

Joint Evaluation Report ESR-1305



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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 17 33—Wood I-Joists

REPORT HOLDER:

PACIFIC WOODTECH CORPORATION

ADDITIONAL LISTEES:

RESOLUTE ENGINEERED WOOD LAROCHE INC.

RESOLUTE ENGINEERED WOOD ST. PRIME LIMITED PARTNERSHIP

EVALUATION SUBJECT:

PWI JOISTS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2021, 2018, 2015 and 2012 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-1305 LABC and LARC Supplement](#).

Properties evaluated:

- Structural
- Sound ratings
- Fire-resistance ratings

2.0 USES

PWI Joists (formerly SolidStart®) are used as, but not limited to, floor joists, roof joists, blocking panels and rim joists.

PWI Joists (formerly SolidStart®) described in this report comply with Section 2303.1.2 of the IBC and Section R502.1.2 of the 2021, 2018 and 2015 IRC (Section R502.1.4 of the 2012 IRC), for allowable stress design.

3.0 DESCRIPTION

3.1 General:

PWI Joists (formerly SolidStart®) are prefabricated wood I-Joists and have sawn lumber or laminated veneer lumber (LVL) flanges and a single web as specified in the quality documentation that contains the manufacturing standards. The top and bottom flanges are parallel, creating constant-depth joists. Web sections are end-joined together to form a continuous web. Web end joints must be of the types specified in the quality documentation. The web-to-flange

connection is a proprietary grooved connection, also conforming to the quality documentation.

PWI Joists (formerly SolidStart®) are available in various lengths and depths, and are produced in the configurations shown in Table 1.

3.2 Material Specifications:

3.2.1 Flanges: Flange material is either sawn lumber or laminated veneer lumber that meets the requirements noted in the quality documentation. Flange material and sizes are listed in Table 1.

3.2.2 Web: Web material is oriented strand board (OSB) that complies with U.S. Voluntary Product Standard PS 2 and the quality documentation. Web thickness is listed in Table 1.

3.2.3 Adhesives: Adhesives are exterior wet-use types complying with ASTM D2559 and ASTM D7247, and are of the types specified in the quality documentation.

4.0 DESIGN AND INSTALLATION

Design of the prefabricated wood I-Joists described in this report is governed by the ANSI/AWC *National Design Specification*® for Wood Construction (NDS), and the applicable code. Additionally, the design and installation of the prefabricated wood I-Joists must comply with Sections 4.1 through 4.7, Tables 2 through 11, Figures 1 and 2, and the manufacturer's published installation instructions. PWI Joists (formerly SolidStart®) may also be used as floor joists

in fire-resistance-rated and sound-rated floor-ceiling assemblies as described in Sections 4.8 and 4.9, and in Figures 3, 4, 5 and 6.

4.1 Reference Design Values:

The reference design moment (M_r), vertical shear (V_r), bending stiffness (EI), and shear stiffness coefficient (K) are given in Table 2. Reference design reactions (R_r) and flange bearing capacities are given in Table 3. Adjustments to the reference design values must be made as applicable, in accordance with Sections 4.1.1 through 4.1.5, and corresponding requirements must be met.

4.1.1 Duration of Load: Tabulated reference design values and capacities of Tables 2 and 3 are for normal load duration. Adjustments for other durations of load must be in accordance with Section 7.3.2 of the NDS. Reference design reaction values are permitted to be adjusted for other load durations in accordance with the NDS, provided the Flange Compression Perpendicular-to-Grain values, as given in Table 3, are not exceeded. Tabulated Flange Compression Perpendicular-to-grain Values must not be increased by a load duration factor, C_D .

4.1.2 Wet Service Factor: PWI Joists (formerly SolidStart®) must be installed in dry, well-ventilated interior

applications in which the in-service moisture content of lumber does not exceed 16 percent. The wet service factor, C_M , is 1.0 when the requirements of this section are met.

4.1.3 Temperature Factor: Adjustments for sustained exposure to elevated temperatures between 100°F and 150°F must be in accordance with Section 7.3.4 of the NDS.

4.1.4 Beam Stability: Continuous lateral support must be provided for the compression flange, and the I-Joists must be restrained against lateral movement and rotation at all supports. Methods specified in the applicable code for lateral support of sawn lumber are acceptable. Bridging is not required for floor and roof joist applications, unless specified as the method for providing lateral support for the compression flange, or unless otherwise required by the applicable code. The beam stability factor, C_L , is 1.0 when the requirements of this section are met.

4.1.5 Repetitive Member Use: The repetitive member use factor, C_r , applicable to the reference design moments given in Table 2, must be limited to 1.0.

4.2 Fasteners:

The design of fasteners driven into the flanges of PWI Joists (formerly SolidStart®) must comply with the applicable code and this Section. Table 5 specifies the equivalent specific gravity of the flanges for fastener design. Table 6 specifies the nail spacing and end and edge distances for nails into the wide face of the I-Joist flanges.

Table 7 specifies the limitations on the allowable lateral design values for PWI Joists (formerly SolidStart®) used as framing members in horizontal wood structural panel diaphragms.

4.3 Web Stiffeners and Web Fillers:

4.3.1 Web Stiffeners: The material, size, and attachment of web reinforcement must be as illustrated and described in Figure 1 and Table 4. Web stiffeners are required to develop the “End Reaction” and “Interior Reaction” capacities in Table 2 in cases where the table says “YES” for web stiffeners. Web stiffeners are also required for a Bird’s Mouth cut.

4.3.2 Web Fillers: Web fillers (web stiffeners that fill out the web cavity to provide a surface that is flush with the edges of the flanges) are required for any of the following conditions:

- At birds mouth cut locations.
- Where sloped joist hangers support I-Joists.
- Where joist hangers do not laterally support the I-Joist’s top flange.

4.4 Holes in I-joist Web:

The size and placement of holes cut into the webs of PWI Joists (formerly SolidStart®) must be in accordance with Figure 2. Alternately, the allowable shear at the location of circular and rectangular web holes (V_{hole}) may be calculated as function of the I-joist depth (D), the height of the hole (H) and, for rectangular holes, the width of the hole (W), using the equation and constants given in Table 8. The allowable shear for obround holes is a fixed value for a specific series and depth as specified in Table 9. The design for shear at web holes must account for partial span loading in accordance with Section 7.4.3 of the NDS.

4.5 Member Spans:

I-joist span must be determined in accordance with Section 3.2.1 of the NDS, and the applicable code. Shear calculations must include all loads within the design span.

4.6 Deflection:

Total I-joist deflection must be calculated by using the formula for deflection due to both bending and shear as follows:

For example, for a simply supported joist with uniformly distributed loads:

$$\Delta = \frac{22.5 WL^4}{EI} + \frac{WL^2}{K}$$

and for a simply supported joist with a concentrated load at midspan:

$$\Delta = \frac{36 PL^3}{EI} + \frac{PL}{K}$$

where:

W is the uniform load, in pounds per lineal foot.

L is the design span, in feet.

EI is the flexural stiffness, provided in Table 2.

P is the concentrated load, in pounds.

K is the shear stiffness coefficient, provided in Table 2.

Δ is the deflection, in inches.

4.7 Blocking Panels and Rim Joists:

Vertical and lateral loads from bearing, brace, and shear walls crossing (not parallel to) a wood I-joist floor or roof framing system must be transferred through the framing system utilizing rim board, blocking panels, or squash blocks (vertical loads only).

PWI Joists (formerly SolidStart®) may be used as rim joists (rim board) and blocking panels for the following applications subject to the allowable loads and limitations in Table 10:

- Transfer, from bearing, shear, and/or brace walls above, to continuous support below, all vertical and lateral loads at the rim board location.
- Provide diaphragm attachment (sheathing to top of rim board).
- Provide lateral support to floor or roof joists (resistance to joist end rotation).

4.8 I-Joists Used in Fire-resistance-rated Floor and Roof Assemblies:

One-hour fire-resistance-rated floor-ceiling assemblies are described in Figures 3, 4 and 5, while a two-hour fire-resistance-rated floor-ceiling assembly is shown in Figure 6. PWI Joists (formerly SolidStart®) may also be used in assemblies 21, and 23 through 28, and 30, as listed in 2021, 2018 and 2015 IBC Table 721.1(3); assemblies 21 and 23 through 28, as listed in 2012 IBC Table 720.1(3); and those assemblies containing wood I-Joists that qualify under footnote q of 2021, 2018 and 2015 IBC Table 721.1(3), and 2012 IBC Table 720.1(3).

4.9 Fire Protection of Floors:

PWI Joists (formerly SolidStart®) may be used in the fire protection assemblies described in Section 4.3 of ICC-ES evaluation report [ESR-1405](#), to meet the provisions of 2021, 2018 and 2015 IRC Section R302.13 (Section R501.3 of the 2012 IRC).

4.10 Sound Ratings:

The assembly described in Figure 3 has the sound transmission and impact insulation classification noted in that figure.

