depth is 1.5".
3. Stud spacing shall be a maximum 24" o.c.
4. Allowable wind speeds are based on the following: Mean roof height 30', Exposure B, 10 sq. ft. effective wind area, corner zone 5.
5. Design value applies to both positive and negative wind load.

5.5 *Uplift and Compression Axial Loading*

5.5.1 PUReWall™ has been tested for both compression and uplift.

5.5.2 Table 8 shows the maximum allowable compression and uplift forces allowed in this application.

5.5.2.1 Designs using the allowable loads in Table 8 shall have a load path capable of transferring loads from their point of origin to their final point of resistance, in accordance with *IRC* Section R301.1.

5.5.2.2 Installation is permitted for double top plate applications only.

5.5.2.2.1 Where truss reactions are less than or equal to the values in Table 8, trusses can be set anywhere along the top plate as needed to frame the roof system.

TABLE 8. ALLOWABLE AXIAL ROOF FRAMING REACTIONS ON PUREWALL™ TOP PLATE

Wall Assembly	Interior Sheathing Material	Max. Allowable Roof Framing Uplift & Gravity Reaction[1] (plf)	
	Type	Uplift	Compression
PUReWall™	½" Lightweight Gypsum	390	1,350

SI: 1 in = 25.4 mm

1. Applicable to general placement anywhere along the wall top plate
2. Maximum allowable load assumes load is concentrated at the mid-span of the top plate between studs.
3. PUReWall™ assemblies are a maximum 24" o.c. stud spacing and a double top plate. All stud cavities are sprayed with Hunter PW-STR SPF. Roof framing assumed to be 24" o.c.
4. All other framing connections are in accordance with the applicable building code.
5. Uplift values apply to single bottom plates.

5.6 *Shear and Uplift Interactions*

5.6.1 PUReWall™ combined uplift and lateral loads can be calculated using Equation 1 when used with adequate hold downs on each end of the shear wall.

EQUATION 1

$$v = 470 - \frac{u^2}{325}$$

Values are based on allowable loads and where:

v = allowable unit shear capacity, plf

u = allowable unit uplift capacity, plf

5.6.2 When using QuickTie™ (QT) System cables spaced 4', 6', and 8' o.c., lateral loads can be calculated as follows:

5.6.2.1 Interaction equation for 4' o.c.

5.6.2.1.1 The allowable lateral load capacity is 385 plf for un-factored uplift loads of 520 plf or less. If the un-factored uplift load exceeds 520 plf, then the lateral load capacity can be calculated using Equation 2.

EQUATION 2

$$v = 2035 - 3.18 * u$$

5.6.2.2 Interaction equation for 6' o.c.

5.6.2.2.1 For un-factored uplift loads of 340 plf or less, the allowable lateral load capacity is calculated as in Equation 3.

EQUATION 3

$$v = 445 - 0.183 * u$$

5.6.2.2.2 If the un-factored uplift load exceeds 340 plf, then the lateral load capacity is calculated as in Equation 4.

EQUATION 4

$$v = 1710 - 3.92 * u$$

5.6.2.3 Interaction equation for 8' o.c.

5.6.2.3.1 The allowable lateral load capacity for un-factored uplift loads of 340 plf or less is calculated as in Equation 5.

EQUATION 5

$$v = 445 - 0.183 * u$$

5.6.2.3.2 If the un-factored uplift load exceeds 340 plf, then the lateral load capacity is calculated as in Equation 6.

EQUATION 6

$$v = 1710 - 3.92 * u$$

5.6.3 QuickTie™ (QT) System cables shall be sized per the manufacturer's design requirements.

5.6.4 An interaction diagram showing the allowable uplift and lateral loads for the PUReWall™ system is given in Figure 7.

