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# ICC-ES Report

## ESR-1225

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Reissued 10/2016  
This report is subject to renewal 10/2017.

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**SECTION: 06 17 33—WOOD I-JOISTS**

**REPORT HOLDER:**

**PACIFIC WOODTECH CORPORATION**

**1850 PARK LANE**  
**BURLINGTON, WASHINGTON 98233**

**EVALUATION SUBJECT:**

**PWI JOISTS**



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# ICC-ES Evaluation Report

**ESR-1225**

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

**REPORT HOLDER:**

**PACIFIC WOODTECH CORPORATION**  
 1850 PARK LANE  
 BURLINGTON, WASHINGTON 98233  
 (360) 707-2200  
[www.pacificwoodtech.com](http://www.pacificwoodtech.com)

**EVALUATION SUBJECT:**
**PWI JOISTS**
**ADDITIONAL LISTEES:**

**ALLIANCE LUMBER**  
 1800 WEST BROADWAY ROAD, SUITE 1  
 TEMPE, ARIZONA 85282

**BLUELINX CORPORATION**  
 4300 WILDWOOD PARKWAY  
 ATLANTA, GEORGIA 30339

**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)

**Properties evaluated:**

- Structural
- Fire-resistance-rated assemblies

**2.0 USES**

PWI joists are used as joists, rafters, headers and blocking panels.

**3.0 DESCRIPTION**
**3.1 General:**

PWI joists comply with IBC Section 2303.1.2 and 2015 IRC Section R502.1.2 and 2012, 2009 and 2006 IRC Section R502.1.4 for allowable stress design, and are manufactured in accordance with the approved Pacific Woodtech Corporation *I-Joist Quality Control Manual*. Joist descriptions are provided in Table 1. Pacific Woodtech Corporation private-labels PWI joists. The company names

and associated product trade names for the PWI joists and private label I-joists are as follows:

COMPANY OR LISTEE	PRODUCT TRADE NAME
Pacific Woodtech Corporation Alliance Lumber BlueLinx Corporation	PWI Integri-Joist™ onCENTER®

All PWI joists, regardless of the private label, are identified as described in Section 7.0 of this report.

**3.2 Materials:**

**3.2.1 Flanges:** Structural composite as specified in the approved quality control manual. See Table 1.

**3.2.2 Webs:** Wood structural panel sections as specified in the approved quality control manual. See Table 1.

**3.2.3 Adhesives:** Exterior-type, heat-durable adhesives complying with ASTM D5055 as specified by the approved quality control manual.

**4.0 DESIGN AND INSTALLATION**
**4.1 General:**

The information provided in this report applies to the Allowable Stress Design method.

**4.2 Web Stiffeners:**

Web stiffeners are not required, with the following exceptions:

- a. Web stiffeners are required at the ends of the I-joist in joist hangers that are not deep enough to laterally support the top flange of the joist. Refer to the hanger installation instructions.
- b. Web stiffeners are required to accommodate special hanger nailing requirements. Refer to the hanger installation instructions.
- c. Web stiffeners are required under concentrated loads applied to the top of the I-joist between supports, or along cantilevers beyond the support, when the concentrated load exceeds 1500 pounds (6672 N).
- d. Web stiffeners are required at birdsmouth cuts at the low end support of sloped joists.
- e. Web stiffeners are required for high reactions at supports.

See Table 2B for allowable reaction and web stiffener use requirements. See Figure 1 for illustrations as well as web stiffener dimensions and nail sizes.

**4.3 Web Holes:**

Tables 4 and 5 provide allowable locations for round, rectangular and duct holes in joists sized by means of

Table 3. For engineered designs, refer to the notes in Tables 4 and 5 and use the following allowable hole shear values:

$$\text{Round holes: } V_{hole} = \left( \frac{d - \text{Hole Diameter (inches)}}{d} - C \right) \times V_{joist}$$

where:

- $V_{hole}$  = allowable joist shear at web hole (lbs).  
 $d$  = joist depth (inches).  
 $C$  = adjustment variable, 0.06 for  $3/8$ -inch-thick webs and 0.00 for  $7/16$ -inch-thick webs, see Table 1.  
 $V_{joist}$  = allowable joist shear (lbs).

Rectangular holes: If the longest side dimension is less than or equal to  $0.75(d - 2d_f)$ , analyze as a round hole with a diameter equal to the longest side dimension divided by 0.75, otherwise analyze as a duct hole with a width equal to the width of the desired rectangular hole.

where:

- $d$  = joist depth (in.)  
 $d_f$  = flange depth (in.), see Table 1.

Duct holes (full height of web removed):

PWI 20/30	$V_{hole} = 300 - 8.5 \times \text{width}$ maximum width = 12 inches
PWI 47/50	$V_{hole} = 360 - 11 \times \text{width}$ maximum width = 14 inches
PWI 40/45/60/70/77/77w	$V_{hole} = 430 - 11.5 \times \text{width}$ maximum width = 20 inches
PWI 90	$V_{hole} = 515 - 12 \times \text{width}$ maximum width = 24 inches

where:

- $V_{hole}$  = allowable joist shear at web hole (lbs).  
 Width = duct hole width (inches).

#### 4.4 Fasteners:

Allowable capacities and spacing for nails into the top of flanges of PWI joists with LVL flanges are in accordance with the NDS for solid-sawn lumber with a specific gravity of 0.50. Allowable capacities and spacing for nails into the side of flanges of PWI joists with LVL flanges are in accordance with the NDS for solid-sawn lumber with a specific gravity of 0.50 for lateral values and 0.47 for withdrawal values.

PWI-47 joists used in diaphragm applications, when designed in accordance with Tables 4.2A and 4.2C of the American Wood Council *Special Design Provisions for Wind and Seismic* with following limitations: nailing spacing must be 4 or 6 inches only; reference shear capacity values must be as provided for 2-inch (51 mm) nominal width framing only; and nails spaced at 4 inches (102 mm) on center at diaphragm boundaries must be staggered  $1/2$  inch (12.7 mm).

#### 4.5 Bridging:

Bridging is not required in the joist span unless specified by the building designer.

#### 4.6 Lateral Support:

Provide lateral restraint at supports (e.g., blocking panels, rim board) and along the compression flange of each joist (e.g., wood structural panel sheathing, gypsum board ceiling, wood structural panel soffit).

### 4.7 Fire-resistive Construction for Roof-ceiling and Floor-ceiling Assemblies:

#### 4.7.1 Assembly 1:

**4.7.1.1 Finish Flooring (Optional):** Hardwood or softwood flooring on building paper; or resilient flooring, parquet floor, synthetic-fiber-felt floor coverings, carpeting, or ceramic tile on  $3/8$ -inch-thick (10 mm) panel-type underlayment; or ceramic tile on  $1 1/4$ -inch (32 mm) mortar bed.

**4.7.1.2 Subfloor:** Wood structural sheathing in compliance with the provisions of PS1 or PS2 and the applicable building code.

**4.7.1.3 Wood Structural Members:** Minimum  $9 1/2$ -inch-deep (241 mm) wood I-joists spaced a maximum of 24 inches (610 mm) on center. Minimum flange size is  $1 1/2$  inches thick by  $1 1/2$  inches wide (38 by 38 mm). Minimum web thickness is  $3/8$  inch (10 mm).