5.0 CONDITIONS OF USE

The PWI Joists (formerly SolidStart®) described in this report comply with, or are suitable alternatives to what is

specified in, those codes specifically listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 PWI Joists (formerly SolidStart®) must be designed and installed in accordance with this report, the approved construction documents and the manufacturer’s installation instructions, which must be available at job site at all times during installation. In the event of a conflict, the most stringent requirement governs. Information provided in Figures 1 through 6 and Tables 1 through 12 must be confirmed for applicability for each project. Engineering calculations and drawings including design details demonstrating that the PWI Joists (formerly SolidStart®) comply with this report must be submitted to the code official when requested. The calculations and drawings including design details must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.2 No cutting or notching of joist flanges is permitted.
- 5.3 Deflections must be limited as set forth in the applicable code, using design properties in Table 2.
- 5.4 Where a one-hour or two-hour fire-resistance rating is required, construction must comply with Section 4.8.
- 5.5 PWI Joists (formerly SolidStart®) must be installed in dry, well-ventilated interior applications in which the in-service moisture content of lumber does not exceed 16 percent.
- 5.6 PWI Joists (formerly SolidStart®) are manufactured at the Pacific WoodTech Corporation facilities in Red Bluff, California; Larouche, Quebec, Canada; and St. Prime, Quebec, Canada under a quality control program with inspections by ICC-ES and APA—The Engineered Wood Association (AA-649).

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Wood I-Joists (AC14), dated June 2019 (editorially revised February 2021).

- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Rim Board Products (AC124), dated June 2019 (editorially revised February 2021).
- 6.3 Reports of fire tests conducted in accordance with ASTM E119.
- 6.4 Reports of sound transmission tests conducted in accordance with ASTM E90 and E492.

7.0 IDENTIFICATION

- 7.1 PWI Joists (formerly SolidStart®) are identified with the report holder name (Pacific WoodTech Corporation) or logo; the joist series; the inspection agency name (APA—The Engineered Wood Association); the evaluation report number (ESR-1305); the mill number; and the date of fabrication.

- 7.2 The report holder’s contact information is the following:

PACIFIC WOODTECH CORPORATION
1850 PARK LANE
BURLINGTON, WA 98233
(360) 707-2200
www.pacificwoodtech.com

- 7.3 The additional listees’ contact information is the following:

RESOLUTE ENGINEERED WOOD LAROUCHE INC.
900, CHEMIN DU LAC HIPPOLITE
LAROUCHE, QUEBEC G0W 1Z0
CANADA

RESOLUTE ENGINEERED WOOD ST. PRIME LIMITED PARTNERSHIP.
101 RUE DU PARC INDUSTRIEL
ST-PRIME, QUEBEC G8J 1H3
CANADA

TABLE 1—PWI JOISTS (FORMERLY SOLIDSTART®) CONFIGURATIONS

JOIST SERIES	FLANGE SIZE WIDTH x DEPTH (inches)	NOMINAL FLANGE WIDTH ¹ (inches)	MINIMUM WEB THICKNESS (inch)	JOIST DEPTH RANGE (inches)
SAWN LUMBER FLANGES				
PWI 18S / LPI 18	2 ¹ / ₂ x 1 ¹ / ₂	3	³ / ₈	9 ¹ / ₂ to 16
PWI 20S / LPI 20Plus	2 ¹ / ₂ x 1 ¹ / ₂	3	³ / ₈	9 ¹ / ₂ to 16
PWI 32S / LPI 32Plus	2 ¹ / ₂ x 1 ¹ / ₂	3	³ / ₈	9 ¹ / ₂ to 16
PWI 42S / LPI 42Plus	3 ¹ / ₂ x 1 ¹ / ₂	3	³ / ₈	9 ¹ / ₂ to 16
		3	⁷ / ₁₆	18 to 24
PWI 52S / LPI 52Plus	3 ¹ / ₂ x 1 ¹ / ₂	3	⁷ / ₁₆	9 ¹ / ₂ to 24
LVL FLANGES				
PWI 36L / LPI 36	2 ¹ / ₄ x 1 ¹ / ₂	3	³ / ₈	11 ⁷ / ₈ to 24
PWI 56L / LPI 56	3 ¹ / ₂ x 1 ¹ / ₂	3	⁷ / ₁₆	11 ⁷ / ₈ to 24
PWI 53L / LPI 530	2 ¹ / ₁₆ x 1 ⁵ / ₁₆	2	³ / ₈	9 ¹ / ₂ to 16

For SI: 1 in = 25.4 mm.

¹Nominal flange width designates the equivalent minimum nominal width of framing members at adjoining panel edges and boundaries for use in horizontal wood structural panel diaphragms framed with PWI Joists (formerly SolidStart®) as shown in Table 7.

TABLE 2—REFERENCE DESIGN VALUES FOR PWI JOISTS (FORMERLY SOLIDSTART®) 1,2,3,4

JOIST SERIES	JOIST DEPTH (in)	MOMENT, M_r (lb-ft)	EI ($\times 10^6$ lbf-in ²)	SHEAR, V_r (lbf)	SHEAR STIFFNESS COEFF., K ($\times 10^6$ lbf-ft./in)
SAWN LUMBER FLANGES					
PWI 18S / LPI 18	9 ^{1/2}	2365	142	1130	0.355
	11 ^{7/8}	3100	248	1335	0.435
	14	3720	371	1510	0.508
	16	4230	514	1680	0.577
PWI 20S / LPI 20Plus	9 ^{1/2} ⁵	2810	185	1260	0.358
	11 ^{7/8} ⁵	3755	318	1485	0.438
	14 ⁵	4400	474	1680	0.512
	16 ⁵	5050	652	1870	0.582
PWI 32S / LPI 32Plus	9 ^{1/2} ⁶	3620	243	1260	0.213
	11 ^{7/8} ⁶	4690	406	1485	0.267
	14 ⁶	5645	589	1680	0.313
	16 ⁶	6545	791	1870	0.358
PWI 42S / LPI 42Plus	9 ^{1/2}	5375	321	1340	0.412
	11 ^{7/8} ⁷	6965	547	1625	0.515
	14 ⁷	8390	802	1875	0.607
	16 ⁷	9725	1092	2115	0.693
	18	11000	1333	2555	0.960
	20	12170	1688	2795	1.067
	22	13335	2088	3030	1.173
	24	14480	2534	3270	1.280
PWI 52S / LPI 52Plus	9 ^{1/2}	6540	356	1745	0.507
	11 ^{7/8}	8475	600	2055	0.633
	14	10205	874	2330	0.747
	16	11835	1183	2585	0.853
	18	13380	1540	2845	0.960
	20	14810	1948	3105	1.067
	22	16220	2408	3360	1.173
	24	17615	2919	3620	1.280

For SI: 1 inch = 25.4 mm, 1 ft-lb = 1.356 N-m, 1 lb = 4.448 N, 1 in²-lb = 0.00287 N-m².
 See Notes for Table 2 on the following page.

TABLE 2 (Continued)—REFERENCE DESIGN VALUES FOR PWI JOISTS (FORMERLY SOLIDSTART®)^{1,2,3,4}

JOIST SERIES	JOIST DEPTH (in)	MOMENT, M _r (lbf-ft)	EI (x10 ⁶ lbf-in ²)	SHEAR, V _r (lbf)	SHEAR STIFFNESS COEFF., K (x10 ⁶ lbf-ft./in)
LVL FLANGES					
PWI 36L / LPI 36	11 ⁷ / ₈	6445	429	1615	0.468
	14	7755	622	1830	0.550
	16	8995	836	2020	0.625
	18	10135	1082	2185	0.700
	20	11270	1360	2320	0.774
	22	12390	1669	2435	0.850
	24	13505	2010	2525	0.922
PWI 56L / LPI 56	11 ⁷ / ₈	10170	668	2055	0.549
	14	12250	968	2330	0.641
	16	14205	1301	2585	0.729
	18	16010	1684	2845	0.817
	20	17800	2115	3105	0.905
	22	19575	2597	3360	0.993
	24	21340	3127	3620	1.081
PWI 53L / LPI 530	9 ¹ / ₂	4000	200	1340	0.478
	11 ⁷ / ₈	5150	337	1565	0.591
	14	6110	492	1765	0.693
	16	6990	666	1955	0.789

For SI: 1 inch = 25.4 mm, 1 ft-lb = 1.356 N-m, 1 lb = 4.448 N, 1 in²-lb = 0.00287 N-m².

¹The allowable design values are for dry use conditions only. Dry use applies to products installed in dry, covered and well ventilated interior conditions, in which the in-service moisture content of lumber does not exceed 16%.

²Reference design values are for normal load duration. Adjustments to the reference design values must be made as applicable, in accordance with Sections 4.1.1 through 4.1.5 of this report, and corresponding requirements must be met.

³When calculating deflection, both bending and shear deformation must be determined (See Section 4.6). For bending deflection use the standard engineering formulas.

Example: Formula for uniform load on a simple span I-joist:

$$\Delta = \frac{22.5 WL^4}{EI} + \frac{WL^2}{K}$$

- Where:
- Δ = Deflection in inches.
 - W = Uniform load in pounds per lineal foot (plf).
 - L = Design span in feet.
 - K = Shear stiffness coefficient in x10⁶ lbf-ft/in.
 - EI = Flexural stiffness in x10⁶ lbf-in.².

⁴For reference design reaction values, see Table 3.