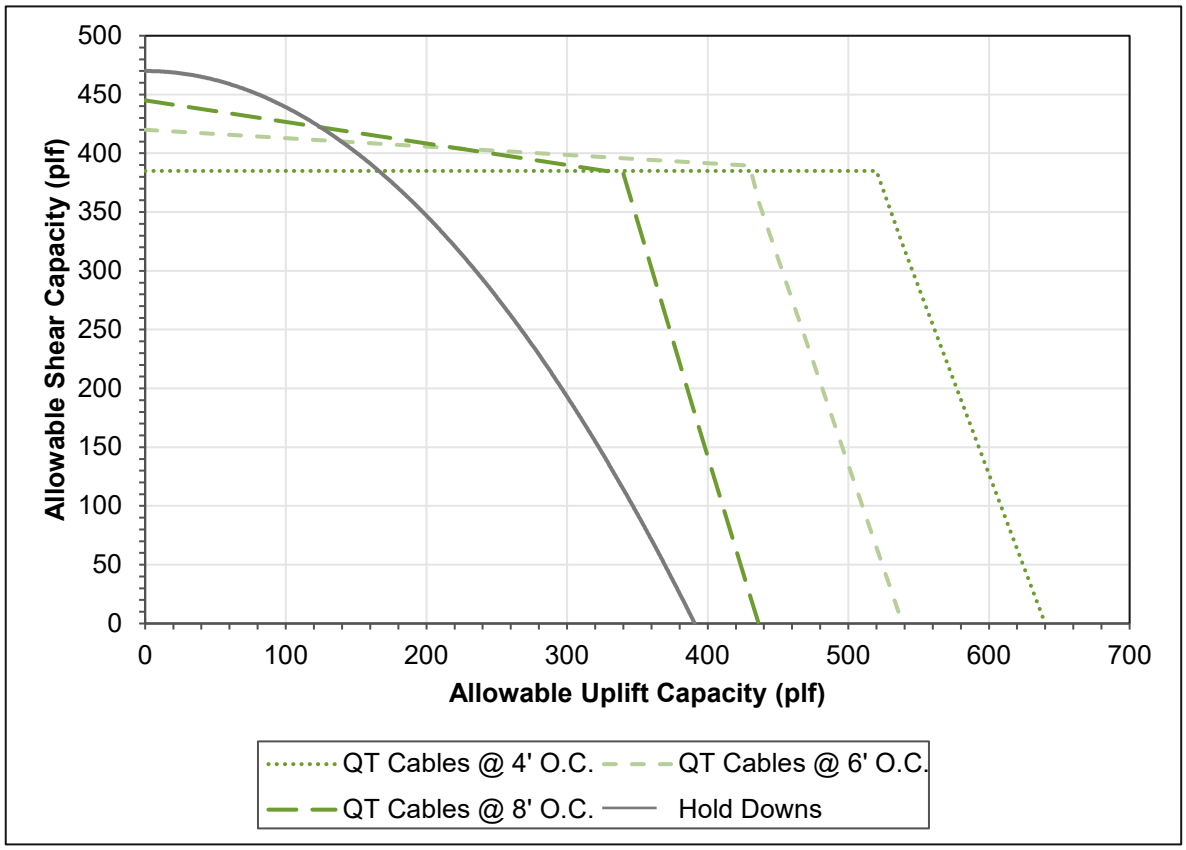


FIGURE 7. PUREWALL™ SYSTEM INTERACTION DIAGRAM FOR SHEAR AND UPLIFT

5.6.5 A comparison of the PUReWall™ systems under a unit shear load of 385 plf is given in Table 9.

TABLE 9. PUREWALL™ SYSTEM COMPARISON

Wall Type		Unit Shear, *v* (plf)	Allowable Unit Capacity, *u* (plf)
PUReWall™ System	QT Cables @ 4' o.c.	385	520
	QT Cables @ 6' o.c.		430
	QT Cables @ 8' o.c.		340
	Hold Downs		165
Wood Structural Panel Sheathing[1]	Nails-Single Row[2]	310	110
	Nails-Double Row[3]		430

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

1. Allowable capacities for wood structural panel sheathing are based on 7/16" OSB or plywood fastened with 8d common (0.131" dia. x 2½" long) nails spaced 6" o.c. along panel edges, 4" o.c. along the top and bottom plates, and 12" o.c. in the field.
2. Wood structural panels shall overlap the top member of the double top plate and bottom plate by 1½" and a single row of fasteners shall be placed ¾" from the panel edge.
3. Wood structural panels shall overlap the top member of the double top plate and bottom plate by 1½". Rows of fasteners shall be ½" apart with a minimum edge distance of ½". Each row shall have nails at the specified spacing.

