



INTERNATIONAL BEAMS Commercial Design Manual *for* I-Joists



The
GREEN
Building
Solution



JANUARY 2010

Our Company

At International Beams Inc. we take pride in providing our customers with premium quality products and services. Our full range of engineered wood products are manufactured to provide consistent, high performance floor and roof systems.

Our technical staff consists of highly trained technical experts available to assist with any design or construction question and to provide full support for our design/layout software.



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Our Guarantee

International Beams Inc. manufactures and tests its products to very high quality control standards. We are confident that our products will provide our customers with consistent high performance when handled and installed in accordance with our Installation Guide. We guarantee that our products are defect-free and capable of supporting loads as specified in our product literature for the life of the structure. In the unlikely event that you receive a product that has a manufacturer's defect, please contact us to have the problem remedied immediately.

Environmental Choice

In choosing wood as a construction material, you are choosing the only building material that is made from renewable resources. Due to sustained forest practices, the volume of wood in our forests has actually increased by 35% over the last 25 years.

International Beams' I-joists are made from two wood products. The flanges are made from small dimension lumber that is sawn from small trees and the tops of larger trees.

The web is a special grade of oriented strand-board that is made from under-utilized wood species. Both components assist in achieving total utilization of each tree harvested.



When considering total environmental impact including extraction of raw materials, energy required during manufacturing, emissions from manufacturing operations, and energy efficiency of buildings, International Beams group of engineered wood products are among the most environmentally friendly building products available.

For details on how IB products can help to meet green building standards, see page 20, or contact International Beams.

Engineered Wood Products

Engineered wood products, and specifically I-joists offer advantages over conventional lumber products that result in savings for the builder and long-term performance benefits for the owner.

I-joists are installed using traditional framing tools and fasteners. With long lengths, I-joists are used in multiple span applications, thus reducing cutting, overlapping and material waste at the job site. Also, since I-joists span longer distances than traditional framing lumber, the joist spacing can be wider, resulting in fewer pieces to handle and install.

The wide flanges used in all IB series provide a larger gluing and nailing surface for floor and roof sheathing. These lightweight joists will not twist, warp, or shrink and are more uniform in their dimensions than solid lumber. Our joists are available in depths from 9½" to 24" and lengths up to 52 feet. For depths less than 18", see our Residential Design Manual or contact International Beams.

International Beams Inc.'s I-joists are recognized as an innovative solution to the building industry's floor and roof framing needs.

Floor Performance

Our broad range of I-joists provides the builder with flexibility in joist selection, spacing, and construction detail. Although all values contained in this brochure meet or exceed code requirements, long-term floor performance (comfort) should be considered in all construction projects.

The following suggestions will increase the floor stiffness and reduce floor vibration:

- Using floor deflection of L/480 instead of the code minimum of L/360.
- Gluing and nailing the sub-floor to the joists.
- Attaching gypsum board to the bottom of the floor.
- Decreasing the joist spacing by one increment based on allowable span.
- Using full depth I-joist blocking panels at mid span between floor joists.
- Using deeper joists.
- Using a thicker sub-floor, i.e. ¾" or 7/8".
- Attaching strapping at 16" o/c.

Design Services

Design and related services include, but are not limited to:

- Beam sizing
- Component Framing Layouts
- Coordination with architects and builders
- On-site review
- Pricing
- Shipping

These services are generally provided by your local International Beams distributor. There are also local lumber yards, stocking dealers, and design professionals who are familiar with our IB products and may be able to provide some of these design services. If you need help with your design project, please contact International Beams at sales@internationalbeams.com, or contact the local distributor indicated on the back cover of this literature.

Engineering Responsibility Position Statement

International Beams Inc. manufactures and distributes proprietary engineered wood products (EWP).

We have full-time professional engineers on staff. Our engineers are active in the development, manufacture, and marketing of IB products.

Our engineering services are limited to supporting the engineered wood components that we manufacture and distribute (IB I-joists, IB LVL, IB Rim Board). We review and seal component calculations produced on our software, and provide advice on proper installation.

The design professional of record (Engineer or Architect) is responsible for design of the overall structure, global lateral stability, and interaction of various components of the structure. The limited scope of engineering services provided by International Beams Inc. does not replace the need on any project for a design professional of record.

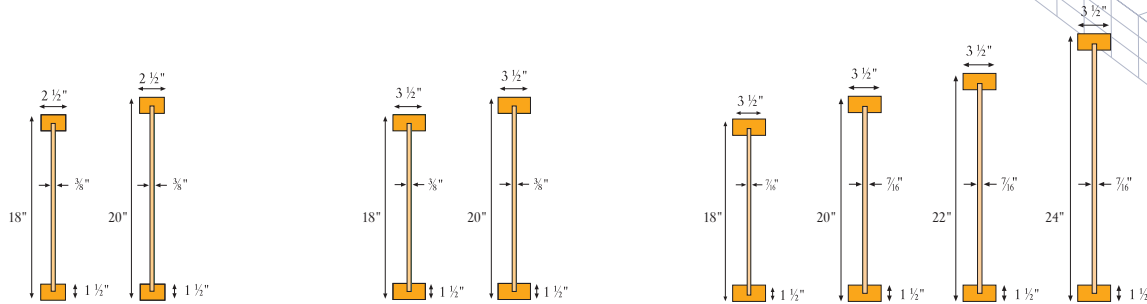


International Beams Commercial Product Line

IB 600

IB 800

IB 900



Engineering Properties of "600, 800, 900 Series Commercial Depth I-Joists" (Allowable Stress Design)^(A)

Series	Depth (in.)	Bending Stiffness ^(B) EI joist (x10 ⁶ psi)	Moment ^(C) M (ft-lbs)	Shear ^(D) V (lbs)	ER ^(E) 1 3/4 in. brg. (lbs)	IR ^(F) 3 1/2 in. brg. (lbs)	Shear Deflection Factor ^(G) K (x10 ⁶ psi)	I-Joist Self-Weight (plf)
IB600	18	1,046	7,895	2,250	1,465	2,500	9.36	3.9
	20	1,304	8,735	2,500	1,550	2,500	10.4	4.1
IB800	18	1,445	11,135	2,300	1,465	3,100	9.36	4.3
	20	1,799	12,380	2,600	1,550	3,100	10.4	4.5
IB900	18	1,565	14,285	2,510	1,465	3,355	11.52	4.5
	20	1,984	15,810	2,695	1,550	3,355	12.8	4.7
	22	2,457	17,320	2,875	1,470	3,355	14.08	4.9
	24	2,985	18,810	3,060	1,470	3,355	15.36	5.1

Notes:

- A. Design values were developed in accordance with NDS "National Design Specification for Wood Construction" for standard term load duration (C_D=1). All values, except EI and K, are permitted to be adjusted for other load durations as permitted by NDS.
- B. Bending stiffness (EI) of the I-joist.
- C. Moment capacity (M) shall **NOT** be increased by any Code-allowed system factor.
- D. Shear capacity (V) of the I-joist with a minimum end bearing of 4 inches with web stiffeners. I-joists without web stiffeners and reaction-limited smaller bearings may have lower capacities. See table 1A for web stiffener requirements which vary by depth and series.
- E. End reaction (ER) capacity is for a minimum end bearing of 1 3/4" without web stiffeners. Higher end reactions are permitted with increased bearing length and web stiffeners. See table 1A for web stiffener requirements which vary by depth and series.
- F. Intermediate reaction (IR) capacity is for a minimum bearing length of 3 1/2 inches without web stiffeners. Higher interior reactions are permitted with increased bearing length and web stiffeners. See table 1A for web stiffener requirements which vary by depth and series.

- G. Shear deflection factor (K), which shall be used to calculate uniform load and center-point load deflections of the I-joist in a simple span application based on equations #1 and #2 below.

Equation #1 $\Delta = \frac{5wL^4}{384EI} + \frac{wL^2}{K}$ Where:
 (Uniform Load) Δ = Calculated deflection (inches)
 w = Unfactored uniform load (lbf/inch)

Equation #2 $\Delta = \frac{PL^3}{48EI} + \frac{2PL}{K}$ L = Design span (inches)
 (Center-Point Load) EI = Bending stiffness of the I-joist (lbf-in²)
 K = Shear deflection factor
 P = Concentrated load (lbf)

- H. For information relating to the use of International Beams products in Canada, refer to our Canadian literature.



ESR-1290



PR-L252

International Beams Commercial Product Line

**End Reaction (ER) and Interior Reactions (IR) Capacities
of "600, 800, 900" Series Commercial Depth I-Joists (Allowable Stress Design) ⁽¹⁾**

Series	Depth (in.)	End Reaction Capacities ⁽²⁾ (pounds)						Interior Reaction Capacities ⁽³⁾ (pounds)			
		1 ¼" Bearing		3 ½" Bearing		4" or Larger Bearing		3 ½" Bearing		5 ½" Bearing	
		No stiffeners	Stiffeners	No stiffeners	Stiffeners	No stiffeners	Stiffeners	No stiffeners	Stiffeners	No stiffeners	Stiffeners
IB600	18	1,465	1,725	1,550	2,250	1,550	2,250	2,500	3,425	3,100	3,735
	20	1,550	1,725	1,550	2,500	1,550	2,500	2,500	3,450	3,100	3,820
IB800	18	1,465	2,270	1,550	2,300	1,600	2,300	3,100	4,225	3,100	4,225
	20	1,550	2,460	1,550	2,600	1,650	2,600	3,100	4,350	3,100	4,350
IB900	18	1,465	2,270	1,675	2,510	1,885	2,510	3,355	4,270	3,355	4,640
	20	1,550	2,470	1,675	2,680	1,885	2,695	3,355	4,600	3,355	5,000
	22	1,470	2,595	1,675	2,820	1,885	2,875	3,355	4,950	3,355	5,075
	24	1,470	2,880	1,675	2,960	1,885	3,060	3,355	5,150	3,355	5,150

Notes:

- Design values were developed in accordance with NDS, "National Design Specification for Wood Construction", for standard term load duration ($C_D = 1$). End and Interior reaction capacities are permitted to be adjusted for other load durations as permitted by NDS.
- Interpolation of the factored end reaction resistances between 1 ¼" and 3 ½" is permitted.
- Interpolation of the factored interior reaction resistances between 3 ½" and 5 ½" is permitted.



