NORDIC ENGINEERED WOOD

RESIDENTIAL DESIGN

CONSTRUCTION GUIDE

NORDIC JOIST™

NORDIC ENGINEERED WOOD

FSC-CERTIFIED PRODUCTS AVAILABLE

FSC www.fsc.org

The mark of responsible forestry

FSC® C011517

NORDIC
ENGINEERED WOOD

BRINGING NATURE'S RESOURCES HOME

Nordic Engineered Wood was founded in the year 2000 to develop and promote high quality wood products for use in residential and light commercial construction.

Our vision is built on the founding principles of reliable service, consistent quality, and responsible forestry practices. Chantiers Chibougamau (CCL) has achieved FSC certification, the international standard for environmentally responsible harvesting and reforestation, to ensure the long term viability of our precious natural resources.

CCL's manufacturing plant is the largest of its kind in North America, with an annual production capacity in excess of 100 million linear feet. Utilizing state-of-the-art technology from forest to finish, Nordic Joist™ is the benchmark against which other I-Joists are compared.

TABLE OF CONTENTS

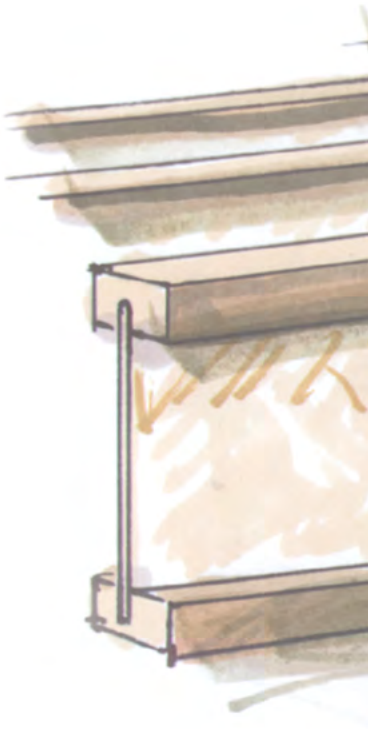
What makes Nordic I-joist better than other I's

Harvesting

The raw material used in Nordic I-joists is high density black spruce harvested on 2.0 million acres of land under the stewardship of Chantiers Chibougamau (CCL). Black spruce is known for its extreme density, fibre strength, and narrow growth rings. CCL utilizes state-of-the-art harvesting and reforestation techniques that ensure the highest quality flange stock, and guarantees that quality for generations to come.

MSR Lumber Flanges

The computerized manufacturing process scans lumber for moisture, wane, warp, splits, and other defects; and machine stress-rates each piece to determine its flexural stress value prior to flange assembly.



Straighter Flanges

Detection of defects in the raw material is one of the most critical components in establishing strong, straight, and consistent flanges. More joints guarantee more consistency. Nordic flanges are made of short length lumber blocks, minimizing inherent deviations and ensuring that your joists stay straight and lay flat.

Tension Testing

After the flanges are manufactured and cured, *every single flange* is tension tested to ensure the integrity of the joints prior to assembly as an I-joist. If the flange doesn't pass the tension-test, it doesn't make it into production.

Quality Control

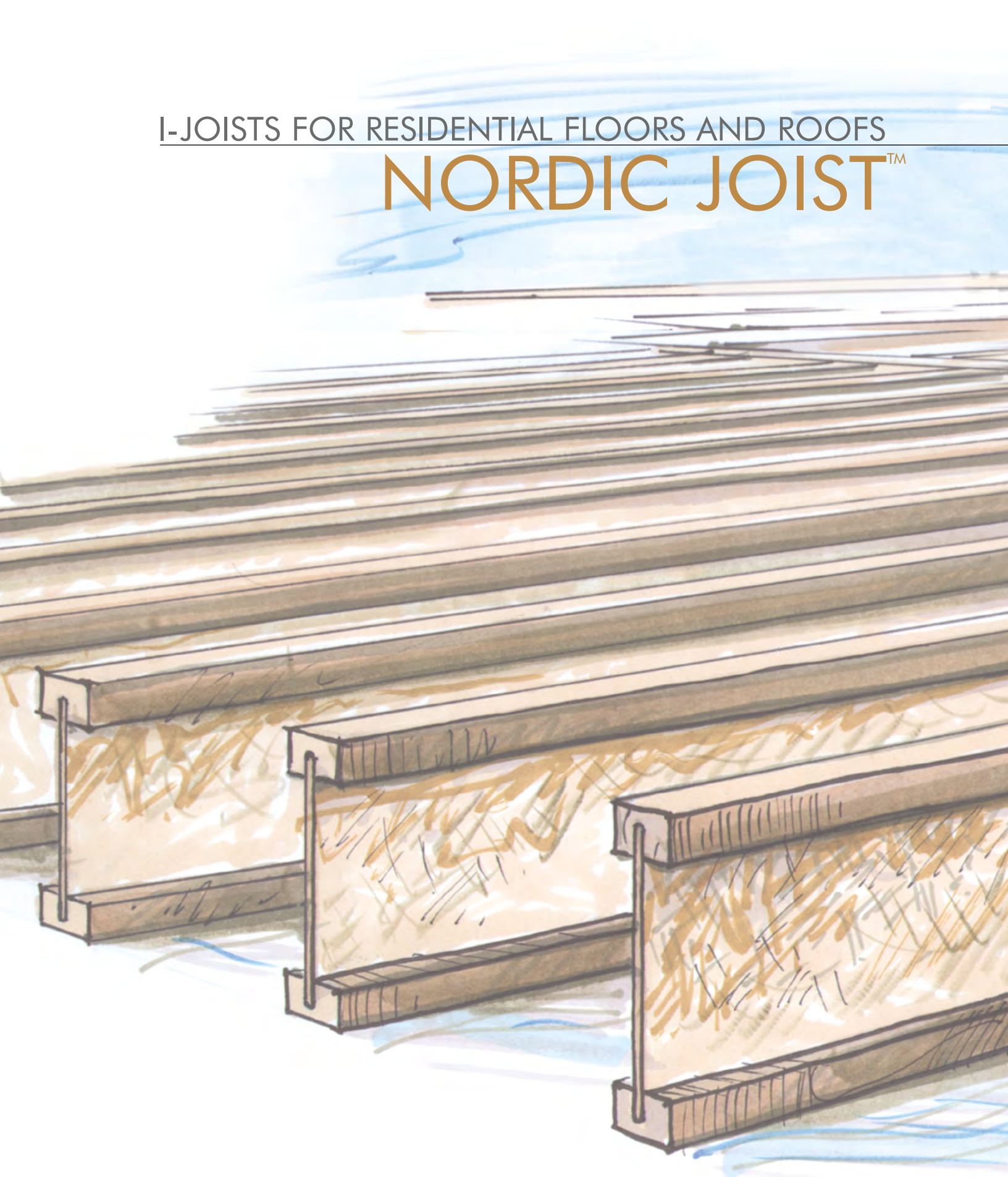
Rigorous manufacturing and product inspections occur on a strict schedule, ensuring the most consistent product available. Adherence to quality control practices is more than a formality.

Third-Party Inspection Services

I-joists produced at the CCL plant have been tested and approved by the following agencies: APA, PFS, Warnock Hersay, and BM Trada. Code approvals include CCMC, ICC-ES, and CE Marking, among others.

I-JOISTS FOR RESIDENTIAL FLOORS AND ROOFS

NORDIC JOIST™



NORDIC JOIST™
FLEXIBILITY, STABILITY, QUALITY

Simple to Install – I-joists save builders time, and therefore money. I-joists are typically pre-cut in two-foot increments in length and shipped to the job site ready to install. This minimizes job site cutting and material waste. I-joists can be cut and fastened with traditional framing tools and fasteners – no special tools are required. Since I-joists can typically be used at greater joist spacing than conventional lumber joists, fewer pieces must be cut and handled on the job site, making I-joist installation less costly and less wasteful for the builder.

Allows Design Flexibility – The availability of long lengths allows for multiple span installations, thus speeding construction by eliminating the need to lap joists over bearing walls or support beams. This also means fewer pieces to handle, resulting in lower labor costs.

Dimensionally Stable – I-joists will not warp, twist, or shrink, and are more uniform and dimensionally stable than conventional lumber joists.

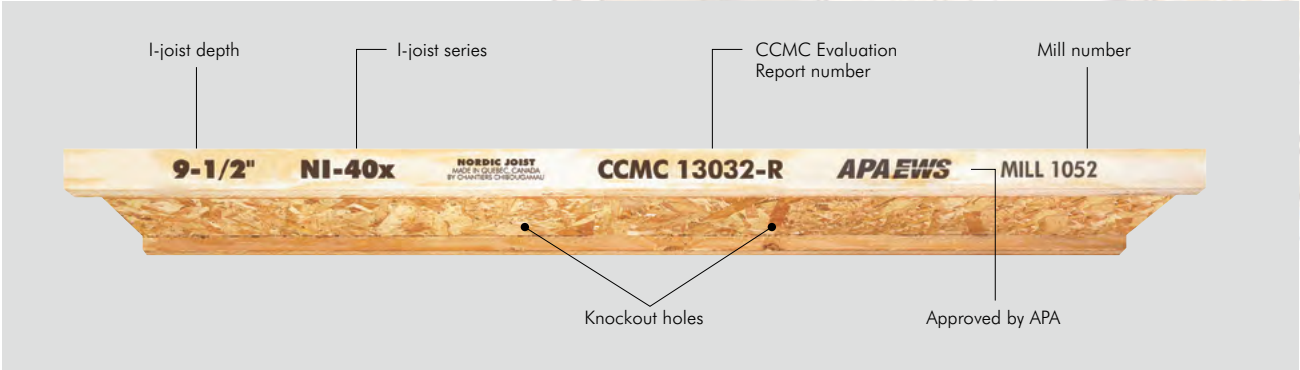
Lightweight – Because I-joists typically weigh less than half as much as comparable conventional lumber joists, they can be installed quickly and efficiently.

Web Holes – The wood structural panel webs in I-joists permit holes to be easily cut on site to permit the passage of electrical wiring, plumbing and ductwork. Nordic I-joists provide **knockout holes** along the length of the joists to facilitate the installation of electrical wiring or light plumbing lines. These knockouts can easily be removed with a hammer as needed.

APA Quality Assured – The APA trademark ensures superior I-joist quality and consistent performance. All products are subject to proven quality assurance programs.

Resource Friendly – Wood I-joists use up to 50% less wood fibre in their production than conventional lumber joists, allowing more efficient use of our natural resources.

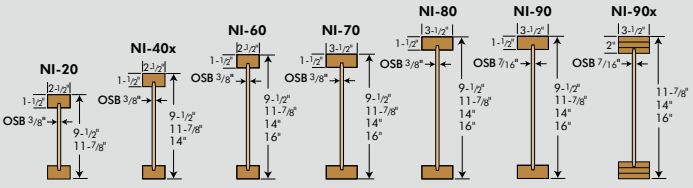
NORDIC JOIST™



DESIGN
PROPERTIES

Chantiers Chibougamau Ltd. harvests its own trees, which enables Nordic products to adhere to strict quality control procedures throughout the manufacturing process. Every phase of the operation, from forest to the finished product, reflects our commitment to quality.

Nordic Engineered Wood I-joists use only finger-jointed black spruce lumber in their flanges, ensuring consistent quality, superior strength, and longer span carrying capacity.



DESIGN PROPERTIES FOR NORDIC I-JOISTS [a][b]

JOIST DEPTH	JOIST SERIES	EI[c] (10^6 lbf-in.^{2})	M_r[d] (lbf-ft)	V_r[e] (lbf)	IR_r[f] (lbf)	IR_r[f] w/ BS (lbf)	IR_r[f] (lbf)	IR_r[f] w/ BS (lbf)	ER_r[g] (lbf)	ER_r[g] w/ BS (lbf)	ER_r[g] (lbf)	ER_r[g] w/ BS (lbf)	K[h] (10^6 lbf)	WEIGHT (plf)
					3-1/2-in BEARING		5-1/2-in BEARING		1-3/4-in BEARING		4-in BEARING			
9-1/2"	NI-20	145	4310	1770	3800	3830	4060	4060	1630	1630	1770	1770	4.94	2.55
	NI-40x	218	4825	1890	3800	3830	4150	4170	1850	1890	1890	1890	4.94	2.65
	NI-60	231	6335	1890	3810	3850	4160	4210	1850	1890	1890	1890	4.94	2.78
	NI-70	304	8515	1890	3810	4210	4240	4240	1890	1890	1890	1890	4.94	3.27
	NI-80	324	8955	1890	3810	4210	4240	4240	1890	1890	1890	1890	4.94	3.27
11-7/8"	NI-20	253	5580	2240	4740	4780	5070	5070	1970	1970	2240	2240	6.18	2.85
	NI-40x	371	6255	2340	4740	4780	5590	5640	2010	2340	2340	2340	6.18	2.85
	NI-60	396	8210	2340	4740	4850	5600	5720	2010	2340	2340	2340	6.18	2.99
	NI-70	515	11035	2340	4740	5260	5790	5790	2130	2340	2340	2340	6.18	3.45
	NI-80	547	11610	2340	4740	5260	5790	5790	2130	2340	2340	2340	6.18	3.45
	NI-90	601	14605	3040	5300	5300	5790	5790	2210	2340	2980	3040	6.18	3.45
	NI-90x	615	15740	3240	6580	6580	6580	6580	2790	3240	2980	3240	6.18	4.43
14"	NI-40x	540	7535	2730	4940	4990	5570	5630	2090	2670	2450	2730	7.28	3.00
	NI-60	584	9890	2730	4960	5150	5590	5990	2120	2670	2450	2730	7.28	3.15
	NI-70	749	13290	2730	5260	5750	6030	6430	2300	2670	2450	2730	7.28	3.75
	NI-80	802	13980	2730	5260	5750	6030	6430	2300	2670	2450	2730	7.28	3.75
	NI-90	877	17580	3350	5300	5750	6030	6430	2300	2670	2980	3350	7.28	3.75
	NI-90x	910	18985	3490	6580	6580	6580	6580	2840	3490	2980	3490	7.28	4.73
16"	NI-40x	734	8730	3110	5140	5190	5560	5610	2160	2960	2450	3110	8.32	3.30
	NI-60	799	11470	3110	5150	5430	5570	6240	2230	2960	2450	3110	8.32	3.46
	NI-70	1015	15410	3110	5750	6200	6250	7030	2450	2960	2450	3110	8.32	3.95
	NI-80	1092	16210	3110	5750	6200	6250	7030	2450	2960	2450	3110	8.32	3.95
	NI-90	1187	20390	3680	5750	6200	6250	7030	2450	2960	2980	3680	8.32	3.95
	NI-90x	1245	21790	3670	6580	6580	6580	6580	2890	3670	2980	3670	8.32	4.93

For SI: 1 lbf = 4.448 N, 1 lbf-ft = 1.356 N-m, 1 lbf-in^2 = 0.00287 N-m^2, 1 inch = 25.4 mm.

(a) The tabulated values are design values for the standard term load duration (K_D = 1.0). All values, except for EI and K, may be adjusted for other load durations as permitted by the code for solid sawn lumber.

(b) The factored vertical (bearing) linear load resistance is 3,300 lbf/ft without load or bearing stiffeners.

(c) Bending stiffness (EI) of the I-joist.

(d) Factored moment resistance (M_r) of the I-joist, which shall not be increased by any code allowed system effect factor.

(e) Factored shear resistance (V_r) of the I-joist.

(f) Factored intermediate reaction (IR_r) of the I-joist with and without bearing stiffeners (BS). Minimum required bearing lengths as indicated. Interpolation of the end reaction between 3-1/2 and 5-1/2-inch bearing is permitted.

(g) Factored end reaction (ER_r) of the I-joist with and without bearing stiffeners (BS). Minimum required bearing lengths as indicated. Interpolation of the end reaction between 1-3/4 and 4-inch bearing is permitted.

(h) Coefficient of shear deflection (K). For calculating uniform load and centre-point load deflections of the I-joist in a simple-span application, use Eqs. 1 and 2.

Uniform Load: $$\delta = \frac{5\omega\ell^4}{384\,EI} + \frac{\omega\ell 2}{K} \quad (1)$$

Centre-Point Load: $$\delta = \frac{P\ell^3}{48\,EI} + \frac{2P\ell}{K} \quad (2)$$

Where:

δ = calculated deflection (in.)

ω = unfactored uniform load (lbf/in.)

ℓ = design span (in.)

P = unfactored concentrated load (lbf)

EI = bending stiffness of the I-joist (lbf-in.^{2})

K = coefficient of shear deflection (lbf)

MAXIMUM FLOOR SPANS

MAXIMUM FLOOR SPANS — 5/8" OSB Sheathing
BARE JOIST

JOIST DEPTH	JOIST SERIES	SIMPLE SPANS ON CENTRE SPACING				MULTIPLE SPANS ON CENTRE SPACING			
		12"	16"	19.2	24"	12"	16"	19.2"	24"
9-1/2"	NI-20	15'-1"	14'-2"	13'-9"	N/A	16'-3"	15'-4"	14'-10"	N/A
	NI-40x	16'-1"	15'-2"	14'-8"	N/A	17'-5"	16'-5"	15'-10"	N/A
	NI-60	16'-3"	15'-4"	14'-10"	N/A	17'-7"	16'-7"	16'-0"	N/A
	NI-70	17'-1"	16'-1"	15'-6"	N/A	18'-7"	17'-4"	16'-9"	N/A
	NI-80	17'-3"	16'-3"	15'-8"	N/A	18'-10"	17'-6"	16'-11"	N/A
11-7/8"	NI-20	16'-11"	16'-0"	15'-5"	N/A	18'-4"	17'-3"	16'-8"	N/A
	NI-40x	18'-1"	17'-0"	16'-5"	N/A	20'-0"	18'-6"	17'-9"	N/A
	NI-60	18'-4"	17'-3"	16'-7"	N/A	20'-3"	18'-9"	18'-0"	N/A
	NI-70	19'-6"	18'-0"	17'-4"	N/A	21'-6"	19'-11"	19'-0"	N/A
	NI-80	19'-9"	18'-3"	17'-6"	N/A	21'-9"	20'-2"	19'-3"	N/A
	NI-90	20'-2"	18'-7"	17'-10"	N/A	22'-3"	20'-7"	19'-8"	N/A
	NI-90x	20'-4"	18'-9"	17'-11"	N/A	22'-5"	20'-9"	19'-10"	N/A
14"	NI-40x	20'-1"	18'-7"	17'-10"	N/A	22'-2"	20'-6"	19'-8"	N/A
	NI-60	20'-5"	18'-11"	18'-1"	N/A	22'-7"	20'-11"	20'-0"	N/A
	NI-70	21'-7"	20'-0"	19'-1"	N/A	23'-10"	22'-1"	21'-1"	N/A
	NI-80	21'-11"	20'-3"	19'-4"	N/A	24'-3"	22'-5"	21'-5"	N/A
	NI-90	22'-5"	20'-8"	19'-9"	N/A	24'-9"	22'-10"	21'-10"	N/A
	NI-90x	22'-7"	20'-11"	19'-11"	N/A	25'-0"	23'-1"	22'-0"	N/A
16"	NI-60	22'-3"	20'-8"	19'-9"	N/A	24'-7"	22'-9"	21'-9"	N/A
	NI-70	23'-6"	21'-9"	20'-9"	N/A	26'-0"	24'-0"	22'-11"	N/A
	NI-80	23'-11"	22'-1"	21'-1"	N/A	26'-5"	24'-5"	23'-3"	N/A
	NI-90	24'-5"	22'-6"	21'-5"	N/A	26'-11"	24'-10"	23'-9"	N/A
	NI-90x	24'-8"	22'-9"	21'-9"	N/A	27'-3"	25'-2"	24'-0"	N/A

MAXIMUM FLOOR SPANS — 5/8" OSB Sheathing
1/2" GYPSUM CEILING

JOIST DEPTH	JOIST SERIES	SIMPLE SPANS ON CENTRE SPACING				MULTIPLE SPANS ON CENTRE SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
9-1/2"	NI-20	15'-7"	14'-8"	14'-2"	N/A	16'-9"	15'-10"	15'-4"	N/A
	NI-40x	16'-7"	15'-7"	15'-1"	N/A	17'-10"	16'-10"	16'-4"	N/A
	NI-60	16'-8"	15'-9"	15'-3"	N/A	18'-1"	17'-0"	16'-5"	N/A
	NI-70	17'-5"	16'-5"	15'-10"	N/A	19'-2"	17'-9"	17'-2"	N/A
	NI-80	17'-8"	16'-7"	16'-0"	N/A	19'-5"	18'-0"	17'-4"	N/A
11-7/8"	NI-20	17'-6"	16'-6"	16'-0"	N/A	19'-2"	17'-10"	17'-3"	N/A
	NI-40x	18'-9"	17'-6"	16'-11"	N/A	20'-8"	19'-3"	18'-5"	N/A
	NI-60	19'-0"	17'-8"	17'-1"	N/A	21'-0"	19'-6"	18'-8"	N/A
	NI-70	20'-1"	18'-7"	17'-9"	N/A	22'-2"	20'-6"	19'-7"	N/A
	NI-80	20'-4"	18'-10"	17'-11"	N/A	22'-5"	20'-9"	19'-10"	N/A
	NI-90	20'-9"	19'-2"	18'-4"	N/A	22'-11"	21'-2"	20'-3"	N/A
	NI-90x	20'-10"	19'-3"	18'-5"	N/A	23'-0"	21'-4"	20'-4"	N/A
14"	NI-40x	20'-10"	19'-4"	18'-6"	N/A	23'-0"	21'-4"	20'-5"	N/A
	NI-60	21'-2"	19'-7"	18'-9"	N/A	23'-4"	21'-8"	20'-9"	N/A
	NI-70	22'-3"	20'-7"	19'-8"	N/A	24'-7"	22'-10"	21'-10"	N/A
	NI-80	22'-7"	20'-11"	20'-0"	N/A	25'-0"	23'-2"	22'-1"	N/A
	NI-90	23'-0"	21'-4"	20'-4"	N/A	25'-6"	23'-7"	22'-6"	N/A
	NI-90x	23'-3"	21'-6"	20'-6"	N/A	25'-8"	23'-9"	22'-8"	N/A
16"	NI-60	23'-1"	21'-5"	20'-6"	N/A	25'-6"	23'-8"	22'-8"	N/A
	NI-70	24'-3"	22'-5"	21'-5"	N/A	26'-10"	24'-10"	23'-9"	N/A
	NI-80	24'-8"	22'-10"	21'-9"	N/A	27'-3"	25'-3"	24'-1"	N/A
	NI-90	25'-1"	23'-2"	22'-2"	N/A	27'-9"	25'-8"	24'-6"	N/A
	NI-90x	25'-4"	23'-5"	22'-4"	N/A	28'-1"	25'-11"	24'-9"	N/A

NOTES:

1. Maximum clear span applicable to residential floor construction with a design live load of 40 psf and dead load of 15 psf. The ultimate limit states are based on the factored loads of 1.50L + 1.25D. The serviceability limit states include the consideration for floor vibration, a live load deflection limit of L/480 and a total load deflection limit of L/240. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
2. Spans are based on a composite floor with glued-nailed oriented strand board (OSB) sheathing with a minimum thickness of 5/8 inch. Adhesive shall meet the requirements given in CGBS-71.26 Standard. No concrete topping or bridging element was assumed.
3. Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches for the intermediate bearings.
4. Bearing stiffeners are not required when I-joists are used with the spans and spacing given in these tables, except as required for hangers.
5. These span charts are based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