5.7 *Water Resistive Barrier*

5.7.1 Where used as a water resistant barrier, the foam sheathing used as part of the PUReWall™ shall have all joints taped. Approved tapes are any 3.75" to 4" wide, non-foil, non-asphaltic tape meeting American Architectural Manufacturers Association (AAMA) specification 711. Tape must be applied in accordance with the sheathing manufacturer's recommendations or as defined in the PUReWall™ Quality Control Manual, otherwise shall be covered with a code-compliant WRB in accordance with *IBC* Section 1403.2[9] and *IRC* Section R703.2.

5.7.2 Flashing shall be installed at all sheathing penetrations and shall comply with all applicable code sections.

5.8 *IECC Compliance*

5.8.1 PUReWall™ meets the continuous insulated sheathing requirements complying with the provisions of *IRC* Section N1102 and *IECC* Section C402.

5.8.2 PUReWall™ has the thermal resistance shown in Table 10.

TABLE 10. PUREWALL™ THERMAL RESISTANCE PROPERTIES – COMPONENT R-VALUES

Component	Thickness (in)	R-Value ($h*ft^2*°F/Btu$)
Hunter PW-STR	1½	10
	2	13

SI: 1 in = 25.4 mm

1. In accordance with *ASTM C518*, aged 90 days

5.8.3 Given the R-values of common wall assembly components, listed in Table 11, the assembly R-value and U-Factor can be calculated for a wood framing construction assembly using the methods described in the California Energy Commission 2013 Joint Appendices Appendix JA4-5 Table 4.1.1 U-Factor Calculations for Wood Framed Assembly.

[9] 2015 *IBC* Section 1404.2

TABLE 11. PUREWALL™ ASSEMBLY COMPONENT STANDARD R-VALUES

Assembly Components	Component R-Value
Outside Air Film[1]	0.17
Vinyl Siding[1,4]	0.62
½" Hunter PW-CG[2]	3.0
1" Hunter PW-CG[2]	6.0
1 ½" Hunter PW-CG[2]	9.0
2" Hunter PW-CG[2]	12.0
3 ½" stud[5]	4.38
5 ½" stud[5]	6.9
1 ½" Hunter PW-STR[3]	10.0
2" Hunter PW-STR[3]	13.0
Fiberglass Batt[1]	13.0
1 ½" Header	1.88
1 ½" Hunter PW-STR Insulation in Header	10.0
Enclosed Air Cavity[1]	0.93
½" Interior Gypsum Board[1]	0.45
Interior Air Film[1]	0.68

1. ASHRAE Heat, Air and Moisture Control in Building Assemblies Ch. 26 Table 1.
2. Thermal values per manufacturers according to ASTM C518 in accordance with ASTM C1289.
3. Thermal values per Table 10 above.
4. Exterior cladding must be added as required. In this example vinyl is used.
5. ASHRAE® Heat, Air and Moisture Control in Building Assemblies – Examples Ch. 27.3 Two Dimensional Assembly U-Factor Calculation.

5.8.3.1 See Table 12 for an example of an assembly containing 2x4 wood framing spaced 24" o.c. with a 22% Framing Fraction, 1" Hunter PW-CG, and 1½" Hunter PW-STR.

TABLE 12. PUREWALL™ U-FACTOR CALCULATIONS FOR WOOD FRAMED ASSEMBLY[1] USING PUREWALL™

Assembly Components	Component R-Value	Assembly R-Value		
		Cavity (R_c)	Frame (R_f)	Insulated Header (R_h)
Outside Air Film[1]	0.17	0.17	0.17	0.17
Vinyl Siding[1,4]	0.62	0.62	0.62	0.62
1" Hunter PW-CG[2]	6.0	6.0	6.0	6.0
3 ½" Stud[5]	4.38	-	4.38	-
1 ½" Hunter PW-STR[3]	10	10	-	-
½" Hunter PW-CG				3.0
1 ½" Lumber Header[6]	1.88	-	-	3.76
Enclosed Air Cavity[1]	0.93	0.93	-	-
½" Interior Gypsum Board[1]	0.45	0.45	0.45	0.45
Interior air film[1]	0.68	0.68	0.68	0.68
Subtotal		**18.85**	**12.30**	**14.6**
U-Factors (1/R-Value)		0.053	0.081	0.068
Framing Fraction[5]		78%	18%	4%
Assembly U-Factor Calculation[5]	= (R_c x Framing Fraction) + (R_f x % Framing Fraction) + (R_h x % Framing Fraction) = (0.053 x .78) + (0.081 x .18) + (0.068 x .04) = 0.0413 + 0.01458 + 0.00272 = 0.0586			
Assembly U-Factor	**0.059**			

