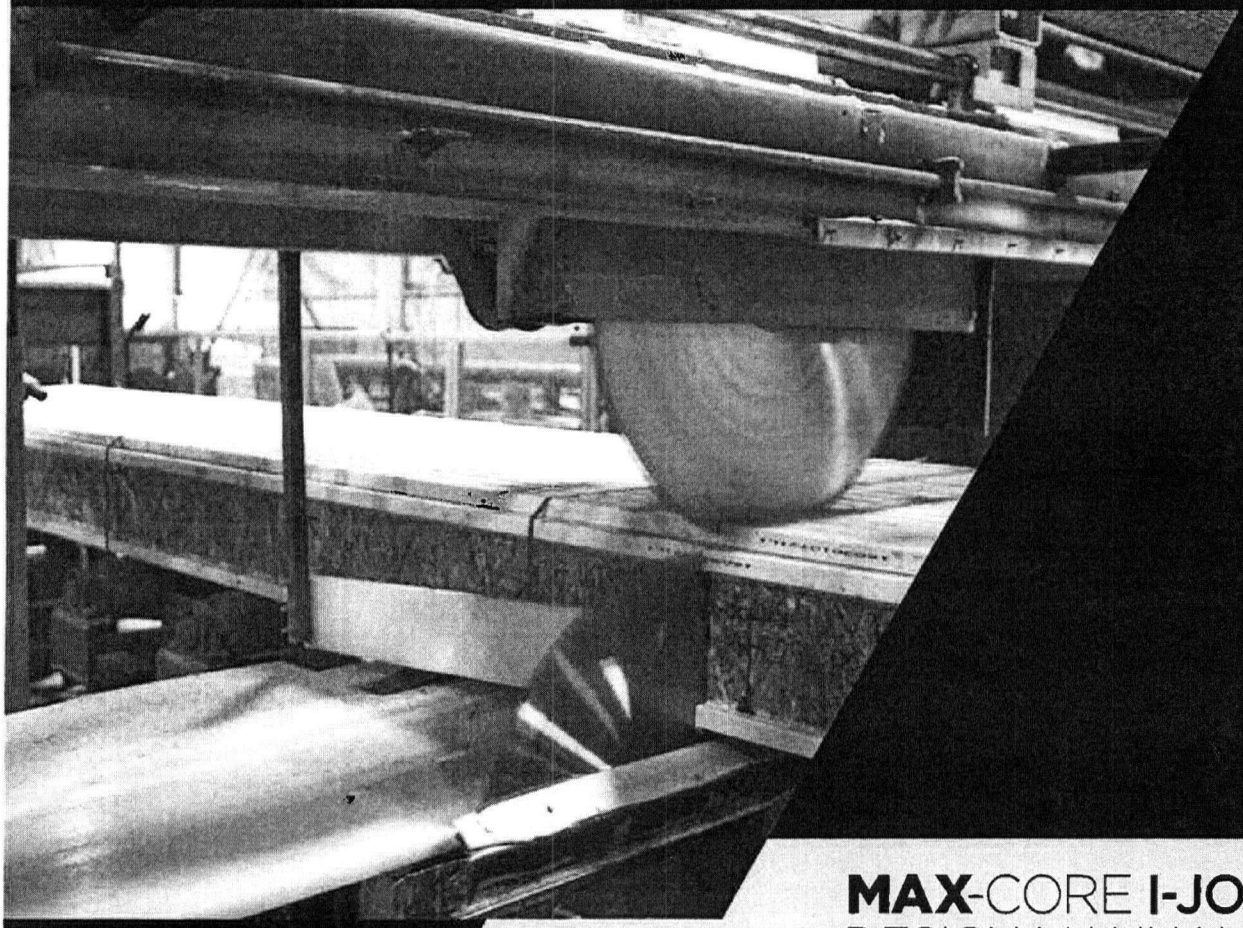
INTERNATIONAL BEAMS



MAX-CORE **I-JOIST** DESIGN MANUAL-US

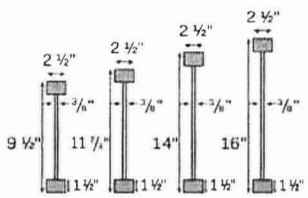
IB MAX-CORE I-JOIST TABLES

TABLE IBU-EP1

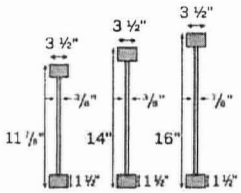
Engineering Properties of IB400, IB600, IB800 and IB900 Series Depth I-Joists (US Allowable Stress Design)(*1)

IB600

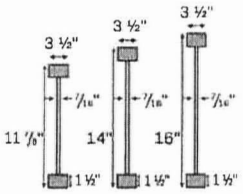
IB400



IB800



IB900



Series	Joist Depth	Bending Stiffness(*2) EI joist (x10⁶ lbf-in²)	Moment(*3) M (ft-lbf)	Shear(*4) V (lbf)	Shear Deflection Factor(*5) K (x10⁶ lbf)	I-Joist Self-Weight (plf)
IB400	9 ½"	198	2800	1185	4.94	2.6
	11 7/8"	336	3630	1480	6.18	2.9
	14"	494	4370	1750	7.28	3.1
	16"	673	5065	2000	8.32	3.3
IB600	9 ½"	235	3860	1370	4.94	2.6
	11 7/8"	399	5000	1570	6.18	2.9
	14"	585	6020	1750	7.28	3.1
	16"	799	6980	2000	8.32	3.3
IB800	11 7/8"	552	7,080	1,585	6.18	3.7
	14"	807	8,530	1,750	7.28	3.9
	16"	1,094	9,890	2,000	8.32	4.1
IB900	11 7/8"	604	8,825	1,925	6.18	3.9
	14"	884	10,630	2,125	7.28	4.1
	16"	1,199	12,635	2,330	8.32	4.3

RESIDENTIAL

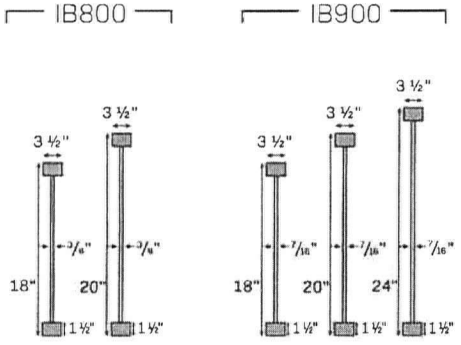
* Refer to notes on page 15

MAX-CORE I-JOIST

TABLE IBU-EP2

Engineering Properties of IB800 and IB900 Series Depth I-Joists (US Allowable Stress Design)[1]

COMMERCIAL



Series	Joist Depth	Bending Stiffness[2] EI joist (x10⁶ lbf-in²)	Moment[3] M (ft-lbf)	Shear[4] V (lbf)	Shear Deflection Factor[5] K (x10⁶ lbf)	I-Joist Self-Weight (plf)
IB800	18"	1,445	11,135	2,300	9.36	4.3
	20"	1,799	12,380	2,600	10.40	4.5
IB900	18"	1,565	14,285	2,510	11.52	4.5
	20"	1,984	15,810	2,695	12.80	4.7
	24"	2,985	18,810	3,060	15.36	5.1

NOTES:

1. 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.
2. Bending stiffness (EI) of the I-joist.
3. Moment capacity (M) shall not be increased by any Code-allowed system factor.
4. 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 tables IBU-ER1 and IBU-IR1 for web stiffener requirements which vary by depth and series.
5. 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 to the right.
6. For information relating to the use of ***IB*** products in Canada, refer to our Canadian literature.