SI units conversion: 1 inch = 25.4 mm, 1 foot = 0.305 m

MAXIMUM FLOOR SPANS — 3/4" OSB Sheathing
BARE JOIST

JOIST DEPTH	JOIST SERIES	SIMPLE SPANS ON CENTRE SPACING				MULTIPLE SPANS ON CENTRE SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
9-1/2"	NI-20	15'-10"	15'-0"	14'-5"	13'-5"	17'-1"	16'-1"	15'-6"	14'-7"
	NI-40x	17'-0"	16'-0"	15'-5"	14'-9"	18'-5"	17'-3"	16'-7"	15'-5"
	NI-60	17'-2"	16'-2"	15'-7"	14'-11"	18'-8"	17'-5"	16'-9"	16'-1"
	NI-70	18'-0"	16'-11"	16'-3"	15'-7"	19'-10"	18'-4"	17'-7"	16'-10"
	NI-80	18'-3"	17'-1"	16'-5"	15'-9"	20'-1"	18'-7"	17'-9"	17'-0"
11-7/8"	NI-20	17'-10"	16'-10"	16'-2"	15'-6"	19'-7"	18'-2"	17'-5"	16'-7"
	NI-40x	19'-4"	17'-11"	17'-3"	16'-6"	21'-3"	19'-9"	18'-10"	17'-7"
	NI-60	19'-7"	18'-2"	17'-5"	16'-9"	21'-7"	20'-0"	19'-1"	18'-1"
	NI-70	20'-9"	19'-2"	18'-3"	17'-5"	22'-11"	21'-2"	20'-2"	19'-1"
	NI-80	21'-1"	19'-5"	18'-6"	17'-7"	23'-3"	21'-6"	20'-5"	19'-4"
	NI-90	21'-6"	19'-10"	18'-11"	17'-11"	23'-9"	21'-11"	20'-10"	19'-9"
	NI-90x	21'-8"	20'-0"	19'-1"	18'-0"	23'-11"	22'-1"	21'-0"	19'-11"
14"	NI-40x	21'-5"	19'-10"	18'-11"	17'-11"	23'-7"	21'-10"	20'-10"	19'-4"
	NI-60	21'-10"	20'-2"	19'-3"	18'-2"	24'-0"	22'-3"	21'-2"	20'-1"
	NI-70	23'-0"	21'-3"	20'-3"	19'-2"	25'-5"	23'-6"	22'-4"	21'-2"
	NI-80	23'-5"	21'-7"	20'-7"	19'-5"	25'-10"	23'-10"	22'-8"	21'-6"
	NI-90	23'-10"	22'-0"	20'-11"	19'-10"	26'-4"	24'-4"	23'-2"	21'-10"
	NI-90x	24'-1"	22'-3"	21'-2"	20'-0"	26'-7"	24'-7"	23'-5"	22'-2"
16"	NI-60	23'-9"	22'-0"	20'-11"	19'-10"	26'-2"	24'-3"	23'-1"	21'-10"
	NI-70	25'-1"	23'-2"	22'-0"	20'-10"	27'-8"	25'-7"	24'-4"	23'-0"
	NI-80	25'-6"	23'-6"	22'-4"	21'-2"	28'-1"	26'-0"	24'-9"	23'-4"
	NI-90	26'-0"	24'-0"	22'-9"	21'-6"	28'-8"	26'-6"	25'-2"	23'-9"
	NI-90x	26'-4"	24'-3"	23'-1"	21'-10"	29'-1"	26'-10"	25'-6"	24'-1"

MAXIMUM FLOOR SPANS — 3/4" OSB Sheathing
1/2" GYPSUM CEILING

JOIST DEPTH	JOIST SERIES	SIMPLE SPANS ON CENTRE SPACING				MULTIPLE SPANS ON CENTRE SPACING			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
9-1/2"	NI-20	16'-4"	15'-5"	14'-6"	13'-5"	17'-8"	16'-8"	15'-9"	14'-7"
	NI-40x	17'-5"	16'-5"	15'-10"	15'-2"	19'-0"	17'-9"	17'-1"	15'-5"
	NI-60	17'-6"	16'-7"	15'-11"	15'-3"	19'-3"	17'-10"	17'-3"	16'-6"
	NI-70	18'-5"	17'-3"	16'-7"	15'-11"	20'-4"	18'-10"	18'-0"	17'-2"
	NI-80	18'-8"	17'-5"	16'-9"	16'-1"	20'-7"	19'-1"	18'-3"	17'-5"
11-7/8"	NI-20	18'-6"	17'-4"	16'-9"	16'-1"	20'-5"	19'-0"	18'-2"	16'-7"
	NI-40x	19'-11"	18'-6"	17'-9"	17'-0"	22'-0"	20'-5"	19'-6"	17'-7"
	NI-60	20'-2"	18'-9"	17'-11"	17'-2"	22'-3"	20'-8"	19'-9"	18'-9"
	NI-70	21'-4"	19'-9"	18'-10"	17'-10"	23'-6"	21'-10"	20'-9"	19'-8"
	NI-80	21'-7"	20'-0"	19'-0"	18'-0"	23'-10"	22'-1"	21'-0"	19'-11"
	NI-90	22'-0"	20'-4"	19'-5"	18'-4"	24'-4"	22'-6"	21'-5"	20'-3"
	NI-90x	22'-2"	20'-6"	19'-6"	18'-6"	24'-5"	22'-8"	21'-7"	20'-5"
14"	NI-40x	22'-1"	20'-6"	19'-7"	18'-7"	24'-5"	22'-8"	21'-8"	19'-4"
	NI-60	22'-5"	20'-10"	19'-11"	18'-10"	24'-9"	23'-0"	22'-0"	20'-10"
	NI-70	23'-8"	21'-11"	20'-10"	19'-9"	26'-1"	24'-3"	23'-1"	21'-10"
	NI-80	24'-0"	22'-3"	21'-2"	20'-0"	26'-6"	24'-7"	23'-5"	22'-2"
	NI-80	24'-5"	22'-7"	21'-6"	20'-4"	27'-0"	25'-0"	23'-10"	22'-6"
	NI-90x	24'-8"	22'-10"	21'-9"	20'-7"	27'-3"	25'-3"	24'-1"	22'-9"
16"	NI-60	24'-6"	22'-9"	21'-8"	20'-6"	27'-0"	25'-2"	24'-0"	22'-9"
	NI-70	25'-9"	23'-10"	22'-9"	21'-6"	28'-5"	26'-4"	25'-2"	23'-9"
	NI-80	26'-1"	24'-2"	23'-1"	21'-10"	28'-10"	26'-9"	25'-6"	24'-1"
	NI-90	26'-7"	24'-7"	23'-5"	22'-2"	29'-5"	27'-3"	25'-11"	24'-6"
	NI-90x	26'-11"	24'-11"	23'-8"	22'-5"	29'-9"	27'-6"	26'-3"	24'-10"

NOTES:

1. Maximum **clear** span applicable to residential floor construction with a design live load of 40 psf and dead load of 15 psf. The ultimate limit states are based on the factored loads of 1.50L + 1.25D. The serviceability limit states include the consideration for floor vibration, a live load deflection limit of L/480 and a total load deflection limit of L/240. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
2. Spans are based on a composite floor with glued-nailed oriented strand board (OSB) sheathing with a minimum thickness of 3/4 inch. Adhesive shall meet the requirements given in CGBS-71.26 Standard. No concrete topping or bridging element was assumed.
3. Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches for the intermediate bearings.
4. Bearing stiffeners are **not** required when I-joists are used with the spans and spacing given in these tables, except as required for hangers.
5. These span charts are based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

SI units conversion: 1 inch = 25.4 mm, 1 foot = 0.305 m

MAXIMUM ROOF SPANS

MAXIMUM ROOF SPANS

SNOW LOAD = 20 PSF, DEAD LOAD = 15 PSF

JOIST DEPTH	JOIST SERIES	SLOPE OF 1/4:12 TO 4:12 ON CENTRE SPACING			SLOPE OF >4:12 TO 8:12 ON CENTRE SPACING			SLOPE OF >8:12 TO 12:12 ON CENTRE SPACING		
		12"	16"	24"	12"	16"	24"	12"	16"	24"
9-1/2"	NI-20	20'-4"	18'-5"	16'-0"	19'-1"	17'-3"	15'-0"	17'-7"	15'-11"	13'-10"
	NI-40x	23'-4"	21'-1"	18'-4"	21'-10"	19'-10"	17'-2"	20'-2"	18'-3"	15'-10"
	NI-60	23'-9"	21'-6"	18'-8"	22'-4"	20'-2"	17'-6"	20'-7"	18'-7"	16'-2"
	NI-70	26'-1"	23'-7"	20'-5"	24'-5"	22'-1"	19'-2"	22'-6"	20'-5"	17'-9"
	NI-80	26'-7"	24'-1"	20'-11"	24'-11"	22'-7"	19'-7"	23'-0"	20'-10"	18'-1"
11-7/8"	NI-20	24'-7"	22'-3"	19'-4"	23'-0"	20'-10"	18'-2"	21'-3"	19'-3"	16'-9"
	NI-40x	27'-11"	25'-3"	21'-11"	26'-2"	23'-8"	20'-7"	24'-1"	21'-10"	19'-0"
	NI-60	28'-6"	25'-10"	22'-5"	26'-9"	24'-3"	21'-1"	24'-8"	22'-4"	19'-5"
	NI-70	31'-1"	28'-2"	24'-5"	29'-2"	26'-5"	23'-0"	26'-11"	24'-4"	21'-2"
	NI-80	31'-9"	28'-9"	24'-11"	29'-9"	27'-0"	23'-5"	27'-5"	24'-10"	21'-7"
	NI-90	32'-9"	29'-8"	25'-9"	30'-9"	27'-10"	24'-2"	28'-4"	25'-8"	22'-4"
	NI-90x	33'-0"	29'-10"	25'-11"	31'-0"	28'-0"	24'-4"	28'-7"	25'-10"	22'-6"
14"	NI-40x	31'-8"	28'-8"	24'-4"	29'-9"	26'-11"	23'-5"	27'-5"	24'-10"	21'-7"
	NI-60	32'-6"	29'-5"	25'-7"	30'-6"	27'-7"	24'-0"	28'-1"	25'-6"	22'-2"
	NI-70	35'-4"	32'-0"	27'-9"	33'-1"	30'-0"	26'-1"	30'-6"	27'-8"	24'-1"
	NI-80	36'-1"	32'-8"	28'-5"	33'-11"	30'-8"	26'-8"	31'-3"	28'-4"	24'-7"
	NI-90	37'-2"	33'-8"	29'-3"	34'-11"	31'-7"	27'-5"	32'-2"	29'-2"	25'-4"
	NI-90x	37'-8"	34'-1"	29'-7"	35'-4"	32'-0"	27'-10"	32'-7"	29'-6"	25'-8"
16"	NI-60	36'-2"	32'-9"	28'-5"	33'-11"	30'-8"	26'-8"	31'-3"	28'-4"	24'-7"
	NI-70	39'-1"	35'-5"	30'-9"	36'-8"	33'-3"	28'-11"	33'-10"	30'-8"	26'-8"
	NI-80	40'-1"	36'-3"	31'-6"	37'-7"	34'-1"	29'-7"	34'-8"	31'-5"	27'-4"
	NI-90	41'-2"	37'-4"	32'-5"	38'-8"	35'-0"	30'-5"	35'-8"	32'-3"	28'-1"
	NI-90x	41'-10"	37'-11"	32'-11"	39'-3"	35'-7"	30'-11"	36'-2"	32'-10"	28'-6"

MAXIMUM ROOF SPANS

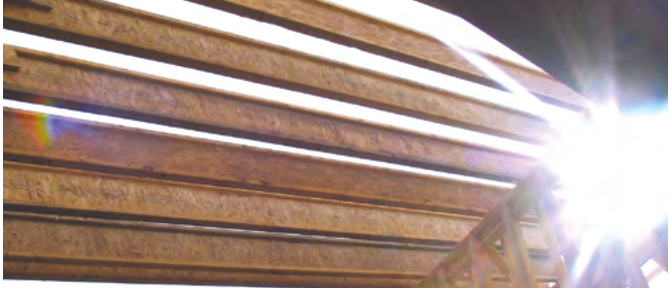
Snow Load = 30 psf, Dead Load = 15 psf

JOIST DEPTH	JOIST SERIES	SLOPE OF 1/4:12 TO 4:12 ON CENTRE SPACING			SLOPE OF >4:12 TO 8:12 ON CENTRE SPACING			SLOPE OF >8:12 TO 12:12 ON CENTRE SPACING		
		12"	16"	24"	12"	16"	24"	12"	16"	24"
9-1/2"	NI-20	18'-9"	17'-0"	14'-9"	17'-8"	16'-0"	13'-11"	16'-5"	14'-10"	12'-10"
	NI-40x	21'-6"	19'-5"	16'-10"	20'-3"	18'-4"	15'-11"	18'-9"	17'-0"	14'-9"
	NI-60	21'-11"	19'-10"	17'-2"	20'-8"	18'-8"	16'-3"	19'-2"	17'-4"	15'-0"
	NI-70	24'-0"	21'-8"	18'-10"	22'-7"	20'-6"	17'-9"	21'-0"	19'-0"	16'-6"
	NI-80	24'-6"	22'-2"	19'-2"	23'-1"	20'-11"	18'-2"	21'-5"	19'-5"	16'-10"
11-7/8"	NI-20	22'-8"	20'-6"	17'-10"	21'-4"	19'-4"	16'-9"	19'-9"	17'-11"	15'-7"
	NI-40x	25'-9"	23'-3"	19'-5"	24'-3"	21'-11"	19'-0"	22'-6"	20'-4"	17'-8"
	NI-60	26'-3"	23'-9"	20'-8"	24'-9"	22'-5"	19'-6"	23'-0"	20'-10"	18'-1"
	NI-70	28'-8"	25'-11"	22'-6"	27'-0"	24'-6"	21'-3"	25'-1"	22'-8"	19'-8"
	NI-80	29'-3"	26'-6"	22'-11"	27'-7"	25'-0"	21'-8"	25'-7"	23'-2"	20'-1"
	NI-90	30'-2"	27'-4"	23'-8"	28'-5"	25'-9"	22'-4"	26'-5"	23'-11"	20'-9"
	NI-90x	30'-5"	27'-6"	23'-10"	28'-8"	25'-11"	22'-6"	26'-7"	24'-1"	20'-11"
14"	NI-40x	29'-2"	26'-2"	21'-4"	27'-6"	24'-11"	20'-11"	25'-6"	23'-1"	20'-1"
	NI-60	30'-0"	27'-2"	23'-6"	28'-3"	25'-7"	22'-2"	26'-2"	23'-9"	20'-7"
	NI-70	32'-7"	29'-5"	25'-7"	30'-8"	27'-9"	24'-1"	28'-5"	25'-9"	22'-5"
	NI-80	33'-3"	30'-1"	26'-2"	31'-5"	28'-5"	24'-8"	29'-1"	26'-4"	22'-11"
	NI-90	34'-3"	31'-0"	26'-11"	32'-4"	29'-3"	25'-5"	30'-0"	27'-2"	23'-7"
	NI-90x	34'-8"	31'-5"	27'-3"	32'-9"	29'-7"	25'-8"	30'-4"	27'-6"	23'-10"
16"	NI-60	33'-4"	30'-2"	26'-2"	31'-5"	28'-5"	24'-8"	29'-1"	26'-4"	22'-11"
	NI-70	36'-1"	32'-8"	28'-4"	34'-0"	30'-9"	26'-9"	31'-6"	28'-7"	24'-10"
	NI-80	36'-11"	33'-5"	29'-0"	34'-10"	31'-6"	27'-5"	32'-3"	29'-3"	25'-5"
	NI-90	38'-0"	34'-4"	29'-10"	35'-10"	32'-5"	28'-2"	33'-2"	30'-1"	26'-1"
	NI-90x	38'-7"	34'-11"	30'-3"	36'-4"	32'-11"	28'-7"	33'-9"	30'-7"	26'-6"

NOTES:

1. Maximum **clear** span applicable to simple-span roof construction with a design roof snow load as shown and dead load of 15 psf. The maximum span is based on the horizontal distance between inside face of supports. The ultimate limit states are based on the factored loads of 1.50S + 1.25D. The serviceability limit states are based on a live load deflection limit of L/360, a total load deflection limit of L/240, and an importance factor of 0.9.
2. Spans include a cantilever of up to 2 feet on one end of the I-joist.
3. Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches on end bearing adjacent to cantilever.
4. Bearing stiffeners are **not** required when I-joists are used with the spans and spacings given in these tables, except as required for hangers.
5. These span charts are based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

SI units conversion: 1 inch = 25.4 mm, 1 foot = 0.305 m



MAXIMUM ROOF SPANS

SNOW LOAD = 40 PSF, DEAD LOAD = 15 PSF

JOIST DEPTH	JOIST SERIES	SLOPE OF 1/4:12 TO 4:12			SLOPE OF >4:12 TO 8:12			SLOPE OF >8:12 TO 12:12		
		ON CENTRE SPACING			ON CENTRE SPACING			ON CENTRE SPACING		
		12"	16"	24"	12"	16"	24"	12"	16"	24"
9-1/2"	NI-20	17'-4"	15'-8"	13'-7"	16'-7"	15'-0"	13'-0"	15'-5"	14'-0"	12'-1"
	NI-40x	19'-10"	17'-11"	15'-4"	19'-0"	17'-2"	14'-11"	17'-8"	16'-0"	13'-11"
	NI-60	20'-2"	18'-3"	15'-10"	19'-5"	17'-6"	15'-2"	18'-0"	16'-4"	14'-2"
	NI-70	22'-2"	20'-0"	17'-4"	21'-3"	19'-2"	16'-8"	19'-9"	17'-11"	15'-6"
	NI-80	22'-7"	20'-5"	17'-8"	21'-8"	19'-7"	17'-0"	20'-2"	18'-3"	15'-10"
11-7/8"	NI-20	20'-11"	18'-11"	16'-5"	20'-0"	18'-2"	15'-9"	18'-8"	16'-11"	14'-8"
	NI-40x	23'-9"	21'-5"	17'-6"	22'-9"	20'-7"	17'-2"	21'-2"	19'-2"	16'-8"
	NI-60	24'-3"	21'-11"	19'-0"	23'-3"	21'-1"	18'-3"	21'-8"	19'-7"	17'-0"
	NI-70	26'-5"	23'-11"	20'-9"	25'-5"	23'-0"	19'-11"	23'-8"	21'-5"	18'-7"
	NI-80	27'-0"	24'-5"	21'-1"	25'-11"	23'-5"	20'-4"	24'-1"	21'-10"	18'-11"
	NI-90	27'-10"	25'-2"	21'-9"	26'-9"	24'-2"	20'-11"	24'-10"	22'-6"	19'-6"
	NI-90x	28'-1"	25'-4"	21'-11"	26'-11"	24'-4"	21'-1"	25'-1"	22'-8"	19'-8"
14"	NI-40x	26'-11"	23'-7"	19'-2"	25'-10"	23'-2"	18'-10"	24'-1"	21'-9"	18'-5"
	NI-60	27'-8"	25'-0"	21'-8"	26'-6"	24'-0"	20'-10"	24'-8"	22'-4"	19'-5"
	NI-70	30'-0"	27'-2"	23'-6"	28'-10"	26'-1"	22'-7"	26'-10"	24'-3"	21'-1"
	NI-80	30'-8"	27'-9"	24'-1"	29'-6"	26'-8"	23'-2"	27'-5"	24'-10"	21'-7"
	NI-90	31'-7"	28'-7"	24'-9"	30'-4"	27'-6"	23'-10"	28'-3"	25'-7"	22'-2"
	NI-90x	32'-0"	28'-11"	25'-1"	30'-9"	27'-10"	24'-1"	28'-7"	25'-11"	22'-6"
16"	NI-60	30'-9"	27'-10"	23'-9"	29'-6"	26'-8"	23'-2"	27'-5"	24'-10"	21'-7"
	NI-70	33'-3"	30'-1"	25'-9"	31'-11"	28'-11"	25'-1"	29'-9"	26'-11"	23'-4"
	NI-80	34'-1"	30'-10"	26'-9"	32'-8"	29'-7"	25'-8"	30'-5"	27'-7"	23'-11"
	NI-90	35'-0"	31'-8"	27'-5"	33'-7"	30'-5"	26'-5"	31'-4"	28'-4"	24'-7"
	NI-90x	35'-7"	32'-2"	27'-11"	34'-2"	30'-11"	26'-10"	31'-10"	28'-9"	25'-0"

MAXIMUM ROOF SPANS

SNOW LOAD = 50 PSF, DEAD LOAD = 15 PSF

JOIST DEPTH	JOIST SERIES	SLOPE OF 1/4:12 TO 4:12			SLOPE OF >4:12 TO 8:12			SLOPE OF >8:12 TO 12:12		
		ON CENTRE SPACING			ON CENTRE SPACING			ON CENTRE SPACING		
		12"	16"	24"	12"	16"	24"	12"	16"	24"
9-1/2"	NI-20	16'-0"	14'-6"	12'-6"	15'-4"	13'-11"	12'-0"	14'-7"	13'-2"	11'-5"
	NI-40x	18'-4"	16'-7"	14'-0"	17'-7"	15'-11"	13'-9"	16'-8"	15'-1"	13'-1"
	NI-60	18'-8"	16'-11"	14'-7"	17'-11"	16'-3"	14'-0"	17'-0"	15'-5"	13'-4"
	NI-70	20'-5"	18'-6"	16'-0"	19'-8"	17'-9"	15'-4"	18'-8"	16'-11"	14'-8"
	NI-80	20'-11"	18'-10"	16'-4"	20'-1"	18'-2"	15'-8"	19'-1"	17'-3"	14'-11"
11-7/8"	NI-20	19'-4"	17'-6"	15'-1"	18'-7"	16'-9"	14'-7"	17'-7"	15'-11"	13'-10"
	NI-40x	21'-11"	19'-8"	16'-0"	21'-1"	19'-1"	15'-9"	20'-0"	18'-1"	15'-5"
	NI-60	22'-5"	20'-3"	17'-7"	21'-6"	19'-6"	16'-10"	20'-5"	18'-6"	16'-1"
	NI-70	24'-6"	22'-1"	19'-1"	23'-6"	21'-3"	18'-5"	22'-4"	20'-2"	17'-6"
	NI-80	24'-11"	22'-7"	19'-6"	24'-0"	21'-8"	18'-9"	22'-9"	20'-7"	17'-10"
	NI-90	25'-9"	23'-3"	20'-1"	24'-9"	22'-4"	19'-4"	23'-6"	21'-3"	18'-5"
	NI-90x	25'-11"	23'-5"	20'-3"	24'-11"	22'-6"	19'-6"	23'-8"	21'-5"	18'-7"
14"	NI-40x	24'-11"	21'-7"	17'-7"	23'-11"	21'-3"	17'-4"	22'-9"	20'-7"	17'-0"
	NI-60	25'-7"	23'-2"	20'-0"	24'-7"	22'-3"	19'-3"	23'-4"	21'-1"	18'-4"
	NI-70	27'-9"	25'-1"	21'-8"	26'-8"	24'-1"	20'-11"	25'-4"	22'-11"	19'-11"
	NI-80	28'-5"	25'-8"	22'-3"	27'-3"	24'-8"	21'-4"	25'-11"	23'-5"	20'-4"
	NI-90	29'-3"	26'-5"	22'-10"	28'-1"	25'-5"	22'-0"	26'-8"	24'-2"	20'-11"
	NI-90x	29'-7"	26'-9"	23'-2"	28'-5"	25'-9"	22'-3"	27'-0"	24'-5"	21'-2"
16"	NI-60	28'-5"	25'-9"	21'-8"	27'-4"	24'-8"	21'-5"	25'-11"	23'-6"	20'-4"
	NI-70	30'-9"	27'-10"	21'-8"	29'-7"	26'-9"	23'-2"	28'-1"	25'-5"	22'-1"
	NI-80	31'-6"	28'-6"	23'-1"	30'-3"	27'-5"	23'-9"	28'-9"	26'-0"	22'-7"
	NI-90	32'-5"	29'-3"	25'-4"	31'-1"	28'-2"	24'-5"	29'-7"	26'-9"	23'-3"
	NI-90x	32'-11"	29'-9"	25'-9"	31'-7"	28'-7"	24'-9"	30'-0"	27'-2"	23'-7"

NOTES:

1. Maximum **clear** span applicable to simple-span roof construction with a design roof snow load as shown and dead load of 15 psf. The maximum span is based on the horizontal distance between inside face of supports. The ultimate limit states are based on the factored loads of 1.50S + 1.25D. The serviceability limit states are based on a live load deflection limit of L/360, a total load deflection limit of L/240, and an importance factor of 0.9.
2. Spans include a cantilever of up to 2 feet on one end of the I-joist.
3. Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches on end bearing adjacent to cantilever.
4. Bearing stiffeners are **not** required when I-joists are used with the spans and spacings given in these tables, except as required for hangers.
5. These span charts are based on uniform loads. For applications with other than uniformly distributed loads, an engineering analysis may be required based on the use of the design properties.

