



INTERNATIONAL BEAMS

Installation Guide



The
GREEN
Building
Solution

JANUARY 2010

Storage, Handling & Safety Guidelines

To assure optimum performance and safe handling, International Beams I-joists must be stored and applied properly. The following guidelines will help protect joists from damage in storage, during shipment, and on the construction site, and protect the installer from jobsite injury.

Storage and Handling

1. Store, stack and handle IB I-joists vertically and level only.
2. Do not store IB I-joists in direct contact with ground and or flatwise.
3. Protect IB I-joists from the weather, and use stickers to separate bundles. Keep sticker materials out of mud and water. Align stickers vertically and space 8' +/- o.c.
4. When handling IB I-joists with a crane on the job site ("picking"), take a few simple precautions to prevent damage to the IB I-joists and injury to you work crew.
 - Pick IB I-joists in bundles as shipped by supplier.
 - Orient the bundles so that the webs of the IB I-joists are vertical.
 - Pick the bundles at the 5th points, using a spreader bar if necessary.
5. Avoid lifting I-joists in the flat orientation.
6. Avoid forklift damage. Never lift I-joists by the top flange.
7. To further protect IB I-joists from dirt and weather, do not open bundles until time of installation.
8. Do not twist or apply loads to the IB I-joist when horizontal.
9. Never use or try to repair a damaged IB I-joist.

Safety Tips

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

- A. Do not allow workers to walk on IB I-joists until joists are fully installed and braced, or serious injuries can result.
- B. Never stack building materials over unsheathed IB I-joists. Stack only over beams or walls.

Illustration 1

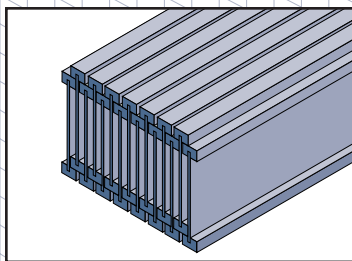


Illustration 2

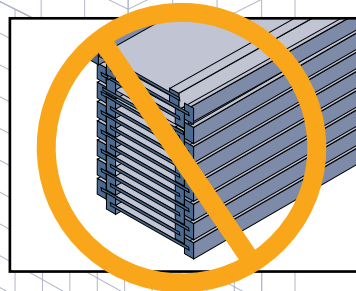


Illustration 3

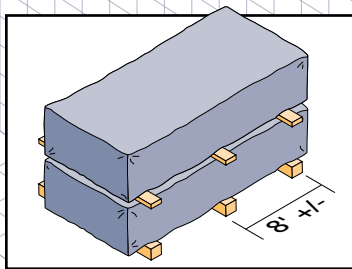


Illustration 4

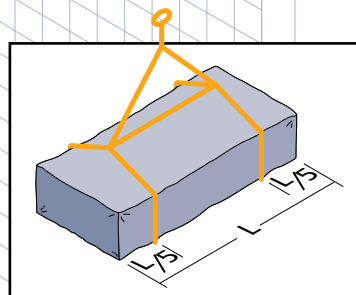


Illustration 5

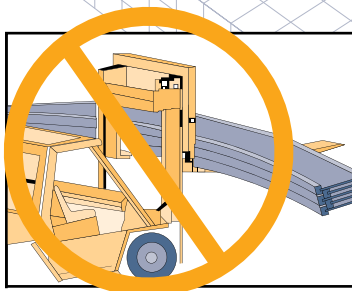


Illustration 6

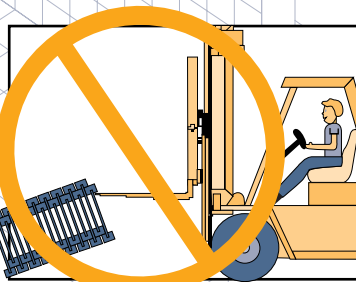


Illustration A

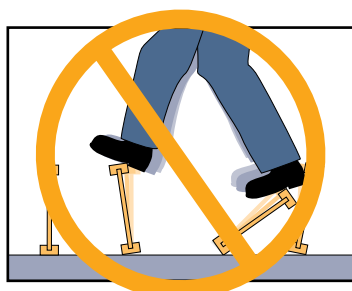
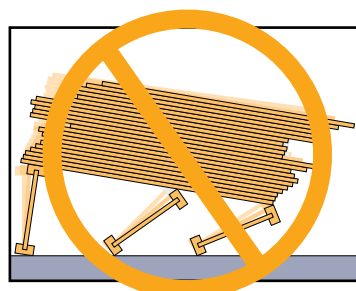


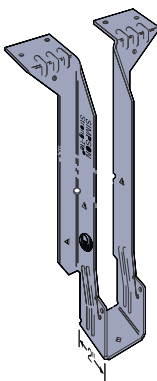
Illustration B



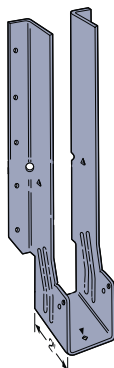
Framing Connectors

Single International Beams Joist Hangers

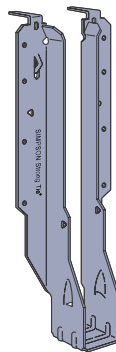
Verify hanger capacity in manufacturer's catalog.



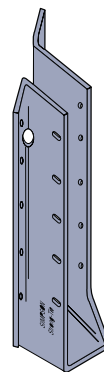
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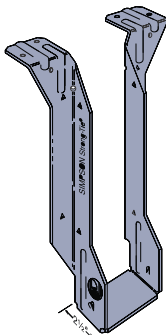
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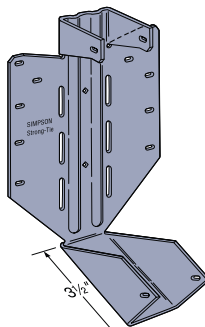
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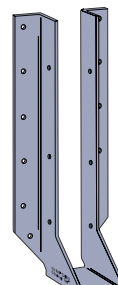
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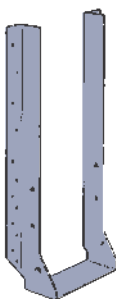
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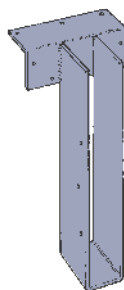
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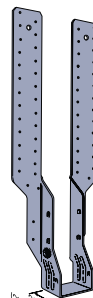
HU



MIU



WPU



THAI

Web Stiffener Requirements

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

- The webs of the IB I-joists are in jeopardy of buckling out of plane. This results in lower buckling capacities for deeper I-joist depths
- The webs of the IB I-joist are in jeopardy of “knifing” through the IB I-joist flanges. This can occur at any IB I-joist depth when the design reaction loads exceed a specific level.
- The IB I-joist is supported in a hanger and the sides of the hanger do not extend up to the top flange. With the top flange unsupported by the hanger sides, the joist may deflect laterally, putting a twist in the flange of the joist. The web stiffener supports the IB I-joist along a vertical axis as designed. (In this application, the web stiffener acts very much like a backer block.)

There are two kinds of web stiffeners: bearing stiffeners and load stiffeners. They are differentiated by the applied load and

location of the gap between the slightly undersized stiffener and the top or bottom flange.

Bearing stiffeners are located at the reactions, both interior and exterior, when required. IB I-joists do not need bearing stiffeners at any support when subjected to normal residential form loads and installed in accordance with the allowable spans.

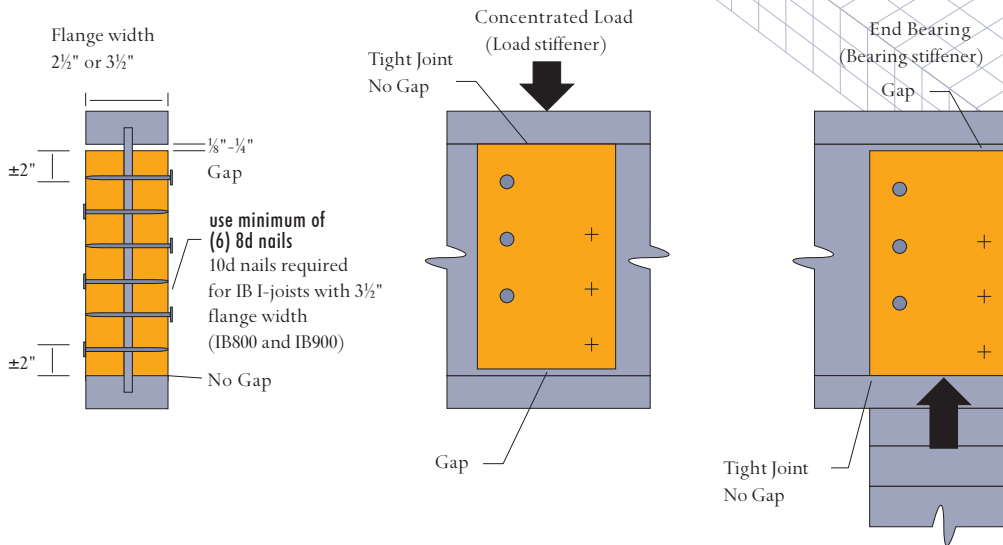
Load stiffeners are located between supports where significant point loads are applied to the top flange of an IB I-joist.