Maximum Floor Spans

Table 2 - IB600, IB800 and IB900 Maximum Floor Spans

40 psf Live Load (3/2" bearings with bearing stiffeners)
 30 psf Dead Load
 Allowable Stress Design (ASD) 100% Load Duration (L/480 live load, L/240 total load deflection criteria)

I-Joist		3/32" OSB subfloor glued and nailed Spacing of IB joist (o.c.)							
Series	Depth	Simple span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB600	18"	30'-1"	26'-1"	23'-8"	21'-2"	30'-1"	26'-1"	23'-8"	19'-7"
	20"	31'-8"	27'-5"	25'-0"	22'-5"	31'-8"	27'-5"	24'-8"	19'-8"
IB800	18"	34'-6"	30'-11"	28'-2"	25'-2"	35'-8"	30'-11"	28'-2"	24'-2"
	20"	37'-1"	32'-6"	29'-8"	26'-8"	37'-7"	32'-6"	29'-8"	24'-11"
IB900	18"	35'-6"	32'-4"	30'-7"	28'-5"	38'-9"	34'-11"	30'-7"	24'-5"
	20"	38'-5"	35'-0"	33'-0"	30'-1"	41'-11"	36'-9"	32'-10"	26'-4"
	22"	41'-3"	37'-7"	35'-2"	31'-5"	44'-5"	38'-6"	35'-2"	28'-4"
	24"	44'-0"	40'-1"	36'-7"	32'-9"	46'-4"	40'-1"	36'-7"	29'-5"

Table 3 - IB600, IB800 and IB900 Maximum Floor Spans

50 psf Live Load (3/2" bearings with bearing stiffeners)
 30 psf Material Weight + 15 psf Partition Dead Load (for a total of 45 psf Dead Load)
 Allowable Stress Design (ASD) 100% Load Duration (L/480 live load, L/240 total load deflection criteria)

I-Joist		3/32" OSB subfloor glued and nailed Spacing of IB joist (o.c.)							
Series	Depth	Simple span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB600	18"	25'-10"	22'-4"	20'-5"	18'-2"	25'-10"	22'-4"	20'-5"	18'-2"
	20"	27'-2"	23'-5"	21'-5"	18'-2"	27'-2"	23'-5"	21'-5"	18'-2"
IB800	18"	30'-8"	26'-7"	24'-2"	21'-8"	30'-8"	26'-7"	22'-2"	17'-10"
	20"	32'-3"	27'-12"	25'-7"	22'-10"	32'-3"	27'-5"	22'-11"	18'-4"
IB900	18"	32'-10"	29'-12"	27'-5"	23'-11"	34'-8"	27'-0"	22'-5"	18'-0"
	20"	35'-6"	31'-8"	28'-11"	25'-10"	36'-5"	29'-1"	24'-2"	19'-5"
	22"	38'-2"	33'-0"	30'-2"	27'-1"	38'-2"	31'-4"	26'-1"	20'-11"
	24"	39'-9"	34'-5"	31'-5"	28'-2"	39'-9"	32'-6"	27'-2"	21'-8"

Notes:

1. Allowable spans are applicable to floor construction. The live load and dead load deflection limits are indicated at the top of the span table.
2. Spans are based on partial composite action with glued and nailed subfloor meeting requirements for APA Span-Rated STURD-I-FLOOR conforming to PRP-108, PS 1, PS 2, CSA 0325, or CSA 0437. Construction adhesive shall meet the requirements given in ASTM D3498 or APA Specification AFG-01.
3. Minimum bearing length shall be 3 1/2" for end bearing and 3 1/2" for interior bearings. Allowable design spans in the table are measured from centerline of supports.
4. Bearing stiffeners are required when I-joists are used with the spans given in this table.
5. This span table is based on uniform loads. For applications with other than uniformly distributed loads, or other applications beyond the scope of the indicated design criteria, an engineering analysis may be required based on the use of the design properties accepted in the ICC-ES ESR 1290 evaluation report. Design properties are also indicated in table 1 at the front of the design manual. For technical support, contact International Beams (IB) or your local IB distributor.
6. Continuous spans given in the table above are the longest span measured between centerline of bearings for a joist with three bearings. The ratio of the shorter span to the longer span must be greater than 40%. For two spans with a ratio between 40% and 80%, provide metal hangers or equivalent to withstand an uplift force at the end of the shorter span. Calculate uplift force at the end of the shorter span when the longer span (only) is loaded with live load.
7. Continuous lateral support must be provided for the top flange of the I-joist. Provide lateral support at bearings to prevent lateral displacement or rotation. For all other applications, consult International Beams.

Maximum Floor Spans

Table 4 - IB600, IB800 and IB900 Maximum Floor Spans

100 psf Live Load (3/2" bearings with bearing stiffeners)
 20 psf Dead Load
 Allowable Stress Design (ASD) 100% Load Duration (L/480 live load, L/240 total load deflection criteria)

I-Joist		3/32" OSB subfloor glued and nailed Spacing of IB joist (o.c.)							
Series	Depth	Simple span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB600	18"	22'-8"	19'-11"	18'-0"	14'-4"	22'-11"	17'-2"	14'-3"	11'-5"
	20"	24'-2"	20'-11"	18'-0"	14'-4"	23'-1"	17'-4"	14'-4"	11'-6"
IB800	18"	24'-11"	22'-7"	21'-2"	19'-0"	27'-2"	21'-2"	17'-8"	14'-1"
	20"	26'-10"	24'-4"	22'-8"	20'-4"	28'-8"	21'-10"	18'-2"	14'-6"
IB900	18"	25'-8"	23'-5"	21'-12"	19'-0"	28'-1"	21'-5"	17'-10"	14'-2"
	20"	27'-11"	25'-4"	23'-10"	20'-7"	30'-5"	23'-1"	19'-2"	15'-4"
	22"	29'-11"	27'-2"	25'-7"	21'-8"	32'-7"	24'-10"	20'-8"	16'-7"
	24"	31'-11"	29'-0"	27'-2"	24'-1"	34'-4"	25'-10"	21'-5"	17'-2"

Table 5 - IB600, IB800 and IB900 Maximum Floor Spans

100 psf Live Load (3/2" bearings with bearing stiffeners)
 30 psf Dead Load
 Allowable Stress Design (ASD) 100% Load Duration (L/480 live load, L/240 total load deflection criteria)

I-Joist		3/32" OSB subfloor glued and nailed Spacing of IB joist (o.c.)							
Series	Depth	Simple span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB600	18"	22'-1"	19'-2"	16'-8"	13'-3"	21'-1"	15'-9"	13'-2"	10'-6"
	20"	23'-2"	19'-11"	16'-8"	13'-3"	21'-2"	15'-12"	13'-3"	10'-7"
IB800	18"	24'-11"	22'-7"	20'-8"	17'-5"	26'-1"	19'-7"	16'-4"	13'-0"
	20"	26'-10"	23'-11"	21'-10"	18'-12"	26'-10"	20'-1"	16'-8"	13'-4"
IB900	18"	25'-8"	23'-5"	21'-10"	17'-5"	26'-4"	19'-8"	16'-5"	13'-1"
	20"	27'-11"	25'-4"	23'-10"	19'-1"	28'-4"	21'-2"	17'-8"	14'-1"
	22"	29'-11"	27'-2"	24'-12"	19'-12"	30'-5"	22'-11"	19'-1"	15'-2"
	24"	31'-11"	28'-12"	26'-11"	22'-2"	31'-8"	23'-10"	19'-10"	15'-11"

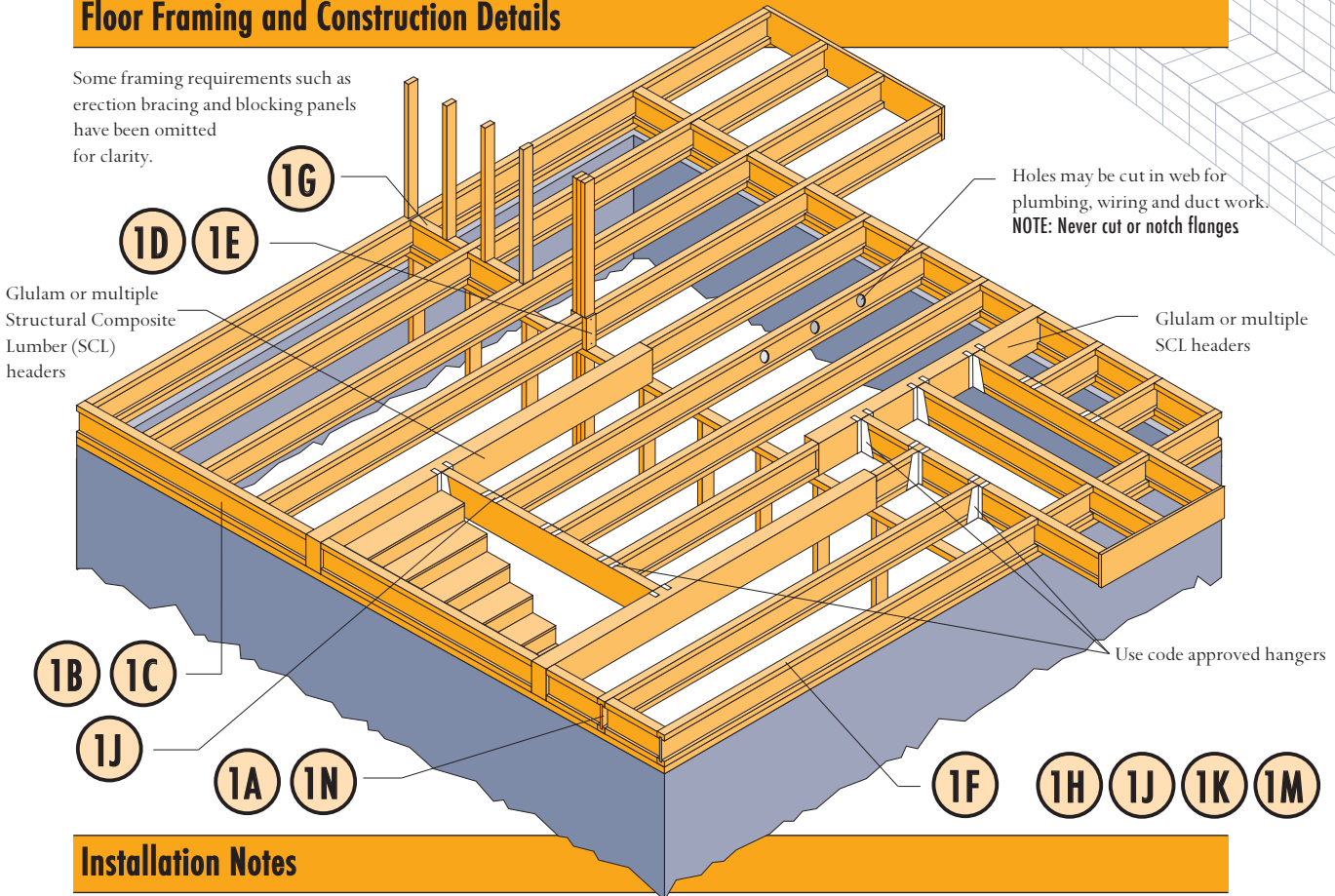
Notes:

1. Allowable spans are applicable to floor construction. The live load and dead load deflection limits are indicated at the top of the span table.
2. Spans are based on partial composite action with glued and nailed subfloor meeting requirements for APA Span-Rated STURD-I-FLOOR conforming to PRP-108, PS 1, PS 2, CSA 0325, or CSA 0437. Construction adhesive shall meet the requirements given in ASTM D3498 or APA Specification AFG-01.
3. Minimum bearing length shall be 3 1/2" for end bearing and 3 3/4" for interior bearings. Allowable design spans in the table are measured from centerline of supports.
4. Bearing stiffeners are required when I-joists are used with the spans given in this table.
5. This span table is based on uniform loads. For applications with other than uniformly distributed loads, or other applications beyond the scope of the indicated design criteria, an engineering analysis may be required based on the use of the design properties accepted in the ICC-ES ESR 1290 evaluation report. Design properties are also indicated in table 1 at the front of the design manual. For technical support, contact International Beams (IB) or your local IB distributor.
6. Continuous spans given in the table above are the longest span measured between centerline of bearings for a joist with three bearings. The ratio of the shorter span to the longer span must be greater than 40%. For two spans with a ratio between 40% and 80%, provide metal hangers or equivalent to withstand an uplift force at the end of the shorter span. Calculate uplift force at the end of the shorter span when the longer span (only) is loaded with live load.
7. Continuous lateral support must be provided for the top flange of the I-joist. Provide lateral support at bearings to prevent lateral displacement or rotation. For all other applications, consult International Beams.