SI units conversion: 1 inch = 25.4 mm, 1 foot = 0.305 m

MAXIMUM
UNIFORM LOADS

MAXIMUM UNIFORM FLOOR LOADS (plf)

JOIST DEPTH	JOIST SERIES	CRITERIA	CLEAR SPAN (ft)											
			8	10	12	14	16	18	20	22	24	26	28	30
9-1/2"	NI-20	L/480 LL		133	81	52	36	25	--	--	--	--	--	--
		L/240 TL			162	105	72	51	37	28	22	17	14	11
		Fact. Load	344	277	230	170	131	103	84	69	58	50	43	37
	NI-40x	L/480 LL		188	116	76	52	37	28	--	--	--	--	--
		L/240 TL					105	75	56	42	33	26	--	--
		Fact. Load	367	295	247	190	146	116	94	78	65	56	48	42
	NI-60	L/480 LL			122	80	55	39	29	--	--	--	--	--
		L/240 TL					111	79	59	44	34	27	--	--
		Fact. Load	367	295	247	212	186	152	123	102	86	73	63	55
	NI-70	L/480 LL			154	102	71	51	38	29	--	--	--	--
		L/240 TL						102	76	58	45	36	29	23
		Fact. Load	367	295	247	212	186	165	149	136	116	99	85	74
	NI-80	L/480 LL			162	108	75	54	40	30	24	--	--	--
		L/240 TL						108	81	61	48	38	30	25
		Fact. Load	367	295	247	212	186	165	149	136	122	104	89	78
11-7/8"	NI-20	L/480 LL		222	136	89	61	44	32	24	--	--	--	--
		L/240 TL						88	65	49	38	30	24	--
		Fact. Load	436	350	293	220	169	134	109	90	76	64	56	48
	NI-40x	L/480 LL			189	125	87	62	46	35	27	--	--	--
		L/240 TL								71	55	44	35	29
		Fact. Load	455	366	306	247	190	150	122	101	85	72	62	54
	NI-60	L/480 LL			199	132	92	66	49	37	29	23	--	--
		L/240 TL						133	99	75	59	46	37	30
		Fact. Load	455	366	306	263	230	197	160	133	111	95	82	71
	NI-70	L/480 LL				165	116	84	63	48	37	30	24	--
		L/240 TL							126	96	75	60	48	39
		Fact. Load	455	366	306	263	230	205	185	168	150	128	110	96
	NI-80	L/480 LL				173	122	88	66	51	39	31	25	--
		L/240 TL							133	102	79	63	51	42
		Fact. Load	455	366	306	263	230	205	185	168	154	135	116	101
	NI-90	L/480 LL				187	132	96	72	55	43	34	28	23
		L/240 TL							144	111	87	69	56	46
		Fact. Load	515	414	347	298	261	232	209	190	175	161	146	127
	NI-90x	L/480 LL			280	190	134	98	73	56	44	35	28	--
		L/240 TL						196	147	113	88	70	57	47
		Fact. Load	630	507	424	364	319	284	256	233	214	183	158	137
14"	NI-40x	L/480 LL				176	123	89	66	51	39	31	25	--
		L/240 TL										63	51	41
		Fact. Load	480	386	323	277	229	181	147	122	102	87	75	66
	NI-60	L/480 LL					132	96	71	54	42	34	27	--
		L/240 TL								109	85	68	55	45
		Fact. Load	482	388	324	279	244	217	193	160	134	115	99	86
	NI-70	L/480 LL					163	119	89	68	54	43	34	28
		L/240 TL								137	108	86	69	57
		Fact. Load	512	411	344	295	259	230	208	189	173	154	133	116
	NI-80	L/480 LL					172	126	95	73	57	45	37	30
		L/240 TL									115	91	74	61
		Fact. Load	512	411	344	295	259	230	208	189	173	160	140	122
	NI-90	L/480 LL						136	102	79	62	49	40	33
		L/240 TL									124	99	80	66
		Fact. Load	515	414	347	298	261	232	209	190	175	161	150	140
	NI-90x	L/480 LL					191	140	106	81	64	51	41	34
		L/240 TL								163	128	103	83	68
		Fact. Load	640	515	430	370	324	288	260	236	217	200	186	166
16"	NI-60	L/480 LL						128	96	74	57	46	37	30
		L/240 TL										92	74	61
		Fact. Load	501	403	337	289	254	226	203	185	156	133	115	100
	NI-70	L/480 LL						157	118	91	72	57	46	38
		L/240 TL										115	93	76
		Fact. Load	559	450	376	323	283	252	227	207	189	175	154	135
	NI-80	L/480 LL						167	126	97	76	61	49	41
		L/240 TL										123	99	82
		Fact. Load	559	450	376	323	283	252	227	207	189	175	162	142
	NI-90	L/480 LL							135	105	82	66	53	44
		L/240 TL											107	88
		Fact. Load	559	450	376	323	283	252	227	207	189	175	163	152
	NI-90x	L/480 LL						186	141	109	86	69	56	46
		L/240 TL										138	112	92
		Fact. Load	640	515	430	370	324	288	260	236	217	200	186	174

NOTES:

1. Table values are based on clear distance between supports and may be used for simple or multiple spans. For multiple-span applications, the end spans shall be 40% or more of the adjacent span.
2. Tabulated loads are based on uniform loads only, and assume continuous lateral bracing of the compression flange. Table values do not include additional stiffness from composite action with glue-nailed or nailed decking.
3. Selected I-joist must satisfy both live and total unfactored loads, and total factored load. Where the live load is blank, the factored load governs the design.
4. The consideration for floor vibration has not been included. Verify that the deflection criteria herein are accepted by local codes and authorities.
5. The I-joist weight has not been taken into account.
6. Minimum bearing length shall be 1-3/4 inches for the end bearings, and 3-1/2 inches for the intermediate bearings.
7. Bearing stiffeners are not required, except as required for hangers.
8. For floor or roof applications with L/360 live load deflection, multiply L/480 value times 1.33.
9. For double joists, double the table values and connect joist per detail 1p on page 19.
10. For roofs with a slope of 2:12 or greater, the horizontal span must be multiplied by the appropriate slope adjustment factor, as given on the following page.

PSF TO PLF CONVERSION TABLE

LOAD IN POUNDS PER LINEAR FOOT (PLF)

ON CENTRE SPACING		LOAD IN POUNDS PER SQUARE FOOT (psf)								
in.	ft	20	25	30	35	40	45	50	55	60
12	1.00	20	25	30	35	40	45	50	55	60
16	1.33	27	34	40	47	54	60	67	74	80
19.2	1.60	32	40	48	56	64	72	80	88	96
24	2.00	40	50	60	70	80	90	100	110	120

o.c. spacing (ft) x load (psf) = load (plf)

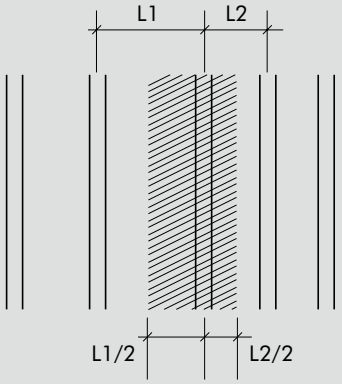
ROOF SLOPE ADJUSTMENT FACTORS

SLOPE IN 12	3	4	5	6	7	8	9	10	11	12
SLOPE FACTOR	1.031	1.054	1.083	1.118	1.158	1.202	1.250	1.302	1.357	1.414

CUTTING LENGTH FOR SLOPED ROOFS

Cut Length (ft) = [Horizontal Distance (ft) x Slope Factor] + [Joist Depth (in.) x Slope in 12 / 144]

JOIST SPACING

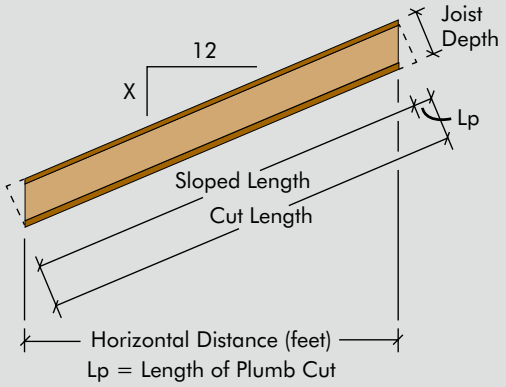


Calculating Uniformly Distributed Load (plf):

$$\left(\frac{L1\ (ft)}{2}+\frac{L2\ (ft)}{2}\right) \times LL\ (psf) = LL\ (plf)$$

$$\left(\frac{L1\ (ft)}{2}+\frac{L2\ (ft)}{2}\right) \times TL\ (psf) = TL\ (plf)$$

Check resulting loads against those in the appropriate chart.



TYPICAL FLOOR FRAMING
AND CONSTRUCTION DETAILS

INSTALLATION NOTES:

1. Installation of Nordic I-joists shall be as shown in Figure 1.
2. Except for cutting to length, I-joist flanges should never be cut, drilled, or notched.
3. Install I-joists so that top and bottom flanges are within 1/2 inch of true vertical alignment.
4. Concentrated loads should only be applied to the top surface of the top flange. Concentrated loads should not be suspended from the bottom flange with the exception of light loads such as ceiling fans or light fixtures.
5. I-joists must be protected from the weather prior to installation.
6. I-joists must not be used in applications where they will be permanently exposed to weather, or will reach a moisture content of 16 percent or greater, such as in swimming pool or hot tub areas. They must not be installed where they will remain in direct contact with concrete or masonry.
7. End bearing length must be at least 1-3/4 inches. For multiple-span joists, intermediate bearing length must be at least 3-1/2 inches.

8. Ends of floor joists shall be restrained to prevent rollover. Use rim board or I-joist blocking panels.
9. I-joists installed beneath bearing walls perpendicular to the joists shall have full-depth blocking panels, rim board, or squash blocks (cripple blocks) to transfer gravity loads from above the floor system to the wall or foundation below.
10. For I-joists installed directly beneath bearing walls parallel to the joists or used as rim board or blocking panels, the maximum allowable vertical load using a single I-joist is 3,300 plf, and 6,600 plf if double I-joists are used.
11. Continuous lateral support of the I-joist's compression flange is required to prevent rotation and buckling. In simple span uses, lateral support of the top flange is normally supplied by the floor sheathing. In multiple span or cantilever applications, bracing of the I-joist's bottom flange is also required at interior supports of multiple-span joists, and at the end support next to the cantilever extension. The ends of all cantilever extensions must be laterally braced as shown in Figure 3, 4, or 5.
12. Nails installed perpendicular to the wide face of the flange shall be spaced in accordance with the applicable building code requirements or approved building plans, but should not be closer than 3 inches on centre for 2-1/2" common spiral nails or 6 inches on centre for 3" common spiral nails. If more than one row of nails is used, the rows must be offset at least 1/2 inch.
13. Figure 1 details on the following pages show only I-joist-specific fastener requirements. For other fastener requirements, see the applicable building code.
14. For proper temporary bracing of wood I-joists and placement of temporary construction loads, see *Safety and Construction Precautions*, on page 42.

FLOOR PERFORMANCE

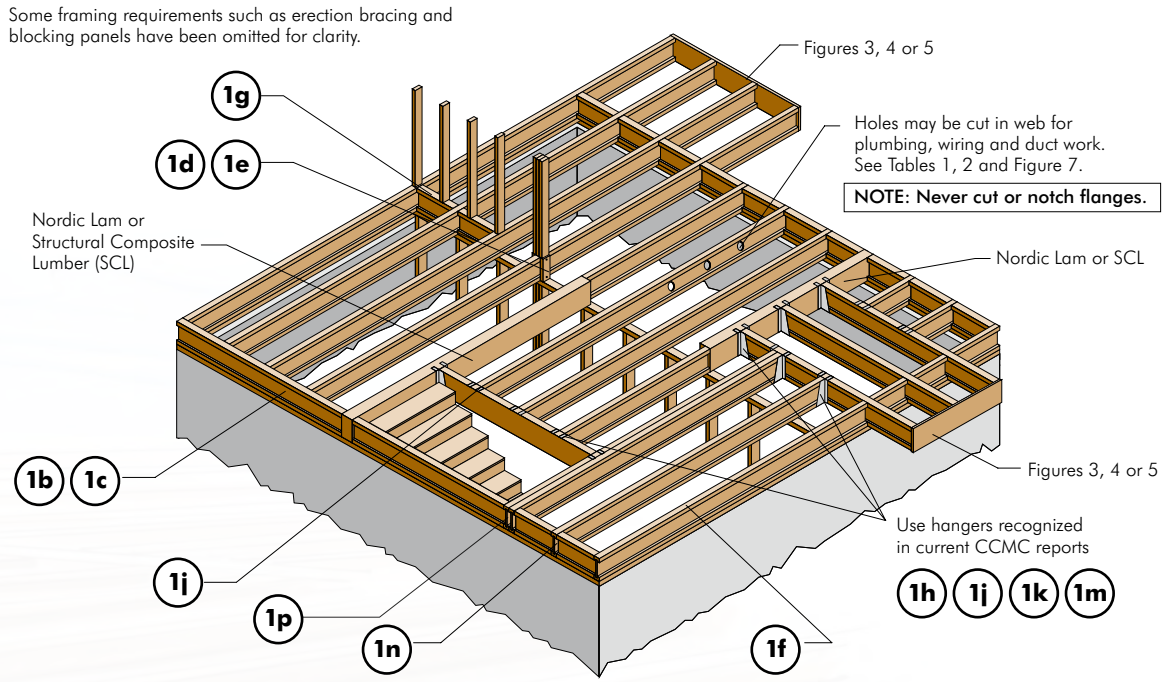
Researchers have proposed a number of methods that can be used to reduce floor vibration. These methods include:

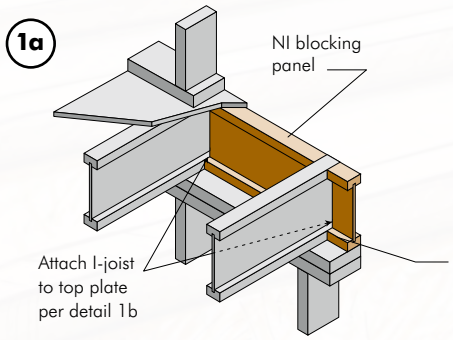
- Gluing the wood structural panel floor to the joists
- Attaching wood structural panels or gypsum board to the bottom of the floor joists
- Decreasing the floor-joist spacing by one increment based on maximum floor span
- Using full-depth blocking at regular intervals between all of the floor joists over the entire floor (Detail 1r)

By far the most practical and most economical way to further increase the stiffness of your floor when using Nordic joists is to select the most economical I-joist from our maximum span tables and then maintain the same joist designation but upgrade to the next net depth. For example: If a 9-1/2" NI-40x is selected for a given application, specifying an 11-7/8" NI-40x will provide an increase in stiffness of over 70% for just a few cents per linear foot.

FIGURE 1

TYPICAL NORDIC I-JOIST FLOOR FRAMING AND CONSTRUCTION DETAILS

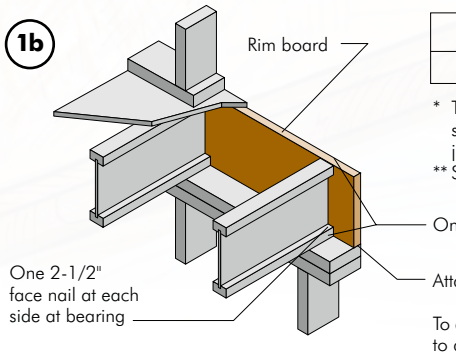




Blocking Panel or Rim Joist	Maximum Factored Uniform Vertical Load* (plf)
NI Joists	3,300

*The uniform vertical load is limited to a joist depth of 16 inches or less and is based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer capacity, see detail 1d.

2-1/2" nails at 6" o.c. to top plate (when used for lateral shear transfer, nail to bearing plate with same nailing as required for decking)



Blocking Panel or Rim Joist	Maximum Factored Uniform Vertical Load* (plf)
1-1/8" APA Rim Board Plus**	8,090

* The uniform vertical load is limited to a rim board depth of 16 inches or less and is based on standard term load duration. It shall not be used in the design of a bending member, such as joist, header, or rafter. For concentrated vertical load transfer capacity, see detail 1d.

** See ANSI/APA PRR410: *Standard for Performance-Rated Engineered Wood Rim Boards,* Form PRR-410.

One 2-1/2" wire or spiral nail at top and bottom flange

Attach rim board to top plate using 2-1/2" wire or spiral toe-nails at 6" o.c.

To avoid splitting flange, start nails at least 1-1/2" from end of I-joist. Nails may be driven at an angle to avoid splitting of bearing plate.

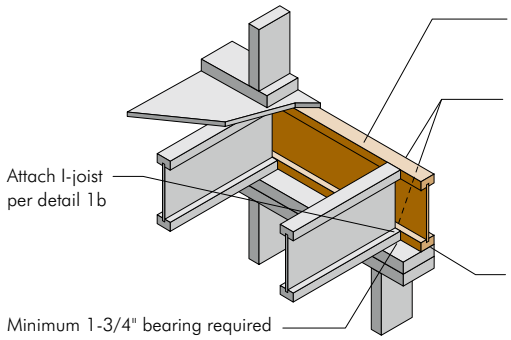
Minimum bearing length shall be 1-3/4" for the end bearings, and 3-1/2" for the intermediate bearings when applicable.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

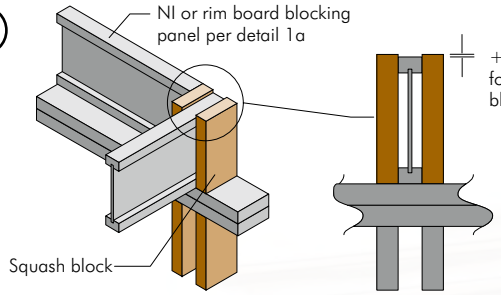
FIGURE 1 (continued)

TYPICAL NORDIC I-JOIST FLOOR FRAMING AND CONSTRUCTION DETAILS

1c



1d

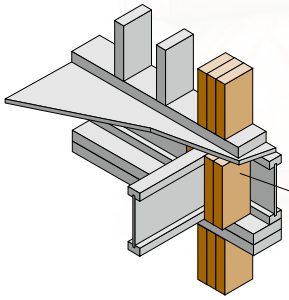


Pair of Squash Blocks	Maximum Factored Vertical Load per Pair of Squash Blocks (lbs)*	
	3-1/2" wide	5-1/2" wide
2x Lumber	5,500	8,500
1-1/8" APA Rim Board Plus **	4,300	6,600

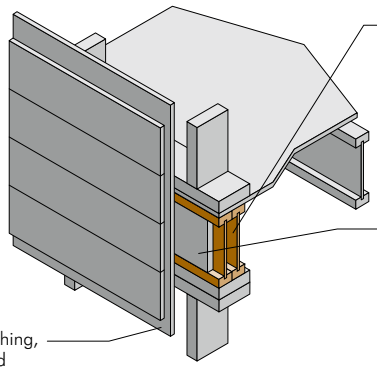
* Provide lateral bracing per detail 1a, 1b, or 1c

** See ANSI/APA PRR410: *Standard for Performance-Rated Engineered Wood Rim Boards,* Form PRR-410.

1e



1f

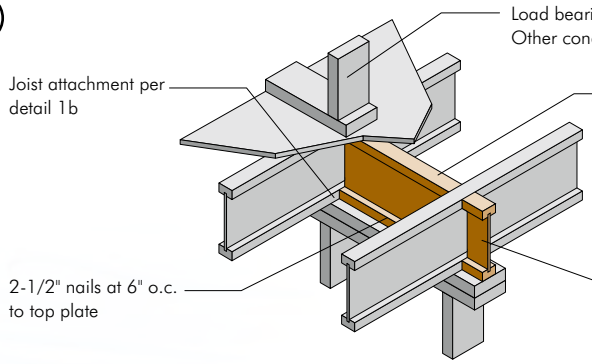


All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

FIGURE 1 (continued)

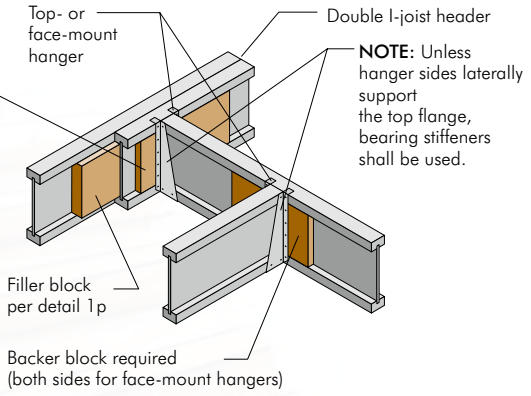
TYPICAL NORDIC I-JOIST FLOOR FRAMING AND CONSTRUCTION DETAILS

1g



1h

Backer block (use if hanger load exceeds 360 lbs) Before installing a backer block to a double I-joist, drive three additional 3" nails through the webs and filler block where the backer block will fit. Clinch. Install backer tight to top flange. Use twelve 3" nails, clinched when possible. Maximum factored resistance for hanger for this detail = 1,620 lbs.



BACKER BLOCKS (Blocks must be long enough to permit required nailing without splitting)

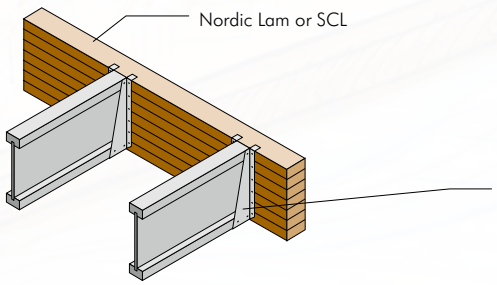
Flange Width	Material Thickness Required*	Minimum Depth**
2-1/2"	1"	5-1/2"
3-1/2"	1-1/2"	7-1/4"

* Minimum grade for backer block material shall be S-P-F No. 2 or better for solid sawn lumber and wood structural panels conforming to CAN/CSA O325 or CAN/CSA O437 Standard.

** For face-mount hangers use net joist depth minus 3-1/4" for joists with 1-1/2" thick flanges. For 2" thick flanges use net depth minus 4-1/4".

For hanger capacity see hanger manufacturer's recommendations. Verify double I-joist capacity to support concentrated loads.

1j



For nailing schedules for multiple beams, see the manufacturer's recommendations.

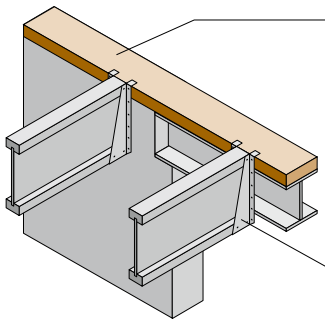
NOTE: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

FIGURE 1 (continued)

TYPICAL NORDIC I-JOIST FLOOR FRAMING AND CONSTRUCTION DETAILS

1k

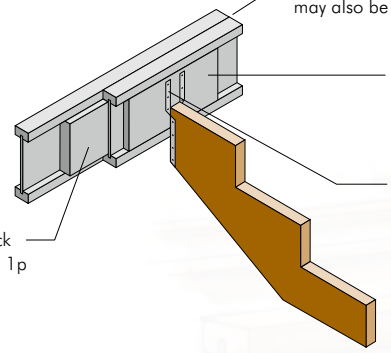


2x plate flush with inside face of wall or beam. 1/8" overhang allowed past inside face of wall or beam.

