



ICC-ES Evaluation Report

ESR-1153

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This report is subject to renewal May 2025.

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 17 33—Wood I-joists

REPORT HOLDER:

WEYERHAEUSER

ADDITIONAL LISTEE:

REDBUILT™ LLC

EVALUATION SUBJECT:

TJI® PREFABRICATED WOOD I-JOISTS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, and 2015 *International Building Code*® (IBC)
- 2021, 2018, and 2015 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-1153 LABC and LARC Supplement](#).

Properties evaluated:

- Structural
- Sound ratings
- Fire-resistance ratings
- Floor Fire Protection

2.0 USES

TJI joists are prefabricated wood I-joists used as floor joists, roof rafters, blocking panels and rim joists, to support code-required loads. Prefabricated wood I-joists described in this report comply with Section 2303.1.2 of the IBC, for allowable stress design; and Section R502.1.2 of the IRC.

3.0 DESCRIPTION

3.1 General:

TJI joists are prefabricated wood I-joists having wood-based flanges and Performance Plus® oriented strand board (OSB) webs. Either the top and bottom flanges are parallel,

forming a constant-depth joist; or the top flange has a single taper, forming a variable-depth joist. The web panels have the face grain oriented vertically, and the web-to-web connection is either butt jointed or serrated and glued to form a continuous web. The web-to-flange connection is a proprietary tongue-and-groove glued joint. Refer to Table 1 for TJI joist series and material descriptions.

3.2 Material Specifications:

3.2.1 Flanges: Flange material is Microllam® laminated veneer lumber (LVL) described in evaluation report [ESR-1387](#). Table 1 of this report specifies flange widths and depths. Flange material and grades are as specified in the quality control manual that contains Weyerhaeuser manufacturing standards.

3.2.2 Webs: Web material is Performance Plus® OSB conforming to DOC Voluntary Product Standard PS2, Exposure 1, along with further requirements set forth in the quality-control manual that contains Weyerhaeuser manufacturing standards. Web material thickness requirements are noted in Table 1 of this report.

3.2.3 Adhesives: Adhesives are of the types specified in the quality control manual that contains Weyerhaeuser manufacturing standards.

4.0 DESIGN AND INSTALLATION

4.1 General:

The design and installation of TJI joists described in this report must comply with Sections 4.2 through 4.16. Additionally, design of TJI joists is governed by the applicable code and corresponding editions of ANSI/AWC *National Design Specification*® for Wood Construction (NDS).

4.2 Design Values:

Table 3 specifies reference design moments, reactions, vertical shear forces, and joist stiffness (*EI*). Reference design reactions are based on minimum bearing lengths of 1¾ inches and 3½ inches (45, 64 and 89 mm), for simple spans; and 3½, 5¼ and 7 inches (89, 133 and 178 mm) at intermediate support points for continuous spans. When joists are used as multiple span members, the calculated shear, used for design at the intermediate support, may be reduced by the percentage determined from the following formula and limited to the depths shown in Table 4: $R = W \div K_{red} \leq 18\%$

where:

$$K_{red} = V_{12} \div 100.$$

R = The percent reduction.

V_{12} = The reference design shear for an 11⁷/₈-inch-deep (302 mm) joist (pounds).

W = The uniform load (plf).

The reference design shear at the interior supports of multiple-span-member TJI joists up to 12 inches (305 mm) deep, used in residential floor construction, is permitted to be increased by 10 percent. This increase in reference design shear does not apply to the design shear at the ends of the joists.

4.3 Fasteners:

Reference lateral and withdrawal design loads for fasteners, installed parallel or perpendicular to Microllam LVL flange glue lines, must be determined in accordance with [ESR-1387](#) and the applicable code.

Allowable nail spacings for TJI joist diaphragm applications must be as specified in Sections 4.14 and 4.15, and Table 2. For non-diaphragm applications, the spacing of fasteners installed into the face grain of Microllam LVL flanges must be greater than or equal to the closest permitted on-center spacing prescribed by the code for fasteners installed in sawn lumber.

The spacing of fasteners installed into the edge grain of Microllam LVL flanges must be greater than or equal to the closest permitted on-center spacing requirements detailed in [ESR-1387](#).

The allowable lateral load capacity of 10d by 1¹/₂-inch-long (38 mm) common nails used to connect minimum No. 18 gage [0.048 inch (1.2 mm) base-metal thickness] metal straps or tension-ties, recognized in a current ICC-ES evaluation report, to TJI joist flanges, in conformance with Figure 5 of this report, is 112 pounds-force (498 N) per nail.

4.4 Web Stiffeners:

Web stiffener requirements for reactions and concentrated loads are noted in Table 3 and Figure 1.

4.5 Lateral Support:

TJI joist compression flanges with widths less than 2.3 inches (58 mm) require lateral support every 18 inches (457 mm) on center. TJI joist compression flanges with widths equal to or greater than 2.3 inches (58 mm) require lateral support every 24 inches (610 mm) on center. Each connection must be capable of transmitting a 75-pound-force (334 N) horizontal load. All TJI joist ends require restraint to prevent rollover. Code-prescribed methods of lateral restraint specified for sawn lumber are acceptable. Bridging is not required for floor and roof TJI joist applications.

4.6 Holes in TJI Joist Web:

The tables in Figure 2 specify allowable sizes and location of round, square and rectangular holes in the TJI joist webs. TJI joists with holes located in the web in accordance with Figure 2 are permitted to be used in the fire-resistive-rated Assemblies B, C, D, E, F, and G described in Figures 3B through 3G.

4.7 Duration of Load:

Adjustments for duration of load, in accordance with Part 2.3.2 of the NDS, apply to the TJI joists and their fastenings.

4.8 In-service Moisture Conditions:

TJI joists must be installed in dry service conditions, where the moisture content in-service is less than 16 percent, as in most covered structures.

4.9 Repetitive-member Use:

The repetitive-member use factor applicable to the resistive moment capacities listed in Table 3 is limited to 1.0.

4.10 Member Spans:

TJI joist spans must be determined in accordance with Part 3.2.1 of the NDS. Vertical shear calculations must include all loads within the span from face to face of supports.

4.11 Deflection:

Deflection of simple span TJI joists with either uniform load or a concentrated load at midspan is determined using the formulas in the footnotes to Table 3.

4.12 Blocking Panels:

Bearing walls perpendicular to and supported by TJI joists at the end or intermediate supports, or both, require full-depth blocking. TJI joists up to and including 16 inches (406 mm) in depth, when used as blocking panels, have a maximum vertical load transfer capacity of 2,100 plf (30,645 N/m). TJI joists over 16 inches (406 mm) and up to and including 20 inches (508 mm) in depth, when used as blocking panels, have a maximum vertical load transfer capacity of 1,550 plf (22,620 N/m).

4.13 Rim Joists:

TJI joists having depths of up to and including 16 inches (406 mm) may be used as rim joists and boundary members of horizontal wood structural diaphragms. The joists have a maximum vertical load transfer capacity of 2,100 plf (30,645 N/m). TJI joists used as rim joists must be laterally supported at the top and continuously supported at the bottom, and the gravity loads must be uniformly applied along the top. Other loading and support conditions must be investigated and approved by a design professional.

4.14 TJI Joists as Prescriptive Diaphragm Framing Members:

TJI joists are permitted as framing members in prescriptive floor and roof diaphragm construction in accordance with Section 2308 of the IBC or Chapters 5 and 8 of the IRC. When TJI 110, TJI 210 or TJI 230 series I-joists are used in floor diaphragm construction, the thickness of the sheathing must be ¹⁹/₃₂ inch (15.1 mm) or greater.

4.15 TJI Joists as Engineered Diaphragm Framing Members:

TJI 110, TJI 210, TJI 230, TJI 360, TJI 560 and TJI 560D joists may be used as framing members in blocked and unblocked engineered diaphragms designed using Tables 4.2A and 4.2C of the ANSI/AWC Special Design Provisions for Wind and Seismic (SDPWS), subject to the limitations specified in Table 2 of this report.

4.16 Cantilevered TJI Joists:

TJI joists are permitted to be installed with cantilevered ends, provided the cantilevers have a maximum length equal to one-third of the adjacent span and support uniform loads only, unless designed by a design professional.

4.17 Fire Protection of Floors:

TJI® joists with Dupont Durable Fire Resistant (FR) laminate applied to both sides of the web are an alternative to 2x10 dimension lumber, prescribed in IRC Section R302.13 Exception 4. The TJI joists with FR laminate are limited to TJI® 230, 360, 560 and 560D I-joists. The FR laminate is precut to fit TJI joist web and must be installed to completely cover both sides of the TJI joist web, with the aluminum side applied toward the web. The FR laminate must be attached to the TJI joist web with two rows of ⁵/₁₆ inch (7.9 mm) T50® or equivalent staples placed at approximately 6 inches (152 mm) on center within 1 inch (25.4 mm) from the flanges. An alternate installation is the

FR laminate factory applied with adhesive. Installation of FR laminate must be in accordance with the Weyerhaeuser installation instructions and this report. Joints in FR laminate must be overlapped a minimum of 1/2 inch (12.7 mm) and fastened with three staples or tightly butted within 1/8 inch (3.2 mm) and stapled on both sides of the joint. Staples are not required at joints where FR laminate is factory applied with adhesive. For holes with diameter greater than 1 1/2 inch (38.1 mm), an additional staple must be placed within 1 inch (25.4 mm) on each side of the hole (two staples on each face of web).