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

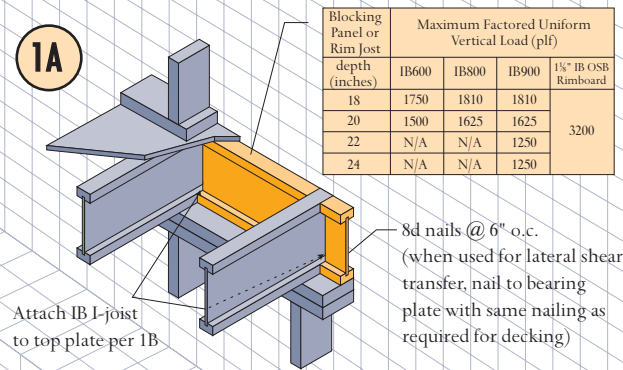
- Before laying out floor system components, verify that IB I-joist flange widths match hanger widths. If not, contact your supplier.
- Except for cutting to length, never cut, drill, or notch IB I-joist flanges.
- Install IB I-joists so that top and bottom flanges are within $\frac{1}{2}$ inch of true 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: $1\frac{3}{4}$ 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

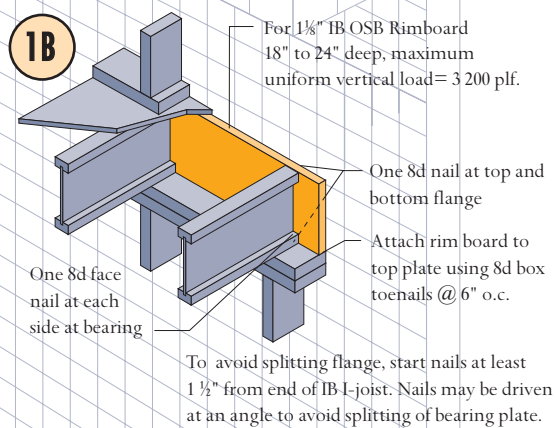
Floor Framing and Construction Details

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

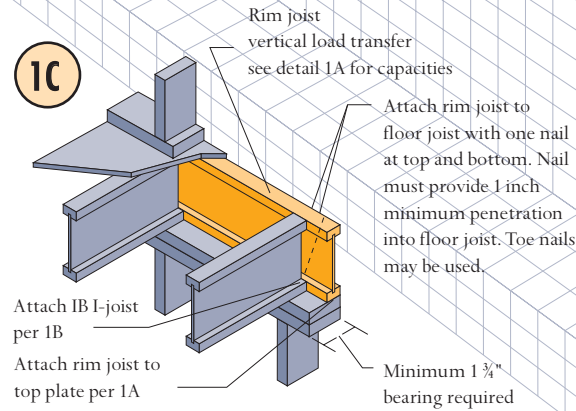
1A



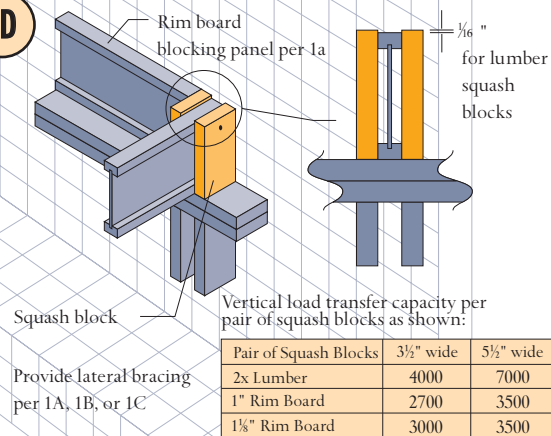
1B



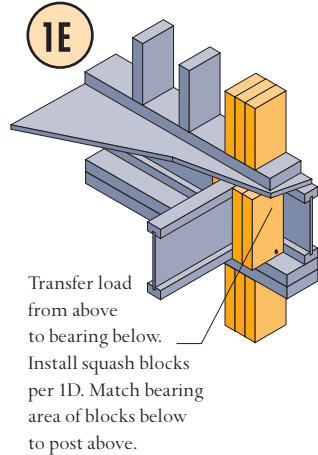
1C



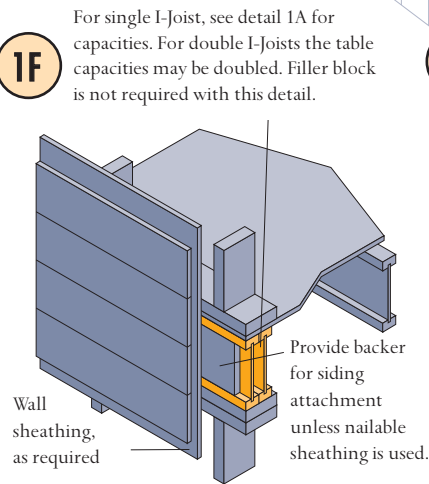
1D



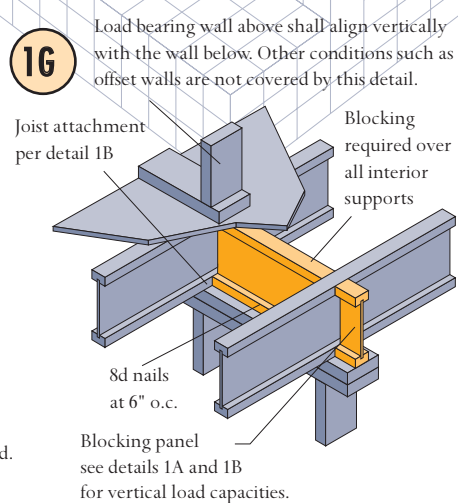
1E



1F



1G



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

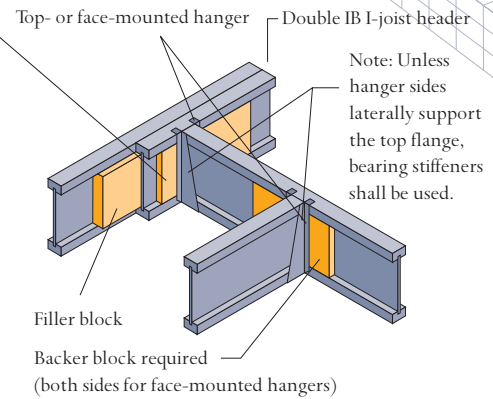
1H Backer block (use if hanger load exceeds 250 lbs.) Before installing a backer block to a double I-joist, drive 3 additional 10d nails through the webs and filler block where the backer block will fit. Clinch. Install backer tight to top flange. Use twelve 10d nails, clinched when possible. Maximum capacity for hanger for this detail = 1280 lbs.

Backer blocks (Blocks must be long enough to permit required nailing without splitting)

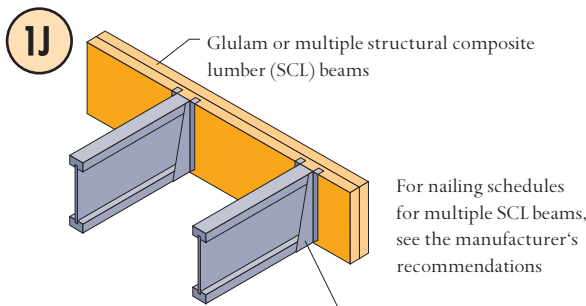
Flange Width	Material Thickness Required*	Minimum Depth**
2 1/2"	1"	5 1/2"
3 1/2"	1 1/2"	7 1/4"

* Minimum grade for backer block material shall be 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".

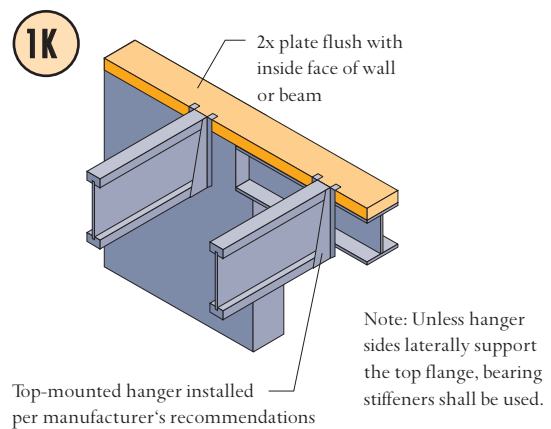


For hanger capacity see hanger manufacturer's recommendations. Verify double IB I-joist capacity to support concentrated loads.

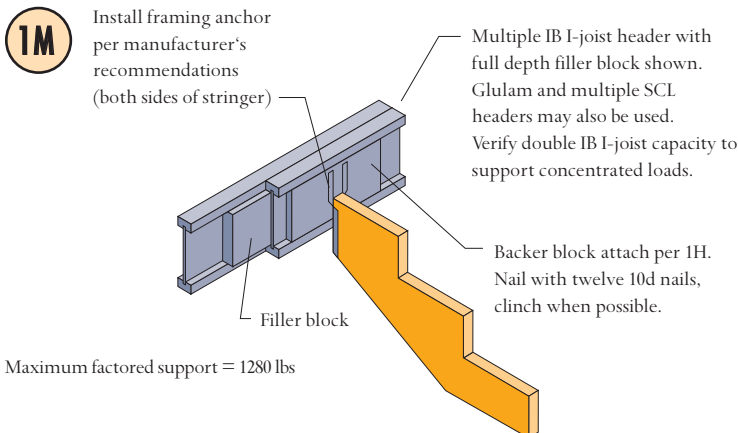


Top- or face-mounted hanger installed per manufacturer's recommendations

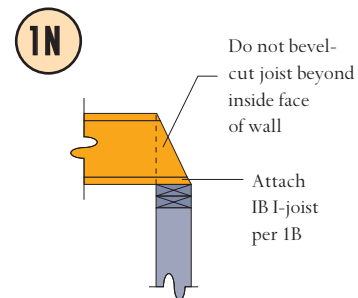
Note: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.



