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NATIONAL EVALUATION SERVICE COMMITTEE

REPORT NO. NER-200
Reissued March 1, 1988
This report is subject to re-examination in 2 years.

TJI®* JOIST

TRUS JOIST CORPORATION
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BOISE, IDAHO 83707

I. SUBJECT

TJI® Joist

II. PROPERTIES FOR WHICH EVALUATION IS SOUGHT

1. Structural Members
2. Fire Resistance Rating
3. Sound Transmission Control

III. DESCRIPTION

A. General

The TJI joist is a joist with wood flanges and webs. Various combinations of flange and web materials are noted in Table No. I. The top and bottom flanges are placed to create either a constant depth joist (parallel) or a constantly varying depth joist (single taper).

The web butt joints are either square butt or serrated as required by the specific manufacturing standard of the Trus Joist Corporation. The web flange connection is made by inserting the web into a groove in the center of the face of the flange members.

B. Fabrication Procedure

The TJI joist is produced in a continuous fabrication process. The flange and web members are fed into a machine which assembles them into the finished product.

The TJI joist is cut to the desired length as it leaves the assembly machine and is stacked in a controlled environment to allow the adhesive to cure.

C. Material Specifications

Flanges — MICRO-LAM laminated veneer lumber is manufactured according to the manufacturing standards of Trus Joist Corporation as specified in Report No. NER-126. Machine-stress rated (MSR) lumber is 1-1/2 inch thick lumber with an "E" of 2.35 x 10^6 psi for the TJI/25S joist, 1.95 x 10^6 psi for the TJI/35S joist, 2.0 x 10^6 psi for the TJI/45S joist, and 1.8 x 10^6 and 2.0 x 10^6 psi for the TJI/38/42 joists. The MSR lumber is visually graded after ripping to rules established by Trus Joist Corporation manufacturing standards. Moisture contents shall be between 7 and 16 percent. End joints meet end joint requirements noted in the quality control manual.

Webs — Web material is either plywood with PS 1-83, Plystran manufactured by Potlatch Corporation or Sturdiwood oriented strand board manufactured by Pelican Spruce Mills, Edmonton, Alberta, Canada. Plystran and Sturdiwood panels are produced under a quality control program with inspections by the American Plywood Association (NER-108). The TJI/38 joist web material is Canadian Douglas-Fir plywood conforming to CSA Standard 0121.

Adhesive — Adhesives shall be of the types specified in the Trus Joist Corporation manufacturing standards and meet the requirements described in ASTM D2559.

D. Design

The allowable design values are as outlined in Table No. II. The requirements for web stiffeners and minimum bearing lengths are shown in Figure No. 1 and Table No. III. The joist webs may contain holes as set forth in the allowable hole chart noted in Figure Nos. 2 and 3 for plywood webs and oriented strand board webs, respectively.

When joists are used as simple-span members, the design shear is equal to the end reaction.

When joists are used as multiple-span members, the design shear is the calculated shear at the interior support reduced by the lesser of 15 percent or the uniform load within a distance "d" (joist depth) from the face of the support for the following conditions:

1. All TJI/25/25S and 250 joists.
2. 10 - 16" deep TJI/35/35S/38 and 350 joists
3. 10 - 24" deep TJI/35X/350X/40/42/420/45/450/55/550/65 and 75 joists.

For all other joist depths, the design shear is the calculated shear at the face of the interior support.

The design shear for multiple span member joists up to 12" deep used in residential floor construction may be increased an additional 10 percent.

For joist qualifying as repetitive members, the bending resistance may be increased 4 and 7 percent for joists with MICRO-LAM LVL and MSR lumber flanges, respectively.

The top flanges of TJI joists must be laterally supported at least every 24", except that 18" is required for joists with 1.65" wide flanges. The ends of the joist must be restrained to prevent rollover. This is normally provided by diaphragm sheathing attached to the top flange and to an end wall or a shear transfer panel capable of transferring a minimum

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force of 50 pounds per foot or the required shear forces due to wind or seismic conditions. Blocking or crossbracing with equivalent strength may be used.

Bridging is not required in TJI floor and roof joist applications.

E. One-Hour, Fire-Resistive Roof-Ceiling or Floor-Ceiling Ratings are Assigned to the Following Constructions (Descriptive details for each assembly are noted below and in Figure No. 4)

1. A double-wood floor consisting of either a subfloor of 1" nominal sheathing, a layer of asbestos paper weighing not less than 14 pounds per 100 square feet and a layer of 1" nominal tongue-and-groove finish flooring; or a subfloor of 1" nominal tongue-and-groove sheathing or 1/2" interior plywood with exterior glue, and a layer of 1" nominal tongue-and-groove finish flooring or 5/8" interior-type plywood finish flooring or a layer of Type I Grade M-1 particleboard not less than 5/8" thick and a suspended ceiling of 5/8" thick, 2' x 2' or 2' x 4' USG FIRECODE AURATONE® lay-in acoustical board supported by an approved exposed fire-rated suspension system attached to the bottom flange or to cold-rolled channels space not over 4' on center. Installed over the acoustical board are 1" thick, 4-pound-per-cubic-foot (minimum) USG THERMAFIBER® mineral wool blankets. Light fixtures having a maximum size of 2' x 4' may be installed in the ceiling, provided the aggregate areas of fixtures do not exceed 12 square feet per 100 square feet of ceiling and the fixtures are protected as follows: A 2-1/4" by 48" piece of USG THERMAFIBER light fixture protection is laid along the long dimensions each side of the fixture and against adjacent suspension members; a 17-1/2" x 48" piece is laid over each side of the fixture and a 4-1/2" x 24" piece at each end and tied to top pieces at corners of the fixture with No. 18 SWG steel wire. In addition, ceiling openings for air diffusers up to a maximum size of 12" in diameter are allowed, provided openings are protected with fire dampers and the aggregate areas do not exceed 113 square inches per 100 square feet of ceiling. The distance from the bottom of the truss to the soffit of the ceiling shall be at least 10".

2. A single-layer floor of 3/4" tongue-and-groove plywood or 23/32" tongue-and-groove APA rated structural-use panel (Exposure 1 or exterior glue), with joists spaced up to 24" on center and a ceiling of two layers of 1/2" thick Type X gypsum board applied to the bottom chord. All butt joints of the 3/4" plywood or 23/32" APA rated structural-use panel (Exposure 1 or exterior glue) must fall on framing members. The first layer of board shall be attached with 1-5/8" long Type S screws placed 12" on center. The second layer shall be installed with the joints staggered from the first layer. It shall be fastened with 2" long Type S screws spaced 12" on center in the field and 8" on center at the butt joints. Type G screws 1-1/2" long shall be spaced 8" on center and 6" each side of the butt joint. The second layer shall be finished with joint tape and compound.

   Resilient channels may be used as part of the ceiling attachment system provided they are spaced 16" on center (24", if joists are 16" on center) and fastened perpendicular to joists with 1" long case-hardened steel, .15" shank diameter, self-drilling and self- tapping Phillips head screws. The ceiling is attached to the resilient channels as described above.

   When used as a roof-ceiling assembly, the decking may be any wood deck as provided in the code and the joist spacing may exceed 24" on center. When joists are spaced more than 24" on center, the ceiling may be applied to stripping spaced 24" on center. The attachment to the stripping is similar to the attachment to the joists described above. The stripping may be 2" x 4" Construction grade Douglas Fir lumber for spans up to 5', attached to the bottom chord with 10d nails.

3. A single layer floor of 3/4" tongue-and-groove plywood or 23/32" tongue-and-groove APA rated structural-use panel (Exposure 1 or exterior glue), with joists spaced up to 24" on center and a ceiling consisting of a single layer of 1/2" thick Type X gypsum wallboard attached to joists spaced 24" on center, or to stripping spaced 24" on center fastened with 1-5/8" long Type S drywall screws located 6" on center at end joints and 8" on center in the field. All butt joints of the 3/4" plywood or 23/32" APA rated structural-use panel (Exposure 1 or exterior glue) must fall on framing members. In addition, an approved exposed fire-rated suspended ceiling system must be installed beneath the gypsum board ceiling a minimum distance 12". The grid system is suspended with No. 12 SWG galvanized steel wire fastened to the furring or joists with 3" long flathead hanger screws. Light fixture protection consists of 6"" wide pieces of ceiling grid panels 4' long for the sides and 2' long for the ends and a full grid panel placed on top. A galvanized steel duct with a maximum 12" diameter steel diffuser opening without damper and a maximum 6" x 12" return-air opening are permitted for each 200 square feet of ceiling. Ceiling panels may be either 5/8" USG FIRECODE AURATONE or 5/8" Gold Bond Fire-Shield Solitude Panels as manufactured by Gold Bond Building Products Division of National Gypsum Company. Noncombustible insulation rated at R-30 or less may be installed above the gypsum board.

