Boise Cascade
Engineered Wood Products

EASTERN INSTALLATION GUIDE

for products manufactured in Alexandria [Lena], Louisiana

Lifetime Guaranteed Quality and Performance

Boise Cascade warrants its BCI® Joist, VERSA-LAM®, and ALLJOIST® products to comply with our specifications, to be free from defects in material and workmanship, and to meet or exceed our performance specifications for the normal and expected life of the structure when correctly stored, installed, and used according to our Installation Guide.

For information about Boise Cascade's engineered wood products, including sales terms and conditions, warranties and disclaimers,

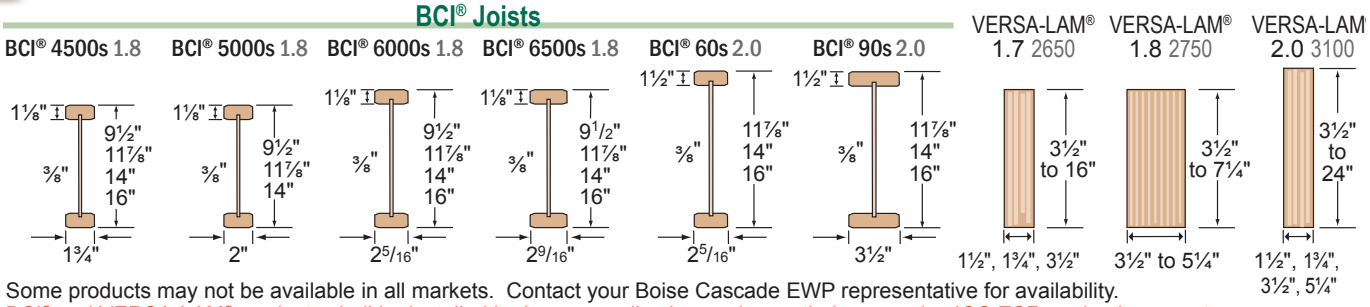
visit our website at www.BCewp.com

To locate your nearest Boise Cascade Engineered Wood Products distributor, call **1-800-232-0788**

EIG book 07/2014

Eastern Product Profile

BCI® Joists

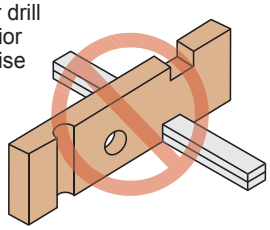


Some products may not be available in all markets. Contact your Boise Cascade EWP representative for availability.
BCI® and VERSA-LAM® products shall be installed in dry-use applications only, per their respective ICC ESR evaluation reports.

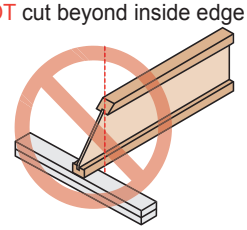
WARNING

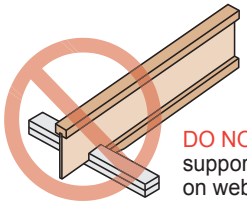
THE FOLLOWING USES ARE NOT ALLOWED

DO NOT notch or drill beams without prior approval from Boise Cascade EWP Engineering.



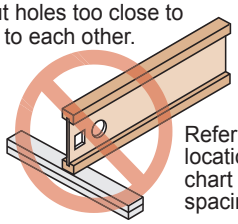
DO NOT cut beyond inside edge of bearing.





DO NOT support joist on web.

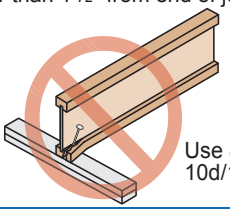
DO NOT cut holes too close to supports or to each other.



Refer to hole location and sizing chart for size and spacing.

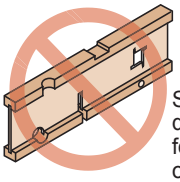
DO NOT nail closer than 1½" from end of joist.

DO NOT use 16d common nails.



Use 8d nails or 10d/16d box nails.

DO NOT cut or notch flange.

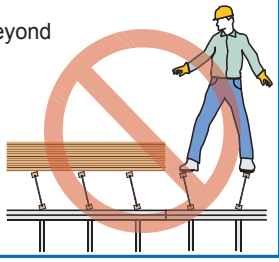


See roof and floor details, this sheet, for allowed cutting of flange.

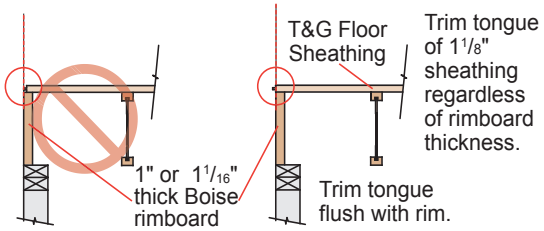
DO NOT walk on joist until proper bracing is in place.

DO NOT load joist beyond design capacity.

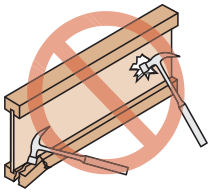
DO NOT stack building materials on unbraced joists.



DO NOT install tongue of floor sheathing flush with either 1" or 1 1/16" thick Boise Cascade rimboard (tongue OK with 1 1/8" and thicker Boise Cascade rimboard).



DO NOT hammer on web unless removing knockout holes.



DO NOT hammer on flange.

SAFETY WARNING

DO NOT ALLOW WORKERS ON BCI® JOISTS UNTIL ALL HANGERS, BCI® RIM JOISTS, RIM BOARDS, BCI® BLOCKING PANELS, X-BRACING AND TEMPORARY 1x4 STRUT LINES ARE INSTALLED AS SPECIFIED BELOW. SERIOUS ACCIDENTS CAN RESULT FROM INSUFFICIENT ATTENTION TO PROPER BRACING DURING CONSTRUCTION. ACCIDENTS CAN BE AVOIDED UNDER NORMAL CONDITIONS BY FOLLOWING THESE GUIDELINES:

- Build a braced end wall at the end of the bay, or permanently install the first eight feet of BCI® Joists and the first course of sheathing. As an alternate, temporary sheathing may be nailed to the first four feet of BCI® Joists at the end of the bay.
- All hangers, BCI® rim joists, rim boards, BCI® blocking panels, and x-bracing must be completely installed and properly nailed as each BCI® Joist is set.
- Install temporary 1x4 strut lines at no more than eight feet on center as additional BCI® Joists are set. Nail the strut lines to the sheathed area, or braced end wall, and to each BCI® Joist with two 8d nails.
- The ends of cantilevers must be temporarily secured by strut lines on both the top and bottom flanges.
- Straighten the BCI® Joists to within ½ inch of true alignment before attaching strut lines and sheathing.
- Remove the temporary strut lines only as required to install the permanent sheathing.
- Failure to install temporary bracing may result in sideways buckling or roll-over under light construction loads.
- Do not stack construction materials (sheathing, drywall, etc.) in the middle of BCI® Joist spans, contact Boise Cascade EWP Engineering for proper storage and shoring information.

BUILDING CODE EVALUATION REPORTS:

BCI® JOISTS BLDG CODE EVALUATION REPORTS
- ICC ESR 1336 (IBC, IRC)

VERSA-LAM® BLDG CODE EVALUATION REPORTS
- ICC ESR 1040 (IBC, IRC)

About Floor Performance

Homeowner's expectations and opinions vary greatly due to the subjective nature of rating a new floor. Communication with the ultimate end user to determine their expectation is critical. ***Vibration*** is usually the cause of most complaints. Installing lateral bridging may help; however, squeaks may occur if not installed properly. Spacing the joists closer together does little to affect the perception of the floor's performance. The most common methods used to increase the performance and reduce vibration of wood floor systems is to ***increase the joist depth, limit joist deflections, glue and screw a thicker, tongue-and-groove subfloor, install the joists vertically plumb with level-bearing supports, and install a direct-attached ceiling to the bottom flanges of the joists.***

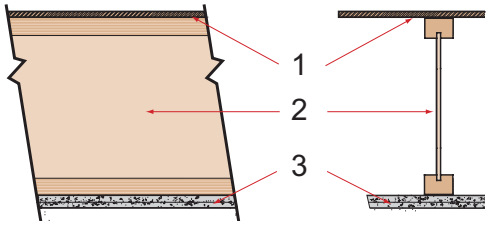
The floor span tables listed below offer three very different performance options, based on performance requirements of the homeowner.