4.18 Fire-resistance-rated Roof-ceiling or Floor-ceiling Assemblies:

See Figures 3A through 3F, for details on one-hour fire-resistance-rated roof-ceiling or floor-ceiling assemblies. See Figure 3G for details on two-hour fire-resistance-rated roof-ceiling or floor-ceiling assemblies. When assemblies A, B, C, D, E, and F are used as floor-ceiling assemblies over unusable crawl spaces, it is permitted to omit the ceiling membrane. Additionally, flooring is permitted to be omitted where unusable attic space occurs above, provided the lateral support requirements of Section 4.5 are met. Alternate floor or roof systems using lightweight concrete or gypsum concrete are permitted in accordance with Table 5.

4.19 Sound Ratings:

Fire-resistance-rated assemblies B, D and G, as described in Figures 3B, 3D and 3G, have sound transmission class (STC) and impact insulation class (IIC) ratings as given in Table 6, provided they are constructed with the additional assembly components and floor coverings specified in Table 6.

5.0 CONDITIONS OF USE

The TJI Prefabricated Wood I-joists described in this report comply with, or are suitable alternatives to, joists and rafters specified in the codes specifically listed in Section 1.0, subject to the following conditions:

- 5.1 TJI joists are designed in accordance with this report.
 - 5.2 Drawings and design details verifying compliance with this report are submitted to the code official for approval.
 - 5.3 Reference design values for TJI joists and their fasteners are permitted to be increased for duration of load in accordance with the applicable code.
 - 5.4 Where one-hour or two-hour fire-resistance-rated construction is required, construction complies with this report.
 - 5.5 Cutting or notching of TJI joist flanges is outside the scope of this report.
- 5.6 The TJI joists with fire resistant overlay are limited to TJI® 230, 360, 560 and 560D I-joists.
 - 5.7 Sound rated assemblies described in Table 6, with STC and or IIC ratings of less than 50, are only applicable in jurisdictions using the IRC.
 - 5.8 TJI joists are produced at the Weyerhaeuser plants located in Castleberry, Alabama; Eugene, Oregon; and Natchitoches, Louisiana; and at the RedBuilt™ LLC plant located in Stayton, Oregon; under a quality control program with inspections by ICC-ES, PFS Corporation (AA-652), or 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), 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, ASTM E413 and ASTM E492.

7.0 IDENTIFICATION

- 7.1 TJI prefabricated wood I-joists are identified by a stamp that includes the product designation, evaluation report number (ESR-1153), manufacturer's name or logo (Trus Joist, Weyerhaeuser), plant number, production date, and the name or logo of the inspection agency (PFS Corporation or APA).
- 7.2 The report holder's contact information is the following:

WEYERHAEUSER
32901 WEYERHAEUSER WAY S. SUITE 102
FEDERAL WAY, WA 98001
(888) 453-8358
wood@weyerhaeuser.com
www.woodbywy.com
- 7.3 The Additional Listee contact information is the following:

REDBUILT™ LLC
200 EAST MALLARD DRIVE
BOISE, IDAHO 83706

TABLE 1—TJI® JOIST DESCRIPTION

TJI JOIST SERIES	FLANGE SIZE, DEPTH × WIDTH (inches)	WEB THICKNESS (inches)	RANGE OF JOIST DEPTHS (inches)
TJI® 110	Minimum 1.25 x 1.75	$\frac{3}{8}$	9 $\frac{1}{2}$ - 16
TJI® 210	Minimum 1.25 x 2.08	$\frac{3}{8}$	9 $\frac{1}{2}$ - 16
TJI® 230	Minimum 1.25 x 2.3	$\frac{3}{8}$	9 $\frac{1}{2}$ - 16
TJI® 360	Minimum 1.375 x 2.3	$\frac{3}{8}$	9 $\frac{1}{2}$ - 20
TJI® 560	Minimum 1.375 x 3.5	$\frac{7}{16}$	9 $\frac{1}{2}$ - 20
TJI® 560D	1.5 x 3.5	$\frac{7}{16}$	9 $\frac{1}{2}$ - 30

For SI: 1 inch = 25.4 mm.

Notes for Table 2 – see page 5

- (a) For wind load applications, the values in the table below may be increased by a factor of 1.4.
- (b) For other than short-term wind and seismic loads, adjustment of the allowable loads for load duration shall be in accordance with the National Design Specification® (NDS®) for Wood Construction.
- (c) For Apparent Shear Stiffness Value, G_a , for floor diaphragm deflection, refer to the corresponding table value in Table 4.2A and 4.2C of the Special Design Provisions for Wind and Seismic (SDPWS).
- (d) The minimum nail bearing length specified in SDPWS Tables 4.2A and 4.2C does not apply provided the fastener penetrates through the flange. One row of nails is permitted along each sheathing panel end and edge. When nail spacing is less than 6 inches on center, adjacent nails within row must be offset (staggered).
- (e) Allowable shear values are applicable for carbon steel smooth shank nails of the specified type and size.
- (f) Refer to NDS for definition of Case 1 through 6.
- (g) Only suitable for applications where Douglas-fir/Larch or equivalent sawn lumber, glulam or structural composite lumber products that allow 2 $\frac{1}{2}$ inches or 2 inches nail spacings are used for boundary framing, joist framing, or blocking members that receive nail spacings closer than 3 inches.
- (h) Value may be multiplied by a factor of 1.18 where sub-floor adhesives, which have been qualified as Class $\frac{1}{8}$ -inch, Type P/O per ASTM D3498-19, are used in combination with mechanical fasteners attachment. Continuous special inspection is not required for this adhesive application.

Table 2-Maximum Allowable Unit Shear Design (ASD) (Pounds per foot) for Sheathed Wood-Framed Diaphragms with Trus Joist® TJI® joists for Seismic Loading (a, b, c, d)

Sheathing Grade	Common Nail Size ^(e) Length (in.) x Shank diameter (in.) x Head diameter (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	TJI® Joist Series with Equivalent Nominal Framing Width	Blocked Diaphragms ^(f)				Unblocked Diaphragms ^(f)		
					Nailed 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)				Nails Spaced 6 in. max. at supported edges		
					6	4	2-1/2 ^(g)	2 ^(g)	Case 1	Case 3	All other configurations (Cases 2, 4, 5 & 6)
					Nailed spacing (in.) at other panel edges (Cases 1, 2, 3, & 4)						
6	6	4	3								
Structural I	8d (2-1/2 x 0.131 x 0.281)	3/8	2	110, 210	270	360	425	-	240	180	155^(h)
			3	230	300	400	480	-	265	200	170^(h)
			3	360, 560, 560D	300	400	600	675	265	200	200
	10d (3 x 0.148 x 0.312)	15/32	2	110, 210	320	425	425	-	285	215	185^(h)
			3	230	360	480	480	-	320	240	205^(h)
			3	360, 560, 560D	360	480	720	-	320	240	240
Sheathing, single floor and other grades covered in DOC PS 1 and PS 2	6d (2 x 0.113 x 0.266)	3/8	2	110, 210	185	250	375	-	165	125	105^(h)
			3	230	210	280	420	-	185	140	120^(h)
			3	360, 560, 560D	210	280	420	475	185	140	140
	8d (2-1/2 x 0.131 x 0.281)	3/8	2	110, 210	240	320	425	-	215	160	135^(h)
			3	230	270	360	480	-	240	180	155^(h)
			3	360, 560, 560D	270	360	540	610	240	180	180
		7/16	2	110, 210	255	340	425	-	230	170	145^(h)
			3	230	285	380	480	-	255	190	160^(h)
			3	360, 560, 560D	285	380	570	645	255	190	190
		15/32	2	110, 210	270	360	425	-	240	180	155^(h)
			3	230	300	400	480	-	265	200	170^(h)
			3	360, 560, 560D	300	400	600	675	265	200	200
	10d (3 x 0.148 x 0.312)	15/32	2	110, 210	290	385	425	-	255	190	160^(h)
			3	230	325	430	480	-	290	215	185^(h)
			3	360, 560, 560D	325	430	650	-	290	215	215
		19/32	2	110, 210	320	425	425	-	285	215	185^(h)
			3	230	360	480	480	-	320	240	205^(h)
			3	360, 560, 560D	360	480	720	-	320	240	240

For SI: 1 inch = 25.4 mm, 1 plf = 14.59 N/m.

"-" = not permitted

Italicized Bold values indicate values that differ from SDPWS Tables 4.2A and Tables 4.2C.

