



HUBER ENGINEERED WOODS

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ZIP SYSTEM® R-SHEATHING

CSI Section:

06 12 00 Structural Panels
06 16 00 Sheathing

1.0 RECOGNITION

ZIP System® R-Sheathing panels, manufactured by Huber Engineered Woods, LLC, were evaluated for use with wood framing to resist racking shear loads due to lateral in-plane wind and seismic forces.

The structural properties of the sheathing were evaluated for compliance with the following codes:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- 2019 California Building Code (CBC) – Supplement attached
- 2019 California Residential Code (CRC) – Supplement attached
- 2020 City of Los Angeles Building Code (LABC) – Supplement attached
- 2020 City of Los Angeles Residential Code (LARC) – Supplement attached

R-Sheathing is recognized for use as an alternative to braced wall panels in accordance with IBC Section 2308.6 and as an equivalent alternative to prescriptive WSP Intermittent Bracing in accordance with IRC Section R602.10. R-Sheathing is also recognized for use in engineered wood frame shear walls under the IBC and IRC.

2.0 LIMITATIONS

Use of the ZIP System® R-Sheathing panels recognized in this report is subject to the following limitations:

2.1 R-Sheathing is limited to use in Risk Category I and II buildings of Type V Construction under the IBC, and buildings constructed under the IRC.

2.2 Walls sheathed with R-Sheathing panels shall be sealed to resist water in accordance with the manufacturer’s installation instructions, covered with an approved cladding, and shall not be subject to wetting in service.

2.3 In accordance with IBC Section 2603.8 and IRC Section R318.4, in areas of “Very Heavy” termite infestation probability, the clearance between R-Sheathing and finished grade shall be no less than 6 inches (152 mm). This clearance shall be increased to 8 inches (203 mm) for wood framing and sheathing in contact with exterior foundation walls in accordance with IBC Section 2304.12.

2.4 Use of R-Sheathing in fire-resistance rated assemblies is outside the scope of this report. R-Sheathing shall not be used in lieu of other wood structural panel (WSP) sheathing in fire-resistance rated assemblies.

2.5 Minimum ½-inch-thick (12.7 mm) gypsum wallboard shall be installed as a thermal barrier on the interior side of walls sheathed with R-Sheathing, in accordance with code.

2.6 R-Sheathing is not for use to resist wind uplift only or combined uplift and shear forces. Any metal straps, ties, or other connectors used to resist uplift forces shall be in contact with and fastened directly to the structural framing.

2.7 Special inspections may be required for wind or seismic force resisting systems in accordance with 2021 IBC Sections 1705.12 and 1705.13, or 2018 and 2015 IBC Sections 1705.11 and 1705.12, as applicable.

2.8 Segments of walls that contain openings and built using R-sheathing panels shall not be counted in braced wall lengths or as shear walls.

2.9 ZIP System® R-Sheathing panels are manufactured by Huber Engineered Woods, LLC. The foam plastic is laminated in Camp Hill, PA; Diboll, TX; Northglenn, CO; Toronto, ONT, CAN; and East Moline, IL.

3.0 PRODUCT USE INSTRUCTIONS

3.1 General

ZIP System® R-Sheathing panels are used as wall sheathing to resist wind pressures and transfer lateral loads to the underlying structure, and to resist shear loads due to wind and seismic forces. R-Sheathing is also used as a nailing base for exterior cladding fasteners where the cladding is not required by the cladding manufacturer’s instructions and Tables R703.15.1 and R703.15.2 of the IRC to be fastened directly to the underlying framing.

3.2 Installation

The manufacturer’s ZIP System® R-Sheathing Installation Manual, this evaluation report, and the applicable provisions of the building code shall be followed when using and

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.





installing this product. Where there is a conflict between these documents, the more restrictive shall govern.

The R-Sheathing shall be installed with the foam plastic insulation layer inward against the framing, and the WRB layer facing out. Fasteners shall be long enough to penetrate beyond the depth of the sheathing and foam plastic layers, and into the framing a minimum of 1½ inches (38.1 mm). Table 1 of this report describes the thickness of each panel layer and the minimum fastener length, spacing, and distance from panel edges required for installation. During installation, care shall be exercised to make sure the fasteners are driven into the framing members at the required spacing and distance from panel edges.