**4.7.1.4 Insulation (Optional):**  $3 1/2$ -inch (89 mm) glass fiber batts, or  $3 1/2$ -inch (89 mm) mineral wool batts.

**4.7.1.5 Resilient Channels:** Minimum 0.018-inch-thick (0.5 mm) resilient channels are installed in continuous rows at a maximum spacing of 24 inches (610 mm) on center, and are perpendicular to the joists. The channels are attached to the bottom of each joist with a  $1 1/4$ -inch-long (32 mm) screw. Additional channels may be installed between continuous rows at the locations of end joints in the first layer of ceiling. The additional channel may be extended a minimum of 2 inches (51 mm) beyond the joists adjacent to each side of the gypsum board panels in the first layer of ceiling.

**4.7.1.6 Ceiling:** Two layers of  $1/2$ -inch-thick (13 mm), Type X gypsum board in compliance with ASTM C1396. The long edge of each layer must be perpendicular to the channels (parallel to the joists). End and side joints must be staggered at least 16 inches (406 mm) from layer to layer. The first layer must be fastened to the resilient channels with  $1 1/4$ -inch (32 mm), Type S screws at 12 inches (305 mm) on center. Screws must be installed a minimum of  $3/8$  inch (10 mm) from end joints and a minimum of  $1 1/2$  inches (38 mm) from side joints. The second layer must be fastened to the resilient channels with  $1 5/8$ -inch (41 mm), Type S screws at 12 inches (305 mm) on center. Screws must be installed a minimum of  $1/2$  inch (13 mm) from end and side joints. One-and-one-half-inch (38 mm), Type G screws may be substituted at end joints in the second layer when end joints fall between channels.

#### 4.7.2 Assembly 2:

**4.7.2.1 Finish Flooring (Optional):** Hardwood or softwood flooring on building paper; or resilient flooring, parquet flooring, synthetic-fiber-felt floor covering, carpeting, or ceramic tile on  $3/8$ -inch-thick (10 mm) panel-type underlayment; or ceramic tile on  $1 1/4$ -inch-thick (32 mm) mortar bed.

**4.7.2.2 Subfloor:** Minimum  $2 3/32$ -inch-thick (19 mm) wood structural sheathing in compliance with the provisions of PS 1 or PS 2 and the applicable building code.

**4.7.2.3 Wood Structural Members:** Minimum  $9 1/2$ -inch-deep (241 mm) wood I-joists spaced a maximum of 24 inches (610 mm) on center. Minimum flange size is  $1 1/8$ -inch-thick-by- $2 5/16$ -inch-wide (29 mm by 59 mm). Minimum web thickness is  $3/8$  inch (10 mm).

**4.7.2.4 Insulation (Optional):**  $3 1/2$ -inch-thick (89 mm) glass fiber batts.

**4.7.2.5 Resilient Channels:** Minimum 0.019-inch-thick (0.5 mm) resilient channels installed perpendicular to the I-joists at 16 inches (406 mm) on center. Attach to each I-joist with one 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm) Type S drywall screw.

**4.7.2.6 Ceiling:** Two layers of 1/2-inch-thick (13 mm) USG SHEETROCK Brand FIRECODE<sup>®</sup> C Core Type X gypsum boards installed with long dimension perpendicular to resilient channels:

**Base Layer:** Butt ends on resilient channels and stagger end joints. Attach to the resilient channels with #6 x 1<sup>1</sup>/<sub>4</sub>-inch-long (32 mm) Type S drywall screws at 12 inches (305 mm) on center. Minimum 1<sup>1</sup>/<sub>2</sub>-inch (38 mm) edge distance and minimum 3/8-inch (10 mm) end distance.

**Face Layer:** Stagger edge joints from base layer by 24 inches (610 mm). Stagger end joints from base layer by minimum 1<sup>1</sup>/<sub>2</sub> channel spaces. Attach to resilient channels through base layer with #6 x 5/8-inch-long (41 mm) Type S drywall screws at 12 inches (305 mm) on center. Attach ends to base layer with #10 x 1<sup>1</sup>/<sub>2</sub>-inch (38 mm) Type G drywall screws at 8 inches (203 mm) on center. Minimum 1<sup>1</sup>/<sub>2</sub>-inch (38 mm) edge distance and end distance. Finish joints with tape and joint compound. Finish screw heads with joint compound.

**4.7.3 Other Assemblies:** PWI joists may be used in the assemblies described in 2015, 2012 IBC Table 721.1(3) and 2009 IBC Table 720.1(3), Item Numbers 21-1.1, and 23-1.1 through 28-1.1; and 2006 IBC Table 720.1(3), Item Numbers 21-1.1, 23-1.1, 25-1.1 through 29-1.1, provided the joists meet the criteria listed in the “Floor or Roof Construction” column. PWI joists with 1<sup>1</sup>/<sub>2</sub>-by-1<sup>1</sup>/<sub>2</sub>-inch flanges (38 mm by 38 mm) satisfy the minimum 2.3-square-inch (14.4 cm<sup>2</sup>), flange-cross-sectional area criterion of 2015, 2012 IBC Table 721.1(3), Item Number 23-1.1 and 2009 IBC Table 720.1(3), Item Number 23-1.1. PWI joists may also be used in wood I-joist assemblies that are qualified under the Footnote q of the IBC tables referenced in this Section 4.7.3.

**4.8 Fire Protection of Floors:**

PWI joists may be used in the fire protection assemblies described in Section 4.3 of ICC-ES evaluation report

[ESR-1405](#) to meet the Exception 4 to 2015 IRC Section R302.13 and 2012 IRC Section R501.3.

**5.0 CONDITIONS OF USE**

The Pacific Woodtech Corporation and private label I-joists described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** I-joists are manufactured at the Pacific Woodtech facility in Burlington, Washington, under a quality-control program with inspections by ICC-ES and APA-EWS.
- 5.2** Design and installation must comply with the applicable building code, this report and the manufacturer’s published installation instructions. In the event of a conflict, the code and this report must govern.
- 5.3** For applications based on Tables 2A and 2B, design calculations and details for specific applications must be furnished to the code official, when requested, when the permit is applied for. Calculations and drawings shall be prepared, signed and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

**6.0 EVIDENCE SUBMITTED**

Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Wood I-joists (AC14), dated June 2013 (editorially revised January 2016).

**7.0 IDENTIFICATION**

Each I-joist must be marked with the product trade name or trademark; the joist series; the production date; the evaluation report number (ESR-1225); the name of the manufacturer (Pacific Woodtech); and the manufacturer’s APA mill number (1048).