   When used as a roof-ceiling assembly, square-edge plywood meeting the structural requirements of the code may be used for roof sheathing and joists may be spaced up to 48"' on center.

4. A single-layer floor of 3/4" or 23/32" tongue-and-groove plywood with joists spaced a maximum of 24" on center and a ceiling consisting of 1/2" USG Type C FIRE-CODE® gypsum board screw attached to standard steel furring channels at 24" on center and suspended from the joists by a specially designed No. 24 gauge Simpson Strong Tie (CSC) ceiling support clip. One inch of (6 pcf minimum) USG THERMAFIBER mineral wool fireproofing is placed between the bottom flange or chord of the joists and the top of the furring channel. All butt joints of the 3/4" plywood must fall on framing members.

5. A double-wood floor as described in paragraph E-1 above, or a single layer of 3/4" tongue-and-groove plywood floor sheathing or plywood roof sheathing meeting the structural requirements of the code applied over joists spaced 24" on center with any approved ceiling system which will provide 40 minute membrane rating. Substantiating data, which may include results of the fire- endurance tests conducted in accordance with ASTM E119 must be furnished to the local building official verifying that a particular ceiling system meets the 40 minute membrane rating requirements. When the membrane rating is to be determined, thermocouples shall be installed on the plane of the combustible materials nearest the fire side at locations required to obtain representative temperatures on the combustible materials in the test specimens. Temperature readings from such thermocouples shall be recorded during the fire-endurance test. The membrane rating is the time

at which temperature readings from the thermocouples reach an average temperature rise of 250° F. above ambient or an individual temperature rise of 325° F. above ambient.

6. A single layer floor of 3/4" tongue-and-groove plywood with joists (TJI/45S-plywood web, TJI/55, TJI/65, TJI/75 or TJI/550) spaced up to 24" on center, RC-1 resilient channel spaced 16" on center, a ceiling of one layer of 5/8" thick USG FIRECODE C gypsum board and 1-1/2" thick, 2-1/2 pound per cubic foot USG THERMAFIBER mineral wool batts. The flooring must be attached to the top flange with construction adhesive (AFG-01) and nailed with 8d common nails spaced a maximum of 6" on center along the boundary and edges and 12" on center in the field. The resilient channel must be attached with 1-5/8" Type S screws at each joist. Two channels must be provided at each gypsum board butt joint, extending to the next joist beyond the longitudinal joints. The gypsum board is fastened to the channels with 1" Type S screws at 12" on center in the field and 8" on center at the butt joints. The mineral wool batts are friction fitted between the bottom flanges and supported by the resilient channels.

7. Alternate Floor System - A minimum 5/8" plywood floor over joists spaced at a minimum of 24" on center with either 1-1/2" of lightweight concrete or 1" of GYP-CRETE® may be considered as an alternate deck for six systems described above. When the joists are limited to a maximum spacing of 20" on center, a 3/4" topping of GYP-CRETE may be used. GYP-CRETE is produced by the Gyp-Crete Corporation.

F. Sound Rating

The system described in paragraph E-2 above, when constructed with resilient channels, has a minimum STC rating of 50; with pad and carpet, the minimum IIC rating is 50; with cushioned vinyl, the minimum IIC rating is 45.

The system described in paragraph E-2 when constructed with resilient channels and a 3/4" GYP-CRETE topping has a minimum STC rating of 50; with pad and carpet, the minimum IIC rating is 50; with cushioned vinyl, the minimum IIC rating is 45.

The system described in paragraph E-4 has a minimum STC rating of 45 and, with pad and carpet, the minimum STC and IIC ratings are 50, provided a minimum 8 pcf layer of USG THERMAFIBER insulation is used.

The system as described in paragraph E-4 with a 3/4" GYP-CRETE topping has a minimum STC rating of 50 and, with a pad and carpet, the minimum IIC rating is 50.

All of the systems require that a minimum 1/4" thick by 3/4" wide strip of resilient covering be provided at the floor perimeter in order to provide floor/wall isolation.

IV. INSTALLATION

Sealed drawings and/or specifications for the erection and installation of the TJI® Joists for each job shall be strictly adhered to and a copy of these instructions shall be available at all times on the jobsite during installation.

V. IDENTIFICATION

TJI Joists shall be identified by a stamp indicating the joist type, NES report number, manufacturer's name, plant number, and the PFS Corporation logo and their report number (NER-QA251).

VI. EVIDENCE SUBMITTED

1. Results of structural load tests, product brochure, descriptive literature, quality control manual and engineering calculations have been submitted under the cover of a manual dated February, 1982.
2. Results of a fire test, Report No. File R5492-2 dated October 6, 1981, conducted by Underwriters Laboratories, Inc. in accordance with ASTM E 119.
3. Results of sound tests performed at Riverbank Acoustical Lab, Geneva, Illinois, and witnessed by Shiner Associates, Inc., Skokie, Illinois, conducted between May, 1981, and September, 1981, in accordance with ASTM E 492 and ASTM E 90.
4. Data under the cover of letters dated March 8, March 23, April 20, and May 20, 1982.
5. Results of load tests, Job No. 63-1978 dated May 24, 1982, witnessed by Northern Testing Laboratories, Boise, Idaho.
6. Results of TJI/40 joist bending tests, Job No. 68-398 dated February 24, 1983, witnessed by Northern Testing Laboratories, Boise, Idaho.
7. Section 4.4 of the MICRO-LAM Laminated Veneer Lumber Manufacturing Standards specified in NER-126.
8. Results of load and fire tests and descriptive data under the cover of letters dated December 2, 1983, February 21, March 2, July and September 13, 1984.
9. Descriptive details and calculations under the cover of letters dated October 24 and October 29, 1984.
10. Results of bending and shear tests conducted on joists with OSB webs, descriptive details and quality control information on OSB web in a manual dated February, 1985, prepared by William Couch, P. E., and Joe Piscione, P. E.
11. Trus Joist Corporation's letter of September 18, 1985 with calculations by J. R. Piscione, P. E.
12. Testing and Analysis of the TJI42/420 joists, dated September, 1985, signed and sealed by Donald J. Sharp.
13. Testing and Analysis of the TJI/38 joist, dated April, 1986, signed and sealed by David E. Rice.

VII. CONDITIONS OF USE

The National Evaluation Service Committee finds that, in their opinion, TJI Joists are acceptable alternative materials, products or methods of construction to those specified in the 1987 Edition of the BOCA National Building Code with 1988 Supplement, the 1985 Standard Building Code and 1986 and 1987 Revisions, and the 1985 Uniform Building Code, subject to the following conditions:

1. TJI Joists are produced at Trus Joist Corporation's Valdosta, Georgia; Eugene, Oregon; Stayton, Oregon; Charesholm, Alberta; and Boise, Idaho plants with quality control inspections by a compliance assurance and/or inspection agency listed by the National Evaluation Service Committee.
2. Allowable loads shall not exceed the values set forth in Table No. II.
3. Design calculations and details for individual jobs shall be furnished to the local building official verifying that the joists comply with this report.
4. No cutting of the flanges shall be permitted and holes in the webs shall conform to the requirements given in Figure Nos. 2 and 3.

This report is subject to re-examination in 2 years.