Joist Depth	BCI® Joist Series	★★★ THREE STAR ★★★					★★★★ FOUR STAR ★★★★					CAUTION	★ MINIMUM STIFFNESS ALLOWED BY CODE ★				CAUTION
		Live Load deflection limited to L/480: The common industry and design community standard for residential floor joists, **33% stiffer than L/360 code minimum.** However, floor performance may still be an issue in certain applications, especially with 9½" and 11⅞" deep joists without a direct-attached ceiling.					**Live Load deflection limited to L/960+:** In addition to providing a floor that is **100% stiffer than the three star floor**, field experience has been incorporated into the values to provide a floor with a premium performance level for the more discriminating homeowner.					**Live Load deflection limited to L/360:** Floors that **meet the minimum building code** L/360 criteria are structurally sound to carry the specified loads; however, there is a much higher risk of floor performance issues. This table should only be used for applications where floor performance is not a concern.				
		12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	32" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	32" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	32" o.c.
9½"	4500s 1.8	16'–11"	15'–6"	14'–8"	13'–7"	11'–9"	11'–6"	11'–6"	10'–0"	10'–0"	9'–7"	18'–9"	16'–8"	15'–3"	13'–7"	11'–9"
	5000s 1.8	17'–6"	16'–0"	15–2"	14'–1"	12'–5"	11'–6"	11'–6"	10'–0"	10'–0"	9'–11"	19'–4"	17'–9"	16'–4"	14'–7"	12'–5"
	6000s 1.8	18'–2"	16'–8"	15'–8"	14'–8"	13'–4"	11'–6"	11'–6"	10'–0"	10'–0"	10'–0"	20'–2"	18'–5"	17'–5"	15'–9"	13'–8"
	6500s 1.8	18'–8"	17'–1"	16'–1"	15'–0"	13'–8"	11'–6"	11'–6"	10'–0"	10'–0"	10'–0"	20'–8"	18'–11"	17'–10"	16'–7"	14'–3"
11⅞"	4500s 1.8	20'–0"	18'–4"	17'–3"	15'–5"	13'–4"	15'–6"	14'–3"	13'–5"	12'–6"	11–4"	21'–10"	18'–11"	17'–3"	15'–5"	13'–4"
	5000s 1.8	20'–9"	19'–0"	17'–11"	16'–7"	13'–4"	15'–6"	14'–9"	13'–11"	12'–11"	11'–9"	23'–0"	20'–4"	18'–6"	16'–7"	13'–4"
	6000s 1.8	21'–7"	19'–8"	18'–7"	17'–4"	14'–10"	15'–6"	15'–4"	14'–5"	13'–5"	12'–1"	23'–10"	21'–10"	20'–0"	17'–11"	14'–10"
	6500s 1.8	22'–2"	20'–3"	19'–2"	17'–10"	14'–10"	16'–0"	15'–10"	14'–11"	13'–10"	12'–7"	24'–6"	22'–5"	21'–1"	18'–10"	14'–10"
	60s 2.0	23'–7"	21'–6"	20'–4"	18'–11"	16'–4"	18'–0"	16'–9"	15'–9"	14'–8"	13'–3"	26'–1"	23'–10"	22'–6"	21'–0"	16'–4"
	90s 2.0	26'–7"	24'–3"	22'–10"	21'–3"	19'–4"	19'–0"	18'–10"	17'–8"	16'–5"	14'–10"	29'–5"	26'–10"	25'–3"	23'–6"	19'–4"
14"	4500s 1.8	22'–9"	20'–7"	18'–9"	16'–9"	13'–11"	17'–10"	16'–3"	15'–4"	14'–3"	13'–0"	23'–10"	20'–7"	18'–9"	16'–9"	13'–11"
	5000s 1.8	23'–7"	21'–7"	20'–2"	18'–0"	13'–11"	18'–6"	16'–10"	15'–11"	14'–9"	13'–5"	25'–7"	22'–1"	20'–2"	18'–0"	13'–11"
	6000s 1.8	24'–6"	22'–5"	21'–2"	19'–6"	15'–5"	19'–2"	17'–6"	16'–6"	15'–4"	13'–11"	27'–1"	23'–11"	21'–10"	19'–6"	15'–5"
	6500s 1.8	25'–2"	23'–0"	21'–8"	20'–2"	15'–5"	19'–8"	17'–11"	16'–11"	15'–8"	14'–3"	27'–9"	25'–2"	22'–11"	20'–6"	15'–5"
	60s 2.0	26'–9"	24'–5"	23'–0"	21'–5"	16'–4"	20'–11"	19'–0"	17'–11"	16'–7"	15'–1"	29'–7"	27'–0"	25'–6"	21'–10"	16'–4"
	90s 2.0	30'–1"	27'–5"	25'–10"	24'–0"	19'–6"	23'–6"	21'–4"	20'–0"	18'–6"	16'–9"	33'–3"	30'–4"	28'–7"	26'–0"	19'–6"
16"	4500s 1.8	25'–2"	22'–0"	20'–1"	17'–11"	14'–1"	19'–9"	18'–0"	17'–0"	15'–10"	14'–1"	25'–5"	22'–0"	20'–1"	17'–11"	14'–1"
	6000s 1.8	27'–0"	24'–9"	23'–4"	20'–10"	15'–9"	21'–2"	19'–4"	18'–2"	16'–11"	15'–4"	29'–6"	25'–6"	23'–4"	20'–10"	15'–9"
	6500s 1.8	27'–9"	25'–4"	23'–11"	21'–1"	15'–9"	21'–9"	19'–9"	18'–8"	17'–4"	15'–8"	30'–8"	26'–11"	24'–6"	21'–1"	15'–9"
	60s 2.0	29'–7"	27'–0"	25'–6"	21'–10"	16'–4"	23'–2"	21'–1"	19'–10"	18'–5"	16'–4"	32'–8"	29'–10"	27'–4"	21'–10"	16'–4"
	90s 2.0	33'–4"	30'–4"	28'–7"	26'–2"	19'–7"	26'–0"	23'–7"	22'–2"	20'–6"	18'–7"	36'–10"	33'–7"	31'–8"	26'–2"	19'–7"

- Span table is based on a residential floor load of 40 psf live load and 10 psf dead load (12 psf dead load for 90s 2.0 joists).
- Span values assume $^{23}/_{32}$" minimum plywood/OSB rated sheathing is glued and nailed to joists for composite action (joists spaced at 32" o.c. require sheathing rated for such spacing - $^{7}/_{8}$" plywood/OSB).
- Span values represent the most restrictive of simple or multiple span applications. Analyze multiple span joists with BC CALC® sizing software if the length of any span is less than half the length of an adjacent span.
- Span values are the maximum allowable clear distance between supports.
- Table values assume minimum bearing lengths without web stiffeners for joist depths of 16" inches and less.
- Floor tile will increase dead load and may require specific deflection limits, contact Boise Cascade EWP Engineering for further information.
- This table was designed to apply to a broad range of applications. It may be possible to exceed the limitations of this table by analyzing a specific application with the BC CALC® sizing software.

(Shaded values do not satisfy the requirements of the North Carolina State Building Code. Refer to the THREE STAR table when spans exceed 20 feet.)

One-Hour Fire Resistive Assembly



See the US version of the Boise Cascade Fire Design & Installation Guide for specific assembly information and other fire resistive options or contact your local Boise Cascade representative.

ICC ESR 1336

FIRE ASSEMBLY COMPONENTS

1. Min. $^{23}/_{32}$" thick tongue and groove sheathing (exterior glue), installed with long edge perpendicular to joist length, staggered one joist spacing with adjacent sheets, and glued to joists with construction adhesive.
2. BCI® Joists at 24" o.c. or less.
3. Two layers ⅝" Type X or two layers ½" Type C gypsum board, installed per Figures 2 or 3 of ICC ESR 1336.

SOUND ASSEMBLY COMPONENTS

When constructed with resilient channels

- Add carpet & pad to fire assembly:
- Add 3½" glass fiber insulation to fire assembly:
- Add an additional layer of minimum ⅝" sheathing and 9½" glass fiber insulation to fire assembly:

STC=54	IIC=68	or
STC=55	IIC=46	or
STC=61	IIC=50	

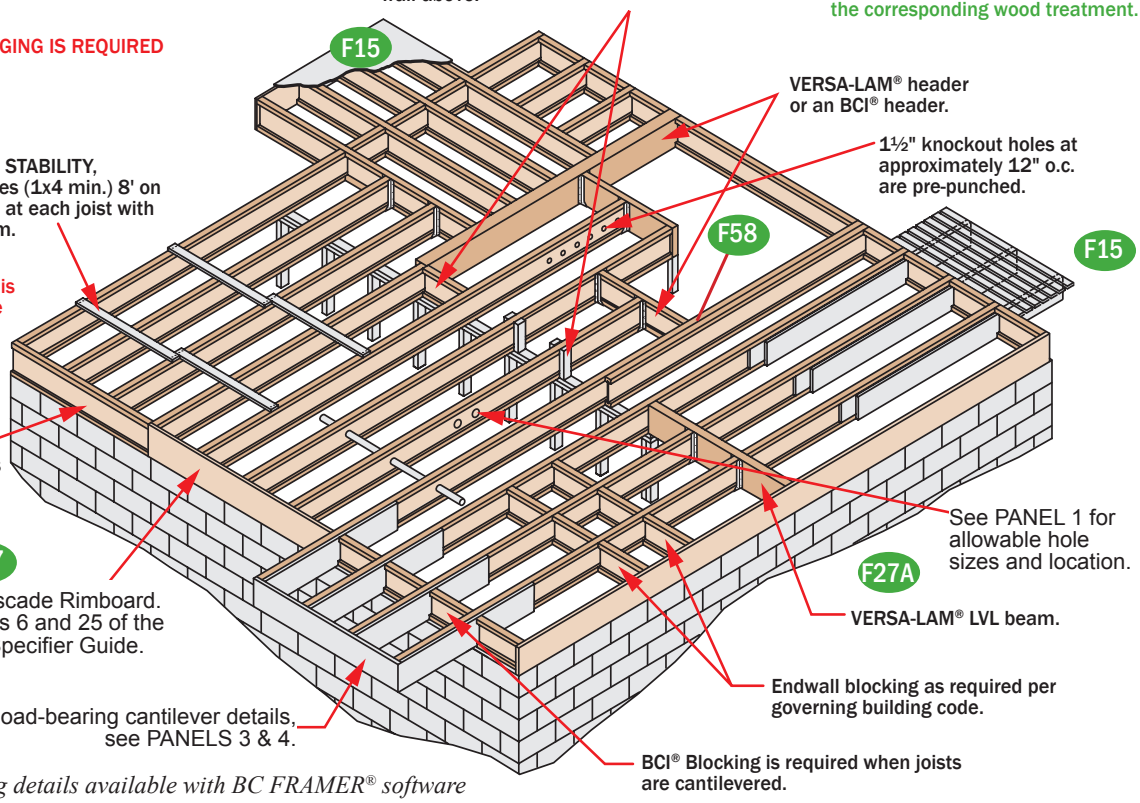
BCI® Joists — Floor Framing

NOTE
The illustration below is showing several suggested applications for the Boise Cascade EWP products. It is not intended to show an actual house under construction.

NO MIDSPAN BRIDGING IS REQUIRED FOR BCI® JOISTS

F06 F09 BCI® ...ing ...2x4 "squash" block on each side required when supporting a load-bearing wall above.

When installing Boise Cascade EWP products with treated wood, use only connectors/fasteners that are approved for use with the corresponding wood treatment.

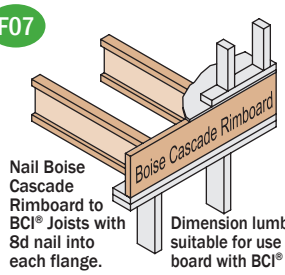


Additional floor framing details available with BC FRAMER® software (see page 33 of the Eastern Specifier Guide)

BCI® Joists — Floor Framing Details

END BEARING DETAILS

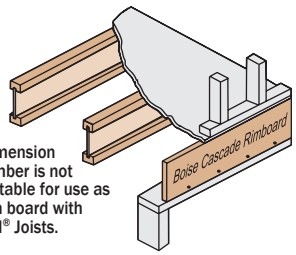
F07



Nail Boise Cascade Rimboard to BCI® Joists with 8d nail into each flange.

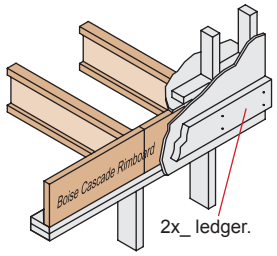
Dimension lumber is not suitable for use as rim board with BCI® Joists.

F07A

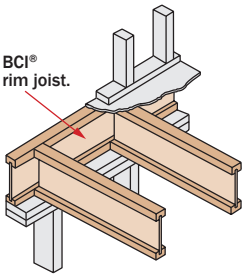


Dimension lumber is not suitable for use as rim board with BCI® Joists.

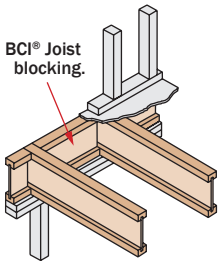
F07B



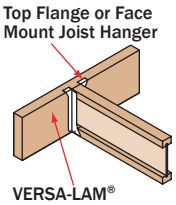
F02



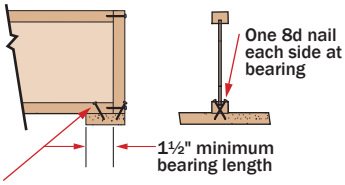
F01



F27A

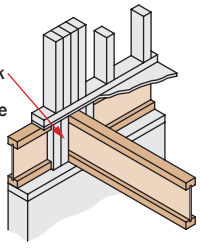


F52

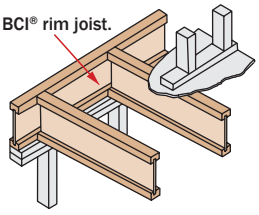


To limit splitting flange, start nails at least 1½" from end. Nails may need to be driven at an angle to limit splitting of bearing plate.

