

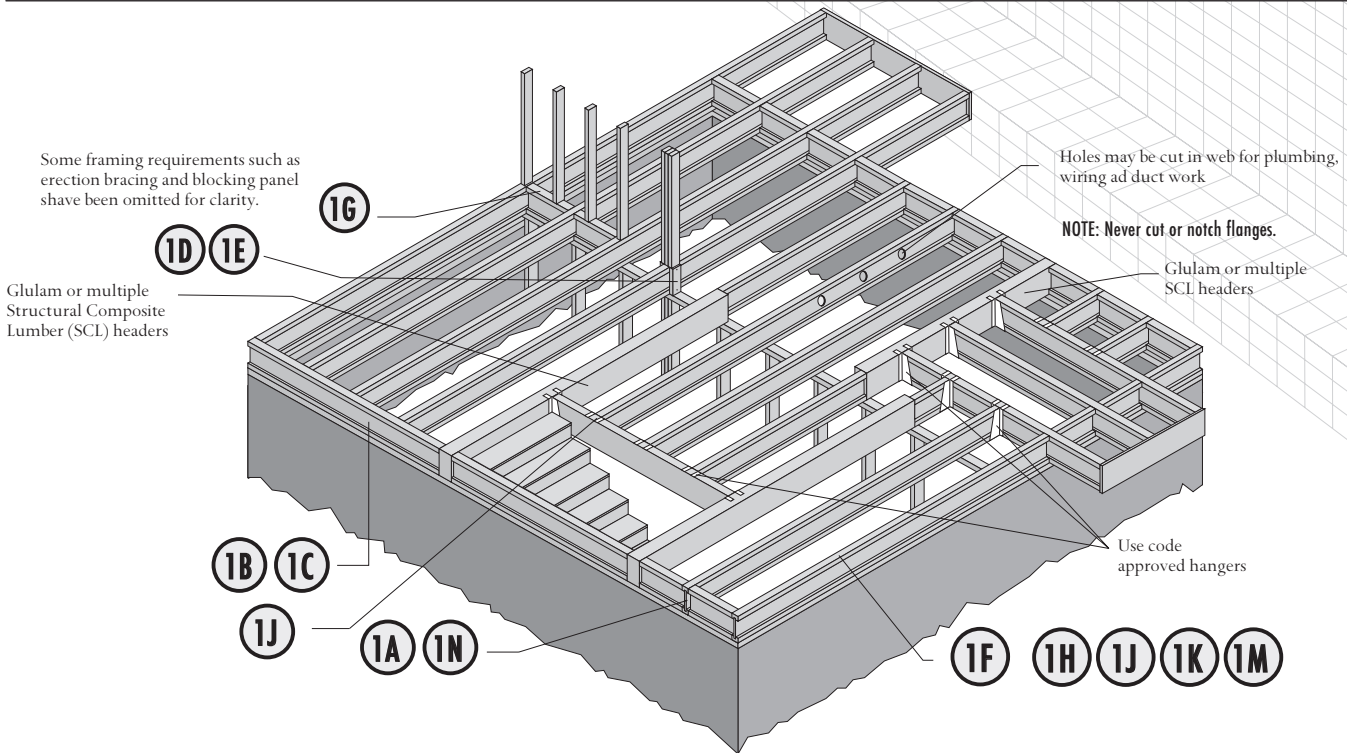
I-Joist Installation Guide

June 2022



Floor Framing & Construction Details

Floor Framing and Construction Details



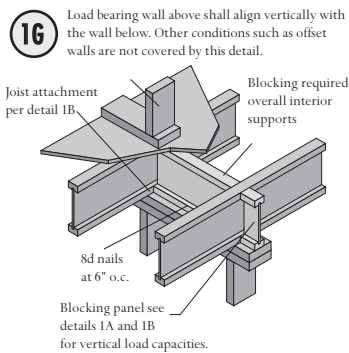
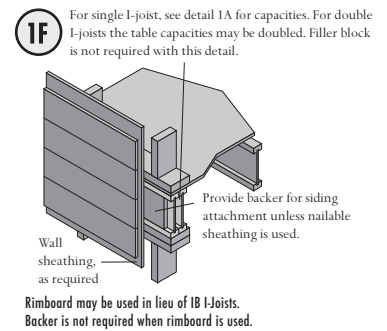
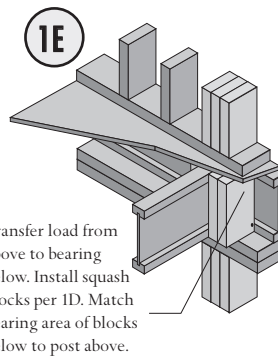
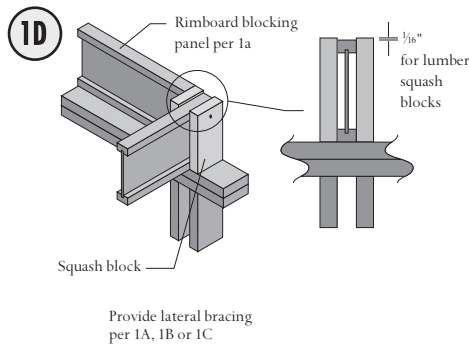
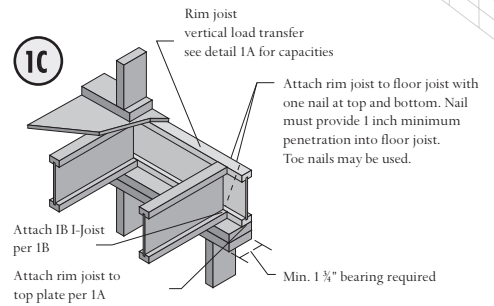
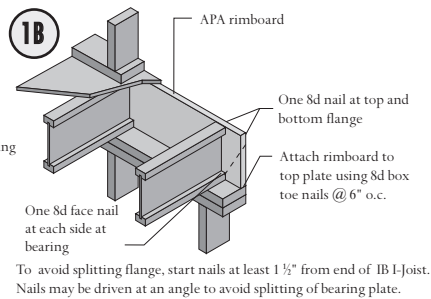
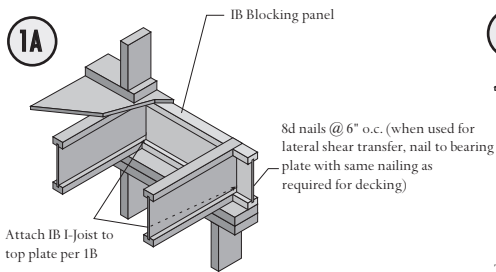
Installation Notes

