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**DIVISION: 06—WOOD AND PLASTICS**  
**Section: 06170—Prefabricated Structural Wood**

**REPORT HOLDER:**

**NORDIC ENGINEERED WOOD**  
185 DORVAL AVENUE, SUITE 304  
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**EVALUATION SUBJECT:**

**NI, ATI, AND BF SERIES PREFABRICATED WOOD I-JOISTS**

**ADDITIONAL LISTEES:**

**J.M. HUBER CORPORATION**  
ONE RESOURCE SQUARE  
10925 DAVID TAYLOR DRIVE, SUITE 300  
CHARLOTTE, NORTH CAROLINA 28262  
(704) 548-5442

**BUILDERS FIRST SOURCE**  
6870 MIMMS DRIVE  
ATLANTA, GEORGIA 30340  
(770) 613-0002

**1.0 EVALUATION SCOPE**

**Compliance with the following codes:**

- 2003 *International Building Code*® (IBC)
- 2003 *International Residential Code*® (IRC)

**Properties evaluated:**

- Structural
- Fire-resistance rating

**2.0 USES**

NI, ATI, and BF-1 Series Prefabricated Wood I-Joists are used as rafters and floor joists.

**3.0 DESCRIPTION**

**3.1 General:**

The prefabricated NI series prefabricated wood I-joists described in this report have solid-sawn wood flanges and oriented strand board (OSB) webs. The top and bottom flanges are parallel, creating a constant-depth I-joist. The web-to-web connection of adjacent OSB panels is jointed and

glued to form a continuous web. The web-to-flange connection is a proprietary, glued, tongue-and-groove joint. Joist depths vary from 9<sup>1</sup>/<sub>4</sub> inches to 24 inches (235 mm to 610 mm). See Tables 1, 2, 3 and 4 for I-joist descriptions and design properties.

Nordic Engineered Wood also provides a private-label prefabricated wood I-joist for J.M. Huber Corp. (ATI series) and for Builders First Source (BF-1 series). With the exception of the labeling, the ATI and BF-1 series are identical to the corresponding NI series noted in Table 1.

**3.2 Materials:**

**3.2.1 Flanges:** Flange material is spruce-pine-fir (SPF), machine-stress-rated (MSR), finger-joined lumber.

**3.2.2 Webs:** Webs are <sup>3</sup>/<sub>8</sub>-inch-thick (9.5 mm) or <sup>7</sup>/<sub>16</sub>-inch-thick (11.1 mm) OSB panels conforming with Structural I, Exposure 1, performance-rated panel requirements as noted in DOC Voluntary Product Standard PS2 and the approved manufacturer's quality control manual.

**3.2.3 Adhesive:** Exterior-type adhesives used in I-joist fabrication comply with ASTM D 2559.

**4.0 DESIGN AND INSTALLATION**

**4.1 General:**

Drawings and/or specifications for the erection of the Nordic NI, ATI, and BF-1 series I-joists shall be submitted to the code official. These documents and this report shall be strictly adhered to, and copies of these documents shall be available at all times on the jobsite during installation.

**4.2 Design Properties:**

Design properties for the Nordic NI, ATI, and BF-1 series I-joists are noted in Tables 2, 3 and 4. Duration of load adjustments to the tabulated values for allowable shear and moment are applicable in accordance with the *National Design Specification for Wood Construction* (NDS).

When joists are used as simple span members, the design shear to be resisted shall be taken as equal to the calculated end reaction for the joists. When joists are used as uniformly loaded multiple span members, continuous over one or more interior supports, or in applications involving cantilevers, the design shear shall be taken as the maximum shear at the face of the supports, using standard engineering and loading principles.

Midspan deflections for a uniformly loaded simple span condition or a simple span condition with a concentrated load at midspan shall be calculated using the equations given in the notes to Tables 2 and 3.

