

# ICC-ES Evaluation Report

**ESR-1141\***

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

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**EVALUATION SUBJECT:**

NASCOR I-JOISTS: NJ925, NJ10, NJ12, NJH925, NJH10,  
NJH12, NJH14, NJH16, NJU10, NJU12, NJU14, NJU16  
AND NJU18

**ADDITIONAL LISTEES:**

ACUJOIST  
9455 HALDANE ROAD  
KELOWNA, BRITISH COLUMBIA V4V 2K5  
CANADA

ALL-FAB BUILDING COMPONENTS, JOIST DIVISION  
P.O. BOX 189  
7 HIGHWAY PROPELLANT ROAD  
STONY MOUNTAIN, MANITOBA R0C 3A0  
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NASCOR BY KOTT  
4220 MARCEL LACASSE  
BOISBRIAND, QUEBEC J7H 1N3  
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NEPEAN, ONTARIO K2H 7V1  
CANADA

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

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- BOCA® *National Building Code*/1999 (BNBC)

- 1999 *Standard Building Code*® (SBC)
- 1997 *Uniform Building Code*™ (UBC)

**Properties evaluated:**

- Structural
- Fire-resistance rating
- Sound transmission

**2.0 USES**

Nascor NJ, NJH and NJU series I-joists described in this report are prefabricated wood I-joists that comply with Section 2303.1.2 of the IBC; Section R502.1.4 of the IRC, for allowable stress design; Section 2313.5 of the BNBC; Section 2301.4.11 of the SBC; and Section 2303, Item 5.1, of the UBC. Nascor I-joists are used as roof rafters, floor joists, blocking, and headers in buildings of combustible construction [Type V (IBC and UBC), Type 5 (BNBC) and Type VI (SBC)].

**3.0 DESCRIPTION**

Nascor I-joists are comprised of solid-sawn lumber flanges and orientated strand board (OSB) webs. The web-to-flange-connection is a glued taper-fitted joint. The web-to-web connection of the OSB panels is a full-depth, taper-shaped glued joint. Nascor I-joists are manufactured in the sizes and configurations shown in Table 1 of this report. The maximum length of Nascor I-joists is 48 feet (14.63 m).

**3.1 Materials:**

**3.1.1 Flanges:** Flange material is nominally dimensioned 2-by-3 or 2-by-4, visually graded No. 2 spruce-pine-fir lumber in accordance with the National Lumber Grading Authority (NLGA) and the Nascor quality control manual. Flanges are either full-length or finger-joined. Flanges of the NJ series I-joists are oriented with the 3-inch nominal dimension vertical, while flanges of the NJH and NJU series I-joist are oriented with the 2-inch nominal dimension vertical.

**3.1.2 Webs:** Web material is <sup>3</sup>/<sub>8</sub>-inch-thick (9.5 mm), Structural 1, Exposure 1 graded, oriented strand board panels that comply with the United States Department of Commerce (DOC) Standard PS 2, and Canadian Standards Association (CSA) Standard O325.

**3.1.3 Adhesive:** Exterior-type, heat-durable adhesives used in I-joist fabrication comply with ASTM D 2559 and ASTM D 5055 as specified in the approved quality documentation.

\*Revised July 2011

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design Properties:

Design of the prefabricated wood I-joists described in this report must be in accordance with the applicable code. Reference design values for Nascor I-joists are given in Table 2 of this report. Loads within a distance “d” from the support, where “d” equals the I-joist depth, must be included in the vertical shear design of the Nascor I-joists.

Allowable spans and loads for Nascor I-joists installed in floors are specified in Table 3 of this report. Floor sheathing must be attached as noted in this section. As an alternative, the allowable spans specified in Table 3 of this report must be reduced by 12 inches (305 mm) and the minimum fastening schedule must be as specified in the applicable code.

Sheathing must be designated as Rated Sheathing or Sturd-I-Floor panels, as specified in PS 2. Panel end joints must be staggered. Ring- or screw-shank nails must be used to attach the panels to supports: 6d for thicknesses through  $\frac{3}{4}$  inch (19.1 mm) and 8d for greater thicknesses. Nails must be spaced at a maximum of 6 inches (152 mm) on center along panel edges and 12 inches (305 mm) on center along intermediate supports, except that for panels with a 48 o.c. Span Rating (floor), nails must be spaced at 6 inches (152 mm) on center along all supported panel edges, as well as along intermediate supports.

Sheathing must be field-glued with an adhesive meeting APA Specification AFG-01 applied to all I-joists and tongue-and-groove edges. Surfaces must be free of surface moisture, dirt, cement, and other foreign materials prior to application of the adhesive.

The adhesive must be applied in accordance with the adhesive manufacturer's instructions. The application rate must be a  $\frac{1}{4}$ -inch-diameter (6.4 mm) bead, except that two  $\frac{1}{4}$ -inch-diameter (6.4 mm) beads must be applied where panels abut on a joist. Tongue-and-groove joints must be glued with the application of a  $\frac{1}{8}$ -inch-diameter (3.2 mm) bead. The adhesive must be applied for the entire length of the member. The sheathing must be completely installed within the time limit specified by the adhesive manufacturer.

If sheathing is square-edged, the panel edges must be supported by nominal 2-inch lumber blocking. Where sheathing is covered with a structural finish floor, such as wood strip flooring, or a  $\frac{1}{4}$ -inch (6.4 mm) minimum thickness underlayment, or has tongue-and-groove edges, blocking is not required.

### 4.2 Moisture Content:

The use of Nascor I-joists is limited to covered dry conditions of use. Dry conditions of use are those environmental conditions represented by sawn lumber in which the moisture content is less than 16 percent.

### 4.3 Cutting and Notching:

Cutting or notching of Nascor I-joists flanges is not permitted, except for cutting to length.

### 4.4 Fire-resistance Rating:

Floor-ceiling assemblies constructed using Nascor I-joists are considered to have a one-hour fire-resistance rating, when constructed in accordance with Figure 3 of this report.

### 4.5 Web Openings:

Web opening sizes and locations must be in accordance with Tables 5 through 10 and Figure 1 of this report.

Tables 5 through 10 are applicable to simple span applications in which the Nascor I-joists resist a uniform load. Web opening conditions not provided for have not been evaluated, and are outside the scope of this report.

### 4.6 Repetitive Members:

Reference design moment values are not permitted to be increased by a repetitive member factor.

### 4.7 Web Stiffeners:

Web stiffeners for Nascor I-joists must be installed in accordance with Table 2 as well as Figure 2 of this report.

### 4.8 Blocking:

Bearing locations of the Nascor I-joists must be provided with adequate support to resist rollover. This support must be provided by wall sheathing, end blocking, rim joists, or cross bridging. Other lateral bracing must be installed consistent with the lateral stability assumed in the design calculations. Full-depth sections of Nascor I-joists may be used as blocking, provided the applied loads do not exceed the allowable uniform vertical loads given in Table 4.

### 4.9 Duration of Load:

Design properties of the Nascor I-joists are based on loads of normal duration. Application of load duration factors must be in accordance with the AF&PA National Design Specification (NDS).

**4.10 Sound Transmission:** Floor-ceiling assemblies constructed using Nascor I-joists,—in accordance with Figure 3 of this report, have a sound transmission class (STC) of 50 and an impact insulation class (IIC) of 45. The assembly has the following STC and IIC ratings when constructed with a  $\frac{3}{4}$ -inch-thick (19.1 mm) floor topping of gypsum concrete recognized in a current ICC-ES evaluation report and with the materials described below:

**4.10.1 STC = 52 and IIC = 53:** The floor-ceiling assembly must have  $\frac{3}{4}$ -inch-thick (19.1 mm) tongue-and-groove sheathing, the floor covering must be ToughGuard Initiator vinyl and the floor cavity must contain  $3\frac{1}{2}$ -inch-thick (89 mm) glass-fiber insulation.