- 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 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 3/4 inches for end bearings and 3 1/2 inches for intermediate bearings.
- When using hangers, seat IB I-Joists firmly in hanger bottoms to minimize settlement.
- Leave a 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 rimboard 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, rimboard, 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 rimboards. IB I-Joist blocking panels or other engineered wood products—such as rimboard—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 2 x 4 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.



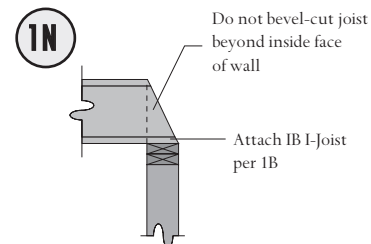
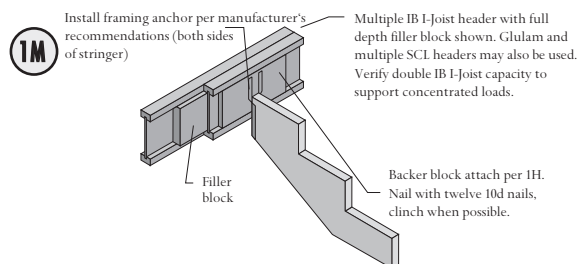
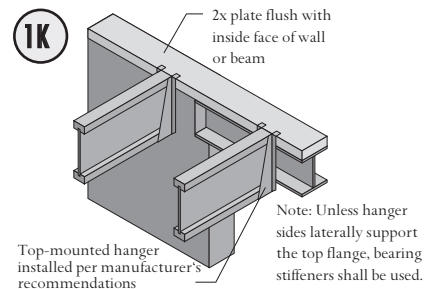
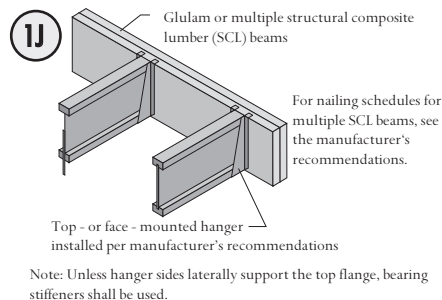
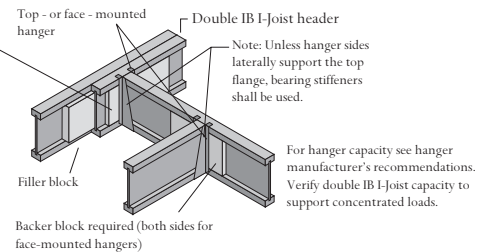
1H Backer block Before installing a backer block to a double I-joist, drive three additional 10d nails through the webs and filler block where the backer block will fit. Clinch. Install backer tight to top flange. Use twelve 10d nails, clinched when possible. Verify hanger capacity with hanger manufacturer.

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 3/4"

* 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.

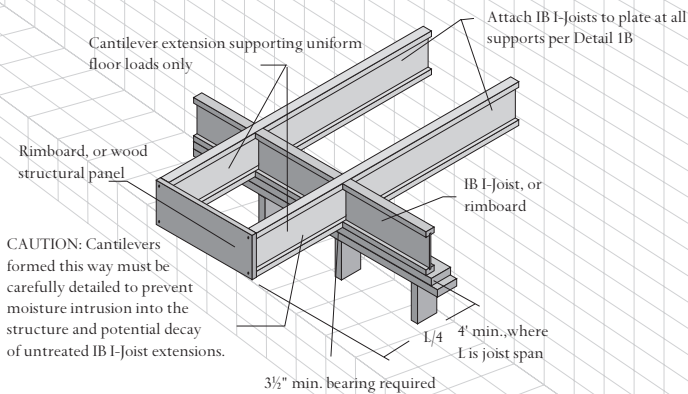
**For face-mount hangers use net joist depth minus 3/4 inch



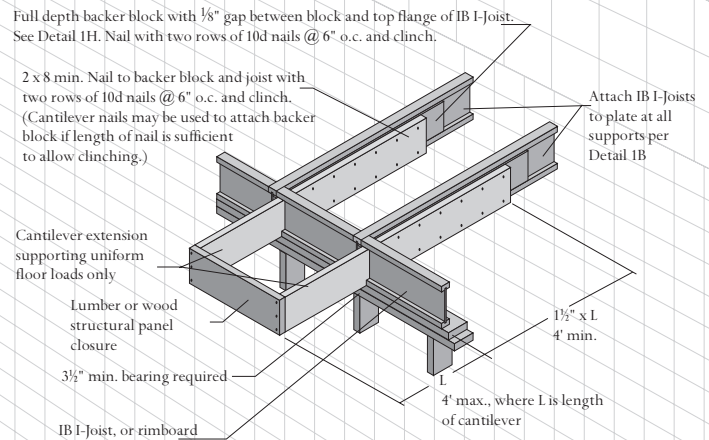
Note: Blocking required at bearing for lateral support, not shown for clarity.