NOTE: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

Top-mount hanger installed per manufacturer's recommendations

1m



Multiple I-joist header with full depth filler block shown. Nordic Lam or or multiple SCL headers may also be used. Verify double I-joist capacity to support concentrated loads.

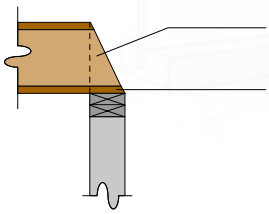
Backer block attached per detail 1h. Nail with twelve 3" nails, clinch when possible.

Install hanger per manufacturer's recommendations

Filler block per detail 1p

Maximum factored load = 1,620 lbs

1n



Do not bevel-cut joist beyond inside face of wall

Attach I-joist per detail 1b

NOTE: Blocking required at bearing for lateral support, not shown for clarity.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

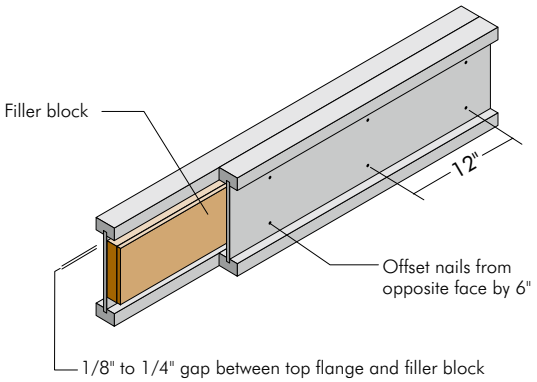
FIGURE 1 (continued)

TYPICAL NORDIC I-JOIST FLOOR FRAMING AND CONSTRUCTION DETAILS

1p

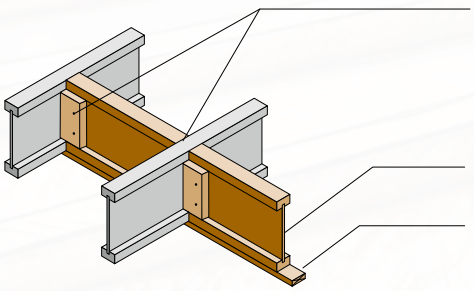
FILLER BLOCK REQUIREMENTS FOR DOUBLE I-JOIST CONSTRUCTION

Flange Size	Net Depth	Filler Block Size
2-1/2" x 1-1/2"	9-1/2" 11-7/8" 14" 16"	2-1/8" x 6" 2-1/8" x 8" 2-1/8" x 10" 2-1/8" x 12"
3-1/2" x 1-1/2"	9-1/2" 11-7/8" 14" 16"	3" x 6" 3" x 8" 3" x 10" 3" x 12"
3-1/2" x 2"	11-7/8" 14" 16"	3" x 7" 3" x 9" 3" x 11"

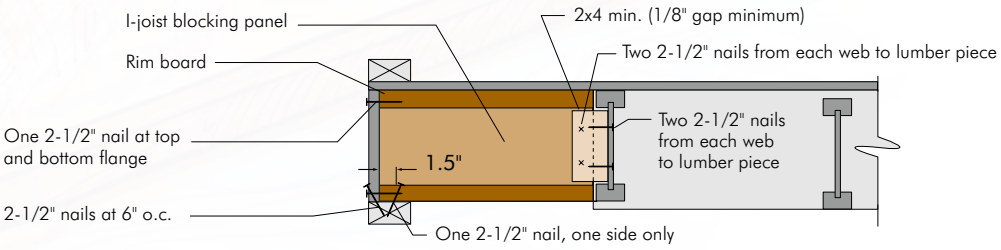


NOTES:
1. Support back of I-joist web during nailing to prevent damage to web/flange connection.
2. Leave a 1/8" to 1/4" gap between top of filler block and bottom of top I-joist flange.
3. Filler block is required between joists for full length of span.
4. Nail joists together with two rows of 3" nails at 12 inches o.c. (clinched when possible) on each side of the double I-joist. Total of four nails per foot required. If nails can be clinched, only two nails per foot are required.
5. The maximum factored load that may be applied to one side of the double joist using this detail is 860 lbf/ft. Verify double I-joist capacity.

1r



1s



NOTES:
- In some local codes, blocking is prescriptively required in the first joist space (or first and second joist space) next to the starter joist. Where required, see local code requirements for spacing of the blocking.
- All nails are common spiral in this detail.Verify double I-joist capacity.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better. Individual components not shown to scale for clarity.

WEB STIFFENER REQUIREMENTS

A web stiffener is a wood block that is used to reinforce the web of an I-joist at locations where:

- The webs of the I-joist are in jeopardy of buckling out of plane. This usually occurs in deeper I-joists.
- The webs of the I-joist are in jeopardy of "knifing" through the I-joist flanges. This can occur at any I-joist depth when the design reaction loads exceed a specific level.
- The I-joist is supported in a hanger and the sides of the hanger do not extend up to the top flange. The web stiffener supports the I-joist along a vertical axis as designed.

There are two kinds of web stiffeners: ***bearing stiffeners*** and ***load stiffeners***. They are differentiated by the applied load and the location of the gap between the slightly undersized stiffener and the top or bottom flange. See Figure 2.

Bearing stiffeners are located at the supports, both interior and exterior, when required. Nordic I-joists **do not** need bearing stiffeners at any support when subjected to the normal residential uniform loads and installed in accordance with the allowable spans printed in this document.

Load stiffeners are located between supports where significant point loads are applied to the top flange of an I-joist.

Web stiffener blocks may be comprised of lumber, rim board, or wood structural panels. The minimum grade of wood structural panels shall conform to CSA O325 or O437 Standard; minimum lumber grade shall be S-P-F No. 2 or better. The depth of the web stiffener should equal the distance between the flanges of the joist minus 1/8 inch – 1/4 inch.

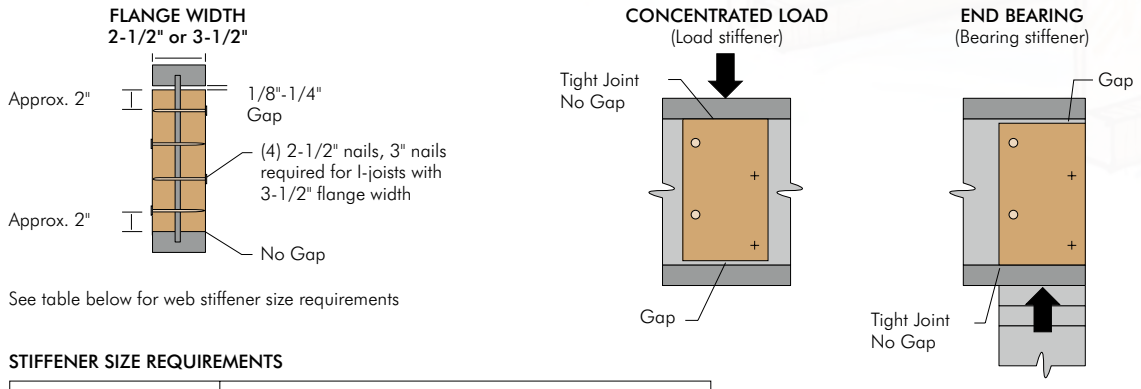
Recommendations:

1. A ***bearing stiffener*** is required in all engineered applications with factored reactions greater than shown in the I-joist design properties table on page 7. The gap between the stiffener and the flange is at the top.

2. A ***bearing stiffener*** is required when the I-joist is supported in a hanger and the sides of the hanger do not extend up to, and support, the top flange. The gap between the stiffener and flange is at the top.

3. A ***load stiffener*** is required at locations where a factored concentrated load greater than 2,370 lbs is applied to the top flange between supports, or in the case of a cantilever, anywhere between the cantilever tip and the support. These values are for standard term load duration, and may be adjusted for other load durations as permitted by the code. The gap between the stiffener and the flange is at the bottom.

FIGURE 2
WEB STIFFENER INSTALLATION DETAILS



See table below for web stiffener size requirements

STIFFENER SIZE REQUIREMENTS

Flange Width	Web Stiffener Size Each Side of Web
2-1/2"	1" x 2-5/16" minimum width
3-1/2"	1-1/2" x 2-5/16" minimum width

CANTILEVER DETAILS
FOR BALCONIES (No Wall Load)

Balconies may be constructed using either continuous Nordic I-joists (Detail 3a) or by adding lumber extensions to the I-joist (Detail 3b). Continuous I-joist cantilevers are limited to one-fourth the adjacent span when supporting uniform loads only.

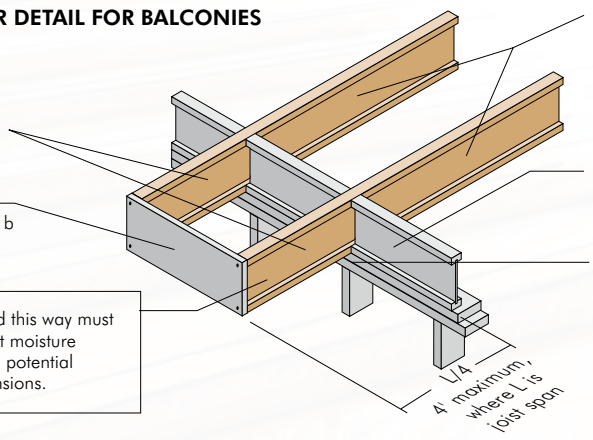
For applications supporting concentrated loads at the end of the cantilever, such as a wall, see Figures 4 and 5.

Unless otherwise engineered, cantilevers are limited to a maximum of 4 feet when supporting uniform loads only. Blocking is required at the cantilever support as shown. Uniform floor loads shall not exceed 40 psf live load and 10 psf dead load. The balcony uniform load shall not exceed 60 psf live load and 10 psf dead load.

Caution : *Cantilevered balcony details address structural considerations only. Cantilevered balcony details for moisture control, weathering and durability are beyond the scope of this publication.*

FIGURE 3
CANTILEVER DETAILS FOR BALCONIES

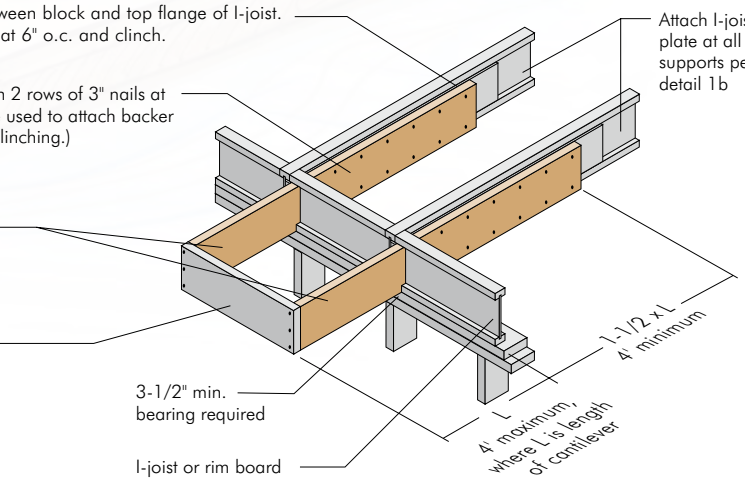
3a **I-JOIST CANTILEVER DETAIL FOR BALCONIES (No Wall Load)**



CAUTION: Cantilevers formed this way must be carefully detailed to prevent moisture intrusion into the structure and potential decay of untreated I-joist extensions.

NOTE: This detail is applicable to cantilevers supporting a maximum specified uniform live load of 60 psf.

3b **LUMBER CANTILEVER DETAIL FOR BALCONIES (No Wall Load)**



NOTE: This detail is applicable to cantilevers supporting a maximum specified uniform live load of 60 psf.

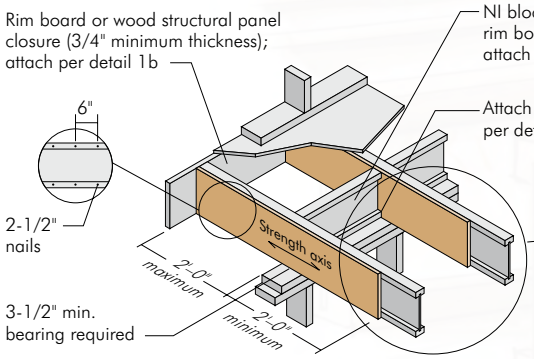
CANTILEVER DETAILS
FOR VERTICAL BUILDING OFFSET (Concentrated Wall Load)

Nordic I-joists may also be used in cantilever applications supporting a concentrated load applied to the end of the cantilever, such as with a vertical building offset. For cantilever-end concentrated load applications that require reinforcing based on the following table, the cantilever is limited to 2 feet maximum.

In addition, blocking is required along the cantilever support and for 4 feet on each side of the cantilever area. Subject to the roof loads and layout (see the following table), three methods of reinforcing are allowed in load bearing cantilever applications: reinforcing sheathing applied to one side of the I-joist (Method 1), reinforcing sheathing applied to both sides of the joist (Method 2), or double I-joists (Alternate Method 2).

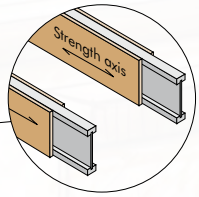
FIGURE 4
CANTILEVER DETAILS FOR VERTICAL BUILDING OFFSET

4a **Method 1 – SHEATHING REINFORCEMENT ONE SIDE**



Method 2 – SHEATHING REINFORCEMENT TWO SIDES

Use same installation as Method 1 but reinforce both sides of I-joist with sheathing.



Use nailing pattern shown for Method 1 with opposite face nailing offset by 3".

NOTE: Canadian softwood plywood sheathing or equivalent (minimum thickness 3/4") required on sides of joist. Depth shall match the full height of the joist. Nail with 2-1/2" nails at 6" o.c., top and bottom flange. Install with face grain horizontal. Attach I-joist to plate at all supports per detail 1b. Verify reinforced I-joist capacity.

4b **Alternate Method 2 – DOUBLE I-JOIST**

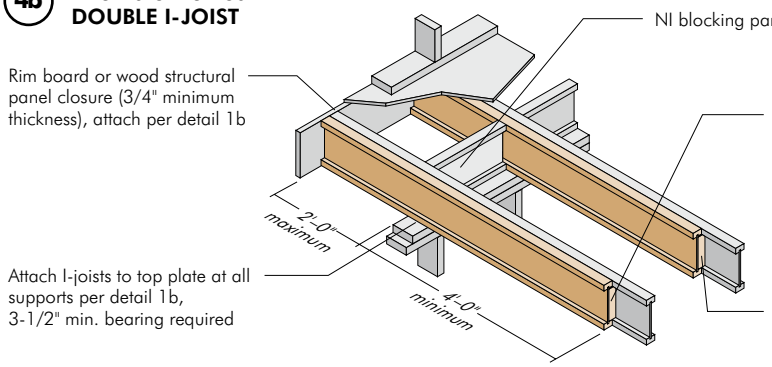
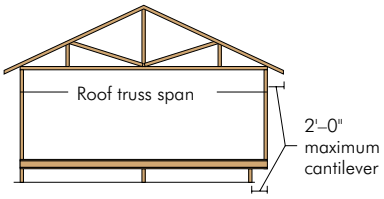
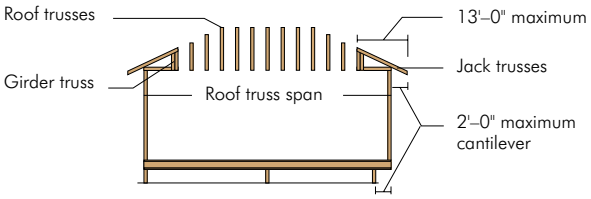


FIGURE 4 (continued)



See table below for NI reinforcement requirements at cantilever.



For hip roofs with the jack trusses running parallel to the cantilevered floor joists, the I-joist reinforcement requirements for a span of 26 ft. shall be permitted to be used.

CANTILEVER REINFORCEMENT METHODS ALLOWED

JOIST DEPTH (in.)	ROOF TRUSS SPAN (ft)	ROOF LOADING (UNFACTORED)											
		LL = 30 psf, DL = 15 psf				LL = 40 psf, DL = 15 psf				LL = 50 psf, DL = 15 psf			
		JOIST SPACING (IN.)				JOIST SPACING (IN.)				JOIST SPACING (IN.)			
		12	16	19.2	24	12	16	19.2	24	12	16	19.2	24
9-1/2"	26	N	N	1	2	N	1	2	X	N	2	X	X
	28	N	N	1	X	N	1	2	X	N	2	X	X
	30	N	1	1	X	N	1	2	X	1	2	X	X
	32	N	1	2	X	N	2	X	X	1	X	X	X
	34	N	1	2	X	N	2	X	X	1	X	X	X
	36	N	1	2	X	1	2	X	X	1	X	X	X
11-7/8"	26	N	N	N	1	N	N	1	2	N	N	1	2
	28	N	N	N	1	N	N	1	2	N	1	1	X
	30	N	N	N	1	N	N	1	2	N	1	2	X
	32	N	N	1	1	N	N	1	2	N	1	2	X
	34	N	N	1	2	N	1	1	X	N	1	2	X
	36	N	N	1	2	N	1	2	X	N	1	2	X
	38	N	N	1	2	N	1	2	X	N	2	X	X
14"	26	N	N	N	N	N	N	N	1	N	N	N	1
	28	N	N	N	N	N	N	N	1	N	N	1	1
	30	N	N	N	N	N	N	N	1	N	N	1	2
	32	N	N	N	1	N	N	N	1	N	N	1	2
	34	N	N	N	1	N	N	1	1	N	N	1	2
	36	N	N	N	1	N	N	1	2	N	1	1	2
	38	N	N	N	1	N	N	1	2	N	1	1	X
	40	N	N	N	1	N	N	1	2	N	1	2	X
16"	26	N	N	N	N	N	N	N	N	N	N	N	1
	28	N	N	N	N	N	N	N	1	N	N	N	1
	30	N	N	N	N	N	N	N	1	N	N	N	1
	32	N	N	N	N	N	N	N	1	N	N	1	1
	34	N	N	N	N	N	N	N	1	N	N	1	2
	36	N	N	N	1	N	N	N	1	N	N	1	2
	38	N	N	N	1	N	N	N	1	N	N	1	2
	40	N	N	N	1	N	N	1	2	N	N	1	2
	42	N	N	N	1	N	N	1	2	N	1	1	X

NOTES:

1. N = No reinforcement required.
   1 = NI reinforced with 3/4" wood structural panel on one side only.
   2 = NI reinforced with 3/4" wood structural panel on both sides, or double I-joist.
   X = Try a deeper joist or closer spacing.
2. Maximum design load shall be: 15 psf roof dead load, 55 psf floor total load, and 80 plf wall load. Wall load is based on 3'-0" maximum width window or door openings. For larger openings, or multiple 3'-0" width openings spaced less than 6'-0" o.c., additional joists beneath the opening's cripple studs may be required.
3. Table applies to joists 12" to 24" o.c. that meet the floor span requirements for a design live load of 40 psf and dead load of 15 psf, and a live load deflection limit of L/480. Use 12" o.c. requirements for lesser spacing.
4. For conventional roof construction using a ridge beam, the Roof Truss Span column above is equivalent to the distance between the supporting wall and the ridge beam. When the roof is framed using a ridge board, the Roof Truss Span is equivalent to the distance between the supporting walls as if a truss is used.
5. Cantilevered joists supporting girder trusses or roof beams may require additional reinforcing.

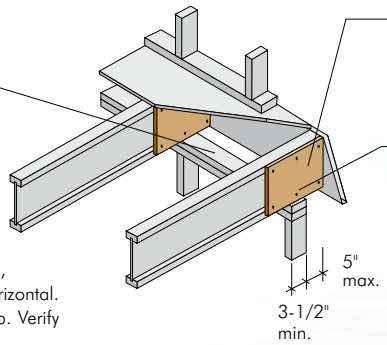
BRICK CANTILEVER DETAILS
FOR VERTICAL BUILDING OFFSET
(Concentrated Wall Load)

FIGURE 5
BRICK CANTILEVER DETAILS FOR VERTICAL BUILDING OFFSET

5a SHEATHING REINFORCEMENT

Provide full depth blocking between joists over support (not shown)

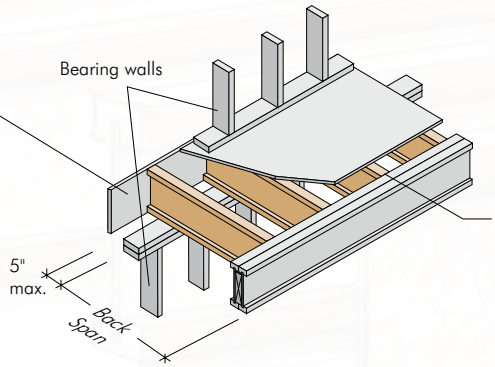
NOTE: Canadian softwood plywood sheathing or equivalent (minimum thickness 3/4") required on sides of joist. Depth shall match the full height of the joist. Nail with 2-1/2" nails at 6" o.c., top and bottom flange. Install with face grain horizontal. Attach I-joist to plate at all supports per detail 1b. Verify reinforced I-joist capacity.



5b SET-BACK DETAIL

Rim board or wood structural panel closure (3/4" minimum thickness), attach per detail 1b.

NOTES:
- Provide full depth blocking between joists over support (not shown for clarity).
- Attach I-joist to plate at all supports per detail 1b.
- 3-1/2" min. I-joist bearing required.



5c SET-BACK CONNECTION

Vertical solid sawn blocks (2x6 S-P-F No. 2 or better) nailed through joist web and web of girder using 2-1/2" nails.
Alternate for opposite side.

NOTES:
- Verify girder joist capacity if the back span exceeds the joist spacing.
- Attach double I-joist per detail 1p, if required.

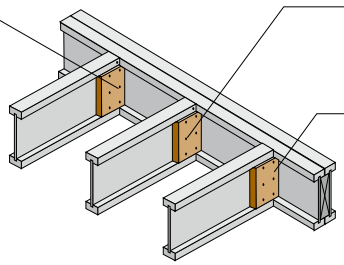
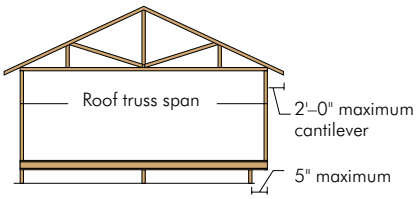
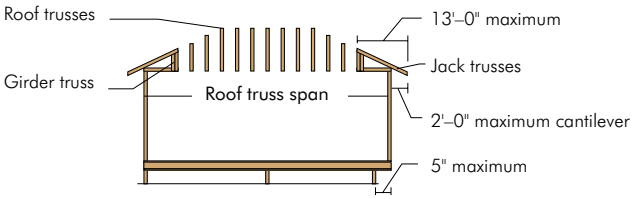


FIGURE 5 (continued)



See table below for NI reinforcement requirements at cantilever.



For hip roofs with the jack trusses running parallel to the cantilevered floor joists, the I-joist reinforcement requirements for a span of 26 ft. shall be permitted to be used.