**4.10.2 STC = 52 and IIC = 75:** The floor-ceiling assembly must have  $\frac{3}{4}$ -inch-thick (19.1 mm) tongue-and-groove sheathing, the floor covering must include a 37-ounce (1048 grams) over a 47-ounce (1332 grams) pad and the floor cavity must contain  $3\frac{1}{2}$ -inch-thick (89 mm) glass-fiber insulation.

**4.10.3 STC = 52 and IIC = 51:** The floor-ceiling assembly must have  $\frac{3}{4}$ -inch-thick (19.1 mm) tongue-and-groove sheathing, the floor covering must include a 0.314-inch-thick (8 mm) DL Laminate Locking Floor over a 2-in-1 foam underlayment and the floor cavity must contain  $3\frac{1}{2}$ -inch-thick (89 mm) glass-fiber insulation.

**4.10.4 STC = 53 and IIC = 52:** The floor-ceiling assembly must have  $\frac{3}{4}$ -inch-thick (19.1 mm) tongue-and-groove sheathing, the floor covering must be an 0.314-inch-thick (8 mm) ToughGuard StarStep vinyl and the floor cavity must contain  $3\frac{1}{2}$ -inch-thick (89 mm) glass-fiber insulation.

## 5.0 CONDITIONS OF USE

The Nascor NJ, NJH and NJU series I-joists described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

**5.1** Installation complies with this report, the manufacturer's published installation instructions and the applicable code. In the event of conflicts between

the manufacturer's published installation instructions and this report, this report governs.

- 5.2** Drawings and design details verifying compliance with this report must be submitted to the code-official for approval, except for cases where structural members can be and are designed based on design aids (e.g., span tables) supplied in this report. The drawings and calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3** Nascor I-joists are fabricated in accordance with the approved quality control manual. Nascor I-joists must bear the stamp of Intertek Testing Services NA Ltd. See Figure 4 of this report for sample labels.
- 5.4** Use of preservative-treated lumber, as part of the Nascor I-joists, is outside the scope of this evaluation.
- 5.5** Reference design values and allowable spans indicated in this report are based on uniform loading on the top flange of the I-joist along its entire length. Other loading conditions are outside the scope of this report.

**5.6** Nascor I-joists used in vertical applications are outside the scope of this report.

**5.7** Nascor I-joists are produced at the Nascor manufacturing facility in Calgary, Alberta, Canada, or at the locations shown for the additional listees given in Table 11 of this report, under a quality control program with inspections by Intertek Testing Services NA Ltd. (AA-647).

## 6.0 EVIDENCE SUBMITTED

- 6.1** Manufacturer's published installation instructions.
- 6.2** Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Wood I-joists (AC14), dated October 2007, editorially revised December 2008.

## 7.0 IDENTIFICATION

The Nascor I-joists described in this report are identified by a stamp bearing the manufacturer's name (Nascor Ltd.), plant number, I-joist type, production code, the name of the inspection agency (Intertek Testing Services NA Ltd.) and the evaluation report number (ESR-1141).

**TABLE 1—PHYSICAL PROPERTIES FOR NASCOR JOISTS**

JOIST TYPE	JOIST DEPTH (inches)	FLANGE WIDTH (inches)	WEB THICKNESS (inches)	JOIST WEIGHT (lbf/ft)
NJ925	9 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.1
NJ10	9 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.2
NJ12	11 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.4
NJH925	9 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.2
NJH10	9 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.3
NJH12	11 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.7
NJH14	14	2 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	3.0
NJH16	16	2 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	3.3
NJU10	9 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.7
NJU12	11 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	2.9
NJU14	14	3 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	3.2
NJU16	16	3 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	3.4
NJU18	18	3 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>8</sub>	3.6

For **SI**: 1 lbf/ft = 14.594 N/m; 1 inch = 25.4 mm.

TABLE 2—REFERENCE DESIGN VALUES FOR NASCOR JOISTS<sup>3,5</sup>

JOIST TYPE	JOIST DEPTH (inches)	MOMENT <sup>1</sup> (ft-lbf)	SHEAR <sup>1,2</sup> (lbf)	END REACTIONS (lbf)				INTERIOR REACTIONS (lbf)				STIFFNESS (EI) (lbf-in <sup>2</sup> × 10 <sup>6</sup> )	SHEAR CONSTANT (K) (lbs × 10 <sup>6</sup> )
				1 1/2" Bearing		2 1/2" Bearing		3 1/2" Bearing		5 1/2" Bearing			
				Stiffeners		Stiffeners		Stiffeners		Stiffeners			
				No	Yes <sup>4</sup>	No	Yes <sup>4</sup>	No	Yes <sup>4</sup>	No	Yes <sup>4</sup>		
NJ925	9 1/4	2200	950	950	-	950	-	1900	-	1900	-	123	11.83
NJ10	9 1/2	2320	970	960	-	970	-	1940	-	1940	-	136	12.70
NJ12	11 7/8	2850	1070	960	-	1070	-	2000	-	2140	-	243	14.50
NJH925	9 1/4	2300	975	950	975	975	975	1950	1950	1950	1950	162	10.91
NJH10	9 1/2	2420	1000	960	1500	1000	1800	2000	2000	2000	2000	175	11.60
NJH12	11 7/8	3400	1140	1000	1500	1140	1800	2200	2280	2280	2280	298	14.50
NJH14	14	5000	1350	1100	1500	1300	1800	2200	2700	2500	2700	430	15.08
NJH16	16	5940	1510	1100	1500	1400	1800	2200	2700	2500	3020	584	16.93
NJU10	9 1/2	3040	1000	880	1000	1000	1000	1820	2000	2000	2000	240	11.11
NJU12	11 7/8	4200	1140	920	1140	960	1140	2170	2280	2280	2280	406	13.75
NJU14	14	5600	1350	1220	1350	1320	1350	2500	2700	2700	2700	594	15.76
NJU16	16	6900	1510	1180	1510	1510	1510	2720	3020	3020	3020	807	17.15
NJU18	18	8400	1600	980	1600	1050	1600	2410	2830	2470	3200	1054	20.04

For SI: 1 ft-lbf = 1.356 N-m; 1 lbf = 4.4 N; 1 lbf-in<sup>2</sup> = 2.87 kN-mm<sup>2</sup>; 1 inch = 25.4 mm.

Notes to Table 2:

<sup>1</sup>Reference design moment and shear values are for loads of normal duration. Reference design moment values are not permitted to be increased by a repetitive member factor.

<sup>2</sup>Joist type and bearing length must be considered when determining allowable shear.

<sup>3</sup>See Conditions of Use for additional requirements and limitations.

<sup>4</sup>See Figure 2 of this report for web stiffener size, location, and nailing requirements.

<sup>5</sup>Calculation of bending and shear deflection, in inches, must be as follows:

(5 wL<sup>4</sup> / 384EI) + (wL<sup>2</sup> / K), for uniform loads

(PL<sup>3</sup> / 48EI) + (2PL / K), for concentrated loads at midspan

where:

- w = Uniform load in pounds per lineal inch.
- L = Effective length in inches.
- EI = Joist bending stiffness.
- P = Concentrated load in pounds.
- K = Shear deflection coefficient in pounds.