Cantilever Framing Details

Cantilever Detail for Balconies



Lumber Cantilever Detail for Balconies



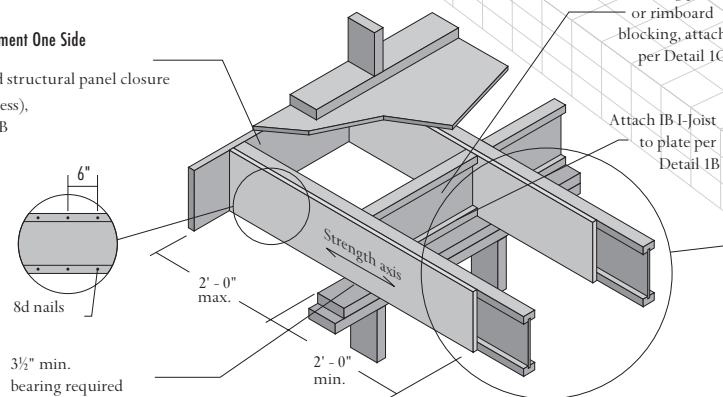
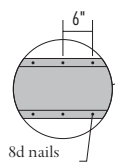
Cantilever Detail for Vertical Building Offset

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

Method 1

Sheathing Reinforcement One Side

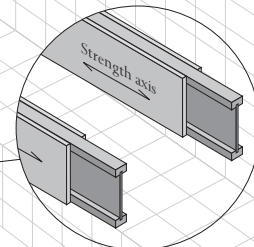
Rimboard or wood structural panel closure (2 3/32" min. thickness), attach per Detail 1B



Method 2

Sheathing Reinforcement Two Sides

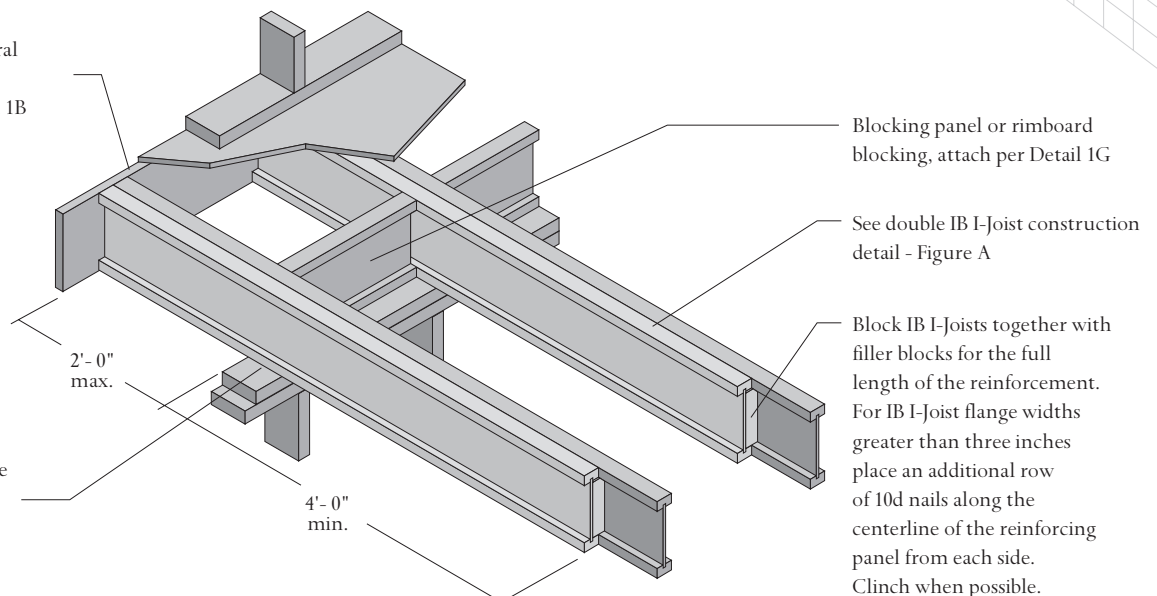
Use same installation as Method 1 but reinforce both sides of IB I-Joist with sheathing



Alternate Method 2

Double IB I-Joist

Rimboard, or wood structural panel closure (2 3/32" min. thickness), attach per Detail 1B



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, rimboard, 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 rimboard product would also work satisfactorily. Ideally, the depth of the web stiffener should equal the distance between the flanges of the joist minus $\frac{1}{4}$ 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.