TABLE NO. I-JOIST DESCRIPTION

JOIST SERIES	FLANGE		WEB MATERIAL	JOIST DEPTHS (INCHES)
	MATERIAL	SIZE (INCHES)		
TJI/25	MICRO=LAM LVL	1.5 x 1.75	3/8" PLYWOOD[1]	7 1/2 TO 16
TJI/35	MICRO=LAM LVL	1.5 x 2.30	3/8" PLYWOOD[1]	10 TO 20
TJI/38	MSR LUMBER	1.5 x 3.50	3/8" PLYWOOD[1]	9 1/2 TO 20
TJI/35X	MICRO=LAM LVL	1.5 x 2.30	15/32" PLYWOOD[1]	10 TO 30
TJI/40	MICRO=LAM LVL	1.5 x 2.50	15/32" PLYWOOD[1]	10 TO 30
TJI/45	MICRO=LAM LVL	1.75 x 2.50	15/32" PLYWOOD[1]	10 TO 30
TJI/55	MICRO=LAM LVL	1.5 x 3.50	15/32" PLYWOOD[1]	10 TO 30
TJI/42	MSR LUMBER	1.5 x 3.50	15/32" PLYWOOD	10 TO 30
TJI/65	MICRO=LAM LVL	1.5 x 3.50	19/32" PLYWOOD	10 TO 30
TJI/75	MICRO=LAM LVL	1.75 x 3.50	19/32" PLYWOOD	10 TO 30
TJI/25S	MICRO=LAM LVL OR MSR LUMBER	1.5 x 1.65	3/8" PLYWOOD[1]	7 1/2 TO 16
TJI/35S	MSR LUMBER	1.5 x 2.625	3/8" PLYWOOD[1]	10 TO 20
TJI/45S	MSR LUMBER	1.5 x 3.50	15/32" PLYWOOD[1]	10 TO 30
TJI/250	MICRO=LAM LVL	1.5 x 1.75	3/8" OSB[2]	7 1/2 TO 11 7/8
TJI/350	MICRO=LAM LVL	1.5 x 2.30	3/8" OSB[2]	10 TO 20
TJI/350X	MICRO=LAM LVL	1.5 x 2.30	7/16" OSB[2]	10 TO 30
TJI/450	MICRO=LAM LVL	1.75 x 2.50	7/16" OSB[2]	10 TO 30
TJI/420	MSR LUMBER	1.5 x 3.50	7/16" OSB[2]	10 TO 30
TJI/550	MICRO=LAM LVL	1.5 x 3.50	7/16" OSB[2]	10 TO 30

[1] 7/16" PLY STRAN MAY BE USED AS AN ALTERNATE WEB MATERIAL.

[2] ORIENTED STRAND BOARD MEETING MINIMUM MATERIAL SPECIFICATIONS CONTAINED IN TRUS JOIST CORPORATION'S MANUFACTURING STANDARDS.

TABLE NO. II-PROPERTIES FOR TJI® JOISTS[2]

DEPTH	WEIGHT (plf)	MOMENT FACTOR (See example)	RESISTIVE SHEAR (lbs.)	I ($In.^4$)
TJI/25 JOIST				
7 1/2	1.8	1,015	640	47
9 1/2	1.9	1,400	805	85
11 7/8	2.0	1,870	990	142
14	2.2	2,295	1,160	212
16	2.4	2,695	1,315	289
TJI/35 JOIST				
10	2.5	2,005	845	125
12	2.6	2,535	1,000	192
14	2.8	3,065	1,160	275
16	3.0	3,600	1,315	372
18	3.1	4,140	1,470	485
20	3.3	4,680	1,625	615
TJI/38 JOIST				
9 1/2	3.1	2,895	805	170
11 7/8	3.3	3,873	990	286
14	3.5	4,750	1,160	418
16	3.7	5,582	1,315	565
18	3.9	6,416	1,470	738
20	4.1	7,252	1,625	933
TJI/35X JOIST				
10	2.7	1,985	1,215	125
12	2.9	2,510	1,420	192
14	3.2	3,035	1,625	275
16	3.4	3,565	1,830	372
18	3.6	4,095	2,030	485
20	3.9	4,630	2,235	615
22	4.1	5,160	2,440	762
24	4.4	5,695	2,645	925
26	4.6	6,230	2,775	1,107
28	4.9	6,765	2,900	1,307
30	5.1	7,300	2,900	1,527
TJI/40 JOIST				
10	2.9	2,215	1,215	135
12	3.1	2,800	1,420	280
14	3.4	3,395	1,625	297
16	3.6	3,990	1,830	404
18	3.8	4,585	2,030	528
20	4.1	5,180	2,235	671
22	4.3	5,780	2,440	831
24	4.6	6,380	2,645	1,011
26	4.8	6,980	2,775	1,211
28	5.1	7,580	2,900	1,431
30	5.3	8,180	2,900	1,671
TJI/45 JOIST				
10	3.1	2,345	1,380	152
12	3.3	2,990	1,575	235
14	3.6	3,640	1,770	337
16	3.8	4,295	1,970	460
18	4.0	4,950	2,165	605
20	4.3	5,610	2,360	772
22	4.5	6,270	2,555	960
24	4.8	6,930	2,750	1,172
26	5.0	7,590	2,950	1,407
28	5.3	8,255	3,030	1,670
30	5.5	8,915	3,115	1,955

TABLE II[2]-CONTINUED-

DEPTH	WEIGHT (plf)	MOMENT FACTOR (See example)	RESISTIVE SHEAR (lbs.)	I ($In.^4$)
TJI/55 JOIST				
10	3.3	3,080	1,380	194
12	3.6	3,895	1,575	298
14	3.8	4,720	1,770	427
16	4.1	5,540	1,970	580
18	4.4	6,370	2,165	759
20	4.6	7,200	2,360	965
22	4.9	8,030	2,555	1,198
24	5.1	8,860	2,750	1,459
26	5.4	9,695	2,950	1,750
28	5.6	10,527	3,030	2,069
30	5.9	11,361	3,115	2,421
TJI/42 JOIST				
10	3.3	3,084	1,380	194
12	3.6	3,902	1,575	299
14	3.8	4,725	1,770	428
16	4.1	5,552	1,970	581
18	4.4	6,381	2,165	761
20	4.6	7,212	2,360	967
22	4.9	8,084	2,555	1,200
24	5.1	8,877	2,750	1,462
26	5.4	9,710	2,950	1,752
28	5.6	10,545	3,030	2,073
30	5.9	11,379	3,115	2,424
TJI/65 JOIST				
10	3.7	3,045	1,755	194
12	4.0	3,850	1,995	299
14	4.3	4,660	2,235	430
16	4.5	5,475	2,480	585
18	4.8	6,290	2,725	765
20	5.1	7,105	2,965	980
22	5.4	7,925	3,205	1,220
24	5.7	8,745	3,450	1,485
26	6.0	9,565	3,690	1,790
28	6.2	10,385	3,930	2,120
30	6.5	11,210	4,170	2,485
TJI/75 JOIST				
10	3.9	3,395	1,755	213
12	4.2	4,335	1,995	331
14	4.5	5,280	2,235	478
16	4.8	6,235	2,480	650
18	5.1	7,190	2,725	855
20	5.4	8,150	2,965	1,095
22	5.7	9,115	3,205	1,360
24	6.0	10,075	3,450	1,665
26	6.3	11,040	3,690	2,000
28	6.6	12,005	3,930	2,370
30	6.9	12,970	4,170	2,780
TJI/25S JOIST				
7 1/2	2.1	960	640	40
9 1/2	2.3	1,315	805	80
11 7/8	2.4	1,760	990	136
14	2.6	2,140	1,160	199
16	2.8	2,530	1,315	273
TJI/35S JOIST				
10	3.0	2,300	845	144
12	3.2	2,910	1,000	221
14	3.4	3,520	1,160	315
16	3.6	4,140	1,315	427
18	3.8	4,755	1,470	558
20	4.0	5,375	1,625	708

(Continued)