R-Sheathing panels used to resist racking shear forces shall have all edges backed by solid framing or blocking. The panels may be installed either vertically or horizontally and shall be gapped in accordance with the manufacturer’s installation instructions.

3.3 Design

ZIP System® R-Sheathing panels may be used as an alternative to WSP in the WSP Intermittent Bracing method in the IRC, including use in Seismic Design Categories C, D₀, D₁, D₂, and E, and braced wall panels in IBC Section 2308.6.

R-Sheathing panels may also be used as an alternative to wood structural panels in shear walls using the design values given in Table 2 of this report, and the seismic design coefficients and structural system limitations applicable for bearing wall system A.15 Light-frame (wood) walls sheathed with wood structural panels rated for shear resistance in Table 12.2-1 of ASCE/SEI 7-16. All the design provisions to resist seismic loads shall follow the detailing requirements in the referenced standards specified in Section 14.5 of ASCE/SEI 7-16. The following seismic design coefficients shall be used:

Response modification factor, $R = 6.5$

Overstrength factor, $\Omega_0 = 3.0$

Deflection amplification factor, $C_d = 4.0$

When used to resist lateral in-plane forces, the panels shall be in accordance with IBC Section 2305 or IRC Section 602.10, as applicable. The maximum shear wall aspect ratio shall be 2:1. Shear wall deflection shall be determined using Equation 4.3-1 and Section 4.3.4 of AWC SDPWS-2021 or Section 4.3.2 of AWC SDPWS-2015 using values of apparent shear stiffness, G_a , in Table 2 of this report. Shear wall nominal and design unit shear capacities shall be determined in accordance with Table 2 of this report.

Braced walls or shear walls built using R-sheathing panels

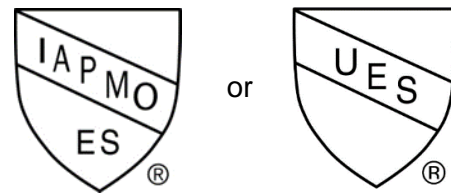
may be mixed with other methods compatible with prescriptive Method WSP in accordance with IRC Section R602.10.4. Serviceability and long-term loading effects shall be considered in design in accordance with Sections 2304.13 and 1604.3.1 of the IBC and the manufacturer’s ZIP System® R-Sheathing Installation Manual.

4.0 PRODUCT DESCRIPTION

ZIP System® R-Sheathing is a composite of Huber’s 7/16-inch-thick (11.1 mm) wood structural panel (WSP) with phenolic-impregnated sheet laminated to its exterior surface (IAPMO UES ER-544) and a foam plastic insulation laminated to its interior surface. The 7/16-inch-nominal-thickness WSP is an Exposure 1, DOC PS 2 span rated sheathing panel. The insulation layer is Atlas Roofing EnergyShield CGF, a polyisocyanurate foam plastic having nominal density of 2.0 pcf (32 kg/m³), minimum compressive strength of 20 psi (138 kPa), a flame-spread index not more than 75, and a smoke developed index not more than 450. The foam plastic is ½-, 1-, 1½-, or 2-inches-thick (12.7 mm, 25.4 mm, 38.1 mm, or 50.8 mm) depending on the R-Sheathing model and is coated with glass fiber facers on both sides (see Table 1 for details). The panels are 4 feet (1219 mm) wide and available in lengths of 8 to 12 feet (2438 mm to 3658 mm) with square or profiled edges.

5.0 IDENTIFICATION

ZIP System® R-Sheathing panels are identified with the manufacturer’s name, the product and model name, IAPMO ES Mark of Conformity and the evaluation report number (ER-482). Either Mark of Conformity may be used as follows:



IAPMO UES ER-482

6.0 SUBSTANTIATING DATA

The following data was reviewed, evaluated, and used to establish recognition of ZIP System® R-Sheathing panels for the uses described in Section 1.0. The test reports are from laboratories in compliance with ISO/IEC 17025.