TABLE 3—ALLOWABLE JOIST SPANS WITH GLUED AND NAILED FLOOR SHEATHING (feet-inches)

JOIST TYPE	FLOOR LOADS (lbf/ft <sup>2</sup> )				FLOOR LOADS (lbf/ft <sup>2</sup> )			
	Live = 40 and Dead = 10				Live = 40 and Dead = 20			
	Joist Spacing (inches)				Joist Spacing (inches)			
	12	16	19.2	24	12	16	19.2	24
NJ925	17 - 5	15 - 11	14 - 9	13 - 3	17 - 1	14 - 9	13 - 6	12 - 1
NJ10	18 - 0	16 - 5	15 - 2	13 - 7	17 - 7	15 - 2	13 - 10	12 - 5
NJ12	21 - 4	18 - 5	16 - 10	15 - 1	19 - 5	16 - 10	15 - 4	13 - 9
NJH925	19 - 0	16 - 7	15 - 1	13 - 6	17 - 6	15 - 1	13 - 10	12 - 4
NJH10	19 - 5	17 - 0	15 - 6	13 - 10	17 - 11	15 - 6	14 - 2	12 - 8
NJH12	23 - 1	20 - 2	18 - 5	16 - 5	21 - 3	18 - 5	16 - 9	15 - 0
NJH14	25 - 11	23 - 7	22 - 3	20 - 0	25 - 9	22 - 4	20 - 4	18 - 3
NJH16	28 - 7	26 - 0	24 - 4	21 - 9	28 - 1	24 - 4	22 - 2	19 - 10 <sup>5</sup>
NJU10	21 - 6	19 - 1	17 - 5	15 - 7	20 - 1	17 - 5	15 - 10	14 - 2
NJU12	25 - 5	22 - 5	20 - 5	18 - 3	23 - 7	20 - 5	18 - 8	16 - 8 <sup>5</sup>
NJU14	28 - 9	25 - 11	23 - 7	21 - 1	27 - 3	23 - 7	21 - 7	19 - 3
NJU16	31 - 9	28 - 9	26 - 3	23 - 5	30 - 3	26 - 3	23 - 11	21 - 5 <sup>5</sup>
NJU18	34 - 7	31 - 6 <sup>5</sup>	28 - 11 <sup>5</sup>	25 - 11 <sup>5</sup>	33 - 5 <sup>5</sup>	28 - 11 <sup>5</sup>	26 - 5 <sup>5</sup>	23 - 7 <sup>5</sup>

For SI: 1 inch = 25.4 mm; 1 lbf/ft<sup>2</sup> = 47.88 Pa; 1 foot = 305 mm.

Notes to Table 3:

<sup>1</sup>Spans listed represent the design span, which is the distance between the centers of the minimum required bearings on a uniformly loaded, simply supported beam.

<sup>2</sup>Spans are based on composite action of glued and nailed sheathing. Spans must be reduced by 12 inches (304.8 mm) where sheathing is nailed only. See Conditions of Use.

<sup>3</sup>Live load deflection is limited to L/360 and total load deflection limited to L/240.

<sup>4</sup>Minimum bearing length of 1 1/2 inches (38.1 mm) is required, unless otherwise noted.

<sup>5</sup>Minimum bearing length of 1 1/2 inches (38.1 mm) is required with web stiffeners at bearing; see Figure 3 of this report.

<sup>6</sup>Web holes must comply with Figure 1 of this report.

**TABLE 4—ALLOWABLE UNIFORM VERTICAL LOADS FOR NASCOR I-JOISTS USED AS BLOCKING (lb/ft)<sup>1,2</sup>**

JOIST TYPE					
NJ925	NJ10	NJ12	NJH925	NJH10	NJU10
2000	2000	2000	2000	2000	2000

For SI: 1 lb/ft = 14.594 N/m.

Notes to Table 4:

<sup>1</sup>Blocking must be fully supported at the bottom flange and laterally supported every 12 inches (304.8 mm) on center at the top and bottom flange.

<sup>2</sup>See Conditions of Use for additional requirements and limitations.

**TABLE 5—RECTANGULAR HOLE LOCATIONS FOR NJ SERIES I-JOISTS**

JOIST TYPE	JOIST SPAN (ft-in.)	RECTANGULAR HOLE HEIGHT (inches)										
		2	2 <sup>1</sup> / <sub>2</sub>	3	3 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>4</sub>	4	4 <sup>1</sup> / <sub>2</sub>	5	5 <sup>1</sup> / <sub>2</sub>	6	6 <sup>3</sup> / <sub>8</sub>
		Minimum Required Distance from the Inside Edge of Support to Edge of the Rectangular Hole (ft-in)										
NJ925	6-0	1-0	1-0	1-0	1-0	1-0						
	8-0	1-0	1-0	1-0	1-0	1-0						
	10-0	1-0	1-0	1-6	2-0	2-0						
	12-0	1-6	2-0	2-6	3-0	3-0						
	13-2	1-0	1-0	1-6	2-6	2-6						
	14-0	1-0	1-0	1-0	1-6	1-6						
	15-5	1-0	1-0	1-0	1-0	1-0						
NJ10	6-0	1-0	1-0	1-0	1-0	1-0	1-0					
	8-0	1-0	1-0	1-0	1-6	1-6	1-6					
	10-0	1-6	1-6	2-0	2-6	2-6	2-6					
	12-0	2-6	2-6	3-0	3-6	3-6	3-6					
	12-4	2-6	3-0	3-0	3-6	3-6	3-6					
	13-8	2-0	2-6	3-0	3-0	3-6	3-6					
	14-0	1-0	1-6	2-0	2-6	2-6	2-6					
	14-6	1-0	1-6	2-0	2-6	2-6	3-0					
NJ12	15-11	1-0	1-0	1-0	1-6	1-6	1-6					
	6-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0
	8-0	1-0	1-0	1-0	1-0	1-0	1-0	1-0	1-6	1-6	2-0	2-0
	10-0	1-0	1-0	1-0	1-6	1-6	1-6	2-0	2-6	2-6	3-0	3-0
	12-0	1-0	1-6	2-0	2-6	2-6	2-6	3-0	3-6	3-6	4-0	4-0
	13-8	2-0	2-6	2-6	3-0	3-6	3-6	4-0	4-0	4-6	5-0	5-0
	14-0	1-0	1-0	1-0	2-0	2-6	2-6	3-0	3-6	4-0	4-0	4-6
	15-3	1-0	2-0	2-6	3-0	3-0	3-6	3-6	4-0	4-6	5-0	5-0
	16-0	1-0	1-0	1-6	2-0	2-6	2-6	3-0	3-6	4-0	4-6	4-6
	16-9	1-0	1-0	2-0	2-6	3-0	3-0	3-6	4-0	4-6	5-0	5-0
	18-0	1-0	1-0	1-0	1-0	1-0	1-6	2-0	2-6	3-0	3-6	4-0
19-2	1-0	1-0	1-0	1-0	1-6	2-0	2-6	3-0	4-0	4-6	4-6	

For SI: 1 inch = 25.4 mm; 1 foot = 305 mm.

Notes to Table 5:

<sup>1</sup>Table is based on a maximum uniform floor loading of 40 lb/ft<sup>2</sup> (1.95 kPa) live and 25 lb/ft<sup>2</sup> (1.20 kPa) dead load.

<sup>2</sup>Table is based on joist spans and spacing indicated in Table 3 of this report. Other spans and spacings are outside the scope of this report.

<sup>3</sup>Joist span is based on clear span, distance from the inside face of the end supports.

<sup>4</sup>The rectangular hole location is the distance measured from the inside face of the nearest support to the edge of the rectangular hole.

<sup>5</sup>Maximum rectangular hole depth must leave 1/4-inch (6.4 mm) minimum of web material between the top and bottom of the rectangular hole and flange.

<sup>6</sup>The maximum allowable rectangular hole width (distance parallel to flange) is to be 1.5 times the rectangular hole depth.

<sup>7</sup>Where the joist span is between those specified in this table, use the adjacent joist span which has the greater required distance.

TABLE 6—ROUND HOLE LOCATIONS FOR NJ SERIES I-JOISTS

JOIST TYPE	JOIST SPAN (ft-in.)	ROUND HOLE DIAMETER (inches)										
		2	2 <sup>1</sup> / <sub>2</sub>	3	3 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>4</sub>	4	4 <sup>1</sup> / <sub>2</sub>	5	5 <sup>1</sup> / <sub>2</sub>	6	6 <sup>3</sup> / <sub>8</sub>
		Minimum Distance from the Inside Edge of Support to Center of the Round Hole (ft-in)										
NJ925	6 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0						
	8 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0						
	10 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6						
	12 - 0	1 - 0	1 - 6	2 - 0	2 - 0	2 - 6						
	13 - 2	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6						
	14 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0						
	15 - 5	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0						
NJ10	6 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0					
	8 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 0					
	10 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6	1 - 6					
	12 - 0	1 - 0	1 - 6	2 - 0	2 - 6	2 - 6	2 - 6					
	12 - 4	1 - 6	1 - 6	2 - 0	2 - 6	2 - 6	3 - 0					
	13 - 8	1 - 0	1 - 0	1 - 6	2 - 0	2 - 0	2 - 6					
	14 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6					
	14 - 6	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6					
15 - 11	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0						
NJ12	6 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0
	8 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0
	10 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 0
	12 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 0	2 - 6	3 - 0
	13 - 8	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6	1 - 6	2 - 0	2 - 6	3 - 0	3 - 6	3 - 6
	14 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 0	2 - 6
	15 - 3	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6	1 - 6	2 - 6	3 - 0	3 - 0
	16 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 0	2 - 6
	16 - 9	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 0	3 - 0
	18 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6
19 - 2	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	

For SI: 1 inch = 25.4 mm; 1 foot = 305 mm.