⁵The 9¹/₂, 11⁷/₈, 14 and 16 inch PWI 20S / LPI 20Plus stamped with mill number 1068 (Larouche, QC), and the 9¹/₂, 11⁷/₈, and 14 inch PWI 20S / LPI 20Plus stamped with mill number 1077 (St. Prime, QC) shall be permitted to be designed as the PRI-40 I-joists in accordance with ESR-1405.

⁶The 9¹/₂, 11⁷/₈, 14 and 16 inch PWI 32S / LPI 32Plus stamped with mill number 1068 (Larouche, QC), and the 9¹/₂, 11⁷/₈, and 14 inch PWI 32S / LPI 32Plus stamped with mill number 1077 (St. Prime, QC) shall be permitted to be designed as the PRI-60 I-joists in accordance with ESR-1405.

⁷The 11⁷/₈, 14 and 16 inch PWI 42S / LPI 42Plus stamped with mill number 1068 (Larouche, QC) or 1069 (Red Bluff, CA), and the 11⁷/₈ and 14 inch PWI 42S / LPI 42Plus stamped with mill number 1077 (St. Prime, QC) are recognized as the PRI-80 in accordance with ESR-1405.

TABLE 3—REFERENCE DESIGN REACTIONS AND FLANGE BEARING CAPACITIES^{1,2,3,4}

JOIST SERIES	JOIST DEPTH (in)	END REACTION (lbf)				INTERMEDIATE REACTION (lbf)				FLANGE COMPRESSION PERP-TO-GRAIN (psi)	
		Minimum Bearing		Maximum Bearing (4 in.)	Minimum Bearing ⁵ (3½ in.)	Maximum Bearing (5½ in.)					
		Web Stiffeners		Web Stiffeners	Web Stiffeners		Web Stiffeners				
		NO	YES ⁶		NO	YES ⁶	NO	YES ⁶			
SAWN LUMBER FLANGES											
PWI 18S / LPI 18	9½	870	1025	1½	995	1130	1975	2135	2205	2370	425
	11⅞	870	1145		1040	1335	2095	2270	2335	2545	
	14	870	1255		1080	1510	2205	2395	2450	2700	
	16	870	1355		1115	1680	2310	2515	2565	2855	
PWI 20S / LPI 20Plus	9½ ⁸	970	1140	1½	1110	1260	2195	2375	2450	2635	425
	11⅞ ⁸	970	1275		1160	1485	2330	2525	2595	2830	
	14 ⁸	970	1395		1200	1680	2455	2665	2725	3005	
	16 ⁸	970	1510		1240	1870	2570	2795	2850	3175	
PWI 32S / LPI 32Plus	9½ ⁹	970	1140	1½	1110	1260	2195	2375	2450	2635	525
	11⅞ ⁹	970	1275		1160	1485	2330	2525	2595	2830	
	14 ⁹	970	1395		1200	1680	2455	2665	2725	3005	
	16 ⁹	970	1510		1240	1870	2570	2795	2850	3175	
PWI 42S / LPI 42Plus	9½	1185	1340	1½	1305	1340	2900	3095	2940	3195	525 ⁷
	11⅞ ¹⁰	1245	1510		1595	1625	3025	3340	3120	3515	
	14 ¹⁰	1300	1660		1595	1875	3140	3565	3280	3805	
	16 ¹⁰	1350	1800		1595	2115	3245	3775	3435	4080	
	18	1500	2305	2½	1690	2555	3450	4285	3850	4625	
	20	1500	2450		1690	2795	3450	4410	3850	4835	
	22	1500	2595		1690	3030	3450	4530	3850	5030	
	24	1500	2705		1690	3270	3450	4640	3850	5210	
PWI 52S / LPI 52Plus	9½	1335	1650	1½	1600	1745	3400	3710	3515	3840	615
	11⅞	1370	1820		1690	2055	3420	4000	3635	4210	
	14	1385	1970		1845	2330	3435	4260	3745	4540	
	16	1400	2110		1985	2585	3450	4505	3850	4855	
	18	1700	2490	2½	2130	2845	3450	4750	3850	5165	
	20	1700	2675		2130	3105	3450	4990	3850	5475	
	22	1700	2865		2130	3360	3450	5235	3850	5790	
	24	1700	3055		2130	3620	3450	5480	3850	6100	

For SI: 1 inch = 25.4 mm, 1 lb = 4.448 N, 1 lb/in = 0.175 N/mm.

See Notes for Table 3 on the following page.

TABLE 3 (Continued)—REFERENCE DESIGN REACTIONS AND FLANGE BEARING CAPACITIES^{1,2,3,4}

JOIST SERIES	JOIST DEPTH (in)	END REACTION (lbf)				INTERMEDIATE REACTION (lbf)				FLANGE COMPRESSION PERP.-TO-GRAIN (psi)	
		Minimum Bearing		Minimum Bearing Length (in)	Maximum Bearing (4 in.)		Minimum Bearing ⁵ (3 1/2 in.)		Maximum Bearing (5 1/2 in.)		
		Web Stiffeners			Web Stiffeners		Web Stiffeners		Web Stiffeners		
		NO	YES ⁶	NO	YES ⁶	NO	YES ⁶	NO	YES ⁶		
LVL FLANGES											
PWI 36L / LPI 36	11 7/8	1025	1500	1 1/2	1290	1615	2500	3105	2835	3470	550
	14	1025	1515		1325	1830	2500	3205	2835	3565	
	16	1025	1525		1360	2020	2500	3305	2835	3655	
	18	1175	1800		1395	2185	2500	3405	2835	3750	
	20	1185	1860	2 1/2	1430	2320	2500	3500	2835	3840	
	22	1200	1915		1465	2435	2500	3600	2835	3930	
	24	1215	1960		1500	2525	2500	3700	2835	4025	
	11 7/8	1145	1660		1 1/2	1515	2055	3130	3860	3670	
14	1145	1755	1535	2330		3130	4055	3670	4300		
16	1145	1845	1555	2585		3130	4245	3670	4525		
18	1315	2300	1575	2845		3130	4435	3670	4750		
20	1325	2455	2 1/2	1595		3105	3130	4620	3670	4975	
22	1335	2610		1615		3360	3130	4810	3670	5200	
24	1340	2770		1635		3620	3130	5000	3670	5430	
9 1/2	880	1125		1 1/2		1095	1340	2065	2300	2265	2500
11 7/8	880	1245	1120		1565	2120	2485	2400	2735		
14	880	1350	1145		1765	2165	2655	2525	2945		
16	880	1450	1165		1955	2210	2810	2640	3140		

For SI: 1 inch = 25.4 mm, 1 lb = 4.448 N, 1 lb/in = 0.175 N/mm.

¹The reference design values are for dry conditions of use only. Dry use applies to products installed in dry covered and well ventilated interior conditions in which the in-service moisture content of lumber does not exceed 16%.

²Reference design values are for normal load duration. Adjustments to the tabulated reference design reaction values must be made as applicable, in accordance with Sections 4.1.1 through 4.1.5 of this report, and corresponding requirements must be met. Reference design reaction values are permitted to be adjusted for other load durations in accordance with the code, provided the tabulated flange compression perpendicular-to-grain values are not exceeded. Tabulated flange compression perpendicular-to-grain values must not be increased for duration of load.

³The applied flange compression perpendicular-to-grain stress must be calculated based on the reaction divided by the bearing length and net flange width. To determine the net flange width, subtract 0.25 inches from the flange width of the PWI 18S / LPI 18, PWI 20S / LPI 20Plus, LPI 32Plus / PWI 18S, PWI 42S / LPI 42Plus, and PWI 52S / LPI 52Plus, or subtract 0.10 inches from the flange width of the PWI 36L / LPI 36, PWI 56L / LPI 56 and PWI 53L / LPI 530. The applied flange compression perpendicular-to-grain based on net flange width must also not exceed the bearing capacity of the supporting material.

⁴Reaction Capacity may be linearly interpolated between the minimum and maximum bearing length values. Bearing lengths longer than the maximum do not further increase Reaction Capacity.

⁵Intermediate Reaction may be linearly extrapolated a minimum bearing length of 3 inches, based on the 3 1/2-inch and 5 1/2-inch values.

