Boise Cascade
Engineered Wood Products

The information in this document pertains to use in the UNITED STATES ONLY, Allowable Stress Design. Refer to the ALLJOIST Specifier Guide Canada for use in Canada, Limit States Design.

ALLJoist®

INSTALLATION GUIDE

Includes AJS® 140 / 150 / 20 / 190 / 25 and VERSA-LAM® BEAMS

US Version

product manufactured in
St. Jacques, New Brunswick
CANADA

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.

Boise Cascade has not evaluated the effects of any pressure or topical applications or treatments on its BCI® Joist, VERSA-LAM®, and ALLJOIST® products.

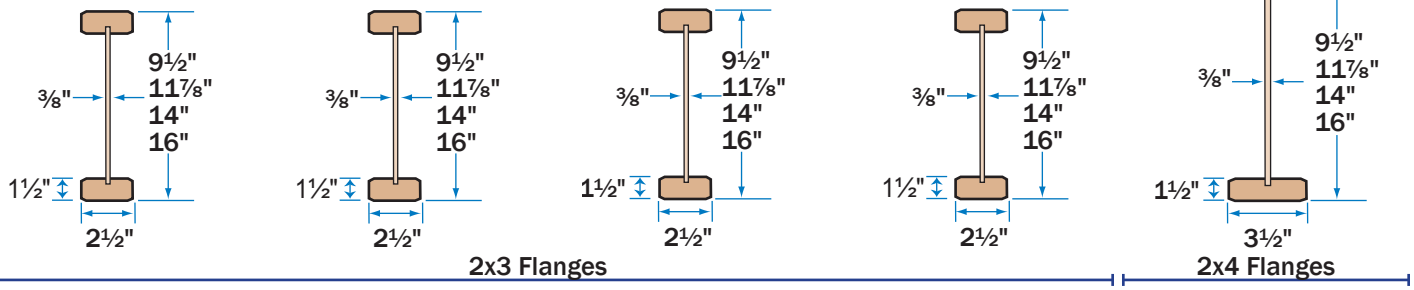
For information about Boise Cascade's engineered wood products, including sales terms and conditions, warranties and disclaimers, visit our website at www.BCewp.com

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

AIG US 08/29/2013 r 11/20/2018

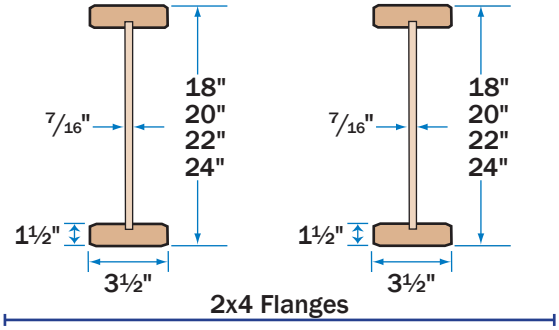
ALLJOIST® Product Profiles

AJS® 140 — AJS® 150 — AJS® 20 — AJS® 190 — AJS® 25



Information on deeper depth AJS® joists is available in the ALLJOIST® Commercial Guide

AJS® 25 Deeper Depths — AJS® 30 Deeper Depths



WARNING

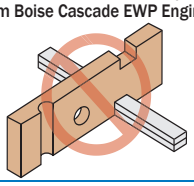
THE FOLLOWING USES ARE NOT ALLOWED

SAFETY WARNING

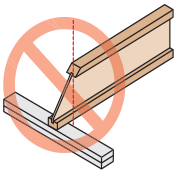
DO NOT ALLOW WORKERS ON AJS® JOISTS UNTIL ALL HANGERS, AJS® RIM JOISTS, RIM BOARDS, AJS® BLOCKING PANELS, X-BRACING AND TEMPORARY 1x4 STRUT LINES ARE INSTALLED AS SPECIFIED BELOW. SERIOUS ACCIDENTS CAN RESULT FROM INSUFFICIENT ATTENTION TO PROPER BRACING DURING CONSTRUCTION. ACCIDENTS CAN BE AVOIDED 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 AJS® Joists and the first course of sheathing. As an alternate, temporary sheathing may be nailed to the first four feet of AJS® Joists at the end of the bay.

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

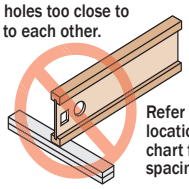


DO NOT cut beyond inside edge of bearing.



DO NOT support joist on web.

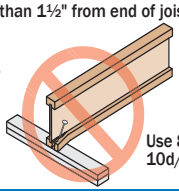
DO NOT cut holes too close to supports or to each other.



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

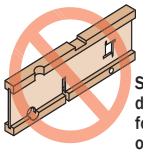
DO NOT nail closer than 1½" from end of joist.

DO NOT use 16d common nails.



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

DO NOT cut or notch flange.

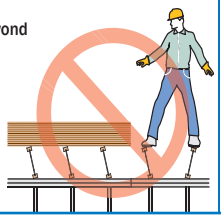


See roof and floor details, this sheet, for allowed cutting of flange.

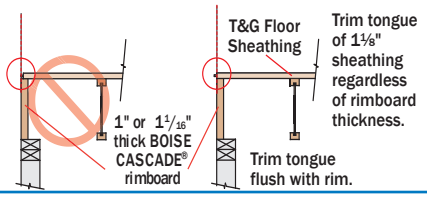
DO NOT walk on joist until proper bracing is in place.

DO NOT load joist beyond design capacity.

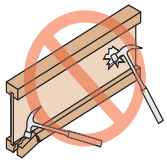
DO NOT stack building materials on unbraced joists.



DO NOT install tongue of floor sheathing flush with either 1" or 1 1/16" thick BOISE CASCADE® rimboard (tongue OK with 1⅛" and thicker BOISE CASCADE® rimboard).



DO NOT hammer on web unless removing knockout holes.



DO NOT hammer on flange.