TABLE 3—REFERENCE DESIGN VALUES FOR TJI JOISTS^{1,2,3}

Joist Depth (in.)	Joist Weight ⁽⁸⁾ (plf)	REFERENCE DESIGN VALUES															
		Moment M _R (ft.-lbs.) ⁽⁹⁾	Shear V _R (lbs.)	EI x 10 ⁶ lbs.-in. ²	K	END REACTION R _{R,e} (lbs.) ^{4,5,6}						INTERMEDIATE REACTION R _{r,i} (lbs.) ^{4,5,6}					
						1 ³ / ₄ "		3 ¹ / ₂ "		Nails Req'd for Web Stiff.	3 ¹ / ₂ " 5 ¹ / ₄ " ⁽⁷⁾		5 ¹ / ₄ " 7" ⁽⁷⁾		Nails Req'd for Web Stiff.		
						Bearing Length		Bearing Length			Bearing Length		Bearing Length				
						Web Stiffeners		Web Stiffeners			Web Stiffeners		Web Stiffeners				
NO	YES	NO	YES	NO	YES	NO	YES	NO	YES								
TJI 110																	
9 ¹ / ₂	2.3	2500	1220	157	4.5	910	NA	1220	NA	NA	1935	NA	2350	NA	NA		
11 ⁷ / ₈	2.5	3160	1560	267	4.5	910	1225	1375	1560	3-8d	1935	2295	2350	2705	3-8d		
14	2.8	3740	1860	392	4.5	910	1225	1375	1735	3-8d	1935	2295	2350	2705	3-8d		
16	3.0	4280	2145	535	4.5	910	1225	1375	1735	3-8d	1935	2295	2350	2705	3-8d		
TJI 210																	
9 ¹ / ₂	2.6	3000	1330	186	4.5	1005	NA	1330	NA	NA	2145	NA	2565	NA	NA		
11 ⁷ / ₈	2.8	3795	1655	315	4.5	1005	1365	1460	1655	3-8d	2145	2505	2565	2925	3-8d		
14	3.1	4490	1945	462	4.5	1005	1365	1460	1815	3-8d	2145	2505	2565	2925	3-8d		
16	3.3	5140	2190	629	4.5	1005	1365	1460	1815	3-8d	2145	2505	2565	2925	3-8d		
TJI 230																	
9 ¹ / ₂	2.7	3330	1330	206	4.5	1060	NA	1330	NA	NA	2410	NA	2790	NA	NA		
11 ⁷ / ₈	3.0	4215	1655	347	4.5	1060	1420	1485	1655	3-8d	2410	2765	2790	3150	3-8d		
14	3.3	4990	1945	509	4.5	1060	1420	1485	1840	3-8d	2410	2765	2790	3150	3-8d		
16	3.5	5710	2190	691	4.5	1060	1420	1485	1840	3-8d	2410	2765	2790	3150	3-8d		
TJI 360																	
9 ¹ / ₂	2.7	4790	1425	249	4.5	1080	NA	1425	NA	NA	2460	NA	3000	NA	NA		
11 ⁷ / ₈	3.0	6180	1705	419	4.5	1080	1440	1505	1705	3-8d	2460	2815	3000	3360	3-8d		
14	3.3	7335	1955	612	4.5	1080	1440	1505	1865	3-8d	2460	2815	3000	3360	3-8d		
16	3.5	8405	2190	830	4.5	1080	1440	1505	1865	3-8d	2460	2815	3000	3360	3-8d		
18	3.7	9465	2425	1085	4.5	1080	1440	1505	1865	3-8d	2460	2815	3000	3360	3-8d		
20	4.0	10515	2660	1376	4.5	1080	1440	1505	1865	3-8d	2460	2815	3000	3360	3-8d		
TJI 560																	
9 ¹ / ₂	3.6	7355	1670	378	5.3	1265	NA	1670	NA	NA	3000	NA	3455	NA	NA		
11 ⁷ / ₈	4.0	9500	2050	636	5.3	1265	1740	1725	2050	3-16d	3000	3475	3455	3930	3-16d		
14	4.2	11275	2390	926	5.3	1265	1740	1725	2200	3-16d	3000	3475	3455	3930	3-16d		
16	4.5	12925	2710	1252	5.3	1265	1740	1725	2200	3-16d	3000	3475	3455	3930	3-16d		
18	4.8	14550	3030	1631	5.3	1265	1740	1725	2200	3-16d	3000	3475	3455	3930	3-16d		
20	5.1	16165	3345	2064	5.3	1265	1740	1725	2200	3-16d	3000	3475	3455	3930	3-16d		
TJI 560D																	
9 ¹ / ₂	3.8	7415	1740	381	5.3	1400	NA	1740	NA	NA	3350	NA	3965	NA	NA		
11 ⁷ / ₈	4.2	9605	2255	643	5.3	1400	1875	1885	2255	3-16d	3350	3825	3965	4440	3-16d		
14	4.5	11430	2540	940	5.3	1400	1875	1885	2355	3-16d	3350	3825	3965	4440	3-16d		
16	4.7	13115	2810	1273	5.3	1400	2030	1885	2515	4-16d	3350	3980	3965	4600	4-16d		
18	5.0	14785	3080	1661	5.3	1400	2030	1885	2515	4-16d	3350	3980	3965	4600	4-16d		
20	5.3	16435	3345	2105	5.3	1400	2190	1885	2675	5-16d	3350	4140	3965	4755	5-16d		
22	5.6	18075	3615	2606	5.3	NA	2345	NA	2830	6-16d	NA	5090	NA	5705	11-16d		
24	5.8	19700	3400	3165	5.3	NA	2345	NA	2830	6-16d	NA	5405	NA	6020	13-16d		
26	6.1	21315	3400	3783	5.3	NA	2450	NA	2990	7-16d	NA	6180 ⁽⁷⁾	NA	6795 ⁽⁷⁾	14-16d		
28	6.4	22915	3400	4463	5.3	NA	2450	NA	3145	8-16d	NA	6335 ⁽⁷⁾	NA	6800 ⁽⁷⁾	15-16d		
30	6.6	24510	3400	5205	5.3	NA	2450	NA	3145	8-16d	NA	6655 ⁽⁷⁾	NA	6800 ⁽⁷⁾	17-16d		

For SI: 1 inch = 25.4 mm, 1 plf = 14 59 N/m, 1 ft.-lb. = 1.356 N-m, 1 lb.-in.² = 2.87 kN-mm.²

Footnotes are on the following page.

FOOTNOTES FOR TABLE 3:

¹Refer to Figure 1 for web stiffener details

²Deflection is calculated as follows:

$$\text{Uniform load : } \Delta = \frac{22.5WL^4}{EI} + \frac{12WL^2}{Kdx10^5}$$

$$\text{Concentrated load at midspan : } \Delta = \frac{36PL^3}{EI} + \frac{24PL}{Kdx10^5}$$

Where:

P = Concentrated load, pounds.

d = Out-to-out depth of joist, inches.

L = Clear span in feet

W = Uniform load in pounds per lineal foot.

EI = From table.

K = From table.

³The stated reference design values are for loads of normal duration. Adjustments to the reference design values must be in accordance with the applicable code, with the exception noted in footnote 9 below.

⁴Interpolation between bearing lengths and joist depths is permitted for reference design reactions.

⁵The minimum bearing length is permitted to be reduced for joists supported by hangers if supplemental nail attachment is provided to the web stiffener.

⁶Required bearing lengths have been determined based on Weyerhaeuser TJI Joist products. Allowable bearing stresses on supporting members must be checked.

⁷Referenced design reactions require 5¹/₄-inch and 7-inch bearing lengths at intermediate supports.