F08



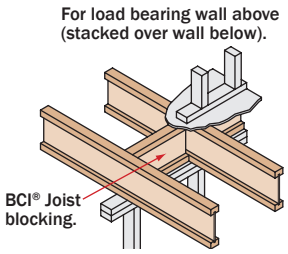
F03



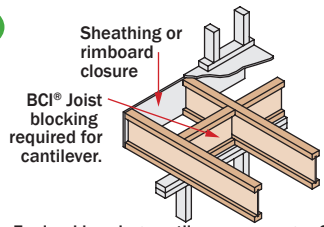
Note: BCI® floor joist must be designed to carry wall above when not stacked over wall below.

INTERMEDIATE BEARING DETAILS

F06



F05

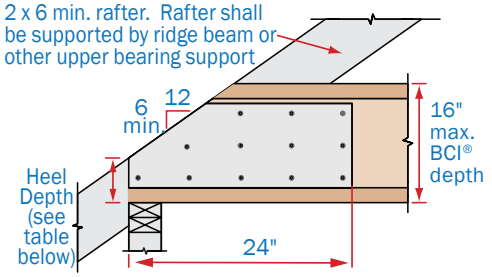


For load bearing cantilever, see pages 8 and 9. Uplift on backspan shall be considered in all cantilever designs.

F14

BCI® Joist Slope Cut Reinforcement

Detail below restores original allowable shear/reaction value to cut end of BCI® joist. BCI® Joist shall not be used as a collar or rafter tension tie.

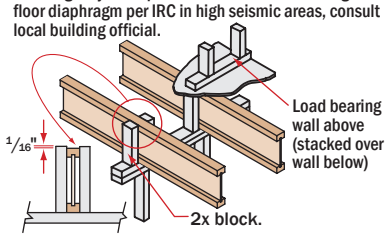


2x blocking required at bearing (not shown for clarity). $^{23}/_{32}$" min. plywood/OSB rated sheathing as reinforcement. Install reinforcement with face grain horizontal. Install on both sides of the joist, tight to bottom flange. Leave minimum ¼" gap between reinforcement and bottom of top flange. Apply construction adhesive to contact surfaces and fasten with 3 rows of min. 10d box nails at 6" o.c. Alternate nailing from each side and clinch.

End Wall Bearing	Minimum Heel Depth — Roof Pitch					
	6/12	7/12	8/12	9/12	10/12	12/12
2 x 4	4⅜"	4 5/16"	4¼"	4¼"	4¼"	4¼"
2 x 6	3⅜"	3 3/16"	2 5/16"	2¾"	2 9/16"	2¼"

F09

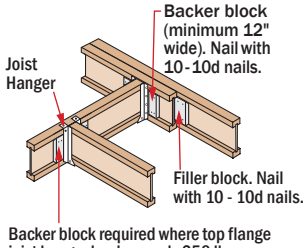
Blocking may be required at intermediate bearings for floor diaphragm per IRC in high seismic areas, consult local building official.



Double Squash Block Vertical Load [lb/ft]				
Size	Joist Spacing [in]			
	12	16	19.2	24
2x4	4463	3347	2789	2231
2x6	7013	5259	4383	3506

1. Squash blocks are to be in full contact with upper floor and lower wall plate.
2. Capacities shown are for a double squash blocks at each joist, SPF or better.

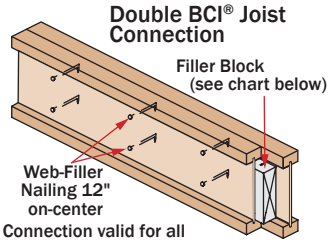
F10



Backer block required where top flange joist hanger load exceeds 250 lbs. Install tight to top flange.

F58

Double BCI® Joist Connection



Connection valid for all applications. Contact Boise Cascade EWP Engineering for specific conditions.

LATERAL SUPPORT

- BCI® Joists shall be laterally supported at the ends with hangers, rimboard, BCI® rim joist or blocking panels. BCI® blocking panels or rimboard are required at cantilever supports.
- Blocking may be required at intermediate bearings for floor diaphragm per IRC in high seismic areas, consult local building official.

MINIMUM BEARING LENGTH FOR BCI® JOISTS

- Minimum end bearing: 1½" for all BCI® Joists. 3½" is required at cantilever and intermediate supports.
- Longer bearing lengths allow higher reaction values. Refer to the building code evaluation report or the BC CALC® software.

NAILING REQUIREMENTS

- BCI® rim joist, rim board or closure panel to BCI® joist:
  - Rims or closure panel 1¼ inches thick and less: 2-8d nails, one each in the top and bottom flange.
  - BCI® 4500s, 5000s rim joist: 2-10d box nails, one each in the top and bottom flange.
  - BCI® 6000s, 60s rim joist: 2-16d box nails, one each in the top and bottom flange.
  - BCI® 6500s, 90s rim joist: Toe-nail top flange to rim joist with 2-10d box nails, one each side of flange.
- BCI® rim joist, rim board or BCI® blocking panel to support:
  - Min. 8d nails @ 6" o.c. per IRC.
  - Connection per design professional of record's specification for shear transfer.
- BCI® joist to support:
  - 2-8d nails, one on each side of the web, placed 1½ inches minimum from the end of the BCI® Joist to limit splitting.
- Sheathing to BCI® joist:
  - Prescriptive residential floor sheathing nailing requires 8d common nails @ 6" o.c. on edges and @ 12" o.c. in the field Table IRC R602.3(1).
  - See closest allowable nail spacing limits on PANEL A for floor diaphragm nailing specified at closer spacing than IRC.
  - Maximum bracing spacing for full lateral stability: 18" for BCI® 4500s and 5000s, 24" for larger BCI® joist series.
  - 14 gauge staples may be substituted for 8d nails if the staples penetrate at least 1 inch into the joist.
  - Wood screws may be acceptable; contact local building official and/or Boise Cascade EWP Engineering for further information.

BACKER AND FILLER BLOCK DIMENSIONS

Series	Backer Block Thickness	Filler Block Thickness
4500s 1.8	⅝" or ¾" wood panels	Two ⅝" wood panels or 2 x _
5000s 1.8	¾" or ⅞" wood panels	Two ¾" wood panels or 2 x _
6000s 1.8	1⅛" or two ½" wood panels	2 x _ + 7/16" or ½" wood panel
6500s 1.8	1⅛" or two ⅝" wood panels	2 x _ + ⅝" or ¾" wood panel
60s 2.0	1⅛" or two ½" wood panels	2 x _ + 7/16" or ½" wood panel
90s 2.0	2 x _ lumber	Double 2 x _ lumber

- Cut backer and filler blocks to a maximum depth equal to the web depth minus ¼" to avoid a forced fit.

WEB STIFFENER REQUIREMENTS

- See *Web Stiffener Requirements* on page 9.

PROTECT BCI® JOISTS FROM THE WEATHER

- BCI® Joists are intended only for applications that provide permanent protection from the weather. Bundles of BCI® Joists should be covered and stored off of the ground on stickers.

BCI® RIM JOISTS AND BCI® BLOCKING

Depth [in]	Series	Vertical Load Capacity [plf]	
		No W.S.(1)	W.S.(2)
9½"	4500s 1.8, 5000s 1.8, 6000s 1.8, 6500s 1.8	2300	N/A
11⅞"	4500s 1.8, 5000s 1.8, 6000s 1.8, 6500s 1.8	2150	N/A
	60s 2.0, 90s 2.0	2500	N/A
14"	4500s 1.8, 5000s 1.8, 6000s 1.8, 6500s 1.8	2000	N/A
	60s 2.0, 90s 2.0	2400	N/A
16"	4500s 1.8, 6000s 1.8, 6500s 1.8	1900	2500
	60s 2.0, 90s 2.0	2300	2700

(1) No web stiffeners required

(2) Web stiffeners required at each end of blocking, values not applicable for rim joists

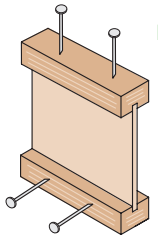
N/A: Not applicable

Closest Allowable Nail Spacing

BCI® Joists — Nail Size	All BCI® Joists			
	Nailing Perpendicular to Glue Line (Wide Face)		Nailing Parallel to Glue Line (Narrow Face)	
	O.C. Spacing [inches]	End of Joist [inches]	O.C. Spacing [inches]	End of Joist [inches]
8d Box (0.113"ø x 2.5")	2	1½	4	1½
8d Common (0.131"ø x 2.5")	2	1½	4	3
10d & 12d Box (0.128"ø x 3", 3.25")	2	1½	4	3
16d Box (0.135"ø x 3.5")	2	1½	4	3
10d & 12d Common & 16d Sinker (0.148"ø x 3", 3.25")	3	2	6	4
16d Common (0.162"ø x 3.5")	3	2	6	4

- If more than one row of nails is used, the rows must be offset at least ½ inch.
- Simpson Strong-Tie A35 connectors may be attached to the side of BCI® 60s and 90s joist flanges only. Use nails as specified by Simpson Strong-Tie; do not attach connectors on both sides of a flange at the same location.

BCI® Joists



BCI® Joists — Load Bearing Cantilever Details

Joist Depth [in]	Joist Series	Roof Truss Span [ft]	Roof Total Load [psf]								
			35			45			55		
			Joist Spacing [in]								
			16	19.2	24	16	19.2	24	16	19.2	24
9½"	4500s 1.8	24	0	0	0	0	0	X	0	X	X
		26	0	0	0	0	0	X	0	X	X
		28	0	0	X	0	X	X	X	X	X
		30	0	0	X	0	X	X	X	X	X
		32	0	0	X	0	X	X	X	X	X
		34	0	0	X	0	X	X	X	X	X
		36	0	X	X	X	X	X	X	X	X
		38	0	X	X	X	X	X	X	X	X
		40	0	X	X	X	X	X	X	X	X
		42	0	X	X	X	X	X	X	X	X
	5000s 1.8	24	0	0	0	0	0	X	0	X	X
		26	0	0	0	0	0	X	0	X	X
		28	0	0	1	0	X	X	X	X	X
		30	0	0	1	0	X	X	X	X	X
		32	0	0	X	0	X	X	X	X	X
		34	0	0	X	X	X	X	X	X	X
		36	0	0	X	X	X	X	X	X	X
		38	0	X'	X	X	X	X	X	X	X
		40	0	X'	X	X	X	X	X	X	X
	6000s 1.8	24	0	0	0	0	0	0	0	X	X
		26	0	0	0	0	0	X	0	X	X
		28	0	0	0	0	0	X	X	X	X
		30	0	0	0	0	0	X	X	X	X
		32	0	0	0	0	X	X	X	X	X
		34	0	0	X	0	X	X	X	X	X
		36	0	0	X	0	X	X	X	X	X
		38	0	0	X	X	X	X	X	X	X
		40	0	0	X	X	X	X	X	X	X
	6500s 1.8	24	0	0	0	0	0	0	0	0	X
		26	0	0	0	0	0	0	0	X	X
		28	0	0	0	0	0	0	0	X	X
		30	0	0	0	0	0	X	0	X	X
		32	0	0	0	0	0	X	0	X	X
		34	0	0	0	0	X	X	X	X	X
		36	0	0	X	0	X	X	X	X	X
		38	0	0	X	0	X	X	X	X	X
		40	0	0	X	0	X	X	X	X	X
11⅞"	4500s 1.8	24	0	0	0	0	0	0	WS	0	X
		26	0	0	0	0	0	WS	0	0	X
		28	0	0	0	0	0	X	0	WS	X
		30	0	0	0	0	0	X	0	WS	X
		32	0	0	WS	0	0	X	0	X	X
		34	0	0	WS	0	0	X	0	X	X
		36	0	0	WS	0	WS	X	0	X	X
		38	0	0	X	0	X	X	X	X	X
		40	0	0	X	0	X	X	X	X	X
		42	0	0	X	0	X	X	X	X	X
	5000s 1.8	24	0	0	0	0	0	WS	0	0	1
		26	0	0	0	0	0	WS	0	0	1
		28	0	0	0	0	0	WS	0	0	X
		30	0	0	WS	0	0	1	0	0	X
		32	0	0	WS	0	0	1	0	1	X
		34	0	0	WS	0	WS	X	0	X	X
		36	0	0	WS	0	WS	X	0	X	X
		38	0	0	WS	0	WS	X	X	X	X
		40	0	0	1	0	1	X	X	X	X
	6000s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	1
		28	0	0	0	0	0	WS	0	0	1
		30	0	0	0	0	0	WS	0	0	X
		32	0	0	0	0	0	1	0	WS	X
		34	0	0	WS	0	0	1	0	WS	X
		36	0	0	WS	0	0	1	0	X	X
		38	0	0	WS	0	WS	X	0	X	X
		40	0	0	1	0	WS	X	X	X	X