Web stiffener blocks may be comprised of lumber, rim board, or structural wood panels. The minimum grade of structural wood panels is Rated Sheathing; minimum lumber grade is Utility grade SPF (south) or better. Any rim board product would also work satisfactorily. Ideally, the depth of the web stiffener should equal the distance between the flanges of the joist minus $\frac{1}{8}$ inch - $\frac{1}{4}$ inch. For bearing stiffeners, this gap is

placed between the stiffener and the bottom of the top flange. For load stiffeners, the gap is located at the bottom of the stiffener.

1. A bearing stiffener is required in all engineered applications with design end reactions greater than the reference joist end reaction without bearing stiffeners. The gap between the stiffener and the flange is at the top.
2. A load stiffener is required at locations where a concentrated load greater than 1500 lb. (unfactored) is applied to the top flange between supports, or in the case of a cantilever, anywhere between the cantilever tip and the support. The gap between the stiffener and the flange is at the bottom.
3. A bearing stiffener is required when the IB 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 top.

Web Stiffener Requirements



Notes: For I-joist depths up to 16 inches, the number of nails in the web stiffeners may be reduced to four.

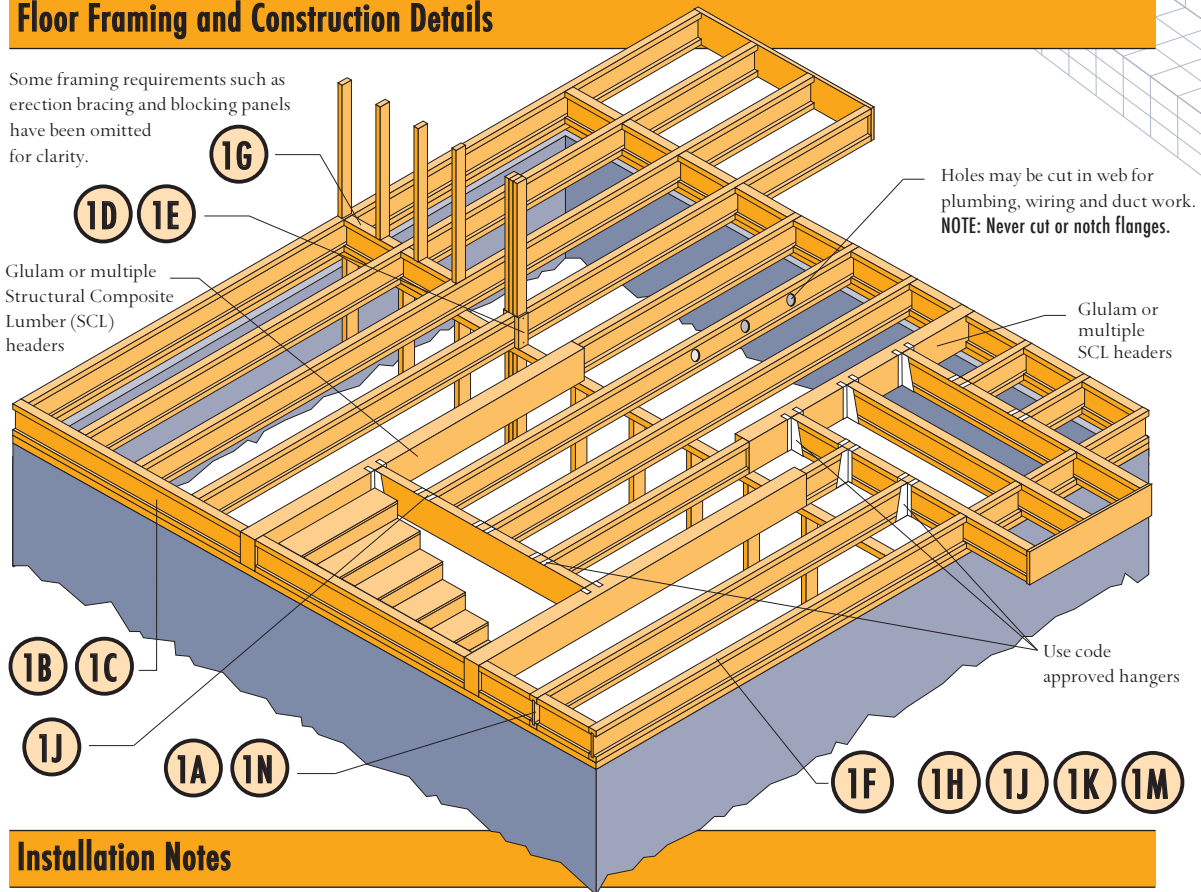
Web Stiffener Size Requirement

Designation	Web Stiffener Size Each Side of Web
IB 400/600	1" x $2\frac{5}{16}''$ minimum width
IB 800/900	$1\frac{1}{2}''$ x $2\frac{5}{16}''$ minimum width

Floor Framing & Construction Details

Floor Framing and Construction Details

Some framing requirements such as erection bracing and blocking panels have been omitted for clarity.



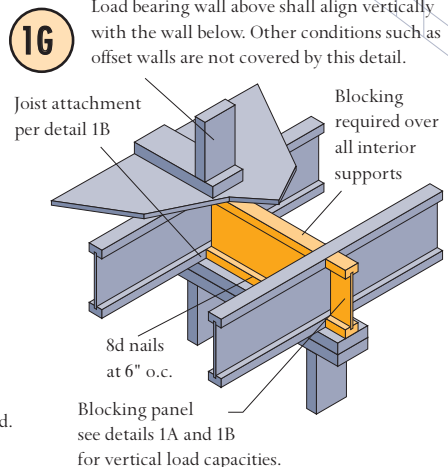
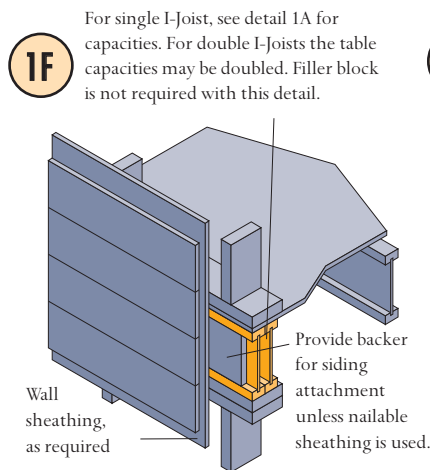
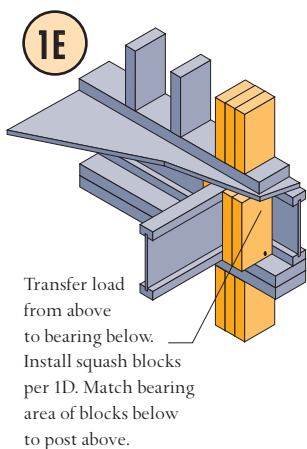
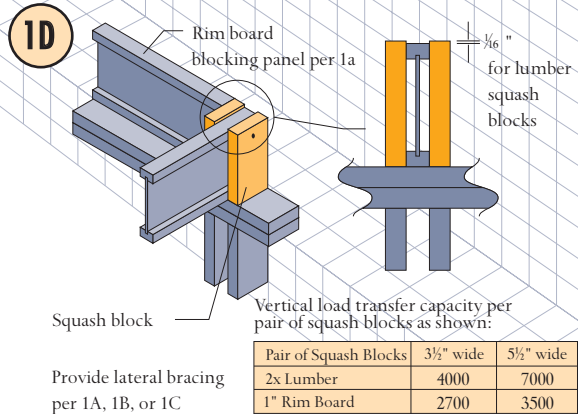
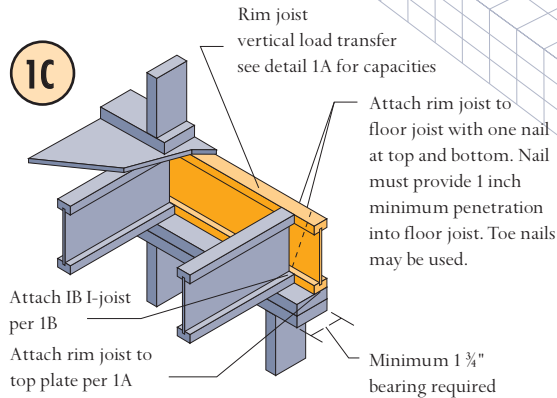
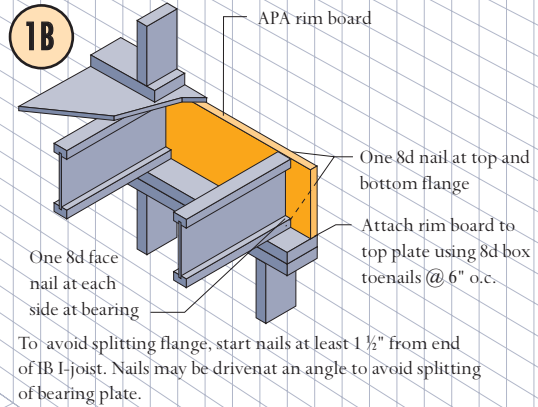
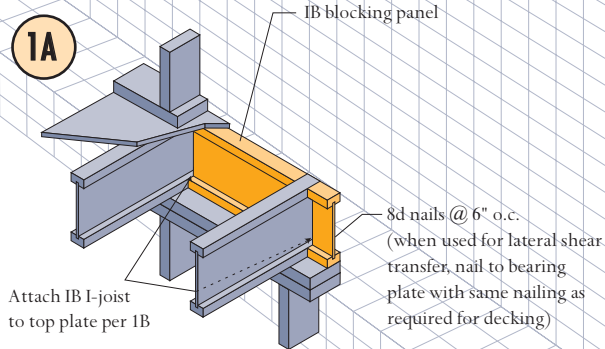
Installation Notes