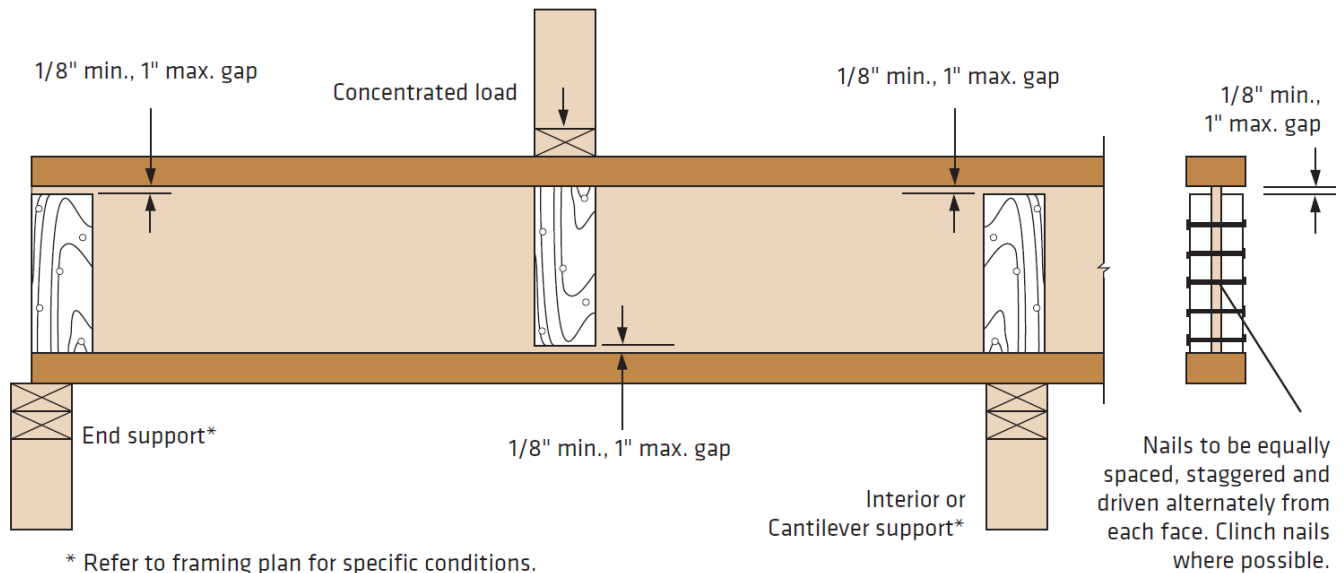
⁶See Figure 1 for required web stiffener details.

⁷The reference design compression perpendicular-to-grain of flanges of the PWI 42S / LPI 42Plus stamped with mill number 1069 (Red Bluff, CA) is permitted to be increased to 615 psi.

⁸The 9 1/2, 11 7/8, 14 and 16 inch PWI 20S / LPI 20Plus stamped with mill number 1068 (Larouche, QC), and the 9 1/2, 11 7/8, and 14 inch PWI 20S / LPI 20Plus stamped with mill number 1077 (St. Prime, QC) shall be permitted to be designed as the PRI-40 in accordance with ESR-1405.

⁹The 9 1/2, 11 7/8, 14 and 16 inch PWI 32S / LPI 32Plus stamped with mill number 1068 (Larouche, QC), and the 9 1/2, 11 7/8, and 14 inch PWI 32S / LPI 32Plus stamped with mill number 1077 (St. Prime, QC) shall be permitted to be designed as the PRI-60 I-joists in accordance with ESR-1405.

¹⁰The 11 7/8, 14 and 16 inch PWI 42S / LPI 42Plus stamped with mill number 1068 (Larouche, QC) or 1069 (Red Bluff, CA), and the 11 7/8 and 14 inch PWI 42S / LPI 42Plus stamped with mill number 1077 (St. Prime, QC) are recognized as the PRI-80 in accordance with ESR-1405.



For SI: 1 in. = 25.4 mm

- ¹Web stiffeners, when required, must be installed in pairs – one to each side of the web. In addition to the requirements noted in Table 3.
- ²Web stiffeners should be cut to fit between the flanges of the I-joist, leaving a minimum 1/8-inch gap (1-inch maximum). At bearing locations, the stiffeners should be installed tight to the bottom flange with the gap to the top flange. At locations of concentrated loads, the stiffeners should be installed tight to the top flange with the gap to the bottom flange.
- ³Web stiffeners should be cut from APA Rated (or equal) OSB or plywood, or from 2x lumber or structural composite lumber.
- ⁴Web stiffeners should be the same width as the bearing surface, with a minimum of 3 1/2 inches.
- ⁵See Table 4 for minimum stiffener thickness, maximum stiffener height, nail size and total number of nails for each pair of stiffeners.
- ⁶Nails must be equally spaced, staggered and driven alternately from each face.

FIGURE 1—I-JOIST WEB STIFFENER DETAILS

TABLE 4—WEB STIFFENER SCHEDULE

JOIST DEPTH	MAXIMUM STIFFENER HEIGHT	JOIST SERIES				
		SAWN LUMBER FLANGES		LVL FLANGES		
		PWI 18S / LPI 18 PWI 20S / LPI 20Plus PWI 32S / LPI 32Plus	PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	PWI 36L / LPI 36S	PWI 56L / LPI 56	PWI 53L / LPI 530
		MINIMUM STIFFENER THICKNESS				
		23/32"	1 1/2"	23/32"	1 1/2"	23/32"
		NAIL SIZE				
		8d Box (2 1/2" x 0.113")	10d Box (3" x 0.128")	8d Box (2 1/2" x 0.113")	10d Box (3" x 0.128")	8d Box (2 1/2" x 0.113")
		TOTAL NAILS REQUIRED				
9 1/2"	6 3/8"	3	3	-	-	3
11 7/8"	8 3/4"	3	3	4	4	3
14"	10 7/8"	3	3	5	5	3
16"	12 7/8"	3	3	6	6	3
18"	14 7/8"	-	7	7	7	-
20"	16 7/8"	-	8	8	8	-
22"	18 7/8"	-	9	9	9	-
24"	20 7/8"	-	10	10	10	-

For SI: 1 in = 25.4 mm.

TABLE 5—EQUIVALENT SPECIFIC GRAVITY FOR DESIGN OF NAIL CONNECTIONS

JOIST SERIES	WITHDRAWAL		DOWEL BEARING	
	Installed in Edge	Installed in Face	Installed in Edge	Installed in Face
SAWN LUMBER FLANGES¹				
PWI 18S / LPI 18 PWI 20S / LPI 20Plus	0.42 (SPF Lumber)			
PWI 32S / LPI 32Plus PWI 42S / LPI 42Plus	0.46 ³ (SPF MSR Lumber with E = 1.8 to 1.9)			
LPI 52Plus18 / PWI 52S	0.50 (SPF MSR Lumber with E = 2.0 and higher)			
LVL FLANGES²				
PWI 36L / LPI 36 PWI 56L / LPI 56 PWI 53L / LPI 530	0.46	0.50	0.50	0.50

¹Equivalent specific gravity for sawn lumber flanges is in accordance with the NDS for the lumber grade indicated in the parentheses.

²Equivalent specific gravity for LVL flanges is in accordance with Table 2 of ICC-ES report [ESR-2403](#) for SolidStart®LVL with a grade of 2250F_b-1.5E and above.

³Equivalent specific gravity for flanges of the PWI 42S / LPI 42Plus stamped with mill number 1069 (Red Bluff, CA) is permitted to be increased to 0.50.

TABLE 6—FLANGE FACE NAILING ¹

JOIST SERIES	NAIL SIZE	MINIMUM DISTANCE FROM JOIST END	CLOSEST O.C. SPACING
SAWN LUMBER FLANGES ²			
PWI 18S / LPI 18 PWI 20S / LPI 20Plus PWI 32S / LPI 32Plus PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	8d Box (2 1/2" x 0.113") 8d Common (2 1/2" x 0.131")	1"	2"
	10d Box (3" x 0.128") 12d Box (3 1/4" x 0.128")	1"	2"
	10 Common (3" x 0.148") 12d Common (3 1/4" x 0.148") 16d Sinker (3 1/4" x 0.148")	1 1/2"	3"
	16d Box (3 1/2" x 0.135") 16d Common (3 1/2" x 0.162")	1 1/2"	4"
LVL FLANGES ³			
PWI 36L / LPI 36 PWI 56L / LPI 56	8d Box (2 1/2" x 0.113") 8d Common (2 1/2" x 0.131")	1 1/2"	3"
	10d Box (3" x 0.128") 12d Box (3 1/4" x 0.128")	1 1/2"	3"
	10 Common (3" x 0.148") 12d Common (3 1/4" x 0.148") 16d Sinker (3 1/4" x 0.148")	1 1/2"	3"
	16d Box (3 1/2" x 0.135") 16d Common (3 1/2" x 0.162")	1 1/2"	5"
PWI 53L / LPI 530	8d Box (2 1/2" x 0.113") 8d Common (2 1/2" x 0.131")	1 1/2"	3"
	10d Box (3" x 0.128") 12d Box (3 1/4" x 0.128")	1 1/2"	3"
	10 Common (3" x 0.148") 12d Common (3 1/4" x 0.148") 16d Sinker (3 1/4" x 0.148")	1 1/2"	3"
	16d Box (3 1/2" x 0.135") 16d Common (3 1/2" x 0.162")	1 1/2"	5"

For SI: 1 in = 25.4 mm.

¹For two rows of nails into the wide face of flanges, the rows must be offset 1/2 inch or more from each other, and staggered.

²Nails into the edges of sawn lumber flanges may be spaced in accordance with the provisions in the NDS.

³Nails into the edges of LVL lumber flanges must be spaced in accordance with Table 3 of ICC-ES report [ESR-2403](#).