Joist Depth [in]	Joist Series	Roof Truss Span [ft]	Roof Total Load [psf]								
			35			45			55		
			Joist Spacing [in]								
			16	19.2	24	16	19.2	24	16	19.2	24
11⅞"	6500s 1.8	24	0	0	0	0	0	0	0	0	1
		26	0	0	0	0	0	0	0	0	X
		28	0	0	0	0	0	0	0	0	X
		30	0	0	0	0	0	1	0	0	X
		32	0	0	0	0	0	1	0	0	X
		34	0	0	0	0	0	X	0	1	X
		36	0	0	0	0	0	X	0	1	X
		38	0	0	0	0	0	X	0	1	X
		40	0	0	1	0	0	X	0	X	X
	60s 2.0	24	0	0	0	0	0	0	0	0	1
		26	0	0	0	0	0	0	0	0	1
		28	0	0	0	0	0	WS	0	0	X
		30	0	0	0	0	0	1	0	0	X
		32	0	0	0	0	0	1	0	1	X
		34	0	0	0	0	0	X	0	1	X
		36	0	0	WS	0	0	X	0	1	X
		38	0	0	1	0	0	X	0	1	X
		40	0	0	1	0	1	X	1	X	X
	90s 2.0	24	0	0	0	0	0	0	0	0	0
		26	0	0	0	0	0	0	0	0	0
		28	0	0	0	0	0	0	0	0	0
		30	0	0	0	0	0	0	0	0	0
		32	0	0	0	0	0	0	0	0	0
		34	0	0	0	0	0	0	0	0	1
		36	0	0	0	0	0	0	0	0	1
		38	0	0	0	0	0	0	0	0	1
		40	0	0	0	0	0	0	0	0	2
14"	4500s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	WS	0	0	WS
		28	0	0	0	0	0	WS	0	0	1
		30	0	0	0	0	0	WS	0	WS	X
		32	0	0	0	0	0	WS	0	WS	X
		34	0	0	WS	0	0	1	0	WS	X
		36	0	0	WS	0	0	X	0	WS	X
		38	0	0	WS	0	WS	X	0	X	X
		40	0	0	WS	0	WS	X	WS	X	X
		42	0	0	WS	0	WS	X	WS	X	X
	5000s 1.8	24	0	0	0	0	0	WS	0	0	WS
		26	0	0	0	0	0	WS	0	0	WS
		28	0	0	0	0	0	WS	0	WS	1
		30	0	0	WS	0	0	WS	0	WS	1
		32	0	0	WS	0	0	WS	0	WS	2
		34	0	0	WS	0	WS	1	0	WS	X
		36	0	0	WS	0	WS	1	0	WS	X
		38	0	0	WS	0	WS	1	WS	1	X
		40	0	0	WS	0	WS	2	WS	1	X
	6000s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	WS
		28	0	0	0	0	0	WS	0	0	WS
		30	0	0	0	0	0	WS	0	0	1
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	0	0	0	WS	0	WS	1
		36	0	0	WS	0	0	WS	0	WS	1
		38	0	0	WS	0	0	1	0	1	2
		40	0	0	WS	0	WS	1	0	1	2
	6500s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	WS
		28	0	0	0	0	0	WS	0	0	WS
		30	0	0	0	0	0	WS	0	0	1
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	0	0	0	WS	0	WS	2
		36	0	0	WS	0	0	WS	0	WS	2
		38	0	0	WS	0	0	1	0	1	2
		40	0	0	WS	0	WS	1	0	1	2

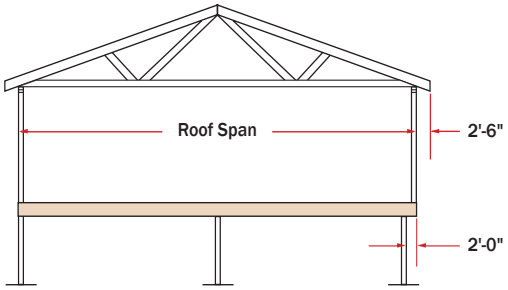
Joist Depth [in]	Joist Series	Roof Truss Span [ft]	Roof Total Load [psf]								
			35			45			55		
			Joist Spacing [in]								
			16	19.2	24	16	19.2	24	16	19.2	24
14"	60s 2.0	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	WS
		28	0	0	0	0	0	0	0	0	WS
		30	0	0	0	0	0	WS	0	0	1
		32	0	0	0	0	0	WS	0	0	1
		34	0	0	0	0	0	WS	0	0	1
		36	0	0	0	0	0	WS	0	WS	2
		38	0	0	0	0	0	1	0	WS	X
		40	0	0	WS	0	0	1	0	1	X
	90s 2.0	24	0	0	0	0	0	0	0	0	0
		26	0	0	0	0	0	0	0	0	0
		28	0	0	0	0	0	0	0	0	0
		30	0	0	0	0	0	0	0	0	0
		32	0	0	0	0	0	0	0	0	0
		34	0	0	0	0	0	0	0	0	WS
		36	0	0	0	0	0	0	0	0	1
		38	0	0	0	0	0	0	0	0	1
		40	0	0	0	0	0	0	0	0	1
16"	4500s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	WS	0	0	WS
		28	0	0	0	0	0	WS	0	0	WS
		30	0	0	0	0	0	WS	0	WS	WS
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	WS	0	0	WS	0	WS	X
		36	0	0	WS	0	0	WS	0	WS	X
		38	0	0	WS	0	WS	1	0	WS	X
		40	0	0	WS	0	WS	1	WS	WS	X
		42	0	0	WS	0	WS	1	WS	1	X
	6000s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	WS
		28	0	0	0	0	0	WS	0	0	WS
		30	0	0	0	0	0	WS	0	0	WS
		32	0	0	0	0	0	WS	0	WS	WS
		34	0	0	0	0	0	WS	0	WS	1
		36	0	0	WS	0	0	WS	0	WS	1
		38	0	0	WS	0	0	WS	0	WS	2
		40	0	0	WS	0	WS	WS	0	WS	2
	6500s 1.8	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	WS
		28	0	0	0	0	0	WS	0	0	WS
		30	0	0	0	0	0	WS	0	0	WS
		32	0	0	0	0	0	WS	0	0	WS
		34	0	0	0	0	0	WS	0	WS	1
		36	0	0	0	0	0	WS	0	WS	1
		38	0	0	0	0	0	WS	0	WS	1
		40	0	0	WS	0	0	WS	0	WS	1
	60s 2.0	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	0	0	WS
		28	0	0	0	0	0	0	0	0	WS
		30	0	0	0	0	0	WS	0	0	WS
		32	0	0	0	0	0	WS	0	0	WS
		34	0	0	0	0	0	WS	0	WS	WS
		36	0	0	0	0	0	WS	0	WS	1
		38	0	0	0	0	0	WS	0	WS	1
		40	0	0	WS	0	0	WS	0	WS	1
	90s 2.0	24	0	0	0	0	0	0	0	0	0
		26	0	0	0	0	0	0	0	0	0
		28	0	0	0	0	0	0	0	0	0
		30	0	0	0	0	0	0	0	0	0
		32	0	0	0	0	0	0	0	0	0
		34	0	0	0	0	0	0	0	0	WS
		36	0	0	0	0	0	0	0	0	WS
		38	0	0	0	0	0	0	0	0	1
		40	0	0	0	0	0	0	0	0	1

1. Cut 48" long reinforcers to match the joist depth. Use min. 23/32" plywood/OSB-rated sheathing, Exposure 1, 48/24 Span Rating panels. The face grain must be horizontal (measure the 48" dimension along the long edge of the panel).
2. Fasten the reinforcer to the joist flanges with 8d nails at 6" o.c. When reinforcing both sides, stagger the nails to avoid splitting the joist flanges.
3. Attach web stiffeners per intermediate Web Stiffener Nailing Schedule on PANEL 2.
4. Use the BC CALC® sizing software to analyze conditions that are not covered by this table. It may be possible to exceed the limitations of this table by analyzing a specific application with BC CALC® sizing software.