BRICK CANTILEVER REINFORCEMENT METHODS ALLOWED

JOIST DEPTH (in.)	ROOF TRUSS SPAN (ft)	ROOF LOADING (UNFACTORED)											
		LL = 30 psf, DL = 15 psf				LL = 40 psf, DL = 15 psf				LL = 50 psf, DL = 15 psf			
		JOIST SPACING (IN.)				JOIST SPACING (IN.)				JOIST SPACING (IN.)			
		12	16	19.2	24	12	16	19.2	24	12	16	19.2	24
9-1/2"	26	1	X	X	X	2	X	X	X	2	X	X	X
	28	1	X	X	X	2	X	X	X	X	X	X	X
	30	1	X	X	X	2	X	X	X	X	X	X	X
	32	2	X	X	X	2	X	X	X	X	X	X	X
	34	2	X	X	X	X	X	X	X	X	X	X	X
	36	2	X	X	X	X	X	X	X	X	X	X	X
11-7/8"	26	N	2	X	X	1	X	X	X	1	X	X	X
	28	N	2	X	X	1	X	X	X	2	X	X	X
	30	1	2	X	X	1	X	X	X	2	X	X	X
	32	1	2	X	X	1	X	X	X	2	X	X	X
	34	1	X	X	X	2	X	X	X	2	X	X	X
	36	1	X	X	X	2	X	X	X	X	X	X	X
	38	1	X	X	X	2	X	X	X	X	X	X	X
14"	26	N	1	2	X	N	2	X	X	1	X	X	X
	28	N	1	X	X	1	2	X	X	1	X	X	X
	30	N	2	X	X	1	2	X	X	1	X	X	X
	32	N	2	X	X	1	X	X	X	2	X	X	X
	34	N	2	X	X	1	X	X	X	2	X	X	X
	36	1	2	X	X	1	X	X	X	2	X	X	X
	38	1	2	X	X	1	X	X	X	2	X	X	X
	40	1	X	X	X	2	X	X	X	2	X	X	X
16"	26	N	1	2	X	N	1	X	X	N	2	X	X
	28	N	1	2	X	N	2	X	X	1	2	X	X
	30	N	1	2	X	N	2	X	X	1	X	X	X
	32	N	1	2	X	N	2	X	X	1	X	X	X
	34	N	2	X	X	1	2	X	X	1	X	X	X
	36	N	2	X	X	1	X	X	X	1	X	X	X
	38	N	2	X	X	1	X	X	X	2	X	X	X
	40	N	2	X	X	1	X	X	X	2	X	X	X
	42	1	2	X	X	1	X	X	X	2	X	X	X

NOTES:

1. N = No reinforcement required.
   1 = NI reinforced with 3/4" wood structural panel on one side only.
   2 = NI reinforced with 3/4" wood structural panel on both sides, or double I-joist.
   X = Try a deeper joist or closer spacing.
2. Maximum design load shall be: 15 psf roof dead load, 55 psf floor total load, and 80 plf wall load. Wall load is based on 3'-0" maximum width window or door openings. For larger openings, or multiple 3'-0" width openings spaced less than 6'-0" o.c., additional joists beneath the opening's cripple studs may be required.
3. Table applies to joists 12" to 24" o.c. that meet the floor span requirements for a design live load of 40 psf and dead load of 15 psf, and a live load deflection limit of L/480. Use 12" o.c. requirements for lesser spacing.
4. For conventional roof construction using a ridge beam, the Roof Truss Span column above is equivalent to the distance between the supporting wall and the ridge beam. When the roof is framed using a ridge board, the Roof Truss Span is equivalent to the distance between the supporting walls as if a truss is used.
5. Cantilevered joists supporting girder trusses or roof beams may require additional reinforcing.

STAIRWELL OPENINGS
IN I-JOIST FLOOR FRAMING

When designing a floor for a residential structure, the designer is often faced with detailing an unsupported stairwell opening in the floor. The following information simplifies the selection of trimmers and headers, provides guidance on the appropriate detailing for their use, and quantifies hanger capacity requirements for I-joist-to-header and header-to-trimmer intersections.

These recommendations are based on the use of Nordic I-joists used in either simple or multiple maximum spans for residential applications, and on a **total specified load of 55 psf** for the floor and stair areas. The information provided is appropriate for stairwell openings from **10.5 ft to 12 ft in length and 48 inches in width**, whose long dimension is either running parallel or perpendicular to the joist span, as shown in Figure 6 below. *When these recommendations are followed, it is unnecessary to support the stairwell opening from below with vertical framing members.* For stairwells parallel to the I-joist span, it is also assumed that there is a **non-load-bearing partition with a specified load of 64 plf** along one header and one trimmer. For stairwells perpendicular to the I-joist span, there is assumed to be a non-load-bearing partition with a specified load of 64 plf along both headers and on the trimmer.

The stair stringers may be attached to the header/trimmer at either end of the stairwell opening. For stairwells parallel or perpendicular to the I-joist spans, the opening may be placed anywhere in the floor without regard to the support of the floor framing.

STAIRWELLS PARALLEL TO I-JOIST SPAN

The most common method for placing a stairwell in a wood-framed floor is to run the long axis of the opening parallel to the span of the I-joist. This generally requires smaller headers and trimmers than the perpendicular orientation.

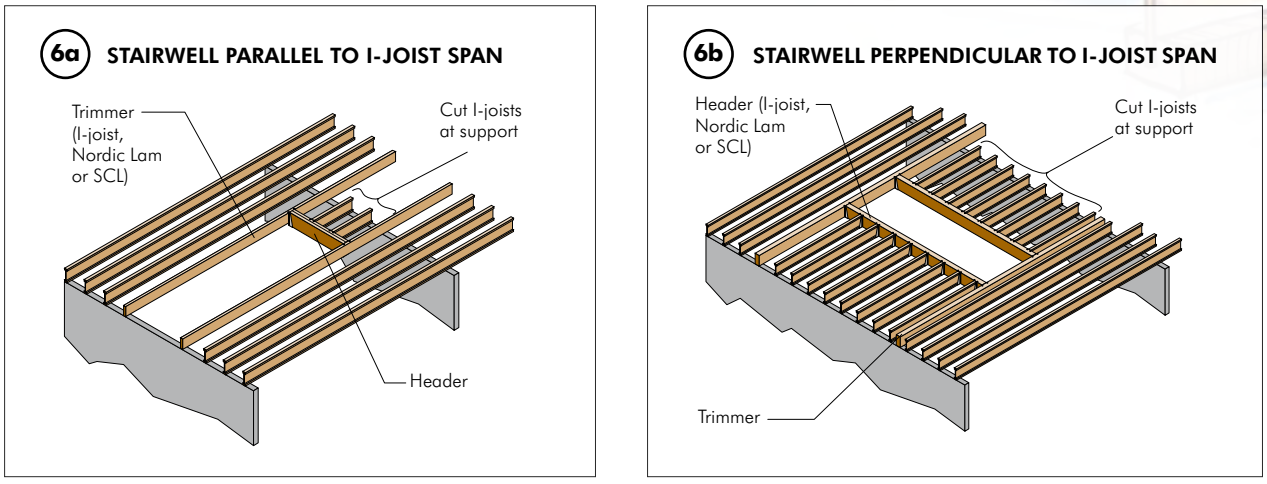
Table shown on the following page is a guide for determining the I-joist requirement or the minimum sections of other engineered wood members required to frame the headers and trimmers seen in Detail 6a.

Caution: *In situations where the stairwell runs parallel to the floor joists and the floor joists are installed over two or more spans, the header supporting the continuous floor joists may be subjected to uplift loads caused by the floor joists it supports. Cutting the interrupted joists at the centre support will eliminate this uplift load. If this method is selected, the designer will have to insure that the maximum* ***simple*** *span for the I-joist is not exceeded. An alternative method would be to leave the floor joists continuous over the interior support and design the header and hangers for the resulting uplift loads.*

STAIRWELLS PERPENDICULAR TO I-JOIST SPAN

Often the floor plan or architectural details of the building are such that it is not possible to orient the stairwell axis parallel to the I-joist span. In such cases, the trimmers are placed parallel to the I-joist span and support the headers by way of metal hangers. The headers, in turn, support the cut ends of the floor

FIGURE 6
STAIRWELL OPENINGS IN I-JOIST FLOORS



joists also via metal hangers. This relationship can be seen in Detail 6b. In addition to the header load, the trimmers are designed to carry the concentrated loads of the stair stringers.

Caution: *Because the headers intersect the span of the floor joists over a large length (up to 12 ft), in cases where the floor joists are used continuous over multiple spans, special design consideration must be given to the adjacent clear span to insure adequate floor performance. To eliminate design problems and allow maximum flexibility in locating the stairwell, consider limiting the maximum spans for continuous floors containing stairwells perpendicular to I-joist spans to those given for simple span floors.*

Upward thrust acting on the header adjacent to a centre support can be eliminated by cutting the I-joists at the centre of the support, thus providing two simple spans where the I-joists are interrupted by the headers. An alternative method would be to leave the floor joists continuous over the interior support and design the header and hangers for the resulting uplift loads.

STAIRWELL OPENINGS PARALLEL TO I-JOIST FLOOR

MAX. I-JOIST CLEAR SPAN (ft)	HEADER REQUIREMENTS			
	SUGGESTED I-JOIST	ALTERNATIVE IJC		JOIST TO HEADER HANGER REQUIREMENT
		SCL	NORDIC LAM 24F-1.9E	
14	(1 ea.) 9-1/2" NI-20	1-3/4" x 9-1/2"	1-3/4" x 9-1/2"	Type A
16	(1 ea.) 9-1/2" NI-40x	1-3/4" x 9-1/2"	1-3/4" x 9-1/2"	Type A
18	(1 ea.) 11-7/8" NI-20	1-3/4" x 11-7/8"	1-3/4" x 11-7/8"	Type A
20	(1 ea.) 11-7/8" NI-40x	1-3/4" x 11-7/8"	1-3/4" x 11-7/8"	Type A
22	(1 ea.) 11-7/8" NI-80	1-3/4" x 11-7/8"	1-3/4" x 11-7/8"	Type A
MAX. I-JOIST CLEAR SPAN (ft)	TRIMMER REQUIREMENTS			
	SUGGESTED I-JOIST	ALTERNATIVE IJC		JOIST TO HEADER HANGER REQUIREMENT
		SCL	NORDIC LAM 24F-1.9E	
14	(2 ea.) 9-1/2" NI-60	3-1/2" x 9-1/2"	2-1/2" x 9-1/2"	Type A
16	(2 ea.) 9-1/2" NI-60	3-1/2" x 9-1/2"	3-1/2" x 9-1/2"	Type A
18	(2 ea.) 11-7/8" NI-60	3-1/2" x 11-7/8"	2-1/2" x 11-7/8"	Type A
20	(2 ea.) 11-7/8" NI-70	3-1/2" x 11-7/8"	3-1/2" x 11-7/8"	Type A
22	(2 ea.) 11-7/8" NI-70	3-1/2" x 11-7/8"	5-1/2" x 11-7/8"	Type A

STAIRWELL OPENINGS PERPENDICULAR TO I-JOIST FLOOR

MAX. I-JOIST CLEAR SPAN (ft)	HEADER REQUIREMENTS			
	SUGGESTED I-JOIST	ALTERNATIVE IJC		JOIST TO HEADER HANGER REQUIREMENT
		SCL	NORDIC LAM 24F-1.9E	
14	(1 ea.) 9-1/2" NI-20	1-3/4" x 9-1/2"	2-1/2" x 9-1/2"	Type A
16	(1 ea.) 9-1/2" NI-60	3-1/2" x 9-1/2"	2-1/2" x 9-1/2"	Type A
18	(1 ea.) 11-7/8" NI-40x	1-3/4" x 11-7/8"	2-1/2" x 11-7/8"	Type A
20	(1 ea.) 11-7/8" NI-60	1-3/4" x 11-7/8"	2-1/2" x 11-7/8"	Type A
22	(1 ea.) 14" NI-40x	1-3/4" x 14	2-1/2" x 14"	Type A
MAX. I-JOIST CLEAR SPAN (ft)	TRIMMER REQUIREMENTS			
	SUGGESTED I-JOIST	ALTERNATIVE IJC		JOIST TO HEADER HANGER REQUIREMENT
		SCL	NORDIC LAM 24F-1.9E	
14	Use Alternative IJC	5-1/4" x 9-1/2"	5-1/4" x 9-1/2"	Type B
16		7" x 9-1/2"	7" x 9-1/2"	Type B
18		5-1/4" x 11-7/8"	5-1/4" x 11-7/8"	Type B
20		7" x 11-7/8"	7" x 11-7/8"	3,915 lbf
22		5-1/4" x 14"	5-1/2" x 14"	4,350 lbf

NOTES:

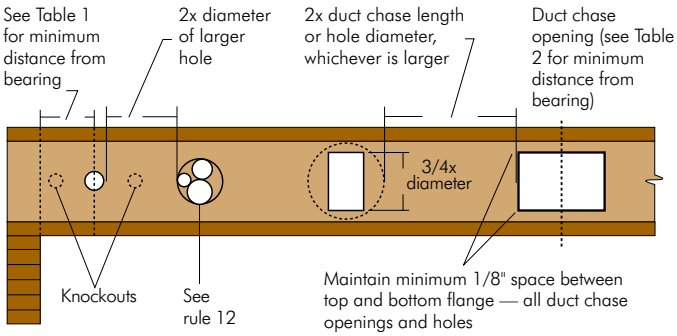
1. Stairwell openings not to exceed 12 ft in length and 48 inches in width (header length).
2. Minimum grade SCL based on E = 2,000,000 psi (apparent), F_b = 5,360 psi, and F_v = 530 psi.
3. Properties of Nordic Lam 24F-1.9E are on E = 1,800,000 psi (apparent), F_b = 4,453 psi, and F_v = 319 psi.
4. Type A face- or top-mount hanger: 3,045 lbf (factored). Type B face- or top-mount hanger: 5,220 lbf (factored).
5. Minimum bearing length shall be 3-1/2 inches for the end bearings, except for italic characters only.
6. Refer to Detail 1p for double I-joist construction.

WEB HOLE SPECIFICATIONS

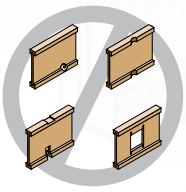
RULES FOR CUTTING HOLES AND DUCT CHASE OPENINGS:

1. The distance between the inside edge of the support and the centreline of any hole or duct chase opening shall be in compliance with the requirements of Table 1 or 2, respectively.
2. I-joist top and bottom flanges must NEVER be cut, notched, or otherwise modified.
3. Whenever possible, field-cut holes should be centred on the middle of the web.
4. The maximum size hole or the maximum depth of a duct chase opening that can be cut into an I-joist web shall equal the clear distance between the flanges of the I-joist minus 1/4 inch. A minimum of 1/8 inch should always be maintained between the top or bottom of the hole or opening and the adjacent I-joist flange.
5. 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.
6. 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 size of the largest square hole *(or twice the length of the longest side of the longest rectangular hole or duct chase opening)* and each hole and duct chase opening shall be sized and located in compliance with the requirements of Tables 1 and 2, respectively.
7. A knockout is **not** considered a hole, may be utilized anywhere it occurs, and may be ignored for purposes of calculating minimum distances between holes and/or duct chase openings.
8. Holes measuring 1-1/2 inches or smaller are permitted anywhere in a cantilevered section of a joist. Holes of greater size may be permitted subject to verification.
9. A 1-1/2 inch hole or smaller can be placed anywhere in the web provided that it meets the requirements of rule number 6 above.
10. All holes and duct chase openings shall be cut in a workman-like manner in accordance with the restrictions listed above and as illustrated in Figure 7.
11. Limit of three maximum-size holes per span, of which one may be a duct chase opening.
12. A group of round holes at approximately the same location shall be permitted if they meet the requirements for a single round hole circumscribed around them.

FIGURE 7
FIELD-CUT HOLE LOCATOR



A knockout hole is NOT considered a hole, may be utilized whenever it occurs and may be ignored for purposes of calculating minimum distance between holes.



Knockouts are prescored holes provided for the contractor's convenience to install electrical or small plumbing lines. They are 1-1/2 inches in diameter, and are spaced 15 inches on centre along the length of the I-joist. Where possible, it is preferable to use knockouts instead of field-cut holes.

Never drill, cut or notch the flange, or over-cut the web.

Holes in webs should be cut with a sharp saw.

For rectangular holes, avoid over-cutting the corners, as this can cause unnecessary stress concentrations. Slightly rounding the corners is recommended. Starting the rectangular hole by drilling a 1-inch diameter hole in each of the four corners and then making the cuts between the holes is another good method to minimize damage to the I-joist.

TABLE 1

HOLE SIZES AND LOCATIONS — Simple or Multiple Span

JOIST DEPTH	JOIST SERIES	MINIMUM DISTANCE FROM INSIDE FACE OF ANY SUPPORT TO CENTRE OF HOLE (ft-in.) ROUND HOLE DIAMETER (in.)															SPAN ADJ. FACTOR
		2	3	4	5	6	6-1/4	7	8	8-5/8	9	10	10-3/4	11	12	12-3/4	
9-1/2"	NI-20	0'-7"	1'-6"	2'-10"	4'-3"	5'-8"	6'-0"	---	---	---	---	---	---	---	---	---	13'-6"
	NI-40x	0'-7"	1'-6"	3'-0"	4'-4"	6'-0"	6'-4"	---	---	---	---	---	---	---	---	---	14'-9"
	NI-60	1'-3"	2'-6"	4'-0"	5'-4"	7'-0"	7'-5"	---	---	---	---	---	---	---	---	---	14'-11"
	NI-70	2'-0"	3'-4"	4'-9"	6'-3"	8'-0"	8'-4"	---	---	---	---	---	---	---	---	---	15'-7"
	NI-80	2'-3"	3'-6"	5'-0"	6'-6"	8'-2"	8'-8"	---	---	---	---	---	---	---	---	---	15'-9"
11-7/8"	NI-20	0'-7"	0'-8"	1'-0"	2'-4"	3'-8"	4'-0"	5'-0"	6'-6"	7'-9"	---	---	---	---	---	---	15'-6"
	NI-40x	0'-7"	0'-8"	1'-3"	2'-8"	4'-0"	4'-4"	5'-5"	7'-0"	8'-4"	---	---	---	---	---	---	16'-6"
	NI-60	0'-7"	1'-8"	3'-0"	4'-3"	5'-9"	6'-0"	7'-3"	8'-10"	10'-0"	---	---	---	---	---	---	16'-9"
	NI-70	1'-3"	2'-6"	4'-0"	5'-4"	6'-9"	7'-2"	8'-4"	10'-0"	11'-2"	---	---	---	---	---	---	17'-5"
	NI-80	1'-6"	2'-10"	4'-2"	5'-6"	7'-0"	7'-5"	8'-6"	10'-3"	11'-4"	---	---	---	---	---	---	17'-7"
	NI-90	0'-7"	0'-8"	1'-5"	3'-2"	4'-10"	5'-4"	6'-9"	8'-9"	10'-2"	---	---	---	---	---	---	17'-11"
	NI-90x	0'-7"	0'-8"	0'-9"	2'-5"	4'-4"	4'-9"	6'-3"	---	---	---	---	---	---	---	---	18'-0"
14"	NI-40x	0'-7"	0'-8"	0'-8"	1'-0"	2'-4"	2'-9"	3'-9"	5'-2"	6'-0"	6'-6"	8'-3"	10'-2"	---	---	---	17'-11"
	NI-60	0'-7"	0'-8"	1'-8"	3'-0"	4'-3"	4'-8"	5'-8"	7'-2"	8'-0"	8'-8"	10'-4"	11'-9"	---	---	---	18'-2"
	NI-70	0'-8"	1'-10"	3'-0"	4'-5"	5'-10"	6'-2"	7'-3"	8'-9"	9'-9"	10'-4"	12'-0"	13'-5"	---	---	---	19'-2"
	NI-80	0'-10"	2'-0"	3'-4"	4'-9"	6'-2"	6'-5"	7'-6"	9'-0"	10'-0"	10'-8"	12'-4"	13'-9"	---	---	---	19'-5"
	NI-90	0'-7"	0'-8"	0'-10"	2'-5"	4'-0"	4'-5"	5'-9"	7'-5"	8'-8"	9'-4"	11'-4"	12'-11"	---	---	---	19'-9"
	NI-90x	0'-7"	0'-8"	0'-8"	2'-0"	3'-9"	4'-2"	5'-5"	7'-3"	8'-5"	9'-2"	---	---	---	---	---	20'-0"
16"	NI-60	0'-7"	0'-8"	0'-8"	1'-6"	2'-10"	3'-2"	4'-2"	5'-6"	6'-4"	7'-0"	8'-5"	9'-8"	10'-2"	12'-2"	13'-9"	19'-10"
	NI-70	0'-7"	1'-0"	2'-3"	3'-6"	4'-10"	5'-3"	6'-3"	7'-8"	8'-6"	9'-2"	10'-8"	12'-0"	12'-4"	14'-0"	15'-6"	20'-10"
	NI-80	0'-7"	1'-3"	2-6"	3'-10"	5'-3"	5'-6"	6'-6"	8'-0"	9'-0"	9'-5"	11'-0"	12'-3"	12'-9"	14'-5"	16'-0"	21'-2"
	NI-90	0'-7"	0'-8"	0'-8"	1'-9"	3'-3"	3'-8"	4'-9"	6'-5"	7'-5"	8'-0"	9'-10"	11'-3"	11'-9"	13'-9"	15'-4"	21'-6"
	NI-90x	0'-7"	0'-8"	0'-9"	2'-0"	3'-6"	4'-0"	5'-0"	6'-9"	7'-9"	8'-4"	10'-2"	11'-6"	12'-0"	---	---	21'-10"

NOTES:

1. Above table may be used for I-joist spacing of 24 inches on centre or less.
2. Hole location distance is measured from inside face of supports to centre of hole.
3. Distances in this chart are based on uniformly loaded joists.

OPTIONAL HOLE CALCULATION:

The above table is based on the I-joists being used at their maximum span. If the I-joists are placed at less than their full maximum span (see Maximum Floor Spans), the minimum distance from the centreline of the hole to the face of any support (D) as given above may be reduced as follows:

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

Where:

- $D_{reduced}$ = Distance from the inside face of any support to centre of hole, reduced for less-than-maximum span applications (ft). The reduced distance shall not be less than 6 inches from the face of the support to edge of the hole.
- L_{actual} = The actual measured span distance between the inside faces of supports (ft).
- SAF = Span Adjustment Factor given in this table.
- D = The minimum distance from the inside face of any support to centre of hole from table above. If $\frac{L_{actual}}{SAF}$ is greater than 1.0, use 1.0 in the above calculation for $\frac{L_{actual}}{SAF}$.

TABLE 2

DUCT CHASE OPENING SIZES AND LOCATIONS — Simple Span Only

JOIST DEPTH	JOIST SERIES	MINIMUM DISTANCE FROM INSIDE FACE OF ANY SUPPORT TO CENTRE OF OPENING (ft-in.) DUCT CHASE LENGTH (in.)								
		8	10	12	14	16	18	20	22	24
9-1/2"	NI-20	4'-1"	4'-5"	4'-10"	5'-4"	5'-8"	6'-1"	6'-6"	7'-1"	7'-5"
	NI-40x	5'-3"	5'-8"	6'-0"	6'-5"	6'-10"	7'-3"	7'-8"	8'-2"	8'-6"
	NI-60	5'-4"	5'-9"	6'-2"	6'-7"	7'-1"	7'-5"	8'-0"	8'-3"	8'-9"
	NI-70	5'-1"	5'-5"	5'-10"	6'-3"	6'-7"	7'-1"	7'-6"	8'-1"	8'-4"
	NI-80	5'-3"	5'-8"	6'-0"	6'-5"	6'-10"	7'-3"	7'-8"	8'-2"	8'-6"
11-7/8"	NI-20	5'-9"	6'-2"	6'-6"	7'-1"	7'-5"	7'-9"	8'-3"	8'-9"	9'-4"
	NI-40x	6'-8"	7'-2"	7'-6"	8'-1"	8'-6"	9'-1"	9'-6"	10'-1"	10'-9"
	NI-60	7'-3"	7'-8"	8'-0"	8'-6"	9'-0"	9'-3"	9'-9"	10'-3"	11'-0"
	NI-70	7'-1"	7'-4"	7'-9"	8'-3"	8'-7"	9'-1"	9'-6"	10'-1"	10'-4"
	NI-80	7'-2"	7'-7"	8'-0"	8'-5"	8'-10"	9'-3"	9'-8"	10'-2"	10'-8"
	NI-90	7'-6"	7'-11"	8'-4"	8'-9"	9'-2"	9'-7"	10'-1"	10'-7"	10'-11"
	NI-90x	7'-7"	8'-1"	8'-5"	8'-10"	9'-4"	9'-8"	10'-2"	10'-8"	11'-2"
14"	NI-40x	8'-1"	8'-7"	9'-0"	9'-6"	10'-1"	10'-7"	11'-2"	12'-0"	12'-8"
	NI-60	8'-9"	9'-3"	9'-8"	10'-1"	10'-6"	11'-1"	11'-6"	13'-3"	13'-0"
	NI-70	8'-7"	9'-1"	9'-5"	9'-10"	10'-4"	10'-8"	11'-2"	11'-7"	12'-3"
	NI-80	9'-0"	9'-3"	9'-9"	10'-1"	10'-7"	11'-1"	11'-6"	12'-1"	12'-6"
	NI-90	9'-2"	9'-8"	10'-0"	10'-6"	10'-11"	11'-5"	11'-9"	12'-4"	12'-11"
	NI-90x	9'-4"	9'-9"	10'-3"	10'-7"	11'-1"	11'-7"	12'-1"	12'-7"	13'-2"
16"	NI-60	10'-3"	10'-8"	11'-2"	11'-6"	12'-1"	12'-6"	13'-2"	14'-1"	14'-10"
	NI-70	10'-1"	10'-5"	11'-0"	11'-4"	11'-10"	12'-3"	12'-8"	13'-3"	14'-0"
	NI-80	10'-4"	10'-9"	11'-3"	11'-9"	12'-1"	12'-7"	13'-1"	13'-8"	14'-4"
	NI-90	10'-9"	11'-2"	11'-8"	12'-0"	12'-6"	13'-0"	13'-6"	14'-2"	14'-10"
	NI-90x	11'-1"	11'-5"	11'-10"	12'-4"	12'-10"	13'-2"	13'-9"	14'-4"	15'-2"

NOTES:

1. Above table may be used for I-joist spacing of 24 inches on centre or less.
2. Duct chase opening location distance is measured from inside face of supports to centre of opening.
3. The above table is based on simple-span joists only. For other applications, contact your local distributor.
4. Distances are based on uniformly loaded floor joists that meet the span requirements for a design live load of 40 psf and dead load of 15 psf, and a live load deflection limit of L/480. For other applications, contact your local distributor.