Top-mounted hanger installed per manufacturer's recommendations



Maximum factored support = 1280 lbs



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

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-joists 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.

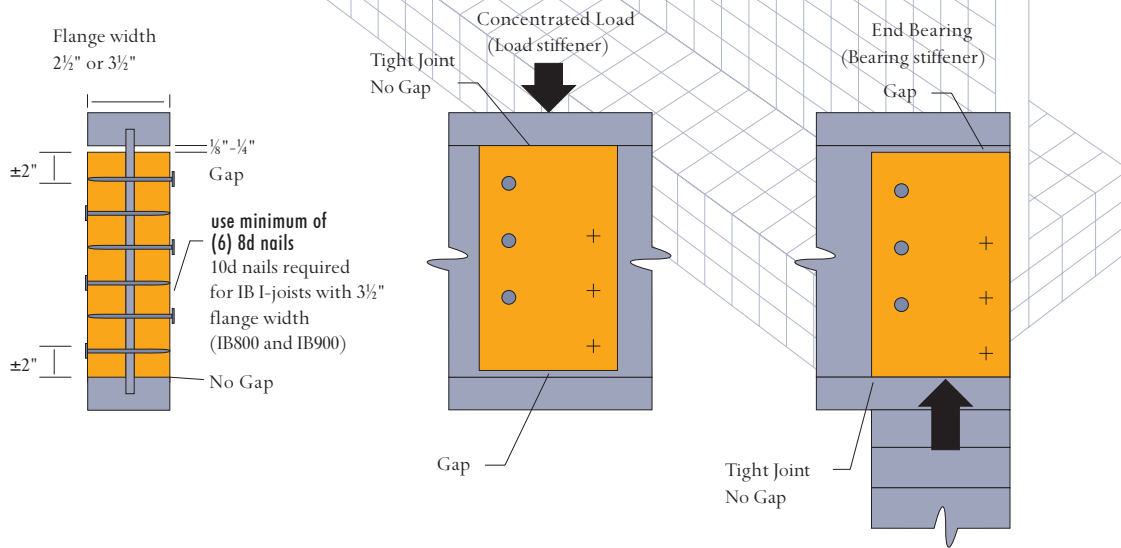
Load stiffeners are located between supports where significant point loads are applied to the top flange of an IB I-joist.

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 1/8 inch - 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 which exceed the “no stiffeners” factored reaction resistances indicated in table 1A on page 4. 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 load 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

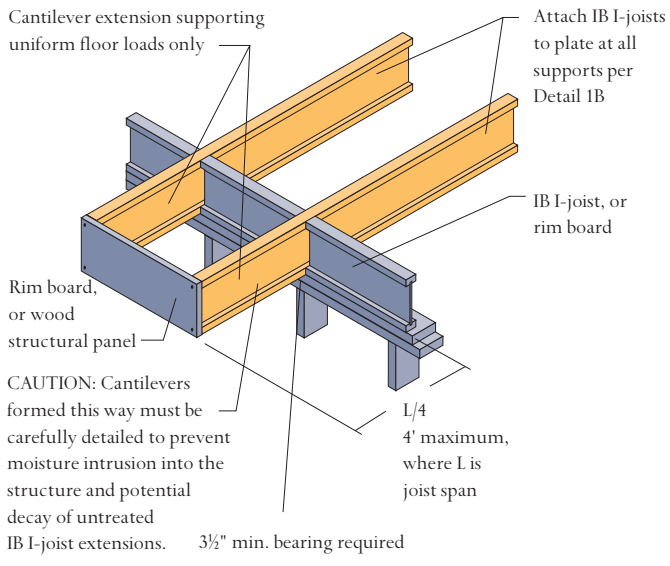


Web Stiffener Size Requirement

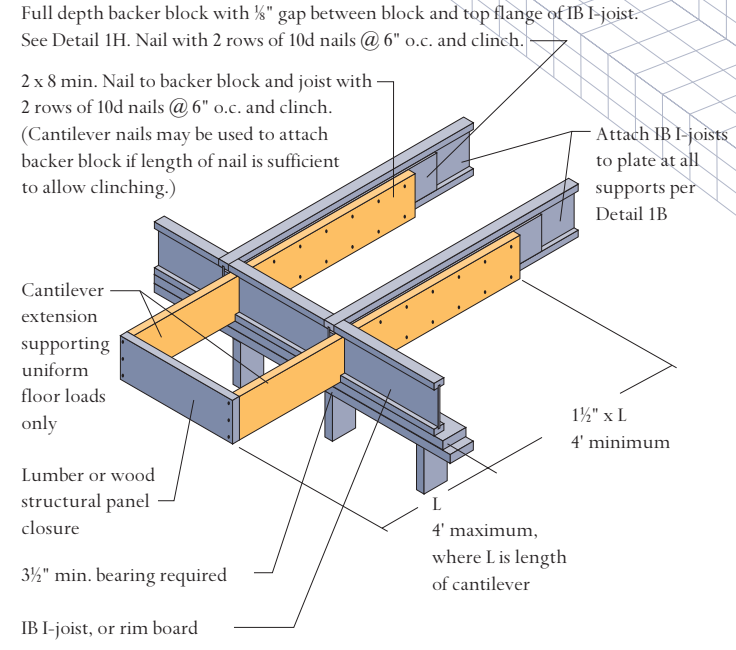
Designation	Web Stiffener Size Each Side of Web
IB 400/600	1" x 2 5/16" minimum width
IB 800/900	1 1/2" x 2 5/16" minimum width

Cantilever Framing Details

Cantilever Detail for Balconies



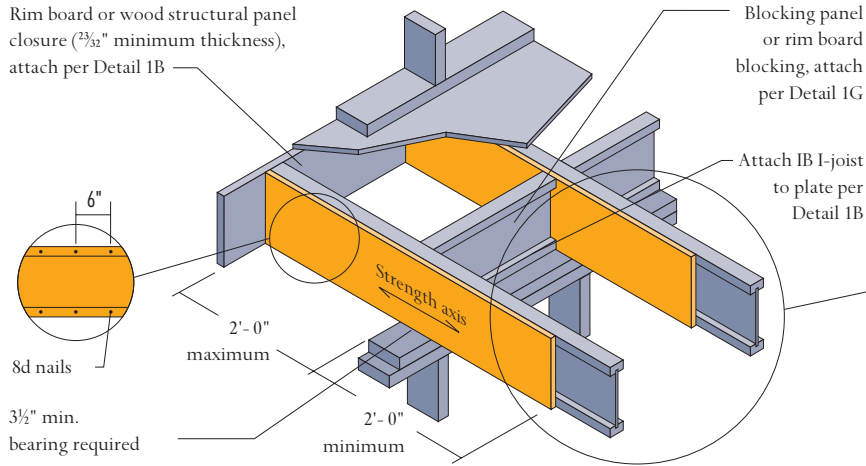
Lumber Cantilever Detail for Balconies



Cantilever Detail for Vertical Building Offset

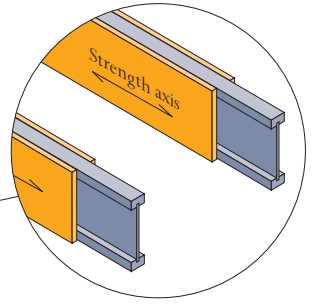
See cantilever reinforcement chart for appropriate reinforcement method.

Method 1 Sheathing Reinforcement One Side



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

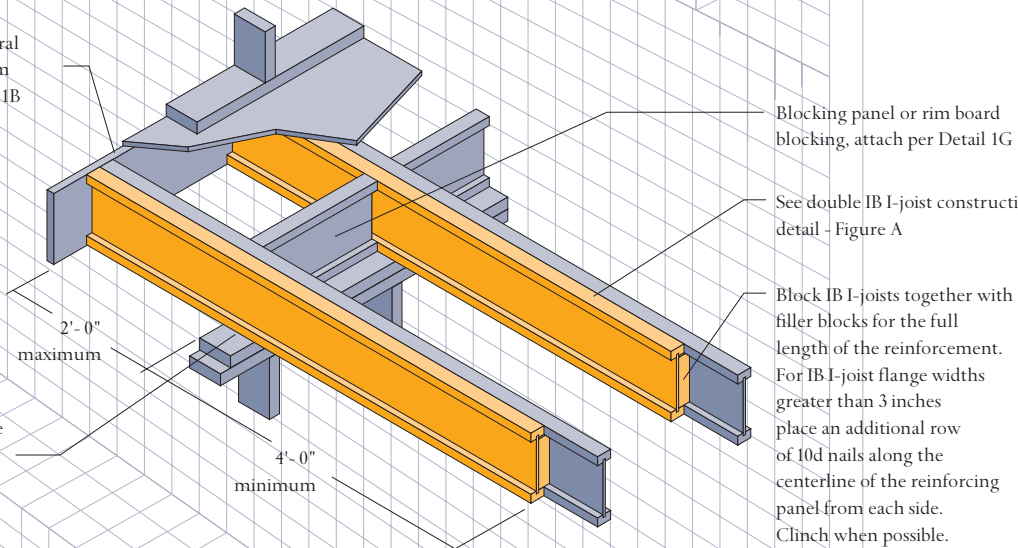
Cantilever Detail for Vertical Building Offset

See cantilever reinforcement chart for appropriate reinforcement method.

Alternate Method 2 Double IB I-joist

Rim board, or wood structural panel closure ($\frac{7}{8}$ " minimum thickness), attach per Detail 1B

Attach IB I-joists to top plate at all supports per Detail 1B
3½" min. bearing required



Blocking panel or rim board blocking, attach per Detail 1G

See double IB I-joist construction detail - Figure A

Block IB I-joists together with filler blocks for the full length of the reinforcement. For IB I-joist flange widths greater than 3 inches place an additional row of 10d nails along the centerline of the reinforcing panel from each side. Clinch when possible.