Notes to Table 6:

<sup>1</sup>Table is based on a maximum uniform floor loading of 40 lbf/ft<sup>2</sup> (1.95 kPa) live and 25 lbf/ft<sup>2</sup> (1.20 kPa) dead load.

<sup>2</sup>Table is based on joist spans and spacings indicated in Table 3 of this report. Other spans and spacings are outside the scope of this report.

<sup>3</sup>Joist span is based on clear span, distance from the inside face of the end supports.

<sup>4</sup>The round hole location is the distance measured from the inside face of the nearest support to the centerline of the round hole.

<sup>5</sup>Maximum round hole depth must leave 1/4-inch (6.4 mm) minimum of web material between the top and bottom of the round hole and flange.

<sup>6</sup>Where the joist span is between those specified in this table, use the adjacent joist span which has the greater required distance.

TABLE 7—RECTANGULAR HOLE LOCATIONS FOR NJH SERIES I-JOISTS

JOIST TYPE	JOIST SPAN (ft-in)	RECTANGULAR HOLE HEIGHT (inches)											
		2	3	4	5	5 <sup>3</sup> / <sub>4</sub>	6	8 <sup>3</sup> / <sub>8</sub>	9	10	10 <sup>1</sup> / <sub>2</sub>	12	12 <sup>1</sup> / <sub>2</sub>
		Minimum Distance from the Inside Edge of Support to Edge of the Rectangular Hole (ft-in)											
NJH925	10-0	1-6	2-0	3-0	3-6	3-6							
	12-0	2-6	3-0	4-0	4-6	4-6							
	12-4	2-6	3-6	4-0	4-6	5-0							
	13-9	2-0	3-0	4-0	4-6	5-0							
	14-0	1-0	2-0	3-6	4-0	4-6							
	15-1	1-6	2-6	4-0	4-6	5-0							
	16-0	1-0	1-0	2-6	3-6	4-0							
NJH10	10-0	1-0	1-6	2-6	3-0	3-6	3-6						
	12-0	2-0	2-6	3-6	4-0	4-6	4-6						
	12-7	2-0	3-0	4-0	4-6	5-0	5-0						
	14-0	1-6	2-6	3-6	4-6	5-0	5-0						
	14-1	1-6	2-6	3-6	4-6	5-0	5-0						
	15-5	1-0	2-0	3-6	4-6	5-0	5-0						
	16-0	1-0	1-0	1-6	3-6	4-0	4-0						
	17-3	1-0	1-0	2-0	4-0	5-0	5-0						
NJH12	12-0	1-0	2-0	3-0	3-6	4-0	4-0	5-0					
	14-0	2-0	3-0	4-0	4-6	5-0	5-0	6-0					
	14-11	2-0	3-6	4-0	5-0	5-6	5-6	6-6					
	16-0	1-6	2-6	3-6	4-6	5-6	5-6	6-6					
	16-8	1-6	3-0	4-0	5-0	5-6	5-6	7-0					
	18-0	1-0	2-0	3-6	4-6	5-6	5-6	7-0					
	18-3	1-0	2-6	3-6	5-0	6-0	6-0	7-6					
	20-0	1-0	1-0	2-6	4-0	5-0	5-0	7-0					
	20-6	1-0	1-0	2-6	4-0	5-6	5-6	7-6					
NJH14	12-0	1-0	1-0	1-6	2-6	3-0	3-0	4-6	5-0	5-0	5-6		
	14-0	1-0	1-6	2-6	3-6	4-0	4-0	5-6	6-0	6-0	6-6		
	16-0	1-6	2-6	3-6	4-6	5-0	5-0	6-6	7-0	7-0	7-6		
	18-0	2-6	3-6	4-6	5-6	6-0	6-0	7-6	8-0	8-0	8-6		
	18-1	2-6	3-6	4-6	6-0	6-6	6-6	7-6	8-0	8-0	8-6		
	19-9	1-0	2-6	3-6	5-0	6-0	6-0	7-6	8-0	8-6	8-6		
	20-0	1-0	1-0	2-6	3-6	5-0	5-0	7-0	7-6	8-0	8-6		
	21-0	1-0	1-6	3-0	4-0	5-6	5-6	7-6	8-0	8-6	9-0		
	22-0	1-0	1-0	1-0	2-6	4-0	4-0	6-0	7-6	8-0	8-6		
23-1	1-0	1-0	1-0	3-0	4-6	4-6	7-6	8-0	8-6	9-0			
NJH16	14-0	1-0	1-0	2-0	3-0	4-0	4-0	5-6	6-0	6-0	6-6	6-6	6-6
	16-0	1-0	1-6	3-0	4-0	5-0	5-0	6-6	7-0	7-0	7-6	7-6	7-6
	18-0	1-6	2-6	4-0	5-0	6-0	6-0	7-6	8-0	8-0	8-6	8-6	8-6
	19-9	2-6	3-6	4-6	5-6	6-6	6-6	8-6	8-6	9-0	9-0	9-6	9-6
	20-0	1-0	2-0	3-6	4-6	5-6	5-6	7-6	8-0	8-6	9-0	9-0	9-0
	21-10	1-6	3-0	4-0	5-6	6-6	6-6	8-6	9-0	9-6	9-6	10-0	10-0
	22-0	1-0	1-0	2-6	4-0	5-6	5-6	8-0	8-6	9-0	9-6	10-0	10-0
	23-2	1-0	1-6	3-6	5-0	5-0	5-0	8-6	9-0	9-6	10-0	10-6	10-6
	24-0	1-0	1-0	1-0	2-6	4-6	4-6	7-6	8-6	9-0	9-6	10-0	10-0
25-6	1-0	1-0	1-6	3-6	5-0	5-0	8-6	9-0	10-0	10-0	10-6	11-0	

For SI: 1 inch = 25.4 mm; 1 foot = 305 mm.

Notes to Table 7:

<sup>1</sup>Table is based on a maximum uniform floor loading of 40 lbf/ft<sup>2</sup> (1.95 kPa) live and 25 lbf/ft<sup>2</sup> (1.20 kPa) dead load.

<sup>2</sup>Table is based on joist spans and spacings indicated in Table 3 of this report. Other spans and spacings are outside the scope of this report.

<sup>3</sup>Joist span is based on the clear span, distance from the inside face of the end supports.

<sup>4</sup>The rectangular hole location is the distance measured from the inside face of the nearest support to the edge of the rectangular hole.

<sup>5</sup>Maximum rectangular hole depth must leave 1/4-inch (6.4 mm) of web material between the top and bottom of the rectangular hole and flange.

<sup>6</sup>The maximum rectangular hole width (distance parallel to flange) is 1.5 times the rectangular hole depth.

<sup>7</sup>Where the joist span is between those specified in this table, use the adjacent joist span which has the greater required distance.