**4.3 Web Hole Size and Location:**

Nordic NI, ATI, and BF-1 series I-joists provide 1<sup>1</sup>/<sub>2</sub>-inch-diameter (38 mm) knockout holes at 15 inches (381 mm) on

center along the length of the joists to facilitate the installation of electrical wiring or light plumbing lines. These knockouts can be removed with a hammer as needed.

If the size of the knockout holes is insufficient for the specific end-use application, larger holes may be field-cut in the web in accordance with the limitations set forth in Figure 1 and Table 5. These provisions apply to uniformly loaded, simple span Nordic NI, ATI, and BF-1 series I-joists when dead loads do not exceed 10 psf (0.5 kN/m<sup>2</sup>) and live loads do not exceed 40 psf (1.9 kN/m<sup>2</sup>).

#### 4.4 I-Joist Flanges:

Flanges shall not be cut.

#### 4.5 Bearing Stiffeners:

Field-installed bearing stiffeners shall be provided at points of end bearing when reactions exceed those permitted by Tables 2 and 3 for unstiffened webs. Such stiffeners shall be installed, when required, and shall be of the type shown in Figure 2.

Bearing stiffeners shall be provided at interior supports when required by Table 4. Such stiffeners shall be installed, when required, and shall be of the type shown in Figure 2.

#### 4.6 Web Stiffeners:

Field-installed web stiffeners are required at points of concentrated loads when required by Figure 2. Such stiffeners, when required, shall be of the type shown in Figure 2, and shall be installed in accordance with Figure 2.

#### 4.7 Bearing Sizes:

Ends of joists shall be provided with a minimum of 1<sup>3</sup>/<sub>4</sub> inches (45 mm) of bearing length.

Interior supports shall be provided with a minimum of 3<sup>1</sup>/<sub>2</sub> inches (89 mm) of bearing length.

#### 4.8 Blocking Panels:

The Nordic NI Proprietary series I-joists shall be restrained against lateral movement and rotation at their supports. This may be accomplished by using blocking panels or rim joists at the ends of the joists. The band joist, no matter what its composition, shall be placed under the load from above so that it transmits such load to the foundation or supporting structure below.

#### 4.9 Bracing:

Wood panel sheathing complying with the requirements of the code shall be nailed or glue-nailed to the top flange of the

Nordic NI Proprietary series I-joists to prevent lateral movement in service. Additionally, the top flange shall be braced to prevent toppling of the beam or buckling of the top flange during construction.

#### 4.10 One-hour Rated Floor-ceiling or Roof-ceiling Fire-resistant Assemblies:

A floor-ceiling or roof-ceiling assembly constructed with the prefabricated wood I-joists described in this report shall be considered to have a one-hour fire-resistance rating, when constructed in accordance with Figure 3 of this report [IBC Table 720.1(3), Item Number 23-1.1].

### 5.0 CONDITIONS OF USE

The NI Series Prefabricated Wood 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 For applications based on Tables 1 through 5, design calculations and details for specific applications shall be furnished to the code official. Calculations and drawings shall be prepared, signed and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.2 No cutting of the flanges shall be permitted, and holes in the webs shall conform to the requirements given in Figure 1.
- 5.3 I-joists are permitted in dry-use service conditions only.
- 5.4 I-joists are manufactured at the Chantiers Chibougamau Ltd. facility in Chibougamau, Quebec, Canada, with quality control inspections by APA—The Engineered Wood Association (AA-649).

### 6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Prefabricated Wood I-joists (AC14), dated June 2004.

### 7.0 IDENTIFICATION

Each I-joist shall be marked with the product trade name or trademark; the joist series; the production date; the evaluation report number (ESR-1742); the name or trademark of the inspection agency (APA EWS); the name of the manufacturer (Nordic Engineered Wood, J.M. Huber Corp., or Builders First Source); and the manufacturer's plant location or number.