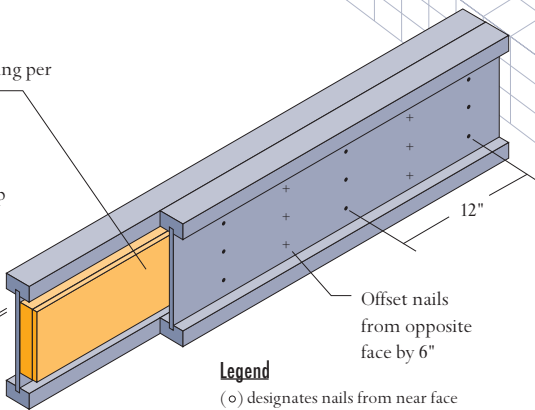
Double Joist Construction

Filler Block Requirements

Figure A

Filler blocking per Table A

1/8" gap between top flange and filler block



Legend

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

Table A

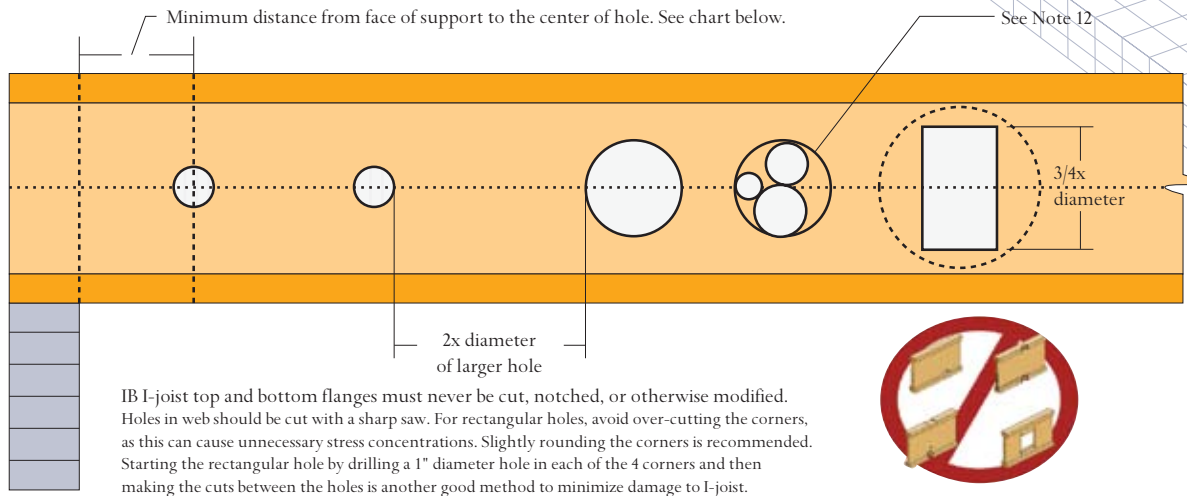
Flange Width	Joist Series	Joist Depth	Filler Depth	Filler Thickness
2½"	IB600	18"	14"	2½"
		20"	16"	
3½"	IB 800	18"	14"	3½"
		20"	16"	
	IB 900	18"	14"	3½"
		20"	16"	
		22"	18"	
		24"	20"	

Notes:

- Support back of IB I-joist web during nailing to prevent damage to web/flange connection.
- Leave a 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.
- 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.

Web Hole Guidelines

Typical Holes



Allowable Webhole Sizes and Locations

40 psf live load and 30 psf dead load (3 1/2" bearings with bearing stiffeners, see Table 2 for maximum spans)

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	4	6	8	10	12	14	14 1/4	16	16 1/4	18	18 1/4	20	20 1/4
18"	IB 600	19'-1"	0'-7"	1'-0"	2'-11"	5'-0"	7'-2"	9'-9"	13'-7"	15'-1"						
	IB 800	23'-8"	0'-7"	2'-3"	4'-2"	6'-5"	8'-11"	12'-1"	16'-6"	18'-3"						
	IB 900	23'-11"	0'-7"	1'-7"	4'-2"	7'-1"	10'-4"	13'-11"	17'-10"	19'-9"						
20"	IB 600	19'-3"	0'-7"	0'-8"	0'-9"	1'-11"	4'-3"	6'-8"	9'-8"	11'-0"	13'-9"	15'-5"				
	IB 800	24'-5"	0'-8"	2'-4"	4'-3"	6'-5"	8'-8"	11'-1"	14'-8"	16'-2"	18'-10"	20'-5"				
	IB 900	25'-10"	0'-7"	1'-3"	3'-8"	6'-3"	8'-10"	12'-1"	15'-9"	17'-6"	20'-6"	22'-5"				
22"	IB 900	27'-10"	0'-7"	0'-11"	3'-4"	5'-9"	8'-3"	10'-10"	13'-9"	15'-2"	17'-11"	19'-8"	22'-7"	24'-6"		
	IB 900	29'-0"	0'-7"	0'-8"	2'-4"	4'-8"	7'-1"	9'-7"	12'-2"	13'-2"	15'-3"	16'-10"	19'-7"	21'-4"	24'-3"	26'-1"

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: $V_{(round\ hole)} = \text{Published Shear Value} \times ((\text{Joist Depth} - \text{Hole Diameter}) / \text{Joist Depth})$.
- SAF = Span adjustment factor, used as defined below

OPTIONAL:

This table is based on I-joists being used at 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:

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

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.

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

Fire and Sound Rated Assemblies

Discussion

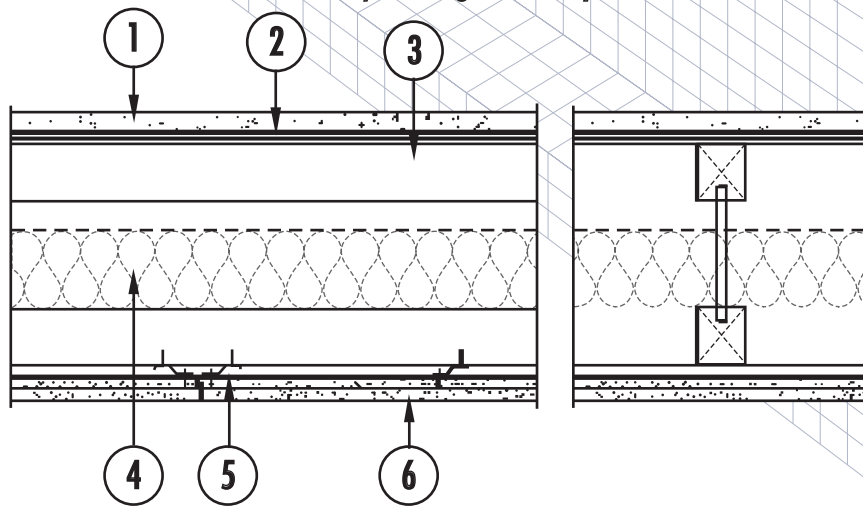
Fire rated assemblies are required for multi-family residential and commercial buildings under the International Building Code (IBC). A 1 or 2-hour fire-rated floor/ceiling separation assembly may be required for floors with wood I-joists depending on the type of building construction (chapter 6), occupancy classification (chapter 3), and building height and area (chapter 5). Most wood framed buildings fit building construction types III and V. IBC tables 503 and 601 are a good place to start for determining fire-rating requirements and restrictions for your particular building.

A minimum sound transmission class (STC) rating of 50 and a minimum impact insulation class (IIC) rating of 50 are both required for floor assemblies for multi-family and commercial buildings under the International Building Code (IBC). 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). The IB-ITS 1-hour fire-rated floor/ceiling assembly 60.02 example below most closely matches assembly item number 27-1.1 of the generic assemblies listed in IBC table 720.1(3). 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 ITS listing. Other fire and sound rated assemblies are available in IBC table 720.1(3).

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



Notes for ITS F/C Assembly 60.02:

Legend:

1. Gypsum underlayment (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)

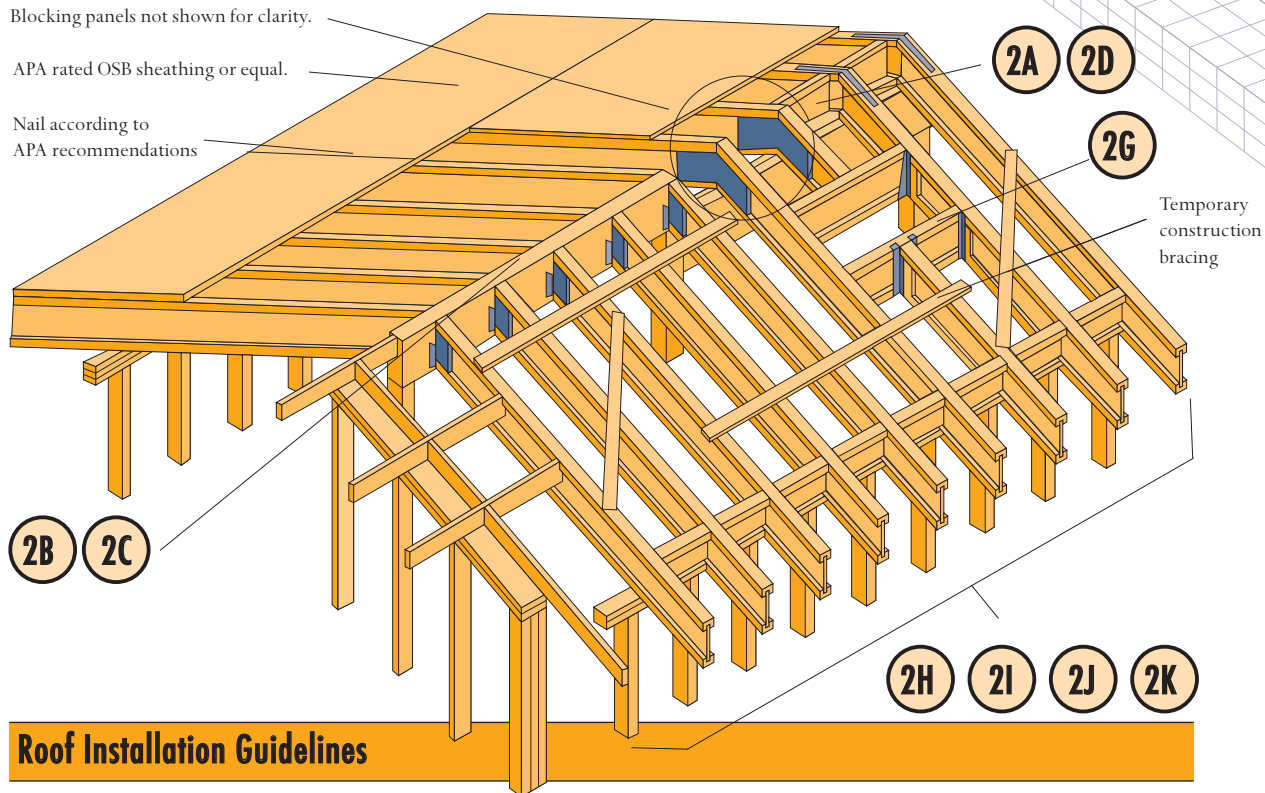
- a) Adding a second 3/8" sub-floor adds 2 points
- b) Adding 3/8" sub-floor plus 1/16" building paper..... adds 3 points
- c) Adding Vinyl floor covering adds 2 points
- d) Adding Hardwood floor covering adds 2 points
- e) Adding Carpet and Underlay adds 20 points

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 shownadds 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

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 in. For continuous framing and roof framing with cantilevers, the immediate support and end bearing adjacent to the cantilever both must be at least 3½ in. 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. 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.
10. Rim board, 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 in. o.c. per row using 8d common nails.
13. 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.
14. 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.
15. All roof details are valid up to 12:12 slope unless otherwise noted.