1. 2x4 Wood Framing, 24" o.c., 22% Framing Factor, 1" Hunter PW-CG, 1½" Hunter PW-STR
2. ASHRAE® Heat, Air and Moisture Control in Building Assemblies Ch. 26 Table 1
3. Thermal values per manufacturers according to *ASTM C518* in accordance with *ASTM C1289*.
4. Thermal values per Table 10 above.
5. Exterior cladding must be added as required. In this example vinyl is used.
6. ASHRAE® Heat, Air and Moisture Control in Building Assemblies –Examples Ch.27.3 Two Dimensional Assembly U-Factor Calculation.
7. Table values use a double header. Using a single header would allow for additional insulation, reducing the U-factor.

5.8.3.2 The same methodology used in Table 12, with alternate polyiso board and cc-SPF thicknesses, is shown in Table 13. The calculations use 2x4 and 2x6 framing spaced 24" o.c. with a 78/18/4% framing fraction with the same assembly components.

TABLE 13. PUREWALL™ U-FACTOR CALCULATIONS FOR WOOD FRAMED ASSEMBLY

Framing Used	Hunter PW-STR Thickness (in)[1]	U-Factor		
		Hunter PW-CG Thickness (in)[2]		
		1	1½	2
2x4	1½	0.059	0.050	0.043
	2	0.053	0.046	0.040
2x6	1½	0.053	0.043	0.038
	2	0.049	0.043	0.038

SI: 1 in = 25.4 mm

1. Exterior cladding must be added as required. In this example vinyl cladding is used.
2. ASHRAE® Heat, Air and Moisture Control in Building Assemblies – Examples Ch. 27.3 Two Dimensional Assembly U-Factor Calculation.

5.8.3.3 These U-factors can be compared to requirements found in *IECC* Table R402.1.4, which are in harmony with the *IBC* and *IRC*. As seen in Figure 8, 2015 Climate Zones 3-5 U-factors can be met with 1½" of Hunter PW-STR and 1" of Hunter PW-CG and Climate Zones 6-8 with 1½" of Hunter-STR and 2" of Hunter PW-CG.