KEY TO TABLE

0 . . . . No Reinforcement Required
WS . . . . Web Stiffeners at Support
1 . . . . Web Stiffeners Plus One Reinforcer
2 . . . . Web Stiffeners Plus Two Reinforcers
X . . . . Use Deeper Joists or Closer Spacing

Reinforced Load Bearing Cantilever Detail

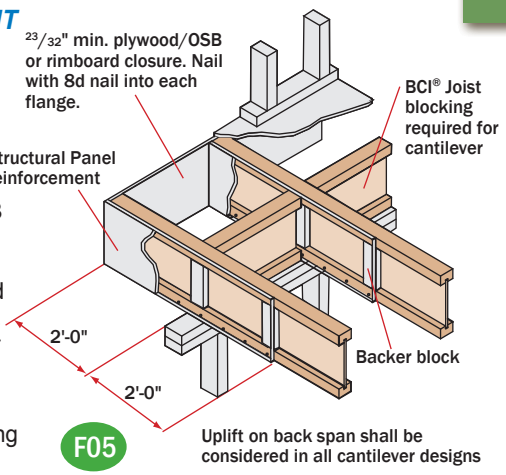


- The tables and details shown in this guide indicate the type of reinforcements, if any, that are required for load-bearing cantilevers up to a maximum length of 2'-0". Cantilevers longer than 2'-0" cannot be reinforced. **However, longer cantilevers with lower loads may be allowable without reinforcement. Analyze specific applications with the BC CALC® software.**

PLYWOOD / OSB REINFORCEMENT (If Required per BC CALC® analysis)

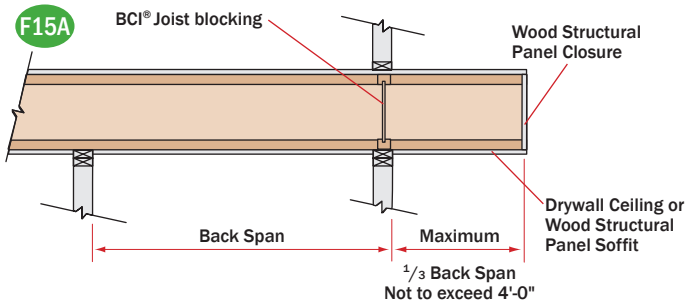
Analyze BCI® Load Bearing Cantilevers in BC CALC® Software

- 23/32" Min. x 48" long plywood / OSB rated sheathing must match the full depth of the BCI® Joist. Nail to the BCI® Joist with 8d nails at 6" o.c. and nail with 4-8d nails into backer block. When reinforcing both sides, stagger nails to limit splitting. Install with horizontal face grain.
- Contact Boise Cascade EWP Engineering for reinforcement requirements on BCI® Joist depths greater than 16".



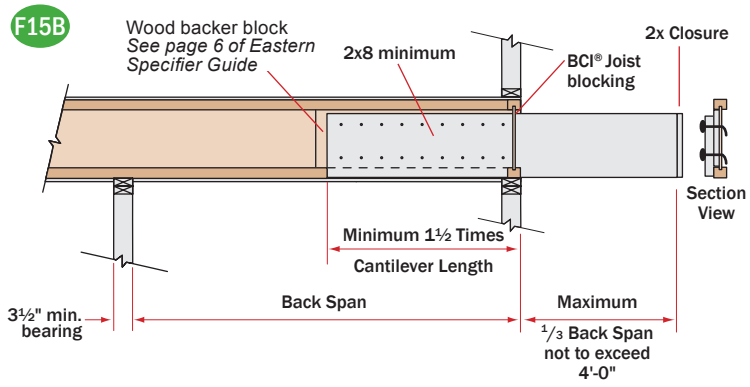
Non-Load Bearing Wall Cantilever Details

BCI® Joists are intended only for applications that provide permanent protection from the weather.

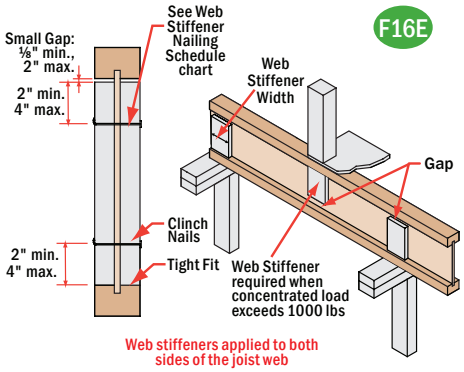


- These details apply to cantilevers with uniform loads only.
- It may be possible to exceed the limitations of these details by analyzing a specific application with the BC CALC® software.

Fasten the 2x8 minimum to the BCI® Joist by nailing through the backer block and joist web with 2 rows of 10d nails at 6" on center. Use 16d nails with BCI® 90s 2.0 joists. Clinch all nails.



Web Stiffener Requirements



Web Stiffener Specifications

BCI® Joist Series	For Structural Capacity (Min. Thick)	Lateral Restraint in Hanger	Minimum Width
4500s 1.8	⅝"	⅝"	2 5/16"
5000s 1.8	⅝"	¾"	2 5/16"
6000s 1.8	¾"	⅛"	2 5/16"
6500s 1.8	¾"	1" or 1⅛"	2 5/16"
60s 2.0	¾"	⅛"	2 5/16"
90s 2.0	2x4 lumber (vertical)		

NOTES

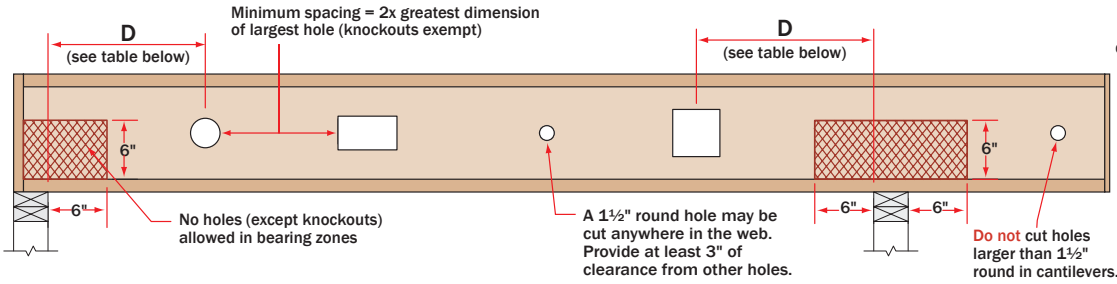
- Web stiffeners are optional except as noted below.
- Web stiffeners are always required in hangers that do not extend up to support the top flange of the BCI® Joist. Web stiffeners may be required with certain sloped or skewed hangers or to achieve uplift values. Refer to the hanger manufacturer's installation requirements.
- Web stiffeners are always required in certain roof applications. See Roof Framing Details on PANEL 3.
- Web stiffeners are always required under concentrated loads that exceed 1000 pounds. Install the web stiffeners snug to the top flange in this situation. Follow the nailing schedule for intermediate bearings.
- Web stiffeners may be cut from structural rated wood panels, engineered rimboard or 2x lumber (BCI® 90s only).
- For Structural Capacity: Web stiffeners needed to increase the BCI® Joist's reaction capacity at a specific bearing location.
- Lateral Restraint in Hanger: Web stiffeners required when hanger does not laterally support the top flange (e.g., adjustable height hangers). Web stiffeners may be of multiple thickness (e.g., BCI® 6500s, double ½" panel OK).
- Web stiffeners may be used to increase allowable reaction values. See BCI® Design Properties on page 24 of the ESG or the BC CALC® software.

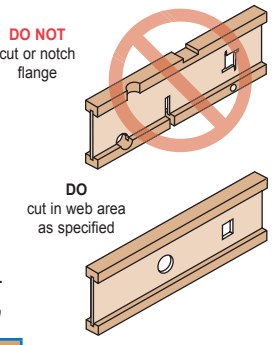
Web Stiffener Nailing Schedule

BCI® Joist Series	Joist Depth	Bearing Location	
		End	Intermediate
4500s 1.8	9½"	2-8d	2-8d
	11⅞"	2-8d	3-8d
	14"	2-8d	5-8d
	16"	2-8d	6-8d
5000s 1.8	9½"	2-8d	2-8d
	11⅞"	2-8d	3-8d
	14"	2-8d	5-8d
6000s 1.8	9½"	2-8d	2-8d
	11⅞"	2-8d	3-8d
	14"	2-8d	5-8d
	16"	2-8d	6-8d
6500s 1.8	9½"	2-8d	2-8d
	11⅞"	2-8d	3-8d
	14"	2-8d	5-8d
	16"	2-8d	6-8d
60s 2.0	11⅞"	2-8d	3-8d
	14"	2-8d	5-8d
	16"	2-8d	6-8d
90s 2.0	11⅞"	3-16d	3-16d
	14"	5-16d	5-16d
	16"	6-16d	6-16d

BCI® Joist Hole Location & Sizing

BCI® Joists are manufactured with 1½" round perforated knockouts in the web at approximately 12" on center





Minimum distance from support, listed in table below, is required for all holes greater than 1½"

MINIMUM DISTANCE (D) FROM ANY SUPPORT TO THE CENTERLINE OF THE HOLE

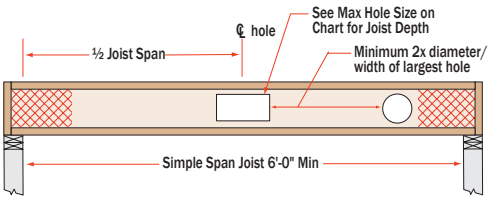
Round Hole Diameter [in]			2	3	4	5	6	6½	7	8	8⅞	9	10	11	12	13
Rectangular Hole Side [in]			-	-	-	3	5	6	7	-	-	-	-	-	-	-
Any 9½" Joist	Span [ft]	8	1'-0"	1'-1"	1'-5"	2'-1"	2'-9"	3'-1"	3'-5"							
		12	1'-0"	1'-2"	2'-2"	3'-2"	4'-2"	4'-8"	5'-2"							
		16	1'-0"	1'-7"	2'-11"	4'-3"	5'-7"	6'-3"	6'-11"							
Round Hole Diameter [in]			2	3	4	5	6	6½	7	8	8⅞	9	10	11	12	13
Rectangular Hole Side [in]			-	-	-	2	3	4	5	7	8	-	-	-	-	-
Any 11⅞" Joist	Span [ft]	8	1'-0"	1'-1"	1'-5"	1'-10"	2'-4"	2'-7"	2'-10"	3'-4"	3'-9"					
		12	1'-0"	1'-4"	2'-1"	2'-10"	3'-7"	3'-11"	4'-3"	5'-0"	5'-8"					
		16	1'-0"	1'-10"	2'-10"	3'-9"	4'-9"	5'-3"	5'-9"	6'-9"	7'-7"					
		20	1'-1"	2'-3"	3'-6"	4'-9"	5'-11"	6'-7"	7'-2"	8'-5"	9'-6"					
Round Hole Diameter [in]			2	3	4	5	6	6½	7	8	8⅞	9	10	11	12	13
Rectangular Hole Side [in]			-	-	-	-	2	3	3	5	6	6	8	9	-	-
Any 14" Joist	Span [ft]	8	1'-0"	1'-1"	1'-2"	1'-3"	1'-8"	1'-10"	2'-1"	2'-6"	2'-10"	2'-11"	3'-4"	3'-8"		
		12	1'-0"	1'-1"	1'-3"	1'-10"	2'-6"	2'-10"	3'-1"	3'-9"	4'-3"	4'-4"	5'-0"	5'-7"		
		16	1'-0"	1'-1"	1'-8"	2'-6"	3'-4"	3'-9"	4'-2"	5'-0"	5'-8"	5'-10"	6'-8"	7'-5"		
		20	1'-0"	1'-1"	2'-1"	3'-2"	4'-2"	4'-8"	5'-2"	6'-3"	7'-2"	7'-3"	8'-4"	9'-4"		
		24	1'-0"	1'-4"	2'-6"	3'-9"	5'-0"	5'-8"	6'-3"	7'-6"	8'-7"	8'-9"	10'-0"	11'-2"		
Round Hole Diameter [in]			2	3	4	5	6	6½	7	8	8⅞	9	10	11	12	13
Rectangular Hole Side [in]			-	-	-	-	-	-	2	3	5	5	6	8	9	10
Any 16" Joist	Span [ft]	8	1'-0"	1'-1"	1'-2"	1'-2"	1'-3"	1'-3"	1'-3"	1'-7"	1'-11"	2'-0"	2'-5"	2'-9"	3'-2"	3'-7"
		12	1'-0"	1'-1"	1'-2"	1'-2"	1'-3"	1'-6"	1'-10"	2'-5"	2'-11"	3'-0"	3'-7"	4'-2"	4'-9"	5'-4"
		16	1'-0"	1'-1"	1'-2"	1'-2"	1'-8"	2'-1"	2'-6"	3'-3"	3'-11"	4'-0"	4'-10"	5'-7"	6'-4"	7'-2"
		20	1'-0"	1'-1"	1'-2"	1'-2"	2'-1"	2'-7"	3'-1"	4'-1"	4'-11"	5'-1"	6'-0"	7'-0"	8'-0"	8'-11"
		24	1'-0"	1'-1"	1'-2"	1'-4"	2'-6"	3'-1"	3'-9"	4'-11"	5'-11"	6'-1"	7'-3"	8'-5"	9'-7"	10'-9"