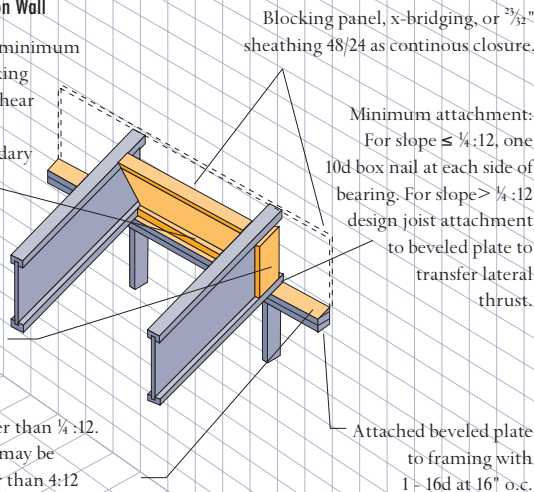
Roof Framing Details

Roof Framing and Construction Details - Residential Construction

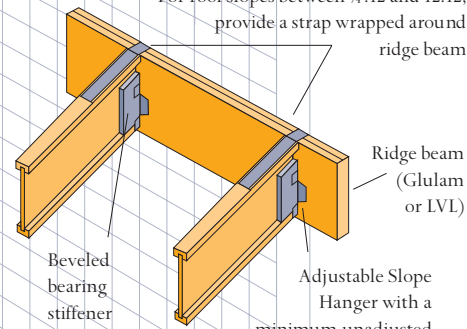
All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity

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 unstiffened end reaction capacities in table 1A on page 4 of this design manual.

Beveled plate for slopes greater than ¼:12. Code-recognized connectors may be substituted. For slopes greater than 4:12 connectors are required to resist lateral thrust.

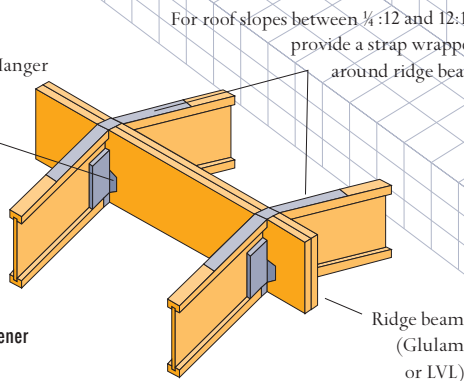


2B **Peak Construction**
 For roof slopes between ¼:12 and 12:12, provide a strap wrapped around ridge beam
 Ridge beam (Glulam or LVL)
 Adjustable Slope Hanger with a minimum unadjusted uplift capacity of 300 lb unfactored resistance.
 Beveled bearing stiffener required each side.



2C **IB I-joist to Ridge Beam Connection**
 Adjustable Slope Hanger with a minimum unadjusted uplift capacity of 300 lb.

Beveled bearing stiffener required each side



2D **IB I-joist Connection with Wood Structural Panel Gussets**

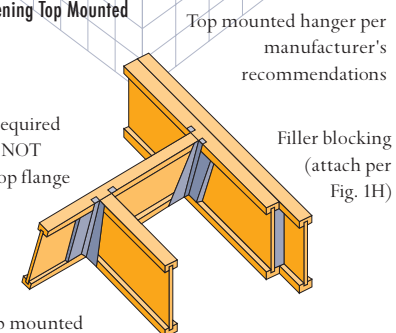
For roof slopes between ¼:12 and 12:12, provide a strap wrapped around ridge beam
 2 1/2" x 2' 0" wood structural panel (front and back sides) with 12-8d nails into each joist with nails clinched. When roof live load exceeds 40 psf, horizontal orientation of gusset strong axis is required. Gap 1/8" at top.
 Blocking panel or x-bridging. Attach per Fig. 2A
 Attach per Fig. 2A
 Attach beveled plate to framing with 1-16d at 16" o.c.
 Support beam or wall

2F **Roof Opening Top Mounted Hangers**

Bearing stiffeners required when hanger does NOT support IB I-joist top plate

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-joist is required. Nail with 10-10d nails for flanges up to 1 1/4" wide. Use 12-10d nails for flanges wider than 1 1/4"



2E **Rafter Connection with Overlapping IB I-joists**

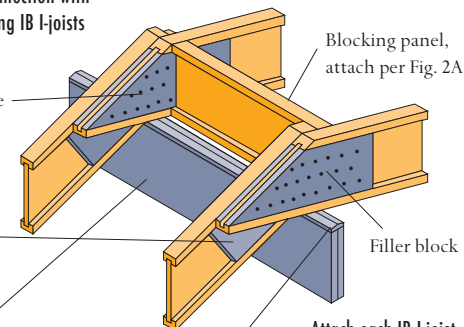
8-8d nails each side

Filler block 8 8d nails 4 each side

Support beam or wall

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

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



Note: Additional connection may be required for wind uplift.

Roof Framing Details

Roof Framing and Construction Details - Residential Construction

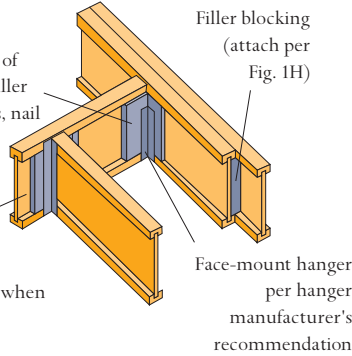
All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity.

2G Roof Opening, Face-Mounted Hangers

Backer block on both sides of web (or backer block and filler block, if multiple IB I-joists, nail with 12-10d 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.

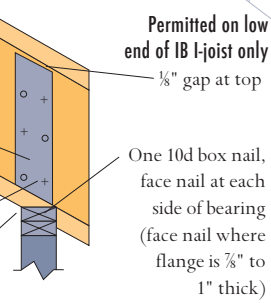


2H Birdsmouth Cut & Bevel Cut Bearing Stiffener

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

6-8d nails (three each side) clinched when possible. 10d nails required for IB I-joists with 3 1/2" flange width (IB800 and IB900)

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



Legend

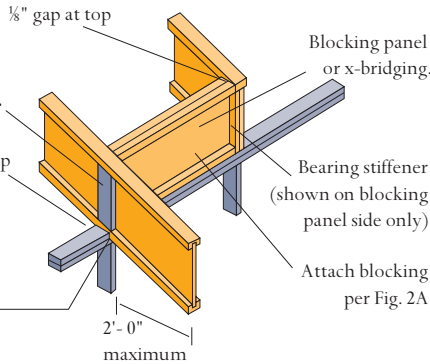
(o) designates nails from near face
(+) designates nails from far face

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

Bearing stiffener required each side.

Attach joist to top plate per Fig. 2H

Birdsmouth cut at bearing



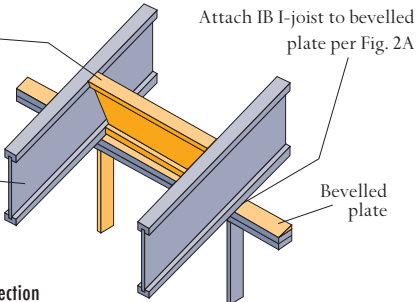
Note: Additional connection may be required for wind uplift. Outside corner of blocking panel may be trimmed if it interferes with roof sheathing. In such cases, position blocking panel on top plate to minimize trimming and still allow required nailing into top plate.

2J Blocking Panel at Beveled Plate

Blocking Panel attach per Fig. 2A

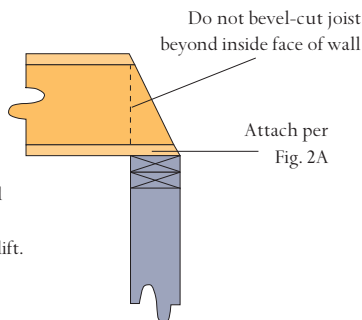
Overhang

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

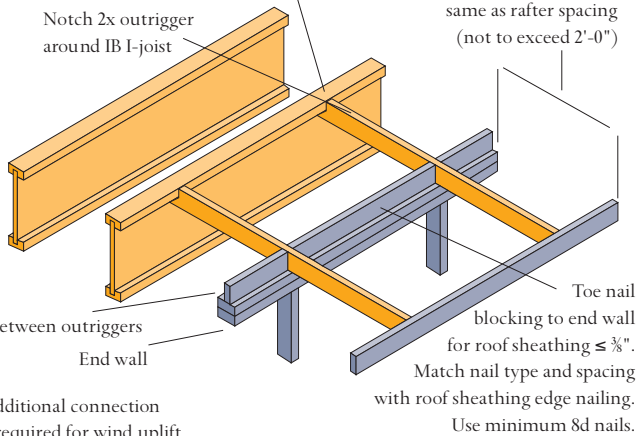
Notch 2x outrigger around IB I-joist

Block between outriggers
End wall

Note: Additional connection may be required for wind uplift.