TABLE 7—ALLOWABLE SHEAR (Pounds Per Foot) FOR HORIZONTAL WOOD STRUCTURAL PANEL DIAPHRAGMS FRAMED WITH PWI JOISTS (FORMERLY SOLIDSTART®) FOR WIND ¹ OR SEISMIC LOADING ^{2,3}

Panel Grade	Common Nail Size	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Framing Members at Adjoining Panel Edges and Boundaries ^{4,5} (in.)	BLOCKED DIAPHRAGMS		UNBLOCKED DIAPHRAGMS		
				Nail spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6) ^{6,7}		Nails Spaced 6 in. max. at supported edges ⁶		
				6	4	Case 1 (No unblocked edges or continuous joints parallel to load)	All other configurations (Cases 2, 3, 4, 5 & 6)	
				Nail spacing (in.) at other panel edges (Cases 1, 2, 3, & 4) ⁶				
				6	6			
Structural 1 Grades	6d ⁸	5/16	2	185	250	165	125	
			3	210	280	185	140	
	8d	3/8	2	270	360	240	180	
			3	300	400	265	200	
	10d	15/32	2	320	425	285	215	
			3	360	480	320	240	
Sheathing, single floor and other grades covered in DOC PS 1 and PS 2	6d ⁸	5/16	2	170	225	150	110	
			3	190	250	170	125	
			3	210	280	185	140	
		8d	3/8	2	240	320	215	160
				3	270	360	240	180
				3	270	360	240	180
	7/16		2	255	340	230	170	
			3	285	380	255	190	
			3	285	380	255	190	
	10d	15/32	2	270	360	240	180	
			3	300	400	265	200	
			3	300	400	265	200	
		19/32	2	290	385	255	190	
			3	325	430	290	215	
			3	325	430	290	215	
	19/32	2	320	425	285	215		
		3	360	480	320	240		
		3	360	480	320	240		

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf = 4.448 N, 1 lbf/ft = 0.0146 N/mm.

¹For wind load applications, the values in the table above shall be permitted to be multiplied by 1.4.

²For shear loads of normal or permanent load duration as defined by the NDS, the values in the table above shall be multiplied by 0.63 or 0.56, respectively.

³The tabulated allowable shear capacities are for I-Joist series with flanges having a specific gravity (G) of 0.50 or higher (see Table 5).

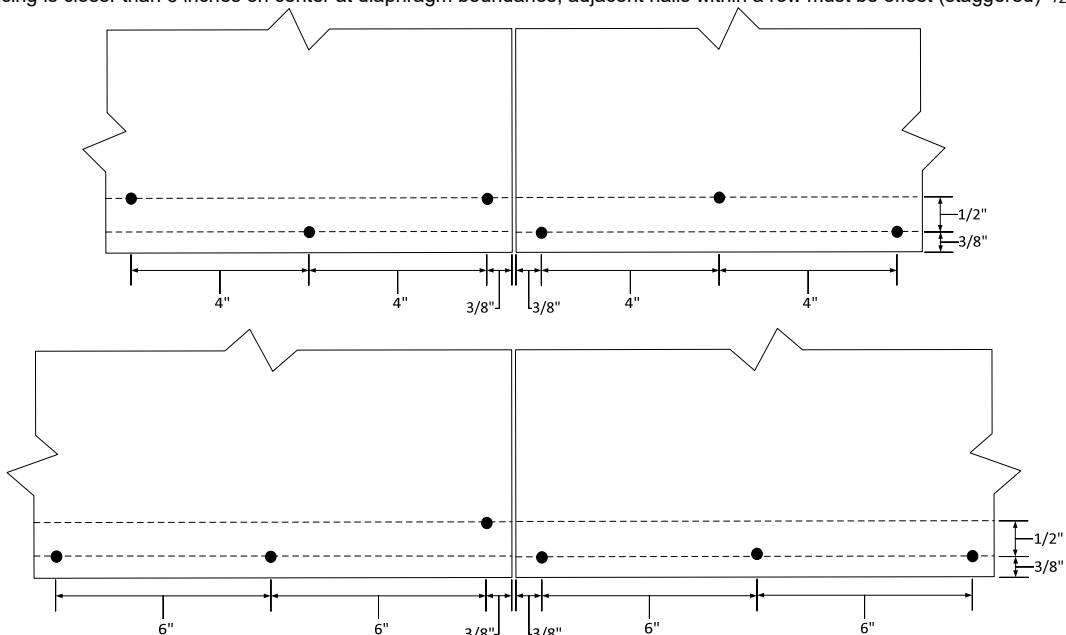
For G < 0.50 the allowable shear capacities shall be reduced by multiplying the allowable shear capacities by the Specific Gravity Adjustment Factor = [1-(0.5-G)]. The Specific Gravity Adjustment Factor shall not be greater than 1.

⁴See Table 1 for equivalent minimum nominal framing width of the flanges for PWI Joists (formerly SolidStart®).

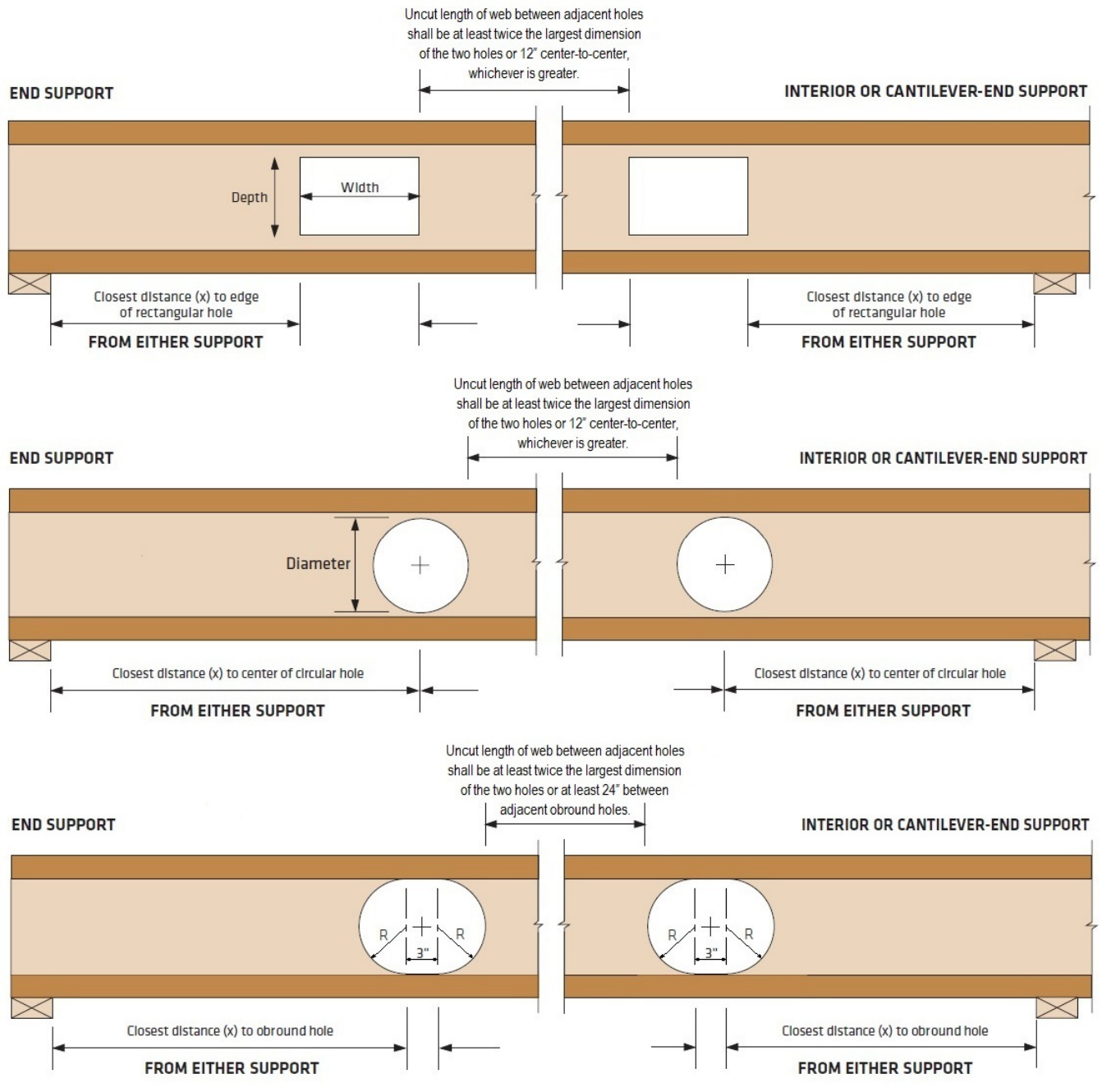
⁵The minimum nominal width of framing members not located at boundaries or adjoining panel edges shall be 2 inches.

⁶Space nails maximum 12 inches o.c. along intermediate framing members (6 inches o.c. when supports are spaced 48 inches o.c. or greater). Fasteners shall be located 3/8 inch minimum from panel edges.

⁷When nail spacing is closer than 6 inches on center at diaphragm boundaries, adjacent nails within a row must be offset (staggered) 1/2 inch:



⁸8d common nails minimum are recommended for roofs due to negative pressures of high winds.



¹CUT HOLES CAREFULLY. DO NOT OVERCUT HOLES. DO NOT CUT I-JOIST FLANGES.

²Holes may be placed anywhere within the depth of the web. A minimum 1/4-inch clear distance is recommended between the hole and the flanges.

³Obround holes are (up to) full web-depth holes with semi-circular ends defined by three overlapping circular holes spaced (up to)

1 1/2 inches apart, center-to-center of the holes. Obround holes are not allowed in the PWI 53L / LPI 530 I-Joists (see Table 9).