TABLE 1— NI SERIES PREFABRICATED WOOD I-JOISTS

SERIES	DEPTH (inches)	FLANGE MATERIAL	FLANGE DIMENSIONS (inches)	WEB
NI-20	9 <sup>1</sup> / <sub>4</sub> - 11 <sup>7</sup> / <sub>8</sub>	Enhanced <sup>3</sup> MSR 1650f-1.5E	2.0 × 1.5	3 <sup>1</sup> / <sub>8</sub> " OSB
NI-40	9 <sup>1</sup> / <sub>2</sub> - 16	MSR 1650f-1.5E	2.5 × 1.5	3 <sup>1</sup> / <sub>8</sub> " OSB
NI-40x ATI-64 <sup>1</sup> BF-140x <sup>2</sup>	9 <sup>1</sup> / <sub>4</sub> - 16	Enhanced <sup>3</sup> MSR 1650f-1.7E	2.5 × 1.5	3 <sup>1</sup> / <sub>8</sub> " OSB
NI-60 BF-160 <sup>2</sup>	9 <sup>1</sup> / <sub>2</sub> - 18	MSR 2100f-1.8E	2.5 × 1.5	3 <sup>1</sup> / <sub>8</sub> " OSB
NI-80 ATI-89 <sup>1</sup> BF-180 <sup>2</sup>	9 <sup>1</sup> / <sub>4</sub> - 16	MSR 2100f-1.8E	3.5 × 1.5	3 <sup>1</sup> / <sub>8</sub> " OSB
NI-80x	18 - 24	MSR 2100f-1.8E	3.5 × 1.5	7 <sup>1</sup> / <sub>16</sub> " OSB

For SI: 1 inch = 25.4 mm.

<sup>1</sup>Private-label product name for J.M. Huber Corporation.

<sup>2</sup>Private-label product name for Builders First Source.

<sup>3</sup>"Enhanced" flange material refers to a proprietary grade conforming to additional grading rules specified in the approved quality control manual.

TABLE 2—DESIGN PROPERTIES FOR NORDIC I-JOISTS<sup>1,2</sup>

DEPTH (inches)	JOIST SERIES	EI <sup>3</sup> (10 <sup>6</sup> lb-in <sup>2</sup> )	M <sup>4</sup> (lb-ft)	V <sup>5</sup> (lb)	IR <sup>6</sup> (lb)	ER <sup>7</sup> (lb)	K <sup>8</sup> (10 <sup>6</sup> lb)
9 <sup>1</sup> / <sub>4</sub>	NI-20	138	2510	1080	1700	900	4.81
	NI-40x	198	2810	1170	2240	1120	4.81
	NI-80	304	5215	1170	2240	1120	4.81
9 <sup>1</sup> / <sub>2</sub>	NI-20	145	2590	1120	1700	900	4.94
	NI-40	193	2735	1120	2160	1080	4.94
	NI-40x	218	2900	1200	2240	1120	4.94
	NI-60	231	3810	1200	2240	1120	4.94
	NI-80	324	5385	1200	2380	1190	4.94
11 <sup>1</sup> / <sub>4</sub>	NI-20	222	3155	1340	1800	900	5.85
	NI-40x	313	3535	1410	2750	1250	5.85
	NI-80	484	6560	1410	2750	1330	5.85
11 <sup>7</sup> / <sub>8</sub>	NI-20	253	3355	1420	1800	900	6.18
	NI-40	330	3545	1420	2500	1200	6.18
	NI-40x	371	3760	1480	2750	1250	6.18
	NI-60	396	4935	1480	2750	1250	6.18
	NI-80	547	6980	1480	2900	1330	6.18
14	NI-40	482	4270	1710	2500	1200	7.28
	NI-40x	540	4530	1730	2750	1250	7.28
	NI-60	584	5945	1730	2750	1250	7.28
	NI-80	802	8405	1730	3310	1330	7.28
16	NI-40	657	4950	1970	2500	1200	8.32
	NI-40x	734	5250	1970	2750	1250	8.32
	NI-60	799	6895	1970	2750	1250	8.32
	NI-80	1092	9745	1970	3310	1330	8.32

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

<sup>1</sup>The tabulated values are design values for normal duration of load. All values, except EI and K, may be adjusted for other durations of load in accordance with the applicable code.