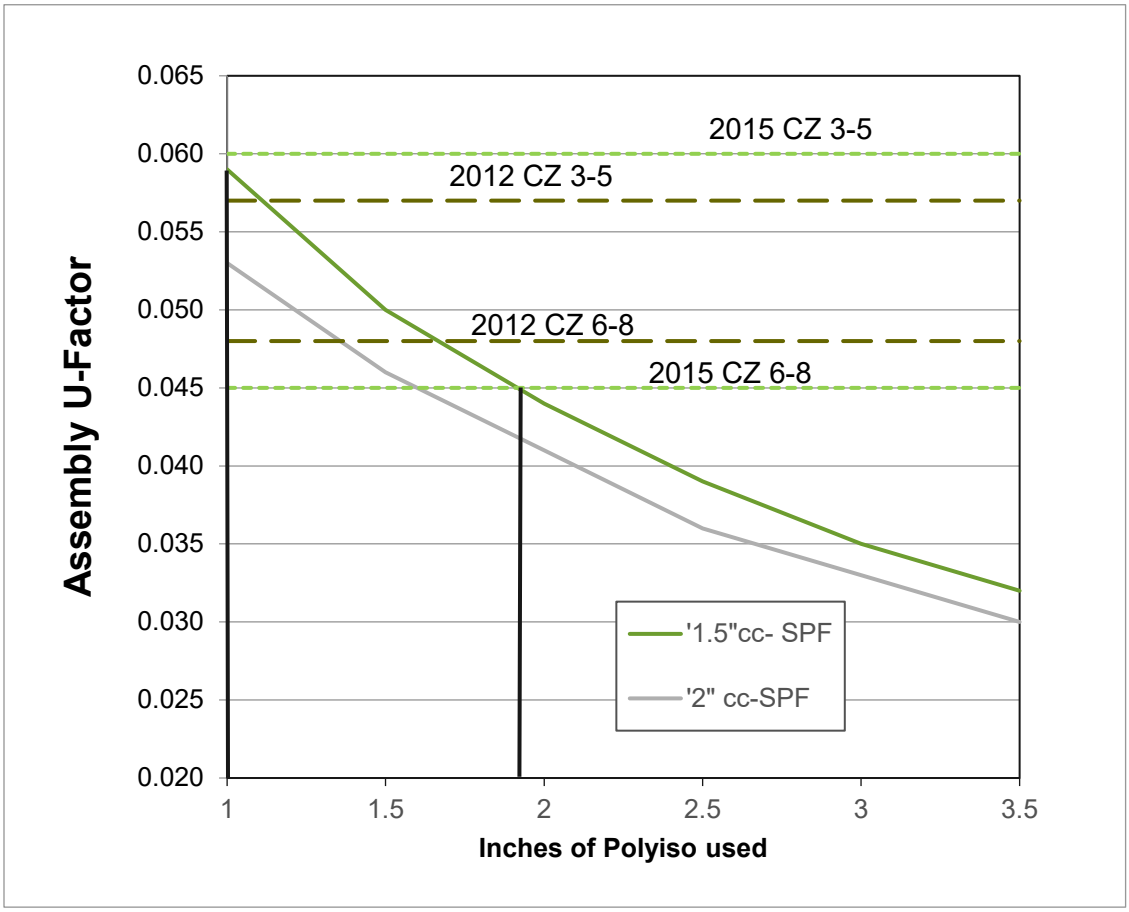


FIGURE 8. ASSEMBLY U-FACTORS FOR EACH SPF & POLYISO THICKNESS TO MEET IECC 2012 & 2015 REQUIREMENTS

5.9 *Air Barrier*

5.9.1 PUReWall™ meets the requirements of *IECC* Section C402 for use as a component of the air barrier, when installed in accordance with the manufacturer's installation instructions and this TER.

5.10 *Surface Burn Characteristics*

5.10.1 PUReWall™ has the flame spread characteristics shown in Table 14.

TABLE 14. SURFACE BURN CHARACTERISTICS OF PUREWALL™ COMPONENT, HUNTER PW-STR

Component	Flame Spread	Smoke Developed
Hunter PW-STR[1]	< 25	< 450

1. Tested in accordance with *ASTM E84*.

5.11 *Thermal Barrier Requirements – Attic, Crawlspace, or Other Uninhabitable Space Applications*

5.11.1 Installation shall be fully protected from the interior of the building by an approved 15-minute thermal barrier or ignition barrier, as required by *IBC* Section 2603.4 and *IRC* Section R316.4.

5.12 *One-hour Fire Rating*

5.12.1 PUReWall™ is approved for use as a one-hour fire resistance rated assembly when constructed in accordance with Figure 9.

5.12.2 This assembly is limited to the conditions where the fire resistance rating is from the interior (gypsum) side of the wall and the assembly is constructed as follows:

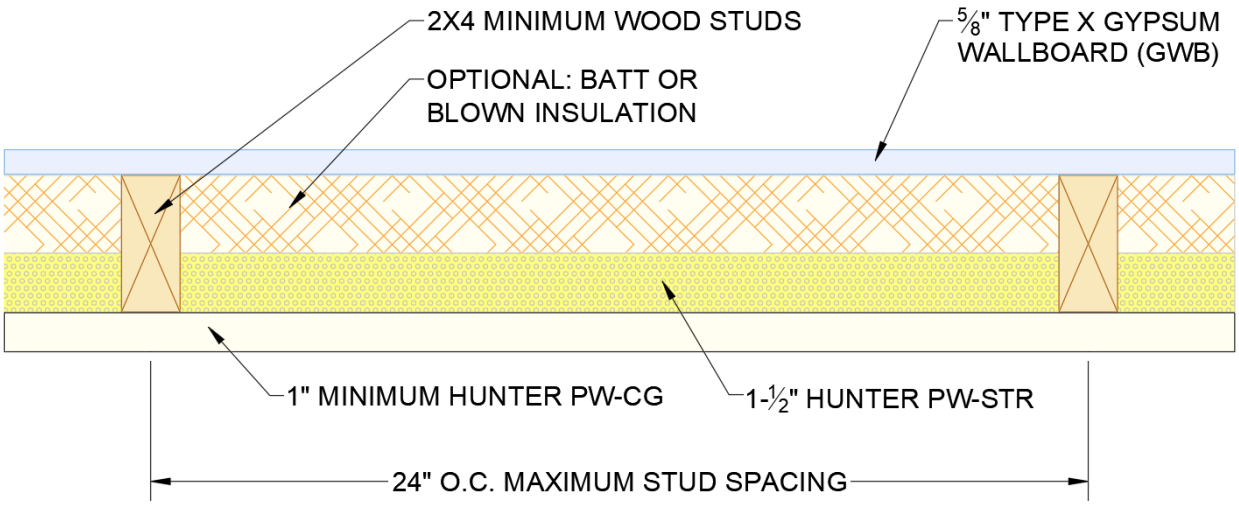


FIGURE 9. PUREWALL™ ONE-HOUR FIRE RESISTANCE RATED WALL ASSEMBLY

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 *Installation Procedure*

6.2.1 *General:*

6.2.1.1 Installation shall comply with the component manufacturer's installation instructions and this TER. In the event of a conflict between the component manufacturer's installation instructions and this TER, the more restrictive shall govern.

6.2.1.2 Frame walls in accordance with the construction documents and the applicable building codes.

6.2.1.3 Wall panel/section shall be square and true prior to sheathing with Hunter PW-CG. Wall panels must meet the standards as defined by the SBCA Wall Panel QC program and the Hunter Panels Quality Control Manual.

6.2.1.4 Means and methods for construction of temporary bracing is the responsibility of the building contractor. Insure temporary bracing is in place until the complete PUReWall™ is installed. For guidance in temporary bracing, see SBCA's *Guide for Handling, Installing & Temporary Bracing of Wall Panels*.

6.2.2 *Hunter PW-CG:*

6.2.2.1 Hunter PW-CG must be installed over studs having a nominal thickness of not less than 2" (51 mm) in the least dimension and spaced a maximum of 24" (610 mm) o.c.

6.2.2.1.1 Where PUReWall™ is manufactured with steel sheathing on the exterior side of the stud, FPIS is installed over the steel sheathing.

6.2.2.2 Hunter PW-CG must be installed vertically with the length dimension of the panels parallel to the framing behind and all panel edges supported by framing or blocking.

6.2.2.3 Hunter PW-CG shall be installed with A) a minimum #9 screw with an approved minimum 1¾" (45 mm) diameter cap washer; B) a 0.148″ diameter nail with an approved minimum 1" (25 mm) diameter cap washer; or C) A 2½" SCRAIL® fastener with an approved minimum 1¾" (45 mm) diameter cap washer

6.2.2.4 Fasteners shall be spaced a maximum of 24" o.c. (610 mm) at panel edges and 48" o.c. (1219 mm) in the field. Additional fasteners may be added to secure edges of penetrations if required.

6.2.2.5 Fasteners shall be of sufficient length to penetrate the framing a minimum of ¾" (20 mm) and shall be installed with the head flush with the surface of the sheathing.

6.2.2.6 Fasteners shall be installed into framing members and driven flush and snug such that gaps between layers are removed, except where a gap under the cladding fastener head is required for attachment of vinyl siding.

6.2.2.7 Fasteners shall be installed in a workmanlike manner and not over-driven, resulting in material damage or excessive distortion of cladding, furring or Hunter PW-CG.

6.2.2.8 Ensure Hunter PW-CG is fastened tightly to the stud to prevent spray foam from entering and expanding between the stud and the Hunter PW-CG.

6.2.3 *SPF Installation*

6.2.3.1 SPF shall be applied in-plant only:

6.2.3.1.1 By persons trained in accordance with the requirements outlined in the PUReWall™ Quality Control Manual.

6.2.3.1.2 In an approved manufacturing plant constructed according to the Hunter Panels Manufacturing Installation Guide or at a site otherwise approved by Hunter Panels.

6.2.3.1.3 Exceptions – Minor repairs and penetrations as described in either the Construction or the Quality Control Manual.

6.2.3.2 Structural spray foam, Hunter PW-STR, shall be sprayed into wall panels as described in the Hunter Panels Quality Control Manual.

6.2.3.3 Structural spray foam, Hunter PW-STR, sets almost immediately. Ensure wall is square and true prior to SPF application.