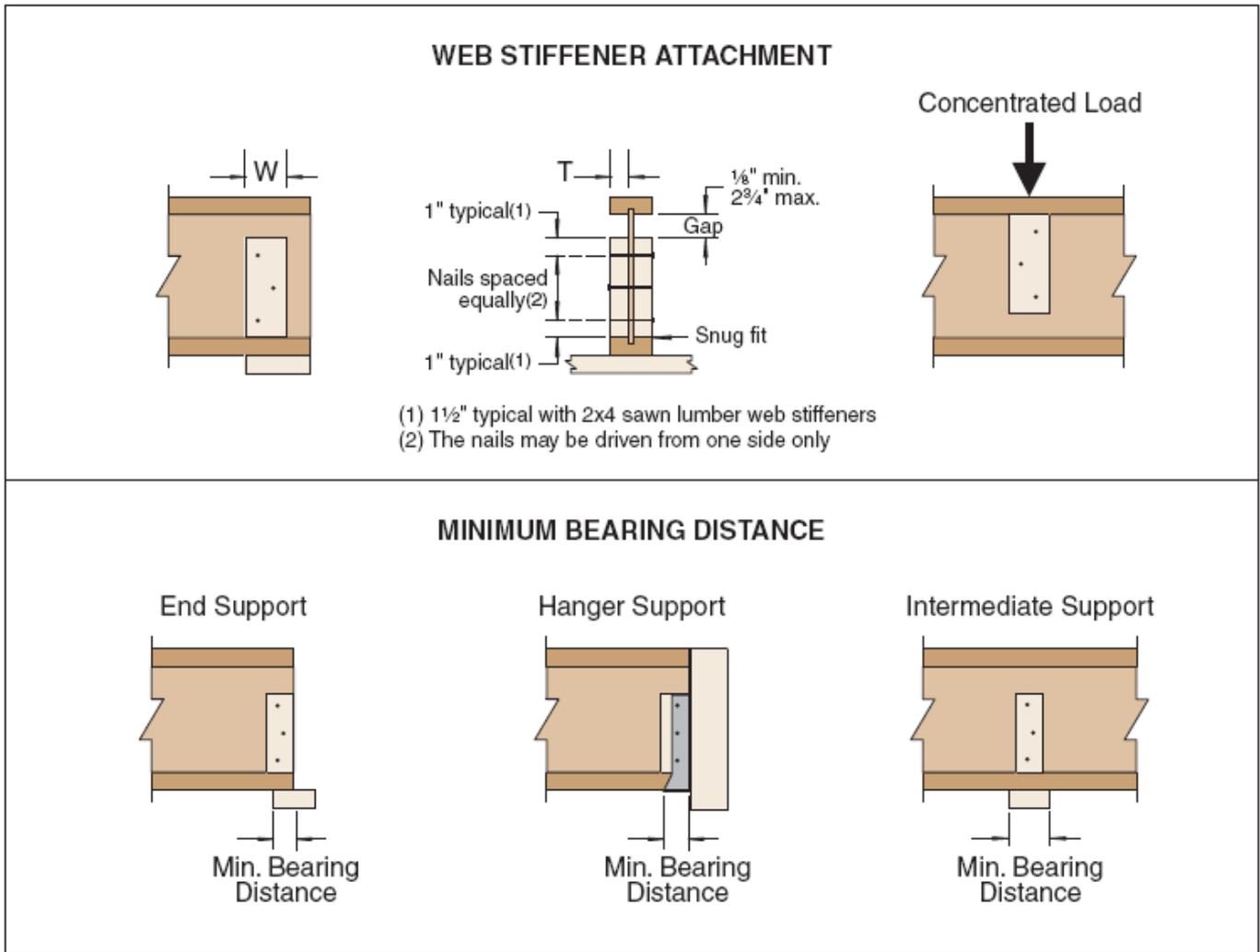
⁸Joist weights shown are calculated on a rational basis, are based on the heavier of eastern or western species products and are suitable for dead load calculation. Contact the producing plant for shipping weight information if needed.

⁹The reference design moment values listed in Table 3 may not be increased by any code allowed repetitive-member use factor.

TABLE 4—PROPERTIES FOR USE IN SECTION 4.2

TJI JOIST SERIES	TJI JOIST DEPTH (inches)	V ₁₂ (lbs.)	K _{red}
TJI® 110	≤ 16	1560	15.60
TJI® 210, TJI® 230	≤ 16	1655	16.55
TJI® 360	≤ 16	1705	17.05
TJI® 560	≤ 16	2050	20.50
TJI® 560D	≤ 24	2255	20.50

For SI: 1 inch = 25.4 mm, 1 lb. = 4.448 N, 1 plf = 14.59 N/m.



Web Stiffener Requirements:

1. Web stiffeners must be installed at bearing points as required in Table 3.
2. Web stiffeners must be installed at points of concentrated loads greater than 1500 pounds and are to be nailed in accordance with the intermediate reaction schedule in Table 3.
3. Web stiffeners are to be installed on each side of the web as shown, with nails equally spaced vertically.
4. A gap must be left at the top of web stiffeners as shown at all bearing conditions. In the case of concentrated loads, web stiffeners are required as shown and the gap must be at the bottom.
5. Web stiffener material must be sheathing meeting the requirements of PS-1 or PS-2 with the face grain parallel to the long axis of the stiffener.
6. Some hangers require web stiffeners to comply with nailing requirements through side plates.
7. If web stiffeners are not used in hanger support, the side of the hanger must extend up to laterally support the top flange.
8. See manufacturer's published installation instructions for additional details and requirements for web stiffeners.

Web stiffener specifications are as follows:

TJI JOIST SERIES	MINIMUM DIMENSIONS		GRADE
	"W" (inches)	"T" (inches)	
TJI® 110	2 ⁵ / ₁₆	5/ ₈	See Note 5
TJI® 210	2 ⁵ / ₁₆	2 ³ / ₃₂	See Note 5
TJI® 230, TJI® 360	2 ⁵ / ₁₆	7/ ₈	See Note 5
TJI® 560, TJI® 560D	3 ¹ / ₂	1 ¹ / ₂	Construction Grade 2x4

FIGURE 1—WEB STIFFENER NOTES AND DETAILS

TABLE C—MINIMUM DISTANCE FROM INSIDE FACE OF END SUPPORT TO NEAREST EDGE OF HOLE^{1,2,3,4,5}

JOIST DEPTH (inches)	TJI JOIST SERIES	ROUND HOLE SIZE (inches)									SQUARE OR RECTANGULAR HOLE SIZE (inches)								
		2	4	6	8	10	12	16	18	20	2	4	6	8	10	12	16	18	20
9 1/2	560D	2'-0"	4'-0"	6'-0"							2'-0"	4'-0"	5'-6"						
11 7/8		1'-6"	3'-0"	5'-0"	6'-6"						3'-0"	4'-6"	6'-6"	7'-6"					
14		1'-0"	2'-0"	4'-0"	5'-6"	8'-0"					2'-0"	4'-0"	6'-6"	8'-6"	9'-0"				
16		1'-0"	1'-6"	3'-0"	5'-0"	6'-6"	9'-0"				2'-0"	4'-0"	6'-0"	8'-6"	10'-0"	11'-0"			
18		1'-0"	1'-0"	1'-6"	3'-6"	5'-6"	7'-6"				1'-0"	3'-0"	5'-6"	8'-0"	10'-6"	11'-6"			
20		1'-0"	1'-0"	1'-0"	2'-6"	4'-6"	6'-0"	10'-6"			1'-0"	2'-6"	5'-0"	7'-0"	10'-0"	12'-6"	14'-6"		
22		1'-0"	1'-0"	1'-0"	1'-6"	3'-6"	5'-0"	8'-6"	11'-6"		1'-0"	1'-0"	3'-6"	6'-6"	14'-6"	15'-0"	16'-0"	16'-6"	
24		1'-0"	1'-0"	1'-0"	2'-0"	3'-6"	5'-0"	8'-0"	10'-0"	12'-6"	1'-0"	1'-6"	4'-0"	6'-6"	9'-6"	15'-0"	16'-0"	16'-6"	17'-0"
26		1'-0"	1'-0"	1'-0"	2'-6"	3'-6"	5'-0"	7'-6"	9'-0"	11'-0"	1'-0"	2'-0"	4'-0"	6'-6"	8'-6"	15'-6"	16'-6"	17'-0"	17'-0"
28		1'-0"	1'-0"	1'-6"	2'-6"	4'-0"	5'-0"	7'-0"	8'-6"	10'-0"	1'-0"	2'-6"	4'-0"	6'-0"	8'-6"	11'-0"	16'-6"	17'-0"	17'-0"
30		1'-0"	1'-0"	1'-6"	2'-6"	3'-6"	5'-0"	7'-0"	8'-0"	9'-6"	1'-0"	2'-0"	4'-0"	6'-0"	8'-0"	10'-0"	16'-6"	17'-0"	17'-6"

See notes below Table D.

TABLE D—MINIMUM DISTANCE FROM INSIDE FACE OF INTERMEDIATE OR CANTILEVER SUPPORT TO NEAREST EDGE OF HOLE^{1,2,3,4,5}

JOIST DEPTH (inches)	TJI JOIST SERIES	ROUND HOLE SIZE (inches)									SQUARE OR RECTANGULAR HOLE SIZE (inches)								
		2	4	6	8	10	12	16	18	20	2	4	6	8	10	12	16	18	20
9 1/2	560D	4'-0"	6'-0"	9'-6"							4'-0"	6'-6"	8'-0"						
11 7/8		2'-0"	4'-6"	7'-0"	10'-0"						4'-0"	6'-6"	10'-0"	10'-6"					
14		1'-0"	3'-0"	5'-6"	8'-6"	11'-6"					2'-6"	6'-0"	9'-0"	12'-0"	13'-6"				
16		1'-0"	1'-0"	3'-6"	6'-6"	10'-0"	13'-0"				1'-0"	5'-0"	8'-6"	12'-6"	14'-6"	16'-0"			
18		1'-0"	1'-0"	1'-0"	4'-6"	7'-6"	11'-0"				1'-0"	3'-0"	7'-6"	11'-6"	16'-0"	17'-0"			
20		1'-0"	1'-0"	1'-0"	1'-0"	4'-6"	8'-6"	16'-0"			1'-0"	1'-0"	5'-6"	10'-0"	15'-0"	18'-0"	20'-0"		
22		1'-0"	1'-0"	2'-6"	4'-6"	6'-6"	8'-0"	13'-0"	16'-6"		1'-0"	3'-6"	6'-6"	10'-0"	19'-0"	20'-0"	21'-0"	21'-6"	
24		1'-0"	2'-6"	4'-0"	5'-6"	7'-0"	8'-6"	12'-6"	15'-0"	17'-6"	2'-0"	5'-0"	7'-6"	10'-6"	14'-0"	20'-0"	21'-0"	21'-6"	22'-0"
26		3'-0"	4'-0"	5'-6"	6'-6"	7'-6"	9'-0"	12'-0"	14'-0"	16'-0"	4'-0"	6'-0"	8'-0"	10'-6"	13'-0"	20'-6"	21'-6"	22'-0"	22'-0"
28		3'-0"	4'-0"	5'-6"	6'-6"	7'-6"	9'-0"	11'-6"	13'-0"	15'-0"	4'-0"	6'-0"	8'-0"	10'-6"	13'-0"	16'-0"	21'-6"	22'-0"	22'-0"
30		3'-0"	4'-0"	5'-6"	6'-6"	8'-0"	9'-0"	11'-6"	13'-0"	14'-6"	4'-0"	6'-0"	8'-0"	10'-6"	12'-6"	15'-0"	21'-6"	22'-0"	22'-6"

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

¹The clear distance between multiple holes must be twice the length of the longest dimension of the largest hole.

