

ROOF DETAILS

FRAMING AND CONSTRUCTION GUIDE

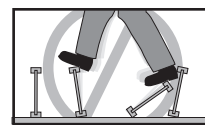


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Bringing Nature's Resources Home



SAFETY AND CONSTRUCTION PRECAUTIONS



WARNING

I-joists are unstable until completely installed with panels fully fastened to the top flanges.

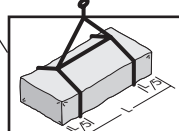
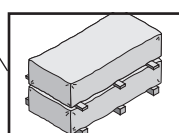
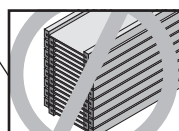
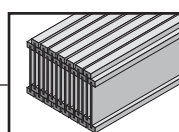
Avoid Accidents by Following these Important Guidelines:

1. Brace and nail each I-joist as it is installed, using hangers, blocking panels, rim board, and/or cross-bridging at joist ends.
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 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 use 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 I-joists vertically, level, and in bundles.
3. Always stack and handle I-joists in the upright position only.
4. Do not store I-joists in direct contact with the ground.
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 FIELD REPAIR A DAMAGED I-JOIST.



MAXIMUM ROOF SPANS

MAXIMUM ROOF SPANS FOR NORDIC I-JOISTS

Snow Load = 20 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	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"
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'-11"	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"
14"	NI-80	31'-9"	28'-9"	24'-11"	29'-9"	27'-0"	23'-5"	27'-5"	24'-10"	21'-7"
	NI-90x	33'-0"	29'-10"	25'-11"	31'-0"	28'-0"	24'-4"	28'-7"	25'-10"	22'-6"
	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"
16"	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-90x	37'-8"	34'-1"	29'-7"	35'-4"	32'-0"	27'-10"	32'-7"	29'-6"	25'-8"
	NI-60	36'-2"	32'-9"	28'-5"	33'-11"	30'-8"	26'-8"	31'-3"	28'-4"	24'-7"
16"	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-90x	41'-10"	37'-11"	32'-11"	39'-3"	35'-7"	30'-11"	36'-2"	32'-10"	28'-6"
	NI-60	36'-2"	32'-9"	28'-5"	33'-11"	30'-8"	26'-8"	31'-3"	28'-4"	24'-7"

MAXIMUM ROOF SPANS FOR NORDIC I-JOISTS

Snow Load = 30 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	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"
11-7/8"	NI-80	24'-6"	22'-2"	19'-2"	23'-1"	20'-11"	18'-2"	21'-5"	19'-5"	16'-10"
	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"
14"	NI-70	28'-8"	25'-11"	22'-6"	27'-0"	24'-6"	21'-3"	25'-11"	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-90x	30'-5"	27'-6"	23'-10"	28'-8"	25'-11"	22'-6"	26'-7"	24'-1"	20'-11"
	NI-40x	29'-2"	26'-2"	21'-4"	27'-6"	24'-11"	20'-11"	25'-6"	23'-1"	20'-1"
16"	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-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-90x	38'-7"	34'-11"	30'-3"	36'-4"	32'-11"	28'-7"	33'-9"	30'-7"	26'-6"

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 and 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 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