⁴Circular holes up to 1 1/2-inch diameter may be placed anywhere in the web.

⁵Perforated "knockouts" may be neglected when locating web holes.

⁶Holes with dimensions larger than 1 1/2 inches are not permitted in cantilevers without special engineering.

⁷Multiple holes must have a minimum clear separation along the length of the joist of at least twice the large dimension of the larger adjacent hole or a minimum center-to-center distance of 12 inches, whichever is greater. In addition, the minimum clear separation between adjacent obround holes must not be less than 24 inches.

⁸Multiple holes may be spaced closer than required in footnote 7 above, provided they fit within the boundary of an acceptable larger hole. Example: two 3-inch round holes aligned parallel to the joist length may be spaced 2 inches apart (clear distance) provided that a 3-inch-high-by-8-inch-long rectangular, or an 8-inch-diameter circular hole are acceptable for the joist depth at that location and completely encompass the holes.

⁹Except as noted in 4, web holes cannot be located any closer than 1 foot from the inside face of the closest bearing to the critical location of the hole (see figure), without further analysis by a design professional.

FIGURE 2—WEB HOLE INSTALLATION REQUIREMENTS

TABLE 8—CIRCULAR AND RECTANGULAR WEB HOLE SHEAR EQUATIONS
(May be used in lieu of the web hole charts)

CIRCULAR HOLE EQUATION CONSTANTS				
Joist Series	Joist Depth (in.)	C1	C2	C3
SAWN LUMBER FLANGES				
PWI 18S / LPI 18	9½" to 16"	V _r	0	0
PWI 20S / LPI 20Plus PWI 32S / LPI 32Plus PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	9½" to 16"	1041	0	361
PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	18" to 24"	2489	0	88
LVL FLANGES				
PWI 36L / LPI 36 PWI 56L / LPI 56	11⅞" to 16"	1621	0	124
	18" to 24"	2489	0	88
PWI 53L / LPI 530	9½" to 16"	V _r	0	0
RECTANGULAR HOLE EQUATION CONSTANTS				
Joist Series	Joist Depth (in.)	C1	C2	C3
SAWN LUMBER FLANGES				
PWI 18S / LPI 18	9½" to 11⅞"	554	-20.4	256
	14" & 16"	977	-30.7	375
PWI 20S / LPI 20Plus PWI 32S / LPI 32Plus PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	9½" to 11⅞"	610	-22.4	282
	14" & 16"	1075	-33.8	413
PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	18" to 24"	1731	-52.0	599
LVL FLANGES				
PWI 36L / LPI 36 PWI 56L / LPI 56	9½" to 11⅞"	610	-22.4	282
	14" & 16"	1075	-33.8	413
	18" to 24"	1731	-52.0	599
PWI 53L / LPI 530	9½" to 11⅞"	610	-22.4	282
	14" & 16"	903	-28.4	347

For SI: 1 in = 25.4 mm, 1 lbf = 4.448 N.

¹The equation to determine the allowable shear at the location of a web hole is:

$$V_{Hole} = C1 * (D_{Joist} - D_{Hole}) / D_{Joist} + C2 * W_{Hole} + C3$$

If $V_{Hole} < 200$ lbf, then $V_{Hole} = 0$ lbf (hole not allowed)

Where: C1, C2 and C3 are the tabulated constants

V_{Hole} = allowable shear at critical location of hole (lbf) (see Note 3 below)

D_{Joist} = Depth of I-joist (in)

D_{Hole} = Diameter or Depth of hole (in)

W_{Hole} = Width of hole (in)

For the PWI 18S / LPI 18, and PWI 53L / LPI 530 :

V_r = reference design shear (lbf) from Table 2, corresponding to the depth of the I-joist being used.

²The Allowable Web Hole Shear calculated from above is for normal load duration and can be adjusted for other durations.

³The critical location for web hole shear is the center of a circular hole or either edge of a rectangular hole.

⁴Web hole height may be full depth of the I-joist web. A minimum ¼-inch clear distance is recommended between the hole and the flanges: Do NOT cut the flanges. The maximum hole width for rectangular holes is 18 inches.

⁵Except as noted in Figure 2, web holes cannot be located any closer than 1 foot from the inside face of the closest bearing to the critical location of the hole (see note 3), without further analysis by a design professional.

⁶Refer to Figure 2 for general information pertaining to locating holes in I-joist webs.

TABLE 9—OBROUND WEB HOLE SHEAR CAPACITY
(May be used in lieu of the web hole charts)

JOIST SERIES	JOIST DEPTH	HOLE SHEAR, V_{Hole} (lbf)
SAWN LUMBER FLANGES		
PWI 18S / LPI 18	9 ¹ / ₂ "	479
	11 ⁷ / ₈ "	486
	14"	422
	16"	381
PWI 20S / LPI 20Plus PWI 32S / LPI 32Plus PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	9 ¹ / ₂ "	533
	11 ⁷ / ₈ "	541
	14"	469
	16"	424
PWI 42S / LPI 42Plus PWI 52S / LPI 52Plus	18" to 24" ³	424
LVL FLANGES		
PWI 36L / LPI 36 PWI 56L / LPI 56	11 ⁷ / ₈ " to 16"	420
	18" to 24" ³	420
PWI 53L / LPI 530	Not Allowed	

For SI: 1 in = 25.4 mm, 1 lbf = 4.448 N.

¹Obround holes are (up to) full web-depth holes with semi-circular ends defined by three overlapping circular holes spaced up to 1¹/₂ inches apart, center-to-center of holes.

²Obround hole allowable shears are based on the maximum size hole for a joist depth. Smaller obround holes are permissible but are limited to the same value.

³For I-joist depths greater than 16 inches, the maximum obround hole for the 16" Joist Depth is permitted to be cut using the allowable for the 16" Joist Depth. The obround hole shall be centered on the depth of the I-joist.

⁴The Allowable Web Hole Shear calculated from above is for normal load duration and can be adjusted for other durations.

⁵The critical location for web hole shear is at the center of either semi-circular end of an obround hole.

⁶Obround holes shall not be located any closer than 1 foot from the inside face of the closest bearing to the critical location of the hole (see note 5), without further analysis by a registered design professional.

⁷Refer to the Figure 2 for general information pertaining to locating holes in I-joist webs.