Equation #1 (Uniform Load)

$$\Delta = \frac{5wL^4}{384EI} + \frac{wL^2}{K}$$

Equation #2 (Center-Point Load)

$$\Delta = \frac{PL^3}{48EI} + \frac{2PL}{K}$$

Where:

Δ = Calculated deflection (inches)
W = Unfactored uniform load (lbf/inch)
L = Design span (inches)
EI = Bending stiffness of the I-joist (lbf-in.²)
K = Shear deflection factor
P = Concentrated load (lbf)

BEARING CAPACITIES

TABLE IBU-ER1

End Reaction (ER) Capacities of IB400, IB600, IB800 and IB900 Series Depth I-Joists (US Allowable Stress Design)[1]

Series	Joist Depth	END REACTION CAPACITIES[2] (lbs)							
		1 ½" Bearing		1 ¾" Bearing		3 ½" Bearing		4" or Larger Bearing	
		No stiffeners	Stiffeners	No stiffeners	Stiffeners	No stiffeners	Stiffeners	No stiffeners	Stiffeners
IB400	9 ½"	1,120	1,185	1,130	1,185	1,185	1,185	1,185	1185
	11 7/8"	1,200	1,420	1,230	1,430	1,465	1,480	1,480	1480
	14"	1,260	1,630	1,295	1,645	1,550	1,750	1,550	1750
	16"	1,325	1,825	1,355	1,845	1,550	2,000	1,550	2000
IB600	9 ½"	1,120	1,185	1,140	1,370	1,185	1,370	1,185	1370
	11 7/8"	1,200	1,420	1,240	1,570	1,465	1,570	1,480	1570
	14"	1,260	1,630	1,335	1,750	1,550	1,750	1,550	1750
	16"	1,325	1,825	1,420	1,925	1,550	2,000	1,550	2000
IB800	11 7/8"	1,200	1,420	1,285	1,585	1,465	1,585	1,480	1,585
	14"	1,260	1,630	1,335	1,750	1,550	1,750	1,550	1,750
	16"	1,325	1,825	1,420	2,000	1,550	2,000	1,550	2,000
	18"	N/A	N/A	1,505	2,270	1,550	2,300	1,600	2,300
	20"	N/A	N/A	1,550	2,460	1,550	2,600	1,650	2,600
IB900	11 7/8"	1,195	1,420	1,400	1,585	1,805	1,805	1,885	1,925
	14"	1,260	1,630	1,400	1,750	1,805	1,960	1,885	2,125
	16"	1,325	1,825	1,420	2,000	1,805	2,330	1,885	2,330
	18"	N/A	N/A	1,505	2,270	1,675	2,510	1,885	2,510
	20"	N/A	N/A	1,550	2,470	1,675	2,680	1,885	2,695
	24"	N/A	N/A	1,470	2,880	1,675	2,960	1,885	3,060

BEARING CAPACITIES

TABLE IBU-IR1

Interior Reactions (IR) Capacities of IB400, IB600, IB800 and IB900 Series Depth I-Joists (US Allowable Stress Design)[1]

Series	Joist Depth	INTERIOR REACTION CAPACITIES[3] (lbs)			
		3 ½" Bearing		5 ½" Bearing	
		No stiffeners	Stiffeners	No stiffeners	Stiffeners
IB400	9 ½"	2,160	2,370	2,370	2,370
	11 7/8"	2,500	2,795	2,810	2,960
	14"	2,500	2,795	3,100	3,455
	16"	2,500	2,795	3,100	3,650
IB600	9 ½"	2,160	2,740	2,370	2,740
	11 7/8"	2,500	3,075	2,810	3,140
	14"	2,500	3,215	3,100	3,455
	16"	2,500	3,350	3,100	3,650
IB800	11 7/8"	2,810	3,140	2,810	3,140
	14"	3,020	3,500	3,100	3,500
	16"	3,100	4,000	3,100	4,000
	18"	3,100	4,225	3,100	4,225
	20"	3,100	4,350	3,100	4,350
IB900	11 7/8"	3,355	3,355	3,355	3,355
	14"	3,355	3,530	3,355	3,660
	16"	3,355	3,920	3,355	4,090
	18"	3,355	4,270	3,355	4,640
	20"	3,355	4,600	3,355	5,000
	24"	3,355	5,150	3,355	5,150

NOTES:

1. 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.
2. Interpolation of the end reaction capacities between 1 ¾ inches and 3 ½ inches is permitted.
3. Interpolation of the interior reaction capacities between 3 ½ inches and 5 ½ inches is permitted.

MAX-CORE I-JOIST

TABLE IBU-MF1

IB400, IB600, IB800 and IB900 Maximum Floor Spans

RESIDENTIAL (40L + 10D)

40 psf Live Load (1 ¾" end bearings and 3 ½" interior bearing without bearing stiffeners)
10 psf Dead Load
Allowable Stress Design (ASD) 100% Load Duration (L/480 live load, L/240 total load deflection criteria)

I-Joist		23/32" OSB SUBFLOOR GLUED AND NAILED SPACING OF IB MAX-CORE I-JOIST (o.c.)							
Series	Depth	Simple Span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB400	9 ½"	18'-4"	16'-9"	15'-10"	14'-9"	19'-12"	18'-4"	16'-9"	15'-0"
	11 7/8"	21'-9"	19'-11"	18'-9"	17'-1"	23'-9"	20'-11"	19'-1"	17'-1"
	14"	24'-8"	22'-7"	20'-11"	18'-9"	26'-6"	22'-11"	20'-11"	18'-9"
	16"	27'-4"	24'-8"	22'-6"	20'-2"	28'-6"	24'-8"	22'-6"	19'-12"
IB600	9 ½"	19'-3"	17'-7"	16'-7"	15'-6"	21'-0"	19'-2"	18'-1"	16'-10"
	11 7/8"	22'-10"	20'-11"	19'-9"	18'-4"	25'-0"	22'-10"	21'-6"	20'-0"
	14"	25'-11"	23'-8"	22'-4"	20'-10"	28'-4"	25'-10"	24'-5"	20'-0"
	16"	28'-9"	26'-3"	24'-9"	23'-1"	31'-5"	28'-8"	25'-0"	20'-0"
IB800	11 7/8"	25'-2"	22'-11"	21'-7"	20'-1"	27'-5"	25'-0"	23'-7"	21'-11"
	14"	28'-6"	26'-0"	24'-6"	22'-9"	31'-1"	28'-4"	26'-8"	24'-2"
	16"	31'-6"	28'-8"	27'-1"	25'-2"	34'-5"	31'-4"	29'-6"	24'-10"
IB900	11 7/8"	25'-10"	23'-6"	22'-2"	20'-7"	28'-2"	25'-8"	24'-2"	22'-5"
	14"	29'-3"	26'-8"	25'-1"	23'-4"	32'-0"	29'-1"	27'-5"	25'-5"
	16"	32'-5"	29'-6"	27'-9"	25'-10"	35'-4"	32'-2"	30'-4"	26'-10"

* Refer to notes on page 21.