TABLE 8—ROUND HOLE LOCATIONS FOR NJH SERIES I-JOISTS

JOIST TYPE	JOIST SPAN (ft-in)	ROUND HOLE DIAMETER (inches)											
		2	3	4	5	5 <sup>3</sup> / <sub>4</sub>	6	8 <sup>3</sup> / <sub>8</sub>	9	10	10 <sup>1</sup> / <sub>2</sub>	12	12 <sup>1</sup> / <sub>2</sub>
Minimum Distance from the Inside Edge of Support to Center of the Round Hole (ft-in)													
NJH925	10 - 0	1 - 0	1 - 6	2 - 6	2 - 6	3 - 0							
	12 - 0	2 - 0	2 - 6	3 - 6	3 - 6	4 - 0							
	12 - 4	2 - 0	3 - 0	3 - 6	4 - 0	4 - 0							
	13 - 9	1 - 6	2 - 6	3 - 0	3 - 6	4 - 0							
	14 - 0	1 - 0	1 - 6	2 - 0	3 - 0	3 - 0							
	15 - 1	1 - 0	2 - 0	2 - 6	3 - 6	3 - 6							
	16 - 0	1 - 0	1 - 0	1 - 0	2 - 0	2 - 6							
NJH10	10 - 0	1 - 0	1 - 0	1 - 6	2 - 0	2 - 6	2 - 6						
	12 - 0	1 - 0	2 - 0	2 - 6	3 - 0	3 - 6	3 - 6						
	12 - 7	1 - 6	2 - 0	3 - 0	3 - 6	4 - 0	4 - 0						
	14 - 0	1 - 0	1 - 6	2 - 6	3 - 0	4 - 0	4 - 0						
	14 - 1	1 - 0	1 - 6	2 - 6	3 - 0	4 - 0	4 - 0						
	15 - 5	1 - 0	1 - 0	2 - 0	2 - 6	3 - 6	3 - 6						
	16 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6						
NJH12	12 - 0	1 - 0	1 - 0	1 - 6	2 - 6	3 - 0	3 - 0	4 - 0					
	14 - 0	1 - 6	2 - 0	2 - 6	3 - 6	4 - 0	4 - 0	5 - 0					
	14 - 11	1 - 6	2 - 6	3 - 0	4 - 0	4 - 6	4 - 6	5 - 6					
	16 - 0	1 - 0	1 - 6	2 - 6	3 - 0	4 - 0	4 - 0	5 - 0					
	16 - 8	1 - 0	2 - 0	2 - 6	3 - 6	4 - 0	4 - 0	5 - 6					
	18 - 0	1 - 0	1 - 0	2 - 0	3 - 0	3 - 6	3 - 6	5 - 0					
	18 - 3	1 - 0	1 - 0	2 - 0	3 - 0	4 - 0	4 - 0	5 - 0					
	20 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 6	2 - 6	4 - 6					
NJH14	12 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	3 - 0	3 - 6	4 - 6	5 - 0		
	14 - 0	1 - 0	1 - 0	1 - 0	1 - 0	2 - 0	2 - 0	4 - 0	4 - 6	5 - 6	6 - 0		
	16 - 0	1 - 0	1 - 0	1 - 6	2 - 0	3 - 0	3 - 0	5 - 0	5 - 6	6 - 6	7 - 0		
	18 - 0	1 - 0	1 - 6	2 - 6	3 - 0	4 - 0	4 - 0	6 - 0	6 - 6	7 - 6	8 - 0		
	18 - 1	1 - 0	1 - 6	2 - 6	3 - 0	4 - 0	4 - 0	6 - 0	6 - 6	7 - 6	8 - 0		
	19 - 9	1 - 0	1 - 0	1 - 0	2 - 0	3 - 0	3 - 0	5 - 6	6 - 6	7 - 6	8 - 0		
	20 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6	4 - 6	5 - 6	7 - 0	7 - 6		
	21 - 0	1 - 0	1 - 0	1 - 0	1 - 0	2 - 0	2 - 0	5 - 0	6 - 0	7 - 6	8 - 0		
	22 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	3 - 0	4 - 6	6 - 0	7 - 0		
23 - 1	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	3 - 6	5 - 6	6 - 6	7 - 6			
NJH16	14 - 0	1 - 0	1 - 0	1 - 0	1 - 6	2 - 0	2 - 0	3 - 6	4 - 0	4 - 6	5 - 0	5 - 6	5 - 6
	16 - 0	1 - 0	1 - 0	1 - 6	2 - 6	3 - 0	3 - 0	4 - 6	5 - 0	5 - 6	6 - 0	6 - 6	6 - 6
	18 - 0	1 - 0	1 - 6	2 - 6	3 - 6	4 - 0	4 - 0	5 - 6	6 - 0	6 - 6	7 - 0	7 - 6	7 - 6
	19 - 9	1 - 6	2 - 6	3 - 6	4 - 0	5 - 0	5 - 0	6 - 6	7 - 0	7 - 6	7 - 6	8 - 6	8 - 6
	20 - 0	1 - 0	1 - 0	1 - 6	2 - 6	3 - 6	3 - 6	5 - 6	6 - 0	6 - 6	7 - 0	7 - 6	8 - 0
	21 - 10	1 - 0	1 - 6	2 - 6	3 - 6	4 - 6	4 - 6	6 - 6	7 - 0	7 - 6	8 - 0	8 - 6	9 - 0
	22 - 0	1 - 0	1 - 0	1 - 0	1 - 6	3 - 0	3 - 0	5 - 6	6 - 0	6 - 6	7 - 0	8 - 0	8 - 0
	23 - 2	1 - 0	1 - 0	1 - 0	2 - 6	3 - 6	3 - 6	6 - 0	6 - 6	7 - 0	7 - 6	8 - 6	9 - 0
	24 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	1 - 0	4 - 0	4 - 6	5 - 6	6 - 0	7 - 6	7 - 6
25 - 6	1 - 0	1 - 0	1 - 0	1 - 0	1 - 6	1 - 6	4 - 6	5 - 6	6 - 6	7 - 0	8 - 6	8 - 6	

For SI: 1 inch = 25.4 mm; 1 foot = 305 mm.

Notes to Table 8:

<sup>1</sup>Table is based on a maximum uniform floor loading of 40 lbf/ft<sup>2</sup> (1.95 kPa) live and 25 lbf/ft<sup>2</sup> (1.20 kPa) dead load.

<sup>2</sup>Table is based on joist spans and spacings indicated in Table 3 of this report. Other spans and spacings are outside the scope of this report.

<sup>3</sup>Joist span is based on the clear span, distance from the inside face of the end supports.

<sup>4</sup>The round hole location is the distance measured from the inside face of the nearest support to the centerline of the round hole.

<sup>5</sup>The maximum round hole depth must leave 1/4-inch (6.4 mm) minimum of web material between the top and bottom of round hole and flange.

<sup>6</sup>Where the joist span is between those specified in this table, use the adjacent joist span which has the greater required distance.