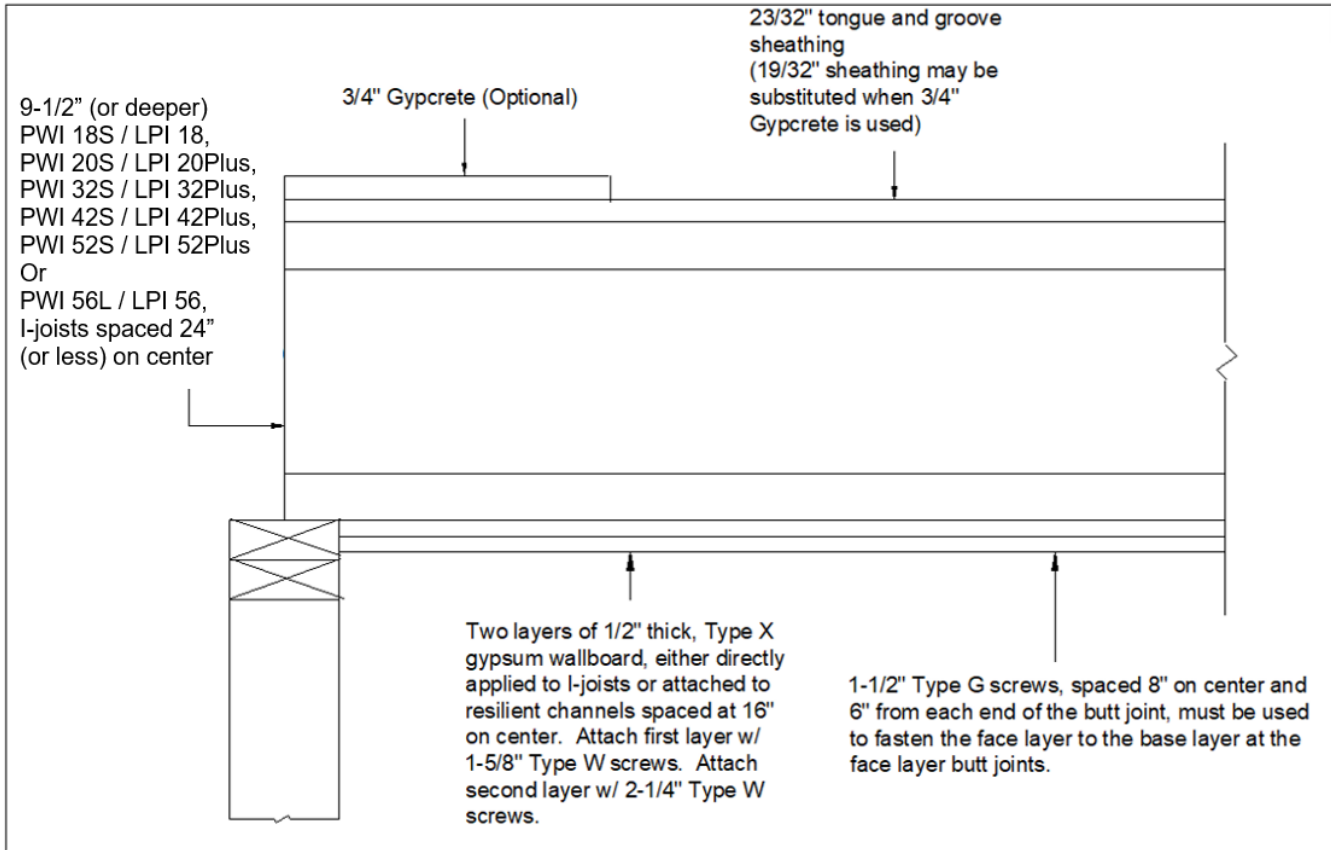
TABLE 10—I-JOIST RIM JOIST AND BLOCKING PANEL CAPACITIES^{1,2}

JOIST DEPTH	UNIFORM VERTICAL LOAD CAPACITY (lbf/ft)							
	SAWN LUMBER FLANGES					LVL FLANGES		
	PWI 18S / LPI 18	PWI 20S / LPI 20Plus	PWI 32S / LPI 32Plus	PWI 42S / LPI 42Plus	PWI 52S / LPI 52Plus	PWI 36L / LPI 36	PWI 56L / LPI 56	PWI 53L / LPI 530
9¹/₂"	1900	1900	2200	2200	2400	-	-	2000
11⁷/₈"	1760	1760	2200	2200	2400	1800	2400	2000
14"	1600	1600	1600	2000	2200	1800	2200	1100
16"	1200	1500	1500	2000	2000	1800	1900	1100
18"	-	-	-	1700	1700	1300	1700	-
20"	-	-	-	1580	1580	1300	1580	-
22"	-	-	-	1300	1300	1200	1300	-
24"	-	-	-	1100	1100	1100	1100	-

For SI: 1 in = 25.4 mm; 1 lbf/ft = 14.6 N/m.

¹PWI Joists (formerly SolidStart[®]) with allowable uniform vertical load transfer capacities of 2000 lbf/ft or greater may be used either as rim joists or blocking panels in prescriptive framing. PWI Joists (formerly SolidStart[®]) with allowable uniform vertical load transfer capacities less than 2000 lbf/ft may be used only as blocking panels unless designed as a rim joist by a registered design professional.

² PWI Joists (formerly SolidStart[®]) used as rim joists shall be limited to a maximum shear load of 200 lbf/ft for I-Joists with LVL flanges or 230 lbf/ft for I-Joists with sawn lumber flanges. These limits are permitted to be multiplied by 1.4 for wind load applications and shall be multiplied by 0.63 and 0.56 for shear loads of normal and permanent load durations, respectively. The minimum nail spacing and end distances shall not be less than as given in Table 6.



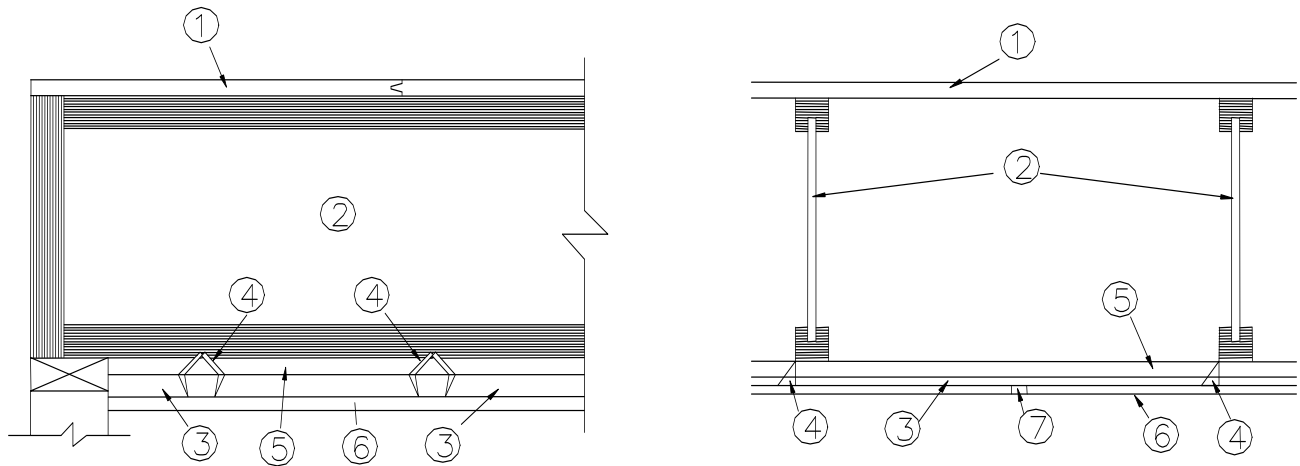
FLOOR ASSEMBLY	STC	IIC
w/o GYPCRETE	50	50
w/ RESILIENT CHANNEL w/ CARPET/PAD		
w/ GYPCRETE	50	50
w/ RESILIENT CHANNEL w/ CARPET/PAD		
w/ GYPCRETE	50	50
w/o RESILIENT CHANNEL w/ CARPET/PAD		

For SI: 1 in. = 25.4 mm.

NOTES:

1. Carpet is minimum 57 ounce carpet with 0.531 inch pile height and 1/2-inch-thick 4 pcf density foam pad.
2. Vinyl is minimum 0.06-inch thick with cushioned vinyl minimum 0.01-inch-thick wear layer.
3. Gypsum concrete is minimum 3/4-inch thick over 19/32-inch plywood.
4. The plywood must be glued at tongue and groove joints and to the I-Joists.
5. Cavity is insulated with 3 1/2-inch-thick fiberglass batts between joists.

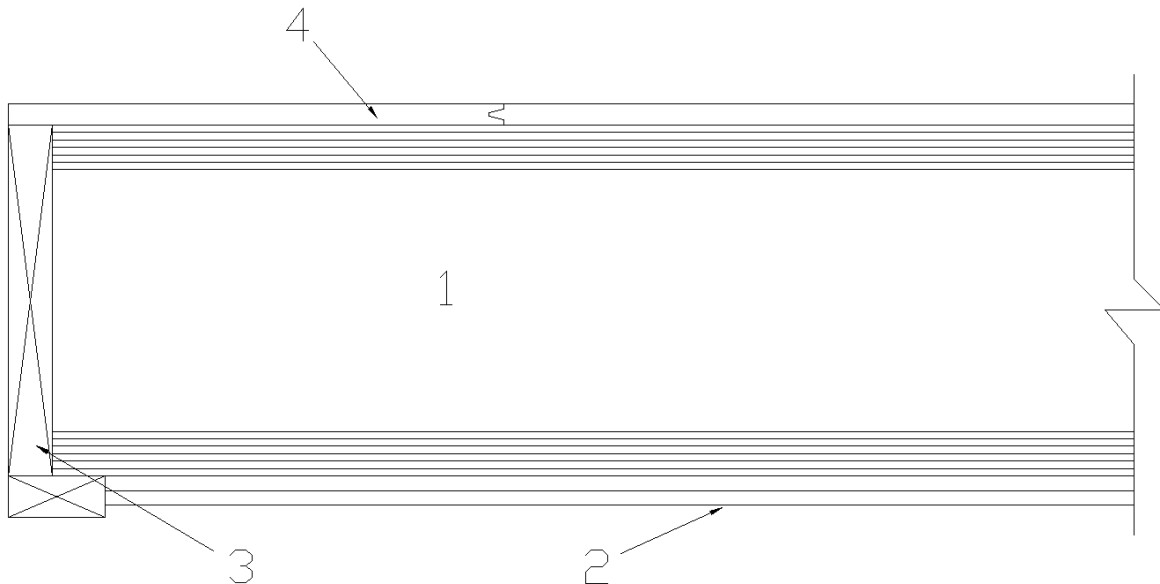
FIGURE 3—ONE-HOUR FLOOR-CEILING FIRE-RESISTIVE ASSEMBLY



For SI: 1 in = 25.4 mm, 1 ft = 305 mm.