RIM BOARD

As an integral part of the Nordic Engineered Wood family of products, high quality rim board provides a compatible, economical, and structural solution for today's higher vertical and lateral loading conditions.

Rim Board Performance

Manufactured in accordance with *CCMC's Technical Guide for Wood-Based Rim Board.*

Helps Improve Energy Efficiency

- Using 16' rim board means fewer joints and when correctly installed, reduced air leakage.
- This helps to maximize the overall energy efficiency of the home.

Multiple Applications

While rim board has been specifically designed and engineered for use as a perimeter framing product for floors, it is also very effective when used as non-structural framing at stairwell openings.

Features and Benefits

- Resists twisting, cupping, cracking and warping.
- Available in 4 depths: 9-1/2", 11-7/8", 14", and 16"
- 16' lengths reduce the number of joints and offer easy handling and installation.
- Each board is edge coated and the units are paper wrapped for protection against the elements.
- Engineered to have the structural strength to transfer both vertical and lateral loads.
- Designed and manufactured for use as a fully supported perimeter board for floor and roof joists in residential and light commercial construction.
- Smooth, stable nailing surface.

Handling and Storage

Handle with the same care as all EWPs.

- Store indoors or undercover.
- Keep rim board up off the ground.
- Cover panels loosely when outdoors to protect from the elements.

Environmentally Responsible Technology

Like all Nordic Engineered Wood products, there is optimum usage of wood fibers with virtually no waste.

Installation

A full 1-1/8" edge surface allows for quick installation with virtually no risk of splitting. Proper installation of the rim board is essential to the overall structural integrity of the building. Refer to *Rim Board Installation and Construction Details* on next page.

Holes in Rim Board

- The maximum allowable round or rectangular hole size shall be 2/3 of the rim board depth. The length of the rim board segment containing a hole shall be at least eight times the hole size. These hole provisions do not apply to rim board installed over openings, such as doors or windows.
- Field-cut holes should be vertically centred in therim board and at least one hole diameter or 6 inches, whichever is less, clear distance away from the end of the wall line. Holes should never be placed such that they interfere with the attachment of the rim board to the ends of the floor joist, or any other code-required nailing.
- When concentrated loads are present on the rim board (loads not supported by any other vertical- load-carrying members such as squash blocks), holes should not be placed in the rim board within a distance equal to the depth of the rim board from the area of loading.
- For multiple holes, the clear spacing between holes shall be at least two times the diameter of the larger hole, or twice the length of the longest side of the longest rectangular hole.

DESIGN PROPERTIES FOR RIM BOARDS [a]

PRODUCT	H_r [b] (lbf/ft)	V_r [c] (lbf/ft)	Z_r [d] (lbf)	P_r [e] (lbf)	WEIGHT (pcf)
1-1/8" Rim Board Plus	260	8,090	580	5,845	35.6

(a) These design values are applicable only to rim board applications in compliance with the connection requirements given in this document and should not be used in the design of a bending member, such as joist, header, rafter, or ledger. The design values are applicable to standard term load duration for wood products, except for the horizontal load transfer capacity which is based on the short-term load duration. All values may be adjusted for other load durations in accordance with the applicable code.

(b) The factored horizontal (shear) load transfer resistance (H_r).

(c) The factored bearing (vertical) load resistance (V_r).

(d) The factored lateral resistance of a 1/2-inch-diameter lag screw (Z_r).

(e) The factored concentrated load resistance (P_r). The maximum concentrated load acting along any area of the floor sheathing above the rim board from 3" to 12" in length. The bearing load must be simultaneously satisfied along with the concentrated load resistance.

Rim Board Installation and Connection Details

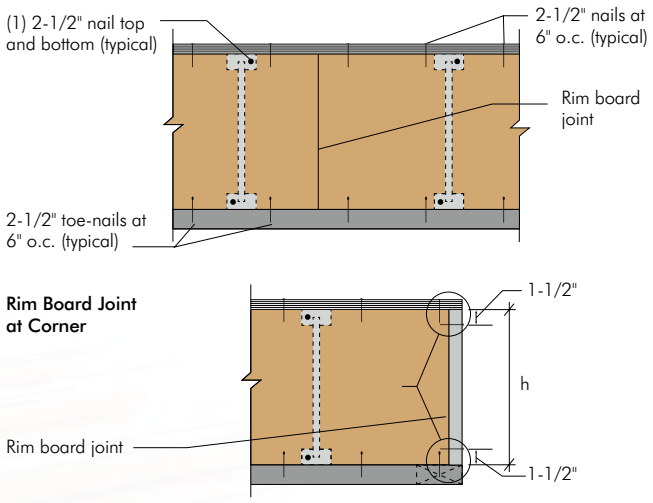
INSTALLATION AND CONNECTION REQUIREMENTS:

1. Floor sheathing to rim board – Use 2-1/2" common nails (wire or spiral) at 6 inches o.c. ***Caution:*** *The horizontal load capacity is not necessarily increased with decreased nail spacing. Under no circumstances should the nail spacing be less than 3 inches.* The 3-1/2" common nails (wire or spiral) used to connect the bottom plate of a wall to the rim board through the sheathing do not reduce the horizontal load capacity of the rim board provided that the 2-1/2" nail spacing (sheathing-rim board) is 6 inches o.c. and the 3-1/2" nail spacing (bottom plate–sheathing–rim board) is in accordance with the prescriptive requirements of the applicable code.
2. Rim board to I-joist – Use two 2-1/2" common nails (wire or spiral), one each into the top and bottom flanges.
3. Rim board to rim board – Attach rim board to rim board in accordance with Detail 8a. Rim board-to-rim board butt joints should be made between floor joists to minimize damage to joists caused by excessive end nailing.
4. Rim board to sill plate – Toe-nail using 2-1/2" common nails (wire or spiral) at 6 inches o.c. as shown in Detail 8b.
5. Starter joist – When rim boards are used as starter joists to transfer vertical loads, there are several installation options, such as blocking panels (Detail 1s), doubling up the rim boards, or placing an I-joist adjacent to the rim board. Please consult your designer for the appropriate option and details for your application.
6. Attachment of 2x lumber ledgers to rim board – Use 1/2-inch diameter lag screws with a minimum nominal length of 4 inches or 1/2-inch diameter through-bolts with washers and nuts. In both cases, use a factored resistance value of 585 lbf per fastener (see Detail 8c). Fasteners should be staggered in 2 rows with a minimum of 2 inches from any edge to the centre of holes. For fastener spacing, consult your local distributor. ***Caution:*** *The lag screw should be inserted in a lead hole by turning with a wrench, not by driving with a hammer. Over-torquing can significantly reduce the lateral resistance of the lag screw and should therefore be avoided. See the 2010 Wood Design Manual published by the Canadian Wood Council for the appropriate size of clearance and lead holes.*
7. Factored lateral resistance of nails applied to the faces of rim board – Calculate the factored lateral nail resistance based on the procedures given in the 2009 CSA-O86 Engineering Design in Wood (Limit States Design) using the factored lateral resistance for Douglas fir-Larch.

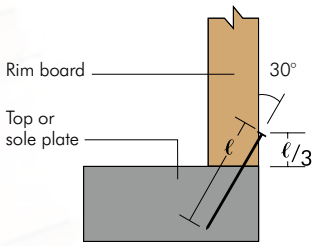
FIGURE 8

RIM BOARD INSTALLATION DETAILS

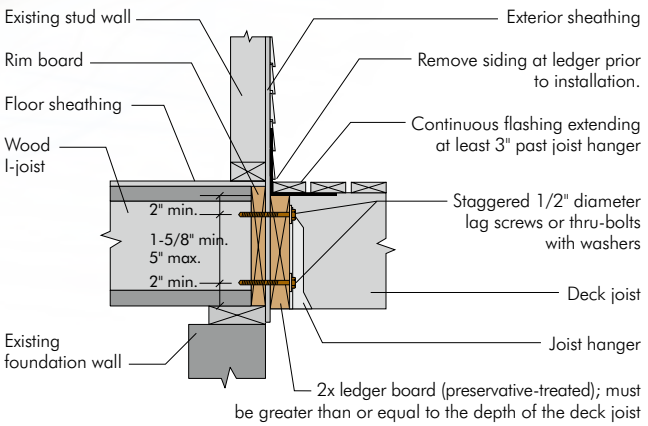
8a **ATTACHMENT DETAILS WHERE RIM BOARDS ABUT**



8b **TOE-NAIL CONNECTION AT RIM BOARD**

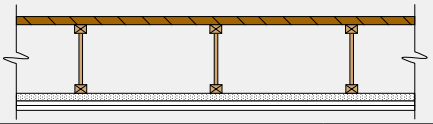
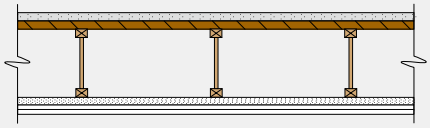


8c **2X LEDGER TO RIM BOARD ATTACHMENT DETAIL**



FIRE AND SOUND RATED SYSTEMS

FIGURE 9
FIRE AND SOUND RESISTANCE OF FLOOR-CEILING ASSEMBLIES

TYPE OF ASSEMBLY	ASSEMBLY NUMBER	DESCRIPTION [1] [2] [3]	FIRE-RESISTANCE RATING [4] [5] [6]	TYPICAL SOUND TRANSMISSION CLASS (STC) [4] [5] [7] [8]	TYPICAL IMPACT INSULATION CLASS (IIC) [4] [7] [9]
Wood Floor Joists (Wood Joists minimum 1-1/2" x 9-1/4", Wood I-joists minimum 1-1/2" x 1-1/2" flange 3/8" OSB or plywood web, minimum 9-1/2" deep)	**F6**	• subfloor of 19/32" plywood, OSB or waferboard, or 21/32" tongue and groove lumber • on wood joists spaced not more than 24" o.c. • with or without absorptive material in cavity • metal furring channels spaced 16" or 24" o.c. • 2 layers of gypsum board on ceiling side			
	F6a	F6 with: • no absorptive material in cavity • metal furring channels spaced 16" o.c. • 5/8" Type X gypsum board	1 h	41	34
	F6b	F6 with: • no absorptive material in cavity • metal furring channels spaced 24" o.c. • 5/8" Type X gypsum board	1 h	42	35
	F6c	F6 with: • absorptive material in cavity • metal furring channels spaced 16" o.c. • 5/8" Type X gypsum board	1 h	44	37
	F6d	F6 with: • absorptive material in cavity • metal furring channels spaced 24" o.c. • 5/8" Type X gypsum board	1 h	45	38
	F6e	F6 with: • no absorptive material in cavity • metal furring channels spaced 16" o.c. • 1/2" Type X gypsum board	1 h	40	33
	F6f	F6 with: • no absorptive material in cavity • metal furring channels spaced 24" o.c. • 1/2" Type X gypsum board	1 h	41	34
	F6g	F6 with: • absorptive material in cavity • metal furring channels spaced 16" o.c. • 1/2" Type X gypsum board	1 h	43	36
	F6h	F6 with: • absorptive material in cavity • metal furring channels spaced 24" o.c. • 1/2" Type X gypsum board	1 h	44	37
	F19	• 1-1/2" concrete topping (at least 14.3 psf) • subfloor of 19/32" plywood, OSB or waferboard, or 21/32" tongue and groove lumber • on wood joists spaced not more than 24" o.c. • with or without absorptive material in cavity • metal furring channels spaced 16" or 24" o.c. • 2 layers of gypsum board on ceiling side			
	F19a	F19 with: • no absorptive material in cavity • metal furring channels spaced 16" o.c. • 5/8" Type X gypsum board	1 h	52	31
	F19e	F19 with: • no absorptive material in cavity • metal furring channels spaced 16" o.c. • 1/2" Type X gypsum board	1 h	52	31

NOTES:

(2) For systems with a ceiling of 2 layers of gypsum board on resilient channels, the fastener and resilient channel arrangement at the gypsum board butt end joints are to be as shown in Figure A-9.10.3.1.B.(b), NBC.

(3) STC values given are for the minimum thickness of subfloor as shown. Minimum subfloor thickness required is determined by joist or truss spacing - see Table 9.23.15.5.A, NBC. Thicker subflooring is also acceptable.

(4) Sound absorptive material includes fibre processed from rock, slag, or glass, or cellulose fibre either loose-fill or spray-applied. To obtain the listed STC rating, the nominal insulation thickness is 6" for rock, slag, or glass fibres or loose-fill cellulose fibre, and 3-1/2" for spray-applied cellulose fibre. Absorptivematerial will affect the STC by approximately adding or subtracting 1 per 2" change of thickness.

(5) The fire and sound ratings are based on the spacing of ceiling supports as noted. A narrower spacing will be detrimental to the sound rating but not to the fire rating.

(6) Type and spacing of fasteners shall be in accordance with Subsection 9.29.5, NBC, or CSA A82.31-M.

(7) STC values given are for depth of framing member noted. For shallower members, subtract 1 from the STC for each 2" reduction in framing depth. For framing members deeper than noted, add 1 to the STC for each 2" increase in framing depth.

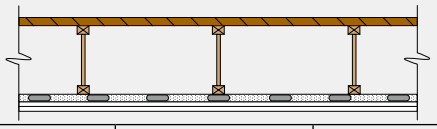
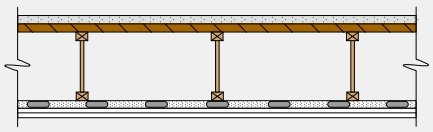
(8) STC values given reflect results for joist spacing of at least 16" o.c. unless otherwise specified. For joist spacing of at least 24" o.c., add 2 to the STC values given in the Table.

(9) IIC values given are for floors tested with no finished flooring.

These tables have been taken from Table A-9.10.3.1.B, National Building Code of Canada. Please refer to NBC for additional types of assembly.

FIGURE 9 (continued)

FIRE AND SOUND RESISTANCE OF FLOOR-CEILING ASSEMBLIES

TYPE OF ASSEMBLY	ASSEMBLY NUMBER	DESCRIPTION [1] [2] [3]	FIRE-RESISTANCE RATING [4] [5] [6]	TYPICAL SOUND TRANSMISSION CLASS (STC) [4] [5] [7] [8]	TYPICAL IMPACT INSULATION CLASS (IIC) [4] [7] [9]
Wood Floor Joists (Wood Joists minimum 1-1/2" x 9-1/4", Wood I-joists minimum 1-1/2" x 1-1/2" flange 3/8" OSB or plywood web, minimum 9-1/2" deep)	**F9**	• subfloor of 19/32" plywood, OSB or waferboard, or 21/32" tongue and groove lumber • on wood joists spaced not more than 24" o.c. • with or without absorptive material in cavity • resilient metal channels spaced 16" or 24" o.c. • 2 layers of gypsum board on ceiling side			
	F9a	F9 with: • no absorptive material in cavity • resilient metal channels spaced 16" o.c. • 5/8" Type X gypsum board	1 h	47	38
	F9b	F9 with: • no absorptive material in cavity • resilient metal channels spaced 24" o.c. • 5/8" Type X gypsum board	1 h	48[B]	40
	F9c	F9 with: • absorptive material in cavity • resilient metal channels spaced 16" o.c. • 5/8" Type X gypsum board	1 h	54	47
	F9d	F9 with: • absorptive material in cavity • resilient metal channels spaced 24" o.c. • 5/8" Type X gypsum board	1 h	55	49
	F9e	F9 with: • no absorptive material in cavity • resilient metal channels spaced 16" o.c. • 1/2" Type X gypsum board	1 h	47	38
	F9f	F9 with: • no absorptive material in cavity • resilient metal channels spaced 24" o.c. • 1/2" Type X gypsum board	1 h	48[B]	40
	F9g	F9 with: • absorptive material in cavity • resilient metal channels spaced 16" o.c. • 1/2" Type X gypsum board	1 h	54	47
	F9h	F9 with: • absorptive material in cavity • resilient metal channels spaced 24" o.c. • 1/2" Type X gypsum board	1 h	55	49
	F21	• 1-1/2" concrete topping (at least 14.3 psf) • subfloor of 19/32" plywood, OSB or waferboard, or 21/32" tongue and groove lumber • on wood joists spaced not more than 24" o.c. • with or without absorptive material in cavity • resilient metal channels spaced 16" or 24" o.c. • 2 layers of gypsum board on ceiling side			
	F21a	F21 with: • no absorptive material in cavity • resilient metal channels spaced 16" o.c. • 5/8" Type X gypsum board	1 h	64	36
	F21e	F21 with: • no absorptive material in cavity • resilient metal channels spaced 16" o.c. • 1/2" Type X gypsum board	1 h	64	36

NOTES:

(2) For systems with a ceiling of 2 layers of gypsum board on resilient channels, the fastener and resilient channel arrangement at the gypsum board butt end joints are to be as shown in Figure A-9.10.3.1.B.(b), NBC.

(3) STC values given are for the minimum thickness of subfloor as shown. Minimum subfloor thickness required is determined by joist or truss spacing - see 9.23.15.5.A, NBC. Thicker subflooring is also acceptable.

(4) Sound absorptive material includes fibre processed from rock, slag, or glass, or cellulose fibre either loose-fill or spray-applied. To obtain the listed STC rating, the nominal insulation thickness is 6" for rock, slag, or glass fibres or loose-fill cellulose fibre, and 3-1/2" for spray-applied cellulose fibre. Absorptive material will affect the STC by approximately adding or subtracting 1 per 2" change of thickness.

(5) The fire and sound ratings are based on the spacing of ceiling supports as noted. A narrower spacing will be detrimental to the sound rating but not to the fire rating.

(6) Type and spacing of fasteners shall be in accordance with Subsection 9.29.5, NBC, or CSA A82.31-M.

(7) STC values given are for depth of framing member noted. For shallower members, subtract 1 from the STC for each 2" reduction in framing depth. For framing members deeper than noted, add 1 to the STC for each 2" increase in framing depth.

(8) STC values given reflect results for joist spacing of at least 16" o.c. unless otherwise specified. For joist spacing of at least 24" o.c., add 2 to the STC values given in the Table.

(9) IIC values given are for floors tested with no finished flooring.

These tables have been taken from Table A-9.10.3.1.B, National Building Code of Canada. Please refer to NBC for additional types of assembly.

TYPICAL ROOF FRAMING
AND CONSTRUCTION DETAILS

INSTALLATION NOTES:

1. Installation of Nordic I-joists shall be as shown in Figure 10.
2. Except for cutting to length, or for providing birdsmouth bearings, I-joist flanges must not be cut, drilled, or notched.
3. I-joists are permitted to be birdsmouth cut at the lower end of the joist only. The birdsmouth cut must have full bearing and not overhang the inside face of the plate. Bearing stiffeners are required at the birdsmouth cut on both sides of the web.
4. When beveled bearing plates are used at I-joist supports, I-joist attachment to the bevel plate must be designed to transfer lateral thrust.
5. End bearing length must be at least 1-3/4 inches. For continuous framing and roof framing with cantilevers, the intermediate support and end bearing adjacent to the cantilever must be at least 3-1/2 inches.
6. Ends of roof joists must be restrained at the bearing to prevent rollover. Rim board or I-joist blocking panels are preferred. Cantilever-end blocking must be placed at the support adjacent to the cantilever, and ends of all cantilever extensions must be laterally braced by a fascia board or other similar methods.
7. Continuous lateral support of the I-joist's compression flange is required to prevent rotation and buckling. In simple span roof applications, lateral support of the top flange is normally supplied by the roof sheathing. Bracing of the I-joist's bottom flange is also required at interior supports of multiple-span joists and at the end support next to an overhang. Lateral support of the entire bottom flange may be required in cases of load reversal such as those caused by high wind.
8. Figure 10 details on the following pages show only I-joist specific fastener requirements. For other fastener requirements, such as wind uplift requirements or other member attachment details, see the applicable building code.
9. All roof details are valid up to a 12:12 slope unless otherwise noted.
10. Verify roof ventilation and insulation requirements with applicable building code.
11. Refer to *Typical Floor Framing Installation Notes* and *Safety and Construction Precautions* for additional information.

FIGURE 10
TYPICAL NORDIC I-JOIST ROOF FRAMING AND CONSTRUCTION DETAILS

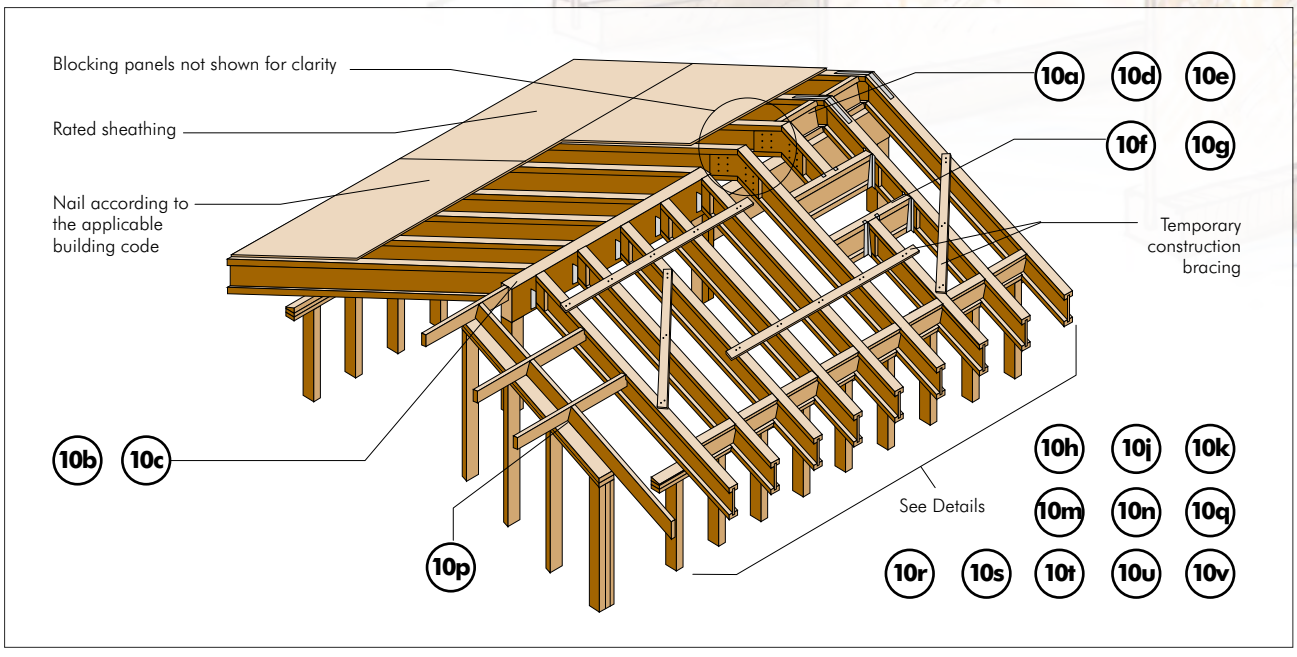
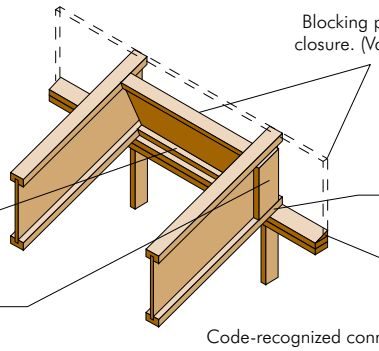


FIGURE 10 (continued)

TYPICAL NORDIC I-JOIST ROOF FRAMING AND CONSTRUCTION DETAILS

10a UPPER END, BEARING ON WALL



Blocking panel, x-bridging, or 3/4" sheathing as continuous closure. (Validate use of x-bridging with local building code).