**TABLE 1—JOIST DESCRIPTION**

Joist Series	Joist Depths [in]		Material	Flange		Web	
	Minimum	Maximum		Width [in]	Depth [in]	Material	Thick. [in]
PWI-20	9 <sup>1</sup> / <sub>2</sub>	14	LVL	1 <sup>3</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>8</sub>	OSB	3/8
PWI-30	9 <sup>1</sup> / <sub>2</sub>	11 <sup>7</sup> / <sub>8</sub>	LVL	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	OSB	3/8
PWI-40	9 <sup>1</sup> / <sub>4</sub>	16	LVL	2 <sup>5</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>8</sub>	OSB	3/8
PWI-45	9 <sup>1</sup> / <sub>2</sub>	16	LVL	2 <sup>1</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>8</sub>	OSB	3/8
PWI-47	7 <sup>7</sup> / <sub>8</sub>	20	LVL	2 <sup>5</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>8</sub>	OSB	3/8
PWI-50	9 <sup>1</sup> / <sub>2</sub>	16	LVL	1 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	OSB	3/8
PWI-60	9 <sup>1</sup> / <sub>4</sub>	16	LVL	2 <sup>5</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>8</sub>	OSB	3/8
PWI-70	11 <sup>7</sup> / <sub>8</sub>	20	LVL	2 <sup>5</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>2</sub>	OSB	3/8
PWI-77	9 <sup>1</sup> / <sub>2</sub>	24	LVL	2 <sup>5</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>2</sub>	OSB	7/16
PWI-77w	9 <sup>1</sup> / <sub>2</sub>	24	LVL	2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	OSB	7/16
PWI-90	9 <sup>1</sup> / <sub>2</sub>	24	LVL	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	OSB	7/16

For **SI**: 1 inch = 25.4 mm.

TABLE 2A—REFERENCE ALLOWABLE STRESS DESIGN VALUES FOR PWI JOISTS <sup>(1, 2)</sup>

Joist Series	Joist Depth	EI <sup>(3, 8)</sup>	k <sup>(4, 8)</sup>	M <sup>(5)</sup>	V <sup>(6)</sup>	Vert. Load <sup>(7)</sup>
PWI-20	9 1/2"	145	4.94	2520	1330	2000
	11 7/8"	253	6.18	3265	1705	2000
	14"	373	7.28	3890	1955	2000
PWI-30	9 1/2"	161	4.94	3225	1330	2000
	11 7/8"	280	6.18	4170	1705	2000
PWI-40	9 1/4"	181	4.81	2650	1280	2000
	9 1/2"	193	4.94	2735	1330	2000
	11 7/8"	330	6.18	3545	1705	2000
	14"	482	7.28	4270	1955	2000
PWI-45	16"	657	8.32	4950	2190	2000
	9 1/2"	193	4.94	3345	1330	2000
	11 7/8"	330	6.18	4315	1705	2000
	14"	486	7.28	5140	1955	2000
PWI-47	16"	665	8.32	5880	2190	2000
	7 7/8"	133	4.10	2690	1000	2000
	9 1/2"	206	4.94	3335	1330	2000
	11 7/8"	344	6.18	4280	1705	2000
PWI-50	14"	499	7.28	5075	1955	2000
	16"	674	8.32	5790	2190	2000
	18"	878	9.36	6500	2425	1450
	20"	1112	10.40	7200	2660	1450
	9 1/2"	186	4.94	3800	1330	2000
PWI-60	11 7/8"	322	6.18	4915	1705	2000
	14"	480	7.28	5860	1955	2000
	16"	663	8.32	6715	2190	2000
	9 1/4"	218	4.81	3665	1280	2000
PWI-70	9 1/2"	231	4.94	3780	1330	2000
	11 7/8"	396	6.18	4900	1705	2000
	14"	584	7.28	5895	1955	2000
	16"	799	8.32	6835	2190	2000
PWI-77/77w	11 7/8"	440	6.18	6730	1705	2000
	14"	644	7.28	8030	1955	2000
	16"	873	8.32	9200	2190	2000
	18"	1141	9.36	10355	2425	1450
	20"	1447	10.40	11495	2660	1450
PWI-90	9 1/2"	261	6.08	5155	1430	2400
	11 7/8"	442	7.60	6675	1925	2400
	14"	648	8.96	7960	2125	2400
	16"	881	10.24	9120	2330	2400
	18"	1152	11.52	10265	2535	1800
	20"	1463	12.80	11395	2740	1800
PWI-90	22"	1815	14.08	12520	2935	1300
	24"	2209	15.36	13630	3060	1300
	9 1/2"	392	6.08	7915	1430	2400
	11 7/8"	661	7.60	10255	1925	2400
	14"	965	8.96	12235	2125	2400
	16"	1306	10.24	14020	2330	2400
PWI-90	18"	1703	11.52	15780	2535	1800
	20"	2155	12.80	17520	2740	1800
	22"	2664	14.08	19245	2935	1300
	24"	3232	15.36	20955	3060	1300

For SI: 1 inch = 25.4 mm, 1 lb = 4.448 N, 1 ft-lb = 1.35 N-m, 1 lb-in<sup>2</sup> = 179 N-mm<sup>2</sup>.

- Applicable adjustment factors must be applied to reference design values in accordance with Section 7.3 of the NDS.
- Reference design values reflect dry service conditions, where the moisture content in service is less than 16%, as in most covered structures.
- Bending stiffness [10<sup>6</sup> lb-in<sup>2</sup>]
- Coefficient of shear deflection [10<sup>6</sup> lb]
- Moment capacity [ft-lb]. Reference moment values must be multiplied by the repetitive member factor, C<sub>r</sub> = 1.0.
- Shear capacity [lb]
- Blocking panel and rim joist vertical load capacity [plf]
- Use Equations 1 and 2 to calculate uniform and center point load deflections in a simple-span application.

$$\text{Uniform Load: } \delta = \frac{5w\lambda^4}{384EI} + \frac{w\lambda^2}{k} \quad [1]$$

$$\text{Center-Point Load: } \delta = \frac{P\lambda^3}{48EI} + \frac{2P\lambda}{k} \quad [2]$$

Where:  $\delta$  = calculated deflection in inches  
 $w$  = uniform load in pounds per inch  
 $P$  = concentrated load in pounds  
 $\ell$  = design span in inches  
 $EI$  = I-joist bending stiffness in pounds-inches squared  
 $k$  = coefficient of shear deflection in pounds