* Refer to notes on page 21

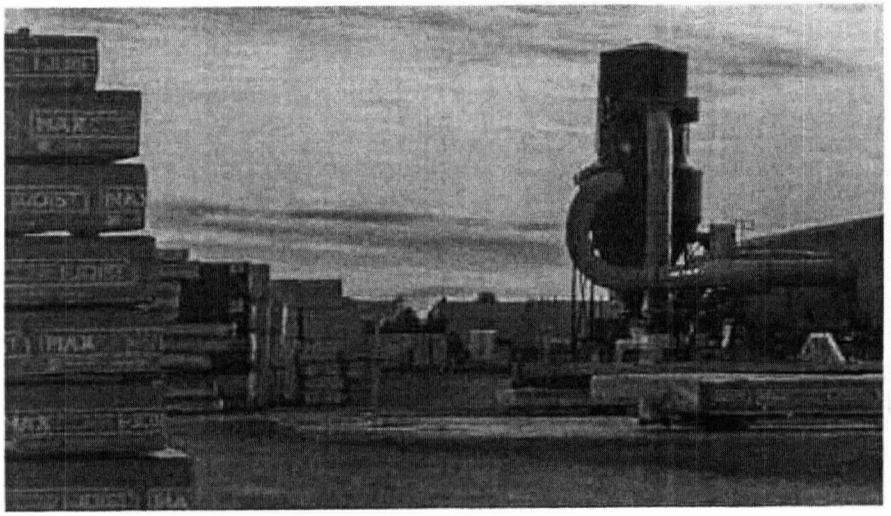
RESIDENTIAL (40L + 15D)

TABLE IBU-MF2

IB400, IB600, IB800 and IB900
Maximum Floor Spans U.S. ASD (Allowable Stress Design)

40 psf Live Load (1 ¾" end bearing and 3 ½" interior bearing without bearing stiffeners)
15 psf Dead Load
Allowable Stress Design (ASD) 100% Load Duration (L/480 live load, L/240 total load deflection criteria)

I-Joist		23/32" OSB SUBFLOOR GLUED AND NAILED SPACING OF *IB* MAX-CORE I-JOIST (o.c.)							
		Simple Span				Multiple Spans			
Series	Depth	12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB400	9 ½"	18'-4"	16'-9"	15'-10"	14'-3"	20'-0"	17'-6"	15'-12"	14'-4"
	11 7/8"	21'-9"	19'-11"	18'-2"	16'-3"	23'-0"	19'-11"	18'-2"	16'-3"
	14"	24'-8"	21'-10"	19'-11"	17'-10"	25'-3"	21'-10"	20'-0"	17'-10"
	16"	27'-2"	23'-6"	21'-6"	19'-3"	27'-2"	23'-6"	21'-6"	18'-3"
IB600	9 ½"	19'-3"	17'-7"	16'-7"	15'-6"	21'-0"	19'-2"	18'-1"	15'-9"
	11 7/8"	22'-10"	20'-11"	19'-9"	18'-4"	25'-0"	22'-10"	21'-4"	18'-3"
	14"	25'-11"	23'-8"	22'-4"	20'-10"	28'-4"	25'-8"	22'-9"	18'-3"
	16"	28'-9"	26'-3"	24'-9"	22'-7"	31'-5"	27'-4"	22'-9"	18'-3"
IB800	11 7/8"	25'-2"	22'-11"	21'-7"	20'-1"	27'-5"	25'-0"	23'-7"	20'-6"
	14"	28'-6"	26'-0	24'-6"	22'-9"	31'-1"	28'-4"	26'-8"	22'-0
	16"	31'-6"	28'-8"	27'-1"	25'-0"	34'-5"	31'-4"	28'-3"	22'-7"
IB900	11 7/8"	25'-10"	23'-6"	22'-2"	20'-7"	28'-2"	25'-8"	24'-2"	22'-5"
	14"	29'-3"	26'-8"	25'-1"	23'-4"	32'-0"	29'-1"	27'-5"	24'-5"
	16"	32'-5"	29'-6"	27'-9"	25'-6"	35'-4"	32'-2"	30'-4"	24'-5"



* Refer to notes on page 21

MAX-CORE I-JOIST

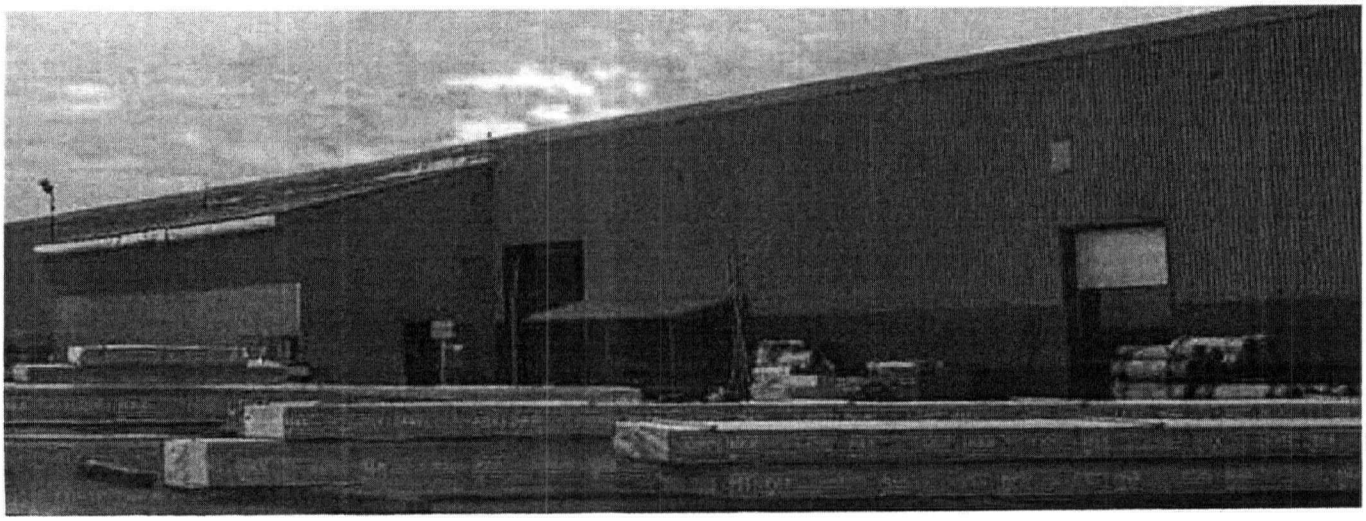
TABLE IBU-MF3

IB400, IB600, IB800 and IB900 Maximum Floor Spans

RESIDENTIAL (40L + 30D)

40 psf Live Load (1 ¾" end bearing and 3 ½" interior bearing without 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		23/32" OSB SUBFLOOR GLUED AND NAILED SPACING OF IB MAX-CORE I-JOIST (o.c.)							
		Simple Span				Multiple Spans			
Series	Depth	12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB400	9 ½"	17'-11"	15'-5"	14'-1"	12'-7"	17'-11"	15'-5"	14'-1"	12'-7"
	11 7/8"	20'-5"	17'-8"	16'-2"	14'-4"	20'-5"	17'-8"	16'-2"	14'-4"
	14"	22'-5"	19'-5"	17'-8"	15'-9"	22'-5"	19'-5"	17'-8"	15'-9"
	16"	24'-1"	20'-11"	19'-1"	17'-1"	24'-1"	20'-11"	19'-1"	16'-0"
IB600	9 ½"	19'-2"	17'-7"	16'-7"	14'-11"	21'-0"	18'-2"	16'-8"	14'-11"
	11 7/8"	22'-11"	20'-8"	18'-11"	16'-11"	23'-11"	20'-8"	18'-11"	16'-11"
	14"	25'-11"	22'-8"	20'-8"	18'-7"	26'-2"	22'-8"	20'-8"	18'-5"
	16"	28'-2"	24'-5"	22'-4"	20'-0"	28'-2"	24'-5"	22'-4"	19'-2"
IB800	11 7/8"	25'-2"	22'-11"	21'-7"	20'-1"	27'-5"	24'-8"	22'-5"	18'-0"
	14"	28'-5"	26'-0"	24'-5"	22'-1"	31'-2"	27'-1"	24'-8"	20'-1"
	16"	31'-5"	28'-8"	26'-7"	23'-10"	33'-7"	29'-2"	26'-7"	22'-11"
IB900	11 7/8"	25'-10"	23'-5"	22'-2"	20'-7"	28'-2"	25'-8"	23'-12"	19'-2"
	14"	29'-2"	26'-8"	25'-2"	23'-5"	32'-0"	29'-1"	25'-2"	20'-2"
	16"	32'-4"	29'-5"	27'-10"	25'-10"	35'-4"	32'-2"	28'-1"	22'-5"



* Refer to notes on page 21.