<sup>2</sup>The vertical (bearing) load capacity (V) is 2000 lb/ft for I-joist depths up to 16 inches without bearing stiffeners.

<sup>3</sup>Bending stiffness (EI) of the I-joist.

<sup>4</sup>The repetitive-member-use factor,  $c_r$ , equals 1.0 in all cases.

<sup>5</sup>Shear capacity (V) of the I-joist.

<sup>6</sup>Intermediate reaction (IR) of the I-joists with a minimum bearing length of 3<sup>1</sup>/<sub>2</sub> inches without bearing stiffeners.

<sup>7</sup>End reaction (ER) of the I-joist with a minimum bearing length of 1<sup>3</sup>/<sub>4</sub> inches without bearing stiffeners. Higher end reaction is permitted. For a bearing length of 4 inches, the end reaction may be set equal to the tabulated shear value. Interpolation of the end reaction between 1<sup>1</sup>/<sub>3</sub>- and 4-inch bearing is permitted. For end reaction values over 1550 pounds, bearing stiffeners are required.

<sup>8</sup>Coefficient of shear deflection (K). For calculating uniform load and center-point load deflections of the I-joists in a simple span application, use equations 1 and 2.

Simple span uniformly distributed load: 
$$\delta = \frac{5wl^4}{384EI} + \frac{wl^2}{k} \quad (1)$$

Simple span concentrated load at center of span: 
$$\delta = \frac{Pl^3}{48EI} + \frac{2Pl}{k} \quad (2)$$

where:

$\delta$  = Deflection (inches)

$EI$  = Stiffness (moment of inertia times modulus of elasticity) (lb-in<sup>2</sup>)

$k$  = Shear deflection coefficient (lbs)

$l$  = Effective span (inches)

$P$  = Concentrated load (lb)

$w$  = Uniform load (pounds per lineal inch)

**TABLE 3—DESIGN PROPERTIES FOR NORDIC I-JOISTS  
18 TO 24 INCHES IN DEPTH<sup>1,2</sup>**

DEPTH (inches)	JOIST SERIES	EI <sup>3</sup> (10 <sup>6</sup> lb-in <sup>2</sup> )	M <sup>4</sup> (lb-ft)	V <sup>5</sup> (lb)	IR <sup>6</sup> (lb)	ER <sup>7</sup> (lb)	K <sup>8</sup> (10 <sup>6</sup> lb)
18	NI-60	1019	7800	2000	2800	1300	9.36
	NI-80x	1399	10,990	2360	3100	1300	9.36
20	NI-80x	1771	12,315	2450	3100	1300	10.40
22	NI-80x	2191	13,645	2530	3100	1300	11.44
24	NI-80x	2660	14,975	2600	3100	1300	12.48

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

See Table 2 footnotes.

**TABLE 4—END AND INTERMEDIATE REACTION DESIGN VALUES FOR  
18- TO 24-INCH I-JOIST<sup>81</sup>**

DEPTH	JOIST SERIES	IR (lb)			ER (lb)		
		3 <sup>1</sup> / <sub>2</sub> "	5 <sup>1</sup> / <sub>2</sub> "		1 <sup>3</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>2</sub> "	
		w/WS	wo/WS	w/WS	w/WS	wo/WS	w/WS
18	NI-60	3500	3150	4100	1700	1520	1860
	NI-80x	3700	3250	4250	1900	1520	2150
20	NI-80x	3700	3250	4250	2010	1520	2250
22	NI-80x	3700	3250	4250	2130	1520	2350
24	NI-80x	3700	3250	4250	2250	1520	2440

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

<sup>1</sup>The tabulated values are design values for normal duration of load. All values, except EI and K, may be adjusted for other durations of load in accordance with the applicable code.