- All hangers, AJS® rim joists, rim boards, AJS® blocking panels, and x-bracing must be completely installed and properly nailed as each AJS® Joist is set.
- Install temporary 1x4 strut lines at no more than eight feet on center as additional AJS® Joists are set. Nail the strut lines to the sheathed area, or braced end wall, and to each AJS® 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 AJS® 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 AJS® Joist spans, contact Boise Cascade EWP Engineering for proper storage and shoring information.

ALLJOIST® Residential Floor Span Tables

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***.

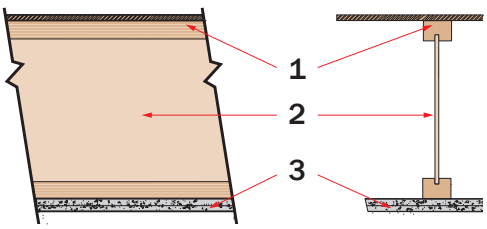
The floor span tables listed below offer three very different performance options, based on performance requirements of the homeowner.

		★★★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+:** A floor that is 100% stiffer than the three star floor. A premium floor that 100% stiffer than the 3-star floor for the 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.			
Joist Depth	ALLJOIST® Series	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
9½"	140	17'–9"	16'–3"	15'–4"	13'–11"	13'–11"	12'–8"	11'–11"	11'–1"	19'–8"	17'–0"	15'–6"	13'–11"
	150	18'–1"	16'–7"	15'–8"	14'–7"	14'–2"	12'–11"	12'–2"	11'–3"	20'–0"	18'–3"	16'–8"	14'–11"
	20	19'–1"	17'–5"	16'–5"	15'–4"	14'–10"	13'–6"	12'–9"	11'–10"	21'–1"	19'–3"	18'–2"	16'–4"
	190	19'–4"	17'–8"	16'–8"	15'–6"	15'–1"	13'–9"	12'–11"	12'–0"	21'–4"	19'–7"	18'–6"	17'–3"
	25	21'–0"	19'–1"	18'–0"	16'–9"	16'–4"	14'–10"	14'–0"	12'–11"	23'–2"	21'–1"	19'–3"	17'–2"
11⅞"	140	21'–2"	19'–4"	17'–8"	15'–10"	16'–7"	15'–1"	14'–3"	13'–3"	22'–5"	19'–5"	17'–8"	15'–10"
	150	21'–7"	19'–8"	18'–7"	17'–0"	16'–10"	15'–4"	14'–6"	13'–5"	23'–10"	20'–10"	19'–0"	17'–0"
	20	22'–8"	20'–9"	19'–7"	18'–3"	17'–9"	16'–2"	15'–2"	14'–1"	25'–1"	22'–10"	20'–10"	18'–8"
	190	23'–0"	21'–0"	19'–10"	18'–6"	18'–0"	16'–4"	15'–5"	14'–4"	25'–5"	23'–3"	21'–11"	19'–0"
	25	24'–11"	22'–9"	21'–5"	18'–3"	19'–6"	17'–8"	16'–8"	15'–5"	27'–7"	24'–0"	21'–11"	18'–3"
14"	140	24'–0"	21'–4"	19'–5"	17'–4"	18'–10"	17'–2"	16'–2"	15'–0"	24'–7"	21'–4"	19'–5"	17'–4"
	150	24'–6"	22'–4"	20'–11"	18'–9"	19'–2"	17'–6"	16'–5"	15'–3"	26'–6"	22'–11"	20'–11"	18'–9"
	20	25'–9"	23'–6"	22'–2"	19'–1"	20'–2"	18'–4"	17'–3"	16'–0"	28'–5"	25'–1"	22'–11"	19'–1"
	190	26'–1"	23'–10"	22'–6"	19'–1"	20'–5"	18'–7"	17'–6"	16'–3"	28'–10"	26'–4"	23'–11"	19'–1"
	25	28'–4"	25'–10"	22'–11"	18'–4"	22'–1"	20'–1"	18'–11"	17'–6"	30'–5"	26'–4"	22'–11"	18'–4"
16"	140	26'–6"	22'–11"	20'–11"	18'–9"	20'–10"	19'–0"	17'–11"	16'–8"	26'–6"	22'–11"	20'–11"	18'–9"
	150	27'–1"	24'–7"	22'–5"	19'–3"	21'–3"	19'–4"	18'–3"	16'–11"	28'–5"	24'–7"	22'–5"	19'–3"
	20	28'–6"	26'–0"	24'–2"	19'–3"	22'–4"	20'–4"	19'–1"	17'–9"	31'–3"	27'–0"	24'–2"	19'–3"
	190	28'–11"	26'–5"	24'–2"	19'–3"	22'–8"	20'–7"	19'–5"	18'–0"	31'–11"	28'–11"	24'–2"	19'–3"
	25	31'–4"	27'–10"	23'–2"	18'–6"	24'–6"	22'–3"	20'–11"	18'–6"	32'–9"	27'–10"	23'–2"	18'–6"

- Table values based on residential floor loads of 40 psf live load and 10 psf dead load (12 psf dead load for AJS® 25 joists).
- Table values assume that $^{23}/_{32}$" min. plywood/OSB rated sheathing is glued and nailed to joists.
- Table values represent the most restrictive of simple or multiple span applications.
- Table values are the maximum allowable clear distance between supports. 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.
- 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 Floor/Ceiling 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.

FIRE ASSEMBLY COMPONENTS

1. Min. $^{23}/_{32}$-inch T&G Wood Structural Panels. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets.
2. AJS® Joists at 24" o.c. or less.
3. Two layers ½" Type C or two layers ⅝" Type X gypsum board

SOUND ASSEMBLY COMPONENTS

When constructed with resilient channels

• Add carpet & pad to fire assembly:	STC=54	IIC=68	or
• Add 3½" glass fiber insulation to fire assembly:	STC=55	IIC=46	or
• Add an additional layer of minimum ⅝" sheathing and 9½" glass fiber insulation to fire assembly:	STC=61	IIC=50	

Floor Framing

Additional roof framing details available with BC FRAMER® software

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.