TABLE II[2]-CONTINUED-

DEPTH	WEIGHT (plf)	MOMENT FACTOR (See example)	RESISTIVE SHEAR (lbs.)		I (In.^{4})
TJI/45S JOIST					
10	3.5	3,080	1,380		195
12	3.8	3,895	1,575		301
14	4.1	4,715	1,770		431
16	4.3	5,540	1,970		587
18	4.6	6,370	2,165		770
20	4.8	7,195	2,360		980
22	5.1	8,030	2,555		1,219
24	5.3	8,860	2,750		1,487
26	5.6	9,690	2,950		1,785
28	5.8	10,525	3,145		2,115
30	6.1	11,355	3,145		2,476
TJI/250 JOIST					
7 1/2	1.9	1,015	860	640[1]	47
9 1/2	2.0	1,400	1,120	965[1]	85
11 7/8	2.1	1,870	1,425	1,145[1]	142
TJI/350 JOIST					
10	2.4	2,005	1,185	1,070[1]	125
12	2.5	2,535	1,445	1,070[1]	192
14	2.7	3,065	1,710	1,160[1]	275
16	2.9	3,600	1,970	1,160[1]	372
18	3.1	4,140	2,155		485
20	3.3	4,680	2,165		615
TJI/350X JOIST					
10	2.5	1,985	1,565	1,280[1]	125
12	2.8	2,510	1,750	1,360[1]	192
14	3.0	3,035	1,935	1,360[1]	275
16	3.2	3,565	2,120	1,360[1]	372
18	3.5	4,095	2,305	1,440[1]	485
20	3.7	4,630	2,490		615
22	3.9	5,160	2,670		762
24	4.2	5,695	2,785		925
26	4.4	6,230	2,900		1,107
28	4.6	6,765	2,900		1,307
30	4.9	7,300	2,900		1,527
TJI/450 JOIST					
10	3.1	2,345	1,565	1,280[1]	152
12	3.3	2,990	1,750	1,360[1]	235
14	3.6	3,640	1,935	1,360[1]	337
16	3.8	4,295	2,120	1,360[1]	460
18	4.0	4,950	2,305	1,440[1]	605
20	4.3	5,610	2,490		772
22	4.5	6,270	2,670		960
24	4.8	6,930	2,785		1,172
26	5.0	7,590	2,900		1,407
28	5.3	8,255	2,900		1,670
30	5.5	8,915	2,900		1,955
TJI/550 JOIST					
10	3.4	3,080	1,565	1,280[1]	194
12	3.6	3,895	1,750	1,360[1]	298
14	3.9	4,720	1,935	1,360[1]	427
16	4.1	5,540	2,120	1,360[1]	580
18	4.3	6,370	2,305	1,440[1]	760
20	4.6	7,200	2,490		965
22	4.8	8,030	2,670		1,198
24	5.0	8,860	2,785		1,459
26	5.3	9,695	2,900		1,750
28	5.6	10,525	2,900		2,069
30	5.8	11,360	2,900		2,421

TABLE II[2]-CONTINUED-

DEPTH	WEIGHT (plf)	MOMENT FACTOR (See example)	RESISTIVE SHEAR (lbs.)	I (In.^{4})
TJI/420 JOIST				
10	3.3	3,084	1,565	200
12	3.6	3,902	1,750	309
14	3.8	4,725	1,935	445
16	4.1	5,552	2,200	609
18	4.4	6,381	2,305	802
20	4.6	7,212	2,490	1,025
22	4.9	8,084	2,670	1,280
24	5.1	8,877	2,785	1,567
26	5.4	9,710	2,900	1,889
28	5.6	10,545	2,900	2,246
30	5.9	11,379	2,900	2,640

[1] Resistive shear for webs without web stiffeners.

[2] The allowable values noted for moment and shear are based on results of performance tests and are for normal duration of load conditions. The values may be increased for duration of load as indicated in Appendix B of the National Design Specification for Wood Construction, 1986 Edition.

The following uniform load formula provides a close approximation of the deflection:

$$\Delta = \frac{5WL^4}{384EI} + \frac{WL^2}{Kd \times 10^5}$$

For a concentrated load at midspan the following formula provides a close approximation of the deflection:

$$\Delta = \frac{PL^3}{48EI} + \frac{2PL}{Kd \times 10^5}$$

K= TJI/25 & 25S	=2.7	K= TJI/65	=4.4
TJI/35 & 35S	=2.7	TJI/75	=4.4
TJI/38	=4.4	TJI/250	=5.3
TJI/45	=3.5	TJI/350	=5.3
TJI/35X	=3.5	TJI/350X	=6.5
TJI/40	=3.5	TJI/450	=6.5
TJI/45S	=3.6	TJI/550	=6.6
TJI/55/42	=3.6	TJI/420	=6.5

P= Concentrated load.
W= Uniform load in pounds per lineal inch.
L= Clear span in inches.
d= Out-to-out depth of joist, in inches.
I= moment of inertia from table.
E= Flange material modulus of elasticity from table.

TJI® JOIST FLANGE MATERIAL PROPERTIES			
MICRO=LAM® LVL		MACHINE STRESS RATED LUMBER	
E(x10^6 psi)	F_t (psi)	E(x10^6 psi)	F_t (psi)
1.8	1750	1.8	1500
2.0	2100	1.8	1825
2.2	2300	1.95	1825
2.4	2600	2.0	1775
		2.0	1900
		2.0	2150
		2.35	2225

EXAMPLE:

$$\text{Resistive Moment (ft.-lb.)} = \frac{\text{Moment factor (from Table No. II)} \times F_t \text{ (from table above)}}{1{,}000}$$

16" TJI/35 with MICRO=LAM flanges, F_t =2100 psi

$$\text{Resistive moment} = \frac{3600 \times 2100}{1{,}000} = 7560 \text{ ft.-lbs.}$$

WEB STIFFENER REQUIREMENTS:

WEB STIFFENERS MUST BE FIELD INSTALLED AT BEARING POINTS AND OTHER POINTS OF CONCENTRATED LOADS AS SHOWN IN THE CHART BELOW.

WEB STIFFENERS ARE TO BE FIELD-INSTALLED AS SHOWN ON EACH SIDE OF THE WEB, WITH NAILS EQUALLY SPACED VERTICALLY. NAILS MUST PASS THROUGH THE WEB AND COMPLETELY PENETRATE THE OPPOSITE STIFFENER.

A GAP MUST BE AT THE TOP OF WEB STIFFENERS AT ALL BEARING CONDITIONS. IN THE CASE OF CONCENTRATED LOADS, THE GAP MUST BE AT THE BOTTOM.