- Before laying out floor system components, verify that IB I-joist flange widths match hanger widths. If not, contact your supplier.
- Except for cutting to length, never cut, drill, or notch IB I-joist flanges.
- Install IB I-joists so that top and bottom flanges are within $\frac{1}{2}$ inch of true vertical alignment.
- IB I-joists must be anchored securely to supports before floor sheathing is attached, and supports for multiple-span joists must be level.
- Minimum bearing lengths: $1\frac{1}{4}$ inches for end bearings and $3\frac{1}{2}$ inches for intermediate bearings.
- When using hangers, seat IB I-joists firmly in hanger bottoms to minimize settlement.
- Leave a $\frac{1}{16}$ inch gap between the IB I-joist end and a header.
- Concentrated loads greater than those that can normally be expected in residential construction should only be applied to the top surface of the top flange. Normal concentrated loads include track lighting fixtures, audio equipment and security cameras. Never suspend unusual or heavy loads from the IB I-joist's bottom flange.
- Whenever possible, suspend all concentrated loads from the top of the IB I-joist. Or, attach the load to blocking that has been securely fastened to the IB I-joist webs.
- Never install IB I-joists where they will be permanently exposed to weather, or where they will remain in direct contact with concrete or masonry.
- Restrain ends of floor joists to prevent rollover. Use rim board or equivalent, rim joists or IB I-joist blocking panels.
- For IB I-joists installed over and beneath bearing walls, use full depth blocking panels, rim board, or squash blocks (cripple members) to transfer gravity loads through the floor system to the wall or foundation below.
- Due to shrinkage, common framing lumber set on edge may never be used as blocking or rim boards. IB I-joist blocking panels or other engineered wood products — such as rim board — must be cut to fit between the IB I-joists, and an IB I-joist-compatible depth selected.
- Provide permanent lateral support of the bottom flange of all IB I-joists at interior supports of multiple-span joists. Similarly, support the bottom flange of all cantilevered IB I-joists at the end support next to the cantilever extension. In the completed structure, the gypsum wallboard ceiling provides this lateral support. Until the final finished ceiling is applied, temporary bracing or struts must be used.
- If square-edge panels are used, edges must be supported between IB I-joists with 2x4 blocking. Glue panels to blocking to minimize squeaks. Blocking is not required under structural finish flooring, such as wood strip flooring, or if a separate underlayment layer is installed.
- Nail spacing:
 - Space nails installed to the flange's top face in accordance with the applicable building code requirements or approved building plans.
 - If nails must be installed into the sides of flanges, spacing shall not be closer than 3 inches o.c. for 8d common nails, and 4 inches o.c. for 10d common nails.

Floor Framing Details

Floor Framing and Construction Details

All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity. Rated capacities for detail 1A thru 1H are available in the International Beams Design Manual.



Rim board may be used in lieu of IB I-joists. Backer is not required when rim board is used.

Floor Framing Details

Floor Framing and Construction Details

All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity.

1H

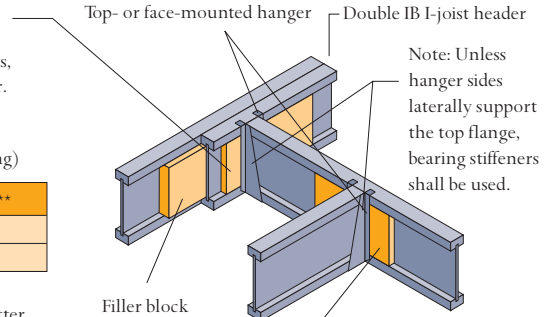
Backer block Before installing a backer block to a double I-joist, drive 3 additional 10d nails through the webs and filler block where the backer block will fit. Clinch. Install backer tight to top flange. Use twelve 10d nails, clinched when possible. Verify hanger capacity with hanger manufacturer.

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 Utility grade SPF (south) or better for solid sawn lumber and Rated Sheathing grade for wood structural panels.

** For face-mount hangers use net joist depth minus 3-1/4".



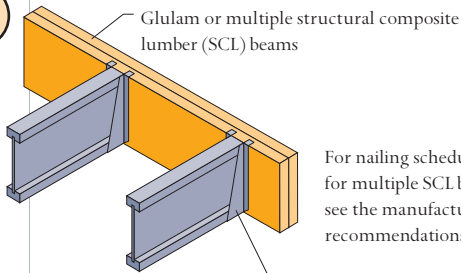
Note: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

Filler block

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

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

1J

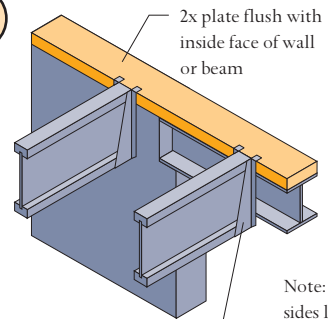


For nailing schedules for multiple SCL beams, see the manufacturer's recommendations

Top- or face-mounted hanger installed per manufacturer's recommendations

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

1K

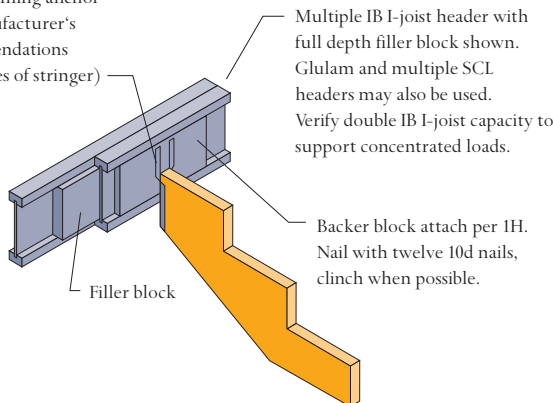


Top-mounted hanger installed per manufacturer's recommendations

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

1M

Install framing anchor per manufacturer's recommendations (both sides of stringer)

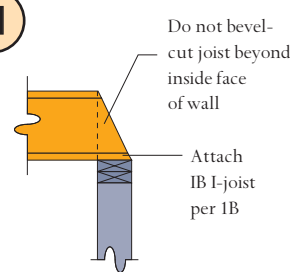


Multiple IB I-joist header with full depth filler block shown. Glulam and multiple SCL headers may also be used. Verify double IB I-joist capacity to support concentrated loads.

Backer block attach per 1H. Nail with twelve 10d nails, clinch when possible.