6.1 Manufacturer’s ZIP System® R-Sheathing Installation Manual.

6.2 Documentation describing the manufacturer’s quality management system.



6.3 Reports of cyclic testing in accordance with ASTM E2126.

6.4 Data analysis in accordance with AC120.

6.5 Reports of equivalency testing in accordance with AC269.1.

6.6 Reports of racking shear testing in accordance with AC269.2.

7.0 STATEMENT OF RECOGNITION:

This report describes the results of research completed by the IAPMO Uniform Evaluation Service on ZIP System® R-Sheathing panels to assess conformance to the codes listed in Section 1.0 and serves as documentation of the product certification. The R-Sheathing is produced at locations noted in Section 2.9 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org

Table 1. Fastening Requirements for R-Sheathing as an Alternative to WSP Intermittent Bracing Method in the IRC and IBC in Seismic Design Categories A through E⁵

Sheathing Panel Designation	Nominal R-Sheathing Thickness (in.)	Minimum Fastener Penetration into Framing ^{1,3} (in.)	Minimum Fastener Length (in.)	Minimum Fastener Diameter ⁴ (in.)	Fastener Spacing (in.)	
					At Panel Edges ²	In the Field
R-3	1.0	1.5	2.5	0.131	3	12
R-6	1.5		3.0			
R-9	2.0		3.5			
R-12	2.5		4.0			

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

1. Wall framing shall be minimum nominal 2 x 4 dimension lumber. Maximum stud spacing shall be 24 inches-on-center.
2. All fasteners shall be located at least 3/8 inch from panel edges.
3. All panel edges shall be backed by framing or blocking.
4. Fasteners shall be smooth shank common nails with 8d common nail head size (0.281-inch diameter), or equivalent, conforming to the requirements of IBC Section 2303.6.
5. Buildings located in Seismic Design Categories C through E shall conform to the provisions in IRC section R301.2.2.



Table 2. Nominal Unit Shear Capacities for Wood-Framed Shear Walls Sheathed with ZIP System® R-Sheathing Panels (1,2,3,4,5,6,7,8,9,10)

R-Sheathing Type	Nominal Combined Panel Thickness including OSB (in.)	Minimum Fastener Penetration into Studs, (in.)	Fastener Type & Size		Fastener spacing (in.)		Seismic		Wind
			Diameter, (in.)	Minimum Length, (in.)	At Panel Edges	In the Field	Nominal Unit Shear Capacity, v_s (plf)	Apparent Shear Stiffness, G_a (kips/in.)	Nominal Unit Shear Capacity, v_w (plf)
R-3	1.0	1.5	0.131	2.5	3	12	560	9.7	785
R-6	1.5			3.0	3	12	510	5.0	715
R-9	2.0			3.5	3	12	480	3.7	670
R-12	2.5			4.0	3	12	435	3.5	610

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm

- Nominal unit shear capacity, v_s or v_w , shall be adjusted in accordance with AWC SDPWS-2021 Section 4.3.5 or AWC SDPWS-2015 Section 4.3.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance.
- Values assume Douglas-Fir-Larch lumber at 19% or less moisture content at time of fabrication.
- When species of framing lumber other than Douglas-Fir-Larch are used, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal capacity by the following specific gravity adjustment factor: Specific Gravity Adjustment Factor: $[1 - (0.50 - G)]$ where G = specific gravity of the framing lumber from the NDS Table 12.3.3A. The Specific Gravity Adjustment Factor shall not exceed 1.0.
- All panel edges shall be backed by framing or blocking, and nails shall be located at least $\frac{3}{8}$ inch from panel edges. A $\frac{3}{4}$ -inch panel edge distance for sheathing nails is recommended, where possible, in locations such as shear wall end posts and wall plates where full 2x nominal framing widths for panel edge nailing are present.
- Fasteners shall be smooth shank common nails with 8d common nail head size (0.281-inch diameter), or equivalent, conforming to the requirements of 2021, 2018, and 2015 IBC Section 2303.6.
- Avoid overdriving fastener heads as required by 2021 IBC Section 2304.10.3 or 2018 and 2015 IBC Section 2304.10.2.
- For nailing conditions other than nail diameter and fastener spacing at panel edges shown above, see AWC SDPWS Section 4.3.7.1, Item 5.
- Shear wall deflection shall be determined in accordance with Equation 4.3-1 and AWC SDPWS-2021 Section 4.3.4 or AWC SDPWS-2015 Section 4.3.2, using values for G_a from the table above.
- The nominal shear capacity for wind includes a 40 percent increase in accordance with IBC Section 2306.3.
- Allowable capacities were determined by analysis of results of cyclic shear testing for applicability in Seismic Category A through E.