6.2.3.4 Take care to protect area and personnel from overspray.

6.2.3.5 Reference *Guidance on Best Practices for the Installation of Spray Polyurethane Foam* and the *Technical Product Data* to understand how to properly process PUReWall™ at various conditions.

6.2.3.6 Use properly functioning high pressure proportioning spray equipment to process Hunter PW-STR. All parts of the spray gun need to function as intended and be clean and free of debris.

6.2.3.7 Substrate shall be clear of debris and dry to the touch before applying Hunter PW-STR.

6.2.3.8 Measure the dew point of the area where the spray foam is being applied. Dew point shall be at 70°F or less, when measured with a calibrated instrument.

6.2.3.9 For proper processing of SPF components, refer to the *PUReWall™ Quality Control Manual* and the *Hunter PW-STR Technical Product Data*.

6.2.3.9.1 Spray the initial pass of Hunter PW-STR to the Hunter PW-CG so that enough material is laid down to wet the surface without running or sagging.

6.2.3.9.2 If the cavity is sufficiently large enough, the Hunter PW-STR first pass should be about 1/2" (13 mm) thick and sprayed in a picture frame, around the edge of the panel.

6.2.3.9.3 Subsequent applications should be layered, until the required total thickness is achieved. The thickness should be measured to ensure compliance before the panel leaves the spray booth. Remedial spraying may be carried out, if required, to achieve the required total thickness. See the *PUReWall™ Quality Control Manual* for details.

6.2.3.10 Panels may be handled immediately after spraying. Full strength develops after 24 hours.

6.2.3.11 For more detailed installation guidelines, see *Guidance on Best Practices for the Installation of Spray Polyurethane Foam* and *Ventilation Considerations for Spray Polyurethane Foam*.

6.2.4 *Steel Sheathing:*

6.2.4.1 28 gage steel sheathing must be installed directly over studs having a nominal thickness of not less than 2" (51 mm) in the least dimension and spaced a maximum of 16" (405 mm) o.c.

6.2.4.2 Steel sheathing must be installed vertically with the length dimension of the panels parallel to the framing behind and all panel edges supported by framing or blocking.

6.2.4.3 Steel sheathing must be fastened to the studs with 1-3/4"x0.120" roofing nails, spaced 3" (76 mm) o.c. along the perimeter and 6" (152 mm) o.c. in the field. Fastener edge distance shall be ¾" (19 mm) along the top and bottom edges and $^3/_8$" (10 mm) along the sides of the panels.

6.2.5 *Installation of PUReWall™ in the field:*

6.2.5.1 PUReWall™ shall be installed in a workmanlike manner subject to industry-accepted tolerances. Additional guidelines for trade installations and management of penetrations in the PUReWall™ may be found in the PUReWall™ Installation Guide (contact Hunter Panels for details).

6.2.5.2 Penetrations up to 100 square inches may be placed in any wall cavity for the installation of utilities and services.

6.2.5.3 Hunter PW-STR SPF foam may be removed at any hold down locations. Maximum size of removed foam area is 4″ wide by 18″ high. Additionally, where required to access anchor bolt locations, an area 4' wide by 4 ½″ high may be removed at each anchor bolt location.

6.2.5.4 When components are being installed in the PUReWall™ a copy of the component manufacturers' installation instructions shall be available at all times on the jobsite during installation.

6.2.5.5 The building designer is responsible for all temporary bracing. Please consult SBCA's *Guide for Handling, Installing & Temporary Bracing of Wall Panels* for further information.

6.2.5.6 Store PUReWall™ on site according to the requirements and conditions outlined in the *Hunter Panels Quality Control Manual*.

6.2.6 *Gypsum Wallboard:*

6.2.6.1 Where required, and unless ⅝" gypsum wallboard is required in accordance with Section 5.12 for a one hour fire resistance rated assembly, gypsum wallboard shall be a minimum ½" (13 mm) thick and shall be installed with a minimum of either:

6.2.6.1.1 #6 x 1¼" (32 mm) type W or S screws

6.2.6.1.2 5d cooler nails

6.2.6.2 For *IBC* and *IRC* prescriptive applications, gypsum fasteners shall be spaced a maximum of 16" (406 mm) o.c. at panel edges and 16" (406 mm) o.c. at intermediate framing. For engineered design, see Table 3.