INSTALLING NORDIC I-JOISTS

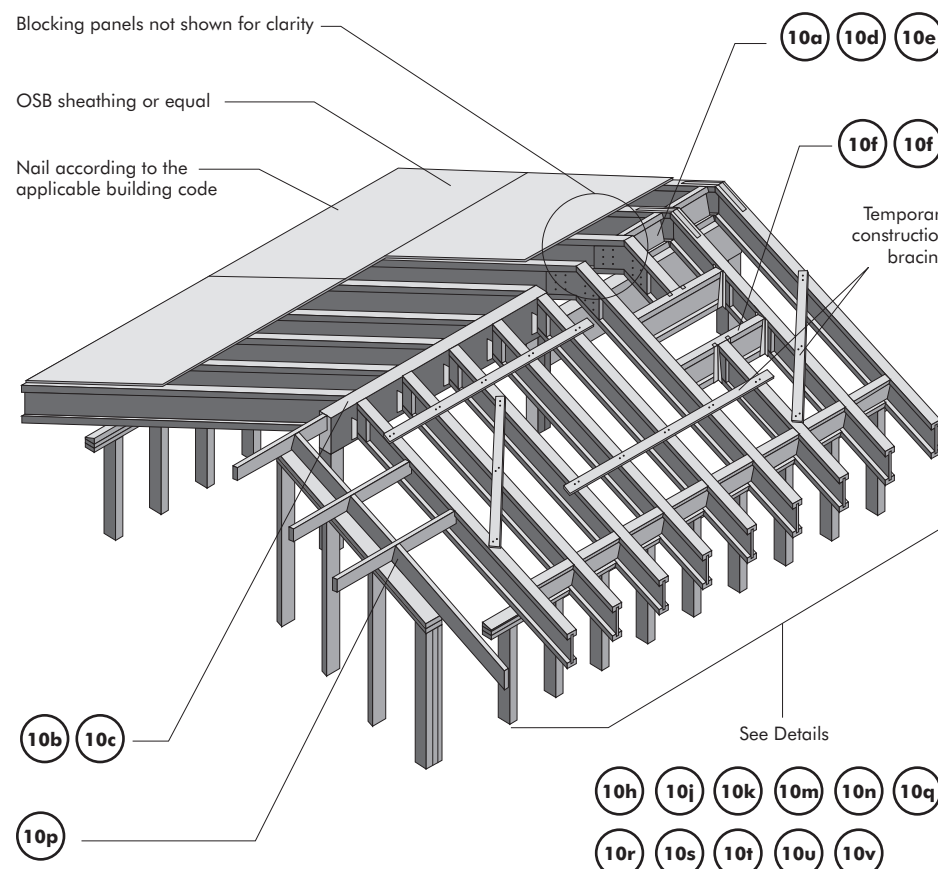
TYPICAL I-JOIST ROOF FRAMING CONSTRUCTION DETAILS AND INSTALLATION NOTES

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 / web 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. Concentrated loads should only be applied to the top surface of the top flange. At no time should concentrated loads be suspended from the bottom flange, with the exception of light loads such as ceiling fans or light fixtures.
6. I-joists must be protected from the weather prior to installation.
7. I-joists must not be used in applications where they will be permanently exposed to weather, or will reach a moisture content greater than 16 percent, 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.
8. 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 both must be at least 3-1/2 inches. For multiple-span joists, intermediate bearing length must be at least 3-1/2 inches.
9. 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 others similar methods.
10. Rim board, I-joist blocking panels, or other means of providing lateral support must be provided at all I-joist bearing points.
11. 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.
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 wire nails or 6 inches on centre for 3" common wire nails. If more than one row of nails is used, the rows must be offset at least 1/2 inch.
13. Details in Figure 10 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. The knockouts may be removed to aid ventilation.
14. The top and bottom flanges of the I-joist must be kept within 1/2 in. of true alignment. The use of I-joist blocking panels or engineered wood rim board greatly simplifies this requirement.
15. All roof details are valid up to a 12:12 slope unless otherwise noted.
16. Refer to *Nordic Installation Guide for Residential Floors* for more details.
17. Roof spans shall be in accordance with Nordic Joist Maximum Roof Span Tables, or designed based on the use of the design properties.
18. Web holes shall be verified, please contact your local representative.

TYPICAL I-JOIST ROOF FRAMING TEMPORARY BRACING NOTES

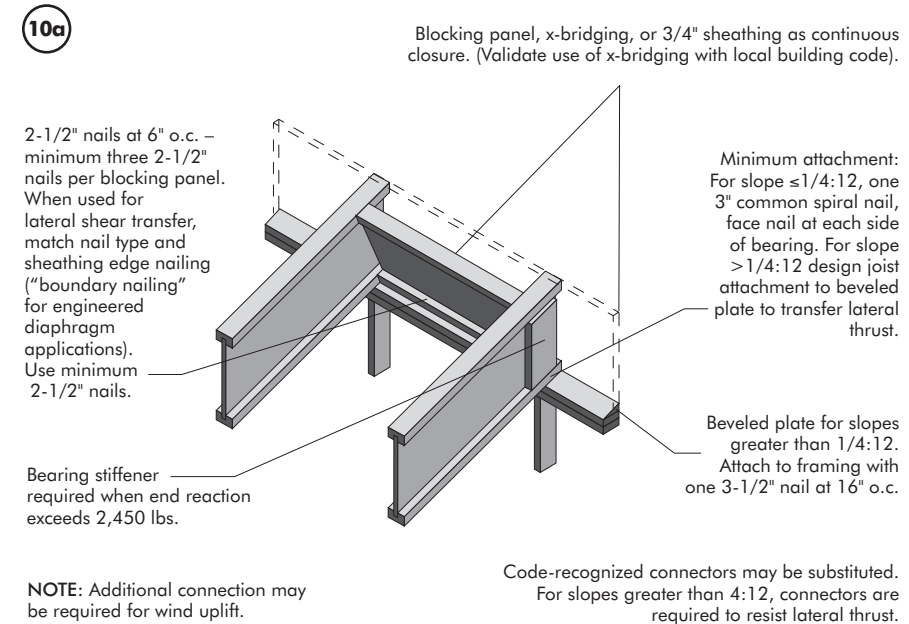
1. All engineered wood rim boards, blocking, connections, and temporary bracing must be installed before workers are allowed on the structure.
2. For temporary bracing, use lines of 1 x 4 nailed to each I-joist with two 2-1/2" nails. The lines should be parallel, about 8 ft apart, and should have ends overlapped.
3. To prevent rollover of the entire roof system, brace each end and every 25 ft of roof with blocking at ends or diagonal bracing. *Please note that in a roof system framed with parallel-chord rafters such as I-joists, the panel roof sheathing alone does not provide bracing for the roof framing! The blocking or bridging at the bearing points must be provided.*
4. The continuous 1 x 4 bracing must be attached to the braced bays.