<sup>2</sup>The vertical (bearing) load capacity (V) is 1850 lb/ft for 18-inch NI-60 and 1275 lb/ft for NI-80x (up to 24 inches) without bearing stiffeners.

<sup>3</sup>Bending stiffness (EI) of the I-joist.

<sup>4</sup>Moment capacity (M) of the I-joist shall not be increased by any code-allowed repetitive-member-use factor.

<sup>5</sup>Shear capacity (V) of the I-joist with a minimum bearing length of 4 inches.

<sup>6</sup>Intermediate reaction (IR) of the I-joists with a minimum bearing length of 3<sup>1</sup>/<sub>2</sub> inches or 5<sup>1</sup>/<sub>2</sub> inches without bearing stiffeners. Higher end reaction is permitted (see Table 4).

<sup>7</sup>End reaction (ER) of the I-joist with a minimum bearing length of 1<sup>3</sup>/<sub>4</sub> inches without bearing stiffeners. Higher end reaction is permitted (see Table 4). For end reaction values over 1850 pounds, bearing stiffeners are required.

<sup>8</sup>Coefficient of shear deflection (K). For calculating uniform load and center-point load deflections of the I-joists in a simple-span application, use equations 1 and 2.

Simple span uniformly distributed load: 
$$\delta = \frac{5wl^4}{384EI} + \frac{wl^2}{k} \quad (1)$$

Simple span concentrated load at center of span: 
$$\delta = \frac{Pl^3}{48EI} + \frac{2Pl}{k} \quad (2)$$

where:

- $\delta$  = Deflection (inches)
- $EI$  = Stiffness (moment of inertia times modulus of elasticity) (lb-in<sup>2</sup>)
- $k$  = Shear deflection coefficient (lbs)
- $l$  = Effective span (inches)
- $P$  = Concentrated load (lb)
- $w$  = Uniform load (pounds per lineal inch)

TABLE 5—LOCATION OF CIRCULAR HOLES IN NI JOIST WEBS, SIMPLE OR MULTIPLE SPAN,  
FOR LIVE LOADS UP TO 40 psf AND DEAD LOADS UP TO 10 psf<sup>1,2,3,4</sup>