TABLE IBU-MF4

IB800 and IB900 Maximum Floor Spans

COMMERCIAL (40L + 30D)

40 psf Live Load (3 ½" 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		23/32" OSB SUBFLOOR GLUED AND NAILED SPACING OF *IB* MAX-CORE I-JOIST (o.c.)							
Series	Depth	Simple Span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
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"
	24"	44'-0"	40'-1"	36'-7"	32'-9"	46'-4"	40'-1"	36'-7"	29'-5"

TABLE IBU-MF5

IB800 and IB900 Maximum Floor Spans

COMMERCIAL (100L + 20D)

100 psf Live Load (3 ½" 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		23/32" OSB SUBFLOOR GLUED AND NAILED SPACING OF *IB* MAX-CORE I-JOIST (o.c.)							
Series	Depth	Simple Span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
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"
	24"	31'-11"	29'-0"	27'-2"	24'-1"	34'-4"	25'-10"	21'-5"	17'-2"

* Refer to notes on page 21.

MAX-CORE I-JOIST

TABLE IBU-MF6

IB800 and IB900 Maximum Floor Spans

COMMERCIAL (100L + 30D)

100 psf Live Load (3 ½" 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)

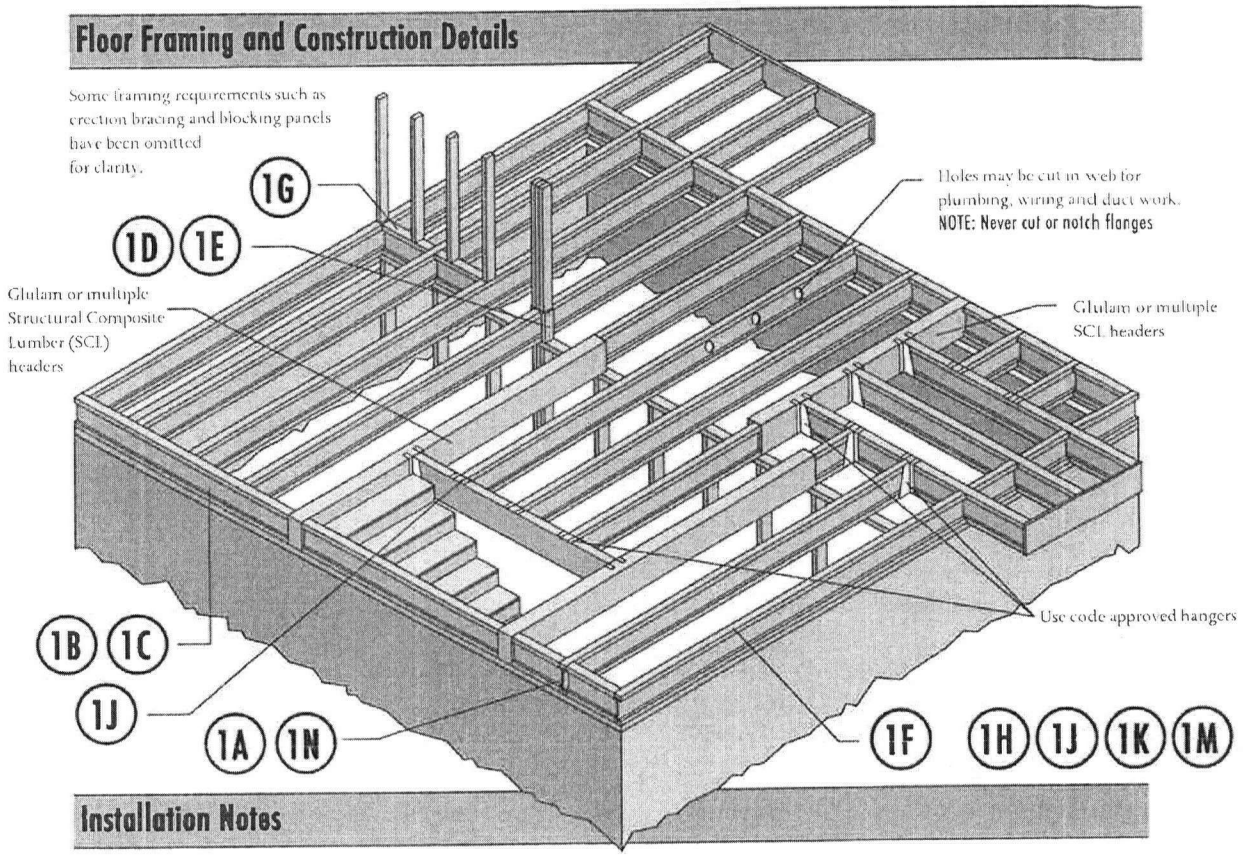
I-Joist		23/32" OSB SUBFLOOR GLUED AND NAILED SPACING OF *IB* MAX-CORE I-JOIST (o.c.)							
Series	Depth	Simple Span				Multiple Spans			
		12"	16"	19.2"	24"	12"	16"	19.2"	24"
IB800	18"	24'-11"	22'-7"	20'-8"	17'-5"	26'-1"	19'-7"	16'-4"	13'-0"
	20"	26'-10"	23'-11"	21'-10"	18'-12"	26'-10"	20'-1"	16'-8"	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"
	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 1 ¾ inch for end bearing and 3 ½ inches for interior bearings. Allowable design spans in the tables are measured from centerline of supports.
4. Bearing stiffeners are NOT required when I-joists are used with the spans given in the tables, except as required by hanger manufacturers.
5. These span tables are 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 and Intertek CCRR-0232 evaluation reports. Design properties are also indicated in tables IBU-EP1 and IBU-EP2. For technical support, contact ***IB*** or your local ***IB*** distributor.
6. Continuous spans given in tables IBU-MF1 thru IBU-MF6 are the longest spans 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 ***IB***.

Floor Framing & Construction Details

Floor Framing and Construction Details



Installation Notes

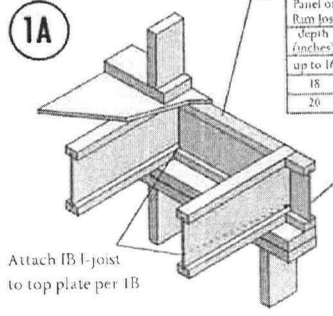
1. Before laying out floor system components, verify that IB I-joist flange widths match hanger widths. If not, contact your supplier.
2. Except for cutting to length, never cut, drill, or notch IB I-joist flanges.
3. Install IB I-joists so that top and bottom flanges are within ½ inch of true vertical alignment.
4. IB I-joists must be anchored securely to supports before floor sheathing is attached, and supports for multiple-span joists must be level.
5. Minimum bearing lengths: 1¾ inches for end bearings and 3½ inches for intermediate bearings.
6. When using hangers, seat IB I-joists firmly in hanger bottoms to minimize settlement.
7. Leave a 1/16 inch gap between the IB I-joist end and a header.
8. 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.
9. 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.
10. Restrain ends of floor joists to prevent rollover. Use rim board or equivalent, rim joists or IB I-joist blocking panels.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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