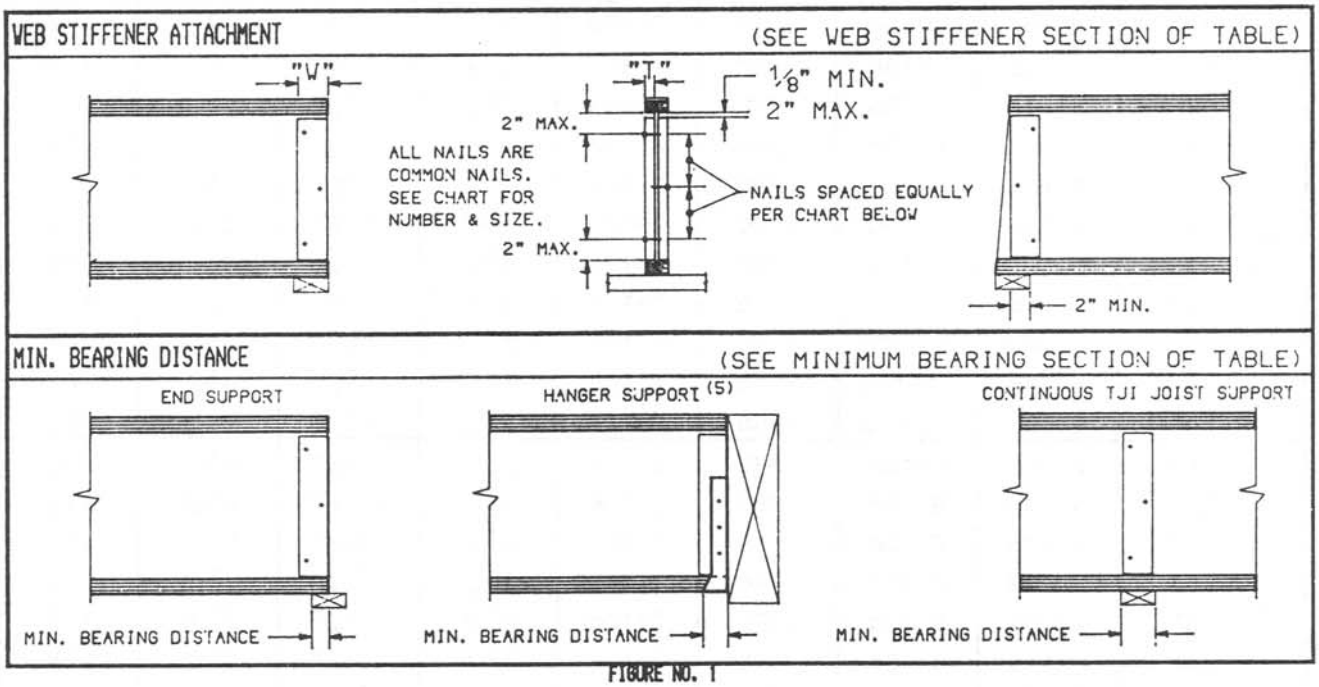


FIGURE NO. 1

TABLE NO. III-WEB STIFFENER DETAILS

		Web Stiffener Requirements						Minimum Bearing Distance	
	TJI Joist Depth/Series	Number of Nails when Web Stiffeners are Required: End Support or Hanger Support[5]	Number of Nails when Web Stiffeners are Required: Intermediate TJI Joist Support[2]	Web Stiffeners Required at Concentrated Loads Greater Than (LBS.)	Number of Nails Required at Concentrated Load	Min. Web Stiffener Width "W" (Inches)	Min. Web Stiffener Thickness "T" (Inches)	End Support or Hanger Support[6] (Inches)	Intermediate TJI Joist Support[2] (Inches)
TJI/25/25S	7 1/2"	None[4]	None	320	2-8d	2 5/16"	11/16"	1 1/2"	3 1/2"
	9 1/2"	None[4]	None	400	2-8d	2 5/16"	11/16"	1 1/2"	3 1/2"
	11 7/8"	None[4]	2-8d[1]	495	2-8d	2 5/16"	11/16"	2 1/4"	3 1/2"
	14"	None	2-8d	580	2-8d	2 5/16"	11/16"	3"	3 1/2"
	16"	None	2-8d	655	2-8d	2 5/16"	11/16"	3 1/2"	3 1/2"
TJI/35/35S	10"	None[4]	None	425	2-8d	2 5/16"	1"	1 1/2"	3 1/2"
	12"	None[4]	None	500	2-8d	2 5/16"	1"	1 1/2"	3 1/2"
	14"	None[4]	2-8d	580	2-8d	2 5/16"	1"	2"	3 1/2"
	16"	None[4]	2-8d	655	2-8d	2 5/16"	1"	2"	3 1/2"
	18"	2-8d	2-8d	735	2-8d	2 5/16"	1"	1 3/4"	3 1/2"
	20"	3-8d	3-8d	810	2-8d	2 5/16"	1"	1 3/4"	3 1/2"

TABLE NO. III-CONTINUED-

TJI Joist Depth/Series		Web Stiffener Requirements						Minimum Bearing Distance	
		Number of Nails when Web Stiffeners are Required		Web Stiffeners Required at Concentrated Loads Greater Than (LBS.)	Number of Nails Required at Concentrated Load	Min. Web Stiffener Width "W" (Inches)	Min. Web Stiffener Thickness "T" (Inches)	End Support or Hanger Support[6] (Inches)	Intermediate TJI Joist Support[2] (Inches)
		End Support or Hanger Support[5]	Intermediate TJI Joist Support[2]						
TJI/42/55	10"	3-10d	3-10d	610	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
	12"	3-10d	3-10d	780	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
	14"	3-10d	6-10d	885	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
	16"	3-10d	6-10d	985	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
	18"	4-10d	7-10d	1080	2-10d	3 1/2"	1 1/2"	2 1/4"	3 1/2"
	20"	4-10d	8-10d	1180	2-10d	3 1/2"	1 1/2"	2 1/2"	3 1/2"
	22"	5-10d	9-10d	1280	2-10d	3 1/2"	1 1/2"	2 1/2"	5 1/2"
	24"	5-10d	10-10d	1375	2-10d	3 1/2"	1 1/2"	3"	5 1/2"
	26"	5-10d	11-10d	1475	2-10d	3 1/2"	1 1/2"	3 1/4"	7"
	28"	6-10d	11-10d	1515	2-10d	3 1/2"	1 1/2"	3 1/4"	7"
	30"	6-10d	12-10d	1560	2-10d	3 1/2"	1 1/2"	3 1/2"	7"
TJI/65/75	10"	3-10d	6-10d	875	2-10d	3 1/2"	1 7/16"	2 1/2"	3 1/2"
	12"	3-10d	6-10d	990	2-10d	3 1/2"	1 7/16"	2 1/2"	3 1/2"
	14"	3-10d	6-10d	1115	2-10d	3 1/2"	1 7/16"	2 1/2"	3 1/2"
	16"	3-10d	6-10d	1240	2-10d	3 1/2"	1 7/16"	2 1/2"	3 1/2"
	18"	4-10d	8-10d	1360	2-10d	3 1/2"	1 7/16"	2 1/2"	3 1/2"
	20"	4-10d	8-10d	1480	2-10d	3 1/2"	1 7/16"	2 3/4"	5 1/2"
	22"	5-10d	10-10d	1600	2-10d	3 1/2"	1 7/16"	3"	5 1/2"
	24"	5-10d	10-10d	1725	2-10d	3 1/2"	1 7/16"	3"	5 1/2"
	26"	6-10d	12-10d	1845	2-10d	3 1/2"	1 7/16"	3"	7 1/4"
	28"	6-10d	12-10d	1960	2-10d	3 1/2"	1 7/16"	3"	7 1/4"
	30"	6-10d	12-10d	2080	2-10d	3 1/2"	1 7/16"	3"	7 1/4"
TJI/38	9 1/2"	None[4]	None	400	2-10d	3 1/2"	1 1/2"	1 1/2"	3 1/2"
	11 7/8"	None[4]	None	495	2-10d	3 1/2"	1 1/2"	1 1/2"	3 1/2"
	14"	None[4]	2-10d	580	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
	16"	None[4]	2-10d	655	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
	18"	2-10d	2-10d	735	2-10d	3 1/2"	1 1/2"	1 3/4"	3 1/2"
	20"	3-10d	3-10d	810	2-10d	3 1/2"	1 1/2"	1 3/4"	3 1/2"
TJI/250	7 1/2"	None[4]	None	400	2-8d	2 5/16"	5/8"	1 1/2"	3 1/2"
	9 1/2"	2-8d	3-8d	450	2-8d	2 5/16"	5/8"	1 1/2"	3 1/2"
	11 7/8"	2-8d	3-8d	570	2-8d	2 5/16"	5/8"	2 1/4"	3 1/2"
TJI/350	10"	2-8d	3-8d	425	2-8d	2 5/16"	7/8"	1 1/2"	3 1/2"
	12"	3-8d	3-8d	500	2-8d	2 5/16"	7/8"	1 1/2"	3 1/2"
	14"	4-8d	4-8d	580	2-8d	2 5/16"	7/8"	2"	3 1/2"
	16"	5-8d	5-8d	655	2-8d	2 5/16"	7/8"	2"	3 1/2"
	18"	6-8d	7-8d	735	2-8d	2 5/16"	7/8"	1 3/4"	3 1/2"
	20"	6-8d	8-8d	810	2-8d	2 5/16"	7/8"	1 3/4"	3 1/2"

TABLE NO. III-CONTINUED-

TJI Joist Depth/Series		Web Stiffener Requirements: Number of Nails when Web Stiffeners are Required: End Support or Hanger Support[5]	Number of Nails when Web Stiffeners are Required: Intermediate TJI Joist Support[2]	Web Stiffeners Required at Concentrated Loads Greater Than (LBS.)	Number of Nails Required at Concentrated Load	Min. Web Stiffener Width "V" (Inches)	Min. Web Stiffener Thickness "T" (Inches)	Minimum Bearing Distance: End Support or Hanger Support[6] (Inches)	Minimum Bearing Distance: Intermediate TJI Joist Support[2] (Inches)
TJI/35X/40	10"	2-8d	2-8d	605	2-8d	2 5/16"	7/8"	2"	3 1/2"
	12"	2-8d	2-8d	710	2-8d	2 5/16"	7/8"	2 1/4"	3 1/2"
	14"	2-8d	4-8d	810	3-8d	2 5/16"	7/8"	2 1/4"	3 1/2"
	16"	2-8d	4-8d	915	3-8d	2 5/16"	7/8"	2 1/4"	3 1/2"
	18"	4-8d	6-8d	1015	3-8d	2 5/16"	7/8"	2 1/2"	5 1/2"
	20"	5-8d	8-8d	1115	4-8d	2 5/16"	7/8"	2 3/4"	5 1/2"
	22"	6-8d	10-8d	1220	4-8d	2 5/16"	7/8"	3"	5 1/2"
	24"	7-8d	12-8d	1320	4-8d	2 5/16"	7/8"	3"	5 1/2"
	26"	8-8d	12-8d	1385	5-8d	3 1/2"	7/8"	3 1/2"	7"
	28"	8-8d	12-8d	1450	5-8d	3 1/2"	7/8"	3 1/2"	7"
	30"	8-8d	12-8d	1450	6-8d	3 1/2"	7/8"	3 1/2"	7"
TJI/45	10"	None[4]	None	690	2-10d	2 1/2"	1"	1 1/2"	3 1/2"
	12"	None[4]	None	785	2-10d	2 1/2"	1"	2 1/4"	3 1/2"
	14"	2-10d	3-10d	885	2-10d	2 1/2"	1"	1 3/4"	3 1/2"
	16"	3-10d	5-10d	985	2-10d	2 1/2"	1"	2"	3 1/2"
	18"	4-10d	5-10d	1080	2-10d	2 1/2"	1"	2 1/4"	5 1/2"
	20"	5-10d	7-10d	1180	3-10d	2 1/2"	1"	2 1/2"	5 1/2"
	22"	6-10d	9-10d	1275	3-10d	2 1/2"	1"	2 1/2"	5 1/2"
	24"	6-10d	11-10d	1375	3-10d	2 1/2"	1"	3"	5 1/2"
	26"	7-10d	10-10d	1475	4-10d	2 1/2"	1"	3 1/4"	5 1/2"
	28"	8-10d	11-10d	1515	4-10d	2 3/4"[3]	1"	3 1/4"	5 1/2"
	30"	9-10d	11-10d	1555	5-10d	2 3/4"[3]	1"	3 1/2"	7"
TJI/45S	10"	None[4]	None	690	2-10d	3 1/2"	1 1/2"	1 3/4"	3 1/2"
	12"	None[4]	2-10d	790	2-10d	3 1/2"	1 1/2"	1 3/4"	3 1/2"
	14"	None[4]	3-10d	885	2-10d	3 1/2"	1 1/2"	2 1/2"[7]	3 1/2"
	16"	None[4]	4-10d	985	2-10d	3 1/2"	1 1/2"	2 1/2"[7]	3 1/2"
	18"	3-10d	5-10d	1080	2-10d	3 1/2"	1 1/2"	1 3/4"	3 1/2"
	20"	3-10d	6-10d	1180	2-10d	3 1/2"	1 1/2"	1 3/4"	3 1/2"
	22"	3-10d	6-10d	1280	2-10d	3 1/2"	1 1/2"	2 3/8"	5 1/2"
	24"	4-10d	7-10d	1375	2-10d	3 1/2"	1 1/2"	2 3/8"	5 1/2"
	26"	5-10d	8-10d	1475	2-10d	3 1/2"	1 1/2"	2 1/2"	5 1/2"
	28"	6-10d	9-10d	1515	2-10d	3 1/2"	1 1/2"	2 1/2"	5 1/2"
	30"	6-10d	9-10d	1560	2-10d	3 1/2"	1 1/2"	2 1/2"	5 1/2"