- Select a table row based on joist depth and the actual joist span rounded up to the nearest table span. Scan across the row to the column headed by the appropriate round hole diameter or rectangular hole side. Use the longest side of a rectangular hole. The table value is the closest that the centerline of the hole may be to the centerline of the nearest support.
- The entire web may be cut out. DO NOT cut the flanges. Holes apply to either single or multiple joists in repetitive member conditions.
- For multiple holes, the amount of uncut web between holes must equal at least twice the diameter (or longest side) of the largest hole.
- 1½" round knockouts in the web may be removed by using a short piece of metal pipe and hammer.
- Holes may be positioned vertically anywhere in the web. The joist may be set with the 1½" knockout holes turned either up or down.
- This table was designed to apply to the design conditions covered by tables elsewhere in this publication (maximum uniform PLF load). Use the BC CALC® software to check other hole sizes or holes under other design conditions. It may be possible to exceed the limitations of this table by analyzing a specific application with the BC CALC® software.

Large Rectangular Holes in BCI® Joists

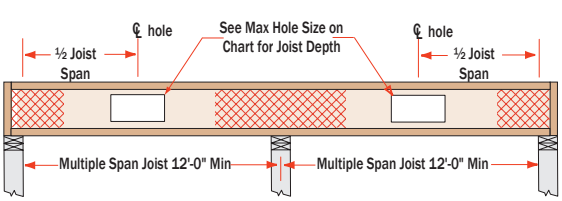
Hole size table based on maximum uniform load of 40 psf live load and 10 psf dead load, at maximum spacing of 24" on-center.

Single Span Joist



Joist Depth	Maximum Hole Size	
	Simple Span	Multiple Span
9½"	6" x 14"	6" x 12"
11⅞"	8" x 16"	8" x 13"
14"	9" x 18" 10" x 17"	8" x 16"
16"	11" x 18" 12" x 16"	10" x 14"

Multiple Span Joist

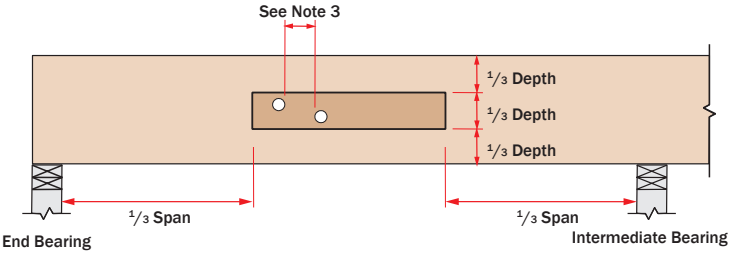


Allowable Holes in VERSA-LAM® Beams

Notes

1. Square and rectangular holes are not permitted.
2. Round holes may be drilled or cut with a hole saw anywhere within the shaded area of the beam.
3. The horizontal distance between adjacent holes must be at least two times the size of the larger hole.
4. Do not drill more than three access holes in any four foot long section of beam.
5. The maximum round hole diameter permitted is:

Beam Depth	Max. Hole Diameter
5 1/2"	3/4"
7 1/4"	1"
9 1/4" and greater	2"



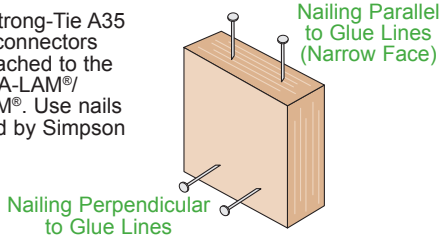
6. These limitations apply to holes drilled for plumbing or wiring access only. The size and location of holes drilled for fasteners are governed by the provisions of the *National Design Specification® for Wood Construction.*
7. Beams deflect under load. Size holes to provide clearance where required.
8. This hole chart is valid for beams supporting uniform load only. For beams supporting concentrated loads or for beams with larger holes, contact Boise Cascade EWP Engineering.

Closest Allowable Nail Spacing

VERSA-LAM® Products Nail Size	Nailing Parallel to Glue Lines (Narrow Face) (1)						Nailing Perpendicular to Glue Lines (Wide Face)	
	VERSA-LAM® 1.4 1800 1 5/16"		VERSA-LAM® 1 3/4"		VERSA-LAM® 3 1/2 & Wider		All Products	
	O.C. [in]	End [in]	O.C. [in]	End [in]	O.C. [in]	End [in]	O.C. [in]	End [in]
8d Box (0.113"ø x 2.5")	3	1½	2	1	2	½	2	½
8d Common (0.131"ø x 2.5")	3	2	3	2	2	1	2	1
10d & 12d Box (0.128"ø x 3", 3.25")	3	2	3	2	2	1	2	1
16d Box (0.135"ø x 3.5")	3	2	3	2	2	1	2	1
10d & 12d Common & 16d Sinker (0.148"ø x 3", 3.25")	4	3	4	3	2	2	2	2
16d Common (0.162"ø x 3.5")	4	3	4	3	2	2	2	2

- Offset and stagger nail rows from floor sheathing and wall sole plate.
- Simpson Strong-Tie A35 and LPT4 connectors may be attached to the side VERSA-LAM®/ VERSA-RIM®. Use nails as specified by Simpson Strong-Tie.

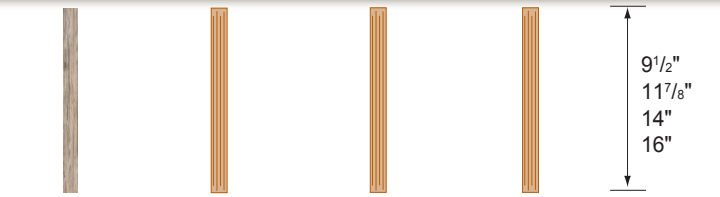
VERSA-LAM® & VERSA-RIM® Products



Nailing Notes

1) For 1¾" thickness and greater, 2 rows of nails (such as for a metal strap) are allowed (use ½" minimum offset between rows and stagger nails).

Boise Cascade Rimboard Properties



1", 1 1/8" BC RIM BOARD® OSB | 1" BC RIM BOARD®★ | 1 5/16" VERSA-LAM® 1.4 1800★ | 1¾" VERSA-LAM® 2.0 3100

★Product may not be available. Check with supplier or Boise Cascade representative for availability.

Product	Vertical Load Capacity		Maximum Floor Diaphragm Lateral Capacity [lb/ft]	Allowable Design Values			
	Uniform [plf]	Point [lb]		Flexural Stress [lb/in²]	Modulus of Elasticity [lb/in²]	Horizontal Shear [lb/in²]	Compression Perpendicular to Grain [lb/in²]
1" BC RIM BOARD® (2) 1" BC RIM BOARD® OSB (2)	3300	3500	180	Limited span capabilities, see note 2			
1⅛" BC RIM BOARD® OSB (2)	4400	3500	180	Limited span capabilities, see note 2			
1 5/16" VERSA-LAM® 1.4 1800 (1)	6000	4450	Permitted per building code for all nominal 2" thick framing floor diaphragms	1800	1,400,000	225	525
1¾" VERSA-LAM® 2.0 3100 (1)	5700	4300	Permitted per building code for all nominal 2" thick framing floor diaphragms	3100	2,000,000	285	750

Closest Allowable Nail Spacing - Narrow Face [in]	Product			
	1" BC RIM BOARD® (2) 1" BC RIM BOARD® OSB (2)	1⅛" BC RIM BOARD® OSB (2)	1 5/16" VERSA-LAM® 1.4 1800 (1)	1¾" VERSA-LAM® 2.0 3100 (1)
8d Box (0.113"ø x 2.5")	3	3	3	3
8d Common (0.131"ø x 2.5")	3	3	3	3
10d & 12d Box (0.128"ø x 3", 3.25")	See publication in note 2 for further nailing information.		3	3
16d Box (0.135"ø x 3.5")			3	3
10d & 12d Common & 16d Sinker (0.148"ø x 3", 3.25")			4	4
16d Common (0.162"ø x 3.5")			6	6

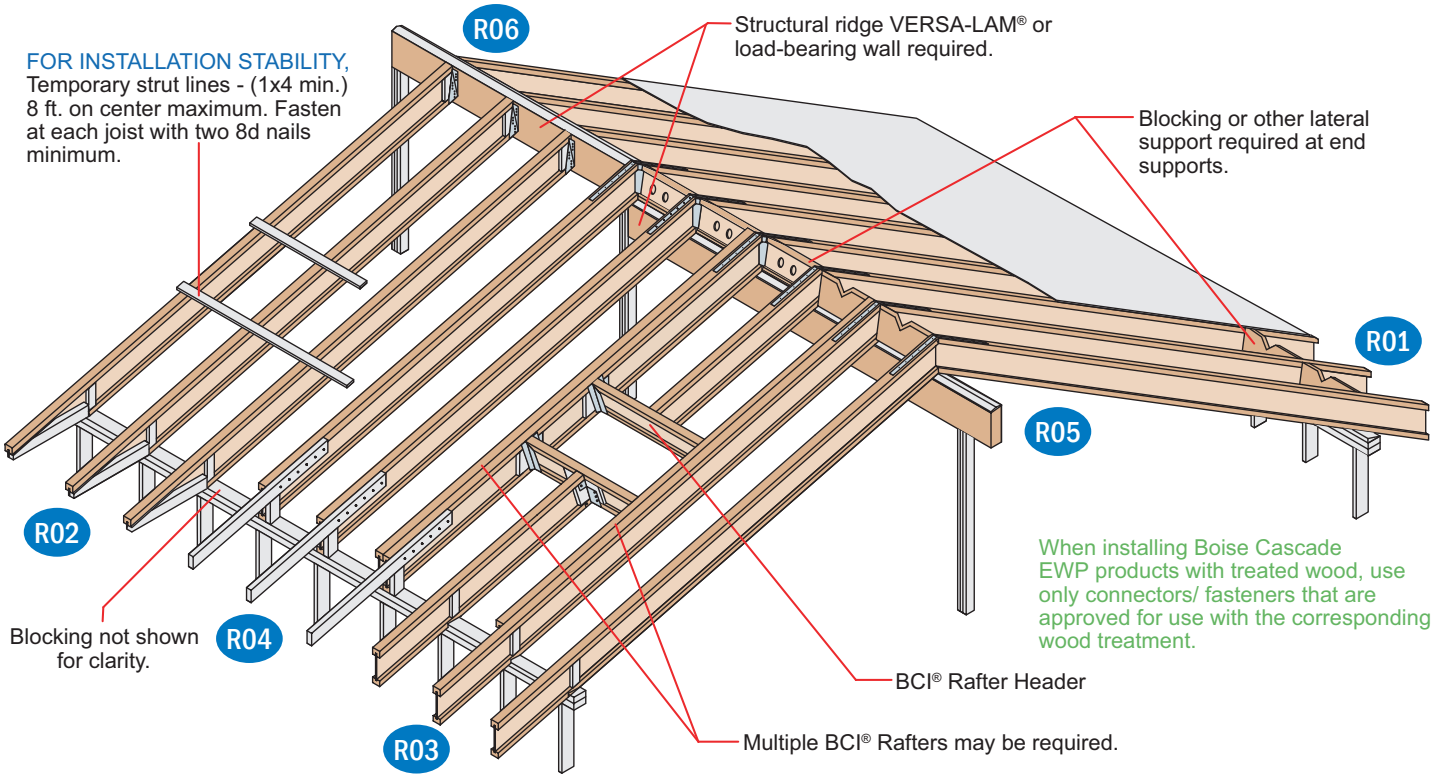
Notes

1. See ICC ESR 1040 for further product information.
2. See *Performance Rated Rim Boards, APA EWS #W345K* for further product information (Rim Board Plus Grade).