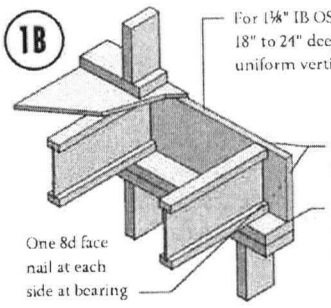
All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details
Individual components not shown to scale for clarity

1A



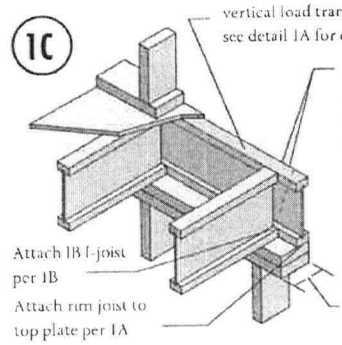
Blocking Panel or Rim Joist depth (inches)	Maximum Uniform Vertical Load (plf)				
	1B400	1B600	1B800	1B900	1⅛" 1B OSB Rimboard
up to 16	2000	2000	2000	2000	4850
18	N/A	1750	1810	1810	3200
20	N/A	1500	1625	1625	3200

1B

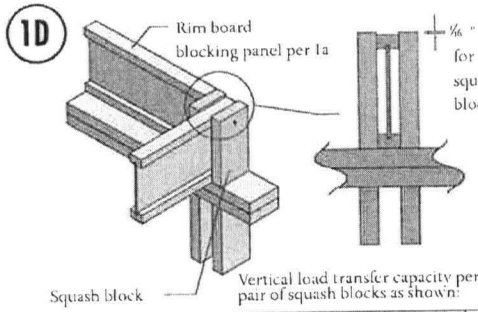


To avoid splitting flange, start nails at least 1 ½" from end of IB I-joist. Nails may be driven at an angle to avoid splitting of bearing plate.

1C



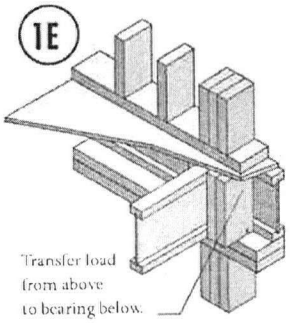
1D



Vertical load transfer capacity per pair of squash blocks as shown:

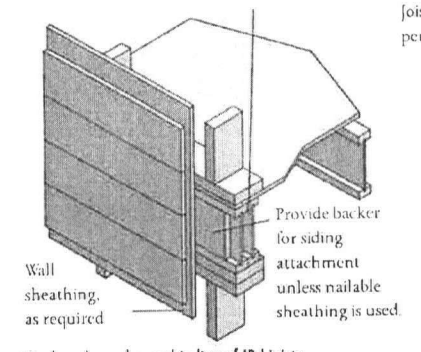
Pair of Squash Blocks	3½" wide	5½" wide
2x Lumber	4000	7000
1" Rim Board	2700	3500
1⅛" Rim Board	3000	3500

1E



1F

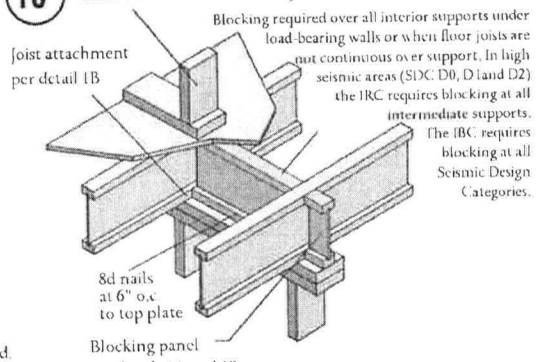
For single I-Joist, see detail 1A for capacities. For double I-Joists the table capacities may be doubled. Filler block is not required with this detail.



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

1G

Load bearing wall above shall align vertically with the wall below. Other conditions such as offset walls are not covered by this detail.



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

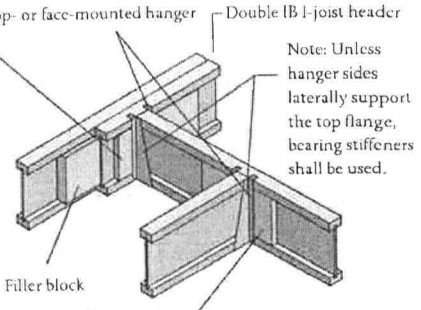
1H **Backer block (use if hanger load exceeds 250 lbs.)** Before installing a backer block to a double I-joist, drive 3 additional 10d nails through the webs and filler block where the backer block will fit. Clinch. Install backer tight to top flange. Use twelve 10d nails, clinched when possible. Maximum 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**
2½"	1"	5½"
3½"	1½"	7¼"

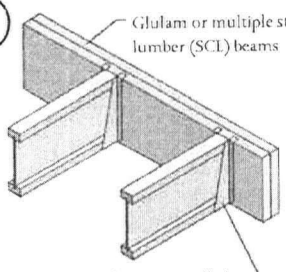
* Minimum grade for backer block material shall be Utility grade SPF (south) or better for solid sawn lumber and Rated Sheathing grade for wood structural panels.

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



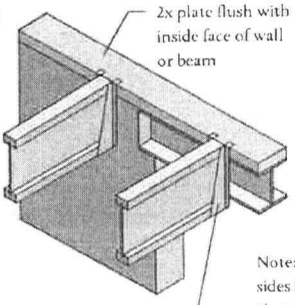
For hanger capacity see hanger manufacturer's recommendations. Verify double IB I-joist capacity to support concentrated loads.

1J

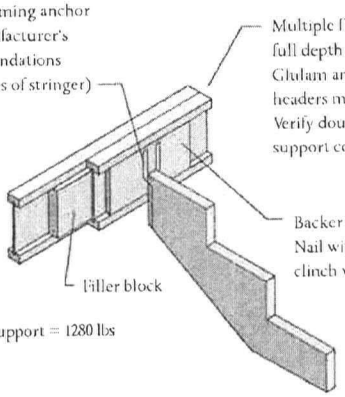


Note: Unless hanger sides laterally support the top flange, bearing stiffeners shall be used.

1K

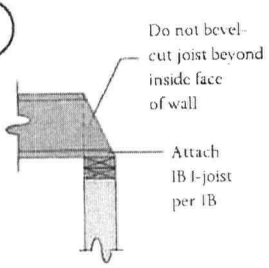


1M



Maximum factored support = 1280 lbs

1N



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 usually occurs in deeper IB I-joists.

• 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.

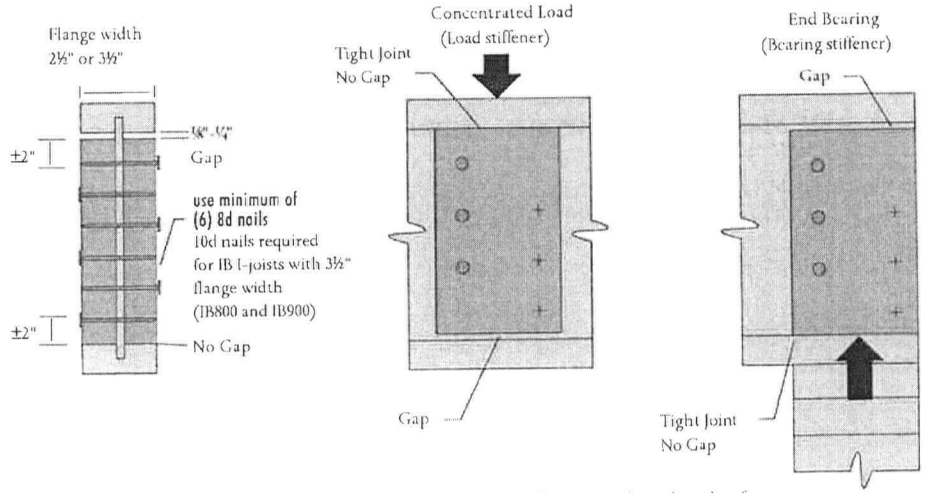
Web stiffener blocks may be comprised of lumber, rim board, or structural wood panels. The minimum grade of structural wood panels is Rated Sheathing; minimum lumber grade is Utility grade SPF (south) or better. Any rim board product would also work satisfactorily. Ideally, the depth of the web stiffener should equal the distance between the flanges of the joist minus ⅛ inch – ¼ 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 gapbetween the stiffener and the flange is atthe 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 acantilever, anywhere between the cantilever tip and the support. The gap between the stiffener and the flange is at the bottom.