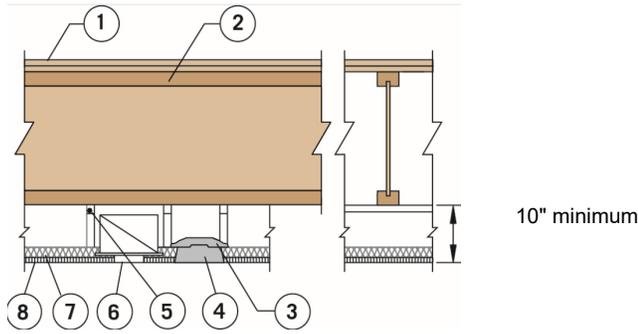
²Holes may be located vertically anywhere within the web. Leave 1/8 inch of web minimum at top and bottom of hole.

³Tables A and C (simple and continuous spans) and Tables B and D (continuous spans) are based on uniform load applications, within the limitations of the applicable Weyerhaeuser literature.

⁴TJI joists are manufactured with 1 1/2-inch diameter perforated knockouts in the web at approximately 12 inches on center along the length of the joist.

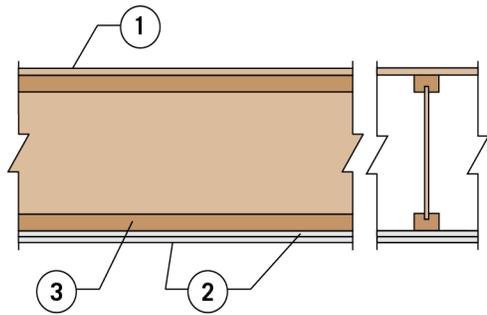
⁵For simple span (5-foot minimum) uniformly loaded joists, one maximum size hole may be located in the web at the center of the joist span provided no other holes occur in the joist.

FIGURE 2—ALLOWABLE HOLE SIZE AND LOCATION FOR THE TJI 560D JOISTS (TABLES C AND D) (Continued)



Assembly Component		Component Specifications	Installation
1	Double Wood Floor	<ul style="list-style-type: none"> Subfloor of nominal 1-inch-thick, tongue-and-groove sheathing or 32/16 span-rated sheathing (Exposure 1) and a second layer of nominal 1-inch-thick, tongue-and-groove finish flooring. Alternatively, finish flooring is permitted to be 40/20 span-rated sheathing (Exposure 1), or Type-1 Grade-1 particleboard not less than 5/8-inch thick. When used as a roof-ceiling assembly, a single layer of square-edged span-rated sheathing (Exposure 1), complying with the code, is permitted to be used for roof sheathing. 	All butt joints of the sheathing must be located over framing members.
2	TJI® Joist	Minimum flange depth of 1½ inches.	Installed in accordance with this report, at a maximum spacing of 48 inches on center.
3	Fixture Protection	See Recessed Light Fixture Installation.	See Recessed Light Fixture Installation.
4	Recessed Light Fixture (Optional)	<ul style="list-style-type: none"> 24-inch x 48 inch, maximum. The aggregate area of the lighting fixture may not exceed 12 square feet per 100 square feet of ceiling area. 	<ul style="list-style-type: none"> Installed in the ceiling. Must be protected by insulation as described below. A 24-inch-by-48-inch fixture is used as an example: <ul style="list-style-type: none"> A 2¼-inch-by-48-inch, minimum 1¼-inch-thick piece of minimum 4 pcf Thermafiber rigid mineral fiber board or Fibrex-FBX 1240 Industrial Board or Fibrex-IF 1240 Flex Batt light fixture protection, is laid along the long sides of the fixture, and against adjacent suspension members Two pieces of the same insulation, measuring 19-½ inches by 48 inches, are laid over the top of the fixture, and A 4½-inch-by-24-inch piece of the same insulation is laid at each end and tied, at the corners of the fixture, to the top pieces using No. 18 SWG steel wire. See Figure 4 for details.
5	Channels	Cold rolled.	Spaced not more than 48 inches on center.
6	Air Diffuser	<ul style="list-style-type: none"> Air diffusers, up to a maximum of 12 inches in diameter, are permitted. The aggregate area must not exceed 113 square inches per 100 square feet of ceiling area. 	Openings must be protected with approved fire dampers.
7	Mineral Wool Blankets	Minimum 1-inch-thick, 4 pcf minimum, Thermafiber® Sound Attenuation Fire Blankets, or Fibrex®-FBX 1240 industrial boards, or Fibrex®-IF 1240 Flex Batt, or IIG MinWool®-1240 Industrial Board, or IIG MinWool®-1240 Flexible Batt.	Installed over the acoustical board.
8	Suspended Ceiling	<ul style="list-style-type: none"> 5/8-inch acoustical panels. 24" x 24" or 24" x 48" USG FIRECODE AURATONE lay-in acoustical board. 	<ul style="list-style-type: none"> Supported by an approved exposed fire-resistance-rated suspension system attached to joist bottom flange or to cold-rolled channels. When TJI® joists are spaced more than 24 inches on center, framing perpendicular to the joists must be installed at 24 inches on center to support the ceiling. The distance from the bottom of the TJI® joists to the soffit of the ceiling must be a minimum of 10 inches.

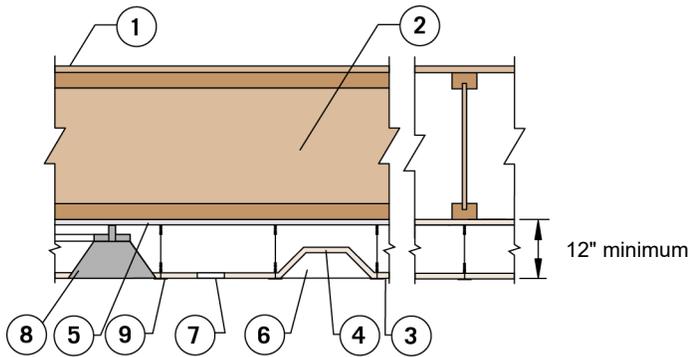
FIGURE 3A—ASSEMBLY A (One-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)



Optional resilient channels directly applied to joists or trusses at 16 inches on-center, supporting both layers of gypsum board, are necessary to achieve sound ratings.

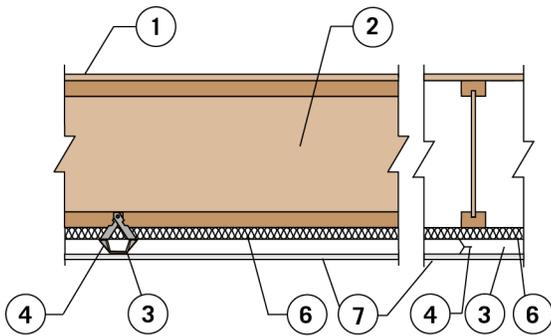
Assembly Component		Component Specifications	Installation
1	Sheathing	<ul style="list-style-type: none"> Single layer of 48/24 span-rated, tongue-and-groove, sheathing (Exposure 1). When used as a roof-ceiling assembly, the decking is permitted to be any wood deck recognized in the code. 	<ul style="list-style-type: none"> Nailed and glued to the top of the TJI® joists. Construction adhesive conforming to ASTM D3498 must be applied to the top of the joists prior to placing sheathing. All butt joints of the sheathing must be located over framing members.
2	Gypsum Board	<ul style="list-style-type: none"> Two layers of 1/2-inch-thick NGC Gold Bond® Fire-Shield C gypsum board, or Two layers of 1/2-inch-thick USG SHEETROCK® Brand FIRECODE® C gypsum panels, or Two layers of 5/8-inch-thick, Type X gypsum board complying with ASTM C 1396. 	<ul style="list-style-type: none"> For TJI® joists spaced 24 inches on-center or less, attach ceiling to joist bottom flange. The first layer of gypsum board must be installed perpendicular to the TJI joists and attached using 1 5/8-inch-long, Type S screws spaced 12 inches on-center. The second layer must be installed with the joints staggered from the first layer. The second layer must be fastened to the TJI joists with 2-inch-long, Type S screws spaced 12 inches on-center in the field and 8 inches on-center at the butt joints. Type G screws, 1 1/2 inches long, must be spaced 8 inches on-center and 6 inches from each side of the transverse joints of the second layer. The second layer must be finished with joint tape and compound.
3	TJI® Joist	TJI® joist.	<ul style="list-style-type: none"> Installed in accordance with this report, with a maximum spacing of 24 inches on-center for floor-ceiling assemblies. When used in roof-ceiling assemblies, the joists are permitted to be spaced a maximum of 48 inches on-center.
(not shown)	Optional Glass Fiber Insulation	Minimum 3 1/2-inch-thick glass fiber insulation or glass fiber insulation rated R-30 or less.	<ul style="list-style-type: none"> May be installed in the joist plenum when resilient channels are used. The insulation must be placed above the resilient channels between the joist bottom flanges.
(not shown)	Optional Resilient Channels	RC-1 resilient channels spaced 16 inches on-center (may be increased to 24 inches on-center if the joists are spaced 16 inches on-center).	<ul style="list-style-type: none"> Fasten perpendicular to the TJI joists using 1-inch-long, Type S screws. When resilient channels are used, the first layer of the ceiling membrane must be installed perpendicular to the channels and attached to the resilient channels using 1-inch-long, Type S screws spaced 12 inches on-center. The second layer must be installed with the joints staggered from the first layer and attached using 1 5/8-inch-long, Type S screws. The screw spacing for the second layer of gypsum board must be a maximum of 12 inches on-center in the field and 8 inches on-center at the butt joints. Type G screws, 1 1/2 inches long, must be spaced 8 inches on-center and 6 inches from each side of the transverse joints of the second layer. The second layer must be finished with joint tape and compound.
(not shown)	Stripping	Minimum of nominal 2-by-4 construction-grade Douglas fir lumber for spans up to 5 feet.	<ul style="list-style-type: none"> In roof-ceiling assemblies in which the TJI® joists are spaced more than 24 inches on-center, the ceiling, including the resilient channels, must be applied to stripping spaced 24 inches on-center. The attachment of the ceiling membrane to the stripping members must be similar to the attachment of the ceiling membrane to the TJI® joists. Attached to the joist bottom flange using a minimum of two 10d box nails into each bottom flange. Stripping materials of equivalent strength and attachment are permitted when approved by the code official.