TABLE NO. III-CONTINUED-

TJI Joist Depth/Series	Web Stiffener Requirements: Number of Nails when Web Stiffeners are Required — End Support or Hanger Support[5]	Number of Nails when Web Stiffeners are Required — Intermediate TJI Joist Support[2]	Web Stiffeners Required at Concentrated Loads Greater Than (LBS.)	Number of Nails Required at Concentrated Load	Min. Web Stiffener Width "W" (Inches)	Min. Web Stiffener Thickness "T" (Inches)	Minimum Bearing Distance: End Support or Hanger Support[6] (Inches)	Minimum Bearing Distance: Intermediate TJI Joist Support[2] (Inches)
TJI/350X/450 10"	3-8d	3-8d	605	2-8d	2 5/16"	7/8"	2"	3 1/2"
TJI/350X/450 12"	3-8d	3-8d	710	2-8d	2 5/16"	7/8"	2 1/4"	3 1/2"
TJI/350X/450 14"	4-8d	6-8d	810	3-8d	2 5/16"	7/8"	2 1/4"	3 1/2"
TJI/350X/450 16"	5-8d	7-8d	915	3-8d	2 5/16"	7/8"	2 1/4"	3 1/2"
TJI/350X/450 18"	6-8d	8-8d	1015	3-8d	2 5/16"	7/8"	2 1/2"	5 1/2"
TJI/350X/450 20"	6-8d	9-8d	1115	4-8d	2 5/16"	7/8"	2 3/4"	5 1/2"
TJI/350X/450 22"	7-8d	11-8d	1220	4-8d	2 5/16"	7/8"	3"	5 1/2"
TJI/350X/450 24"	8-8d	12-8d	1320	4-8d	2 5/16"	7/8"	3"	5 1/2"
TJI/350X/450 26"	8-8d	12-8d	1385	5-8d	3 1/2"*	3/4"*	3 1/2"	7"
TJI/350X/450 28"	8-8d	12-8d	1450	5-8d	3 1/2"*	3/4"*	3 1/2"	7"
TJI/350X/450 30"	8-8d	12-8d	1450	6-8d	3 1/2"*	3/4"*	3 1/2"	7"
* WEB STIFFENERS SHOULD BE 3/4" MICRO-LAM								
TJI/420/550 10"	3-10d	3-10d	610	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
TJI/420/550 12"	3-10d	3-10d	710	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
TJI/420/550 14"	4-10d	6-10d	810	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
TJI/420/550 16"	5-10d	7-10d	985	2-10d	3 1/2"	1 1/2"	2"	3 1/2"
TJI/420/550 18"	6-10d	8-10d	1080	2-10d	3 1/2"	1 1/2"	2 1/4"	3 1/2"
TJI/420/550 20"	6-10d	9-10d	1180	2-10d	3 1/2"	1 1/2"	2 1/2"	5 1/2"
TJI/420/550 22"	7-10d	11-10d	1280	2-10d	3 1/2"	1 1/2"	2 1/2"	5 1/2"
TJI/420/550 24"	8-10d	12-10d	1375	2-10d	3 1/2"	1 1/2"	3"	5 1/2"
TJI/420/550 26"	8-10d	12-10d	1375	2-10d	3 1/2"	1 1/2"	3"	5 1/2"
TJI/420/550 28"	8-10d	12-10d	1375	2-10d	3 1/2"	1 1/2"	3"	5 1/2"
TJI/420/550 30"	8-10d	12-10d	1375	2-10d	3 1/2"	1 1/2"	3"	5 1/2"

(1) Web stiffeners with two nails are required for the TJI/25 joist at continuous supports when bearing on plates is less than 5 1/2 inches and the reaction is greater than 1700 lbs. (1700# is the maximum reaction for 3 1/2 inch bearing with no web stiffeners).

(2) For maximum load, specific applications may permit reduction in this criteria.

(3) May be reduced to 2 1/2 inches for end support or hanger support.

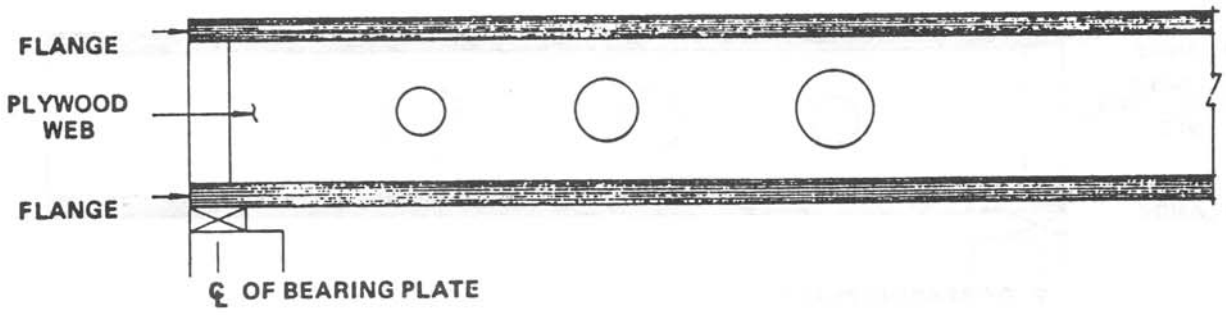
(4) "U" type hangers require web stiffeners to comply with nailing requirement through side plates of hanger.

(5) If web stiffeners are not used in hanger support, the sides of the hanger must extend up to support the top flange laterally.

(6) The minimum bearing length may be reduced for joists supported by hangers if supplemental nail attachment to the end web stiffener is provided.

(7) May be reduced to 1 3/4 inches by using web stiffeners with two nails.