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

Web Stiffener Requirements



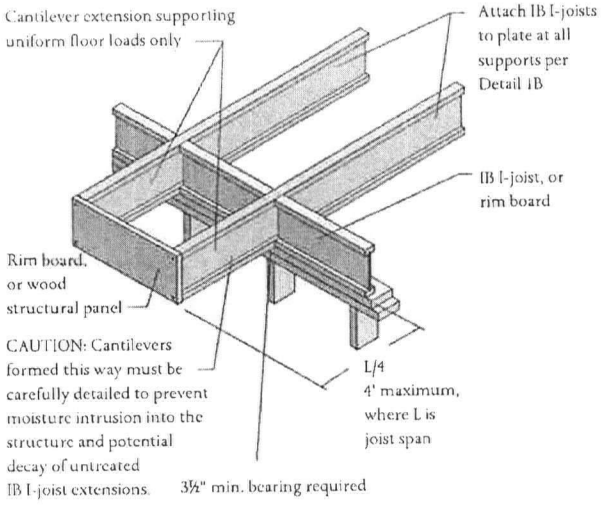
Notes: For I-Joist depths up to 16 inches, the number of nails in the web stiffeners may be reduced to four.

Web Stiffener Size Requirement

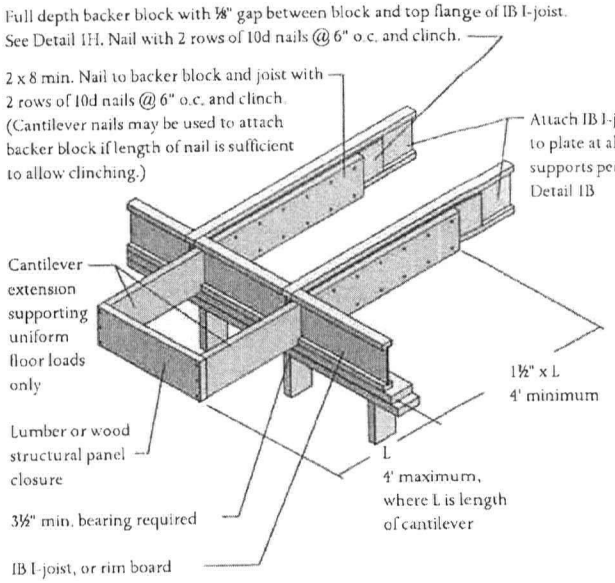
Designation	Web Stiffener Size Each Side of Web
IB 400/600	1" x 2⅝" minimum width
IB 800/900	1½" x 2⅝" minimum width

Cantilever Framing Details

Cantilever Detail for Balconies



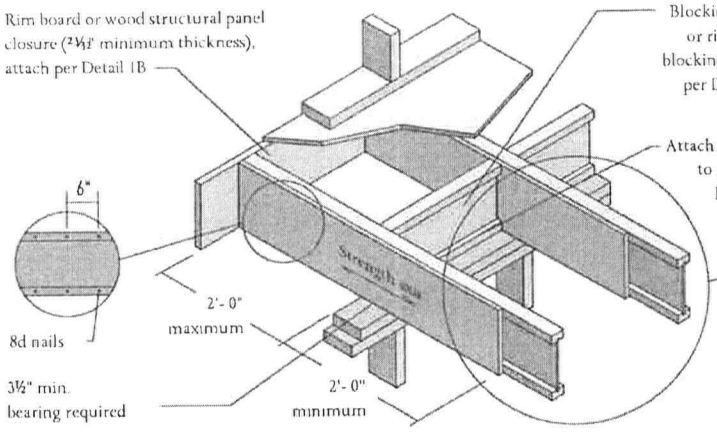
Lumber Cantilever Detail for Balconies



Cantilever Detail for Vertical Building Offset

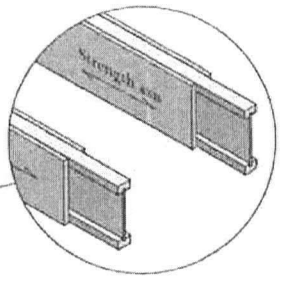
See cantilever reinforcement chart for appropriate reinforcement method.

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



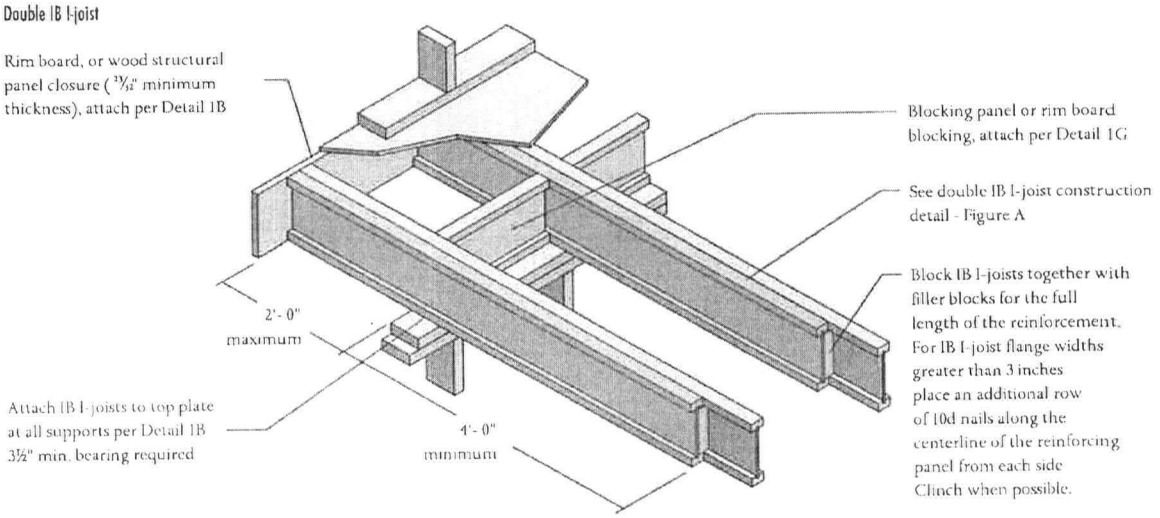
Use nailing pattern shown for Method 1 with opposite face nailing offset by 3"

Cantilever Framing Details

Cantilever Detail for Vertical Building Offset

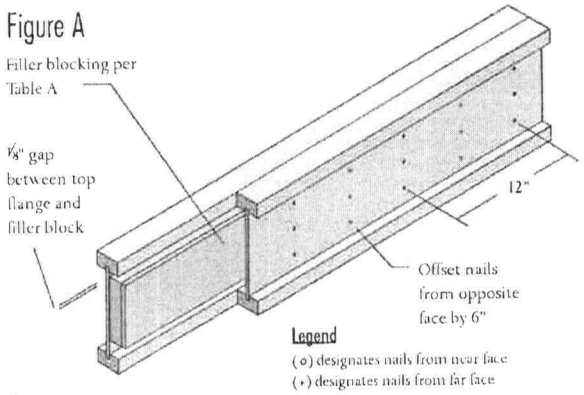
See cantilever reinforcement chart for appropriate reinforcement method.