FIGURE 3B—ASSEMBLY B (One-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)



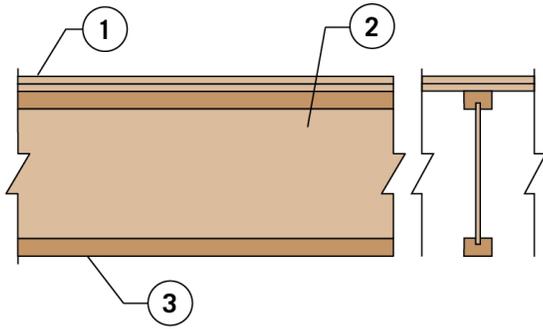
Assembly Component		Component Specifications	Installation
1	Sheathing	<ul style="list-style-type: none"> Single layer of 48/24 span-rated, tongue-and-groove, sheathing (Exposure 1). When used as a roof-ceiling assembly, a single layer of square-edged span-rated sheathing (Exposure 1), complying with the code, is permitted to be used for roof sheathing. 	<ul style="list-style-type: none"> Nailed and glued to the top of the TJI® joists. Construction adhesive conforming to ASTM D3498 must be applied to the top of the joists prior to placing sheathing. All butt joints of the sheathing must be located over framing members.
2	TJI® Joist	TJI® joist.	<ul style="list-style-type: none"> Installed in accordance with this report, at a maximum spacing of 24 inches on center for floor-ceiling assemblies. When used in roof-ceiling assemblies the joists are permitted to be spaced a maximum of 48 inches on center. When the joist spacing exceeds 24 inches on center, framing perpendicular to the joists must be installed at 24 inches on center to support the ceiling.
(not shown)	Optional Insulation	Glass fiber batt insulation rated R-30 or less.	Installed above the gypsum board, in the cavity between the joists.
3	Ceiling Panel	24-inch x 24-inch, 5/8-inch-thick, USG FIRECODE AURATONE ceiling panel.	Installed on steel suspension grid.
4	Fixture Protection	Ceiling grid panels.	Light fixture protection must consist of 6-inch-wide pieces of ceiling grid panels that are 48 inches long for the sides, and 24 inches long for the ends, with a full grid panel placed on top.
5	Gypsum Board	<ul style="list-style-type: none"> Single layer of, 1/2-inch-thick NGC Gold Bond® Fire-Shield C gypsum board, or 5/8-inch-thick, Type X gypsum board complying with ASTM C 1396. 	<ul style="list-style-type: none"> Attached to the joists, or to stripping spaced 24 inches on-center or less. Installed perpendicular to the TJI joists or stripping. The gypsum board must be fastened using 1 5/8-inch-long, Type S screws located 6 inches on-center at end joints and 8 inches on-center in the field.
6	Light Fixture (Optional)	24-inch x 48-inch recessed light.	Protected with ceiling panels per Fixture Protection above.
(not shown)	Optional Duct	Galvanized steel duct.	<ul style="list-style-type: none"> A duct is permitted for each 200 square feet of ceiling. Air return opening and steel diffuser are required.
7	Air Return Opening	Maximum 6-inch x 12-inch opening per 200 square feet of ceiling.	Required if steel duct is used.
8	Diffuser	<ul style="list-style-type: none"> Steel diffuser without damper. Maximum of 12 inches in diameter per 200 square feet of ceiling. 	Required if steel duct is used.
9	Suspension Grid	Approved, exposed, fire-resistance-rated steel suspension ceiling grid.	<ul style="list-style-type: none"> Install beneath the gypsum board ceiling membrane. Minimum distance between the suspended ceiling and the gypsum board ceiling membrane must be 12 inches. The grid system must be suspended with No. 12 SWG galvanized steel wire fastened to the stripping or joists using 3-inch long flathead hanger screws.

FIGURE 3C—ASSEMBLY C (One-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)



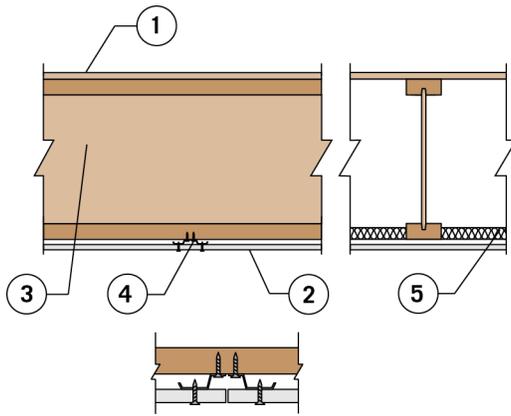
Assembly Component		Component Specifications	Installation
1	Sheathing	<ul style="list-style-type: none"> Single layer of 48/24 span-rated, tongue-and-groove, sheathing (Exposure 1). When used as a roof-ceiling assembly, a single layer of square-edged span-rated sheathing (Exposure 1), complying with the code, is permitted to be used for roof sheathing. 	All butt joints of the sheathing must be located over framing members.
2	TJI® Joist	Minimum flange depth of 1 ³ / ₈ inches.	Installed in accordance with this report, at a maximum spacing of 24 inches on-center.
3	Channels	No. 26 gauge galvanized steel furring channel.	<ul style="list-style-type: none"> Installed perpendicular to joists. Furring channels spaced 24 inches on-center. Furring channels spaced 1½ inches from, and on each side of, wallboard end joints, and 24 inches from end joints. Attached and suspended from the joists using No. 24 gage proprietary attachment clips designated “Simpson Strong-Tie CSC Support Clips.” A CSC support clip must be located at each joist, to support the furring channel. At channel splices, adjacent pieces are overlapped a minimum of 6 inches, and are tied with double-strand No. 18 SWG galvanized steel wire at each end of the overlap.
4	Clips	Simpson Strong-Tie Co. Type CSC support clips.	<ul style="list-style-type: none"> Support furring channels at the intersection with each joist with clips. Support clips nailed to side of joist bottom flange with 1½ -inch-long No. 11 gauge nail.
(not shown)	Stabilizer Strap	¾-inch x 6-inch No. 24 gauge galvanized steel strap.	Used to prevent rotation of the support clips at wallboard end joints and along walls.
6	Mineral Wool Blankets	<ul style="list-style-type: none"> Single layer of 1-inch-thick, minimum 6 pcf Thermafiber Type CW 90 mineral-wool blanket, Fibrex-FBX 1280 Industrial Board, Fibrex-IF 1280 Flex Batt, IIG MinWool 1260 Industrial Board or IIG MinWool 1260 Flexible Batt. Alternatively, a layer of 2-inch-thick, Thermafiber mineral-wool blanket, having a density of 8 pcf, is permitted to be used. 	Installed below the bottom flanges of the joists and on top of the furring channels.
7	Gypsum Board	<ul style="list-style-type: none"> Single layer of ½-inch-thick, USG SHEETROCK® Brand FIRECODE® C gypsum board, or Single layer of ½-inch-thick, CertainTeed ProRoc® Type C gypsum board. 	Attached with screws to steel furring channels placed perpendicular to the joists.