TABLE 2B—REFERENCE ALLOWABLE STRESS REACTION VALUES FOR PWI JOISTS <sup>(1, 2)</sup>

Joist Series	Joist Depth	ER ( $1\frac{3}{4}'' \leq \ell_b \leq 3\frac{1}{2}''$ ) <sup>(3)</sup>		IR ( $3\frac{1}{2}'' \leq \ell_b \leq 5\frac{1}{4}''$ ) <sup>(4)</sup>		WS <sup>(5)</sup> Nails	b <sub>EFF</sub> <sup>(6)</sup>
		No Web Stiffeners	With Web Stiffeners	No Web Stiffeners	With Web Stiffeners		
PWI-20	9 <sup>1</sup> / <sub>2</sub> "	117.1 × ℓ <sub>b</sub> + 710	0.0 × ℓ <sub>b</sub> + 1120	142.9 × ℓ <sub>b</sub> + 1490	0.0 × ℓ <sub>b</sub> + 2240	4	1.62
	11 <sup>7</sup> / <sub>8</sub> "	222.9 × ℓ <sub>b</sub> + 525	0.0 × ℓ <sub>b</sub> + 1420	245.7 × ℓ <sub>b</sub> + 1130	211.4 × ℓ <sub>b</sub> + 1535	4	
	14"	222.9 × ℓ <sub>b</sub> + 525	97.1 × ℓ <sub>b</sub> + 1370	245.7 × ℓ <sub>b</sub> + 1130	211.4 × ℓ <sub>b</sub> + 1535	4	
PWI-30	9 <sup>1</sup> / <sub>2</sub> "	77.7 × ℓ <sub>b</sub> + 809	77.7 × ℓ <sub>b</sub> + 809	0.0 × ℓ <sub>b</sub> + 1905	0.0 × ℓ <sub>b</sub> + 1905	4	1.37
	11 <sup>7</sup> / <sub>8</sub> "	210.9 × ℓ <sub>b</sub> + 576	210.9 × ℓ <sub>b</sub> + 576	0.0 × ℓ <sub>b</sub> + 1905	0.0 × ℓ <sub>b</sub> + 1905	4	
PWI-40	9 <sup>1</sup> / <sub>4</sub> "	0.0 × ℓ <sub>b</sub> + 1080	0.0 × ℓ <sub>b</sub> + 1080	0.0 × ℓ <sub>b</sub> + 2160	0.0 × ℓ <sub>b</sub> + 2160	4	2.18
	9 <sup>1</sup> / <sub>2</sub> "	22.9 × ℓ <sub>b</sub> + 1040	0.0 × ℓ <sub>b</sub> + 1120	0.0 × ℓ <sub>b</sub> + 2240	0.0 × ℓ <sub>b</sub> + 2240	4	
	11 <sup>7</sup> / <sub>8</sub> "	194.3 × ℓ <sub>b</sub> + 740	0.0 × ℓ <sub>b</sub> + 1420	291.4 × ℓ <sub>b</sub> + 1310	0.0 × ℓ <sub>b</sub> + 2840	4	
	14"	200.0 × ℓ <sub>b</sub> + 730	0.0 × ℓ <sub>b</sub> + 1710	291.4 × ℓ <sub>b</sub> + 1310	205.7 × ℓ <sub>b</sub> + 2120	4	
	16"	200.0 × ℓ <sub>b</sub> + 730	0.0 × ℓ <sub>b</sub> + 1970	291.4 × ℓ <sub>b</sub> + 1310	257.1 × ℓ <sub>b</sub> + 2250	8	
PWI-45	9 <sup>1</sup> / <sub>2</sub> "	80.0 × ℓ <sub>b</sub> + 840	0.0 × ℓ <sub>b</sub> + 1120	0.0 × ℓ <sub>b</sub> + 2240	0.0 × ℓ <sub>b</sub> + 2240	4	1.93
	11 <sup>7</sup> / <sub>8</sub> "	245.7 × ℓ <sub>b</sub> + 550	0.0 × ℓ <sub>b</sub> + 1420	180.0 × ℓ <sub>b</sub> + 1620	137.1 × ℓ <sub>b</sub> + 2120	4	
	14"	245.7 × ℓ <sub>b</sub> + 550	80.0 × ℓ <sub>b</sub> + 1430	180.0 × ℓ <sub>b</sub> + 1620	240.0 × ℓ <sub>b</sub> + 1760	4	
	16"	245.7 × ℓ <sub>b</sub> + 550	228.6 × ℓ <sub>b</sub> + 1170	180.0 × ℓ <sub>b</sub> + 1620	240.0 × ℓ <sub>b</sub> + 1760	8	
PWI-47	7 <sup>7</sup> / <sub>8</sub> "	171.4 × ℓ <sub>b</sub> + 565	14.3 × ℓ <sub>b</sub> + 1085	222.9 × ℓ <sub>b</sub> + 1030	168.6 × ℓ <sub>b</sub> + 1535	4	2.18
	9 <sup>1</sup> / <sub>2</sub> "	180.0 × ℓ <sub>b</sub> + 560	14.3 × ℓ <sub>b</sub> + 1220	217.1 × ℓ <sub>b</sub> + 1100	162.9 × ℓ <sub>b</sub> + 1730	4	
	11 <sup>7</sup> / <sub>8</sub> "	197.1 × ℓ <sub>b</sub> + 540	17.1 × ℓ <sub>b</sub> + 1410	208.6 × ℓ <sub>b</sub> + 1200	157.1 × ℓ <sub>b</sub> + 2005	4	
	14"	208.6 × ℓ <sub>b</sub> + 535	20.0 × ℓ <sub>b</sub> + 1580	200.0 × ℓ <sub>b</sub> + 1295	151.4 × ℓ <sub>b</sub> + 2250	4	
	16"	222.9 × ℓ <sub>b</sub> + 520	22.9 × ℓ <sub>b</sub> + 1740	191.4 × ℓ <sub>b</sub> + 1390	145.7 × ℓ <sub>b</sub> + 2485	8	
	18"	234.3 × ℓ <sub>b</sub> + 510	22.9 × ℓ <sub>b</sub> + 1905	182.9 × ℓ <sub>b</sub> + 1480	140.0 × ℓ <sub>b</sub> + 2720	8	
	20"	248.6 × ℓ <sub>b</sub> + 495	25.7 × ℓ <sub>b</sub> + 2065	177.1 × ℓ <sub>b</sub> + 1560	134.3 × ℓ <sub>b</sub> + 2955	10	
PWI-50	9 <sup>1</sup> / <sub>2</sub> "	46.9 × ℓ <sub>b</sub> + 933	46.9 × ℓ <sub>b</sub> + 933	0.0 × ℓ <sub>b</sub> + 2040	0.0 × ℓ <sub>b</sub> + 2040	4	1.62
	11 <sup>7</sup> / <sub>8</sub> "	180.0 × ℓ <sub>b</sub> + 700	180.0 × ℓ <sub>b</sub> + 700	0.0 × ℓ <sub>b</sub> + 2040	0.0 × ℓ <sub>b</sub> + 2040	4	
	14"	164.6 × ℓ <sub>b</sub> + 727	213.7 × ℓ <sub>b</sub> + 641	0.0 × ℓ <sub>b</sub> + 2040	0.0 × ℓ <sub>b</sub> + 2040	4	
	16"	164.6 × ℓ <sub>b</sub> + 727	293.7 × ℓ <sub>b</sub> + 501	0.0 × ℓ <sub>b</sub> + 2040	0.0 × ℓ <sub>b</sub> + 2040	8	
PWI-60	9 <sup>1</sup> / <sub>4</sub> "	0.0 × ℓ <sub>b</sub> + 1080	0.0 × ℓ <sub>b</sub> + 1080	0.0 × ℓ <sub>b</sub> + 2160	0.0 × ℓ <sub>b</sub> + 2160	4	2.18
	9 <sup>1</sup> / <sub>2</sub> "	2.9 × ℓ <sub>b</sub> + 1040	0.0 × ℓ <sub>b</sub> + 1120	0.0 × ℓ <sub>b</sub> + 2240	0.0 × ℓ <sub>b</sub> + 2240	4	
	11 <sup>7</sup> / <sub>8</sub> "	194.3 × ℓ <sub>b</sub> + 740	0.0 × ℓ <sub>b</sub> + 1420	291.4 × ℓ <sub>b</sub> + 1310	0.0 × ℓ <sub>b</sub> + 2840	4	
	14"	200.0 × ℓ <sub>b</sub> + 730	0.0 × ℓ <sub>b</sub> + 1710	291.4 × ℓ <sub>b</sub> + 1310	205.7 × ℓ <sub>b</sub> + 2120	4	
	16"	200.0 × ℓ <sub>b</sub> + 730	0.0 × ℓ <sub>b</sub> + 1970	291.4 × ℓ <sub>b</sub> + 1310	257.1 × ℓ <sub>b</sub> + 2250	8	
PWI-70	11 <sup>7</sup> / <sub>8</sub> "	148.6 × ℓ <sub>b</sub> + 900	0.0 × ℓ <sub>b</sub> + 1420	217.1 × ℓ <sub>b</sub> + 1700	0.0 × ℓ <sub>b</sub> + 2840	4	2.18
	14"	260.0 × ℓ <sub>b</sub> + 705	67.4 × ℓ <sub>b</sub> + 1474	308.6 × ℓ <sub>b</sub> + 1380	154.3 × ℓ <sub>b</sub> + 2610	4	
	16"	260.0 × ℓ <sub>b</sub> + 705	216.0 × ℓ <sub>b</sub> + 1214	308.6 × ℓ <sub>b</sub> + 1380	257.1 × ℓ <sub>b</sub> + 2250	8	
	18"	260.0 × ℓ <sub>b</sub> + 705	246.3 × ℓ <sub>b</sub> + 1377	308.6 × ℓ <sub>b</sub> + 1380	342.9 × ℓ <sub>b</sub> + 2300	8	
	20"	260.0 × ℓ <sub>b</sub> + 705	260.0 × ℓ <sub>b</sub> + 1353	308.6 × ℓ <sub>b</sub> + 1380	342.9 × ℓ <sub>b</sub> + 2300	10	
PWI-77 PWI-77w	9 <sup>1</sup> / <sub>2</sub> "	82.9 × ℓ <sub>b</sub> + 1140	0.0 × ℓ <sub>b</sub> + 1430	94.3 × ℓ <sub>b</sub> + 2365	0.0 × ℓ <sub>b</sub> + 2860	4	2.18
	11 <sup>7</sup> / <sub>8</sub> "	271.4 × ℓ <sub>b</sub> + 810	20.0 × ℓ <sub>b</sub> + 1855	260.0 × ℓ <sub>b</sub> + 1785	345.7 × ℓ <sub>b</sub> + 1820	4	
	14"	271.4 × ℓ <sub>b</sub> + 810	134.3 × ℓ <sub>b</sub> + 1655	260.0 × ℓ <sub>b</sub> + 1785	345.7 × ℓ <sub>b</sub> + 1820	4	
	16"	271.4 × ℓ <sub>b</sub> + 810	251.4 × ℓ <sub>b</sub> + 1450	260.0 × ℓ <sub>b</sub> + 1785	345.7 × ℓ <sub>b</sub> + 1820	8	
	18"	271.4 × ℓ <sub>b</sub> + 810	225.7 × ℓ <sub>b</sub> + 1745	260.0 × ℓ <sub>b</sub> + 1785	194.3 × ℓ <sub>b</sub> + 3090	8	
	20"	271.4 × ℓ <sub>b</sub> + 810	291.4 × ℓ <sub>b</sub> + 1630	260.0 × ℓ <sub>b</sub> + 1785	194.3 × ℓ <sub>b</sub> + 3090	10	
	22"	NA	291.4 × ℓ <sub>b</sub> + 1880	NA	171.4 × ℓ <sub>b</sub> + 3525	10	
	24"	NA	291.4 × ℓ <sub>b</sub> + 1880	NA	171.4 × ℓ <sub>b</sub> + 3525	10	
PWI-90	9 <sup>1</sup> / <sub>2</sub> "	17.1 × ℓ <sub>b</sub> + 1370	0.0 × ℓ <sub>b</sub> + 1430	0.0 × ℓ <sub>b</sub> + 2860	0.0 × ℓ <sub>b</sub> + 2860	4	3.37
	11 <sup>7</sup> / <sub>8</sub> "	285.7 × ℓ <sub>b</sub> + 900	14.3 × ℓ <sub>b</sub> + 1875	282.9 × ℓ <sub>b</sub> + 2365	0.0 × ℓ <sub>b</sub> + 3850	4	
	14"	285.7 × ℓ <sub>b</sub> + 900	128.6 × ℓ <sub>b</sub> + 1675	351.4 × ℓ <sub>b</sub> + 2125	225.7 × ℓ <sub>b</sub> + 3065	4	
	16"	285.7 × ℓ <sub>b</sub> + 900	245.7 × ℓ <sub>b</sub> + 1470	351.4 × ℓ <sub>b</sub> + 2125	351.4 × ℓ <sub>b</sub> + 2625	8	
	18"	285.7 × ℓ <sub>b</sub> + 900	220.0 × ℓ <sub>b</sub> + 1765	351.4 × ℓ <sub>b</sub> + 2125	351.4 × ℓ <sub>b</sub> + 3125	8	
	20"	285.7 × ℓ <sub>b</sub> + 900	285.7 × ℓ <sub>b</sub> + 1650	351.4 × ℓ <sub>b</sub> + 2125	351.4 × ℓ <sub>b</sub> + 3125	10	
	22"	NA	285.7 × ℓ <sub>b</sub> + 1900	NA	351.4 × ℓ <sub>b</sub> + 3375	10	
	24"	NA	285.7 × ℓ <sub>b</sub> + 1900	NA	351.4 × ℓ <sub>b</sub> + 3375	10	