BCI® Joists, VERSA-LAM® and ALLJOIST® must be stored, installed and used in accordance with the Boise Cascade EWP Installation Guide, building codes, and to the extent not inconsistent with the Boise Cascade EWP Installation Guide, usual and customary building practices and standards. VERSA-LAM®, ALLJOIST®, and BCI® Joists must be wrapped, covered, and stored off of the ground on stickers at all times prior to installation. VERSA-LAM®, ALLJOIST® and BCI® Joists are intended only for applications that assure no exposure to weather or the elements and an environment that is free from moisture from any source, or any pest, organism or substance which degrades or damages wood or glue bonds. Failure to correctly store, use or install VERSA-LAM®, ALLJOIST®, and BCI® Joist in accordance with the Boise Cascade EWP Installation Guide will void the limited warranty.

BCI® Rafters

Additional roof framing details available with BC FRAMER® software
(see page 33 of the Eastern Specifier Guide)



SAFETY WARNING

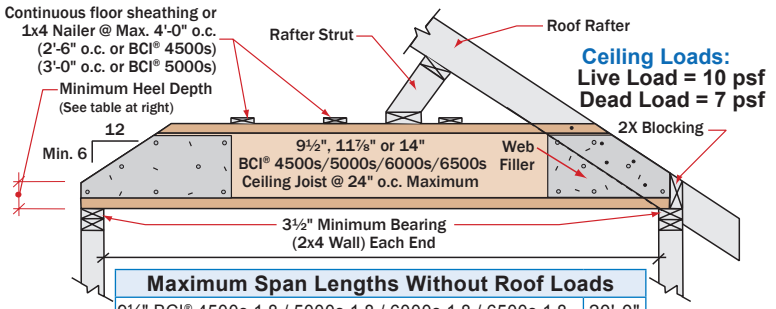
DO NOT ALLOW WORKERS ON BCI® JOISTS UNTIL ALL HANGERS, BCI® RIM JOISTS, RIM BOARDS, BCI® BLOCKING PANELS, X-BRACING AND TEMPORARY 1x4 STRUT LINES ARE INSTALLED AS SPECIFIED BELOW.

SERIOUS ACCIDENTS CAN RESULT FROM INSUFFICIENT ATTENTION TO PROPER BRACING DURING CONSTRUCTION. ACCIDENTS CAN BE AVOIDED UNDER NORMAL CONDITIONS BY FOLLOWING THESE GUIDELINES:

- Build a braced end wall at the end of the bay, or permanently install the first eight feet of BCI® Joists and the first course of sheathing. As an alternate, temporary sheathing may be nailed to the first four feet of BCI® Joists at the end of the bay.
- All hangers, BCI® rim joists, rim boards, BCI® blocking panels, and x-bracing must be completely installed and properly nailed as each BCI® Joist is set.
- Install temporary 1x4 strut lines at no more than eight feet on center as additional BCI® Joists are set. Nail the strut lines to the sheathed area, or braced end wall, and to each BCI® Joist with two 8d nails.
- The ends of cantilevers must be temporarily secured by strut lines on both the top and bottom flanges.
- Straighten the BCI® Joists to within ½ inch of true alignment before attaching strut lines and sheathing.
- Remove the temporary strut lines only as required to install the permanent sheathing.
- Failure to install temporary bracing may result in sideways buckling or roll-over under light construction loads.

BCI® Ceiling Joist with Bevel End Cut *(For Limited-Access Attics Only)*

BCI® Joist shall not be used as collar/tension tie. Roof rafter shall be supported by ridge beam or other upper bearing support.



Maximum Span Lengths Without Roof Loads	
9½" BCI® 4500s 1.8 / 5000s 1.8 / 6000s 1.8 / 6500s 1.8	20'-0"
11⅞" BCI® 4500s 1.8 / 5000s 1.8 / 6000s 1.8 / 6500s 1.8	22'-6"
14" BCI® 4500s 1.8 / 5000s 1.8 / 6000s 1.8 / 6500s 1.8	24'-6"

(If roof loads present, see Notes 2 & 3 at right)

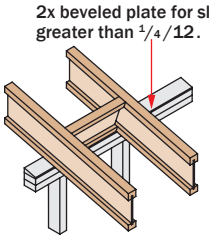
Minimum Heel Depths	Joist Depth	End Wall	
		2 x 4	2 x 6
	9½"	2½"	1½"
	11⅞"	3½"	2½"
	14"	4½"	3½"

Notes:

1) Detail is to be used only for ceiling joists with no access to attic space.
2) Ceiling joist must be designed to carry all roof load transferred through rafter struts as shown.
3) BCI® ceiling joist end reaction may not exceed 550 pounds.
4) Minimum roof slope is 6/12.
5) Nail roof rafter to BCI® top flange with 1 - 10d (3" long) box or larger nail.
6) 1x4 nailers must be continuous and nailed to a braced end wall.
7) Install a web filler on each side of BCI® Joist at beveled ends. Nail roof rafter to BCI® Joist per building code requirements for ceiling joist to roof rafter connection.

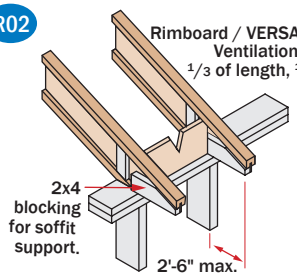
Additional roof framing details available with BC FRAMER® software

R01



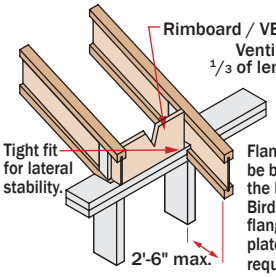
Simpson VPA or USP TMP connectors or equal can be used in lieu of beveled plate for slopes from 3/12 to 12/12.

R02

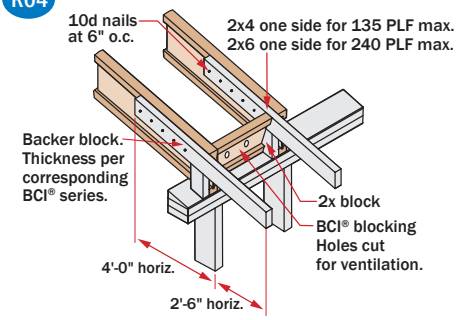


Flange of BCI® Joists may be birdsmouth cut only at the low end of the joist. Birdsmouth cut BCI® Joist flange must bear fully on plate, web stiffener required each side. Bottom flange shall be fully supported.

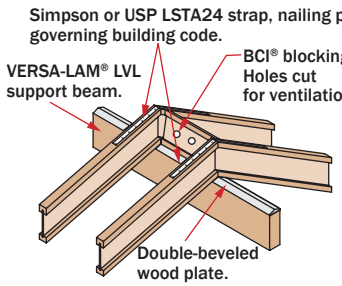
R03



R04

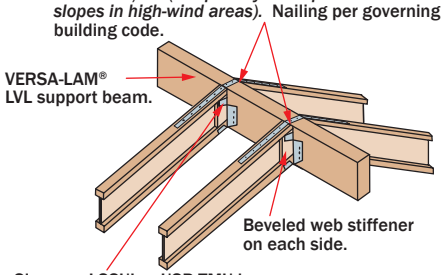


R05

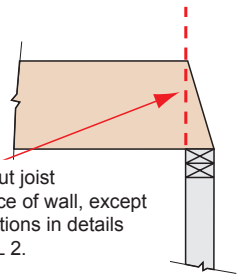


Blocking on both sides of ridge may be required for shear transfer per design professional of record.

R06

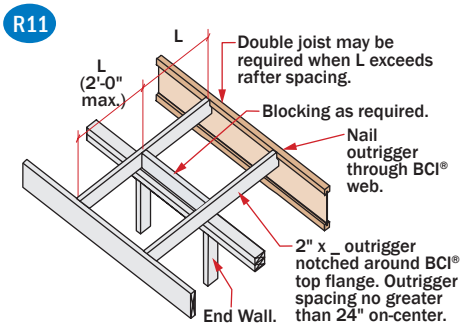


R07

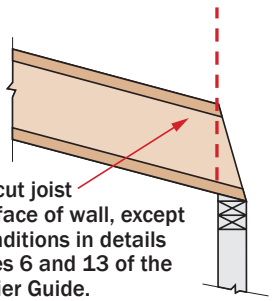


DO NOT bevel-cut joist beyond inside face of wall, except for specific conditions in details shown on PANEL 2.

R11



DN05



DO NOT bevel-cut joist beyond inside face of wall, except for specific conditions in details shown on pages 6 and 13 of the Eastern Specifier Guide.

NOTES TO ROOF FRAMING DETAILS

LATERAL SUPPORT

- BCI® Joists must be laterally supported at end supports (including supports adjacent to overhangs) with hangers, rimboard, or blocking (VERSA-LAM®, BOISE CASCADE® Rimboard or BCI® Joist). Metal cross bracing or other x-bracing provides adequate lateral support for BCI® Joists, consult governing building code for roof diaphragm connection provisions.

MINIMUM BEARING LENGTH FOR BCI® JOISTS

- Minimum end bearing: 1½" for all BCI® Joists. 3½" is required at cantilever and intermediate supports.
- Longer bearing lengths allow higher reaction values. Refer to the building code evaluation report or the BC CALC® sizing software.