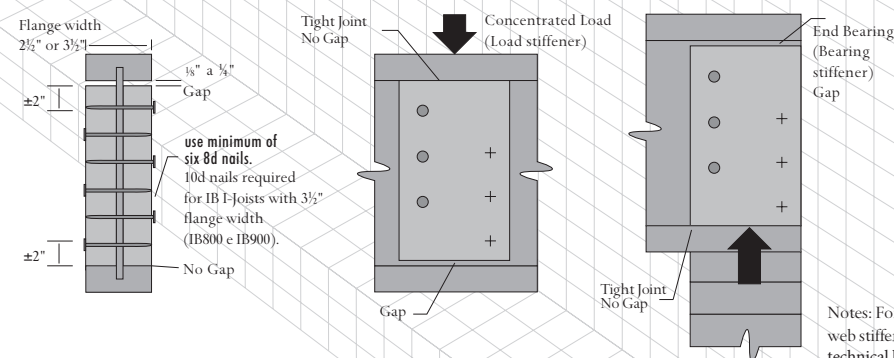
1. A bearing stiffener is required in all engineered applications with design end reactions greater than the reference joist end reaction without bearing stiffeners. The gap between the stiffener and the flange is at the top.

2. A load stiffener is required at locations where a concentrated load greater than 1500 pounds (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

Web Stiffener Size Requirements



Designation	Web Stiffener Size Each Side of Web
IB400/600	1" x 2 3/8" min. width

Notes: For I-joist depths up to 16 inches, the number of nails in the web stiffeners may be reduced to 4. For deeper I-joists, see IB technical bulletin TB-IJ-17

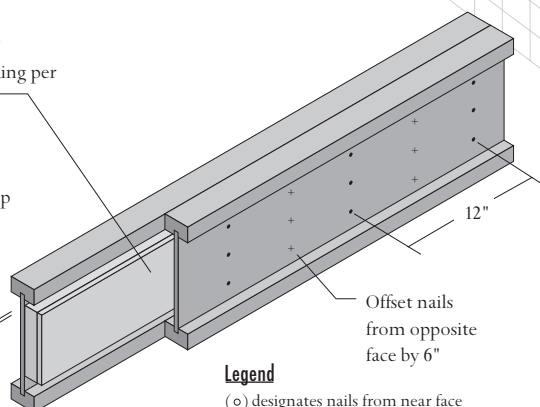
Double Joist Construction

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:

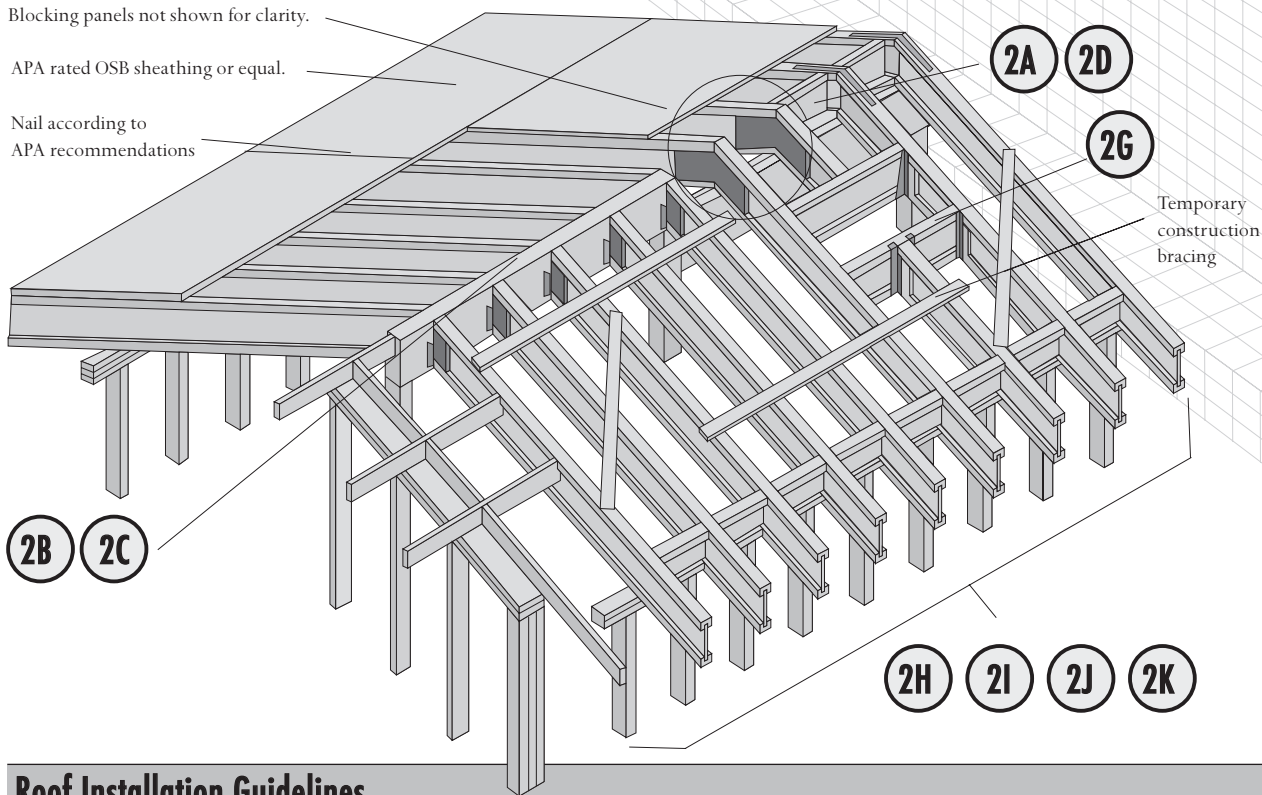
1. Support back of IB I-joist web during nailing to prevent damage to web / flange connection.
2. Leave a $\frac{1}{8}$ " gap between top of filler block and bottom of top IB I-joist flange.
3. Filler block is required between joists for full length of span.
4. Nail joists together with three rows of 10d nails at 12" o.c. (clinched when possible on each side of the double IB I-joist. Total of six nails per foot required. If nails can be clinched, only three nails per foot are required. For I-joist depths up to 16 inches, rows of nails may be reduced to two rows, total of four nails per foot (two nails per foot if clinched).
5. 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 $3\frac{1}{2}$ inches long FILLER blocks at maximum 4' o.c. spacing using a minimum of six nails from each face.