2-1/2" nails at 6" o.c. – minimum three 2-1/2" nails per blocking panel.
When used for lateral shear transfer, match nail type and sheathing edge nailing ("boundary nailing" for engineered diaphragm applications).
Use minimum 2-1/2" nails.

Minimum attachment: For slope ≤1/4:12, one 3" common spiral nail, face nail at each side of bearing. For slope >1/4:12 design joist attachment to beveled plate to transfer lateral thrust.

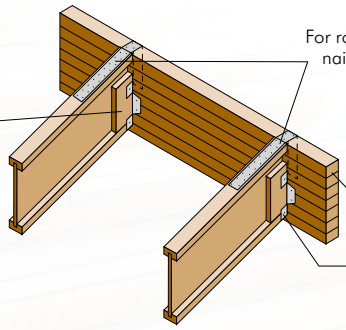
Beveled plate for slopes greater than 1/4:12. Attach to framing with one 3-1/2" nail at 16" o.c.

Bearing stiffener required when end reaction exceeds 2,450 lbs.

Code-recognized connectors may be substituted. For slopesgreater than 4:12, connectors are required to resist lateral thrust.

NOTE: Additional connection may be required for wind uplift.

10b RIDGE CONNECTION



For roof slopes between 1/4:12 and 12:12, provide a strap tie nailed at a minimum of 3" spacing or in accordance with the recommendation of thestrap manufacturer.

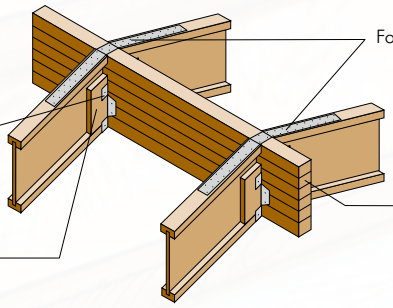
Beveled bearing stiffener required each side

Ridge beam (Nordic Lam or SCL)

Adjustable slope hanger with a minimum factored uplift resistance of 450 lbs

NOTE: Additional connection may be required for wind uplift.

10c I-JOIST TO RIDGE BEAM CONNECTION



For roof slopes between 1/4:12 and 12:12, provide a strap nailed at a minimum of 3" spacing on each side of roof slope or in accordance with the recommendation of the strap manufacturer

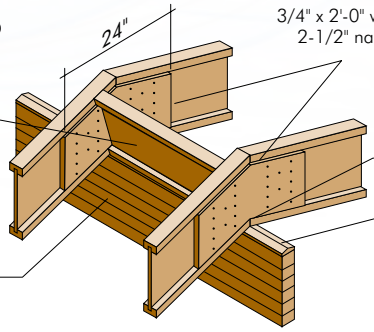
Adjustable slope hanger with a minimum factored uplift resistance of 450 lbs

Ridge beam (Nordic Lam or SCL)

Beveled bearing stiffener required each side

NOTE: Additional connection may be required for wind uplift.

10d I-JOIST CONNECTION WITH WOOD STRUCTURAL PANEL GUSSETS



3/4" x 2'-0" wood structural panel (front and back sides) with twelve 2-1/2" nails into each joist with nails clinched. When design roof snow load exceeds 40 psf, horizontal orientation of gusset strong axis is required. Gap 1/8" at top.

Blocking panel or x-bridging. Attach per detail 10a.

Attach I-joist per detail 10a

Attach double-beveled plate to framing with one 3" nail at 16" o.c.

Support beam or wall

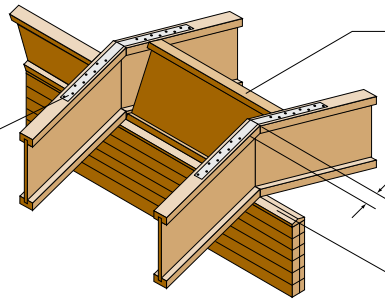
NOTE: Additional connection may be required for wind uplift.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better species. Individual components not shown to scale for clarity. Provide adequate ventilation at each joist bay as per detail 10v.

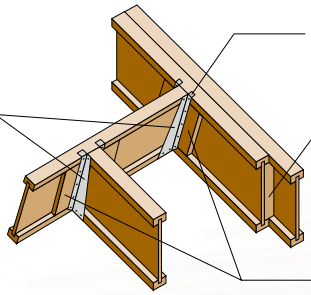
FIGURE 10 (continued)

TYPICAL NORDIC I-JOIST ROOF FRAMING AND CONSTRUCTION DETAILS

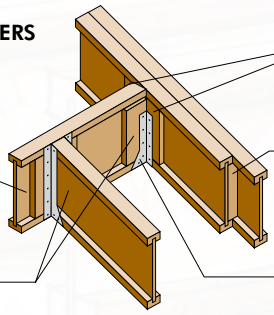
10e I-JOIST CONNECTION WITH TIE STRAP



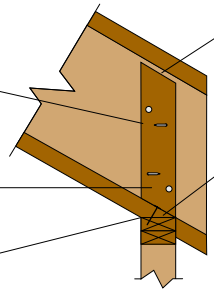
10f ROOF OPENING TOP-MOUNT HANGERS



10g ROOF OPENING FACE-MOUNT HANGERS



10h BIRDSMOUTH CUT & BEVEL CUT BEARING STIFFENERS (Permitted on low end of I-joist only)

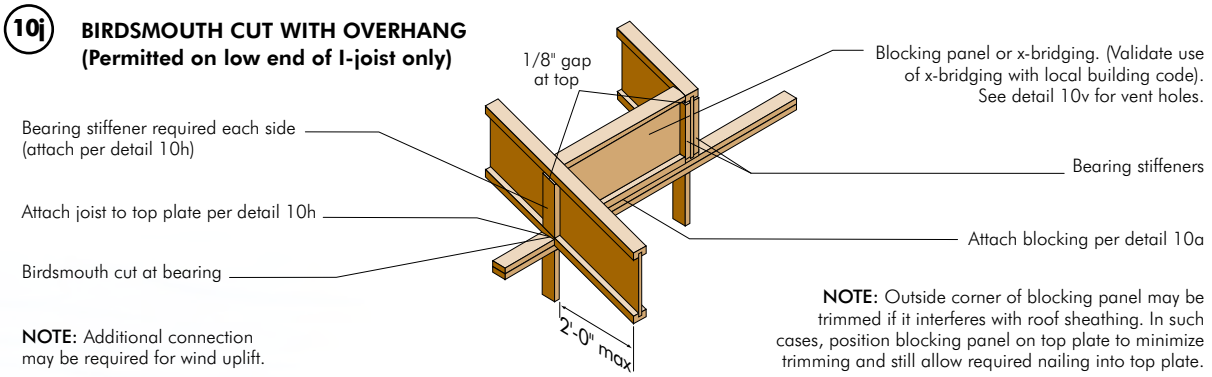


All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better species. Individual components not shown to scale for clarity. Provide adequate ventilation at each joist bay as per detail 10v.

FIGURE 10 (continued)

TYPICAL NORDIC I-JOIST ROOF FRAMING AND CONSTRUCTION DETAILS

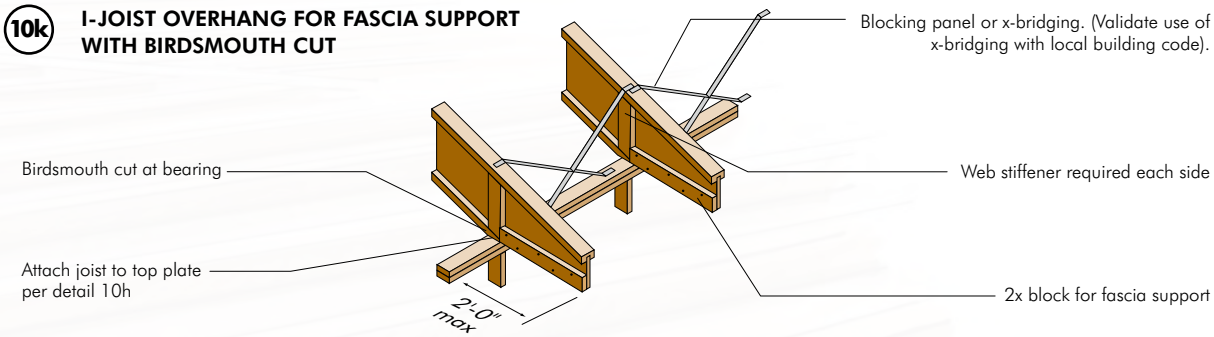
10j BIRDSMOUTH CUT WITH OVERHANG (Permitted on low end of I-joist only)



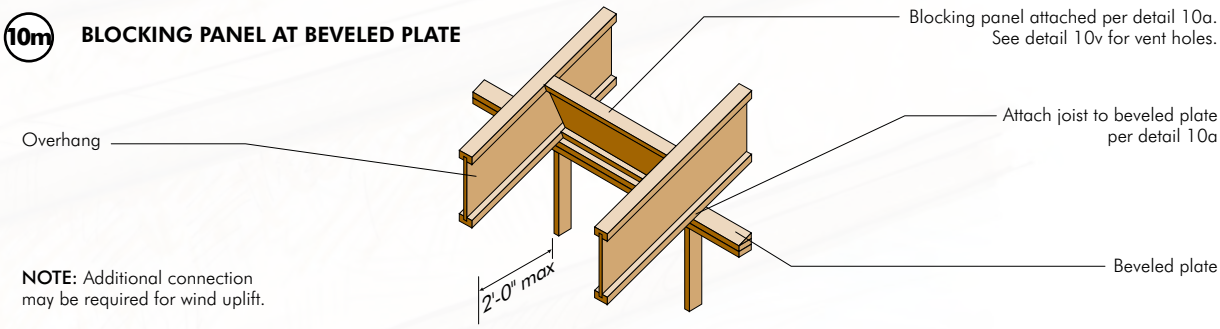
NOTE: Additional connection may be required for wind uplift.

NOTE: Outside corner of blocking panel may be trimmed if it interferes with roof sheathing. In such cases, position blocking panel on top plate to minimize trimming and still allow required nailing into top plate.

10k I-JOIST OVERHANG FOR FASCIA SUPPORT WITH BIRDSMOUTH CUT

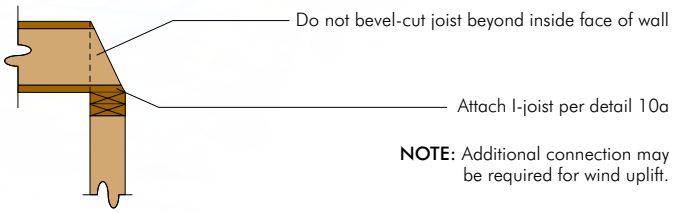


10m BLOCKING PANEL AT BEVELED PLATE



NOTE: Additional connection may be required for wind uplift.

10n I-JOIST WITH BEVEL-CUT END



NOTE: Blocking panel or x-bridging required at bearing for lateral support, not shown for clarity.

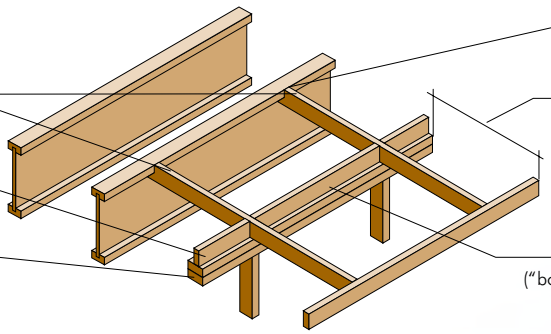
NOTE: Additional connection may be required for wind uplift.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better species. Individual components not shown to scale for clarity. Provide adequate ventilation at each joist bay as per detail 10v.

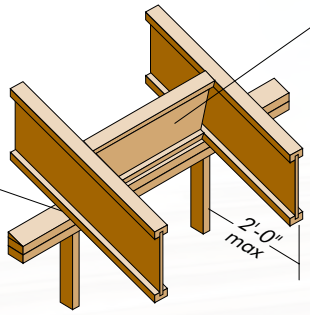
FIGURE 10 (continued)

TYPICAL NORDIC I-JOIST ROOF FRAMING AND CONSTRUCTION DETAILS

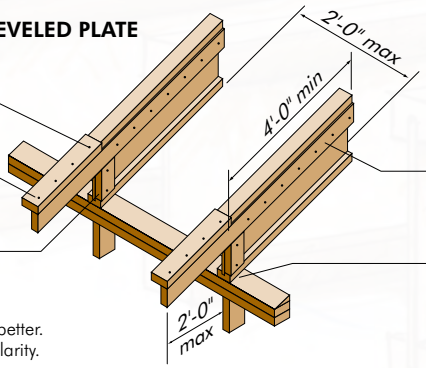
10p OUTRIGGER



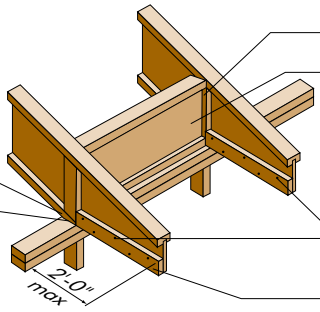
10q I-JOIST OVERHANG WITH BEVELED PLATE



10r LUMBER OVERHANG WITH BEVELED PLATE



10s I-JOIST OVERHANG FOR FASCIA SUPPORT WITH BIRDSMOUTH CUT

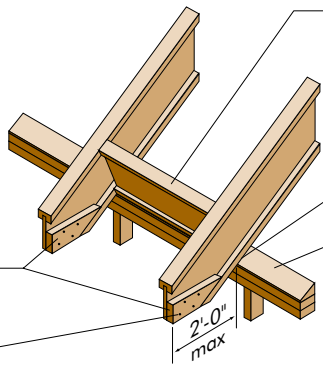


All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better species. Individual components not shown to scale for clarity. Provide adequate ventilation at each joist bay as per detail 10v.

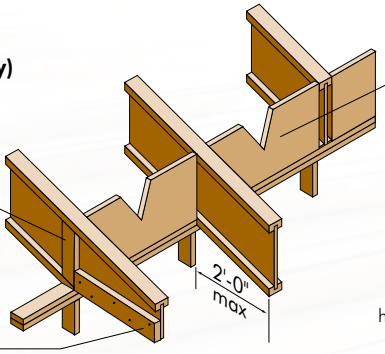
FIGURE 10 (continued)

TYPICAL NORDIC I-JOIST ROOF FRAMING AND CONSTRUCTION DETAILS

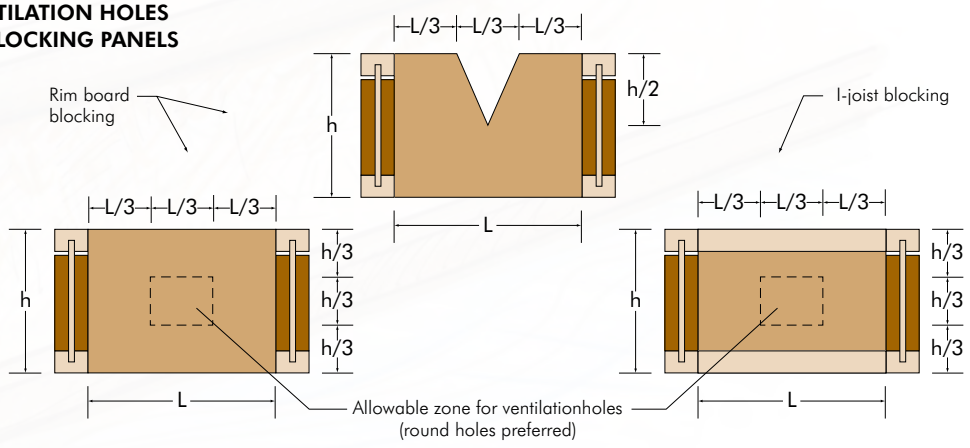
10t I-JOIST OVERHANG FOR FASCIA SUPPORT WITH BEVELED PLATE



10u BIRDSMOUTH CUT (Permitted on low end of I-joist only)



10v VENTILATION HOLES IN BLOCKING PANELS



NOTES:
- Corrosion-resistant wire cloth screening, hardware cloth, perforated vinyl or similar material shall cover the ventilation holes per code.
- The maximum allowable round hole diameter for a lateral restraint-only blocking panel shall be 2/3 of the lesser dimension of blocking panel depth or length.
- Whenever possible, field-cut holes should be centred in the blocking panel both vertically and horizontally.

All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better species. Individual components not shown to scale for clarity. Provide adequate ventilation at each joist bay as per detail 10v.

FRAMING CONNECTORS

SIMPSON STRONG-TIE CONNECTORS

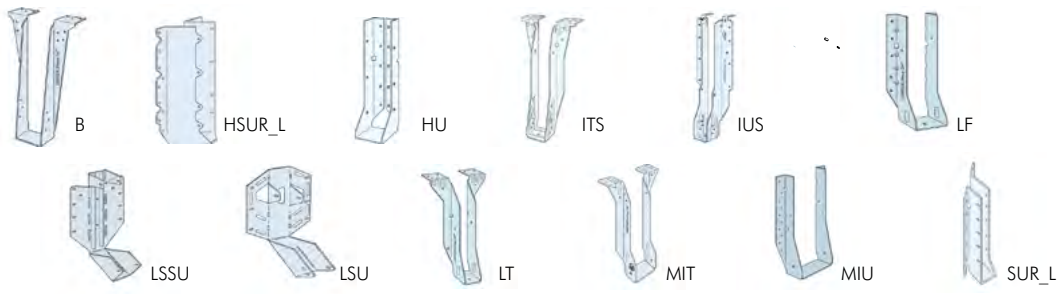
	JOIST SERIES	JOIST DEPTH	FACE MOUNT					TOP MOUNT				
			MODEL	Fastener Type		Fact. Resist. (lbs)		MODEL	Fastener Type		Fact. Resist. (lbs)	
				Header	Joist	Uplift (1.15)	Normal		Header	Joist	Uplift (1.15)	Normal
SINGLE JOISTS	NI-20 NI-40x NI-60	9-1/2	IUS2.56/9.5	8-10d	-	105	1690	LT259	6-10d	1-#8 x 1-1/4 WS	75	1725
		11-7/8	IUS2.56/11.88	10-10d	-	105	1820	LT251188	6-10d	1-#8 x 1-1/4 WS	75	1725
		14	IUS2.56/14	12-10d	-	105	1820	LT2514	6-10d	1-#8 x 1-1/4 WS	75	1725
		16	IUS2.56/16	14-10d	-	105	1935	LT2516	6-10d	1-#8 x 1-1/4 WS	75	1725
	NI-70 NI-80	9-1/2	IUS3.56/9.5	10-10d	-	105	1685	LT359	6-10d	2-#8 x 1-1/4 WS	75	1725
		11-7/8	IUS3.56/11.88	12-10d	-	105	1685	LT351188	6-10d	2-#8 x 1-1/4 WS	75	1725
		14	IUS3.56/14	12-10d	-	105	1685	LT3514	6-10d	2-#8 x 1-1/4 WS	75	1725
		16	IUS3.56/16	14-10d	-	105	1685	LT3516	6-10d	2-#8 x 1-1/4 WS	75	1725
	NI-90x	11-7/8	LF3511	12-10d	2-#8 x 1-1/4 WS	105	2270	LT351188	6-10d	2-#8 x 1-1/4 WS	75	1725
		14	LF3514	14-10d	2-#8 x 1-1/4 WS	105	2385	LT3514	6-10d	2-#8 x 1-1/4 WS	75	1725
		16	MIU3.56/16	24-10d	2-10d x 1-1/2	410	3485	LT3516	6-10d	2-#8 x 1-1/4 WS	75	1725
DOUBLE JOISTS	NI-20 NI-40x NI-60	9-1/2	MIU5.12/9	16-16d	2-10d x 1-1/2	410	3230	MIT39.5-2	8-16d	2-10d x 1-1/2	320	2420
		11-7/8	MIU5.12/11	20-16d	2-10d x 1-1/2	410	3230	MIT311.88-2	8-16d	2-10d x 1-1/2	320	2420
		14	MIU5.12/14	22-16d	2-10d x 1-1/2	410	3485	MIT314-2	8-16d	2-10d x 1-1/2	320	2420
		16	MIU5.12/16	24-16d	2-10d x 1-1/2	410	3485	MIT5.12/16	8-16d	2-10d x 1-1/2	320	2420
	NI-70 NI-80 NI-90x	9-1/2	HU410-2	18-16d	8-16d	1865	4690	B7.12/9.5	14-16d	6-16d	1170	3910
		11-7/8	HU412-2	22-16d	8-16d	1865	4690	B7.12/11.88	14-16d	6-16d	1170	3910
		14	HU414-2	26-16d	12-16d	2685	5780	B7.12/14	14-16d	6-16d	1170	3910
		16	HU414-2	26-16d	12-16d	2685	5780	B7.12/16	14-16d	6-16d	1170	3910

	JOIST SERIES	JOIST DEPTH	FIELD SLOPE & SKEW					45° SKEW				
			MODEL	Fastener Type		Fact. Resist. (lbs)		MODEL	Fastener Type		Fact. Resist. (lbs)	
				Header	Joist	Uplift (1.15)	Normal		Header	Joist	Uplift (1.15)	Normal
SINGLE JOISTS	NI-20 NI-40x NI-60	9-1/2	LSSUH310	14-16d	12-10d x 1-1/2	1155	1860	SUR/L2.56/9	14-16d	2-10d x 1-1/2	385	2805
		11-7/8	LSSUH310	14-16d	12-10d x 1-1/2	1155	1860	SUR/L2.56/11	16-16d	2-10d x 1-1/2	385	2805
		14	LSSUH310	14-16d	12-10d x 1-1/2	1155	1860	SUR/L2.56/14	18-16d	2-10d x 1-1/2	385	2805
		16	LSSUH310	14-16d	12-10d x 1-1/2	1155	1860	SUR/L2.56/14	18-16d	2-10d x 1-1/2	385	2805
	NI-70 NI-80	9-1/2	LSSUH410	14-16d	12-10d x 1-1/2	1155	2170	SUR/L410	14-16d	6-16d	1395	2875
		11-7/8	LSSUH410	14-16d	12-10d x 1-1/2	1155	2170	SUR/L410	14-16d	6-16d	1395	2875
		14	LSSUH410	14-16d	12-10d x 1-1/2	1155	2170	SUR/L414	18-16d	8-16d	1555	2895
		16	LSSUH410	14-16d	12-10d x 1-1/2	1155	2170	SUR/L414	18-16d	8-16d	1555	2895
DOUBLE JOISTS	NI-20 NI-40x NI-60	9-1/2	Refer to Wood Construction Connectors catalog for hanger selection					HSUR/L5.12/9	12-16d	2-10d x 1-1/2	195	2350
		11-7/8	LSU5.12	24-16d	16-10d x 1-1/2	910	1845	HSUR/L5.12/11	16-16d	2-10d x 1-1/2	195	2965
		14	LSU5.12	24-16d	16-10d x 1-1/2	910	1845	HSUR/L5.12/14	20-16d	2-10d x 1-1/2	195	2965
		16	LSU5.12	24-16d	16-10d x 1-1/2	910	1845	HSUR/L5.12/16	24-16d	2-10d x 1-1/2	195	2965
	NI-70 NI-80 NI-90x	9-1/2	Refer to Wood Construction Connectors catalog for hanger selection					HU410-2x	18-16d	8-16d	1710	3045
		11-7/8						HU412-2x	22-16d	8-16d	1710	3045
		14						HU414-2x	26-16d	12-16d	2565	3755
		16						HU414-2x	26-16d	12-16d	2565	3755

NOTES:

1. Support material assumed to be Nordic Lam or sawn lumber (Douglas Fir-Larch, Southern Pine or Spruce-Pine-Fir species).
2. Loads may not be increased for short-term loading. Uplift loads have been increased 60% for wind loading with no further increase allowed. Divide by 1.6 for normal loading applications such as cantilever construction.
3. Shaded hangers require web stiffeners. Web stiffeners may be required by others for non-shaded hangers.
4. Leave 1/16" (1/8" maximum) clearance between the end of the supported joist and the header or hanger.
5. When I-joist is used as header, all nails must be 10d x 1-1/2. Refer to *Wood Construction Connectors* catalog for allowable loads.
6. To verify connector suitability for a specific application, refer to *Wood Construction Connectors* catalog, or visit www.strongtie.com.