JOIST DEPTH (in.)	JOIST SERIES	SAF <sup>5</sup> (ft-in)	MINIMUM DISTANCE FROM INSIDE FACE OF ANY SUPPORT TO CENTER OF HOLE (ft-in)														
			Round Hole Diameter (in.)														
			2	3	4	5	6	6 <sup>1</sup> / <sub>4</sub>	7	8	8 <sup>5</sup> / <sub>8</sub>	9	10	10 <sup>3</sup> / <sub>4</sub>	11	12	12 <sup>3</sup> / <sub>4</sub>
9 <sup>1</sup> / <sub>4</sub>	NI-20	13-5	0-6	1-6	3-0	4-0	6-0	---	---	---	---	---	---	---	---	---	---
	NI-40x	14-9	0-6	1-6	3-0	4-6	6-0	---	---	---	---	---	---	---	---	---	---
	NI-80	17-8	2-6	3-6	5-0	6-6	8-6	---	---	---	---	---	---	---	---	---	---
9 <sup>1</sup> / <sub>2</sub>	NI-20	13-5	0-6	1-0	2-6	3-6	5-6	6-0	---	---	---	---	---	---	---	---	---
	NI-40	14-7	0-6	2-0	3-0	4-6	6-6	6-6	---	---	---	---	---	---	---	---	---
	NI-40x	15-0	0-6	1-6	3-0	4-6	6-6	6-6	---	---	---	---	---	---	---	---	---
	NI-60	16-7	1-6	2-6	4-0	5-6	7-6	7-6	---	---	---	---	---	---	---	---	---
	NI-80	18-2	2-6	3-6	5-0	6-6	8-6	8-6	---	---	---	---	---	---	---	---	---
11 <sup>1</sup> / <sub>4</sub>	NI-20	14-2	0-6	0-6	0-6	2-0	3-6	4-0	5-6	7-6	---	---	---	---	---	---	---
	NI-40x	16-7	0-6	0-6	1-6	3-0	4-6	5-0	6-0	8-0	---	---	---	---	---	---	---
	NI-80	20-9	2-0	3-0	4-6	6-0	7-6	8-0	9-0	11-0	---	---	---	---	---	---	---
11 <sup>7</sup> / <sub>8</sub>	NI-20	14-2	0-6	0-6	0-6	1-0	3-0	3-0	4-6	6-6	7-6	---	---	---	---	---	---
	NI-40	16-7	0-6	0-6	1-6	2-6	4-0	4-6	5-6	7-0	8-0	---	---	---	---	---	---
	NI-40x	17-1	0-6	0-6	1-6	2-6	4-0	4-6	5-6	7-0	8-0	---	---	---	---	---	---
	NI-60	19-8	0-6	1-6	3-0	4-6	5-6	6-0	7-6	9-0	10-0	---	---	---	---	---	---
	NI-80	21-7	1-6	3-0	4-0	5-6	7-0	7-6	8-6	10-6	11-6	---	---	---	---	---	---
14	NI-40	18-3	0-6	0-6	0-6	1-0	2-0	2-6	3-6	4-6	5-6	6-0	8-0	9-6	---	---	---
	NI-40x	18-10	0-6	0-6	0-6	1-0	2-6	2-6	3-6	5-0	6-0	6-6	8-0	10-0	---	---	---
	NI-60	21-7	0-6	0-6	1-6	3-0	4-0	4-6	5-6	7-0	8-0	8-6	11-6	12-0	---	---	---
	NI-80	24-6	1-0	2-0	3-6	5-0	6-0	6-6	7-6	9-0	10-0	11-0	12-6	14-0	---	---	---
16	NI-40	19-8	0-6	0-6	0-6	0-6	0-6	0-6	1-6	3-0	3-6	4-6	5-6	7-0	7-0	9-0	11-0
	NI-40x	20-3	0-6	0-6	0-6	0-6	0-6	1-0	2-0	3-6	4-0	4-6	6-0	7-0	7-6	9-6	11-6
	NI-60	21-9	0-6	0-6	0-6	0-6	1-6	2-0	3-0	4-6	5-6	6-0	8-0	9-6	10-0	12-0	14-0
	NI-80	26-3	0-6	1-0	2-0	3-6	4-6	5-0	6-0	7-6	8-6	9-0	10-6	12-0	12-6	14-6	16-0

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

<sup>1</sup>Table may be used for I-joist spacing of 24 inches on center or less.

<sup>2</sup>Hole location distance is measured from inside face of supports to center of hole.

<sup>3</sup>Distances in this chart are based on uniformly loaded joists.

<sup>4</sup>For continuous joists with more than one span, use the longest span to determine hole location in either span.

<sup>5</sup>SAF = Span Adjustment Factor, used as defined below.

#### OPTIONAL:

Table 5 is based on the I-joists being used at their maximum span. If the I-joists are placed at less than their full allowable span, the maximum distance from the centerline of the hole to the face of any support ( $D$ ) as given above may be reduced as follows:

$$D_{\text{reduced}} = \frac{L_{\text{actual}} D}{SAF}$$

where:

$D_{\text{reduced}}$  = Distance from the inside face of any support to center of hole, reduced for less-than-maximum span applications (ft). The reduced distance shall not be less than that shown below:

When calculating hole location by this optional method, the following minimum distances between the center of the hole and the inside face of the support shall apply:

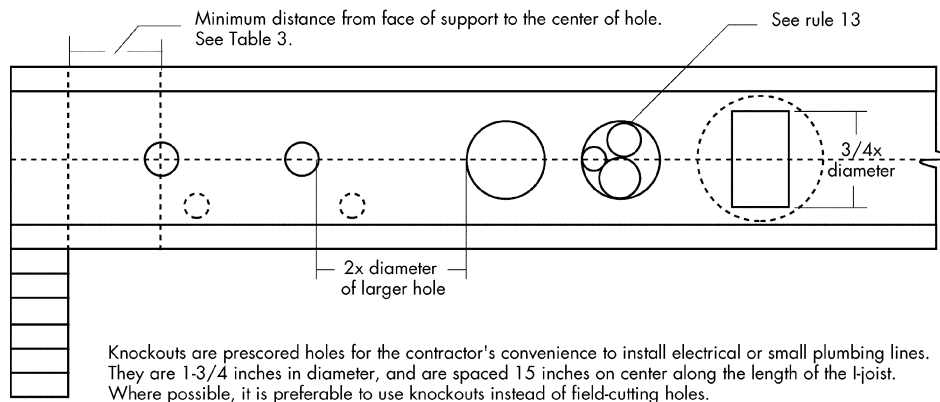
Hole diameter (in)	2	3	4	5	6	6 <sup>1</sup> / <sub>4</sub>	7	8	8 <sup>5</sup> / <sub>8</sub>	9	10	10 <sup>3</sup> / <sub>4</sub>	11	12	12 <sup>3</sup> / <sub>4</sub>
Minimum distance (ft-in)	0-6	0-6	1-0	1-0	1-0	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	1-6	2-0

$L_{actual}$  = The actual measured span distance between the inside faces of supports (ft).

SAF = Span Adjustment Factor given in Table 5.

$D$  = The minimum distance from the inside face of any support to center of hole from Table 5.

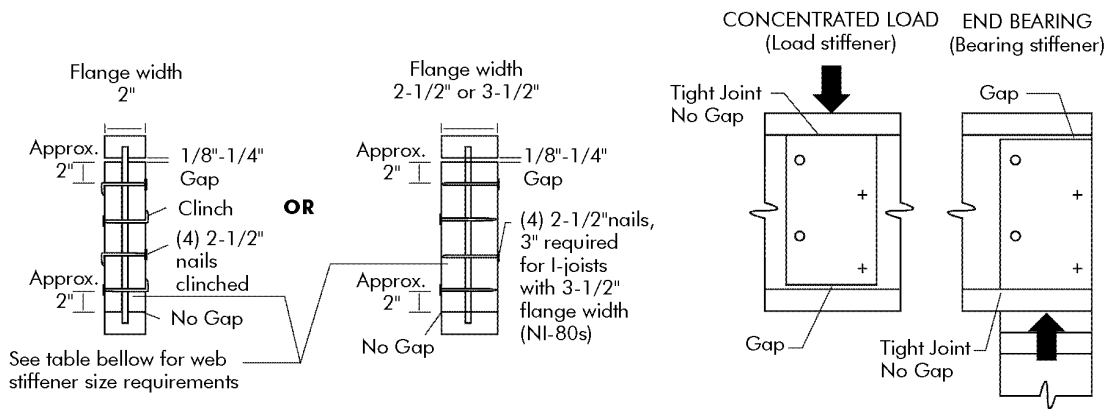
$$\text{If } \frac{L_{actual}}{SAF} \geq 1.0 \text{ use 1.0 in the above calculation for } \frac{L_{actual}}{SAF}.$$