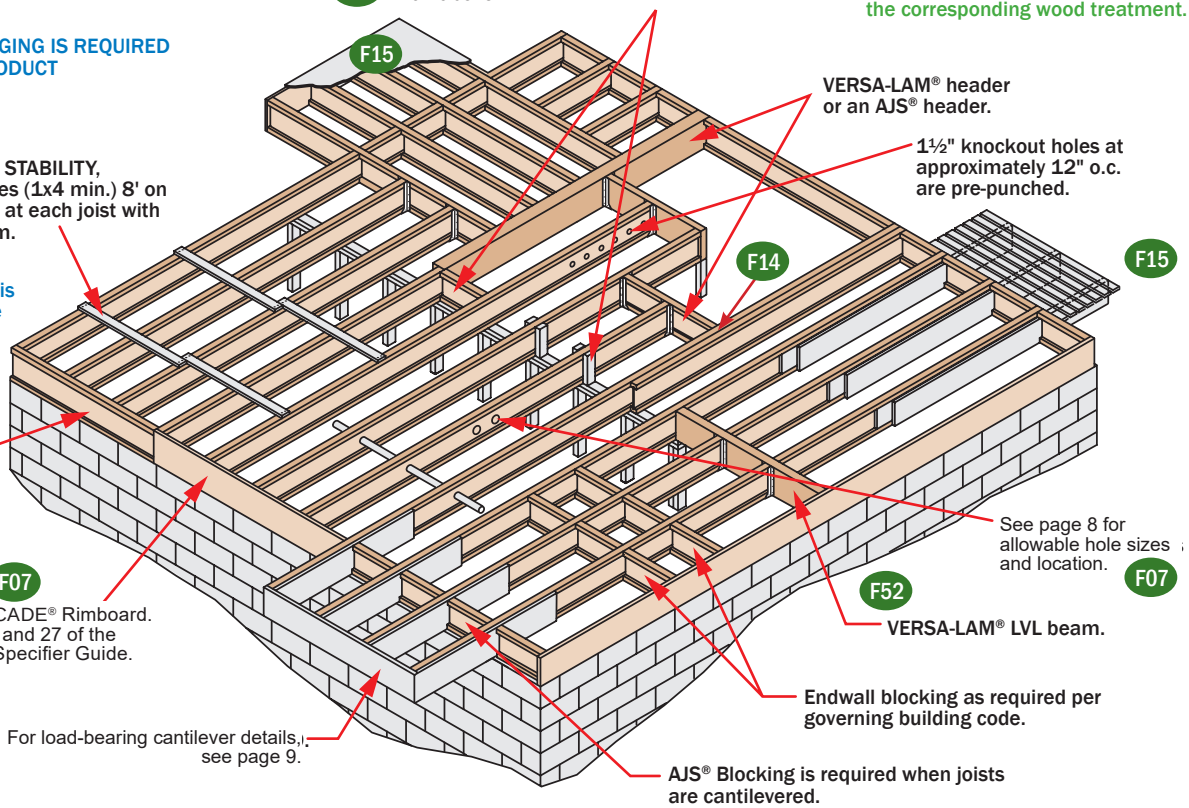
NO MIDSPAN BRIDGING IS REQUIRED FOR ALLJOIST® PRODUCT

FOR INSTALLATION STABILITY, Temporary strut lines (1x4 min.) 8' on center max. Fasten at each joist with 2-8d nails minimum.

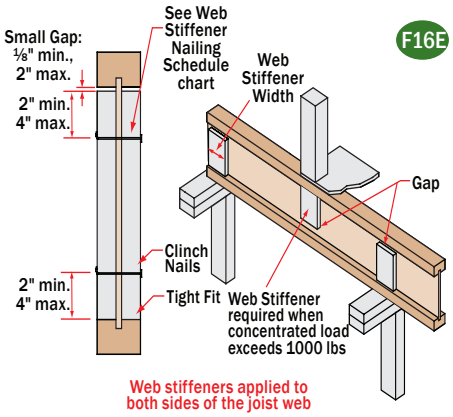
Dimension lumber is not suitable for use as a rim board in ALLJOIST® floor systems.

F06 F09 **AJS® blocking or 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.



Web Stiffener Requirements



Structural Panel Web Stiffener			
	Minimum Thickness		
AJS® Series	In Hanger	No Hanger	Minimum Width
140 / 150 / 20 / 190	1"	1½"	$2^{5}/_{16}$"
25	2x4 lumber (vertical)		

Web Stiffener Nailing Schedule		
AJS® Series	Joist Depth	Nailing
140 150 20 190 25	9½" – 11⅞"	3-10d
	14" – 16"	5-10d

NOTES

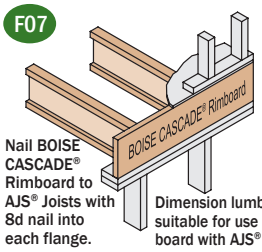
- Web stiffeners are optional except as noted below.
- Web stiffeners are always required for 18" and deeper AJS® joists at all bearing locations.
- Web stiffeners are always required in hangers that do not extend up to support the top flange of the AJS® Joist. Web stiffeners may be required with certain 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 page 7.
- 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 used to increase allowable reaction values. See *AJS® Design Properties* on page 26 of the ASG or the BC CALC® software.

Floor Framing Details

Additional floor framing details available with BC FRAMER® software

END BEARING DETAILS

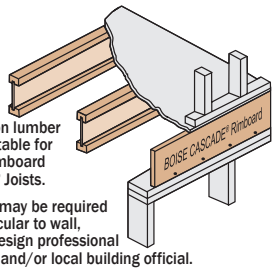
F07



Nail BOISE CASCADE® Rimboard to AJS® Joists with 8d nail into each flange.

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

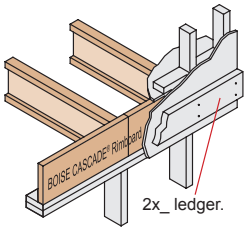
F07A



Dimension lumber is not suitable for use as rimboard with AJS® Joists.