Do not notch IB I-joist flange

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



Maximum Commercial Roof Spans

Table 6 - Maximum Roof Spans

Snow Load Duration 115 %

Live load/Dead load (psf)			20/15			25/15			30/15			40/15			
Roof slope (min.)			1/4:12	>4:12	>8:12	1/4:12	>4:12	>8:12	1/4:12	>4:12	>8:12	1/4:12	>4:12	>8:12	
Roof slope (max.)			4:12	8:12	12:12	4:12	8:12	12:12	4:12	8:12	12:12	4:12	8:12	12:12	
IB Series	Depth	Spacing													
IB600	18"	16"	39'-0"	36'-8"	33'-10"	36'-6"	35'-2"	32'-7"	34'-6"	33'-8"	31'-6"	31'-3"	30'-8"	29'-7"	
		19.2"	35'-7"	34'-6"	31'-10"	33'-4"	32'-6"	30'-8"	31'-6"	30'-9"	29'-7"	28'-6"	28'-0"	27'-3"	
		24"	31'-10"	30'-11"	29'-6"	29'-10"	29'-1"	28'-0"	28'-2"	27'-6"	26'-8"	25'-6"	25'-0"	24'-4"	
	20"	16"	41'-0"	39'-6"	36'-6"	38'-5"	37'-5"	35'-1"	36'-3"	35'-5"	33'-11"	32'-10"	32'-3"	31'-5"	
		19.2"	37'-5"	36'-4"	34'-3"	35'-1"	34'-2"	33'-0"	33'-1"	32'-4"	31'-4"	30'-0"	29'-5"	28'-8"	
		24"	33'-6"	32'-6"	31'-3"	31'-5"	30'-7"	29'-6"	29'-7"	28'-11"	28'-0"	26'-10"	26'-4"	25'-7"	
IB800	18"	16"	43'-5"	40'-10"	37'-8"	41'-6"	39'-1"	36'-3"	39'-11"	37'-8"	35'-0"	37'-1"	35'-4"	32'-11"	
		19.2"	40'-9"	38'-4"	35'-5"	39'-0"	36'-9"	34'-1"	37'-5"	35'-5"	32'-11"	33'-10"	33'-2"	30'-11"	
		24"	37'-9"	35'-6"	32'-10"	35'-5"	34'-1"	31'-7"	33'-5"	32'-8"	30'-6"	30'-2"	29'-9"	28'-8"	
	20"	16"	46'-9"	43'-11"	40'-7"	44'-8"	42'-1"	39'-0"	42'-11"	40'-7"	37'-8"	39'-1"	38'-0"	35'-5"	
		19.2"	43'-11"	41'-3"	38'-1"	41'-9"	39'-7"	36'-8"	39'-5"	38'-1"	35'-5"	35'-9"	35'-0"	33'-4"	
		24"	39'-11"	38'-3"	35'-4"	37'-4"	36'-5"	34'-0"	35'-3"	34'-5"	32'-10"	31'-5"	31'-4"	30'-6"	
IB900	18"	16"	46'-9"	42'-0"	38'-9"	42'-9"	40'-3"	37'-4"	41'-1"	38'-9"	36'-0"	38'-5"	36'-4"	33'-11"	
		19.2"	43'-11"	39'-5"	36'-5"	40'-2"	37'-10"	35'-1"	38'-7"	36'-5"	33'-10"	36'-1"	34'-2"	31'-10"	
		24"	45'-9"	36'-7"	33'-9"	37'-2"	35'-1"	32'-6"	35'-9"	33'-9"	31'-4"	31'-10"	31'-8"	29'-6"	
	20"	16"	48'-4"	45'-5"	42'-0"	46'-3"	43'-7"	40'-4"	44'-6"	42'-0"	39'-0"	41'-7"	39'-4"	36'-8"	
		19.2"	45'-6"	42'-9"	39'-5"	43'-6"	40'-11"	37'-11"	41'-9"	39'-5"	36'-8"	39'-1"	37'-0"	34'-6"	
		24"	42'-1"	39'-7"	36'-7"	40'-3"	37'-11"	35'-2"	38'-8"	36'-7"	34'-0"	33'-8"	34'-3"	31'-11"	
	22"	16"	52'-0"	48'-10"	45'-1"	49'-8"	46'-10"	43'-4"	47'-9"	45'-1"	41'-11"	44'-8"	42'-3"	39'-5"	
		19.2"	48'-10"	45'-11"	42'-5"	46'-8"	44'-0"	40'-9"	44'-11"	42'-5"	39'-4"	39'-11"	39'-9"	37'-1"	
		24"	45'-3"	42'-6"	39'-3"	43'-3"	40'-9"	37'-9"	38'-11"	39'-3"	36'-6"	31'-11"	35'-0"	34'-4"	
		24"	16"	55'-5"	52'-1"	48'-1"	53'-1"	49'-11"	46'-3"	51'-0"	48'-2"	44'-8"	47'-8"	45'-1"	42'-1"
			19.2"	52'-1"	49'-0"	45'-3"	49'-10"	46'-11"	43'-6"	47'-11"	45'-3"	42'-0"	39'-11"	42'-5"	39'-6"
			24"	48'-4"	45'-5"	41'-11"	43'-8"	43'-6"	40'-4"	38'-11"	41'-11"	38'-11"	31'-11"	35'-0"	36'-8"

Notes:

1. Allowable clear span applicable to simple-span roof construction with design snow and dead load as specified. The maximum span is based on the horizontal distance between centerline of supports. (Exception: 1 3/4" from outside face of bearings at cantilevers, when bearing at cantilever exceeds 3 1/2").
2. Deflection is limited to the following criteria: live load at L/240, total load at L/180, where L is the span in inches.
3. Additional considerations: NO composite action with the sheathing; both flanges assumed to be continuously laterally braced; provide lateral support at bearings to prevent lateral displacement or rotation; tie-down for uplift conditions must be provided for by the building designer.
4. Spans include a cantilever of up to 24" at one end of the IB I-joist.
5. Minimum bearing length shall be 1 1/4" for end bearing and 3 1/2" for bearing adjacent to cantilever.
6. Bearing stiffeners are not required when I-joists are used with the spans given in this table, except as required by hanger manufactures.
7. This span table is based on uniform loads and on Allowable Stress Design (ASD) per NDS-2005 edition. For applications with other than uniformly distributed loads, or other applications beyond the scope of the indicated design criteria, an engineering analysis may be required based on the use of the design properties accepted in the ICC-ES ESR 1290 evaluation report. Design properties are also indicated in table 1 at the front of the design manual. For technical support, contact International Beams (IB) or your local IB distributor.

Maximum Commercial Roof Spans

Table 7 - Maximum Roof Spans

			Snow Load Duration 115%						Construction Load Duration 125%					
Live load/Dead load (psf)			50/15			20/10			20/15			25/15		
Roof slope (min.)			1/4:12	>4:12	>8:12	1/4:12	>4:12	>8:12	1/4:12	>4:12	>8:12	1/4:12	>4:12	>8:12
Roof slope (max.)			4:12	8:12	12:12	4:12	8:12	12:12	4:12	8:12	12:12	4:12	8:12	12:12
IB Series	Depth	Spacing												
IB600	18"	16"	28'-9"	28'-4"	27'-8"	41'-3"	38'-11"	36'-1"	39'-0"	36'-8"	33'-10"	35'-9"	33'-5"	30'-8"
		19.2"	26'-3"	25'-10"	25'-3"	38'-9"	36'-7"	33'-11"	36'-8"	34'-6"	31'-10"	32'-8"	31'-5"	28'-10"
		24"	23'-6"	23'-1"	22'-7"	35'-11"	33'-10"	31'-6"	33'-2"	31'-11"	29'-6"	29'-2"	28'-1"	26'-8"
	20"	16"	30'-3"	29'-9"	29'-1"	44'-4"	41'-10"	38'-10"	42'-0"	39'-6"	36'-6"	37'-7"	36'-0"	33'-0"
		19.2"	27'-8"	27'-2"	26'-7"	41'-8"	39'-4"	36'-6"	39'-1"	37'-1"	34'-3"	34'-4"	33'-0"	31'-0"
		24"	24'-7"	24'-4"	23'-9"	37'-10"	36'-6"	33'-11"	34'-11"	33'-11"	31'-9"	30'-8"	29'-6"	28'-1"
IB800	18"	16"	34'-2"	33'-5"	31'-3"	45'-10"	43'-3"	40'-2"	43'-5"	40'-10"	37'-8"	39'-9"	37'-2"	34'-1"
		19.2"	31'-2"	30'-8"	29'-5"	43'-1"	40'-8"	37'-9"	40'-9"	38'-4"	35'-5"	37'-4"	34'-11"	32'-0"
		24"	25'-0"	27'-5"	26'-10"	39'-11"	37'-8"	35'-0"	37'-9"	35'-6"	32'-10"	34'-7"	32'-4"	29'-8"
	20"	16"	36'-0"	35'-5"	33'-8"	49'-4"	46'-7"	43'-3"	46'-9"	43'-11"	40'-7"	42'-9"	40'-0"	36'-8"
		19.2"	32'-11"	32'-4"	31'-7"	46'-4"	43'-9"	40'-8"	43'-11"	41'-3"	38'-1"	40'-2"	37'-7"	34'-6"
		24"	26'-1"	28'-11"	28'-3"	42'-11"	40'-7"	37'-8"	40'-8"	38'-3"	35'-4"	36'-7"	34'-9"	31'-11"
IB900	18"	16"	36'-1"	34'-5"	32'-2"	47'-2"	44'-6"	41'-4"	44'-8"	42'-0"	38'-9"	40'-11"	38'-3"	35'-1"
		19.2"	33'-9"	32'-4"	30'-3"	44'-4"	41'-10"	38'-10"	42'-0"	39'-5"	36'-5"	38'-5"	35'-11"	33'-0"
		24"	27'-0"	29'-9"	28'-0"	41'-1"	38'-9"	36'-0"	38'-11"	36'-7"	33'-9"	35'-7"	33'-3"	30'-7"
	20"	16"	39'-1"	37'-3"	34'-10"	51'-1"	48'-2"	44'-9"	48'-4"	45'-5"	42'-0"	44'-4"	41'-5"	38'-0"
		19.2"	35'-8"	35'-0"	32'-9"	48'-0"	45'-3"	42'-1"	45'-6"	42'-9"	39'-5"	41'-7"	38'-11"	35'-8"
		24"	28'-7"	31'-6"	30'-4"	44'-6"	42'-0"	39'-0"	42'-1"	39'-7"	36'-7"	38'-7"	36'-0"	33'-1"
	22"	16"	40'-7"	40'-1"	37'-5"	54'-10"	51'-9"	48'-0"	52'-0"	48'-10"	45'-1"	47'-7"	44'-6"	40'-9"
		19.2"	33'-10"	37'-4"	35'-2"	51'-7"	48'-8"	45'-2"	48'-10"	45'-11"	42'-5"	44'-9"	41'-9"	38'-4"
		24"	27'-1"	29'-10"	32'-7"	47'-9"	45'-1"	41'-11"	45'-3"	42'-6"	39'-3"	41'-5"	38'-9"	35'-6"
	24"	16"	40'-7"	42'-9"	39'-11"	58'-6"	55'-3"	51'-3"	55'-5"	52'-1"	48'-1"	50'-9"	47'-5"	43'-6"
		19.2"	33'-10"	37'-4"	37'-7"	55'-0"	51'-11"	48'-2"	52'-1"	49'-0"	45'-3"	47'-9"	44'-7"	40'-11"
		24"	27'-1"	29'-10"	33'-7"	51'-0"	48'-2"	44'-8"	48'-4"	45'-5"	41'-11"	41'-9"	41'-4"	37'-11"

Notes:

1. Allowable clear span applicable to simple-span roof construction with design snow and dead load as specified. The maximum span is based on the horizontal distance between centerline of supports. (Exception: 1 3/4" from outside face of bearings at cantilevers, when bearing at cantilever exceeds 3 1/2").
2. Deflection is limited to the following criteria: live load at L/240, total load at L/180, where L is the span in inches.
3. Additional considerations: NO composite action with the sheathing; both flanges assumed to be continuously laterally braced; provide lateral support at bearings to prevent lateral displacement or rotation; tie-down for uplift conditions must be provided for by the building designer.
4. Spans include a cantilever of up to 24" at one end of the IB I-joist.
5. Minimum bearing length shall be 1 3/4" for end bearing and 3 1/2" for bearing adjacent to cantilever.
6. Bearing stiffeners are not required when I-joists are used with the spans given in this table, except as required by hanger manufactures.
7. This span table is based on uniform loads and on Allowable Stress Design (ASD) per NDS-2005 edition. For applications with other than uniformly distributed loads, or other applications beyond the scope of the indicated design criteria, an engineering analysis may be required based on the use of the design properties accepted in the ICC-ES ESR 1290 evaluation report. Design properties are also indicated in table 1 at the front of the design manual. For technical support, contact International Beams (IB) or your local IB distributor.

