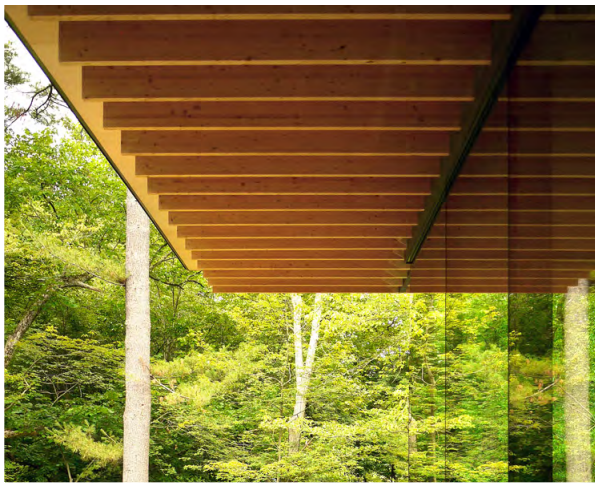
NORDIC LAM™

GLULAM JOISTS

13F-1.7E



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NORDIC LAM™
13F-1.7E

13F-1.7E

ALLOWABLE FLOOR SPANS
LIVE LOAD = 40 PSF, DEAD LOAD = 10 PSF
LIVE LOAD DEFLECTION LIMITED TO L/480

WIDTH (in.)	DEPTH (in.)	SIMPLE SPANS ON CENTER SPACING				MULTIPLE SPANS ON CENTER SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
1-1/2"	7-1/4	14'-0"	12'-11"	12'-4"	11'-1"	15'-3"	13'-6"	12'-4"	11'-0"
	9-1/4	17'-7"	16'-3"	15'-5"	13'-11"	19'-2"	17'-0"	15'-6"	13'-10"
	9-1/2	18'-0"	16'-8"	15'-10"	14'-4"	19'-8"	17'-6"	15'-11"	14'-3"
	11-1/4	21'-2"	19'-6"	18'-6"	16'-10"	23'-1"	20'-6"	18'-9"	16'-9"
	11-7/8	22'-3"	20'-6"	19'-6"	17'-8"	24'-4"	21'-7"	19'-9"	17'-7"
	14	26'-0"	24'-0"	22'-9"	20'-2"	28'-5"	25'-4"	23'-1"	20'-7"
	16 (*)	30'-7"	28'-2"	26'-8"	25'-1"	33'-6"	30'-9"	29'-2"	27'-5"

ALLOWABLE FLOOR SPANS
LIVE LOAD = 40 PSF, DEAD LOAD = 10 PSF
LIVE LOAD DEFLECTION LIMITED TO L/360

WIDTH (in.)	DEPTH (in.)	SIMPLE SPANS ON CENTER SPACING				MULTIPLE SPANS ON CENTER SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
1-1/2"	7-1/4	15'-5"	13'-7"	12'-5"	11'-1"	15'-7"	13'-6"	12'-4"	11'-0"
	9-1/4	19'-4"	17'-1"	15'-7"	13'-11"	19'-8"	17'-0"	15'-6"	13'-10"
	9-1/2	19'-10"	17'-7"	16'-0"	14'-4"	20'-2"	17'-6"	15'-11"	14'-3"
	11-1/4	23'-3"	20'-7"	18'-10"	16'-10"	23'-9"	20'-6"	18'-9"	16'-9"
	11-7/8	24'-6"	21'-8"	19'-10"	17'-8"	25'-0"	21'-7"	19'-9"	17'-7"
	14	28'-8"	25'-5"	23'-2"	20'-2"	29'-3"	25'-4"	23'-1"	20'-7"
	16 (*)	33'-9"	31'-0"	29'-5"	26'-11"	36'-10"	33'-10"	32'-1"	27'-8"

NOTES:

1. Allowable clear span applicable to residential floor construction with a design live load of 40 psf and dead load of 10 psf. The live load deflection is limited to L/480 or L/360, and the total load deflection to L/240. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
2. L/480 spans are based on a composite floor with glued-nailed sheathing meeting the requirements for APA Rated Sheathing or APA Rated STURD-I-FLOOR conforming to PRP-108, PS 1, or PS 2 with a minimum thickness of 19/32 inch (40/20 or 20 oc) for a joist spacing of 19.2 inches or less, or 23/32 inch (48/24 or 24 oc) for a joist spacing of 24 inches. Adhesive shall meet APA Specification AFG-01 or ASTM D3498.
3. Spans are based on 1-1/2-inch width joists and 13F-1.7E layup (F_b = 1,350 psi, F_v = 250 psi, E_{app} = 1,600,000 psi, F_{cp} = 450 psi), (*) except for 16-inch depth which are based on 1-1/2-inch width joists and 24F-1.9E layup (F_b = 2,400 psi, F_v = 250 psi, E_{app} = 1,800,000 psi, F_{cp} = 600 psi). The apparent E value already includes a 5% shear deflection.
4. Table values assume that lateral support is provided at each support and continuously along the compression edge of the joist.
5. Minimum bearing length shall be 1-1/2 inches for the end bearings, and 3-1/2 inches for the intermediate bearings.
6. This span chart is based on uniform loads, a load duration factor, C_D, of 1.00, and dry-use conditions. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

13F-1.7E

ALLOWABLE FLOOR SPANS

LIVE LOAD = 40 PSF, DEAD LOAD = 20 PSF
LIVE LOAD DEFLECTION LIMITED TO L/480

WIDTH (in.)	DEPTH (in.)	SIMPLE SPANS ON CENTER SPACING				MULTIPLE SPANS ON CENTER SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
1-1/2"	7-1/4	14'-0"	12'-5"	11'-3"	10'-1"	14'-3"	12'-4"	11'-2"	10'-0"
	9-1/4	17'-7"	15'-7"	14'-3"	12'-9"	18'-0"	15'-6"	14'-2"	12'-8"
	9-1/2	18'-0"	16'-0"	14'-7"	13'-1"	18'-5"	15'-11"	14'-6"	13'-0"
	11-1/4	21'-2"	18'-10"	17'-2"	15'-4"	21'-8"	18'-9"	17'-1"	15'-3"
	11-7/8	22'-3"	19'-10"	18'-1"	16'-2"	22'-10"	19'-9"	18'-0"	16'-1"
	14	26'-0"	23'-2"	21'-0"	16'-9"	26'-8"	23'-1"	21'-1"	17'-3"
	16 (*)	30'-7"	28'-2"	26'-8"	22'-5"	33'-6"	30'-9"	28'-10"	23'-1"

ALLOWABLE FLOOR SPANS

LIVE LOAD = 40 PSF, DEAD LOAD = 20 PSF
LIVE LOAD DEFLECTION LIMITED TO L/360

WIDTH (in.)	DEPTH (in.)	SIMPLE SPANS ON CENTER SPACING				MULTIPLE SPANS ON CENTER SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
1-1/2"	7-1/4	14'-4"	12'-5"	11'-3"	10'-1"	14'-3"	12'-4"	11'-2"	10'-0"
	9-1/4	18'-1"	15'-7"	14'-3"	12'-9"	18'-0"	15'-6"	14'-2"	12'-8"
	9-1/2	18'-6"	16'-0"	14'-7"	13'-1"	18'-5"	15'-11"	14'-6"	13'-0"
	11-1/4	21'-9"	18'-10"	17'-2"	15'-4"	21'-8"	18'-9"	17'-1"	15'-3"
	11-7/8	22'-11"	19'-10"	18'-1"	16'-2"	22'-10"	19'-9"	18'-0"	16'-1"
	14	26'-9"	23'-2"	21'-0"	16'-9"	26'-8"	23'-1"	21'-1"	17'-3"
	16 (*)	33'-9"	31'-0"	28'-0"	22'-5"	36'-10"	33'-10"	28'-10"	23'-1"

NOTES:

1. Allowable clear span applicable to residential floor construction with a design live load of 40 psf and dead load of 20 psf. The live load deflection is limited to L/480 or L/360, and the total load deflection to L/240. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
2. L/480 spans are based on a composite floor with glued-nailed sheathing meeting the requirements for APA Rated Sheathing or APA Rated STURD-I-FLOOR conforming to PRP-108, PS 1, or PS 2 with a minimum thickness of 19/32 inch (40/20 or 20 oc) for a joist spacing of 19.2 inches or less, or 23/32 inch (48/24 or 24 oc) for a joist spacing of 24 inches. Adhesive shall meet APA Specification AFG-01 or ASTM D3498.
3. Spans are based on 1-1/2-inch width joists and 13F-1.7E layup (F_b = 1,350 psi, F_v = 250 psi, E_{app} = 1,600,000 psi, F_{cp} = 450 psi), (*) except for 16-inch depth which are based on 1-1/2-inch width joists and 24F-1.9E layup (F_b = 2,400 psi, F_v = 250 psi, E_{app} = 1,800,000 psi, F_{cp} = 600 psi). The apparent E value already includes a 5% shear deflection.
4. Table values assume that lateral support is provided at each support and continuously along the compression edge of the joist.
5. Minimum bearing length shall be 1-1/2 inches for the end bearings, and 3-1/2 inches for the intermediate bearings.
6. This span chart is based on uniform loads, a load duration factor, C_D, of 1.00, and dry-use conditions. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

NORDIC LAM™
13F-1.7E

13F-1.7E

ALLOWABLE ROOF SPANS
SNOW LOAD = 30 PSF, DEAD LOAD = 15 PSF

WIDTH (in.)	DEPTH (in.)	SLOPE OF 1/4:12 TO 4:12			SLOPE OF >4:12 TO 8:12			SLOPE OF >8:12 TO 12:12		
		ON CENTER SPACING			ON CENTER SPACING			ON CENTER SPACING		
		12"	16"	24"	12"	16"	24"	12"	16"	24"
1-1/2"	7-1/4	16'-2"	14'-8"	11'-11"	17'-4"	15'-9"	13'-3"	18'-11"	17'-2"	14'-11"
	9-1/4	20'-7"	18'-4"	14'-11"	22'-1"	20'-0"	16'-7"	24'-0"	21'-10"	18'-11"
	9-1/2	21'-1"	18'-10"	15'-4"	22'-8"	20'-7"	17'-0"	24'-8"	22'-5"	19'-4"
	11-1/4	24'-11"	22'-0"	17'-11"	26'-9"	24'-3"	19'-10"	29'-1"	26'-5"	22'-7"
	11-7/8	26'-3"	23'-1"	18'-9"	28'-2"	25'-7"	20'-10"	30'-8"	27'-10"	23'-8"
	14	30'-10"	26'-9"	20'-7"	33'-1"	29'-8"	24'-3"	36'-0"	32'-8"	27'-6"
	16 (*)	34'-11"	30'-2"	20'-3"	37'-8"	33'-6"	25'-0"	40'-11"	37'-2"	30'-11"

ALLOWABLE ROOF SPANS
SNOW LOAD = 40 PSF, DEAD LOAD = 15 PSF

WIDTH (in.)	DEPTH (in.)	SLOPE OF 1/4:12 TO 4:12			SLOPE OF >4:12 TO 8:12			SLOPE OF >8:12 TO 12:12		
		ON CENTER SPACING			ON CENTER SPACING			ON CENTER SPACING		
		12"	16"	24"	12"	16"	24"	12"	16"	24"
1-1/2"	7-1/4	15'-2"	13'-4"	10'-10"	16'-4"	14'-10"	12'-1"	17'-10"	16'-2"	13'-10"
	9-1/4	19'-4"	16'-9"	13'-7"	20'-10"	18'-8"	15'-2"	22'-9"	20'-8"	17'-5"
	9-1/2	19'-10"	17'-2"	13'-11"	21'-4"	19'-2"	15'-7"	23'-4"	21'-2"	17'-10"
	11-1/4	23'-2"	20'-0"	16'-4"	25'-3"	22'-4"	18'-2"	27'-7"	25'-0"	20'-10"
	11-7/8	24'-4"	21'-1"	17'-2"	26'-7"	23'-6"	19'-2"	29'-1"	26'-4"	21'-10"
	14	28'-4"	24'-6"	17'-2"	31'-3"	27'-3"	21'-4"	34'-1"	31'-0"	25'-4"
	16 (*)	31'-11"	25'-7"	17'-0"	35'-7"	30'-9"	21'-1"	38'-10"	35'-1"	27'-5"