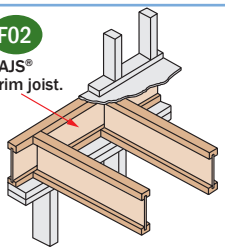
Blocking may be required perpendicular to wall, consult design professional of record and/or local building official.

F07B



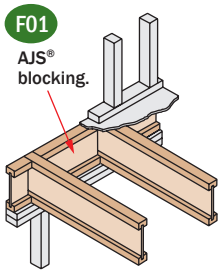
2x_ ledger.

F02

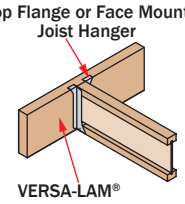


Use of AJS® rimjoist requires 2x6 wall for minimum joist bearing.

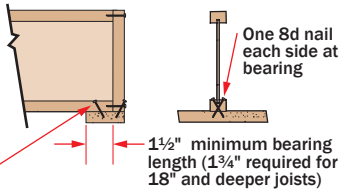
F01



F27A

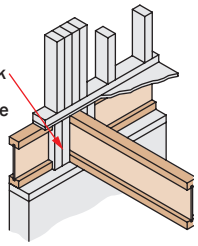


F52

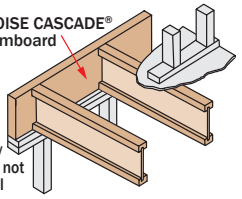


To limit splitting flange, start nails at least 1½" from end. Nails may need to be driven at an angle to limit splitting of bearing plate.

F08



F03

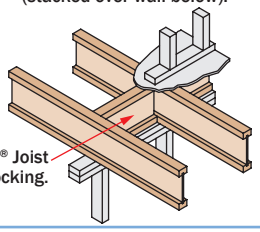


Note: AJS® floor joist must be designed to carry wall above when not stacked over wall below.

Blocking required underneath braced wall panels and shear walls, consult design professional of record.

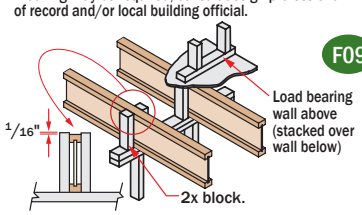
INTERMEDIATE BEARING DETAILS

F06 For load bearing wall above (stacked over wall below).



Blocking may be required, consult design professional of record and/or local building official.

F09



Nail block with one 10d nail into each flange.

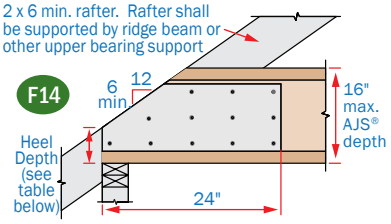
Double Squash Block Vertical Load [lb/ft]				
Size	Joist Spacing [in]			
	12	16	19.2	24
2x4	4463	3347	2789	2231
2x6	7013	5259	4383	3506

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.

AJS® Joist Slope Cut Reinforcement

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

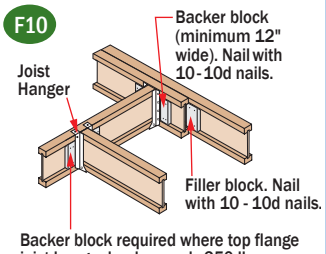
F14



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. 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.

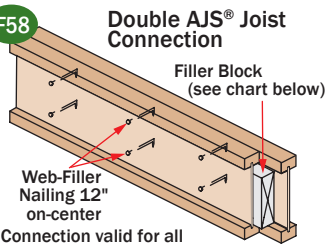
End Wall Bearing	Minimum Heel Depth					
	Roof Pitch					
	6/12	7/12	8/12	9/12	10/12	12/12
2 x 4	4⅜"	4 5/16"	4¼"	4¼"	4¼"	4¼"
2 x 6	3⅜"	3 3/16"	2 5/16"	2¾"	2 9/16"	2¼"

F10



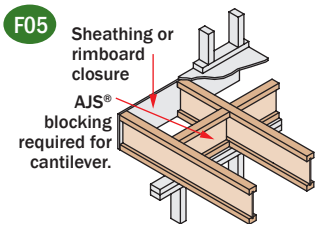
Backer block required where top flange joist hanger load exceeds 250 lbs. Install tight to top flange.

F58 Double AJS® Joist Connection



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

F05



For load bearing cantilever, see pages 9 and 10. Uplift on backspan shall be considered in all cantilever designs.

LATERAL SUPPORT

- AJS® Joists must be laterally supported at the ends with hangers, AJS® rim joists, rim boards, AJS® blocking panels or x-bracing. AJS® blocking panels or x-bracing 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 AJS® JOISTS

- 1½ inches is required at end supports. 3½ inches 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

- AJS® rim joist, rim board or closure panel to AJS® Joist:
  - Rims or closure panel 1¼ inches thick and less: 2-8d nails, one each in the top and bottom flange.
  - AJS® 140/150/20/190 rim joist: 2-16d box nails, one each in the top and bottom flange.
  - AJS® 25 rim joist: Toe-nail top flange to rim joist with 2-10d box nails, one each side of flange.
- AJS® rim joist, rim board or AJS® blocking panel to support:
  - 8d nails at 6 inches on center.
  - When used for shear transfer, follow the building designer's specification.
- AJS® Joist to support:
  - 2-8d nails, one on each side of the web, placed 1½ inches minimum from the end of the AJS® Joist to limit splitting.
- Sheathing to AJS® joist, rim joist, blocking:
  - Prescriptive residential floor sheathing nailing requires 8d common nails @ 6" o.c. on edges and @ 12" o.c. in the field IRC Table R602.3(1). Closer nail spacing may be required per design professional of record.
  - 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

AJS® Series	Backer Block Thickness	Filler Block Thickness
140 150 20 190	1⅛" or two ½" wood panels	2x_ + ⅝" wood panel
25	2x_ lumber	Double 2x_ lumber

- Cut backer and filler blocks to a maximum depth equal to the web depth minus ¼" to avoid a forced fit.
- For deeper AJS® Joists, stack 2x lumber or use multiple pieces of ¾" wood panels.