NAILING REQUIREMENTS

- BCI® rim joist, rim board or closure panel to BCI® joist:
  - Rims or closure panel 1¾ inches thick and less: 2-8d nails, one each in the top and bottom flange.
  - BCI® 4500s, 5000s rim joist: 2-10d box nails, one each in the top and bottom flange.
  - BCI® 6000s, 60s rim joist: 2-16d box nails, one each in the top and bottom flange.
  - BCI® 6500s, 90s rim joist: Toe-nail top flange to rim joist with 2-10d box nails, one each side of flange.
- BCI® rim joist, rim board or BCI® blocking panel to support:
  - Min. 8d nails @ 6" o.c. per IRC.
  - Connection per design professional of record's specification for shear transfer
- BCI® joist to support:
  - 2-8d nails, one on each side of the web, placed 1½ inches minimum from the end of the BCI® Joist to limit splitting.
- Sheathing to BCI® joist:
  - Prescriptive residential roof sheathing nailing requires 8d common nails @ 6" o.c. on edges and @ 12" o.c. in the field Table IRC R602.3(1).
  - See closest allowable nail spacing limits on PANEL A for floor diaphragm nailing specified at closer spacing than IRC.
  - Maximum bracing spacing for full lateral stability: 18" for BCI® 4500s and 5000s, 24" for larger BCI® joist series.
  - 14 gauge staples may be substituted for 8d nails if the staples penetrate at least 1 inch into the joist.
  - Wood screws may be acceptable, contact local building official and/or Boise Cascade EWP Engineering for further information.

BACKER AND FILLER BLOCK DIMENSIONS

Series	Backer Block Thickness	Filler Block Thickness
4500s 1.8	5/8" or 3/4" wood panels	Two 5/8" wood panels or 2 x _
5000s 1.8	3/4" or 7/8" wood panels	Two 3/4" wood panels or 2 x _
6000s 1.8	1⅛" or two ½" wood panels	2 x _ + 7/16" or ½" wood panel
6500s 1.8	1⅛" or two 5/8" wood panels	2 x _ + 5/8" or 3/4" wood panel
60s 2.0	1⅛" or two ½" wood panels	2 x _ + 7/16" or ½" wood panel
90s 2.0	2 x _ lumber	Double 2 x _ lumber

- Cut backer and filler blocks to a maximum depth equal to the web depth minus ¼" to avoid a forced fit.

WEB STIFFENER REQUIREMENTS

- See *Web Stiffener Requirements* on PANEL 2.

PROTECT BCI® JOISTS FROM THE WEATHER

- BCI® Joists are intended only for applications that provide permanent protection from the weather. Bundles of BCI® Joists should be covered and stored off of the ground on stickers.

MAXIMUM SLOPE

- Unless otherwise noted, all roof details are valid for slopes of 12 in 12 or less.

VENTILATION

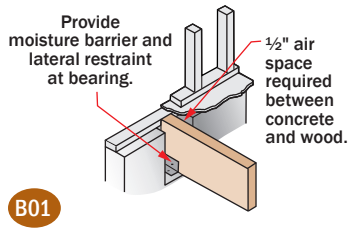
- The 1½ inch, pre-stamped knock-out holes spaced at 12 inches on center along the BCI® Joist may all be knocked out and used for cross ventilation. Consult a ventilation expert for specific requirements. Deeper joists that what is structurally needed may be advantageous in ventilation design. Consult local building official and/or ventilation specialist for specific ventilation requirements.

BIRDSMOUTH CUTS

- BCI® Joists may be birdsmouth cut only at the low end support. BCI® joists with birdsmouth cuts may cantilever up to 2'-6" past the low end support. The bottom flange must sit fully on the support and may not overhang the inside face of the support. High end supports and intermediate supports may not be birdsmouth cut.

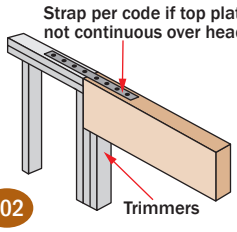
VERSA-LAM® Beam Details

Bearing at concrete/masonry walls



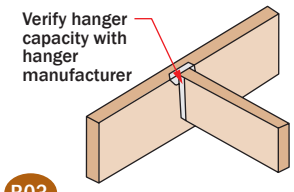
B01

Bearing for door or window header



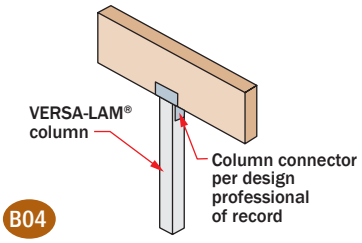
B02

Beam to beam connector



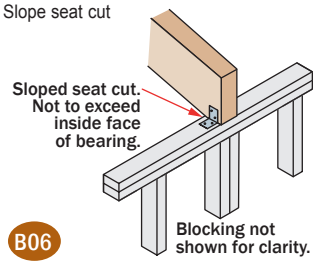
B03

Bearing at column



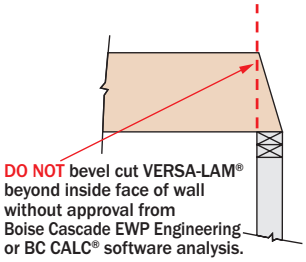
B04

Slope seat cut



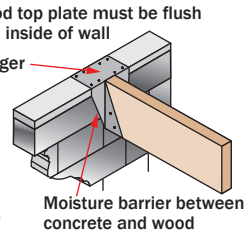
B06

Bevel cut



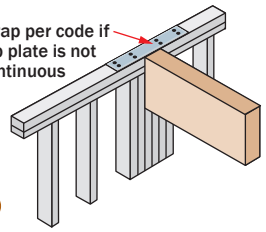
B07

Beam to concrete/masonry walls



B08

Bearing framing into wall



B09

VERSA-LAM® Installation Notes

- Minimum of ½" air space between beam and wall pocket or adequate barrier must be provided between beam and concrete/masonry.
- Adequate bearing shall be provided. If not shown on plans, please refer to load tables in your region's Specifier Guide.
- VERSA-LAM® beams are intended for interior applications only and should be kept as dry as possible during construction.
- Continuous lateral support of top of beam shall be provided (side or top bearing framing).

Multiple Member Connectors

Side-Loaded Applications

Number of Members	Maximum Uniform Side Load [plf]							
	Nailed		½" Dia. Through Bolt[1]			⅝" Dia. Through Bolt[1]		
	2 rows 16d Sinkers @ 12" o.c.	3 rows 16d Sinkers @ 12" o.c.	2 rows @ 24" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 6" o.c. staggered	2 rows @ 24" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 6" o.c. staggered
1¾" VERSA-LAM® (Depths of 18" and less)								
2	470	705	505	1010	2020	560	1120	2245
3[2]	350	525	375	755	1515	420	840	1685
4[3]	use bolt schedule		335	670	1345	370	745	1495
3½" VERSA-LAM®								
2[3]	use bolt schedule		855	1715	N/A	1125	2250	N/A
1¾" VERSA-LAM® (Depths of 24")								
Number of Members	Nailed		½" Dia. Through Bolt[1]			⅝" Dia. Through Bolt[1]		
	3 rows 16d Sinkers @ 12" o.c.	4 rows 16d Sinkers @ 12" o.c.	3 rows @ 24" o.c. 8" staggered	3 rows @ 18" o.c. 6" staggered	3 rows @ 12" o.c. 4" staggered	3 rows @ 24" o.c. 8" staggered	3 rows @ 18" o.c. 6" staggered	3 rows @ 12" o.c. 4" staggered
2	705	940	755	1010	1515	840	1120	1685
3[2]	525	705	565	755	1135	630	840	1260
4[3]	use bolt schedule		505	670	1010	560	745	1120

1. Design values apply to common bolts that conform to ANSI/ASME standard B18.21-1981 (ASTM A307 Grades A&B, SAE J429 Grades 1 or 2, or higher). A washer not less than a standard cut washer shall be between the wood and the bolt head and between the wood and the nut. The distance from the edge of the beam to the bolt holes must be at least 2" for ½" bolts and 2½" for ⅝" bolts. Bolt holes shall be the same diameter as the bolt.
2. The nail schedules shown apply to both sides of a 3-member beam.
3. 16d box nails = 0.135" diameter x 3.5" length, 16d sinker nails = 0.148" diameter x 3.25" length.
4. 7" wide beams must be top-loaded or loaded from both sides (lesser side shall be no less than 25% of opposite side).

Top-Loaded Applications

For top-loaded beams and beams with side loads with less than those shown:

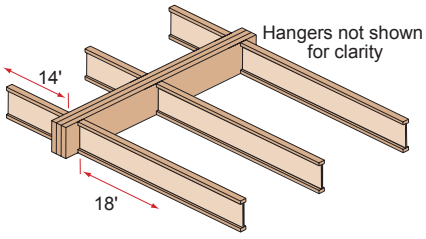
Plies	Depth	Nailing	Maximum Uniform Load From One Side
(2) 1¾" plies	Depths 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	400 plf
	Depths 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	600 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	800 plf
(3) 1¾"" plies [2]	Depths 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	300 plf
	Depths 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	450 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	600 plf
(4) 1¾" plies	Depths 18" & less	2 rows ½" bolts @ 24" o.c., staggered	335 plf
	Depth = 24"	3 rows ½" bolts @ 24" o.c., staggered every 8"	505 plf
(2) 3½" plies	Depths 18" & less	2 rows ½" bolts @ 24" o.c., staggered	855 plf
	Depth 20" - 24"	3 rows ½" bolts @ 24" o.c., staggered every 8"	1285 plf

1. Beams wider than 7" must be designed by the engineer of record.
2. All values in these tables may be increased by 15% for snow-load roofs and by 25% for non-snow load roofs where the building code allows.
3. Use allowable load tables or BC CALC® software to size beams.
4. An equivalent specific gravity of 0.5 may be used when designing specific connections with VERSA-LAM®.
5. Connection values are based upon the 2005 NDS.
6. ***FastenMaster TrussLok, Simpson Strong-Tie SDW or SDS, and USP WS screws may also be used to connect multiple member VERSA-LAM® beams, contact Boise Cascade EWP Engineering for further information.***

Designing Connections for Multiple VERSA-LAM® Members

When using multiple ply VERSA-LAM® beams to create a wider member, the connection of the plies is as critical as determining the beam size. When side loaded beams are not connected properly, the inside plies do not support their share of the load and thus the load-carrying capacity of the full member decreases significantly. The following is an example of how to size and connect a multiple-ply VERSA-LAM® floor beam.

Given: Beam shown below is supporting residential floor load (40 psf live load, 10 psf dead load) and is spanning 16'-0". Beam depth is limited to 14".



Find: A multiple 1¾" ply VERSA-LAM® that is adequate to support the design loads and the member's proper connection schedule.

1. Calculate the tributary width that beam is supporting:
   14' / 2 + 18' / 2 = 16'.
2. Use PLF tables on pages 28-30 of ESG or BC CALC® to size beam.
   A Triple VERSA-LAM® 2.0 3100 1¾" x 14" is found to adequately support the design loads.
3. Calculate the maximum plf load from one side (the right side in this case).
   Max. Side Load = (18' / 2) x (40 + 10 psf) = 450 plf
4. Go to the Multiple Member Connection Table, Side-Loaded Applications, 1¾" VERSA-LAM®, 3 members.
5. The proper connection schedule must have a capacity greater than the max. side load:
   Nailed: 3 rows 16d sinkers @ 12" o.c:
   525 plf is greater than 450 plf OK
   Bolts: ½" diameter 2 rows @ 12" staggered:
   755 plf is greater than 450 plf OK