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

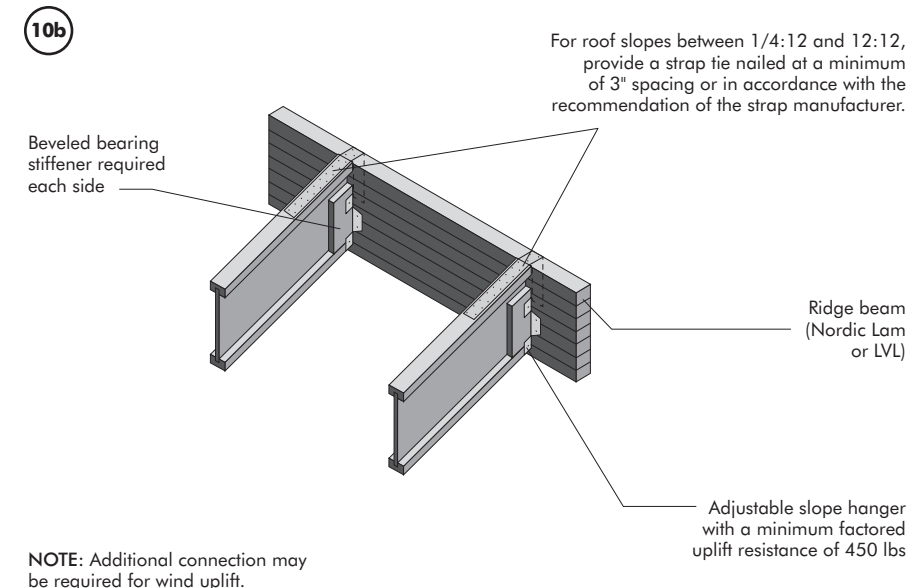


All nails shown in the above details are assumed to be common wire nails unless otherwise noted. 3" (0.122" dia.) common spiral nails may be substituted for 2-1/2" (0.128" dia.) common wire nails. Framing lumber assumed to be Spruce-Pine-Fir No. 2 or better species. Individual components not shown to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