WEB STIFFENER REQUIREMENTS

- See *Web Stiffener Requirements* on page 4.

PROTECT AJS® JOISTS FROM THE WEATHER

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

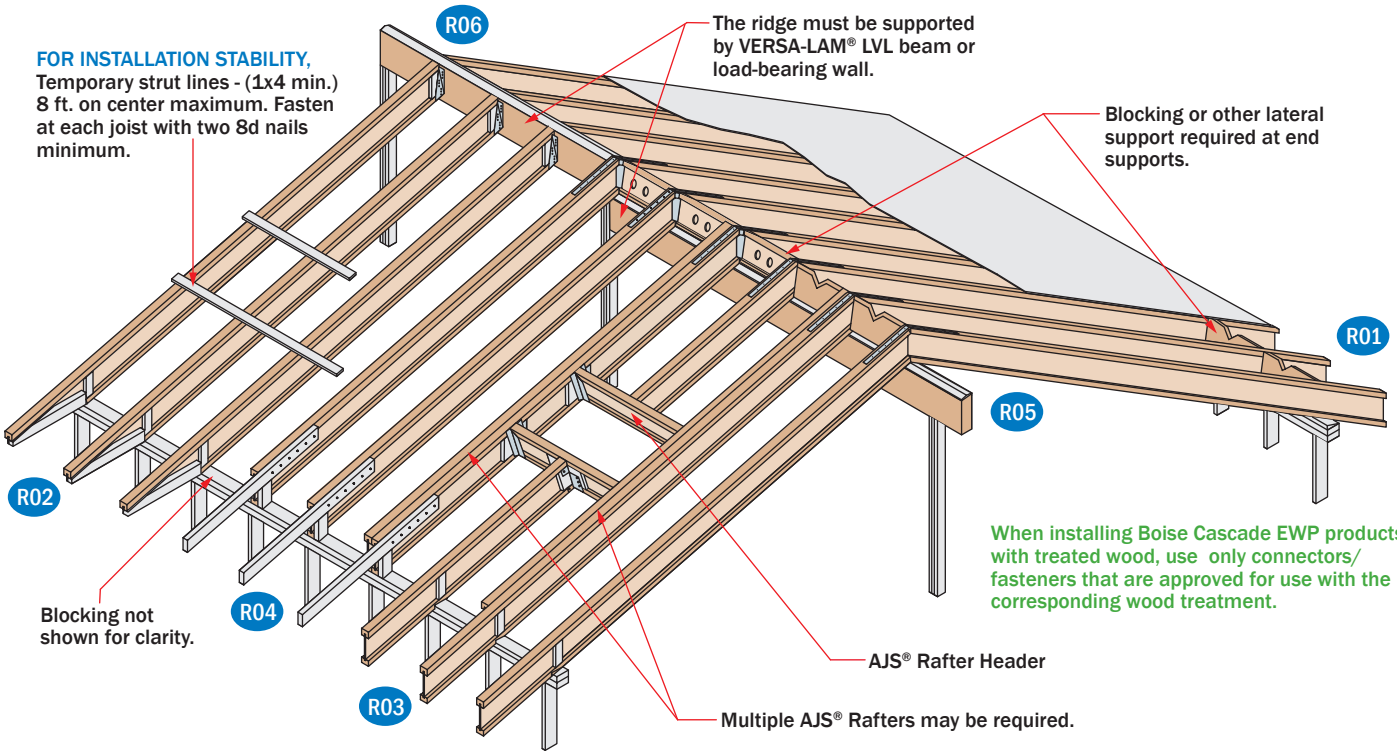
AJS® RIM JOISTS AND BLOCKING

Joist Depth	Vertical Load Transfer Capacity (plf)
9½"	1875
11⅞"	1680
14"	1500
16"	1340

1) Web stiffeners required at each end of blocking panel. Distance between stiffeners must be less than 24".

AJS® Rafters

Additional roof framing details available with BC FRAMER® software



SAFETY WARNING

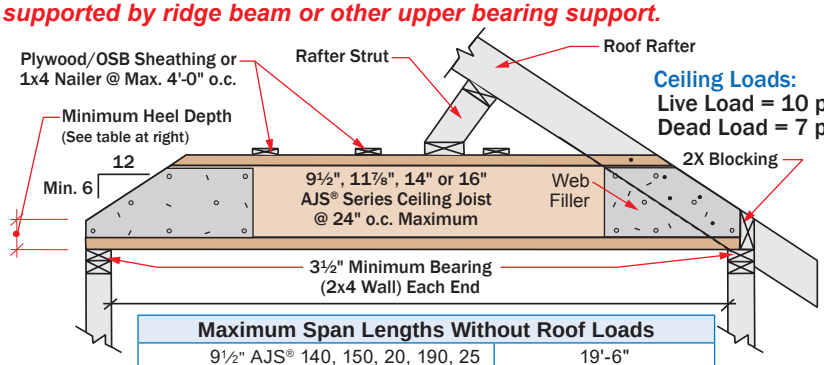
DO NOT ALLOW WORKERS ON AJS® JOISTS UNTIL ALL HANGERS, AJS® RIM JOISTS, RIM BOARDS, AJS® BLOCKING PANELS, X-BRACING AND TEMPORARY 1x4 STRUT LINES ARE INSTALLED AS SPECIFIED BELOW.

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 AJS® Joists and the first course of sheathing. As an alternate, temporary sheathing may be nailed to the first four feet of AJS® Joists at the end of the bay.
- All hangers, AJS® rim joists, rim boards, AJS® blocking panels, and x-bracing must be completely installed and properly nailed as each AJS® Joist is set.
- Install temporary 1x4 strut lines at no more than eight feet on center as additional AJS® Joists are set. Nail the strut lines to the sheathed area, or braced end wall, and to each AJS® 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 AJS® Joist 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.