CALIFORNIA SUPPLEMENT

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1.0 RECOGNITION

The ZIP System® R-Sheathing described in IAPMO UES Evaluation Report ER-482 is recognized for use as an alternative to braced wall panels, as an equivalent alternative material for use in prescriptive WSP Intermittent Bracing, and for use in engineered wood frame shear walls in accordance with the following codes:

- 2019 California Building Code (CBC)
- 2019 California Residential Code (CRC)

2.0 LIMITATIONS

2.1 Use and installation shall be in accordance with ER-482, the manufacturer's published installation instructions, and the California Building Code or California Residential Code, as applicable:

- Additional requirements in accordance with CBC Chapter 23 and general construction requirements in accordance with CBC Section 2304 for buildings of wood construction, as applicable, shall be met.
- Additional requirements dealing with modifications to AWC SDPWS for lateral force resisting systems in accordance with CBC Section 2305, as applicable, shall be met.
- Additional limitations for wall construction and wall bracing described in CBC Section 2308.2.7, as applicable, shall be met.

2.2 The site-specific design criteria for wind speed, exposure category, and seismic design category shall be determined in accordance with Chapter 16 of the CBC or Section R301 of the CRC, as applicable.

2.3 Special Inspections are required for use of ZIP System® R-Sheathing in accordance with CBC Chapter 17 or Chapter 17A, as applicable for the building application in accordance with the Matrix Adoption Tables of the CBC, including special inspections for light frame construction where required by the code.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org



CITY OF LOS ANGELES SUPPLEMENT

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1.0 RECOGNITION

Huber Engineered Woods ZIP System® R-Sheathing described in IAPMO UES Evaluation Report ER-482 and this LABC and LARC Supplement was evaluated for use as a component of wood-framed shearwalls to resist racking shear loads due to lateral in-plane wind and seismic forces. R-Sheathing is recognized for use in engineered wood-frame shearwalls in accordance with LABC Section 2305 or LARC Section R301.1.3, as applicable, constructed under the following codes:

- 2020 City of Los Angeles Building Code (LABC)
- 2020 City of Los Angeles Residential Code (LARC)

2.0 LIMITATIONS

2.1 Use and installation shall be in accordance with ER-482, the manufacturer's published installation instructions, and the City of Los Angeles Building and Residential Codes, as applicable. A copy of the manufacturer's installation instructions shall be available on site for Registered Deputy Inspectors. Where conflicts occur, the more restrictive shall govern.

2.2 Design loads shall be determined in accordance with 2020 LABC Chapter 16 or 2020 LARC Section R301, as applicable.

2.3 Construction documents shall be approved and stamped by a California licensed design professional for all dwellings of wood-frame construction more than 2 stories in height in Seismic Design Category A, B, or C, and more than 1 story in height located in Seismic Design Category D₀, D₁, D₂, or E in accordance with LARC Section R301.1.3.2.

2.4 Use of ZIP System® R-Sheathing as an alternative to prescriptive braced wall panels and as an equivalent alternative to prescriptive WSP Intermittent Bracing in accordance the LABC and LARC are outside the scope of this supplement.

2.5 Special inspections, where required, shall be in accordance with LABC Chapter 17 or Chapter 17A, as applicable.

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org