Alternate Method 2
Double IB I-joist



Double Joist Construction

Figure A



Notes

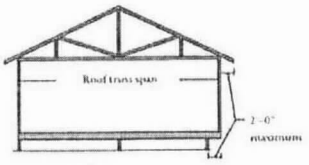
1. Support back of IB I-joist web during nailing to prevent damage to web/flange connection
2. Leave a 1/8" gap between top of filler block and bottom of top IB I-joist flange
3. Filler block is required between joists for full length of span.
4. Nail joists together with three rows of 10d nails at 12" o.c. (clinched when possible) on each side of the double IB I-joist. Total of 6 nails per foot required. If nails can be clinched, only 3 nails per foot are required. For I-joists depths up to 16", rows of nails may be reduced to 2 rows, total of 4 nails per linear foot (2 nails per foot if clinched).
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 3-1/2" long FILLER blocks at maximum 4' o.c. spacing using a minimum of (6) nails from each face.

Filler Block Requirements

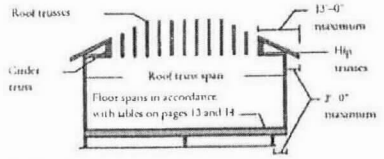
Table A

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

Cantilever Reinforcement



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



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

Cantilever Reinforcement Chart (all IB I-Joist Series)

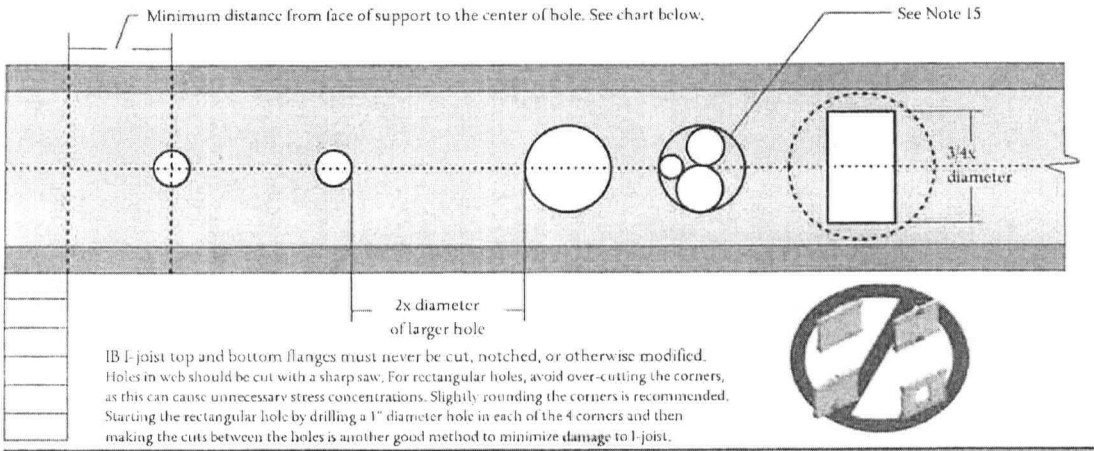
Joist Depth (in.)	Roof Truss Span ft.	ROOF DESIGN LOADS TL= 35 psf (Snow up to 20 psf, DL= 15 psf) I-Joist Spacing (in.) 12	16	19.2	24	TL= 45 psf (Snow up to 30 psf, DL= 15 psf) I-Joist Spacing (in.) 12	16	19.2	24	TL= 55 psf (Snow up to 40 psf, DL= 15 psf) I-Joist Spacing (in.) 12	16	19.2	24
9½"	26	N	N	N	1	N	N	1	2	N	N	1	X
	28	N	N	N	1	N	N	1	2	N	1	2	X
	30	N	N	N	1	N	N	1	2	N	1	2	X
	32	N	N	N	1	N	N	1	X	N	1	2	X
	34	N	N	1	2	N	1	1	X	N	1	2	X
	36	N	N	1	2	N	1	2	X	N	2	X	X
11⅞"	26	N	N	N	N	N	N	N	1	N	N	N	1
	28	N	N	N	N	N	N	N	1	N	N	1	1
	30	N	N	N	N	N	N	N	1	N	N	1	2
	32	N	N	N	N	N	N	N	1	N	N	1	2
	34	N	N	N	1	N	N	N	1	N	N	1	2
	36	N	N	N	1	N	N	1	1	N	1	1	2
	38	N	N	N	1	N	N	1	2	N	1	1	X
14"	26	N	N	N	N	N	N	N	1	N	N	N	1
	28	N	N	N	N	N	N	N	1	N	N	N	1
	30	N	N	N	N	N	N	N	1	N	N	1	1
	32	N	N	N	1	N	N	N	1	N	N	1	2
	34	N	N	N	1	N	N	N	1	N	N	1	2
	36	N	N	N	1	N	N	1	1	N	N	1	2
	38	N	N	N	1	N	N	1	1	N	1	1	2
	40	N	N	N	1	N	N	1	2	N	1	1	2
16"	26	N	N	N	N	N	N	N	1	N	N	N	1
	28	N	N	N	N	N	N	N	1	N	N	1	1
	30	N	N	N	1	N	N	N	1	N	N	1	2
	32	N	N	N	1	N	N	N	1	N	N	1	2
	34	N	N	N	1	N	N	1	1	N	N	1	2
	36	N	N	N	1	N	N	1	1	N	N	1	2
	38	N	N	N	1	N	N	1	2	N	1	1	2
	40	N	N	N	1	N	N	1	2	N	1	1	2
	42	N	N	N	1	N	N	1	2	N	1	1	2
18"	26	N	N	N	N	N	N	N	1	N	N	1	1
	28	N	N	N	1	N	N	N	1	N	N	1	1
	30	N	N	N	1	N	N	N	1	N	N	1	2
	32	N	N	N	1	N	N	1	1	N	N	1	2
	34	N	N	N	1	N	N	1	1	N	N	1	2
	36	N	N	N	1	N	N	1	2	N	1	1	2
	38	N	N	N	1	N	N	1	2	N	1	1	2
	40	N	N	N	1	N	N	1	2	N	1	1	2
	42	N	N	1	1	N	N	1	2	N	1	2	X
	44	N	N	1	1	N	N	1	2	N	1	2	X
20"	26	N	N	N	1	N	N	N	1	N	N	1	1
	28	N	N	N	1	N	N	N	1	N	N	1	2
	30	N	N	N	1	N	N	N	1	N	N	1	2
	32	N	N	N	1	N	N	1	1	N	N	1	2
	34	N	N	N	1	N	N	1	1	N	1	1	2
	36	N	N	N	1	N	N	1	2	N	1	1	2
	38	N	N	N	1	N	N	1	2	N	1	1	2
	40	N	N	1	1	N	N	1	2	N	1	1	2
	42	N	N	1	1	N	N	1	2	N	1	2	X
	44	N	N	1	1	N	1	1	2	N	1	2	X
	46	N	N	1	2	N	1	1	2	N	1	2	X

Notes:

1. N– No reinforcement required.
   1= IB I-joists reinforced with 23/32" OSB structural panel or OSB rimboard on one side only.
   2= IB I-joists reinforced with 23/32" OSB structural panel or OSB rimboard on both sides, or double IB I-joist.
   X= Try a deeper joist or closer spacing.
2. Maximum load shall be: 15 psf roof dead load, 55 psf floor total load, (40 psf live load plus 15 psf dead load), and 80 plf wall dead load. Wall is based on 3'-0" minimum width window or door openings. For larger openings, or multiple 3'-0" width openings spaced less than 6'-0" o.c., additional joists beneath the opening's cripple studs may be required.
3. Table applies to joists 12" to 24" o.c. Use 12" o.c. requirements for lesser spacings.
4. For conventional roof construction using a structural ridge beam, the Roof Truss Span column above is equivalent to the horizontal distance between the supporting wall and the ridge beam. When the roof is framed using a ridge board (non-structural ridge element) and ceiling joists tie the roof together at the top of the exterior walls, the Roof Truss Span is equivalent to the horizontal distance between the supporting walls as if a truss is used.