TABLE 9—RECTANGULAR HOLE LOCATIONS FOR NJU SERIES I-JOISTS

JOIST TYPE	JOIST SPAN (ft-in)	RECTANGULAR HOLE DIAMETER (inches)											
		2	4	5	6	7	8 <sup>3</sup> / <sub>8</sub>	10	10 <sup>1</sup> / <sub>2</sub>	12	12 <sup>1</sup> / <sub>2</sub>	13	14 <sup>1</sup> / <sub>2</sub>
		Minimum Required Distance from the Inside Edge of Support to Edge of the Rectangular Hole (ft-in)											
NJU10	14-0	3-0	4-6	5-0	5-6								
	14-1	3-0	4-6	5-0	5-6								
	15-9	2-6	4-6	5-6	6-0								
	16-0	1-0	3-6	4-6	5-6								
	17-3	1-6	4-6	5-6	6-0								
	18-0	1-0	3-0	4-0	5-0								
	20-0	1-0	4-0	5-0	6-0								
NJU12	16-0	3-0	5-0	5-6	6-6	6-6	7-6						
	16-7	3-0	5-0	6-0	6-6	7-0	7-6						
	18-0	2-6	4-6	5-6	6-6	7-0	7-6						
	18-7	2-6	5-0	6-0	6-6	7-6	8-0						
	20-0	1-6	4-6	6-0	6-6	7-6	8-0						
	20-4	2-0	4-6	6-0	7-0	7-6	8-6						
	22-0	1-0	3-6	5-0	6-6	7-0	8-0						
23-6	1-0	4-0	5-6	7-0	8-0	9-0							
NJU14	16-0	1-6	3-6	4-6	5-0	5-6	6-6	7-0	7-6				
	18-0	2-6	4-6	5-6	6-0	6-6	7-6	8-0	8-6				
	19-2	3-0	5-0	6-0	6-6	7-6	8-0	8-6	9-0				
	20-0	1-6	4-0	5-0	6-0	7-0	8-0	8-6	9-0				
	21-5	2-0	5-0	5-6	6-6	7-6	8-6	9-6	9-6				
	22-0	1-0	3-6	5-0	6-0	7-0	8-0	9-0	9-6				
	23-6	1-0	4-0	5-6	6-6	7-6	9-0	10-0	10-0				
	24-0	1-0	1-6	3-6	5-0	6-6	7-6	9-0	9-6				
	26-0	1-0	2-6	4-6	6-0	7-6	8-6	10-0	10-6				
27-1	1-0	3-0	5-0	6-6	8-0	9-6	10-6	11-0					
NJU16	18-0	1-6	4-0	5-0	6-0	6-6	7-6	8-0	8-6	8-6	8-6		
	20-0	2-6	5-0	6-0	7-0	7-6	8-6	9-0	9-6	9-6	9-6		
	21-3	3-0	5-6	6-6	7-6	8-0	9-0	9-6	10-0	10-6	10-6		
	22-0	1-6	4-6	5-6	6-6	7-6	8-6	9-6	10-0	10-0	10-6		
	23-9	2-0	5-0	6-6	7-6	8-6	10-0	10-6	10-6	11-0	11-0		
	24-0	1-0	3-6	5-6	6-6	8-0	9-0	10-0	10-6	11-0	11-0		
	26-0	1-0	4-6	6-6	7-6	9-0	10-0	11-0	11-6	12-0	12-0		
	26-1	1-0	5-0	6-6	7-6	9-0	10-0	11-0	11-6	12-0	12-0		
	28-0	1-0	2-6	4-6	6-6	8-0	9-6	11-0	11-6	12-0	12-0		
	30-0	1-0	3-6	5-6	7-6	9-0	10-6	12-0	12-6	13-0	13-0		
NJU18	20-0	1-6	3-6	4-6	5-6	6-0	7-0	8-0	8-0	8-6	8-6	9-0	9-0
	22-0	2-6	4-6	5-6	6-6	7-0	8-0	9-0	9-0	9-6	9-6	9-6	10-0
	23-6	3-0	5-6	6-0	7-0	7-6	8-6	9-6	9-6	10-0	10-6	10-6	10-6
	24-0	1-0	3-6	4-6	6-0	6-6	8-0	9-0	9-0	10-0	10-0	10-0	10-6
	26-0	2-0	4-6	5-6	7-0	7-6	9-0	10-0	10-0	11-0	11-0	11-0	11-6
	26-3	2-0	4-6	6-0	7-0	8-0	9-0	10-0	10-6	11-0	11-0	11-6	11-6
	28-0	1-0	3-6	5-0	6-6	7-6	9-0	10-0	10-6	11-0	11-6	11-6	12-0
	28-9	1-0	4-0	5-6	6-6	8-0	9-0	10-6	11-0	11-6	11-6	12-0	12-0
30-0	1-0	1-0	2-6	4-6	6-0	7-6	9-6	10-0	11-0	11-0	11-6	11-6	

For SI: 1 inch = 25.4 mm; 1 foot = 305 mm.

Notes to Table 9:

- <sup>1</sup>Table is based on a maximum uniform floor loading of 40 lbf/ft<sup>2</sup> (1.95 kPa) live and 25 lbf/ft<sup>2</sup>(1.20 kPa) dead load.
- <sup>2</sup>Table is based on joist spans and spacings indicated in Table 3 of this report. Other spans and spacings are outside the scope of this report.
- <sup>3</sup>Joist span is based on the clear span, distance from the inside face of the end supports.
- <sup>4</sup>The rectangular hole location is the distance measured from the inside face of the nearest support to the edge of the rectangular hole.
- <sup>5</sup>Maximum rectangular hole depth must leave 1/4-inch (6.4 mm) of web material between the top and bottom of the rectangular hole and flange.
- <sup>6</sup>The maximum rectangular hole width (distance parallel to flange) is 1.5 times the rectangular hole depth.
- <sup>7</sup>Where the joist span is between those specified in this table, use the adjacent joist span which has the greater required distance.

TABLE 10—ROUND HOLE LOCATIONS FOR NJU SERIES I-JOISTS

JOIST TYPE	JOIST SPAN (ft-in)	ROUND HOLE DIAMETER (inches)											
		2	4	5	6	7	8 <sup>3</sup> / <sub>8</sub>	10	10 <sup>1</sup> / <sub>2</sub>	12	12 <sup>1</sup> / <sub>2</sub>	13	14 <sup>1</sup> / <sub>2</sub>
		Minimum Required Distance from the Inside Edge of Support to Center of Hole (ft-in)											
NJU10	14-0	2-0	3-6	4-0	4-6								
	14-1	2-0	3-6	4-0	5-0								
	15-9	1-6	3-0	4-0	4-6								
	16-0	1-0	2-0	3-0	4-0								
	17-3	1-0	2-6	3-6	4-6								
	18-0	1-0	1-0	2-0	3-0								
	20-0	1-0	1-6	3-0	4-0								
NJU12	16-0	2-6	3-6	4-6	5-0	5-6	6-0						
	16-7	2-6	4-0	4-6	5-6	6-0	6-0						
	18-0	1-6	3-6	4-0	5-0	5-6	6-0						
	18-7	2-0	3-6	4-6	5-0	5-6	6-0						
	20-0	1-0	3-0	4-0	4-6	5-6	6-0						
	20-4	1-0	3-0	4-0	5-0	5-6	6-6						
	22-0	1-0	1-0	2-6	3-6	4-6	5-6						
NJU14	23-6	1-0	2-0	3-0	4-0	5-0	6-0						
	16-0	1-0	1-6	2-0	3-0	3-6	5-0	6-6	7-0				
	18-0	1-0	2-6	3-0	4-0	4-6	6-0	7-6	8-0				
	19-2	1-6	3-0	3-6	4-6	5-6	6-6	8-0	8-6				
	20-0	1-0	1-6	2-6	3-0	4-0	5-6	7-6	8-6				
	21-5	1-0	2-0	3-0	4-0	5-0	6-6	8-6	9-0				
	22-0	1-0	1-0	1-6	2-6	3-6	5-6	8-0	8-6				
	23-6	1-0	1-0	2-0	3-6	4-6	6-6	8-6	9-6				
	24-0	1-0	1-0	1-0	1-0	2-0	4-0	7-0	8-0				
NJU16	26-0	1-0	1-0	1-0	1-6	3-0	5-0	8-0	9-0				
	27-1	1-0	1-0	1-0	1-6	3-6	5-6	8-6	9-6				
	18-0	1-0	2-6	3-6	4-0	4-6	5-6	6-6	7-0	7-6	7-6		
	20-0	1-6	3-6	4-6	5-0	6-0	6-6	7-6	8-0	8-6	8-6		
	21-3	2-6	4-0	5-0	5-6	6-6	7-6	8-6	8-6	9-0	9-6		
	22-0	1-0	2-6	3-6	4-6	5-6	6-6	7-6	8-0	8-6	9-0		
	23-9	1-0	3-6	4-6	5-6	6-6	7-6	8-6	9-0	9-6	10-0		
	24-0	1-0	1-6	2-6	4-0	5-0	6-6	7-6	8-0	9-0	9-6		
	26-0	1-0	2-6	3-6	5-0	6-0	7-6	8-6	9-0	10-0	10-6		
NJU18	26-1	1-0	2-6	3-6	5-0	6-0	7-6	8-6	9-0	10-0	10-6		
	28-0	1-0	1-0	1-0	3-0	4-0	6-0	7-6	8-0	9-6	10-0		
	30-0	1-0	1-0	2-0	4-0	5-0	7-0	8-6	9-0	10-6	11-0		
	20-0	1-0	1-0	1-6	2-0	2-6	3-6	4-6	5-0	6-0	6-6	7-0	8-0
	22-0	1-0	2-0	2-6	3-0	3-6	4-6	5-6	6-0	7-0	7-6	8-0	9-0
	23-6	1-6	2-6	3-0	3-6	4-6	5-0	6-6	6-6	8-0	8-6	8-6	10-0
	24-0	1-0	1-0	1-0	1-6	2-6	3-6	5-0	5-6	7-0	7-6	8-0	9-6
	26-0	1-0	1-0	2-0	2-6	3-6	4-6	6-0	6-6	7-6	8-6	9-0	10-6
	26-3	1-0	1-0	2-0	2-6	3-6	4-6	6-0	6-6	8-0	8-6	9-0	10-6
28-0	1-0	1-0	1-0	1-0	2-0	3-6	5-0	5-6	7-6	8-0	8-6	10-6	
28-9	1-0	1-0	1-0	1-6	2-6	4-0	5-6	6-0	7-6	8-6	9-0	11-0	
30-0	1-0	1-0	1-0	1-0	1-0	1-0	2-6	3-6	5-6	6-6	7-0	9-6	