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

1. Reaction values are permitted to be adjusted for load duration in accordance with Section 7.3.2 of the NDS, provided the adjusted value is less than or equal to the limiting value calculated in footnote 6 to this table.
2. Reference design values reflect dry service conditions, where the moisture content in service is less than 16%, as in most covered structures.
3. End reaction capacity [lb]. For  $1\frac{3}{4}'' \leq \ell_b \leq 3\frac{1}{2}''$ , where ℓ<sub>b</sub> is the bearing length in inches. See Note 6.
4. Intermediate reaction capacity [lb]. For  $3\frac{1}{2}'' \leq \ell_b \leq 5\frac{1}{4}''$ , where ℓ<sub>b</sub> is the bearing length in inches. See Note 6.
5. Number of web stiffener nails. Refer to Figure 1 for web stiffener and nail dimensions.
6. Effective flange width [in]. ER shall not exceed b<sub>EFF</sub> × ℓ<sub>b</sub> × F<sub>CL</sub> and IR shall not exceed b<sub>EFF</sub> × ℓ<sub>b</sub> × F<sub>CL</sub> × C<sub>b</sub>, where ℓ<sub>b</sub> is the bearing length in inches, F<sub>CL</sub> is the reference compression design value perpendicular to grain in pounds per square inch and C<sub>b</sub> = (ℓ<sub>b</sub> + 0.375) ÷ ℓ<sub>b</sub>. For LVL flanges, F<sub>CL</sub> = 650 psi. Do not adjust F<sub>CL</sub> for load duration. Compression of the support surface must also be checked.