### Rules for cutting holes in NI Joists

1. The distance between the inside edge of the support and the centerline of any hole shall be in compliance with the requirements of Table 5.
2. I-joist top and bottom flanges shall not be cut, notched, or otherwise modified.
3. The maximum-size hole that can be cut into an I-joist web shall equal the clear distance between the flanges of the I-joist minus  $\frac{1}{4}$  inch. A minimum of  $\frac{1}{8}$  inch shall always be maintained between the top or bottom of the hole and the adjacent I-joist flange.
4. The sides of square holes or longest sides of rectangular holes shall not exceed three fourths of the diameter of the maximum found hole permitted in that location.
5. Where more than one hole is necessary, the distance between adjacent hole edges shall exceed twice the diameter of the largest round hole or twice the sized of the largest square hole (or twice the length of the longest side of the longest rectangular hole) and each hole shall be sized and located in compliance with the requirements of Table 5.
6. One-and-one-half-inch holes may be anywhere in a cantilevered section of a NI Joist. Holes larger than  $1\frac{1}{2}$  inches in diameter shall not be cut in cantilevers.
7. A  $1\frac{1}{2}$ -inch hole may be placed anywhere in the web provided that it meets the requirements of item number 6 above.
8. For joists with more than one span, use the longest span to determine hole location in either span.
9. All holes shall be cut in a workmanlike manner in accordance with the restrictions listed above and as illustrated in Figure 1.
10. Limit three maximum-size holes per span.
11. A group of found holes at approximately the same location shall be permitted if they meet the requirements for a single round hole circumscribed around them.

FIGURE 1—TYPICAL HOLES



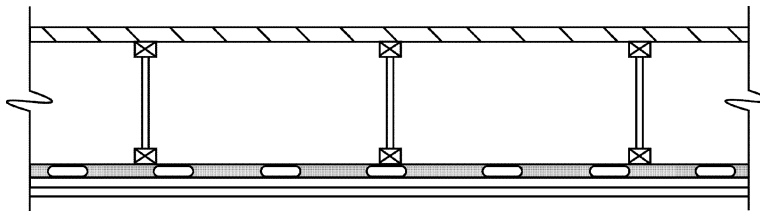
**Requirements for web stiffeners**

1. Web stiffeners shall be placed on each side of the I-joist web at:
  - a) Hangers with side nailing.
  - b) Hangers which do not support top flanges of I-joists.
  - c) Locations where concentrated loads in excess of 1500 pounds are applied to the top flange of the I-joist between supports, or in case of cantilever, any where between the cantilever tip and the support.
  - d) At exterior supports in engineered applications where concentrated loads cause exterior reaction loads to exceed 1550 pounds.
2. Web stiffeners shall be made of utility grade SPF (south) or better for lumber and/or sheathing grade or better for wood structural panels.

**FIGURE 2—NI I-JOIST WEB STIFFENER CONSTRUCTION DETAILS**

**TABLE 6—WEB STIFFENER SIZE REQUIRED**

I-JOIST FLANGE WIDTH	WEB STIFFENER SIZE REQUIRED ON EACH SIDE OF WEB
2 inches	$\frac{3}{4} \times 2\frac{5}{16}$ minimum width
$2\frac{1}{2}$ inches	$1 \times 2\frac{5}{16}$ minimum width
$3\frac{1}{2}$ inches	$1\frac{1}{2} \times 2\frac{5}{16}$ minimum width



1. Wood I-joist, noted in Table 1, at 24 inches (610 mm) o.c. spacing.
2. Nominal 1 x 4 wood furring strip spacer applied parallel to and covering the bottom of the bottom flange of each member, tacked in place.
3. Two inches (51 mm) mineral fiber insulation, 3.5 pcf (56 kg/m<sup>3</sup>) (nominal) installed adjacent to the bottom flange of the I-joist and supported by the nominal 1 x 4 furring strip spacer.
4. One-half inch (13 mm) deep single leg resilient channel 16 inches (406 mm) on center (channels doubled at wallboard end joints), placed perpendicular to the furring strip and joist and attached to each joist by  $1\frac{7}{8}$  inch (48 mm) Type S drywall screws.
5. Five-eighths inch (16 mm) Type C gypsum wallboard applied perpendicular to the channel with end joints staggered at least 4 feet (1219 mm) and fastened with  $1\frac{1}{8}$ -inch (29 mm), Type S drywall screws spaced 7 inches (178 mm) on center; wallboard joints to be taped and covered with joint compound.

**FIGURE 3—ONE-HOUR FIRE-RESISTIVE FLOOR-CEILING OR ROOF-CEILING ASSEMBLY [IBC TABLE 720.1(3) ITEM NUMBER 23-1.1]**