For SI: 1 inch = 25.4 mm; 1 foot = 305 mm.

Notes to Table 10:

<sup>1</sup>Table is based on a maximum uniform floor loading of 40 lbf/ft<sup>2</sup> (1.95 kPa) live and 25 lbf/ft<sup>2</sup> (1.20 kPa) dead load.

<sup>2</sup>Table is based on joist spans and spacings indicated in Tables 4 or 5 of this report. Other spans and spacings are outside the scope of this report.

<sup>3</sup>Joist span is based on the clear span, distance from the inside face of the end supports.

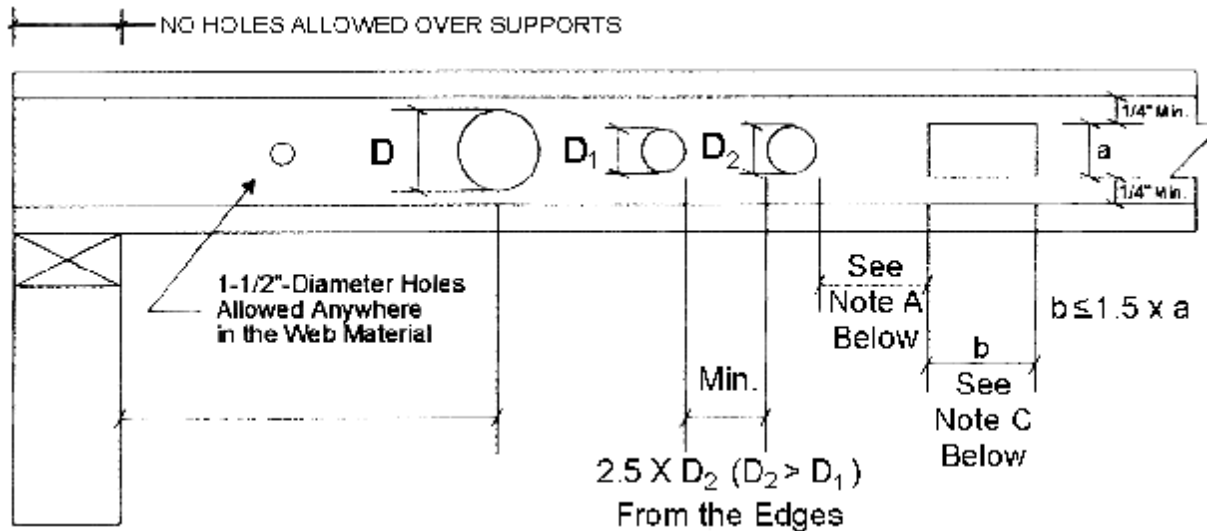
<sup>4</sup>The round hole location is the distance measured from the inside face of the nearest support to the centerline of the round hole.

<sup>5</sup>The maximum round hole depth must leave <sup>1</sup>/<sub>4</sub>-inch (6.4 mm) minimum of web material between the top and bottom of the round hole and flange.

<sup>6</sup>Where the joist span is between those specified in this table, use the adjacent joist span which has the greater required distance.

TABLE 11—MANUFACTURER'S PRODUCT LIST

MANUFACTURING PLANT	PRODUCT	PLANT NUMBER
Nascor Ltd.	NJ10, NJ12, NJH10, NJH12, NJH14, NJH16, NJU10, NJU12, NJU14, NJU16, & NJU18	0190-1212
Acujoist	NJ10, NJ12, NJH10, NJH12, NJH14, & NJH16	0598-7455
All-Fab Building Components Inc.	NJ10, NJ12, NJH10, NJH12, NJH14, & NJH16	0393-1890
G.E. Fabricators, Inc.	NJ925, NJ10, NJ12, NJH925, NJH10, NJH12, NJH14, & NJH16	0694-2690
Nascor by KOTT	NJ10, NJ12, NJH10, NJH12, NJH14, & NJH16	0897-4220
Nascor by KOTT	NJ10, NJ12, NJH10, NJH12, NJH14 & NJH16	0292-4320
Southern Truss Inc.	NJ10, NJH10, NJH12, NJH14 & NJH16	1195-5510



Notes on Hole Chart:

A. MULTIPLE HOLES

- The spacing required between the edges of round holes must be a minimum of 2.5 times the diameter of the largest round hole.
- The spacing required between the edges of rectangular holes must be a minimum of 5 times the width (distance parallel to flange) of the largest rectangular hole.
- The spacing required between the edges of a round hole and a rectangular hole must be 5 times the width of the largest rectangular hole or 5 times the diameter of the round hole, whichever is greater.

B. ROUND HOLES (Refer to Tables 5 - 10 for locations and spans)

- A 1 1/2-inch-diameter (38 mm) hole is permitted anywhere in the web except over a support.
- Holes must leave a minimum of 1/4-inch (6.4 mm) of uncut web above and below the hole.

C. RECTANGULAR HOLES (Refer to Tables 5 - 10 for locations and spans)

- The holes must be centered vertically in the web.
- Cutting a radius on the corners of a rectangular hole is recommended. Corners must not be over-cut.
- The maximum allowable hole width (distance parallel to the flanges) must be 1.5 times the hole depth.

D. GENERAL

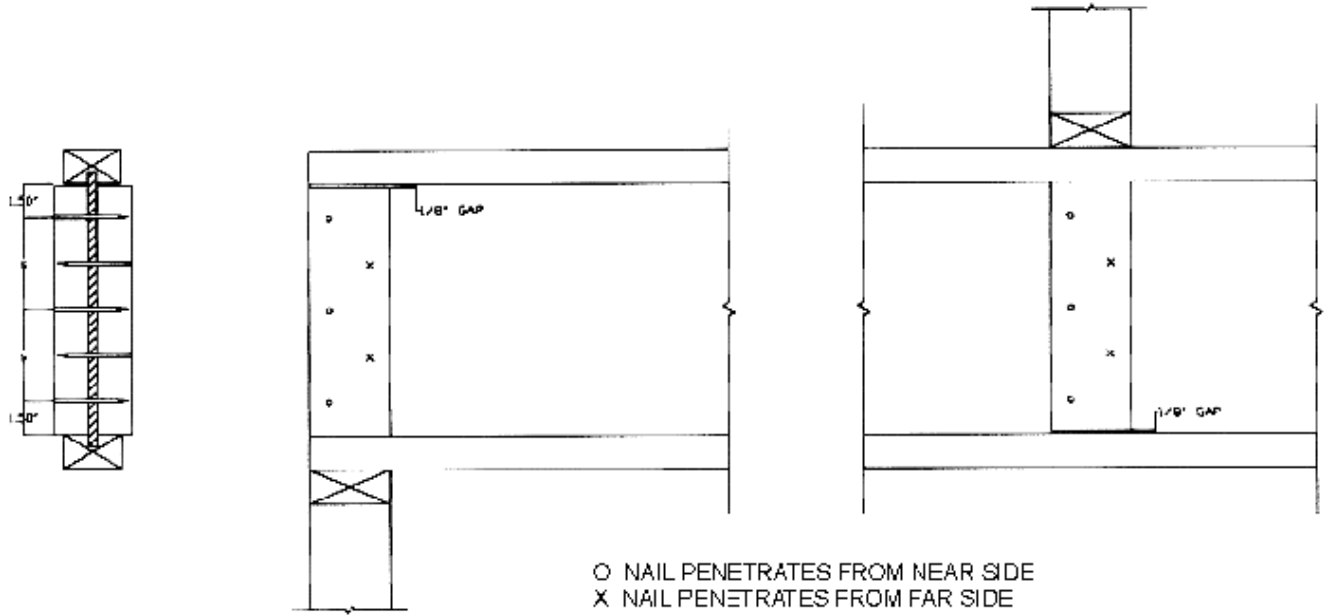
- Holes are not allowed over a support.
- Flanges must not be cut or notched.
- A minimum distance of 1/4-inch (6 mm) is required between the edge of the hole and the flange.
- Valid for simply supported spans where uniform distributed loads do not exceed 40 lbf/ft<sup>2</sup> (1915 Pa) live and 25 lbf/ft<sup>2</sup> (1197 Pa) dead.
- Multiple maximum size holes may not be possible for some joist types. Check required edge distance and the required spacing between holes.