SIMPSON Strong-Tie™



USP STRUCTURAL CONNECTORS

	JOIST SERIES	JOIST DEPTH	FACE MOUNT MODEL	FACE MOUNT Fastener Type Header	FACE MOUNT Fastener Type Joist	FACE MOUNT Fact. Resist. (lbs) Uplift (1.15)	FACE MOUNT Fact. Resist. (lbs) Normal	TOP MOUNT MODEL	TOP MOUNT Fastener Type Header	TOP MOUNT Fastener Type Joist	TOP MOUNT Fact. Resist. (lbs) Uplift (1.15)	TOP MOUNT Fact. Resist. (lbs) Normal
SINGLE JOISTS	NI-20 NI-40x NI-60	9-1/2" 11-7/8" 14" 16"	THF25925 THF25112 THF25140 THF25160	12-10d 14-10d 18-10d 22-10d	2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2	238 511 511 511	2350 2350 3128 3128	TFL2595 TFL25118 TFL2514 TFL2516	6-10d 6-10d 6-10d 6-10d	2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2	529 529 529 529	1771 1771 1771 1771
	NI-70 NI-80 NI-90x	9-1/2" 11-7/8" 14" 16"	THF35925 THF35112 THF35140 THF35157	12-10d 16-10d 20-10d 22-10d	2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2	330 330 330 330	3720 3720 4743 4743	THO35950 THO35118 THO35140 THO35160	10-10d 10-10d 12-10d 12-10d	2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2 2-10d x 1-1/2	355 355 355 355	2115 2115 3160 3160
DOUBLE JOISTS	NI-20 NI-40x NI-60	9-1/2" 11-7/8" 14" 16"	THF25925-2 THF25112-2 THF25140-2 THF25160-2	12-10d 16-10d 20-10d 24-10d	6-10d 6-10d 6-10d 6-10d	2361 2361 2361 2361	3720 3720 4743 4743	THO25160-2 THO25118-2 THO25140-2 THO25160-2	10-16d 10-16d 12-16d 12-16d	6-10d 6-10d 6-10d 6-10d	2210 2210 2210 2210	4265 4265 4715 4715
	NI-70 NI-80 NI-90x	9-1/2" 11-7/8" 14" 16"	HD7100 HD7120 HD7140 HD7160	12-16d 16-16d 20-16d 24-10d	6-10d 6-10d 12-10d 12-10d	3149 3149 3149 3149	5123 5123 5123 5123	BPH7195 BPH71118 BPH7114 BPH7116	10-16d 10-16d 10-16d 10-16d	6-10d 6-16d 6-16d 6-16d	1245 1245 1245 1245	4725 4725 4725 4725

	JOIST SERIES	JOIST DEPTH	FIELD SLOPE & SKEW MODEL	FIELD SLOPE & SKEW Fastener Type Header	FIELD SLOPE & SKEW Fastener Type Joist	FIELD SLOPE & SKEW Fact. Resist. (lbs) Uplift (1.15)	FIELD SLOPE & SKEW Fact. Resist. (lbs) Normal	45° SKEW MODEL	45° SKEW Fastener Type Header	45° SKEW Fastener Type Joist	45° SKEW Fact. Resist. (lbs) Uplift (1.15)	45° SKEW Fact. Resist. (lbs) Normal
SINGLE JOISTS	NI-20 NI-40x NI-60	9-1/2" 11-7/8" 14" 16"	LSSH25 LSSH25 LSSH25 LSSH25	14-16d 14-16d 14-16d 14-16d	12-10d x 1-1/2 12-10d x 1-1/2 12-10d x 1-1/2 12-10d x 1-1/2	1390 1390 1390 1390	3025 3025 3025 3025	SKH2520L/R SKH2520L/R SKH2524L/R SKH2524L/R	14-10d 14-10d 16-10d 16-10d	10-10d x 1-1/2 10-10d x 1-1/2 10-10d x 1-1/2 10-10d x 1-1/2	2065 2065 2065 2065	2320 2320 2320 2320
	NI-70 NI-80 NI-90x	9-1/2" 11-7/8" 14" 16"	LSSH35 LSSH35 LSSH35 LSSH35	14-16d 14-16d 14-16d 14-16d	12-10d x 1-1/2 12-10d x 1-1/2 12-10d x 1-1/2 12-10d x 1-1/2	1845 1845 1845 1845	3715 3715 3715 3715	*SKH410L/R *SKH410L/R *SKH414L/R *SKH414L/R	16-16d 16-16d 22-16d 22-16d	10-16d 10-16d 10-16d 10-16d	2530 2530 2530 2530	2620 2620 5260 5260
DOUBLE JOISTS	NI-20 NI-40x NI-60	9-1/2" 11-7/8" 14" 16"	*Refer to Canadian Product Catalog for hanger selection*					*SKH2520L/R-2 *SKH2520L/R-2 *SKH2524L/R-2 *SKH2524L/R-2	14-10d 14-10d 16-10d 16-10d	10-10d 10-10d 10-10d 10-10d	2530 2530 2530 2530	3855 3855 3590 3590
	NI-70 NI-80 NI-90x	9-1/2" 11-7/8" 14" 16"	*Refer to Canadian Product Catalog for hanger selection*					HD7100-SK45L/R HD7120-SK45L/R HD7140-SK45L/R HD7160-SK45L/R	12-16d 16-16d 20-16d 24-16d	6-10d 6-10d 8-10d 8-10d	2362 2362 2362 2362	5123 5123 5123 5123

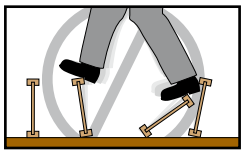
NOTES:

1. Support material assumed to be Nordic Lam or sawn lumber (Douglas Fir-Larch, Southern Pine or Spruce-Pine-Fir species).
2. Loads may not be increased for short-term loading. Uplift loads have been increased 60% for wind loading with no further increase allowed. Divide by 1.6 for normal loading applications such as in cantilever construction.
3. Shaded hangers require web stiffeners. Web stiffeners may be required by others for non-shaded hangers.
4. Leave 1/16" (1/8" maximum) clearance between the end of the supported joist and the header or hanger.
5. When I-joist is used as header, all nails must be 10d x 1-1/2. Refer to *Canadian Product Catalog* for allowable loads.
6. To verify connector suitability for a specific application, refer to the *Canadian Product Catalog*, or visit www.USPconnectors.com.

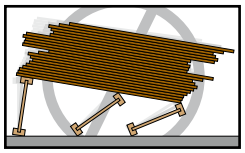
** Miter cut required on end of joist to achieve design loads.*

USP STRUCTURAL CONNECTORS® A MiTek® Company

SAFETY
AND CONSTRUCTION PRECAUTIONS



Do not walk on I-joists until fully fastened and braced, or serious injuries can result.



Never stack building materials over unsheathed I-joists. Once sheathed, do not over-stress I-joist with concentrated loads from building materials.

I-joists are not stable until completely installed, and will not carry any load until fully braced and sheathed.

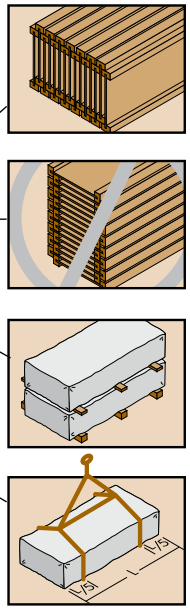
Avoid Accidents by Following these Important Guidelines:

1. Brace and nail each I-joist as it is installed, using hangers, blocking panels, rim board, and/or cross-bridging at joist ends. When I-joists are applied continuous over supports and a load-bearing wall is planned at that location, blocking will be required at the interior support. See detail 1g on page 17.
2. When the building is completed, the floor sheathing will provide lateral support for the top flanges of the I-joists. Until this sheathing is applied, temporary bracing, often called struts, or temporary sheathing must be applied to prevent I-joist rollover or buckling.
   - Temporary bracing or struts must be 1x4 inch minimum, at least 8 feet long and spaced no more than 8 feet on centre, and must be secured with a minimum of two 2-1/2" nails fastened to the top surface of each I-joist. Nail the bracing to a lateral restraint at the end of each bay. Lap ends of adjoining bracing over at least two I-joists.
   - Or, sheathing (temporary or permanent) can be nailed to the top flange of the first 4 feet of I-joists at the end of the bay.
3. For cantilevered I-joists, brace top and bottom flanges, and brace ends with closure panels, rim board, or cross-bridging.
4. Install and fully nail permanent sheathing to each I-joist before placing loads on the floor system. Then, stack building materials over beams or walls only.
5. *Never* install a damaged I-joist.

Improper storage or installation, failure to follow applicable building codes, failure to follow span ratings for Nordic I-joists, failure to follow allowable hole sizes and locations, or failure to use web stiffeners when required can result in serious accidents. Follow these installation guidelines carefully.

STORAGE
AND HANDLING GUIDELINES

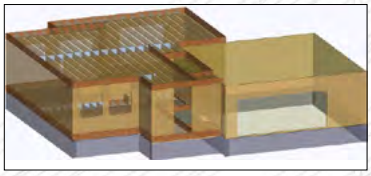
1. Bundle wrap can be slippery when wet. Avoid walking on wrapped bundles.
2. Store, stack and handle I-joists vertically and level only.
3. Always stack and handle I-joists in the upright position only.
4. Do not store I-joists in direct contact with the ground and/or flatwise.
5. Protect I-joists from weather, and use spacers to separate bundles.
6. Bundled units should be kept intact until time of installation.
7. When lifting I-joists with a crane on the job site, take a few simple precautions to prevent damage to the I-joists and injury to your work crew.
   - Pick I-joists in bundles as shipped by the supplier.
   - Orient the bundles so that the webs of the I-joists are vertical.
   - Pick the bundles at the 5th points, using a spreader bar if necessary.
8. Do not handle I-joists in a horizontal orientation.
9. NEVER USE OR TRY TO REPAIR A DAMAGED I-JOIST.

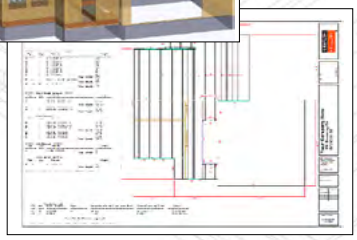


SOFTWARE

Component Solutions EWP Edition®

ISTRUCT™



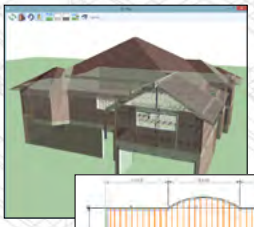


Component Solutions EWP Edition by Simpson Strong-tie and iStruct by CSD (Calculated Structured Designs) are software that integrate and automate all of the major functions that take place in specifying and engineering building components and materials for wood frame structures.

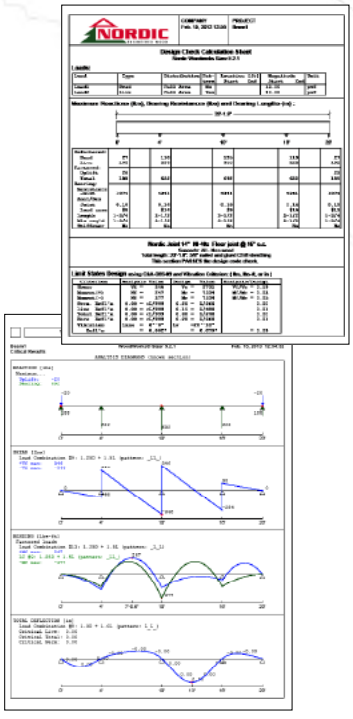
Design, analyze, engineer, calculate, plan, report, generate takeoffs, and finalize the sale all with one software solution. Generate a full house design including all engineered wood floor and roof systems, taking into account all live and gravity loads as they are transferred down through the structure, and complete with all individual component calculations.

In addition, any Nordic glulam and joist may be sized separately and independent from any structure.

Component Solutions EWP Edition and iStruct are available to distributors.



Nordic Sizer



Nordic Sizer by WOODWORKS® is a software program that can be used to design individual members (joists, beams, floor/roof slabs, columns, wall panels) using the full range of Nordic's engineered wood products: glued laminated timber beams and columns, prefabricated wood I-joists, glulam decking, and cross-laminated timber (CLT).

Nordic Sizer analyzes and designs simple and multiple span members for factored dead, live, snow, and wind loads as per CSA O86-09, automatically patterns loads and checks all load combinations as per NBC 2010. Joists and beams may be set horizontally, sloped, or axially rotated (purlins). Columns, studs, and wall panels may be analyzed under combinations of axial and bending loads, and in consideration of load excentricities.

The user may also specify deflection limits, lateral bracing, end notches, web holes, built-up members, service conditions, and floor composition for vibration calculation. Fire design according to NBC 2010, Division B, D-2.11 and D-2.4, but also according to an alternative char-rate method is available for all solid timber products. Material, grade and series, width and thickness may all be specified as 'unknown' - a list of acceptable sections with all the combinations for a given span and loading situation will be generated.

Nordic Sizer is available to engineers, architects, and specifiers working with Nordic products.

DEAD LOAD
MATERIAL WEIGHTS

MATERIAL	(psf)
SHEATHING AND DECKING	
OSB, 3/8-in.	1.4
OSB, 7/16-in.	1.6
OSB, 1/2-in.	1.9
OSB, 19/32-in.	2.2
OSB, 23/32-in.	2.7
Plywood, 11/32-in.	1.1
Plywood, 15/32-in.	1.5
Plywood, 19/32-in.	1.9
Plywood, 23/32-in.	2.3
Plywood, 1-1/8-in.	3.6
Metal deck, 20 gage	2.5
Metal deck, 18 gage	3.0
Wood decking, 1-in.	3.0
Wood decking, 2-in.	5.0
Wood decking, 3-in.	8.0
CEILINGS	
Gypsum board, 1/2-in.	2.2
Gypsum board, 5/8-in.	2.8
Mechanical duct allowance	4.0
Plaster on wood lath	8.0
Suspended steel channel system	2.0
Wood furring suspension system	2.5
COVERINGS	
Asbestos-cement shingles	4.0
Asphalt shingles	2.0
Wood shingles	3.0
Cement tile	16
Clay tile (for mortar add 10 psf)	1.9
Minimum	10
Spanish	19
Composition:	1.9
3-ply ready roofing	1.0
4-ply felt and gravel	5.5
5-ply felt and gravel	6.0

MATERIAL	(psf)
COVERINGS (continued)	
Gypsum sheathing, 1/2-in.	2.0
Skylight, metal frame, 3/8-in. glass	8.0
Waterproofing membranes:	1.9
Bituminous, gravel-covered	5.5
Bituminous, smooth surface	1.5
Liquid applied	1.0
Single-ply, sheet	0.7
FLOOR FILL	
Gyp-crete, 3/4"	6.3
Lightweight concrete, 1-1/2"	12
Stone concrete, 1-1/2"	18
FLOOR FINISHES	
Carpet and pad	2.0
Ceramic or quarry tile (3/4-in.)	5.0
on 1/2-in. mortar bed	16
on 1-in. mortar bed	23
Hardwood, nominal 1-in.	4.0
Linoleum or asphalt tile, 1/4-in.	1.0
Marble and mortar	4.0
on stone-concrete fill	33
Slate (per inch thickness)	15
Subflooring, 3/4-in.	3.0
FLOORS (12-in. spacing)	
2 x 4	1.4
2 x 6	2.1
2 x 8	2.8
2 x 10	3.6
2 x 12	4.3
NI joist	2.20 - 3.95

NOTES:
- See page 7 for I-joist weight/linear foot
- For 16-in. spacing, divide by 1.33
- For 19.2-in. spacing, divide by 1.6
- For 24-in. spacing, divide by 2

MATERIAL	(psf)
FRAME PARTITIONS	
Wood or steel studs,	1.4
1/2-in. gypsum board each side	8
Wood studs, 2 x 4,	1.9
unplastered	4
plastered one side	12
plastered two sides	20
FRAME WALLS	
Exterior stud walls:	1.9
2 x 4 at 16-in., 5/8-in. gypsum,	2.3
insulated, 3/8-in. siding	11
2 x 6 at 16-in., 5/8-in. gypsum,	2.5
insulated, 3/8-in. siding	12
Exterior stud walls with brick veneer	48
Windows, glass, frame and sash	8

NOTE: Wall weights in pounds per square foot of wall. Multiply weight times wall height for pounds per linear foot (plf).

INSULATION (per inch thickness)	
Cellular glass	0.7
Fibrous glass	1.1
Fibreboard	1.5
Perlite	0.8
Polystyrene foam	0.2
Rigid insulation	1.5
Urethane foam with skin	0.5

NOTES:
1. Estimated material weights in pounds per square foot (psf).
2. Wood decking and 2x lumber weight based on Douglas Fir.
3. Adding 1.0 to 2.0 psf is recommended for miscellaneous dead loads.
4. For additional information, refer to Minimum Design Loads for Buildings and Other Structures, ASCE Standard 7-10, Tables C3-1 and C3-2.

CONVERSION FACTORS

CONVERSION FACTORS

ITEM	IMPERIAL – METRIC			METRIC – IMPERIAL		
LENGTH	1 in.	=	25.4 mm	1 mm	=	0.0393701 in.
		=	0.0254 m	1 m	=	39.3701 in.
	1 ft	=	0.3048 m		=	3.28084 ft
	1 yd	=	0.9144 m		=	1.09361 yd
	1 mile	=	1.60934 km	1 km	=	0.621371 mile
LENGTH / TIME	1 ft/s	=	0.3048 m/s	1 m/s	=	3.28084 ft/s
	1 mph	=	1.60934 km/h	1 km/h	=	0.621371 mph
AREA	1 $in.^2$	=	645.16 mm^2	1 mm^2	=	0.001550 $in.^2$
	1 ft^2	=	0.0929030 m^2	1 m^2	=	10.7639 ft^2
	1 acre	=	0.404686 ha	1 ha	=	2.47105 acres
	1 mi^2	=	2.58999 km^2	1 km^2	=	0.386102 mi^2
VOLUME	1 $in.^3$	=	16387.1 mm^3	1 mm^3	=	0.0000610237 $in.^3$
	1 ft^3	=	0.0283168 m^3	1 m^3	=	35.3147 ft^3
	1 yd^3	=	0.764555 m^3		=	1.30795 yd^3
	1 fl oz (US)	=	29.5735 ml	1 ml	=	0.0338141 fl oz (US)
	1 gal (US)	=	3.78541 l	1 l	=	0.264172 gal (US)
MASS	1 oz	=	28.3495 g	1 g	=	0.0352740 oz
	1 lb	=	0.453592 kg	1 kg	=	2.20462 lb
	1 short ton (2,000 lbs)	=	0.907185 tons	1 ton	=	1.10231 short tons
MASS / VOLUME	1 lb/ft^3	=	16.1085 kg/m^3	1 kg/m^3	=	0.062079 lb/ft^3
FORCE	1 lb	=	4.44822 N	1 N	=	0.224809 lb
STRESS	1 $lb/in.^2$ (psi)	=	0.00689476 N/mm^2 (MPa)	1 N/mm^2 (MPa)	=	145.038 $lb/in.^2$ (psi)
LOADING	1 lb/ft^2 (psf)	=	0.0478803 kN/m^2 (KPa)	1 kN/m^2 (KPa)	=	20.8854 lb/ft^2 (psf)
	1 lb/ft (plf)	=	0.0145939 kN/m	1 kN/m	=	68.5218 lb/ft (plf)
MOMENT	1 lb-ft	=	0.00135582 kN-m	1 kN-m	=	737.561 lb-ft
TEMPERATURE	1 °F	=	(°F-32) / 1.8 °C	1 °C	=	32 + 1.8 (°C) °F

NOTES:

1. 9.80665 Newtons (N) = 1.0 kilogram (kg) x 9.80665 m/s^2
2. 1.0 Pascal (Pa) = 1.0 Newtons per square metre (N/m^2)

PRODUCT WARRANTY

CHANTIERS CHIBOUGAMAU

PRODUCT WARRANTY

Chantiers Chibougamau guarantees that, in accordance with our specifications, Nordic products are free from manufacturing defects in material and workmanship.

Furthermore, Chantiers Chibougamau warrants that our products, when utilized in accordance with our handling and installation instructions, will meet or exceed our specifications for the lifetime of the structure.

ONE SMALL STEP FOR NORDIC ENGINEERED WOOD

ONE GIANT STEP
FOR INDUSTRY

From its inception Nordic Engineered Wood has strived to provide the most efficient wood products with the least environmental impacts. That's why Nordic Engineered Wood, in its exclusive partnership with Chantiers Chibougamau Ltd., has become a leader in demanding well-managed forestry practices.

Back in 2000, Nordic was one of the first in North America to demand that the wood used in its products meet or exceed the ISO 14001 Standard. Continuing its ongoing commitment to responsible wood solutions, Nordic Engineered Wood is proud to offer products that are certified by the Forest Stewardship Council, the international benchmark of well-managed forests.

What's in a logo?

With all the certification bodies out there, trying to do the right thing and buying responsibly produced products can be confusing. The FSC label makes it easy to make the right choice when buying wood products. This is what sets FSC apart:

Only FSC

- prohibits conversion of natural forests or other habitat around the world
- prohibits the use of highly hazardous pesticides around the world
- respects human rights with particular attention to indigenous peoples
- is the only forest ***certification system*** that is supported by all major environmental groups.
- identifies areas that need special protection (e.g. cultural or sacred sites, habitats of endangered animals or plants.

But most importantly only FSC reviews each certified operation ***at least*** once a year – and if they are found not to comply, the certificate is withdrawn.

"FSC has the highest environmental standard for forest management of any certification system in the world."

Monte Hummel
World Wildlife Fund, Canada

Protecting nature's resources is everyone's responsibility; at Nordic Engineered Wood we are doing our part.

Do yours.

FSC-Certified wood products are available. Consult your local distributor for details.

FSC
www.fsc.org

The mark of responsible forestry

FSC® C011517

www.nordicewp.com

NORDIC ENGINEERED WOOD

HEAD OFFICE AND TECHNICAL SERVICES
info@nordicewp.com
T. 514.871.8526 • F. 514.871.9789

FSC www.fsc.org
The mark of responsible forestry
FSC® C011517

N-C101/ April 2015
Printed in Canada on recycled paper