NOTES:

1. Allowable clear span applicable to simple-span roof construction with a design roof snow load as shown and dead load of 15 psf. The allowable span is based on the horizontal distance between inside face of supports. The snow load deflection is limited to L/240 and the total load deflection to L/180. Other deflection limits may apply.
2. Spans are based on 1-1/2-inch width rafters and 13F-1.7E layup (F_b = 1,350 psi, F_v = 250 psi, E_{app} = 1,600,000 psi, F_{cp} = 450 psi), (*) except for 16-inch depth which are based on 1-1/2-inch width joists and 24F-1.9E layup (F_b = 2,400 psi, F_v = 250 psi, E_{app} = 1,800,000 psi, F_{cp} = 600 psi). The apparent E value already includes a 5% shear deflection. Spans include a cantilever of up to 2 feet on one end of the rafter.
3. Table values assume that lateral support is provided at each support and continuously along the compression edge of the rafter.
4. Minimum bearing length shall be 1-1/2 inches for the end bearings, and 3-1/2 inches on end bearing adjacent to cantilever.
5. These span charts are based on uniform loads, a load duration factor, C_D, of 1.15, and dry-use conditions. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

13F-1.7E

HOLE SIZES AND LOCATIONS — Simple or Multiple Span

DEPTH (in.)	SPACING (in.)	MINIMUM DISTANCE FROM INSIDE FACE OF ANY SUPPORT TO CENTER OF HOLE (ft-in.)				
		ROUND HOLE DIAMETER (in.)				
		2	3	4	5	6
7-1/4	≤ 24	1'-4"	---	---	---	---
9-1/4	≤ 24	1'-4"	2'-0"	---	---	---
9-1/2	≤ 24	1'-4"	2'-0"	---	---	---
11-1/4	≤ 24	1'-4"	2'-0"	---	---	---
11-7/8	≤ 24	1'-4"	2'-0"	2'-8"	---	---
14	≤ 24	1'-4"	2'-0"	2'-8"	---	---
16	≤ 24	1'-4"	2'-0"	2'-8"	3'-4"	---

NOTES:

1. Above tables may be used for joist spacing of 24 inches on center or less.
2. The 16-inch depth is based on 1-1/2-inch width joists and 24F-1.9E layup.
3. Hole location distances are measured from inside face of supports to center of hole.
4. For continuous joists with more than one span, use the longest span to determine hole location in either span.
5. Distances are based on uniformly loaded floor joists that meet the span requirements (see Allowable Floor Spans).
6. The above table is based on the joists being used at their maximum spans.