- 1. Floor Sheathing** ²³/₃₂-inch thick 4-ft by 8-ft tongue and groove (APA Rated Sturdi-I-Floor) sheets installed perpendicular to I-Joists and fastened with an AFG-01 construction adhesive and 6d deformed shank or 8d common nails, maximum 12 inches on center at all locations.
- 2. Wood I-Joists** PWI Joists (formerly SolidStart®) shall be a minimum of 11¹/₄-inch deep with flange dimensions at least 1¹/₂ inches x 1¹/₂ inches of LVL or 1¹/₂ inches x 2¹/₂ inches of sawn lumber, and a minimum of ³/₈-inch thick OSB web. Maximum I-Joist spacing is 24 inches on center. Use 1 inch minimum rim board or blocking panels at the I-Joist ends, installed in accordance with the manufacturer's published installation instructions. Holes in the webs per manufacturers' instructions are permitted.
- 3. Furring Channels** Resilient furring channels measuring 2.636 inches wide by 0.838 inches deep formed from No. 26 gauge (0.0719 inch) galvanized steel sheet spaced 24-in. on center perpendicular to the joists. Supported by Simpson CSC clips (4). At splices, channels overlapped 6 inches, and tied with two double strands of No. 18 SWG galvanized steel wire at each end of overlap. At wallboard end joints, a second length of channel is installed adjacent to the first to provide one channel for each wallboard end. Second channel span from joist to joist outside the wallboard width to support the entire end of the wallboard.
- 4. Hanger Clips** Simpson Type CSC hangers for furring channels. One at each intersection of joist and channel nailed with one 6d or 8d common nail.
- 5. Insulation** 1-inch thick 24x48-inch mineral wood batts with nine pounds per cubic foot density.
- 6. Gypsum Wallboard** ⁵/₈-inch thick US Gypsum Company Firecode C in 4-foot wide sheets installed perpendicular to furring channels with 1-inch long Type S wallboard screws on 8-in. centers. End joints attached to the doubled channels, long joints backed by sheet metal Tee-Sections (7). Edges of wallboard attached to Tee-Sections by 1-inch Type S wallboard screws 8-in. on center with one screw at each Tee-Section-channel intersection.
- 7. Tee-Section** Formed from No. 20 gauge (0.0359 inch) galvanized steel sheet. Sections are 1⁷/₈-in. wide overall with the short leg ¹/₂-inch long overall.
- 8. Finish System** (Not Shown) Paper tape embedded in joint compound over joints with edges of compound feathered out and exposed screw heads covered with compound.

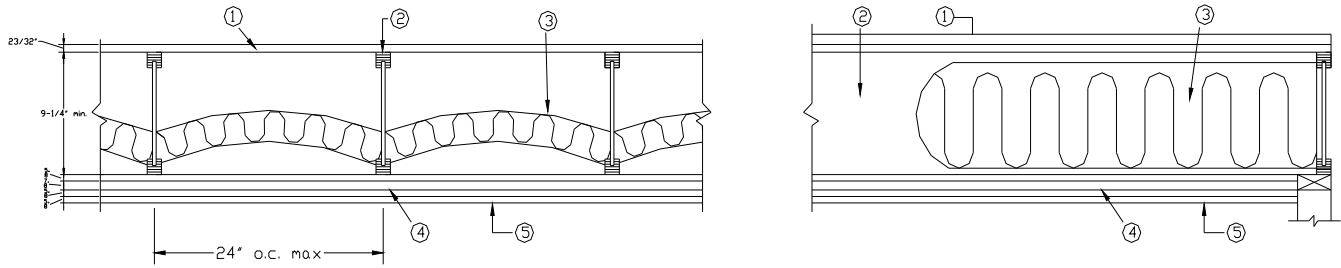
FIGURE 4—ONE-HOUR FLOOR-CEILING FIRE-RESISTIVE ASSEMBLY



For SI: 1 in = 25.4 mm, 1 ft = 305 mm.

- 1. **Wood I-Joists** PWI Joists (formerly SolidStart®) shall be a minimum of 1 1/4 inches deep with flange dimensions at least 1 1/2 inches x 1 1/2 inches of LVL and minimum of 3/8-inch thick OSB web. Maximum spacing is 24 inches on center. Holes in the webs per manufacturers' instructions are permitted.
- 2. **Gypsum Wallboard** 2 layers of 1/2-inch thick Type FSW-C gypsum wallboard in 4-foot wide sheets, manufactured by National Gypsum, are directly attached to the bottom flanges of the joists. The long dimension of the wallboard is oriented perpendicular to the joists. The first layer is fastened to the joists with 1/4-inch Type S drywall screws spaced 24 inches on center, butt joints being staggered 25 inches from the adjacent rows of the face layer. The second layer is fastened to the joists with 1 3/8-inch Type S drywall screws spaced 12 inches on center with its joints being staggered 24 inches in each direction from joints of the first layer.
- 3. **End Rim/Blocking** Use 1-inch minimum rim board or blocking panels installed in accordance with the manufacturer's published installation instructions.
- 4. **Floor Sheathing** 19/32-inch thick tongue-and-groove in 4-foot x 8-foot sheets installed with long edge perpendicular to the joists and fastened with 8d common or 6d shank nails at a maximum 6 inches on center at all locations. End joints are staggered 24 inches from adjacent rows.
- 5. **Finish System (Not Shown)** Exposed wallboard joints are treated with paper tape embedded in joint compound and covered with two coats of compound. Screw heads are covered with two coats of joint compound.

FIGURE 5—ONE-HOUR FLOOR-CEILING FIRE-RESISTIVE ASSEMBLY



For SI: 1 in = 25.4 mm, 1 ft = 305 mm.

- | | |
|-------------------------------------|---|
| 1. Floor Sheathing | <p>Panels shall conform to the requirements of PS 1-83, Exposure 1, interior type with exterior glue, minimum ²³/₃₂-inch thick, tongue-and-groove long edges for floors and a minimum ¹⁵/₃₂-inch thick square edges for roofs. Install long edges perpendicular to the I-Joists. Stagger end joints on I-Joists. For floors, apply AFG-01 construction adhesive in a ³/₈-inch bead on the top surface of the I-Joists, and grooved edges of the sheathing. Nail with 6d deformed shank nails, 8d common nails, or equivalent-sized screws a maximum of 6 inches on center on the panel ends, and a maximum of 12 inches on center in the field. Optionally, with minimum ³/₄-inch thick light-weight concrete or floor topping mixture, panels shall be minimum ¹⁹/₃₂-inch thick.</p> |
| 2. Wood I-Joists | <p>PWI Joists (formerly SolidStart®) shall be minimum 9¹/₄-inch deep with flange dimensions of at least 1¹/₂ inches x 1¹/₂ inches of LVL or 1¹/₂ inches x 2¹/₂ inches of sawn lumber, and minimum ³/₈-inch-thick OSB webs. Maximum spacing is 24 inches on center. Holes in the webs per manufacturers' instructions are permitted.</p> |
| 3. Insulation | <p>Unfaced fiberglass batts 24 inches wide by 48 inches long by 3¹/₂-inches thick with 3.5 pcf density placed in the plenum and supported by stay wires spaced about 12 inches apart.</p> |
| 4. Furring channels | <p>Resilient furring channels formed from No. 28 gauge (0.0179 inch) galvanized sheet steel measuring 2.636 inches wide by 0.838 inches deep spaced 16 inches on center perpendicular to the joists and attached to the joist by 1⁵/₈-inch Type S wallboard screws.</p> |
| 5. Gypsum Wallboard | <p>Wallboard is ⁵/₈-inch-thick US Gypsum Firecode C, Celotex Fi-Rok Plus, Georgia-Pacific Fire Stop C, or Gold Bond Fire-Shield FSW-C. Install the base layer perpendicular to the joists with the ends staggered at the joists with 1⁵/₈-inch-long Type S wallboard screws at 12 inches on center. Furring channels are installed as described above between the base and intermediate layers. The intermediate layer is attached perpendicular to the channels with the ends staggered at the channels with one-inch-long Type S wallboard screws at 12 inches on center. The finish layer is attached to the channels with 1⁵/₈-inch-long Type S wallboard screws spaced 8 inches on center. The ends of the finish layer are staggered at the channels with respect to each other and with respect to the intermediate layer end joints. Long joints of the finish layer are staggered with respect to the long joints of the intermediate layer.</p> |
| 6. Finish System (Not Shown) | <p>On finish layer only. Paper tape embedded in joint compound over joints with compound edges feathered out and exposed screw heads covered with compound. As an alternative, nominal ²³/₃₂-inch-thick veneer plaster may be applied over the entire surface of the wallboard.</p> |

FIGURE 6—TWO-HOUR FLOOR-CEILING FIRE RESISTIVE ASSEMBLY

DISCLAIMER

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 33—Wood I-joists

REPORT HOLDER:

PACIFIC WOODTECH CORPORATION

EVALUATION SUBJECT:

PWI JOISTS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that PWI Joists (formerly SolidStart®), described in ICC-ES evaluation report [ESR-1305](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

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

2.0 CONCLUSIONS

The PWI Joists (formerly SolidStart®), described in Sections 2.0 through 7.0 of the evaluation report [ESR-1305](#), comply with the LABC Chapter 23, and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The PWI Joists (formerly SolidStart®), described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-1305](#).
- The design, installation, conditions of use and identification are in accordance with the 2018 *International Building Code*® (IBC) and 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report [ESR-1305](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Flanges must not be subjected to dynamic or static outward forces which may tend to separate the flanges from the web. Bottom flanges must not support load exceeding 250 pounds on each side of flange at 5 feet on center or 100 pounds per linear foot.

This supplement expires concurrently with the evaluation report ESR-1305, reissued August 2021 and revised October 2022.

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 17 33—Wood I-Joists

REPORT HOLDER:

PACIFIC WOODTECH CORPORATION

EVALUATION SUBJECT:

PWI JOISTS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that PWI Joists (formerly SolidStart®), described in ICC-ES evaluation report ESR-1305, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The PWI Joists (formerly SolidStart®), described in Sections 2.0 through 7.0 of the evaluation report ESR-1305, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-1305 for the 2018 *International Building Code*® (IBC) meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the PWI Joists (formerly SolidStart®) for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this evaluation report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report ESR-1305, reissued August 2021 and revised October 2022.