Table A

Flange Width	Joist Series	Joist Depth	Filler Depth	Filler Thickness
2 1/2"	IB400/600	9 1/2"	6"	2 1/8"
	IB400/600	11 7/8"	8"	
	IB400/600	14"	10"	
	IB400/600	16"	12"	

Roof Framing & Construction Details

Roof Framing and Construction Details



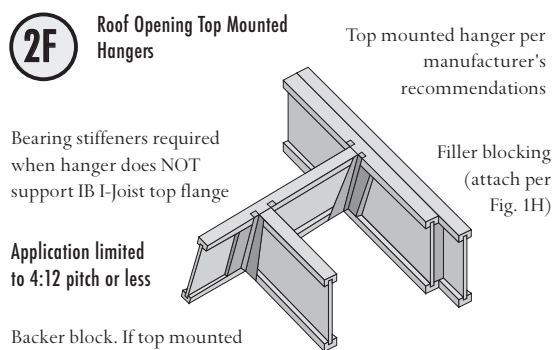
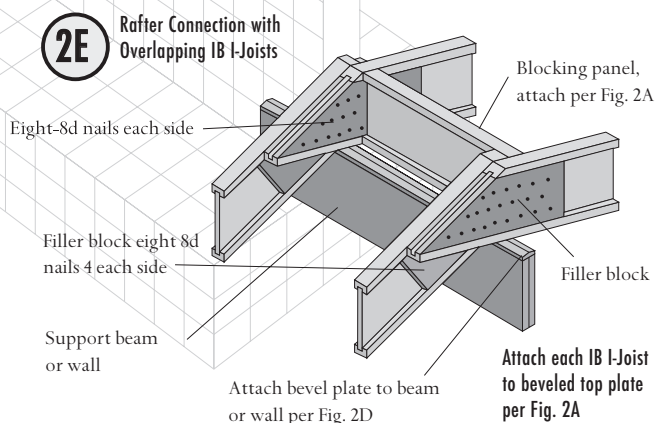
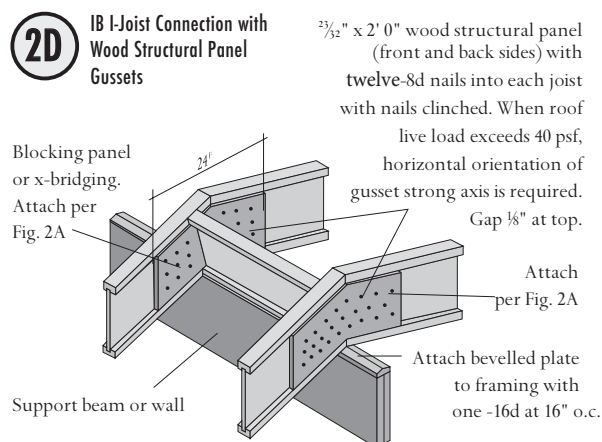
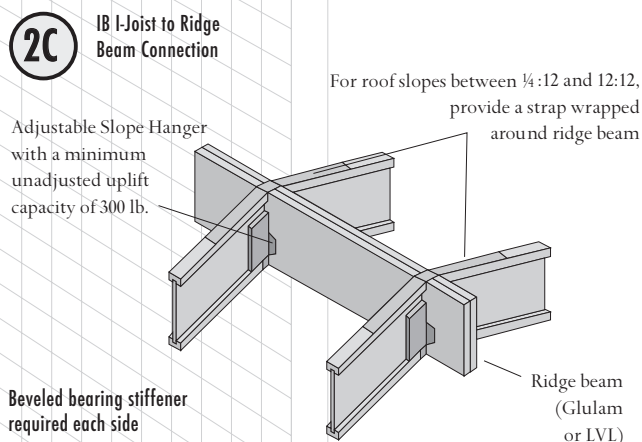
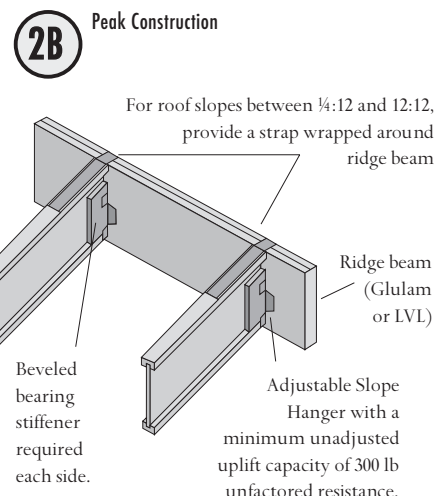
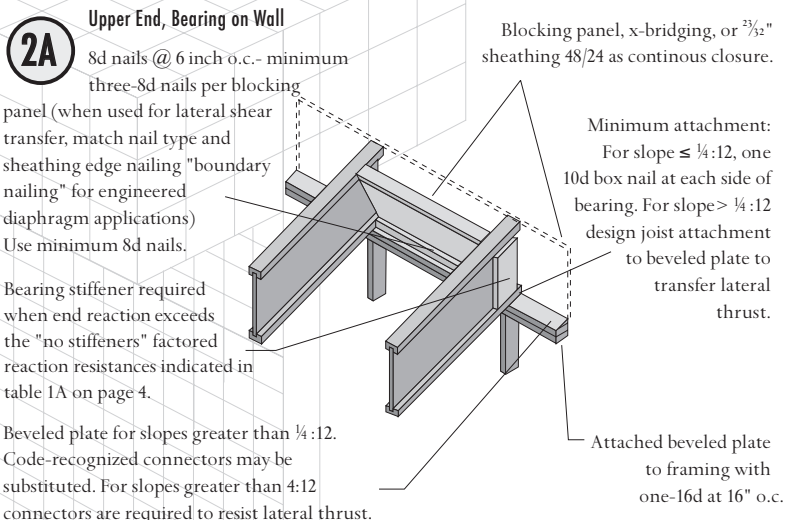
Roof Installation Guidelines