TABLE 3—ALLOWABLE RESIDENTIAL FLOOR SPANS – 40 PSF LIVE LOAD AND 10 PSF DEAD LOAD <sup>(1-7)</sup>

Joist Series	Joist Depth	Simple Span				Two or More Continuous Spans			
		12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
PWI-20	9 1/2"	16'-8"	15'-3"	14'-5"	13'-6"	18'-6"	17'-0"	15'-7"	13'-11"
	11 7/8"	19'-11"	18'-3"	17'-3"	16'-0"	22'-3"	19'-6"	17'-10"	15'-8"
	14"	22'-8"	20'-9"	19'-6"	17'-5"	24'-8"	21'-4"	19'-6"	15'-8"
PWI-30	9 1/2"	17'-1"	15'-8"	14'-10"	13'-10"	19'-0"	17'-5"	16'-5"	15'-0"
	11 7/8"	20'-6"	18'-9"	17'-9"	16'-7"	22'-10"	20'-10"	18'-9"	15'-0"
PWI-40	9 1/4"	17'-7"	16'-1"	15'-2"	14'-2"	19'-7"	17'-7"	16'-0"	14'-4"
	9 1/2"	18'-0"	16'-5"	15'-6"	14'-6"	20'-0"	17'-10"	16'-3"	14'-6"
	11 7/8"	21'-5"	19'-7"	18'-6"	16'-8"	23'-7"	20'-4"	18'-7"	16'-7"
	14"	24'-4"	22'-3"	20'-6"	18'-4"	25'-11"	22'-5"	20'-5"	18'-3"
PWI-45	9 1/2"	18'-0"	16'-5"	15'-6"	14'-6"	20'-0"	18'-3"	17'-3"	16'-1"
	11 7/8"	21'-5"	19'-7"	18'-6"	17'-3"	23'-11"	21'-10"	20'-6"	17'-9"
	14"	24'-4"	22'-3"	21'-0"	19'-5"	27'-2"	24'-7"	22'-3"	17'-9"
	16"	27'-0"	24'-8"	23'-4"	19'-5"	30'-2"	26'-4"	22'-3"	17'-9"
PWI-47	7 7/8"	15'-10"	14'-6"	13'-8"	12'-9"	17'-7"	16'-1"	15'-2"	14'-1"
	9 1/2"	18'-4"	16'-9"	15'-9"	14'-9"	20'-5"	18'-7"	17'-6"	14'-7"
	11 7/8"	21'-8"	19'-10"	18'-8"	17'-5"	24'-2"	22'-0"	19'-0"	15'-2"
	14"	24'-6"	22'-5"	21'-2"	17'-10"	27'-4"	23'-8"	19'-8"	15'-8"
	16"	27'-2"	24'-9"	22'-7"	18'-0"	30'-2"	24'-6"	20'-4"	16'-3"
	18"	29'-7"	27'-1"	22'-10"	18'-3"	32'-0"	25'-2"	20'-11"	16'-8"
PWI-50	9 1/2"	17'-10"	16'-3"	15'-5"	14'-5"	19'-10"	18'-1"	17'-1"	15'-11"
	11 7/8"	21'-4"	19'-6"	18'-5"	17'-2"	23'-9"	21'-8"	20'-2"	16'-1"
	14"	24'-4"	22'-2"	21'-0"	19'-7"	27'-1"	24'-3"	20'-2"	16'-1"
	16"	27'-0"	24'-8"	23'-4"	20'-1"	30'-2"	24'-3"	20'-2"	16'-1"
PWI-60	9 1/4"	18'-7"	16'-11"	16'-0"	14'-11"	20'-8"	18'-10"	17'-9"	16'-6"
	9 1/2"	18'-11"	17'-3"	16'-4"	15'-3"	21'-1"	19'-2"	18'-1"	16'-10"
	11 7/8"	22'-7"	20'-8"	19'-6"	18'-2"	25'-2"	22'-11"	21'-8"	18'-5"
	14"	25'-8"	23'-5"	22'-2"	20'-8"	28'-8"	26'-1"	23'-0"	18'-5"
	16"	28'-6"	26'-0"	24'-7"	21'-5"	31'-10"	27'-8"	23'-0"	18'-5"
PWI-70	11 7/8"	23'-4"	21'-3"	20'-1"	18'-8"	26'-0"	23'-8"	22'-3"	19'-5"
	14"	26'-5"	24'-2"	22'-9"	21'-3"	29'-6"	26'-10"	24'-4"	19'-5"
	16"	29'-3"	26'-9"	25'-2"	23'-0"	32'-8"	29'-3"	24'-4"	19'-5"
	18"	32'-0"	29'-3"	27'-7"	23'-0"	35'-9"	29'-3"	24'-4"	19'-5"
	20"	34'-8"	31'-7"	28'-10"	23'-0"	38'-8"	29'-3"	24'-4"	19'-5"
PWI-77 PWI-77w	9 1/2"	19'-8"	17'-11"	16'-11"	15'-10"	21'-11"	20'-0"	18'-10"	17'-7"
	11 7/8"	23'-5"	21'-4"	20'-2"	18'-10"	26'-1"	23'-9"	22'-5"	20'-11"
	14"	26'-7"	24'-3"	22'-11"	21'-4"	29'-8"	27'-0"	25'-6"	21'-4"
	16"	29'-5"	26'-10"	25'-4"	23'-8"	32'-10"	29'-11"	26'-8"	21'-4"
	18"	32'-2"	29'-4"	27'-9"	25'-6"	35'-11"	32'-1"	26'-8"	21'-4"
	20"	34'-10"	31'-10"	30'-0"	25'-6"	38'-11"	32'-1"	26'-8"	21'-4"
	22"	37'-5"	34'-2"	32'-3"	30'-1"	41'-10"	38'-2"	35'-1"	31'-5"
24"	40'-0"	36'-6"	34'-5"	32'-2"	44'-8"	40'-2"	36'-8"	32'-9"	
PWI-90	9 1/2"	22'-2"	20'-2"	19'-0"	17'-8"	24'-8"	22'-5"	21'-1"	19'-8"
	11 7/8"	26'-5"	24'-0"	22'-7"	21'-1"	29'-5"	26'-9"	25'-2"	23'-4"
	14"	29'-11"	27'-3"	25'-8"	23'-11"	33'-4"	30'-4"	28'-6"	26'-6"
	16"	33'-1"	30'-2"	28'-5"	26'-5"	36'-11"	33'-7"	31'-7"	26'-7"
	18"	36'-2"	32'-11"	31'-0"	27'-10"	40'-4"	36'-8"	33'-3"	26'-7"
	20"	39'-2"	35'-8"	33'-7"	27'-10"	43'-8"	39'-9"	33'-3"	26'-7"
	22"	42'-0"	38'-3"	36'-1"	33'-7"	46'-11"	42'-8"	40'-2"	36'-7"
24"	44'-10"	40'-10"	38'-6"	35'-10"	50'-1"	45'-6"	42'-10"	36'-7"	

For SI: 1 inch = 25.4 mm.

- Table values apply to uniformly loaded, residential floor joists.
- Span is measured from face to face of supports.
- Deflection is limited to L/240 at total load and L/480 at live load.
- Table values are based on sheathing that is glued and nailed to the joists (<sup>23</sup>/<sub>32</sub>" panels for joists at 24" o.c. and <sup>19</sup>/<sub>32</sub>" panels for joists at 19.2" o.c. and less). Reduce spans by 12" if sheathing is nailed only.
- Provide at least 1 3/4" of bearing length at end supports and 3 1/2" at intermediate supports. Web stiffeners are not required when joists are used at these spans and spacings, except as might be required by joist hanger manufacturers.
- Provide lateral restraint at supports (e.g. blocking panels, rim board) and along the compression flange of each joist (e.g. wood structural panel sheathing, gypsum board ceiling, wood structural panel soffit).
- Use other means to analyze conditions outside the scope of this table (e.g. commercial floors, different bearing conditions, concentrated loads) or for multiple span joists if the length of any span is less than half the length of an adjacent span.