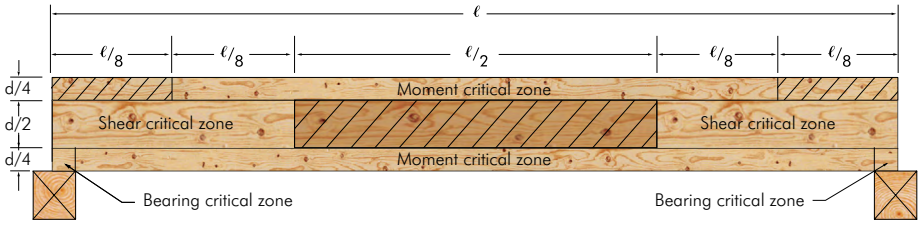
RULES FOR CUTTING HOLES

1. The distance between the inside edge of the support and the centerline of any hole shall be in compliance with the requirements of the above table.
2. Field-cut holes should be centered on the middle of the joist, with an allowable tolerance of 1/10 the joist depth.
3. The sides of square holes or longest sides of rectangular holes should not exceed 3/4 of the diameter of the maximum round hole permitted at that location. The corners of square/rectangular holes must have a radius of 1 inch.
4. Where more than one hole is necessary, the minimum clear spacing between adjacent holes, as measured between the nearest edge of the holes, should be 8 hole diameters based on the largest diameter of any adjacent hole in the joist. Each hole shall be sized and located in compliance with the requirements of the above table.
5. For a uniformly loaded, simply supported joist, holes with a diameter of up to 1-1/2 inches or 1/10 the joist depth, whichever is smaller, are permitted anywhere at mid-height along the middle portion of the joist, as shown in the diagram below. Holes of greater size or different location may be permitted providing they have been verified.
6. For continuous joists with more than one span, use the longest span to determine hole location in either span.
7. The maximum number of holes shall not exceed 1 hole per 5 feet of beam length. The hole spacing limitation, as given above, shall be satisfied separately.
8. For glulam members that have been oversized, the guidelines given above may be relaxed based on an engineering analysis.
9. All holes shall be cut in a workman-like manner in accordance with the restrictions listed above.

FIGURE 1

ALLOWABLE HOLES IN BEAMS

ZONES WHERE SMALL HORIZONTAL HOLES ARE PERMITTED IN A UNIFORMLY LOADED, SIMPLY SUPPORTED BEAM



Zones where horizontal holes holes with a diameter of up to 1-1/2 inches or 1/10 the joist depth are permitted for passage of wires, conduit, etc.

DESIGN VALUES
FOR NORDIC LAM™

DESIGN PROPERTIES (1,2)

APPLICATION	JOISTS
APPEARANCE GRADE	INDUSTRIAL
STRESS GRADE	13F-1.7E
EWS LAYUP	N/A
Bending About X-X Axis	
Bending at Extreme Fiber (F_{bx})(3,4)	1350 psi
Longitudinal Shear (F_{vx})(5)	250 psi
Compression Perpendicular to Grain (F_{cpx})	450 psi
Shear-Free Modulus of Elasticity (E_x)	1.7E+06 psi
Apparent Modulus of Elasticity ($E_{x,app.}$)(6)	1.6E+06 psi
Specific Gravity	0.41
Density (for Member Weight)	35 pcf

(1) The tabulated design values are for dry conditions of use. For wet conditions of use, multiply the tabulated values by the wet service factors, C_M, per ANSI/AWC NDS-2012, 5.3.3.

(2) The tabulated design values are for normal duration of loading. For other durations of loading, see applicable design code (ANSI/AWC NDS-2012, 2.3.2 and Chapter 5).

(3) Nordic Lam bending members are symmetrical throughout the depth of the member (balanced layups).

(4) The values of F_{bx} are based on members 1-1/2 inches in width by 12 inches in depth. For members with other depths, F_{bx} shall be multiplied by a size factor of $(12/d)^{(1/9)}$.

(5) For non-prismatic members, notched members, members subject to impact or cyclic loading, or shear design of bending members at connections (ANSI/AWC NDS-2012, 3.4.3.3), the design value for shear (F_{vx} and F_{vy}) shall be multiplied by a factor of 0.72.

(6) The tabulated apparent E values already include a 5% shear deflection. For beam stability and column stability calculations, E_{min} shall be determined by multiplying the tabulated apparent modulus of elasticity by 0.528.

(7) Design of glulam members shall be in accordance to National Design Specification, 2012 Edition.

Refer to Nordic Lam Design and Construction Guide for more information.
Nordic Lam products are listed in APA Product Report PR-L294.

FEATURES AND BENEFITS

- Meets the 2012 IRC R501.3 fire-protection requirements in single-family homes.
- For single-family homes meeting the IRC requirements; eliminates need for sprinkler system, gypsum board or structural wood panel ceiling.
- EASY TO USE - no special tools required; use of conventional framing details.
- 100% USABLE with major defects removed during manufacturing.
- Longer spans and multiple span applications saves time and money, reduces waste.
- DIMENSIONAL STABILITY - less twisting, cracking and warping than dimension lumber.
- I-joist compatible and dimension lumber depths; lengths up to 48 ft available.

NORDIC ENGINEERED WOOD

Sustainable Wood Solutions

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