1. Installation of IB I-Joists must be as shown in details 2A- 2L.
2. 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.
3. 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.
4. 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.
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 (lighting fixtures, ceiling fans, etc.).
6. IB I- Joists must be protected from the weather prior to installation.
7. 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.
8. End-bearing length must be at least 1¼ inches. For continuous framing and roof framing with cantilevers, the immediate support and end bearing adjacent to the cantilever both must be at least 3½ inches. For multiple-span joists, intermediate bearing length must be at least 3½ in.
9. Ends of roof joists must be restrained at the bearing to prevent rollover. Rimboard 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.
10. Rimboard, IB I-Joist blocking panels, or other means of providing lateral support must be provided at all IB I-Joist bearing points.
11. 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.
12. 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 inches o.c. per row using 8d common nails.
13. If IB I-Joists are oriented so that the knockouts provided by the manufacturer are adjacent to the top flange, they may be removed to aid ventilation.
14. The top and bottom flanges of the IB I-Joist must be kept within ½ inch of true alignment. The use of IB I-Joist blocking panels or engineered wood rimboard greatly simplifies this requirement.
15. 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.



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-Joist) is required. Nail with ten-10d nails for flanges up to $1\frac{1}{4}$ " wide. Use twelve-10d nails for flanges wider than $1\frac{1}{4}$ "

Note: Additional connection may be required for wind uplift.

Roof Framing Details

Roof Framing and Construction Details - Residential Construction

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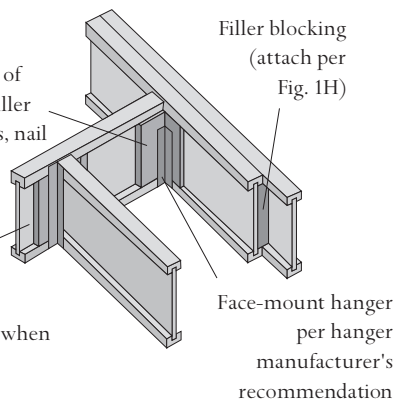
2G

Roof Opening, Face-Mounted Hangers

Backer block on both sides of web (or backer block and filler block, if multiple IB I-Joists, nail with twelve-10d nails clinch when possible.

Header may be IB I-Joist, LVL, glulam, or lumber

Bearing stiffeners required when hanger does not support IB I-Joist top flange.



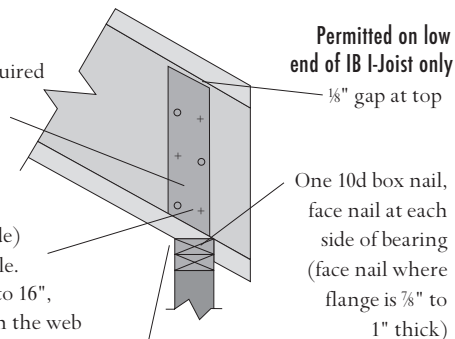
2H

Birdsmouth Cut & Bevel Cut Bearing Stiffener

Bearing stiffeners required each side of IB I-Joist. Bevel cut bearing stiffener to match roof slope.

Six 8d nails (3 each side) clinched when possible. For I-joist depths up to 16", the number of nails in the web stiffeners may be reduced to four.