Filler block

1N



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

Installing an I-joist Glued Floor System

Installation Guidelines

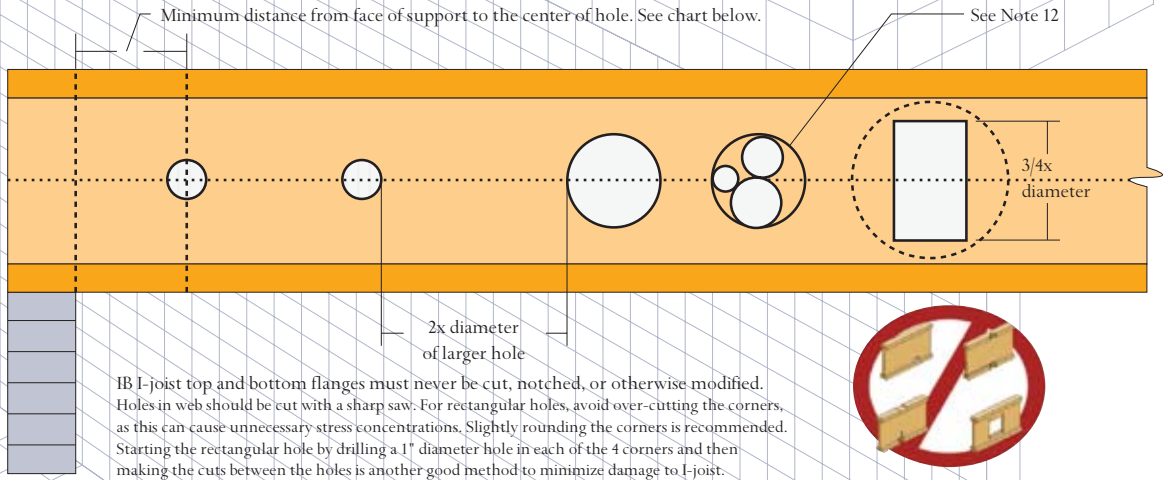
1. Wipe any mud, dirt, water, or ice from I-joist flanges before gluing.
2. Snap a chalk line across the I-joists four feet in from the wall for panel edge alignment and as a boundary for spreading glue.
3. Spread only enough glue to lay one or two panels at a time, or follow specific recommendations from the glue manufacturer.
4. Lay the first panel with tongue side to the wall, and nail in place. This protects the tongue of the next panel from damage when tapped into place with a block and sledgehammer.
5. Apply a continuous line of glue (about ¼-inch diameter) to the top flange of a single I-joist. Apply glue in a winding pattern on wide areas, such as with double I-joists.
6. Apply two lines of glue on I-joists where panel ends butt to assure proper gluing of each end.
7. After the first row of panels in place, spread glue in the groove of one or two panels at a time before laying the next row. Glue line may be continuous or spaced, but avoid squeeze-out by applying a thinner line (1/8-inch) than used on I-joist flanges.
8. Tap the second row of panels into place, using a block to protect groove edges.
9. Stagger end joints in each succeeding row of panels. A 1/8-inch space between all end joints and 1/8-inch at all edges, including T&G edges, is recommended (use a spacer tool or an 8d common nail to assure accurate and consistent spacing).
10. Complete all nailing of each panel before glue sets. Check the manufacturer's recommendations for allowable cure time (warm weather accelerates glue setting). Use 6d ring or screw-shank nails for panels ¾-inch thick or less, and 8d ring or screw-shank nails for thicker panels. Space nails per Table below. Closer nail spacing may be required by some codes, or for diaphragm construction. The finished deck can be walked on right away and will carry construction loads without damage to the glue bond.

Maximum Joist Spacing (in.)	Panel Thickness ⁽²⁾ (in.)	Fastening: Glued-Nailed Nail Size and Type	Maximum Spacing (in.)	
			Supported Panel Edges	Intermediate Supports
			16	23/32
20	23/32	6d ring-or screw-shank	12	12
24	23/32 or 3/4	6d ring-or screw-shank	12	12
	7/8	6d ring-or screw-shank	6	12

1. Special conditions may impose heavy traffic and concentrated loads that require construction in excess of the minimums shown.
2. Panels in a given thickness may be manufactured in more than one allowable span. Panels with an allowable span greater than the actual joist spacing may be substituted for panels of the same thickness with an allowable span matching the actual joist spacing. For example, 19/32-inch thick Sturd-I-Floor 20 oc may be substituted for 19/32-inch thick I-joist 16 oc overjoists 16 inches on center.
3. For U.S. construction, use only adhesives conforming to APA specification AFG-01 or ASTM D 3498. In Canada, use only adhesives conforming to CGSB 71.26 "Adhesives for field gluing lumber to sub floors" applied in accordance with the manufacturer's recommendations. If OSB panels with sealed surfaces and edges as to be used, use only solvent-based glues; check with panel manufacturer.
4. 8d common nails may be substituted if ring or screw-shank nails are not available.
5. Recommended minimum thickness.

Web Hole Guidelines

Typical Holes



Allowable Webhole Sizes and Locations

40 psf live load and 15 psf dead load (1 3/4" end bearings, 3 1/2" interior without bearing stiffeners)

Minimum Distance, D, from Inside Face of Any Support to Center of Web Hole (Simple or Multi-span)

I-Joist Depth	I-Joist Series	SAF	Round Hole Diameter (inches)															
			2	3	4	5	6	6 1/4	7	8	8 3/4	9	10	10 3/4	11	12	12 3/4	
9 1/2"	IB 400	14'-1"	0'-7"	1'-9"	2'-11"	4'-3"	5'-7"	6'-0"										
	IB 600	15'-4"	1'-5"	2'-8"	3'-11"	5'-4"	7'-1"	7'-7"										
	IB 800	16'-9"	2'-5"	3'-8"	5'-0"	6'-7"	8'-5"	8'-10"										
11 3/8"	IB 400	16'-1"	0'-7"	0'-8"	1'-4"	2'-6"	3'-9"	4'-1"	5'-1"	6'-6"	7'-9"							
	IB 600	18'-1"	0'-7"	1'-6"	2'-8"	3'-11"	5'-5"	5'-10"	7'-1"	8'-10"	10'-0"							
	IB 800	19'-11"	1'-9"	2'-11"	4'-2"	5'-5"	7'-0"	7'-5"	8'-8"	10'-6"	11'-9"							
14"	IB 900	20'-5"	0'-7"	1'-4"	2'-10"	4'-4"	6'-0"	6'-5"	7'-8"	9'-6"	10'-9"							
	IB 400	17'-8"	0'-7"	0'-8"	1'-2"	2'-3"	3'-4"	3'-7"	4'-5"	5'-7"	6'-4"	6'-10"	8'-6"	10'-4"				
	IB 600	18'-1"	0'-7"	0'-8"	1'-9"	3'-1"	4'-5"	4'-9"	5'-10"	7'-7"	8'-8"	9'-5"	11'-4"	12'-11"				
16"	IB 800	21'-10"	1'-9"	3'-0"	4'-4"	5'-8"	7'-1"	7'-6"	8'-7"	10'-2"	11'-2"	11'-9"	13'-6"	15'-0"				
	IB 900	23'-2"	0'-8"	1'-11"	3'-2"	4'-6"	5'-10"	6'-3"	7'-3"	8'-9"	9'-10"	10'-7"	12'-7"	14'-2"				
	IB 400	18'-1"	0'-7"	0'-8"	0'-11"	1'-10"	2'-9"	3'-0"	3'-9"	5'-0"	5'-9"	6'-3"	7'-7"	8'-7"	9'-0"	11'-2"	12'-11"	
18"	IB 600	18'-1"	0'-7"	0'-8"	1'-4"	2'-8"	4'-1"	4'-5"	5'-6"	7'-0"	7'-11"	8'-6"	10'-2"	11'-6"	12'-0"	14'-4"	16'-2"	
	IB 800	22'-5"	2'-4"	3'-6"	4'-8"	5'-11"	7'-2"	7'-5"	8'-5"	9'-10"	10'-10"	11'-5"	13'-1"	14'-5"	14'-10"	16'-9"	18'-6"	
	IB 900	24'-3"	0'-7"	1'-8"	3'-0"	4'-5"	5'-11"	6'-3"	7'-5"	8'-11"	9'-11"	10'-6"	12'-3"	13'-6"	14'-0"	15'-10"	17'-6"	
20"	IB 400	18'-1"	0'-7"	0'-8"	1'-2"	2'-0"	3'-2"	3'-6"	4'-5"	5'-10"	6'-11"	7'-7"	9'-4"	10'-9"	11'-2"	13'-1"	14'-8"	
	IB 600	22'-5"	1'-10"	3'-1"	4'-5"	5'-8"	7'-0"	7'-4"	8'-4"	9'-9"	10'-8"	11'-2"	12'-8"	13'-10"	14'-3"	15'-10"	17'-2"	
	IB 800	24'-3"	0'-7"	1'-4"	2'-6"	3'-9"	5'-3"	5'-8"	6'-9"	8'-5"	9'-5"	10'-0"	11'-8"	13'-0"	13'-6"	15'-4"	16'-9"	
20"	IB 900	24'-3"	0'-7"	1'-2"	2'-6"	3'-10"	5'-0"	5'-6"	6'-6"	7'-5"	8'-8"	9'-5"	10'-0"	11'-8"	13'-0"	13'-5"	15'-2"	16'-7"
	IB 400	18'-1"	0'-7"	0'-9"	1'-6"	2'-2"	3'-0"	3'-2"	4'-2"	5'-8"	6'-7"	7'-2"	8'-9"	10'-0"	10'-5"	12'-1"	13'-4"	
	IB 600	22'-5"	1'-7"	2'-9"	3'-10"	5'-0"	6'-2"	6'-6"	7'-5"	8'-8"	9'-5"	10'-0"	11'-8"	13'-0"	13'-5"	15'-2"	16'-7"	
20"	IB 800	24'-3"	0'-7"	1'-2"	2'-6"	3'-10"	5'-2"	5'-6"	6'-6"	7'-11"	8'-10"	9'-5"	10'-11"	12'-0"	12'-5"	14'-0"	15'-3"	

Notes:

- Table may be used for I-joist spacing 24 inches on center or less.
- Hole location distance is measured from inside face of supports to center of hole.
- Distances in this chart are based on uniformly loaded joists.
- Joists with web hole location and/or sizes that fall outside of the scope of this table must be analyzed based on the actual hole size, joist spacing, span and loading condition. The I-joist shear capacity at the location of the circular web hole is calculated using the following equation: $V_{(circular\ hole)}$ = Published Shear Value x [(Joist Depth - Hole Diameter) / Joist Depth]

SAF = Span adjustment factor, used as defined below

OPTIONAL:

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

$$D_{reduced} = L_{unmod} / SAF \times D$$

Where:

$D_{reduced}$ = Distance from the inside face of any support to center of hole, reduced for less than maximum span applications (ft).