The Green Building Solution



IB products are among the most environmentally friendly building products available. The components used in our manufacturing process are harvested from certified sustainable forests. Our manufacturing facility is FSC registered.

The following is a list of potential points attainable by using IB products under each of the three major green standards. Our products can also contribute to other point categories that are project or site specific. If you have questions relating to green points please contact us at sales@internationalbeams.com or 866 457-4043.

National Green Building Standard ICC 700-2008

Practice	Criteria	Description	IB Points
601.2	Material usage	Building code compliant structural systems or advanced framing techniques.	3
601.4	Material usage	Detailed framing plans/cut list	2
601.5	Material usage	Pre-cut components	4
606.1	Bio-based Products are used		6
606.2	A minimum of two certified wood based products are used in a major element of the building.	FSC certified products	4
606.3	Manufacturing energy	From renewable resources	2
607.1	Resource Efficient Materials	Engineered wood	3
608.1	Indigenous materials (500 mi)	Available only in certain regions	2
609.1	Life cycle analysis	3 pts per product, 15 pts for building	3
901.4	Indoor environmental quality	Contains no urea formaldehyde	4
	IB Points Under Program		33

LEED 2009 New Construction and Major Renovations

	Criteria	Description	IB Points
MR 5	Regional Materials	Available only in certain regions	1
MR 7	Renewable materials	FSC certified product	1
IEQ 4.4	Indoor environmental quality	low emitting materials	1
	IB Points Under Program		3

GREEN GLOBES - DESIGN FOR NEW BUILDINGS AND RETROFITS 2004

	Criteria	Description	IB Points
10.1.1.1	Low impact systems and materials	Life cycle analysis	10
10.3.2.1	Minimal consumption of resources	FSC certified	6
12.2.1	Control of indoor pollutants	Low VOC emitting (formaldehyde)	3
10.1.2.1	Assemblies	Bio-based products	2
10.1.4.1	Transportation (500 miles)	Certain regions	1
6.2.2.1	Building materials	Wood protected at job site and in transit	1
10.6.1.1	Conservation through design	Efficient use of materials	1
	IB Points Under Program		24



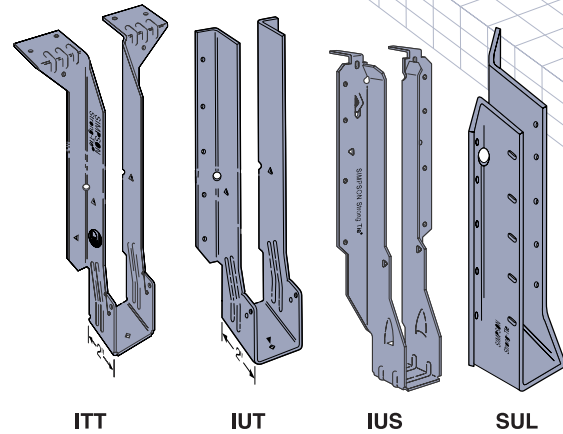
Wood is the world's most renewable, sustainable, and environmentally friendly building product available.

Framing Connectors

Single International Beams Joists - U.S. ASD⁽⁵⁾

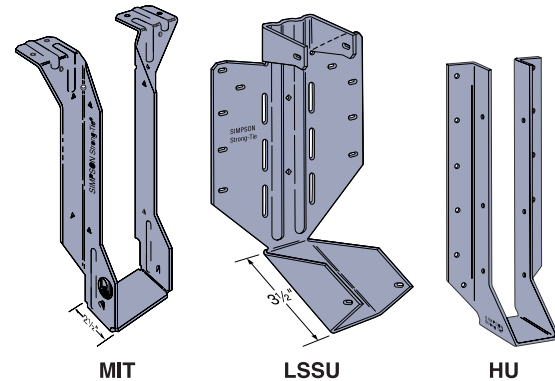
Top Mount

Joist Height (inches)	Model	B Dim. (inches)	TF Dim. (inches)	Fastener Type		Uplift - DF (C _D =1.6)	Downward Load ⁽³⁾⁽⁴⁾ (C _D =1.0)	
				Header	Joist		DF LVL	SPF I-Joist ⁽¹⁾
Joist Width = 2 1/2"							IB600	
18	MIT318	2 1/2	2 3/16	(8) 16d	(2) 10dx1 1/2	215	(1950)	886
20	MIT320	2 1/2	2 3/16	(8) 16d	(2) 10dx1 1/2	215	(2057)	886
Joist Width = 3 1/2"							IB800 IB900	
18	MIT418	2 1/2	2 3/16	(8) 16d	(2) 10dx1 1/2	215	(2283)	(2335) 886
20	MIT420	2 1/2	2 3/16	(8) 16d	(2) 10dx1 1/2	215	(2335)	(2335) 886
Joist Width = 3 1/2"							IB900	
22	HIT422	3	2 3/8	(10) 16d	(2) 10dx1 1/2	315	(2550)	---
24	HIT424	3	2 3/8	(10) 16d	(2) 10dx1 1/2	315	(2550)	---



Face Mount

Joist Height (inches)	Model	B Dim. (inches)	TF Dim. (inches)	Fastener Type		Uplift - DF (C _D =1.6)	Downward Load ⁽³⁾⁽⁴⁾ (C _D =1.0)	
				Header	Joist		DF LVL	SPF I-Joist ⁽¹⁾
Joist Width = 2 1/2"							IB600	
18	MIU2.56/18	2 1/2	---	(26) 16d	(2) 10dx1 1/2	230	(1950)	---
20	MIU2.56/20	2 1/2	---	(28) 16d	(2) 10dx1 1/2	230	(2057)	---
Joist Width = 3 1/2"							IB800 IB900	
18	MIU3.56/18	2 1/2	---	(26) 16d	(2) 10dx1 1/2	230	(2283)	(2373) ---
20	MIU3.56/20	2 1/2	---	(28) 16d	(2) 10dx1 1/2	230	(2520)	(2560) ---
Joist Width = 3 1/2"							IB900	
22	MIU3.56/20	2 1/2	---	(26) 16d	(2) 10dx1 1/2	230	(2691)	---
24	MIU3.56/20	2 1/2	---	(28) 16d	(2) 10dx1 1/2	230	(2914)	---



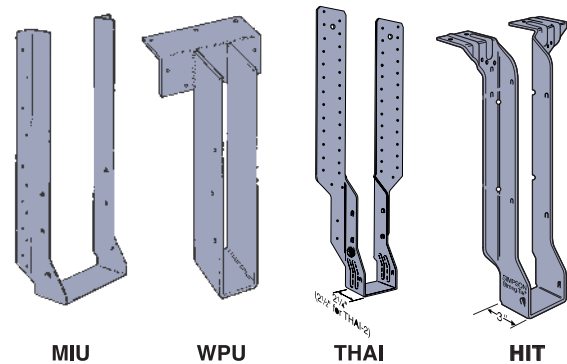
Notes:

- When I-joist is used as a header, all header nails must be 10dx1 1/2", and flange shall be minimum 1 1/2" thick.
- Web stiffeners are always required for MIU3.56/20 for 22" and 24" deep IB900 I-joists.
- Web stiffeners are required when calculated factored downward reaction exceeds the following:

Depth (inches)	IB600		IB800		IB900	
	MIT & MIU	MIT & MIU	MIT	HIT	MIU	MIU
18	1500	1500	1555	---	1555	---
20	1550	1550	1604	---	1604	---
22	---	---	---	1616	footnote ⁽²⁾	---
24	---	---	---	1616	footnote ⁽²⁾	---

4. Numbers in brackets thus (1950) indicate maximum factored end reaction limit of I-joist with web stiffeners (lbs), and must not be exceeded.

5. See Simpson Connector Selection Guide for all other applications.



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 unshathed IB I-joists. Stack only over beams or walls.

Illustration 1

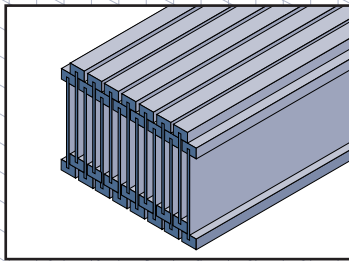


Illustration 2

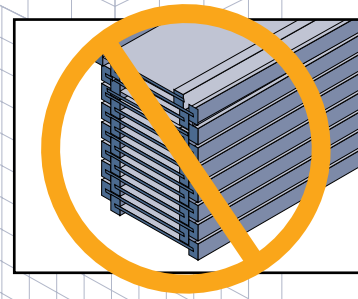


Illustration 3

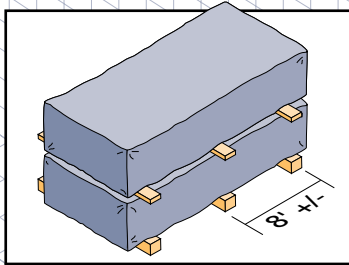


Illustration 4

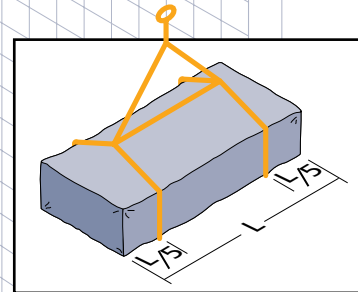


Illustration 5

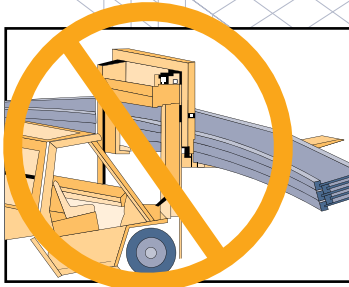


Illustration 6

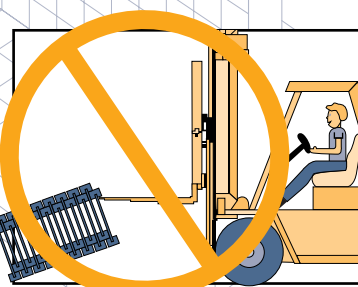


Illustration A

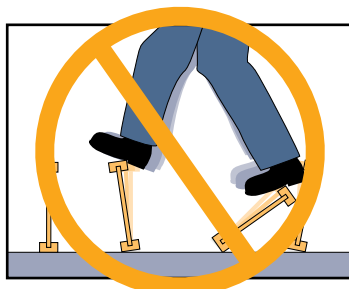
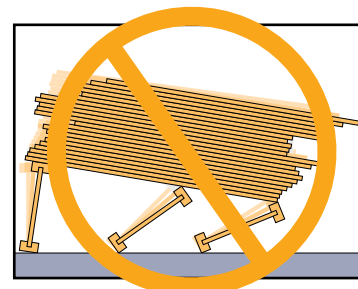


Illustration B





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