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

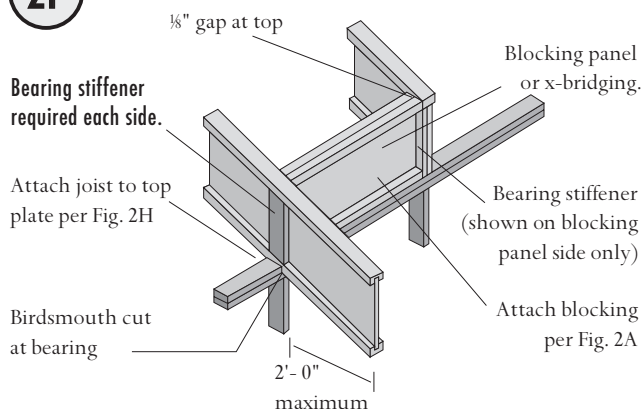


Legend

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

2I

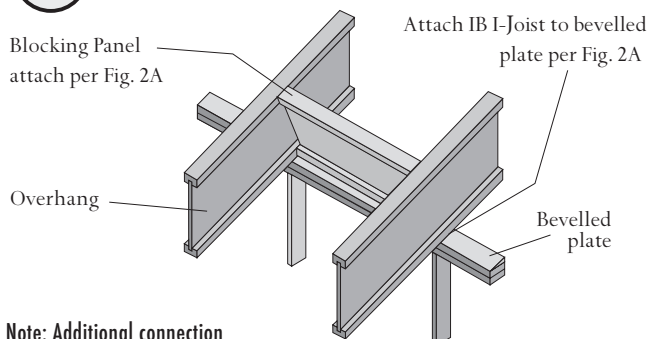
Birdsmouth Cut with Overhang (Permitted on low end of IB I-Joist only)



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

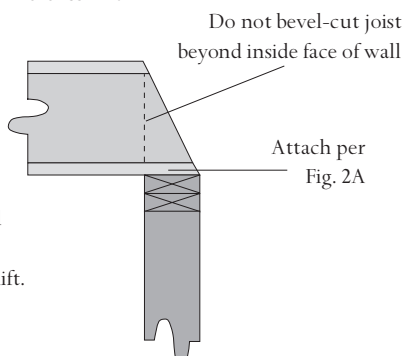


Note: Additional connection may be required for wind uplift.

2K

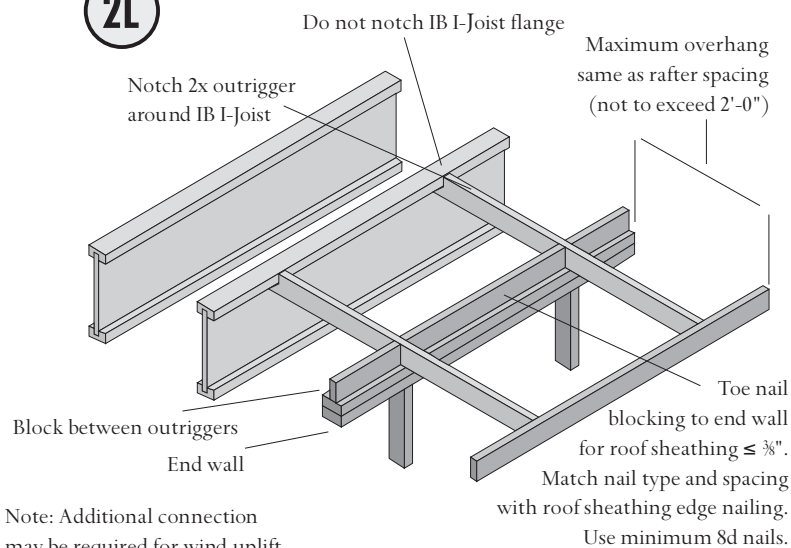
IB I-Joist with Bevel-Cut End

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



2L

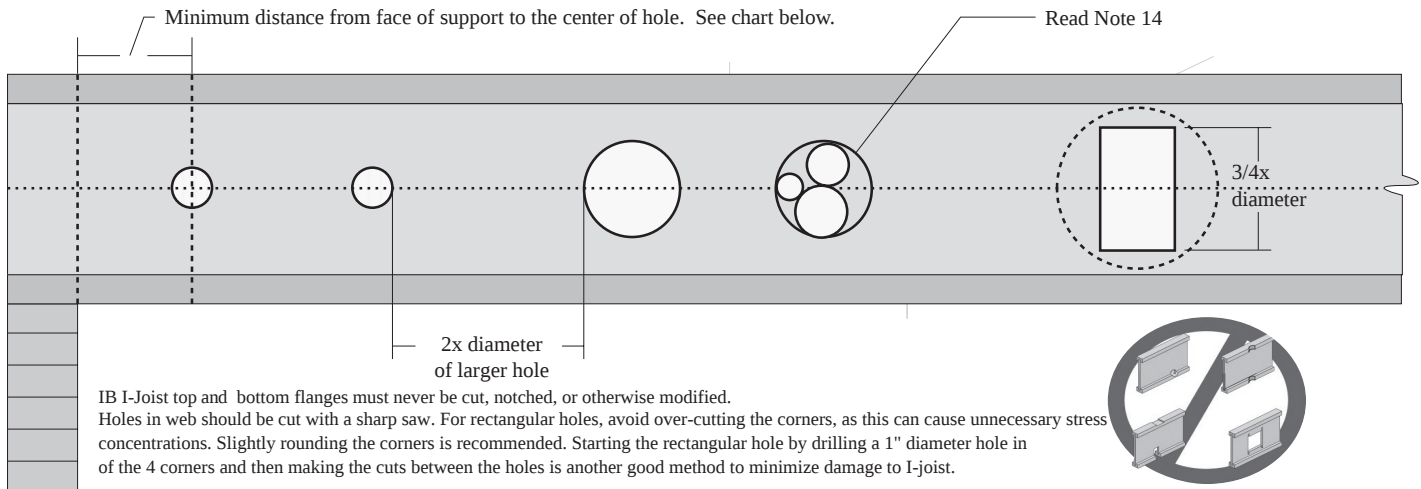
Outrigger



Note: Additional connection may be required for wind uplift.