The reduced distance must not be less than 6-inches from the face of support to edge of hole

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

SAF = Span Adjustment Factor given above

D = The minimum distance from the inside face of any support to center of hole given above.

If L_{unmod}/SAF is greater than 1, use 1 in the above calculation for L_{unmod}/SAF

- I-joist top and bottom flanges must NEVER be cut, notched, or otherwise modified.

- Whenever possible field-cut holes should be centered on the middle of the web.

- The maximum size hole that can be cut into an I-joist web shall equal the clear distance between the flanges of the I-joist minus 1/4 inch.

A minimum of 1/8 inch should be maintained between the top or bottom of the hole and the adjacent I-joist flange.

- The sides of square holes or longest sides of rectangular holes should not exceed three fourths of the diameter of the maximum round hole permitted at the location.

- 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) and each hole must be sized and located in compliance with the requirements of the table above.

- 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.

- 1-1/2" holes shall be permitted anywhere in a cantilevered section of an IB Joist. Holes of greater size may be permitted subject to verification.

- A 1-1/2" hole can be placed anywhere in the web provided that it meets the requirements of 6 above.

- For joists with more than one span, use the longest span to determine hole location in either span.

- All holes shall be cut in a workman-like manner in accordance with the restrictions listed above and as illustrated in figure above.

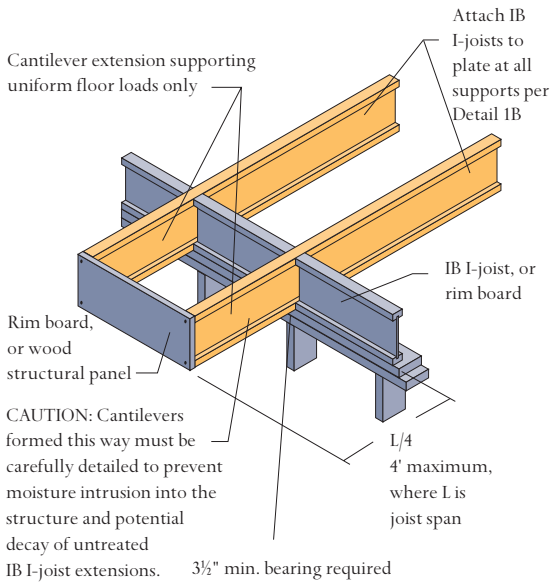
- A group of round holes at approximately the same location shall be permitted if they meet the requirements for a single round circumscribed around them.

- Refer to International Beams Design Software for other hole sizes and locations.

Cantilever Framing Details

Cantilever Detail for Balconies

Lumber Cantilever Detail for Balconies



Full depth backer block with 1/8" gap between block and top flange of IB I-joist. See Detail 1H. Nail with 2 rows of 10d nails @ 6" o.c. and clinch.

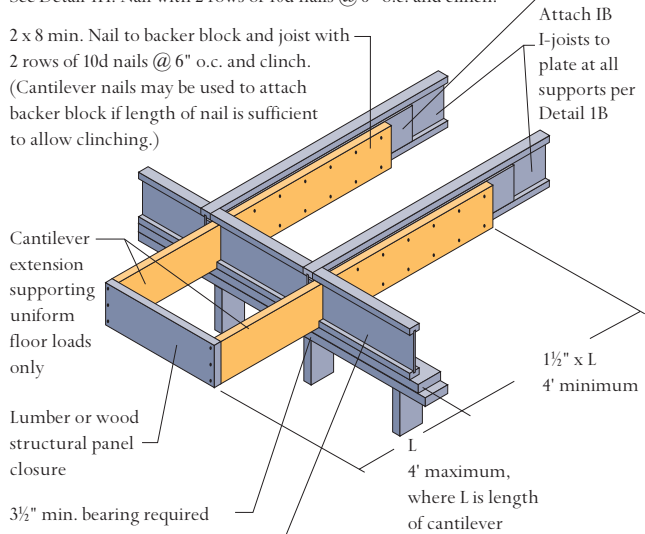
2 x 8 min. Nail to backer block and joist with 2 rows of 10d nails @ 6" o.c. and clinch. (Cantilever nails may be used to attach backer block if length of nail is sufficient to allow clinching.)

Cantilever extension supporting uniform floor loads only

Lumber or wood structural panel closure

3/2" min. bearing required

IB I-joist, or rim board

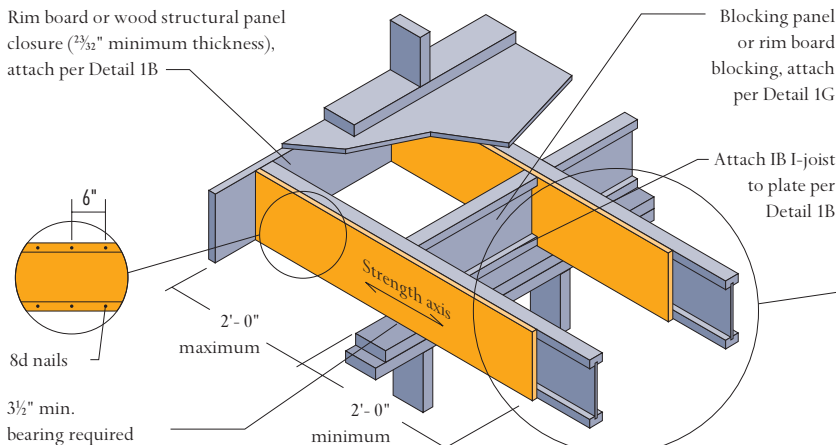


Cantilever Detail for Vertical Building Offset

IB I-joists shall be properly designed to carry all applied loads, including the offset vertical loads.

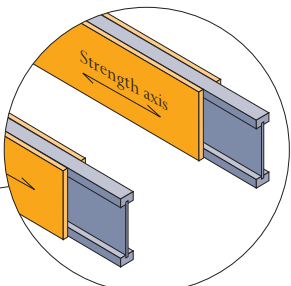
Method 1 Sheathing Reinforcement One Side

Rim board or wood structural panel closure (3/32" minimum thickness), attach per Detail 1B



Method 2 Sheathing Reinforcement Two Sides

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



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

Cantilever Framing Details

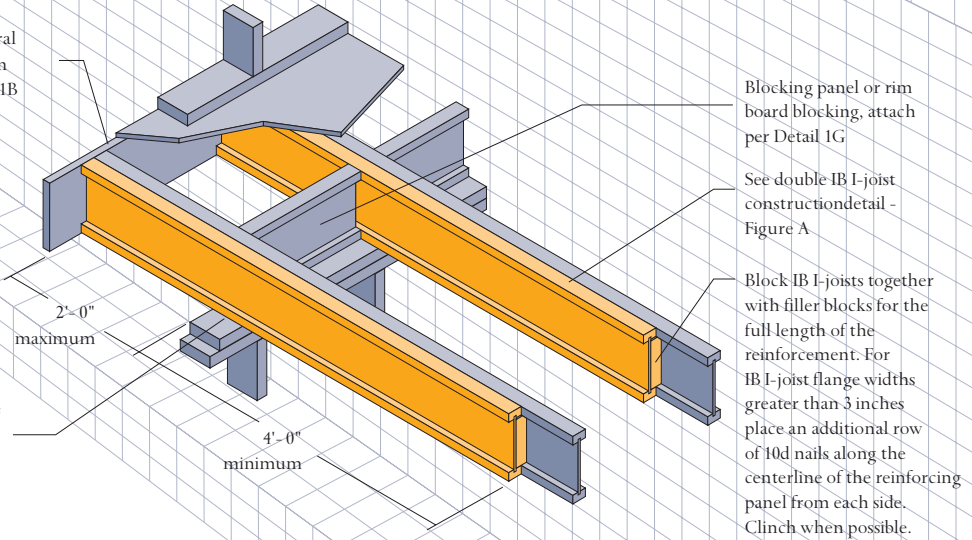
Cantilever Detail for Vertical Building Offset

See cantilever reinforcement chart for appropriate reinforcement method.