Web Hole Guidelines

Typical Holes



IB I-joist top and bottom flanges must never be cut, notched, or otherwise modified. Holes in web should be cut with a sharp saw. For rectangular holes, avoid over-cutting the corners, as this can cause unnecessary stress concentrations. Slightly rounding the corners is recommended. Starting the rectangular hole by drilling a 1" diameter hole in each of the 4 corners and then making the cuts between the holes is another good method to minimize damage to I-joist.

Allowable Webhole Sizes and Locations

40 psf live load and 15 psf dead load (1¾" end bearings, 3½" interior without bearing stiffeners)

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

Round Hole Diameter (inches)

I-Joist Depth	I-Joist Series	SAF	2	3	4	5	6	6¾	7	8	8□	9	10	10 ¾	11	12	12 ¾
9½"	IB 400	14'-1"	0'-7"	1'-9"	2'-11"	4'-3"	5'-7"	6'-0"									
	IB 600	15'-4"	1'-5"	2'-8"	3'-11"	5'-4"	7'-1"	7'-7"									
	IB 800	16'-9"	2'-5"	3'-8"	5'-0"	6'-7"	8'-5"	8'-10"									
11⅞"	IB 400	16'-1"	0'-7"	0'-8"	1'-4"	2'-6"	3'-9"	4'-1"	5'-1"	6'-6"	7'-9"						
	IB 600	18'-1"	0'-7"	1'-6"	2'-8"	3'-11"	5'-5"	5'-10"	7'-1"	8'-10"	10'-0"						
	IB 800	19'-11"	1'-9"	2'-11"	4'-2"	5'-5"	7'-0"	7'-5"	8'-8"	10'-6"	11'-9"						
	IB 900	20'-5"	0'-7"	1'-4"	2'-10"	4'-4"	6'-0"	6'-5"	7'-8"	9'-6"	10'-9"						
14"	IB 400	17'-8"	0'-7"	0'-8"	1'-2"	2'-3"	3'-4"	3'-7"	4'-5"	5'-7"	6'-4"	6'-10"	8'-6"	10'-4"			
	IB 600	18'-1"	0'-7"	0'-8"	1'-9"	3'-1"	4'-5"	4'-9"	5'-10"	7'-7"	8'-8"	9'-5"	11'-4"	12'-11"			
	IB 800	21'-10"	1'-9"	3'-0"	4'-4"	5'-8"	7'-1"	7'-6"	8'-7"	10'-2"	11'-2"	11'-9"	13'-6"	15'-0"			
	IB 900	23'-2"	0'-8"	1'-11"	3'-2"	4'-6"	5'-10"	6'-3"	7'-3"	8'-9"	9'-10"	10'-7"	12'-7"	14'-2"			
16"	IB 400	18'-1"	0'-7"	0'-8"	0'-11"	1'-10"	2'-9"	3'-0"	3'-9"	5'-0"	5'-9"	6'-3"	7'-7"	8'-7"	9'-0"	11'-2"	12'-11"
	IB 600	18'-1"	0'-7"	0'-8"	1'-4"	2'-8"	4'-1"	4'-5"	5'-6"	7'-0"	7'-11"	8'-6"	10'-2"	11'-6"	12'-0"	14'-1"	16'-2"
	IB 800	22'-5"	2'-4"	3'-6"	4'-8"	5'-11"	7'-2"	7'-5"	8'-5"	9'-10"	10'-10"	11'-5"	13'-1"	14'-5"	14'-10"	16'-9"	18'-6"
	IB 900	24'-3"	0'-7"	1'-8"	3'-0"	4'-5"	5'-11"	6'-3"	7'-5"	8'-11"	9'-11"	10'-6"	12'-3"	13'-6"	14'-0"	15'-10"	17'-6"
18"	IB 600	18'-1"	0'-7"	0'-8"	1'-2"	2'-0"	3'-2"	3'-6"	4'-5"	5'-10"	6'-11"	7'-7"	9'-4"	10'-9"	11'-2"	13'-1"	14'-8"
	IB 800	22'-5"	1'-10"	3'-1"	4'-5"	5'-8"	7'-0"	7'-4"	8'-4"	9'-9"	10'-8"	11'-2"	12'-8"	13'-10"	14'-3"	15'-10"	17'-2"
	IB 900	24'-3"	0'-7"	1'-4"	2'-6"	3'-9"	5'-3"	5'-8"	6'-9"	8'-5"	9'-5"	10'-0"	11'-8"	13'-0"	13'-6"	15'-4"	16'-9"
20"	IB 600	18'-1"	0'-7"	0'-9"	1'-6"	2'-2"	3'-0"	3'-2"	4'-2"	5'-8"	6'-7"	7'-2"	8'-9"	10'-0"	10'-5"	12'-1"	13'-4"
	IB 800	22'-5"	1'-7"	2'-9"	3'-10"	5'-0"	6'-2"	6'-6"	7'-5"	8'-8"	9'-5"	10'-0"	11'-8"	13'-0"	13'-5"	15'-2"	16'-7"
	IB 900	24'-3"	0'-7"	1'-2"	2'-6"	3'-10"	5'-2"	5'-6"	6'-6"	7'-11"	8'-10"	9'-5"	10'-11"	12'-0"	12'-5"	14'-0"	15'-3"

Notes:

1. Table may be used for I-joist spacing 24 inches on center or less.
2. Hole location distance is measured from inside face of supports to center of hole.
3. Distances in this chart are based on uniformly loaded joists.
4. 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: $V_{h} = V_{r} \times (\text{Joist Depth} - \text{Hole Diameter}) / \text{Joist Depth}$

   V_{r} = Published Shear Value

   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 reduces as follows:

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

   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 L, use 1 in the above calculation for L_{actual} SAF.
5. I-joist top and bottom flanges must NEVER be cut, notched, or otherwise modified.
6. Whenever possible field cut holes should be centered on the middle of the web.
7. 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-inch.
8. A minimum of ⅛ inch should be maintained between the top or bottom of the hole and the adjacent I-joist flange.
9. 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.
10. Where more than one hole is necessary, the distance between adjacent hole edges shall exceed twice the diameter of the largest round hole or twice the size of the largest square hole (or twice the length of the longest side of the longest rectangular hole) and each hole must be sized and located in compliance with the requirements of the table above.
11. 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.
12. 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.
13. A 1 1/2" hole can be placed anywhere in the web provided that it meets the requirements of 6 above.
14. For joists with more than one span, use the longest span to determine hole location in either span.
15. All holes shall be cut in a workman like manner in accordance with the restrictions listed above and as illustrated in figure above.
16. 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.
17. Refer to International Beams Design Software for other hole sizes and locations.