FIGURE NO. 2
ALLOWABLE HOLE SIZE CHART



SPAN IN FEET	DIAMETER										
	3"	4"	5"	6"	7"	8"	9"	10"	12"	14"	16"
14	1-0	1-3	1-6	2-0	2-3	2-6	3-0	3-3	4-0	4-6	5-3
15	1-0	1-3	1-9	2-0	2-6	2-9	3-0	3-6	4-3	5-0	5-6
16	1-0	1-6	1-9	2-3	2-6	3-0	3-3	3-9	4-6	5-3	6-0
17	1-0	1-6	1-9	2-3	2-9	3-0	3-6	4-0	4-9	5-6	6-3
18	1-3	1-6	2-0	2-6	2-9	3-3	3-9	4-3	5-0	5-9	6-9
19	1-3	1-6	2-0	2-6	3-0	3-6	4-0	4-6	5-3	6-3	7-0
20	1-3	1-9	2-3	2-9	3-3	3-9	4-0	4-6	5-6	6-6	7-6
21	1-3	1-9	2-3	2-9	3-3	3-9	4-3	4-9	5-9	6-9	7-9
22	1-3	1-9	2-3	3-0	3-6	4-0	4-6	5-0	6-0	7-3	8-3
23	1-6	2-0	2-6	3-0	3-9	4-3	4-9	5-3	6-3	7-6	8-6
24	1-6	2-0	2-6	3-3	3-9	4-3	5-0	5-6	6-9	7-9	9-0
25	1-6	2-0	2-9	3-3	4-0	4-6	5-0	5-9	7-0	8-0	9-3
26	1-6	2-3	2-9	3-6	4-0	4-9	5-3	6-0	7-3	8-6	9-9
27	1-9	2-3	3-0	3-6	4-3	4-9	5-6	6-3	7-6	8-9	10-0
28	1-9	2-3	3-0	3-9	4-6	5-0	5-9	6-6	7-9	9-0	10-6
29	1-9	2-3	3-0	3-9	4-6	5-3	6-0	6-6	8-0	9-6	10-9
30	1-9	2-3	3-3	4-0	4-9	5-6	6-0	6-9	8-3	9-9	11-3
31	1-9	2-6	3-3	4-0	4-9	5-6	6-3	7-0	8-6	10-0	11-6
32	2-0	2-9	3-6	4-3	5-0	5-9	6-6	7-3	8-9	10-3	12-0
33	2-0	2-9	3-6	4-3	5-3	6-0	6-9	7-6	9-0	10-9	12-3
34	2-0	2-9	3-6	4-6	5-3	6-0	7-0	7-9	9-3	11-0	12-9
35	2-0	3-0	3-9	4-6	5-6	6-3	7-0	8-0	9-9	11-3	13-0
36	2-3	3-0	3-9	4-9	5-6	6-6	7-3	8-3	10-0	11-9	13-6

MINIMUM DISTANCE FROM C/L OF SUPPORT IN FEET AND INCHES TO C/L OF HOLE

TJI JOIST HOLE CHART INSTRUCTIONS

ROUND HOLES—For simple spans and uniform loads use the table above to determine hole sizes.

SQUARE HOLES—Square hole sizes are determined by multiplying the maximum round hole diameter by a factor of 0.8.

MULTIPLE HOLES—Where more than one hole is desired, the amount of wood between holes must equal or exceed twice the diameter of the largest hole or twice the side of the largest square hole.

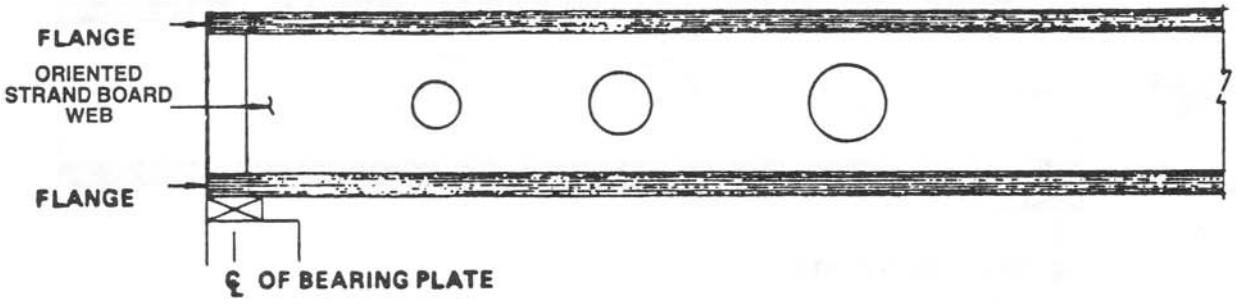
CANTILEVERS AND CONTINUOUS SPANS—For uniformly loaded cantilevers and continuous TJI joists, the holes must be located 1 inch farther from the support for each foot of clear span in addition to the values indicated in the table above.

SPECIAL—Exceptions to these rules may be possible through special inquiry.

NOTE—Do not cut the joist within 4 inches of the support centerline, otherwise a 2-inch hole can be cut in the web anywhere. THE TOP AND BOTTOM FLANGES ARE NEVER TO BE CUT—The sizes given in the table are hole sizes, not duct sizes.

TJI/25 JOIST—Where more than three-fourths of the depth of the web is removed, 1 foot must be added to the distance.

FIGURE NO. 3
ALLOWABLE HOLE SIZE AND DISTANCE FROM SUPPORT DETAILS



HOLE FACTOR—TABLE A
DIAMETER OF HOLE (Inches)[1]

JOIST DEPTH (Inches)	HOLE FACTOR				
	2	3	4	5	6
10	2 1/4	3	3 3/4	4 1/2	5 1/4
12	3	4	5	5 3/4	6 3/4
14	3 1/2	4 3/4	6	7 1/4	8 1/2
16	4 1/4	5 3/4	7	8 1/2	10
18	5	6 1/2	8 1/4	9 3/4	11 1/2
20	5 1/2	7 1/2	9 1/4	11 1/4	13
22	6 1/4	8 1/4	10 1/2	12 1/2	14 3/4
24	7	9 1/4	11 1/2	13 3/4	16 1/4
26	7 1/2	10 1/4	12 3/4	15 1/4	17 3/4
28	8 1/4	11	13 3/4	16 1/2	19 1/4
30	9	12	15	17 3/4	20 3/4

[1]If a particular hole diameter is not given in the table, the next largest size diameter indicated should be used.

MINIMUM DISTANCE FROM C/L OF SUPPORT IN FEET AND INCHES TO C/L OF HOLE—TABLE B

SPAN (Feet)	HOLE FACTOR				
	2	3	4	5	6
14	1'3"	2'0"	2'9"	3'6"	4'0"
15	1'6"	2'3"	3'0"	3'9"	4'6"
16	1'6"	2'3"	3'0"	4'0"	4'9"
17	1'6"	2'6"	3'3"	4'3"	5'0"
18	1'9"	2'6"	3'6"	4'6"	5'3"
19	1'9"	2'9"	3'9"	4'9"	5'6"
20	2'0"	3'0"	4'0"	5'0"	6'0"
21	2'0"	3'0"	4'0"	5'3"	6'3"
22	2'0"	3'3"	4'3"	5'6"	6'6"
23	2'3"	3'3"	4'6"	5'9"	6'9"
24	2'3"	3'6"	4'9"	6'0"	7'0"
25	2'6"	3'9"	5'0"	6'3"	7'6"
26	2'6"	3'9"	5'0"	6'6"	7'9"
27	2'6"	4'0"	5'3"	6'9"	8'0"
28	2'9"	4'0"	5'6"	7'0"	8'3"
29	2'9"	4'3"	5'9"	7'3"	8'6"
30	3'0"	4'6"	6'0"	7'6"	9'0"
31	3'0"	4'6"	6'0"	7'9"	9'3"
32	3'0"	4'9"	6'3"	8'0"	9'6"
33	3'3"	4'9"	6'6"	8'3"	9'9"
34	3'3"	5'0"	6'9"	8'6"	10'0"
35	3'6"	5'3"	7'0"	8'9"	10'6"
36	3'6"	5'3"	7'0"	9'0"	10'9"

Instructions:

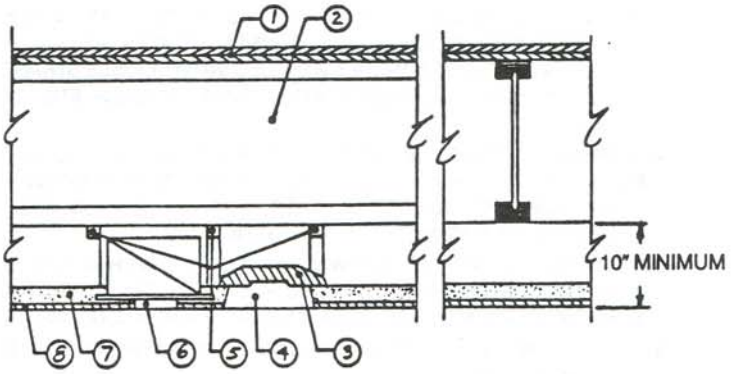
1. From the Hole Factor Table A, for a specific joist depth and hole diameter, the hole factor is obtained.