Alternate Method 2 Double IB I-joist

Rim board, or wood structural panel closure ($\frac{3}{8}$ " minimum thickness), attach per Detail 1B

Attach IB I-joists to top plate at all supports per Detail 1B
 $\frac{3}{8}$ " min. bearing required



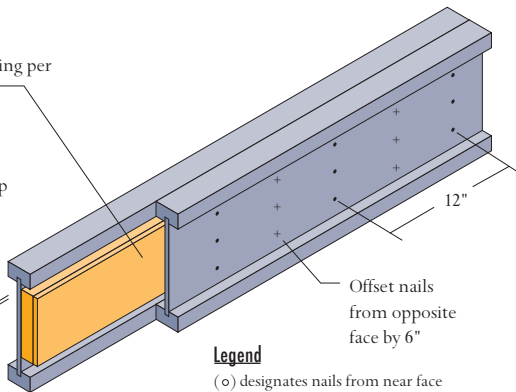
Double Joist Construction

Filler Block Requirements for Double Joist Construction

Figure A

Filler blocking per Table A

$\frac{1}{8}$ " gap between top flange and filler block



Legend

(o) designates nails from near face
(+) designates nails from far face

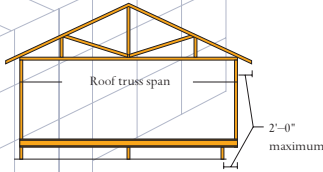
Notes:

- Support back of IB I-joist web during nailing to prevent damage to web/flange connection.
- Leave a $\frac{1}{8}$ " gap between top of filler block and bottom of top IB I-joist flange.
- Filler block is required between joists for full length of span.
- Nail joists together with three rows of 10d nails at 12" o.c. (clinched when possible on each side of the double IB I-joist. Total of 6 nails per foot required. If nails can be clinched, only 3 nails per foot are required. For I-joists depths up to 16", rows of nails may be reduced to 2 rows, total of 4 nails per linear foot (2 nails per foot if clinched).
- Where discrete BACKER blocks are used for side-applied point loads (see detail 1H), and the remaining length of a 2-ply IB I-joist girder is top-loaded, the FILLER block need not be continuous. Install minimum 3-1/2' long FILLER blocks at maximum 4' o.c. spacing using a minimum of (6) nails from each face.

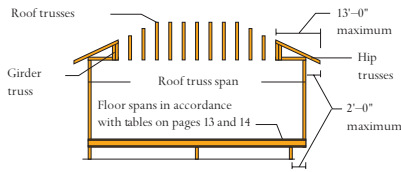
Table A

Flange Width	Joist Series	Joist Depth	Filler Depth	Filler Thickness
2½"	IB400/600	9½"	6"	2⅛"
	IB400/600	11⅞"	8"	
	IB400/600	14"	10"	
	IB400/600	16"	12"	
	IB600	18"	14"	
3½"	IB600	20"	16"	
	IB800	9½"	6"	3⅛"
	IB800/900	11⅞"	8"	
	IB800/900	14"	10"	
	IB800/900	16"	12"	
	IB800/900	18"	14"	
	IB800/900	20"	16"	

Cantilever Reinforcement



See Table below for IB I-joist reinforcement requirements at cantilever.



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

Cantilever Reinforcement Chart (all IB I-Joist Series)

Joist Depth (in.)	Roof Truss Span (ft.)	ROOF DESIGN LOADS											
		TL= 35 psf (Snow up to 20 psf, DL= 15 psf)				TL= 45 psf (Snow up to 30 psf, DL= 15 psf)				TL= 55 psf (Snow up to 40 psf, DL= 15 psf)			
		I-Joist Spacing (in.)				I-Joist Spacing (in.)				I-Joist Spacing (in.)			
		12	16	19.2	24	12	16	19.2	24	12	16	19.2	24
9 1/2"	26	N	N	N	1	N	N	1	2	N	N	1	X
	28	N	N	N	1	N	N	1	2	N	1	2	X
	30	N	N	N	1	N	N	1	2	N	1	2	X
	32	N	N	N	1	N	N	1	X	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	2	X	X	
11 1/8"	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	N	N	N	N	1	N	N	1	2
	34	N	N	N	1	N	N	N	1	N	N	1	2
36	N	N	N	1	N	N	1	1	N	1	1	2	
38	N	N	N	1	N	N	1	2	N	1	1	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	N	1
	30	N	N	N	N	N	N	N	1	N	N	1	1
	32	N	N	N	1	N	N	N	1	N	N	1	2
	34	N	N	N	1	N	N	N	1	N	N	1	2
36	N	N	N	1	N	N	1	1	N	N	1	2	
38	N	N	N	1	N	N	1	1	N	1	1	2	
40	N	N	N	1	N	N	1	2	N	1	1	2	
16"	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	1	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	1	N	N	1	2	
38	N	N	N	1	N	N	1	2	N	1	1	2	
40	N	N	N	1	N	N	1	2	N	1	1	2	
42	N	N	N	1	N	N	1	2	N	1	1	2	
18"	26	N	N	N	N	N	N	N	1	N	N	1	1
	28	N	N	N	1	N	N	N	1	N	N	1	1
	30	N	N	N	1	N	N	N	1	N	N	1	2
	32	N	N	N	1	N	N	1	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	2	
40	N	N	N	1	N	N	1	2	N	1	1	2	
42	N	N	1	1	N	N	1	2	N	1	2	X	
44	N	N	1	1	N	N	1	2	N	1	2	X	
20"	26	N	N	N	1	N	N	N	1	N	N	1	1
	28	N	N	N	1	N	N	N	1	N	N	1	2
	30	N	N	N	1	N	N	N	1	N	N	1	2
	32	N	N	N	1	N	N	1	1	N	N	1	2
	34	N	N	N	1	N	N	1	1	N	1	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	2	
40	N	N	1	1	N	N	1	2	N	1	1	2	
42	N	N	1	1	N	N	1	2	N	1	2	X	
44	N	N	1	1	N	N	1	2	N	1	2	X	
46	N	N	1	2	N	1	1	2	N	1	2	X	

Notes: 1. N= No reinforcement required.
 1= IB I-joists reinforced with 3/8" OSB structural panel or OSB rimboard on one side only.
 2= IB I-joists reinforced with 3/8" OSB structural panel or OSB rimboard on both sides, or double IB I-joist.
 X= Try a deeper joist or closer spacing.

2. Maximum load shall be: 15 psf roof dead load, 55 psf floor total load, (40 psf live load plus 15 psf dead load), and 80 plf wall dead load. Wall is based on 3'-0" minimum 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. Use 12" o.c. requirements for lesser spacings.
 4. For conventional roof construction using a structural ridge beam, the Roof Truss Span column above is equivalent to the horizontal distance between the supporting wall and the ridge beam. When the roof is

framed using a ridge board (non-structural ridge element) and ceiling joists tie the roof together at the top of the exterior walls, the Roof Truss Span is equivalent to the horizontal distance between the supporting walls as if a truss is used.

Fire and Sound Rated Assemblies

Discussion

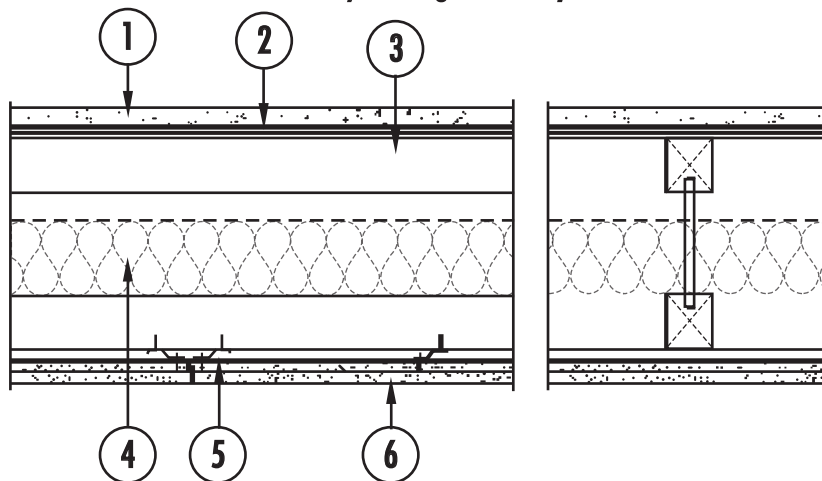
Fire rated assemblies are required for multi-family residential and commercial buildings to meet building code requirements. A 1 or 2-hour fire-rated floor/ceiling separation assembly may be required for floors with wood I-joists depending on the type of building construction, occupancy classification, and building height and area.

A minimum sound transmission class (STC) rating of 50 and a minimum impact insulation class (IIC) rating of 50 may be required for floor assemblies for multi-family and commercial buildings. These building types must meet the STC-IIC sound rating minimum requirements in addition to applicable fire-rating requirements.