FIGURE 1—ALLOWABLE HOLE SIZE AND LOCATION FOR NASCOR JOISTS

JOIST CROSS SECTION

END/INTERIOR SUPPORT DETAIL

CONCENTRATED LOAD DETAIL



JOIST DEPTH (inches)	STIFFENER DEPTH (inches)	NAIL SPACING (inches)
9 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>8</sub>
9 <sup>1</sup> / <sub>2</sub>	6 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>
11 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	2 <sup>15</sup> / <sub>16</sub>
14	10 <sup>7</sup> / <sub>8</sub>	5
16	12 <sup>7</sup> / <sub>8</sub>	5
18	14 <sup>7</sup> / <sub>8</sub>	4

For SI: 1 inch = 25.4 mm.

Notes to Figure 2:

<sup>1</sup>Web stiffener material must be 2 × 4 SPF or 3/4-inch OSB/plywood.

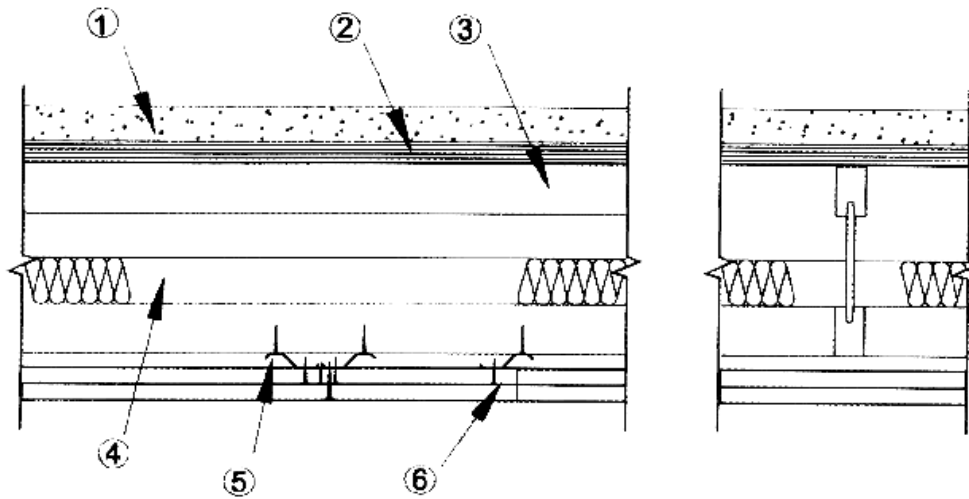
<sup>2</sup>Web stiffeners must be fastened using 3 1/4-inch × 0.148-inch-diameter common wire nails.

<sup>3</sup>For maximum bearing reaction refer to Table 2 of this report.

<sup>4</sup>All web stiffeners are field installed.

<sup>5</sup>Allowable bearing stress of the supporting member must be checked.

FIGURE 2—WEB STIFFENERS DETAIL FOR NASCOR JOISTS



**STC RATING WITHOUT TOPPING—50  
IIC RATING WITHOUT TOPPING OR CONCRETE—45**

- 1. Topping (Optional):** Lightweight concrete must have a maximum density of 110 lb/ft<sup>3</sup> (1762/m<sup>3</sup>) with a minimum compressive strength of 3,000 lbf/in<sup>2</sup> (20.7 Mpa). Minimum thickness must be 1½ inches (38 mm) where joists are spaced at a maximum of 20 inches (508 mm) on center and 1-inch (25.4 mm) where joist are spaced between 20 and 24 inches (508 and 610 mm) on center. The lightweight concrete topping is permitted to be augmented with a lightweight floor topping mix containing perlite or vermiculite aggregate.
- 2. Sub flooring:** A single layer consisting of a minimum 5⁄8-inch (15.9 mm) tongue-and-groove Rated Sheathing or Rated Sturd-I-Floor. The sheathing must be plywood (Exposure 1 or exterior glue) or orientated strand board conforming to one of the following:

Douglas fir plywood-PS-1-83 Group 1 Structural  
Softwood plywood-PS-1-83 Group III C-D  
Orientated strand board-PS-2-92

The panels must have a 48-inch (1219 mm) width, with the long dimension installed perpendicular to the joists. End joints must be staggered a minimum of 24 inches (610 mm) and must fall on the joists. The sheathing must be fastened to the joists in accordance with this report or the applicable code. Construction adhesive complying with ASTM D 3498 must be applied between the sub flooring and the joists.

- 3. Structural Members:** Nascor Joists having a minimum depth of 9½ inches (241 mm) installed at 24 inches (610 mm) on center maximum.
- 4. Insulation (Optional):** Insulation must be minimum 3½-inch-thick, maximum 6-inch-thick (89-152 mm) glass-fiber insulation batts having a density of 0.75 lb/ft<sup>3</sup> (12.0 kg/m<sup>3</sup>). The insulation must be located above the bottom joist flanges with butt joints falling on the resilient channels.
- 5. Resilient Channels:** Nominal ½-inch (12.7 mm) offset, 24 gauge galvanized steel channels installed perpendicular to joists and spaced 16 inches (406 mm) on center maximum. Additional channels are required at gypsum board end joints of both layers of gypsum wallboard such that each board end rests on its own channel. These additional channels must extend to the next joist on each side of the board edges. The resilient channels are attached to the bottom flange perpendicular to the joists with 1¼-inch-long (32 mm) Type S screws at each joist.
- 6. Gypsum Wallboard:** Two layers of ½-inch-thick (12.7 mm) Type X gypsum wallboard, installed perpendicular to the furring channels. Base layer gypsum wallboard end joints must be staggered 48 inches (620 mm). The base layer is attached to the channels with 1¼-inch-long (32 mm) Type S screws spaced at 8 inches (203 mm) on center. The screws must be located 1½ inches (38 mm) from the board edges. The face layer end and edge joints must be staggered a minimum of 24 inches (610 mm) from those of the base layer. The face layer is attached through the base layer to the channels with 1⅝-inch-long (41 mm) Type S screws spaced at 8 inches (203 mm) on center. The screws must be located 1½ inches (38 mm) from the board edges. Face layer joints must be taped and finished with two coats of joint compound. The screw heads must be covered with two coats of joint compound.

**FIGURE 3—ONE-HOUR FIRE-RESISTANCE-RATING AND SOUND RATING ASSEMBLY**

Web Stamps




The **NASCOR JOISTS**

**Strong Quiet**

Type™

Chord Stamps



1297-1218 NJ10 ICC ESR-xxxx 01/22/04

{(NASCOR logo)(Warnock Hersey)(Plant Location)(Joist Type)(Evaluation Report No.)(Production Code(shift))}

**FIGURE 4—SAMPLES OF TYPICAL PRODUCTION LABELS**