Web Hole Guidelines IB EWP Inc.

Typical Web Holes



Allowable Web Hole Sizes and Locations (U.S. ASD)

40psf unfactored Live Load, 15 psf unfactored Dead Load (1 3/4" end bearings, 3 1/2" interior without bearing stiffeners)

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

Round Hole Diameter (inches)

RESIDENTIAL (40L + 15D) - SINGLE & MULTIPLE SPANS	Joist Depth (in)	Series	SAF	2	3	4	5	6	6 1/4	7	8	8 5/8	9	10	10 3/4	11
	9.5	IB400	14-0"	0-7"	1-7"	2-10"	4-1"	5-6"	5-10"							
		IB600	15-4"	0-7"	1-4"	2-9"	4-2"	5-9"	6-2"							
		IB700	15-11"	0-7"	1-11"	3-5"	4-11"	6-6"	7-0"							
		IB800	16-9"	1-2"	2-7"	4-1"	5-7"	7-3"	7-8"							
		IB900x	17-2"	0-7"	1-11"	3-6"	5-3"	7-1"	7-7"							
	11.875	IB400	15-11"	0-7"	0-8"	1-3"	2-5"	3-8"	4-0"	5-0"	6-4"	7-3"				
		IB600	17-11"	0-7"	0-9"	2-0"	3-3"	4-7"	4-11"	6-0"	7-6"	8-6"				
		IB700	17-11"	0-7"	0-8"	1-8"	3-0"	4-4"	4-8"	5-9"	7-4"	8-4"				
		IB800	19-11"	0-9"	2-0"	3-4"	4-8"	6-1"	6-5"	7-6"	9-1"					
		IB900x	20-4"	0-7"	0-10"	2-5"	4-0"	5-7"	6-0"	7-4"	9-2"	10-5"				
	14	IB400	17-6"	0-7"	0-8"	0-8"	0-11"	2-1"	2-5"	3-4"	4-7"	5-5"	5-11"	7-4"	8-6"	
		IB600	17-11"	0-7"	0-8"	0-8"	1-2"	2-4"	2-8"	3-7"	4-10"	5-8"	6-3"	7-8"	8-10"	
		IB700	17-11"	0-7"	0-8"	0-8"	0-10"	2-0"	2-4"	3-3"	4-7"	5-5"	6-0"	7-5"	8-7"	
		IB800	22-3"	0-7"	1-0"	2-3"	3-6"	4-9"	5-1"	6-2"	7-7"	8-6"	9-0"	10-7"		
		IB900x	23-1"	0-7"	0-8"	1-6"	2-11"	4-4"	4-9"	5-11"	7-6"	8-7"	9-2"	11-0"		
	16	IB400	17-11"	0-7"	0-8"	0-8"	0-9"	0-9"	0-10"	1-2"	2-4"	3-2"	3-7"	4-10"	5-10"	6-3"
		IB600	17-11"	0-7"	0-8"	0-8"	0-9"	0-9"	0-10"	1-2"	2-4"	3-2"	3-7"	4-10"	5-11"	6-3"
		IB700	17-11"	0-7"	0-8"	0-8"	0-9"	0-9"	0-10"	1-3"	2-5"	3-3"	3-9"	5-0"	6-1"	6-5"
		IB800	22-3"	0-7"	0-8"	0-8"	1-2"	2-5"	2-8"	3-8"	4-11"	5-9"	6-3"	7-8"	8-9"	9-2"
		IB900x	24-1"	0-7"	0-8"	0-8"	0-9"	2-0"	2-5"	3-5"	4-10"	5-9"	6-4"	7-11"	9-1"	9-6"

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:
 $V_{\text{round hole}} = \text{Published Shear Value} \times [(\text{Joist Depth} - \text{Hole Diameter}) / \text{Joist Depth}]$
SAF = Span adjustment factor, used as defined below
OPTIONAL:
This table is based on I-joists being used at a span = SAF. If the I-joists are placed at less than SAF, the maximum distance from the centerline of the hole to the face of any support (D), as given above may be reduced as follows:
 $D_{\text{reduced}} = L_{\text{actual}} / \text{SAF} \times D$
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_{actual} = 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.
The table is only applicable to cases where $L_{\text{actual}} \leq \text{SAF}$
- 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 be 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, and may be utilized anywhere it occurs and may be ignored for purposes of calculating minimum distances between holes.
- 1 1/2" diameter round holes shall be permitted anywhere in a cantilevered section of an IB I-joist. Holes of greater size may be permitted subject to verification.
- A single round web hole 1 1/2" diameter may be located anywhere in the web provided that it meets the requirements of note 9 above. Several web holes of 1 1/2" diameter in a horizontal row are permitted if they meet the requirements of note 9 and cover a length of 24 inches or less. Multiple web hole openings 1 1/2" in diameter covering a length of greater than 24 inches may be allowed subject to verification.
- All holes shall be cut in a workman-like manner in accordance with the restrictions listed above and as illustrated in figure above. For rectangular holes, avoid overcutting corners. It is recommended to start by drilling one inch diameter holes at the four corners, then making cuts between the holes to minimize damage to the joist.
- 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.
- For joists with more than one span, use the longest span to determine hole location in either span.
- Refer to IB EWP Inc. design software for other hole sizes and locations.