IB ITS Listed Assemblies and Generic Assemblies in IBC

International Beams (IB) I-joists are listed with Intertek Testing Service (ITS), an accredited test lab and listing service recognized by the International Codes Council (ICC) and International Building Code (IBC) in the U.S., and by the Standards Council of Canada and National Building Code of Canada (NBCC) in Canada. The IB-ITS 1-hour fire-rated floor/ceiling assembly 60.02 example below closely matches generic assemblies in both the IBC and NBCC. Other generic fire and sound rated assemblies are available in IBC table 720.1(3) for the U.S., or Table A-9.10.3.1B of NBCC for Canada. It is also possible to achieve a one-hour fire-rated floor/ceiling separation using IB I-joists with a single layer of 5/8" thick type C gypsum board ceiling if a minimum of 1 1/2" rock wool insulation (2.5 pcf density) is used (see IB-ITS assembly 60.01). For details of construction, refer to the complete IB-ITS listing.

Design No. IBI/MWP 60-02 Assembly Rating: 60 minutes Floor/Ceiling Assembly



Notes for ITS F/C Assembly 60.02:

Legend:

1. Gypsum underlayer (optional for fire rating)
2. Minimum 19/32" thick OSB or plywood subfloor (minimum 23/32" thickness required for 24" o.c. spacing)
3. International Beams Inc. IB-series I-joists, minimum 9 1/2" deep, maximum 24" o.c.
4. Maximum 3 1/2" fiberglass insulation (optional for fire rating)
5. Resilient channels at 16" o.c.
6. Two layers of 1/2" thick Type X gypsum wallboard finish ceiling

Table C - Items that may be added to the assemblies to increase sound ratings

IIC Ratings (source: ITS Report Number-3180279COQ-004)

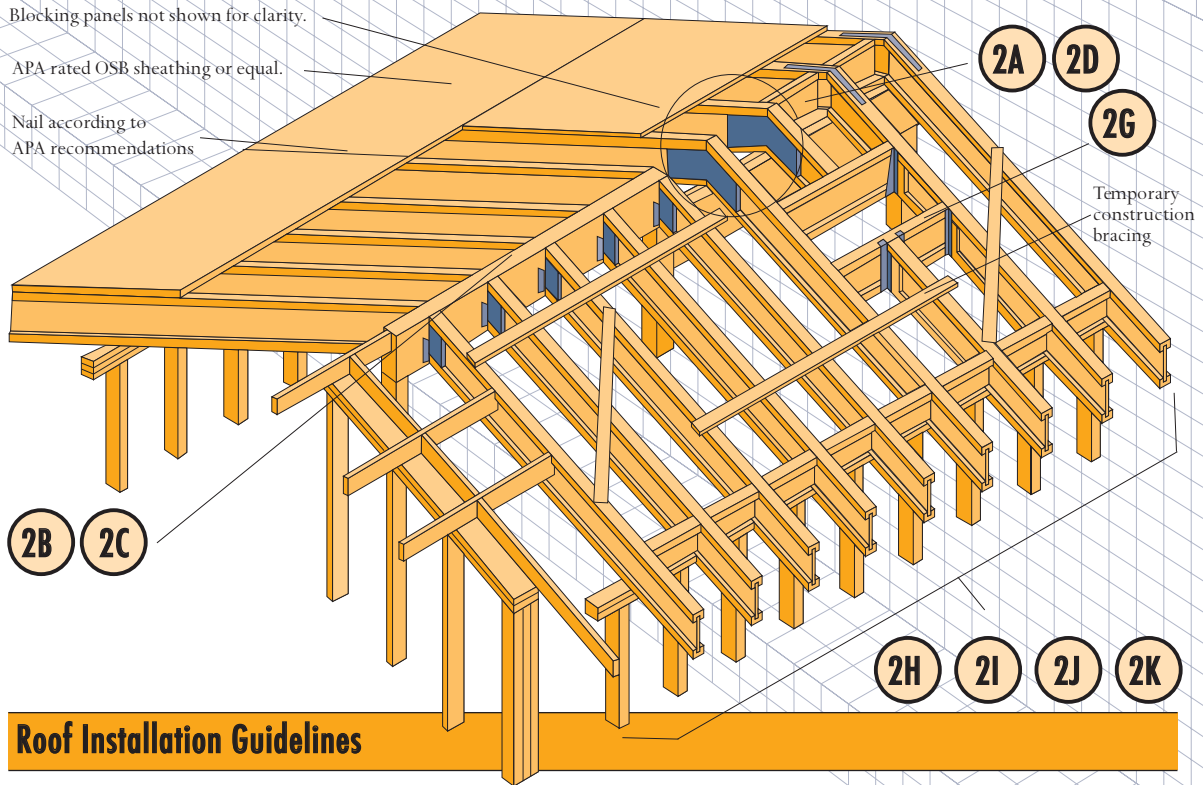
- | | |
|--|----------------|
| a) Adding a second 5/8" sub-floor | adds 2 points |
| b) Adding 5/8" sub-floor plus 1/16" building paper | adds 3 points |
| c) Adding Vinyl floor covering | adds 2 points |
| d) Adding Hardwood floor covering | adds 2 points |
| e) Adding Carpet and Underlay | adds 20 points |

STC Ratings (source: NBCC-2005, Vol. 2 Table A-9.10.3.1.B footnotes)

- | | |
|--|--------------|
| a) Each 2" of insulation added to minimum 6" thickness | adds 1 point |
| b) Each 2" of I-joist depth over minimum depth shown | adds 1 point |
| c) Increase I-joist spacing from 16" to 24" o.c. | adds 1 point |

Roof Framing & Construction Details

Roof Framing and Construction Details



Roof Installation Guidelines

- Installation of IB I-joists must be as shown in details 2A- 2L.
- Except for cutting to length, or for providing birdsmouth bearings as detailed in detail 2H, IB I-joist top or bottom flanges should NEVER be cut, drilled or notched.
- IB 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.
- When beveled bearing plates are used at IB I-joist supports, IB I-joist attachment to the bevel plate must be designed to transfer lateral thrust.
- 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 (lighting fixtures, ceiling fans, etc.).
- IB I-joists must be protected from the weather prior to installation.
IB I-joists must not be used in places where they will permanently exposed to weather (overhangs are exceptionally vulnerable) or in areas where they will reach a moisture content greater than 16%, such as in a swimming pool or hot-tub enclosure. They must not be installed where they will be in direct contact with concrete or masonry.
- End-bearing length must be at least 1¼ in. For continuous framing and roof framing with cantilevers, the immediate support and end bearing adjacent to the cantilever both must be at least ¾ in. For multiple-span joists, intermediate bearing length must be at least ¾ in.
- Ends of roof joists must be restrained at the bearing to prevent rollover. Rim board or IB 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 method.
- Rim board, IB I-joist blocking panels, or other means of providing lateral support must be provided at all IB I-joist bearing points.
- Continuous lateral support of the IB 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 IB 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.
- Nails installed perpendicular to the wide face of the flange must be spaced in accordance with the applicable building code requirements or approved building plans but should not be closer than 3 in. o.c. per row using 8d common nails.
- If IB I-joists are oriented so that the knockouts provide by the manufacturer are adjacent to the top flange, they may be removed to aid ventilation.
- The top and bottom flanges of the IB I-joist must be kept within ½ in. of true alignment. The use of IB I-joist blocking panels or engineered wood rim board greatly simplifies this requirement.
- All roof details are valid up to 12:12 slope unless otherwise noted.

Roof Framing Details

Roof Framing and Construction Details - Residential Construction

All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity.

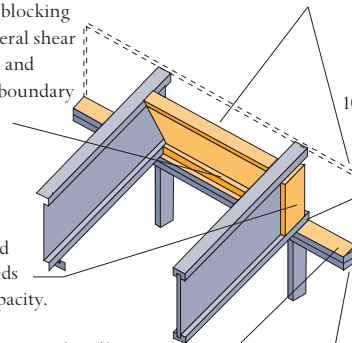
2A Upper End, Bearing on Wall

8d nails @ 6" o.c. - minimum
3-8d 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 8d nails.

Bearing stiffener required when end reaction exceeds the joist end reaction capacity.

Beveled plate for slopes greater than 1/4:12. Code-recognized connectors may be substituted. For slopes greater than 4:12 connectors are required to resist lateral thrust.

Blocking panel, x-bridging, or 3/2" sheathing 48/24 as continuous closure.



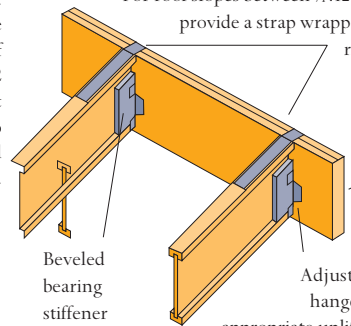
2B Peak Construction

For roof slopes between 1/4:12 and 12:12, provide a strap wrapped around ridge beam

Ridge beam (Glulam or LVL)

Adjustable slope hanger with an appropriate uplift capacity (min 300 lb).