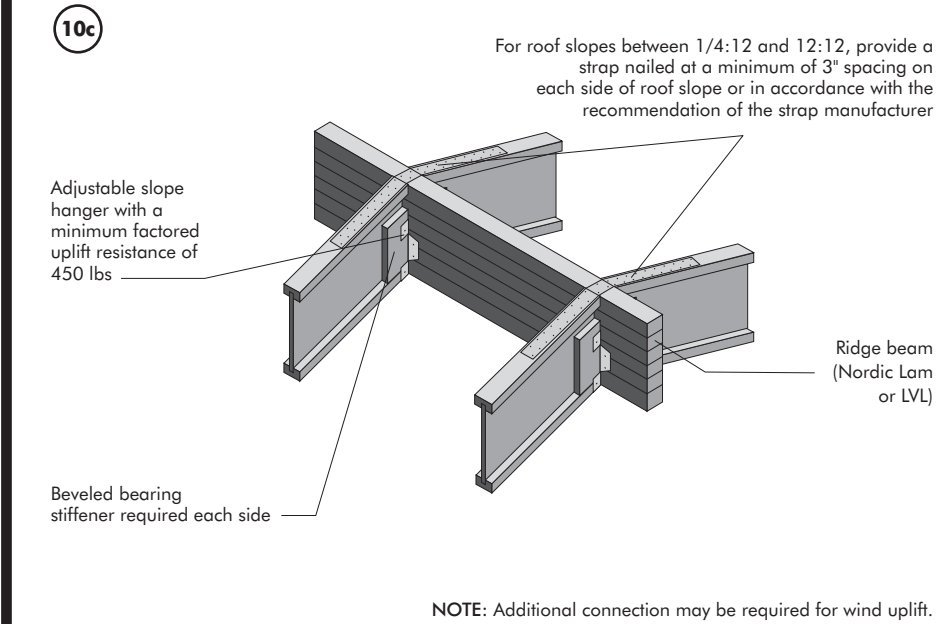
UPPER END, BEARING ON WALL



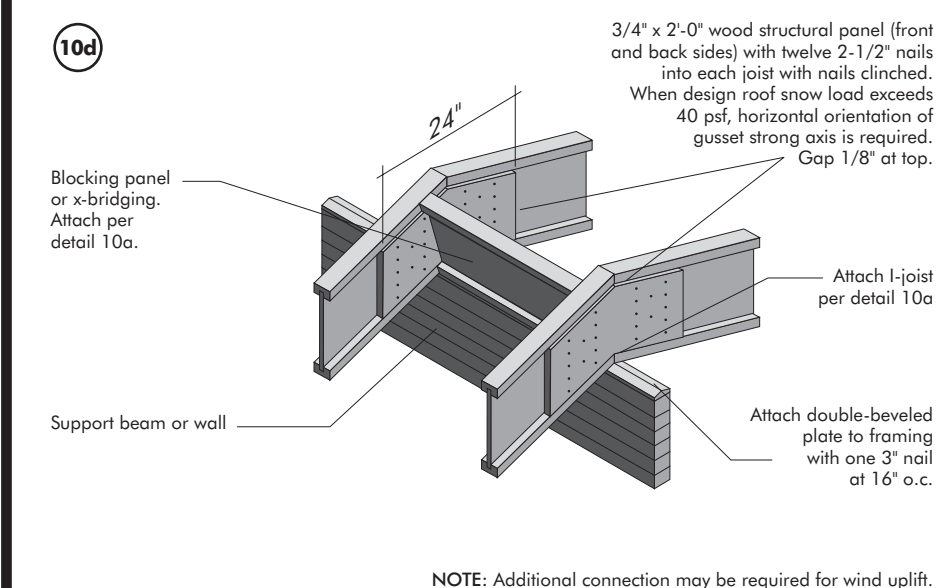
RIDGE CONNECTION



I-JOIST TO RIDGE BEAM CONNECTION



I-JOIST CONNECTION WITH WOOD STRUCTURAL PANEL GUSSETS



I-JOIST CONNECTION WITH TIE STRAP

10e

Blocking panel or x-bridging. (Validate use of x-bridging with local building code).

Tie strap nailed at a minimum of 3" spacing or in accordance with manufacturer's recommendations

Strap nails: Leave 2-3/8" minimum end distance

Double-beveled bearing plate

I-JOIST OVERHANG FOR FASCIA SUPPORT WITH BIRDSMOUTH CUT

10k

Blocking panel or x-bridging. (Validate use of x-bridging with local building code).

Birds-mouth cut at bearing

Attach joist to top plate per detail 10h

Web stiffener required each side

2x block for fascia support

LUMBER OVERHANG WITH BEVELED PLATE

10r

2-1/2" nails at 6" o.c.

2x filler

2x4 overhang attached to web of I-joist with 1 row of 2-1/2" nails at 8" o.c. clinched

2x4 min. beveled bearing block cut to fit

Attach I-joist per detail 10a

NOTE: Blocking panel or x-bridging not shown for clarity.

NOTE: Additional connection may be required for wind uplift.

BACKER BLOCK

10h

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.

Double I-joist header

Top- or face-mount hanger

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

Backer block required (both sides for face-mount hangers)

Filler block per detail 1p

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

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 CSA O325 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".

ROOF OPENING TOP-MOUNT HANGERS

10f

Top-mount hanger per manufacturer's recommendations

Bearing stiffeners required when hanger does not support I-joist top flange

Filler blocking per detail 1p

Backer block per detail 1h. If top-mount hanger is fully supported by top flange, backer block only required on hanger side. If face nailing is required, then backer block (filler block if multiple I-joist) is required on both sides. Nail with twelve 3" nails.