2. Using the hole factor and the span of the joist the minimum distance from center line of support to the center line of the hole can be obtained from the Table B.

3. Holes in the OSB web material are limited to round holes.

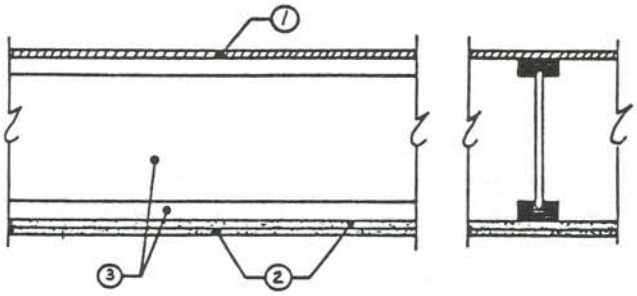
4. The instructions noted at the bottom of Figure No. 2 are also applicable to OSB webs.

FIGURE NO. 4
FIRE-RESISTIVE ASSEMBLY DETAILS



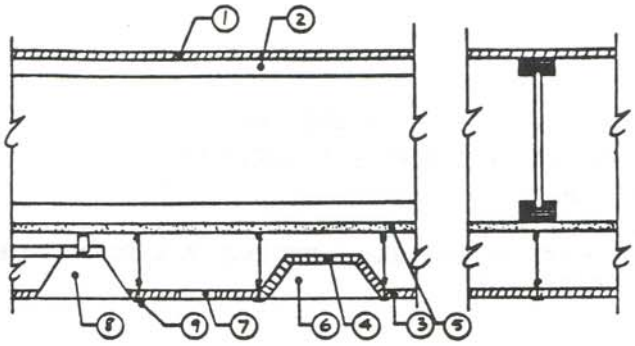
ASSEMBLY E-1.

1. DOUBLE-WOOD FLOOR.
2. TJI® JOIST.
3. FIXTURE PROTECTION.
4. 24-INCH X 48-INCH RECESSED LIGHT FIXTURE.
5. COLD-ROLLED CHANNELS.
6. 12-INCH AIR DIFFUSER.
7. USG THERMAFIBER MINERAL WOOL BLANKETS.
8. 5/8-INCH ACOUSTICAL PANELS 24 INCHES X 24 INCHES SUPPORTED BY AN APPROVED EXPOSED FIRE-RATED TENSION SUSPENSION SYSTEM.



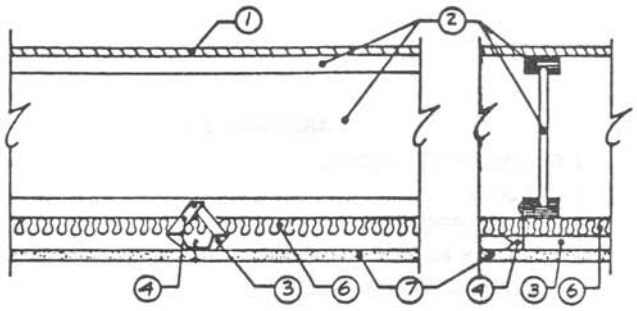
ASSEMBLY E-2.

1. 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. TWO LAYERS 1/2-INCH TYPE X GYPSUM BOARD.
3. TJI® JOIST.



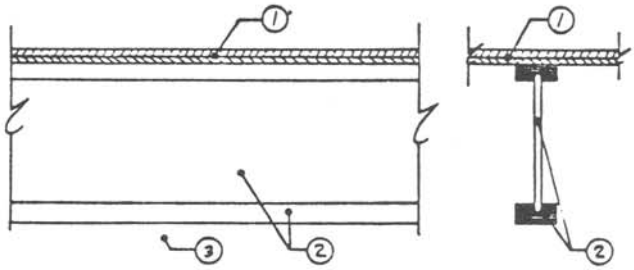
ASSEMBLY E-3.

1. 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. TJI® JOIST.
3. 5/8-INCH X 24-INCH X 48-INCH PANELS.
4. FIXTURE PROTECTION.
5. 1/2-INCH TYPE X GYPSUM WALLBOARD.
6. 24-INCH X 48-INCH RECESSED LIGHT FIXTURE.
7. 6-INCH X 12-INCH OPENING FOR RETURN AIR.
8. 12-INCH DIAMETER DIFFUSER OPENING.
9. STEEL SUSPENSION GRID.



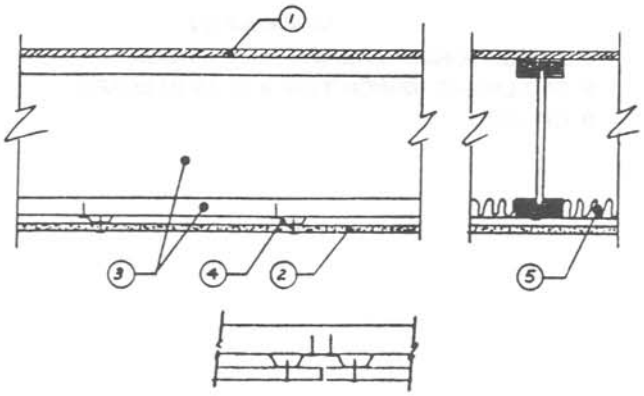
ASSEMBLY E-4.

1. SINGLE-LAYER FLOOR OF 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. TJI® JOIST.
3. NO. 26 GAUGE GALVANIZED STEEL FURRING CHANNEL INSTALLED PERPENDICULAR TO JOISTS. FURRING CHANNELS SPACED 1½ INCHES FROM AND ON EACH SIDE OF WALLBOARD END JOINTS AND 24 INCHES ON CENTER AWAY FROM END JOINTS. CHANNEL SECURED TO JOISTS WITH SUPPORT CLIPS (ITEM 4) AT EACH JOIST LOCATION. AT CHANNEL SPLICES, ADJACENT PIECES OVERLAPPED 6 INCHES AND TIED WITH DOUBLE STRAND OF NO. 18 SWG GALVANIZED STEEL WIRE AT EACH END OF OVERLAP.
4. SIMPSON CO. TYPE CSC SUPPORT CLIPS TO BE USED TO SUPPORT FURRING CHANNELS AT THE INTERSECTION WITH EACH JOIST. SUPPORT CLIPS NAILED TO SIDE OF JOIST BOTTOM FLANGE WITH 1 1/2-INCH LONG 11 GAUGE NAIL.
5. STABILIZER STRAP (NOT SHOWN) - 3/4-INCH X 6-INCH 24 GAUGE GALVANIZED STEEL STRAP USED TO PREVENT ROTATION OF THE SUPPORT CLIPS AT WALLBOARD END JOINTS AND ALONG WALLS.
6. 1-INCH (6 PCF MINIMUM) USG THERMAFIBER MINERAL WOOL FIRE PROOFING.
7. 1/2-INCH USG TYPE C FIRECODE® GYPSUM WALLBOARD.



ASSEMBLY E-5.

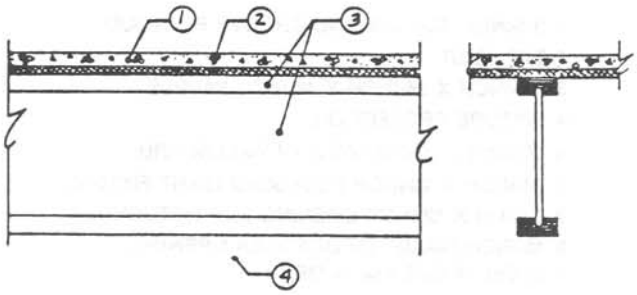
1. DOUBLE-WOOD FLOOR.
2. TJI® JOISTS.
3. AN APPROVED CEILING SYSTEM THAT WILL PROVIDE A 40-MINUTE MEMBRANE RATING.



JOINT DETAIL FOR
BUTT JOINTS PERPENDICULAR
TO FRAMING MEMBERS.

ASSEMBLY E-6

1. 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. 5/8-INCH USG TYPE C FIRECODE® GYPSUM WALLBOARD.
3. TJI® JOIST.
4. USG RC-1 CHANNEL AT 16" ON CENTER.
5. USG THEMAFIBER MINERAL WOOL BATTS.



ASSEMBLY E-7.

1. LIGHTWEIGHT CONCRETE OR GYPCRETE®
2. PLYWOOD.
3. TJI® JOISTS.
4. ANY OF THE SIX CEILING SYSTEMS AS SPECIFIED IN E-1 THROUGH E-6.

FIGURE NO. 4—Continued
FIRE-RESISTIVE ASSEMBLY DETAILS