FIGURE 3D—ASSEMBLY D (One-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)



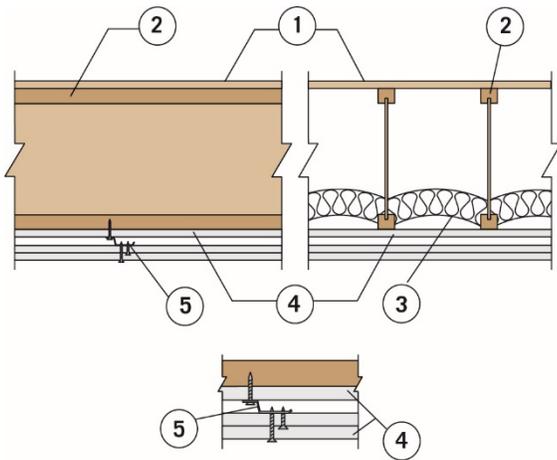
Assembly Component		Component Specifications	Installation
1	Double Wood Floor	<ul style="list-style-type: none"> Subfloor of nominal 1-inch-thick, tongue-and-groove sheathing or 32/16 span-rated sheathing (Exposure 1) and a second layer of nominal 1-inch-thick, tongue-and-groove finish flooring or 40/20 span-rated sheathing (Exposure 1), or Type-1 Grade-1 particleboard not less than 5/8-inch thick. Alternatively, a single layer of 48/24 span-rated, tongue-and-groove sheathing (Exposure 1) may be used. When used as a roof-ceiling assembly, a single layer of square-edged span-rated sheathing (Exposure 1), complying with the code, is permitted to be used for roof sheathing. 	<ul style="list-style-type: none"> When a single-layer floor is used, a construction adhesive conforming to ASTM D3498 must be applied to the top of the joists prior to placing sheathing. All butt joints of the sheathing must be located over framing members.
2	TJI® Joist	TJI® joist.	<ul style="list-style-type: none"> Installed in accordance with this report. Maximum spacing of 24 inches on-center for floor-ceiling assemblies, and a maximum spacing of 48 inches on-center for roof-ceiling assemblies. When the flooring consists of a double wood floor, the joists may be spaced a maximum of 48 inches on-center.
(not shown)	Channels	Resilient channels.	<ul style="list-style-type: none"> Installed at 24 inches on-center when joist spacing is more than 24 inches on-center.
(not shown)	Stripping	Minimum of nominal 2-by-4, construction-grade Douglas fir lumber for spans up to 5 feet. Stripping materials of equivalent strength and attachment are permitted when specifically approved by the code official.	<ul style="list-style-type: none"> Stripping attached to the joist bottom flange using a minimum of two 10d box nails. Attachment of the ceiling membrane to the stripping must be similar to the attachment of the ceiling membrane to the TJI joists.
3	Ceiling System	<ul style="list-style-type: none"> Any approved ceiling membrane that provides a minimum 40-minute finish rating must be used. An example of an approved ceiling having a 40-minute finish rating is one that consists of two layers of 1/2 inch-thick, Type X gypsum board complying with ASTM C1396, a minimum of 4 feet wide, installed perpendicular to the TJI joists, as described in Figure 3B of this report (Assembly B). 	<ul style="list-style-type: none"> Substantiating data, including a report of the fire-endurance testing conducted in accordance with ASTM E119, must be furnished to the local code official, and must verify that a particular ceiling system meets the 40-minute finish rating requirements. When the finish rating is to be determined, temperature performance of protective membranes must be in accordance with Section 47 of ASTM E119. The finish rating is defined in Section 48 of ASTM E119.

FIGURE 3E—ASSEMBLY E (One-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)



Assembly Component		Component Specifications	Installation
1	Sheathing	<ul style="list-style-type: none"> Single layer of 48/24 span-rated, tongue-and-groove, sheathing (Exposure 1). When used as a roof-ceiling assembly, a single layer of square-edged span-rated sheathing (Exposure 1), complying with the code, is permitted to be used for roof sheathing. 	<ul style="list-style-type: none"> Attached to the TJI® joist top flange with construction adhesive that meets ASTM D3498, and nailed using 8d common nails spaced a maximum of 6 inches on-center along the boundary and edges, and 12 inches on-center in the field. All butt joints of the sheathing must be located over framing members.
2	Gypsum Board	<ul style="list-style-type: none"> Single layer of 5/8-inch-thick, USG SHEETROCK® Brand FIRECODE® C gypsum board, or Single layer of 5/8-inch-thick, CertainTeed ProRoc® Type C gypsum board. 	<p>Fastened to the resilient channels with 1-inch-long, Type S screws spaced 12 inches on-center in the field and 8 inches on-center at the butt joints.</p>
3	TJI® Joist	Nominal 2 x 4 or larger flanges.	<ul style="list-style-type: none"> Installed in accordance with this report. When used in a floor-ceiling assembly, joist spacing must not exceed 24 inches on-center. When used in a roof-ceiling assembly, joist spacing is permitted to exceed 24 inches on-center.
4	Channels	RC-1 resilient channels.	<ul style="list-style-type: none"> Installed perpendicular to joists. Spaced at 16 inches on-center. Attached to the joists with 1 5/8-inch-long, Type S screws at each joist. Two channels must be provided at each gypsum-board butt joint, and extend to the next joist beyond the longitudinal joints.
(not shown)	Stripping	Minimum of nominal 2-by-4, construction-grade Douglas fir lumber for spans up to 5 feet. Stripping materials of equivalent strength and attachment are permitted when specifically approved by the code official.	<ul style="list-style-type: none"> In roof-ceiling assemblies in which TJI® joists are spaced more than 24 inches on-center, the ceiling, including the resilient channels, must be attached to stripping spaced 24 inches on-center. The attachment of the ceiling membrane to the stripping members is similar to the attachment of the ceiling membrane to the joists. Stripping must be attached to the bottom flanges of the joists using a minimum of two 10d box nails.
5	Mineral Wool Blankets	Single layer of 1 1/2-inch-thick, minimum 2 1/2 pcf, Thermafiber Sound Attenuation Fire Blankets, Fibrex-SAFB (Sound Attenuation Fire Batts), or IIG MinWool 1200 Sound Attenuation Fire Batts.	<ul style="list-style-type: none"> Installed between the bottom flanges of the joists and on top of the resilient channels. Friction-fitted into place and supported by the resilient channels.

FIGURE 3F—ASSEMBLY F (One-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)



Assembly Component		Component Specifications	Installation
1	Sheathing	<ul style="list-style-type: none"> • Single layer of 48/24 span-rated, tongue-and-groove, sheathing (Exposure 1). • When used as a roof-ceiling assembly, a single layer of square-edged span-rated sheathing (Exposure 1), complying with the code, is permitted to be used for roof sheathing. 	<ul style="list-style-type: none"> • All butt joints of the sheathing must be located over framing members. • Flooring is permitted to be omitted where unusable attic space occurs above the system, provided the requirements of Section 4.5 are met.
2	TJI® Joist	Minimum joist depth of 9¼ inches.	Installed in accordance with this report, at a maximum spacing of 24 inches on-center.
3	Optional Insulation	Glass-fiber insulation with unfaced batts that are 24 inches wide by 48 inches long by 3½ inches thick.	Installed in the plenum and supported by stay wires spaced at 12 inches along the joist bottom flange.
4	Gypsum Board	Three layers of 5⁄8-inch-thick NGC Gold Bond® Fire-Shield C gypsum board.	<ul style="list-style-type: none"> • Base layer installed perpendicular to joists with end joints staggered, and attached directly to the bottom flange using 1½-inch-long Type S screws spaced 12 inches on-center along each joist. Resilient channels attached per 5 below. • Middle layer of gypsum board installed perpendicular to the resilient channels, with end joints staggered, and attached to the resilient channels with 1-inch-long, Type S screws spaced 12 inches on-center. • Finish layer of gypsum board installed with edges and end joints staggered from the middle layer, and must be fastened to the resilient channels using 1½-inch-long, Type S screws spaced 8 inches on-center. Joints of the finish layer of gypsum board must be covered with joint compound and paper tape, and exposed screw heads must be covered with joint compound. • Ceiling membrane may be omitted when used as a floor-ceiling assembly over unusable crawl spaces.
5	Channels	Minimum No. 28 gauge (0.016 inch) resilient channels.	<ul style="list-style-type: none"> • Installed perpendicular to joists, under the first layer of gypsum board. • Spaced a maximum of 16 inches on-center. • Attached to the bottom flange of each joist with 1½-inch-long, Type S screws.

FIGURE 3G—ASSEMBLY G (Two-hour Fire-resistance-rated Roof-ceiling or Floor-ceiling Assembly)

TABLE 5—ALTERNATE FLOOR OR ROOF SYSTEMS

Applicable Assembly	Assembly Description Location	Maximum TJI® Joist Spacing	Sheathing Required	Floor or Roof Topping Required
One-Hour (A, B, C, D, E, F) and Two-Hour (G)	Figures 3A through 3G	24 inches on-center	Minimum 48/24 span-rated sheathing (Exposure 1).	<ul style="list-style-type: none"> 1½-inch-thick lightweight concrete or ¾-inch-thick gypsum concrete over the sheathing. Gypsum concrete must be recognized in a current ICC-ES evaluation report, and the report must include an evaluation for fire resistance that permits the replacement of the floor systems with the sheathing and gypsum concrete system.
		20 inches on-center	Minimum 40/20 span-rated sheathing (Exposure 1).	