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

AJS® 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" AJS® 140, 150, 20, 190, 25	19'-6"
11⅞" AJS® 140, 150, 20, 190, 25	22'-0"
14" AJS® 140, 150, 20, 190, 25	24'-6"

If roof loads transfer to ceiling joists through struts, analyze with BC CALC® software, not exceeding end reaction limit stated in Note 3 (see right).

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

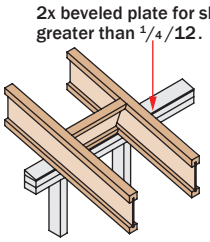
Notes:

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) AJS® ceiling joist end reaction may not exceed 550 pounds.
4) Minimum roof slope is 6/12.
5) Nail roof rafter to AJS® top flange with 1-16d sinker or box nail.
6) 1x4 nails shall be continuous and nailed to an end wall braced to the roof diaphragm.
7) Install a 24" long web stiffener on each side of AJS® Joist at beveled ends. Nail roof rafter to AJS® Joist per building code requirements for ceiling joist to roof rafter connection.

Roof Framing Details

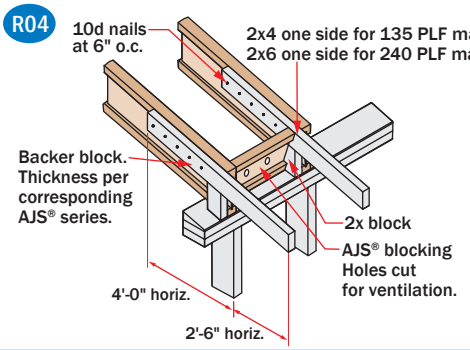
Additional roof framing details available with BC FRAMER® software

R01

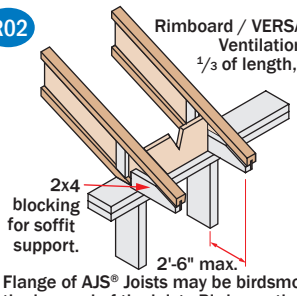


Simpson VPA or USP TMP connectors or equal can be used in lieu of beveled plate for slopes from 3/12 to 12/12.

R04

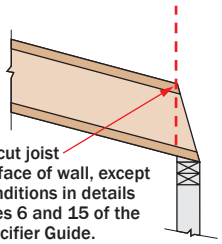


R02



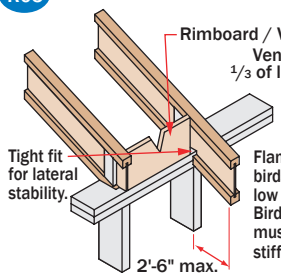
Flange of AJS® Joists may be birdsmouth cut only at the low end of the joist. Birdsmouth cut AJS® joist must bear fully on plate, web stiffener required each side. Bottom flange shall be fully supported.

DN05

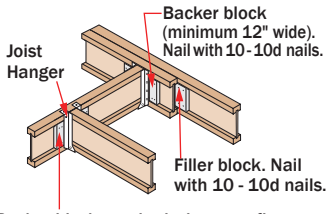


DO NOT bevel-cut joist beyond inside face of wall, except for specific conditions in details shown on pages 6 and 15 of the ALLJOIST® Specifier Guide.

R03

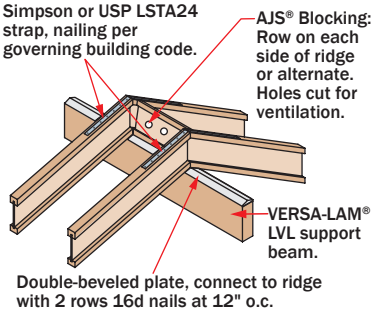


R07

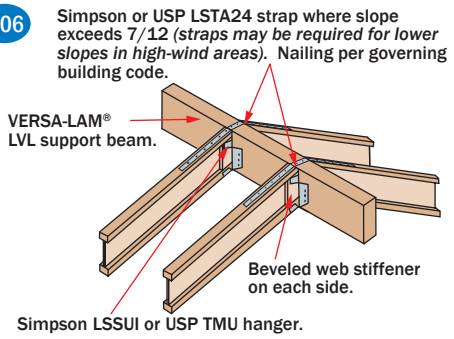


Backer block required where top flange joist hanger load exceeds 250 lbs. Install tight to top flange.

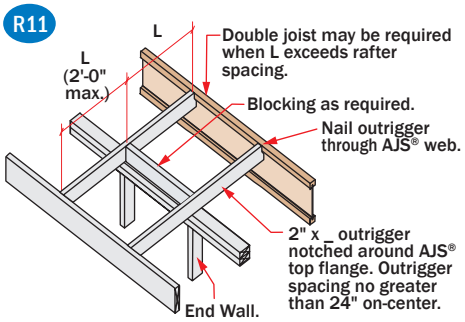
R05



R06



R11



LATERAL SUPPORT

- AJS® Joists must be laterally supported at the ends with hangers, AJS® rim joists, rim boards, AJS® blocking panels or x-bracing. AJS® blocking panels or x-bracing 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 AJS® JOISTS

- 1½ inches is required at end supports. 3½ inches 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

- AJS® rim joist, rim board or closure panel to AJS® Joist:
  - Rims or closure panel 1¼ inches thick and less: 2-8d nails, one each in the top and bottom flange.
  - AJS® 140/150/20/190 rim joist: 2-16d box nails, one each in the top and bottom flange.
  - AJS® 25 rim joist: Toe-nail top flange to rim joist with 2-10d box nails, one each side of flange.
- AJS® rim joist, rim board or AJS® blocking panel to support:
  - 8d nails at 6 inches on center.
  - When used for shear transfer, follow the building designer's specification.
- AJS® Joist to support:
  - 2-8d nails, one on each side of the web, placed 1½ inches minimum from the end of the AJS® Joist to limit splitting.
- Sheathing to AJS® joist, rim joist, blocking:
  - Prescriptive residential roof sheathing nailing requires 8d common nails @ 6" o.c. on edges and @ 12" o.c. in the field IRC Table R602.3(1). Closer nail spacing may be required per design professional of record.
  - 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

AJS® Series	Backer Block Thickness	Filler Block Thickness
140 150 20 190	1⅛" or two ½" wood panels	2x _ + ⅝" wood panel
25	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.
- For deeper AJS® Joists, stack 2x lumber or use multiple pieces of ¾" wood panels.