TABLE 4—DUCT HOLES<sup>1,2,3,4</sup>

Minimum Distance 'D' From Any Support to the Centerline of the Hole (See Figure 2)

Joist Series	Joist Span	Duct Hole Width				
		8"	10"	12"	14"	16"
PWI-20	8 ft.	3'-10"	3'-11"	3'-11"		
	12 ft.	5'-9"	5'-10"	5'-11"		
	16 ft.	7'-8"	7'-10"	7'-11"		
	20 ft.	9'-7"	9'-9"	9'-11"		
	24 ft.	11'-6"	11'-9"	11'-11"		
PWI-30	8 ft.	3'-9"	3'-10"	3'-11"		
	12 ft.	5'-8"	5'-9"	5'-11"		
	16 ft.	7'-7"	7'-8"	7'-10"		
	20 ft.	9'-5"	9'-8"	9'-10"		
	24 ft.	11'-4"	11'-7"	11'-10"		
PWI-40/60	8 ft.	3'-6"	3'-7"	3'-9"	3'-10"	3'-11"
	12 ft.	5'-3"	5'-5"	5'-7"	5'-9"	5'-11"
	16 ft.	7'-0"	7'-3"	7'-6"	7'-8"	7'-10"
	20 ft.	8'-10"	9'-1"	9'-4"	9'-7"	9'-10"
	24 ft.	10'-7"	10'-11"	11'-3"	11'-6"	11'-10"
PWI-45	8 ft.	3'-5"	3'-7"	3'-8"	3'-9"	3'-10"
	12 ft.	5'-2"	5'-4"	5'-6"	5'-8"	5'-10"
	16 ft.	6'-11"	7'-2"	7'-5"	7'-7"	7'-9"
	20 ft.	8'-8"	9'-0"	9'-3"	9'-6"	9'-9"
	24 ft.	10'-5"	10'-9"	11'-1"	11'-4"	11'-8"
PWI-47	8 ft.	3'-9"	3'-10"	3'-11"	(6)	
	12 ft.	5'-7"	5'-9"	5'-11"	(6)	
	16 ft.	7'-6"	7'-8"	7'-10"	(6)	
	20 ft.	9'-4"	9'-7"	9'-10"	(6)	
	24 ft.	11'-3"	11'-6"	11'-10"	(6)	
PWI-50	8 ft.	3'-8"	3'-9"	3'-10"	3'-11"	
	12 ft.	5'-6"	5'-7"	5'-9"	5'-11"	
	16 ft.	7'-4"	7'-6"	7'-9"	7'-11"	
	20 ft.	9'-2"	9'-5"	9'-8"	9'-11"	
	24 ft.	11'-0"	11'-3"	11'-7"	11'-11"	
PWI-70	8 ft.	3'-7"	3'-8"	3'-9"	3'-10"	(6)
	12 ft.	5'-5"	5'-6"	5'-8"	5'-10"	(6)
	16 ft.	7'-2"	7'-5"	7'-7"	7'-9"	(6)
	20 ft.	9'-0"	9'-3"	9'-6"	9'-9"	(6)
	24 ft.	10'-10"	11'-1"	11'-5"	11'-8"	(6)
PWI-77/77w depth ≤ 20" (5)	8 ft.	3'-8"	3'-9"	3'-11"	3'-11"	(6)
	12 ft.	5'-7"	5'-8"	5'-10"	5'-11"	(6)
	16 ft.	7'-5"	7'-7"	7'-10"	7'-11"	(6)
	20 ft.	9'-4"	9'-6"	9'-9"	9'-11"	(6)
	24 ft.	11'-2"	11'-5"	11'-9"	11'-11"	(6)
PWI-90 depth ≤ 20" (5)	8 ft.	3'-8"	3'-9"	3'-10"	3'-11"	(6)
	12 ft.	5'-7"	5'-8"	5'-10"	5'-11"	(6)
	16 ft.	7'-5"	7'-7"	7'-9"	7'-11"	(6)
	20 ft.	9'-4"	9'-6"	9'-8"	9'-11"	(6)
	24 ft.	11'-2"	11'-5"	11'-8"	11'-10"	(6)

For SI: 1 inch = 25.4 mm.

1. Table values apply to joists sized by means of Table 3.
2. Web holes may be located anywhere between the joist flanges. Leave at least 1/8 inch clearance between the edges of holes and the flanges.
3. Do not cut rectangular holes, or round holes larger than 1 1/2 inches in diameter, in cantilevers.
4. The horizontal clearance between the edges of adjacent holes must be at least twice the diameter (or longest side) of the larger hole. Exception: A 1 1/2-inch diameter hole may be drilled anywhere in the web. Provide at least 3 inches of horizontal clearance from adjacent holes of any size.
5. For depths ≥ 22", refer to the engineered design recommendations in Section 4.3.
6. Refer to the engineered design recommendations in Section 4.3



TABLE 5—ROUND AND RECTANGULAR HOLES<sup>(1-4)</sup>

Minimum Distance 'D' From Any Support to the Centerline of the Hole (See Figure 2)