6.2.6.3 Fastener edge distance is a minimum of ⅜" (10 mm).

7 Test Engineering Substantiating Data

7.1 Test reports and data supporting the following material and structural properties:

7.1.1 Lateral load testing in accordance with *ASTM E2126* and *ASTM E564*

7.1.2 Transverse wind load testing in accordance with *ASTM E330*

7.1.3 Uplift load testing in accordance with *ASTM E72*

7.1.4 Surface burning testing for the SPF used in the production of the PUReWall™ in accordance with *ASTM E84*

7.1.5 Material property testing for Hunter PW-STR SPF in accordance with *ASTM D1623*, *D1622*, *D2842*, *D2126*, *D6226*, *E2178*, *C518* and *E96*

7.1.6 Air leakage properties of Hunter PW-STR SPF in accordance with *ASTM E2178*

7.1.7 Thermal transmission properties of Hunter PW-STR SPF in accordance with *ASTM C518*

7.2 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.

7.3 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 Lateral load resistance due to wind and seismic loads carried by shear walls in accordance with Table 1 through Table 6

8.1.2 Use as equivalent to the CS-PF as described in *IRC* Section R602.10.5 and Section R602.10.6.4

8.1.3 Transverse wind load resistance in accordance with Table 7

8.1.4 Axial tension and compression resistance in accordance with Table 8

8.1.5 Combined shear and uplift in accordance with Table 9

8.1.6 Thermal resistance properties in accordance with Table 10, Table 11, Table 12, and Table 13

8.1.7 Component of an air barrier in accordance with *IECC* Section C402

8.1.8 Surface burning characteristics in accordance with Table 14

8.1.9 Water-resistive barrier in accordance with *IBC* Section 1404.2[10] and *IRC* Section R703.2

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 When the PUReWall™ is not installed for use as wall bracing, as described in this TER, the walls shall be braced by other materials, in accordance with the applicable code.

9.2 When used in accordance with the *IBC* in Seismic Design Categories C, D, E or F, special inspections shall comply with *IBC* Section 1705.12.[11]

9.3 When used in accordance with the *IBC* in high wind areas, special inspections shall comply with *IBC* Section 1705.11.[12]

9.4 Loads applied shall not exceed those recommended by the manufacturer as follows:

9.4.1 Allowable shear loads do not exceed values in Table 1 through Table 5 or those calculated according to Table 6, as applicable.

9.4.2 Allowable transverse loads do not exceed values in Table 7.

9.4.3 Allowable axial loads do not exceed values in Table 8.

9.5 All panel edges shall be supported by wall framing or solid blocking a minimum of 2" (51 mm) nominal thickness in the least dimension.

9.6 The panel manufacturer's installation instructions shall be available on the jobsite for inspection.

9.7 Refer to the PUReWall™ quality control manual and Field Guide for construction means and methods support.

9.7.1 Storage handling, installing, restraining and bracing of the panels are defined in the QC procedures and installation guide and in the SBCA bracing instructions. The installer and builder are required to account for any adverse weather or other local conditions that may affect the proper construction means and methods.

9.7.2 The contractor or wall installer is responsible for following the PUReWall™ Quality Control Manual, and Installation Guide for recommended installation instructions, and all means and methods of construction.

9.7.3 Contact Hunter Panels for additional information regarding means and methods.

9.8 In areas where the probability of termite infestation is very heavy, in accordance with *IBC* Section 2603.8 or *IRC* Section R318.4, the product must not be placed on exterior walls located within 6" (152mm) of the ground, unless an approved method of protecting the plastic foam and structure from subterranean termite damage is provided, as required in *IRC* Section R318.1.

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[10] 2015 *IBC* Section 1403.2

[11] 2012 *IBC* Section 1705.11

[12] 2012 *IBC* Section 1705.10

9.9 The Hunter PW-STR SPF insulation components are manufactured in Spring, TX and Cartersville, GA under a quality program with inspections by UL.

9.10 This TER only applies to walls manufactured under the Hunter Panels Quality Control and Manufacturing Guidelines Documents issued under license to panel producers.

9.11 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.

9.12 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.

9.13 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*).

9.14 At a minimum, this product shall be installed per Section 6 of this TER.

9.15 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.

9.16 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.

9.17 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 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 hunterpanels.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.

11.2 For information on the current status of this TER, contact DrJ Certification.