WEB STIFFENER REQUIREMENTS

- See *Web Stiffener Requirements* on page 4.

PROTECT AJS® JOISTS FROM THE WEATHER

- AJS® Joists are intended only for applications that provide permanent protection from the weather. Bundles of AJS® 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

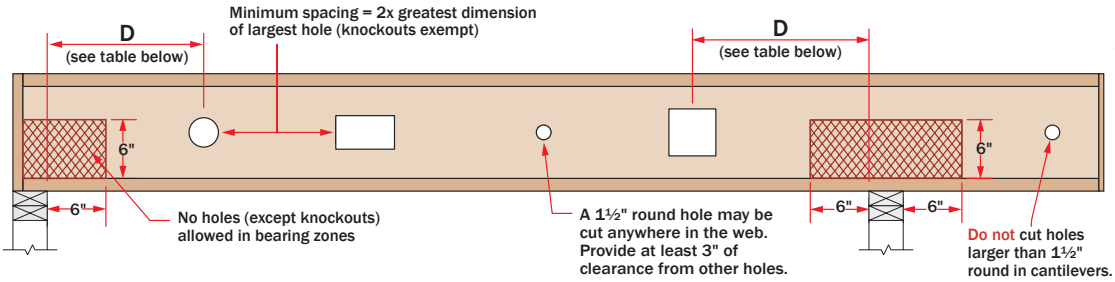
- The 1½ inch, pre-stamped knock-out holes spaced at 12 inches on center along the AJS® Joist may all be knocked out and used for cross ventilation. Deeper joists than what is structurally needed may be advantageous in ventilation design. Consult local building official and/or ventilation specialist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

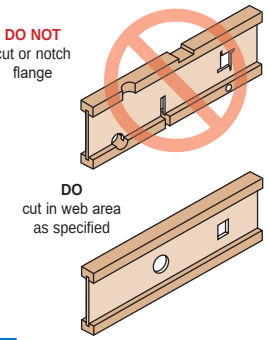
BIRDSMOUTH CUTS

- AJS® Joists may be birdsmouth cut only at the low end support. AJS® 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.

AJS® Joist Hole Location & Sizing

AJS® 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]			-	-	2	4	6	6	-	-	-	-	-	-	-	-
Any 9½" Joist	Span [ft]	8	2'–0"	2'–5"	2'–11"	3'–5"	3'–10"	4'–0"								
		12	3'–0"	3'–8"	4'–5"	5'–1"	5'–10"	6'–0"								
		16	4'–0"	4'–11"	5'–11"	6'–10"	7'–9"	8'–0"								
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'–5"	1'–10"	2'–3"	2'–8"	2'–11"	3'–1"	3'–6"	3'–11"					
		12	1'–5"	2'–1"	2'–9"	3'–5"	4'–0"	4'–4"	4'–8"	5'–4"	5'–11"					
		16	1'–11"	2'–10"	3'–8"	4'–6"	5'–5"	5'–10"	6'–3"	7'–1"	7'–10"					
		20	2'–5"	3'–6"	4'–7"	5'–8"	6'–9"	7'–3"	7'–10"	8'–11"	9'–10"					
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'–4"	1'–8"	1'–11"	2'–1"	2'–6"	2'–10"	2'–11"	3'–4"	3'–9"		
		12	1'–0"	1'–1"	1'–4"	2'–0"	2'–7"	2'–11"	3'–2"	3'–10"	4'–4"	4'–5"	5'–0"	5'–7"		
		16	1'–0"	1'–1"	1'–10"	2'–8"	3'–5"	3'–10"	4'–3"	5'–1"	5'–9"	5'–11"	6'–8"	7'–6"		
		20	1'–0"	1'–3"	2'–4"	3'–4"	4'–4"	4'–10"	5'–4"	6'–4"	7'–3"	7'–4"	8'–5"	9'–5"		
		24	1'–0"	1'–7"	2'–9"	4'–0"	5'–2"	5'–10"	6'–5"	7'–8"	8'–8"	8'–10"	10'–1"	11'–3"		
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'–8"	2'–0"	2'–1"	2'–5"	2'–10"	3'–2"	3'–7"
		12	1'–0"	1'–1"	1'–2"	1'–2"	1'–4"	1'–8"	1'–11"	2'–6"	3'–0"	3'–1"	3'–8"	4'–3"	4'–10"	5'–5"
		16	1'–0"	1'–1"	1'–2"	1'–2"	1'–10"	2'–2"	2'–7"	3'–4"	4'–0"	4'–2"	4'–11"	5'–8"	6'–5"	7'–2"
		20	1'–0"	1'–1"	1'–2"	1'–4"	2'–3"	2'–9"	3'–3"	4'–3"	5'–1"	5'–2"	6'–2"	7'–1"	8'–1"	9'–0"
		24	1'–0"	1'–1"	1'–2"	1'–7"	2'–9"	3'–4"	3'–11"	5'–1"	6'–1"	6'–3"	7'–4"	8'–6"	9'–8"	10'–10"

- 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. 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.