Round Hole Diameter		2"	3"	4"	5"	6"	6 1/4"	8 5/8"	10"	10 3/4"	12"	12 3/4"	14 3/4"	16 3/4"		
Rectangular Hole Side		1 1/2"	2 1/4"	3"	3 3/4"	4 1/2"	4 1/2"	6 1/4"	7 1/2"	8"	9"	9 1/2"	11"	12 1/2"		
7 7/8" Joist	Span	8 ft.	1'-3"	1'-11"	2'-7"											
		12 ft.	1'-10"	2'-10"	3'-11"											
		16 ft.	2'-5"	3'-10"	5'-3"											
9 1/4" Joist	Span	8 ft.	1'-1"	1'-4"	2'-0"	2'-8"	3'-3"									
		12 ft.	1'-1"	2'-0"	3'-0"	3'-11"	4'-11"									
		16 ft.	1'-5"	2'-8"	4'-0"	5'-3"	6'-7"									
9 1/2" Joist	Span	8 ft.	1'-1"	1'-7"	2'-1"	2'-8"	3'-2"	3'-4"								
		12 ft.	1'-7"	2'-4"	3'-2"	3'-11"	4'-9"	5'-0"								
		16 ft.	2'-1"	3'-2"	4'-3"	5'-3"	6'-4"	6'-8"								
11 7/8" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-8"	2'-2"	2'-3"	3'-6"							
		12 ft.	1'-1"	1'-2"	1'-10"	2'-6"	3'-3"	3'-5"	5'-3"							
		16 ft.	1'-1"	1'-5"	2'-5"	3'-4"	4'-4"	4'-7"	7'-0"							
		20 ft.	1'-1"	1'-9"	3'-0"	4'-2"	5'-5"	5'-8"	8'-10"							
14" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-5"	1'-6"	2'-7"	3'-2"	3'-8"					
		12 ft.	1'-1"	1'-2"	1'-2"	1'-5"	2'-1"	2'-3"	3'-10"	4'-10"	5'-5"					
		16 ft.	1'-1"	1'-2"	1'-2"	1'-10"	2'-9"	3'-0"	5'-2"	6'-5"	7'-3"					
		20 ft.	1'-1"	1'-2"	1'-2"	2'-4"	3'-5"	3'-9"	6'-5"	8'-0"	9'-1"					
16" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-10"	2'-5"	2'-9"	3'-4"	3'-9"			
		12 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	2'-8"	3'-7"	4'-1"	5'-0"	5'-7"			
		16 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-4"	1'-6"	3'-7"	4'-9"	5'-5"	6'-7"	7'-5"			
		20 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-8"	1'-11"	4'-6"	6'-0"	6'-10"	8'-3"	9'-4"			
		24 ft.	1'-1"	1'-2"	1'-2"	1'-3"	2'-0"	2'-4"	5'-5"	7'-2"	8'-2"	9'-11"	11'-2"			
18" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-8"	1'-11"	2'-6"	2'-10"	3'-10"		
		12 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-7"	2'-6"	2'-11"	3'-9"	4'-2"	5'-9"		
		16 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	2'-2"	3'-3"	3'-11"	5'-0"	5'-7"	7'-7"		
		20 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	2'-8"	4'-1"	4'-11"	6'-2"	7'-0"	9'-6"		
		24 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	3'-2"	4'-11"	5'-10"	7'-5"	8'-5"	11'-5"		
20" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-5"	1'-5"	1'-9"	2'-0"	2'-10"	3'-11"	
		12 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-5"	1'-10"	2'-7"	3'-1"	4'-3"	5'-10"	
		16 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-10"	2'-5"	3'-6"	4'-1"	5'-9"	7'-9"	
		20 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	2'-3"	3'-1"	4'-4"	5'-1"	7'-2"	9'-9"	
		24 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	2'-9"	3'-8"	5'-2"	6'-1"	8'-7"	11'-8"	
22" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-8"	1'-10"	2'-3"	2'-5"	3'-0"	3'-6"	
		12 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-11"	2'-6"	2'-10"	3'-4"	3'-8"	4'-6"	5'-4"	
		16 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	2'-7"	3'-4"	3'-9"	4'-5"	4'-10"	6'-0"	7'-1"	
		20 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-5"	1'-7"	3'-2"	4'-2"	4'-8"	5'-7"	6'-1"	7'-6"	8'-10"	
		24 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-8"	1'-10"	3'-10"	5'-0"	5'-7"	6'-8"	7'-3"	8'-11"	10'-7"	
24" Joist	Span	8 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	2'-0"	2'-7"	3'-1"	
		12 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-4"	1'-11"	2'-3"	2'-9"	3'-0"	3'-10"	4'-7"	
		16 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-10"	2'-7"	3'-0"	3'-8"	4'-0"	5'-1"	6'-2"	
		20 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	2'-3"	3'-2"	3'-8"	4'-6"	5'-0"	6'-4"	7'-8"	
		24 ft.	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	2'-9"	3'-10"	4'-5"	5'-5"	6'-0"	7'-8"	9'-3"	

For SI: 1 inch = 25.4 mm.

1. Table values apply to joists sized by means of Table 3.
2. Web holes may be located anywhere between the joist flanges. Leave at least 1/8 inch clearance between the edges of holes and the flanges.
3. Do not cut rectangular holes, or round holes larger than 1 1/2 inches in diameter, in cantilevers.
4. The horizontal clearance between the edges of adjacent holes must be at least twice the diameter (or longest side) of the larger hole. Exception: A 1 1/2-inch diameter hole may be drilled anywhere in the web. Provide at least 3 inches of horizontal clearance from adjacent holes of any size.

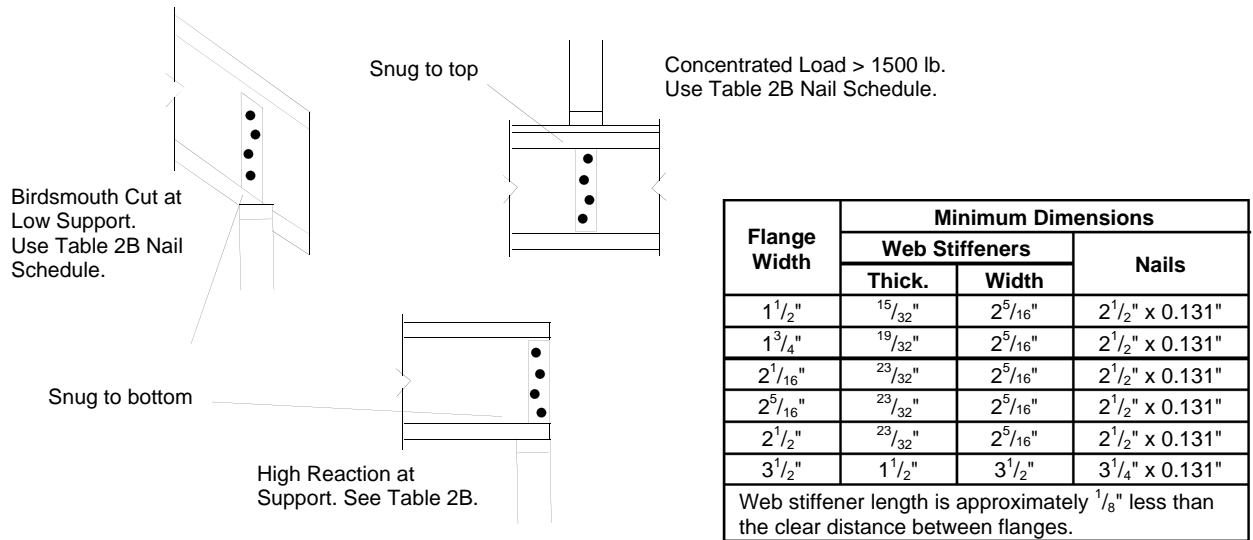


FIGURE 1

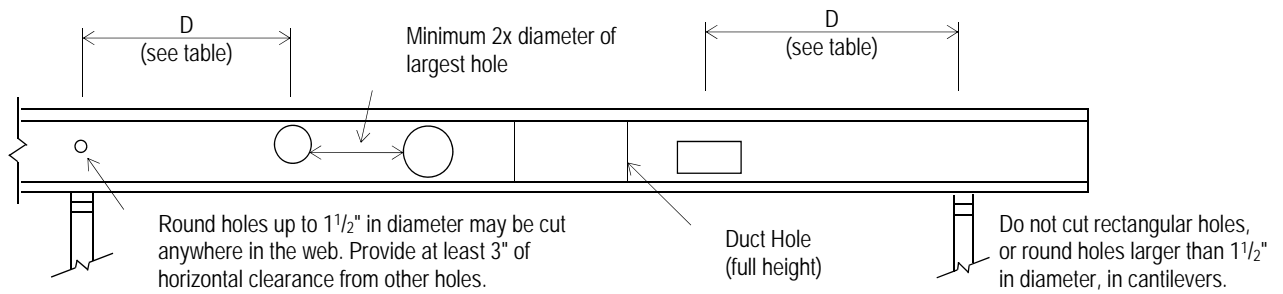


FIGURE 2