Application limited to 4:12 slope or less

BLOCKING PANEL AT BEVELED PLATE

10m

Blocking panel attached per detail 10a. See detail 10v for vent holes.

Overhang

Attach joist to beveled plate per detail 10a

Beveled plate

NOTE: Additional connection may be required for wind uplift.

I-JOIST OVERHANG FOR FASCIA SUPPORT WITH BIRDSMOUTH CUT

10s

Bearing stiffener required each side

Blocking panel attached per detail 10a, or x-bridging. (Validate use of x-bridging with local building code.) See detail 10v for vent holes.

Birds-mouth cut at bearing

Attach I-joist per detail 10h

2-1/2" nails at 6" o.c. clinched

2x block for fascia support

NOTE: Additional connection may be required for wind uplift.

FILLER BLOCK

10p

Filler block

1/8" gap between top flange and filler block

Offset nails from opposite face by 6"

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:

- Support back of I-joist web during nailing to prevent damage to web/flange connection.
- Leave a 1/8-inch gap between top of filler block and bottom of top I-joist flange.
- Filler block is required between joists for full length of span.
- 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.
- 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.

ROOF OPENING FACE-MOUNT HANGERS

10g

Backer block on both sides of web (or backer block and filler block, if multiple I-joists), nail with twelve 3" nails, clinch when possible

Header may be I-joist, Nordic Lam, or LVL

Filler blocking per detail 1p

Face-mount hanger per manufacturer's recommendations

Bearing stiffeners required when hanger does not support I-joist top flange

I-JOIST WITH BEVEL-CUT END

10n

Do not bevel-cut joist beyond inside face of wall

Attach I-joist per detail 10a

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.

I-JOIST OVERHANG FOR FASCIA SUPPORT WITH BEVELED PLATE

10t

Blocking panel attached per detail 10a, or x-bridging. (Validate use of x-bridging with local building code.) See detail 10v for vent holes.

Attach I-joist per detail 10a

Beveled plate, attach per detail 10a

2x block for fascia support (cut to fit)

Attach per detail 10s

NOTE: Additional connection may be required for wind uplift.

BIRDSMOUTH CUT & BEVEL CUT BEARING STIFFENER

10h (Permitted on low end of I-joist only)

1/8" gap at top

Bearing stiffeners required each side of I-joist. Bevel-cut bearing stiffener to match roof slope. Install tight to top of bottom flange.

One 3" common spiral nail, face nail at each side of bearing (face nail where flange is 7/8" to 1" thick)

Four 2-1/2" nails (two each side) clinched when possible

Birdsmouth cut shall bear fully and not overhang the inside face of plate

NOTE: Additional connection may be required for wind uplift.

OUTRIGGER

10p

Do not notch I-joist flange

Notch 2x outrigger around I-joist flange. Nail through web into outrigger.

Maximum overhang same as rafter spacing (not to exceed 2'-0")

Blocking between outriggers

End wall

Toe-nail blocking to end wall for roof sheathing = 5/8". Match nail type and spacing with roof sheathing edge nailing ("boundary nailing" for engineered diaphragm applications). Use minimum 2-1/2" nails.

NOTE: Additional connection may be required for wind uplift.

BIRDSMOUTH CUT

10u (Permitted at low end of I-joist only)

Blocking panel attached per detail 10a. See detail 10v for vent holes.

Beveled web stiffeners required on both sides

2x4 block for soffit support

NOTE: Corrosion-resistant wire cloth screening, hardware cloth, perforated vinyl or similar material shall cover the ventilation holes per code.

BIRDSMOUTH CUT WITH OVERHANG

10j (Permitted on low end of I-joist only)

Blocking panel or x-bridging. (Validate use of x-bridging with local building code.) See detail 10v for vent holes.

1/8" gap at top

Bearing stiffener required each side (attach per detail 10h)

Attach joist to top plate per detail 10h

Attach blocking per detail 10a

Birdsmouth cut at bearing

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.

NOTE: Additional connection may be required for wind uplift.

I-JOIST OVERHANG WITH BEVELED PLATE

10q

Blocking panel attached per detail 10a, or x-bridging. (Validate use of x-bridging with local building code.) See detail 10v for vent holes.

Attach joist to beveled plate per detail 10a

NOTE: Additional connection may be required for wind uplift.

VENTILATION HOLES IN BLOCKING PANELS

10v

Rim board blocking

I-joist blocking

Allowable zone for ventilation holes (round holes preferred)

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 centered in the blocking panel both vertically and horizontally.

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.