Beveled bearing stiffener required each side.

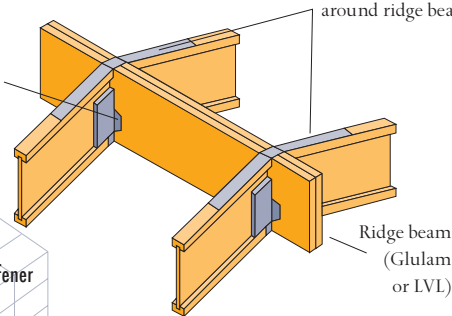


2C IB I-joint to Ridge Beam Connection

Adjustable slope hanger with an appropriate uplift capacity.

Beveled bearing stiffener required each side

For roof slopes between 1/4:12 and 12:12, provide a strap wrapped around ridge beam

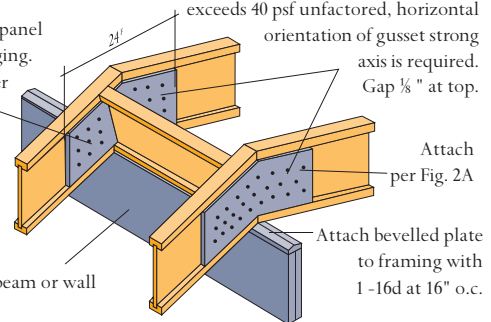


2D IB I-joint Connection with Wood Structural Panel Gussets

Blocking panel or x-bridging. Attach per Fig. 2A

Support beam or wall

3/2" x 2' 0" wood structural panel (front and back sides) with 12-8d nails into each joist with nails clinched. When roof live load exceeds 40 psf unfactored, horizontal orientation of gusset strong axis is required. Gap 1/8" at top.



2E Rafter Connection with Overlapping IB I-joists

8-8d nails each side

Filler block 8 8d nails 4 each side

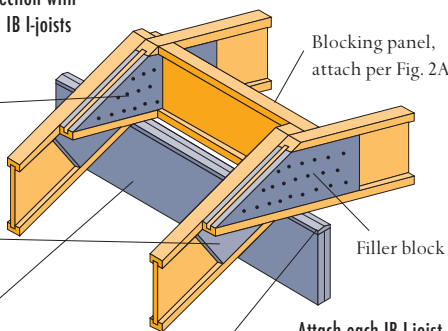
Support beam or wall

Attach bevel plate to beam or wall per Fig. 2D

Blocking panel, attach per Fig. 2A

Filler block

Attach each IB I-joint to beveled top plate per Fig. 2A



2F Roof Opening Top Mounted Hangers

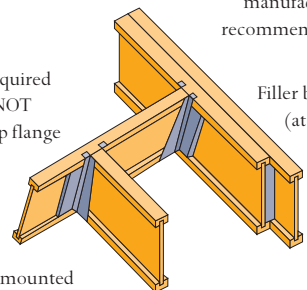
Bearing stiffeners required when hanger does NOT support IB I-joint top flange

Application limited to 4:12 pitch or less

Backer block. If top mounted hanger is fully supported by top flange, backer block only required on hanger side. If face nailing is required, then second backer block (filler block if multiple IB I-joint is required. Nail with 10-10d nails for flanges up to 1 3/4" wide. Use 12-10d nails for flanges wider than 1 3/4"

Top mounted hanger per manufacturer's recommendations

Filler blocking (attach per Fig. 1H)



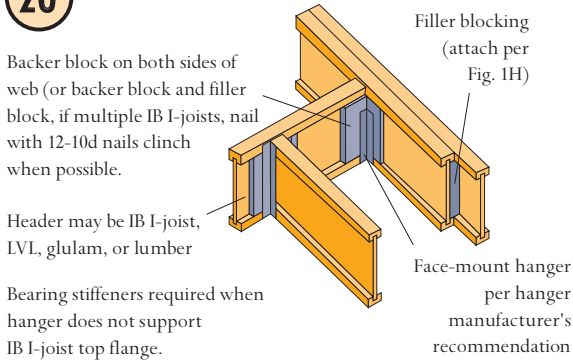
Note: Additional connection may be required for wind uplift.

Roof Framing Details

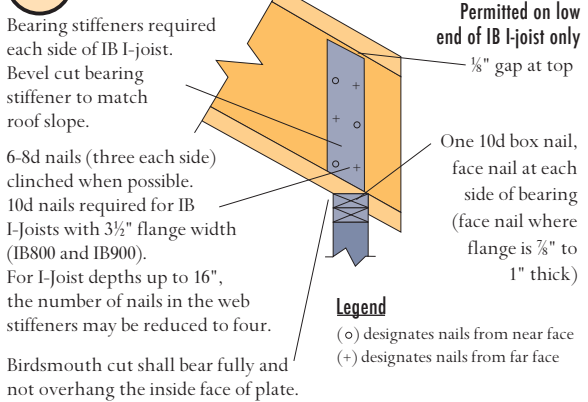
Roof Framing and Construction Details - Residential Construction

All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity.

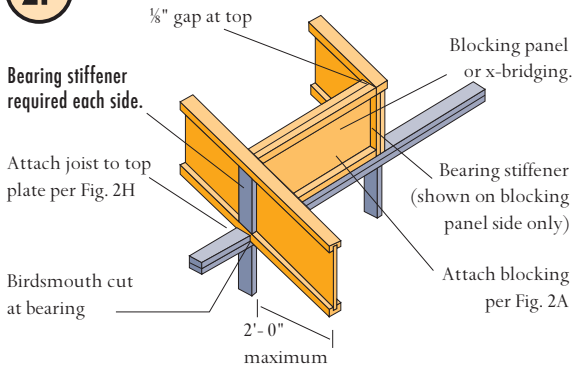
2G Roof Opening, Face-Mounted Hangers



2H Birdsmouth Cut & Bevel Cut Bearing Stiffener

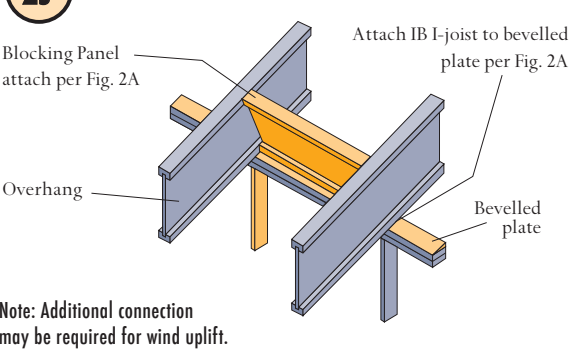


2I Birdsmouth Cut with Overhang (Permitted on low end of IB I-joist only)



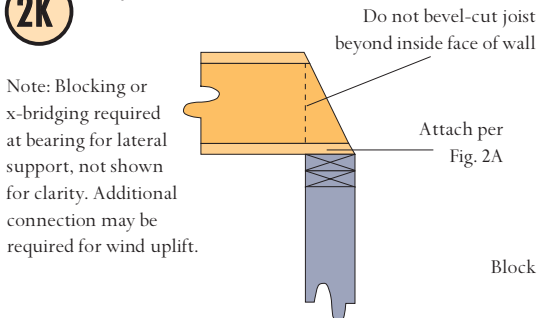
Note: Additional connection may be required for wind uplift. Outside corner of blocking panel may be trimmed if it interferes with roof sheathing. In such cases, position blocking panel on top plate to minimize trimming and still allow required nailing into top plate.

2J Blocking Panel at Beveled Plate



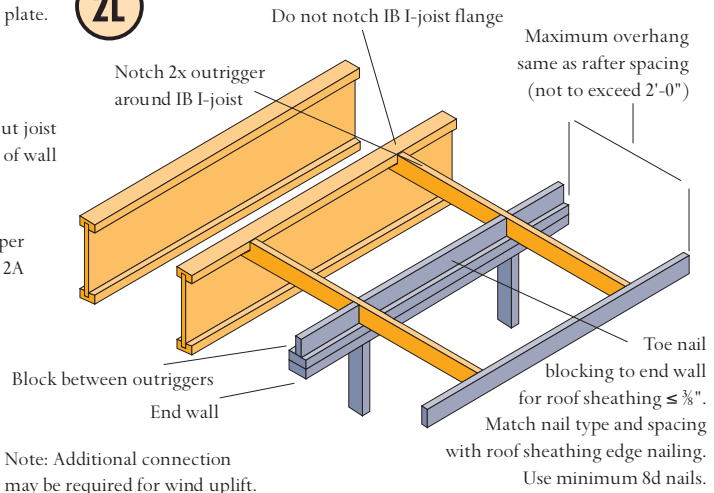
Note: Additional connection may be required for wind uplift.

2K IB I-joist with Bevel-Cut End



Note: Blocking or x-bridging required at bearing for lateral support, not shown for clarity. Additional connection may be required for wind uplift.

2L Outrigger



Note: Additional connection may be required for wind uplift.