TABLE 6—SOUND RATINGS

Assembly	Assembly Figure	STC Rating	Assembly Components Required	IIC Rating	Floor Covering Required
Assembly B Option 1	Figure 3B	50, minimum	Assembly B constructed with resilient channels spaced at 16 inches on-center to separate the ceiling membrane from the structural framing.	60	The floor covering must include a 40-ounce-per-square-yard pad and a 56-ounce-per-square-yard carpet.
				51	<ul style="list-style-type: none"> Floor covering must consist of Tarkett Acoustiflor sheet vinyl, Ceiling must consist of two layers of ½-inch-thick, Type X gypsum board, and the Bottom of the floor cavity must contain 3½-inch-thick glass-fiber insulation.
				45	The floor covering must include a 43.2-ounce-per-square-yard, minimum 0.123-inch-thick cushioned vinyl.
Assembly B Option 2	Figure 3B	58, minimum	<ul style="list-style-type: none"> Assembly B constructed with resilient channels spaced at 16 inches on center to separate the ceiling membrane from the structural framing. ¾-inch-thick floor topping of gypsum concrete recognized in a current ICC-ES evaluation report. 	54	The floor covering must include a 40-ounce-per-square-yard pad and a 56-ounce-per-square-yard carpet.
				54	<ul style="list-style-type: none"> Floor covering must consist of Tarkett Acoustiflor sheet vinyl, Ceiling must consist of two layers of ½-inch-thick, Type X gypsum board, and the Bottom of the floor cavity must contain 3½-inch-thick glass-fiber insulation.
				50	<ul style="list-style-type: none"> Floor covering must be either Armstrong VIOS or Armstrong Cambray sheet vinyl, Ceiling must consist of two layers of ½-inch-thick Type X gypsum board, and Bottom of the floor cavity must contain 3½-inch-thick glass fiber insulation.
Assembly D Option 1	Figure 3D	47	Assembly D	54	Floor covering must include a 40-ounce-per-square-yard pad and a 56-ounce-per-square-yard carpet.
Assembly D Option 2	Figure 3D	59	Assembly D constructed with a ¾-inch-thick topping of gypsum concrete recognized in a current ICC-ES evaluation report.	54	Floor covering must include a 40-ounce-per-square-yard pad and a 56-ounce-per-square-yard carpet.
Assembly G	Figure 3G	50	Assembly G, constructed with 3½-inch-thick unfaced glass fiber insulation.	64	The floor covering must include a 69-ounce-per-square-yard, 3/8-inch-thick pad and 80-ounce-per-square-yard carpet.

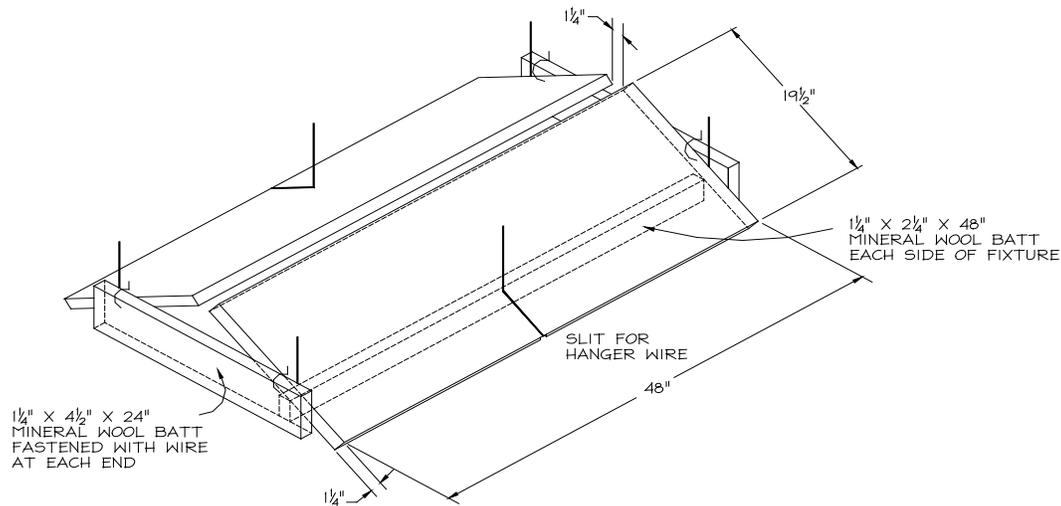
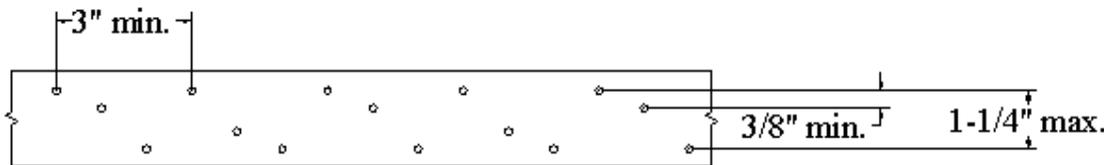


FIGURE 4—LIGHT FIXTURE PROTECTION

(See Figure 4A, Items 4 and 7 for detailed description of mineral wool batts.)
For SI: 1 inch = 25.4 mm.

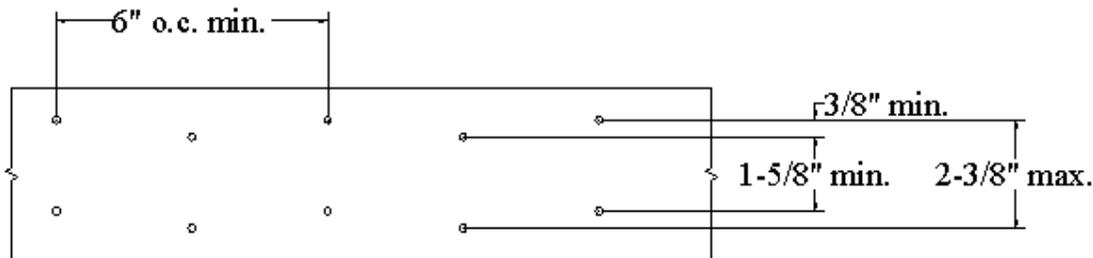
Detail A:



3 rows of 10d x 1.5" nails at 3" o.c.

Detail A is applicable to all TJI Joists with structural composite lumber flange widths of 2.3 inches or greater. Simpson Strong-Tie Co. MSTI or PAI straps, or other straps of the same minimum gauge, dimensions, grade of steel and nail patterns and recognized in a current ICC-ES Report or ICC-ES Legacy Report may be used.

Detail B:



4 rows of 10d x 1.5" nails at 6" o.c.

Detail B is applicable to all TJI Joists with structural composite lumber flange widths of 3.5 inches. Simpson Strong-Tie Co. LSTI straps, or other straps of the same minimum gauge, dimensions, grade of steel and nail patterns and recognized in a current ICC-ES Report or ICC-ES Legacy Report may be used.

General Notes:

Connection capacity limited to a lateral nail design value of 112 lbs/nail with the following conditions.

1. All nails must be 10d short nails, 0.148 inches x 1.5 inches.
2. Minimum steel thickness must be 18 gauge (0.049 inches).
3. Total connection capacity must not exceed the code approved strap or tension-tie design value.
4. The connection capacity is permitted to be increased for duration of load in accordance with the code.
5. No additional reductions are necessary due to penetration.
6. The minimum required end distance must be 3 inches.

FIGURE 5—METAL STRAP AND TENSION-TIE CONNECTION CAPACITIES AND DETAILS FOR TJI JOISTS

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

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

REPORT HOLDER:

WEYERHAEUSER

EVALUATION SUBJECT:

TJI® PREFABRICATED WOOD I-JOISTS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the TJI® Prefabricated Wood I-Joists, described in ICC-ES evaluation report [ESR-1153](#), 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:

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The TJI® Prefabricated Wood I-Joists, described in Sections 2.0 through 7.0 of the evaluation report [ESR-1153](#), comply with LABC Chapter 23, and LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The TJI® Prefabricated Wood I-Joists, described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-1153](#).
- The design, installation, conditions of use and identification are in accordance with the 2021 *International Building Code*® (2021 IBC) provisions noted in the evaluation report [ESR-1153](#).
- The inspection is 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.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued May 2023 and revised September 2023.

DIVISION: 06 00 00—WOOD, PLASTIC AND COMPOSITES

Section: 06 17 33—Wood I-joists

REPORT HOLDER:

WEYERHAEUSER

EVALUATION SUBJECT:

TJI® PREFABRICATED WOOD I-JOISTS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that TJI® Prefabricated Wood I-joists, described in ICC-ES evaluation report ESR-1153, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2023 and 2020 *Florida Building Code—Building*
- 2023 and 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The TJI® Prefabricated Wood I-joists, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-1153, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be 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-1153 for the 2021 and 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the TJI® Prefabricated Wood I-joists for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential* has not been evaluated and is outside the scope of this supplemental 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, reissued May 2023, revised September 2023.