Reinforced Load Bearing Cantilever Tables

AJS® Joists

AJS® 140

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
AJS® 140	9½"	24	0	0	1	0	0	X	0	X	X
		26	0	0	1	0	1	X	1	X	X
		28	0	0	X	0	1	X	1	X	X
		30	0	0	X	0	X	X	X	X	X
		32	0	0	X	1	X	X	X	X	X
		34	0	1	X	1	X	X	X	X	X
		36	0	1	X	1	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
	11⅞"	24	0	0	0	0	0	0	0	0	X
		26	0	0	0	0	0	1	0	0	X
		28	0	0	0	0	0	1	0	1	X
		30	0	0	0	0	0	X	0	1	X
		32	0	0	0	0	0	X	0	1	X
		34	0	0	1	0	0	X	0	X	X
		36	0	0	1	0	1	X	1	X	X
		38	0	0	1	0	1	X	1	X	X
		40	0	0	X	0	1	X	1	X	X
	14"	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	0	1
		32	0	0	0	0	0	WS	0	WS	X
		34	0	0	0	0	0	1	0	WS	X
		36	0	0	WS	0	0	1	0	1	X
		38	0	0	WS	0	0	1	0	1	X
		40	0	0	WS	0	WS	X	0	1	X
	16"	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	0	WS
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	WS	0	0	WS	0	WS	1
		36	0	0	WS	0	0	WS	0	WS	1
		38	0	0	WS	0	WS	WS	0	WS	X
		40	0	0	WS	0	WS	1	0	WS	X

AJS® 150

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
AJS® 150	9½"	24	0	0	1	0	0	2	0	1	X
		26	0	0	1	0	1	X	1	2	X
		28	0	0	1	0	1	X	1	X	X
		30	0	0	2	0	1	X	1	X	X
		32	0	0	2	1	2	X	2	X	X
		34	0	1	X	1	2	X	2	X	X
		36	0	1	X	1	X	X	X	X	X
		38	0	1	X	1	X	X	X	X	X
		40	0	1	X	2	X	X	X	X	X
	11⅞"	24	0	0	0	0	0	0	0	0	1
		26	0	0	0	0	0	1	0	0	1
		28	0	0	0	0	0	1	0	1	X
		30	0	0	0	0	0	1	0	1	X
		32	0	0	0	0	0	1	0	1	X
		34	0	0	1	0	0	2	0	1	X
		36	0	0	1	0	1	X	1	2	X
		38	0	0	1	0	1	X	1	2	X
		40	0	0	1	0	1	X	1	X	X
	14"	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	1
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	WS	0	0	1	0	WS	X
		36	0	0	WS	0	0	1	0	1	X
		38	0	0	WS	0	WS	1	0	1	X
		40	0	0	WS	0	WS	1	WS	1	X
	16"	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	1
		36	0	0	WS	0	0	WS	0	WS	1
		38	0	0	WS	0	WS	WS	0	WS	1
		40	0	0	WS	0	WS	1	WS	WS	X

AJS® 20

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
AJS® 20	9½"	24	0	0	1	0	0	2	0	2	X
		26	0	0	1	0	1	X	1	2	X
		28	0	0	1	0	1	X	1	2	X
		30	0	0	2	0	2	X	1	X	X
		32	0	0	2	1	2	X	2	X	X
		34	0	1	2	1	2	X	2	X	X
		36	0	1	X	1	X	X	2	X	X
		38	0	1	X	1	X	X	X	X	X
		40	0	2	X	2	X	X	X	X	X
	11⅞"	24	0	0	0	0	0	WS	0	0	1
		26	0	0	0	0	0	1	0	0	2
		28	0	0	0	0	0	1	0	1	X
		30	0	0	0	0	0	1	0	1	X
		32	0	0	WS	0	0	2	0	1	X
		34	0	0	1	0	0	X	0	1	X
		36	0	0	1	0	1	X	1	2	X
		38	0	0	1	0	1	X	1	2	X
		40	0	0	1	0	1	X	1	X	X
	14"	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	WS	0	WS
		28	0	0	0	0	0	WS	0	0	1
		30	0	0	0	0	0	WS	0	WS	1
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	WS	0	0	1	0	WS	X
		36	0	0	WS	0	WS	1	0	1	X
		38	0	0	WS	0	WS	1	0	1	X
		40	0	0	WS	0	WS	1	WS	1	X
	16"	24	0	0	0	0	0	0	0	0	WS
		26	0	0	0	0	0	0	WS	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	1
		36	0	0	WS	0	0	WS	0	WS	1
		38	0	0	WS	0	WS	WS	WS	WS	1
		40	0	0	WS	0	WS	1	WS	WS	X

AJS® 190

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
AJS® 190	9½"	24	0	0	1	0	0	2	0	2	X
		26	0	0	1	0	1	X	1	2	X
		28	0	0	1	0	1	X	1	X	X
		30	0	0	2	0	2	X	1	X	X
		32	0	0	2	1	2	X	2	X	X
		34	0	1	X	1	2	X	2	X	X
		36	0	1	X	1	X	X	X	X	X
		38	0	1	X	2	X	X	X	X	X
		40	0	2	X	2	X	X	X	X	X
	11⅞"	24	0	0	0	0	0	WS	0	0	1
		26	0	0	0	0	0	1	0	0	2
		28	0	0	0	0	0	1	0	1	X
		30	0	0	0	0	0	1	0	1	X
		32	0	0	WS	0	0	2	0	1	X
		34	0	0	1	0	0	X	0	1	X
		36	0	0	1	0	1	X	1	2	X
		38	0	0	1	0	1	X	1	X	X
		40	0	0	1	0	1	X	1	X	X
	14"	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	WS	1
		30	0	0	0	0	0	WS	0	WS	1
		32	0	0	0	0	0	WS	0	WS	1
		34	0	0	WS	0	0	1	0	WS	X
		36	0	0	WS	0	WS	1	0	1	X
		38	0	0	WS	0	WS	1	WS	1	X
		40	0	0	WS	0	WS	1	WS	1	X
	16"	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	1
		36	0	0	WS	0	WS	WS	0	WS	1
		38	0	0	WS	0	WS	WS	WS	WS	1
		40	0	0	WS	0	WS	1	WS	WS	X

AJS® 25

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
AJS® 25	9½"	24	0	0	1	0	0	X	0	2	X
		26	0	0	1	0	1	X	1	X	X
		28	0	0	2	0	1	X	1	X	X
		30	0	0	2	0	2	X	2	X	X
		32	0	0	X	1	2	X	2	X	X
		34	0	1	X	1	X	X	X	X	X
		36	0	1	X	1	X	X	X	X	X
		38	0	2	X	2	X	X	X	X	X
		40	0	2	X	2	X	X	X	X	X
	11⅞"	24	0	0	0	0	0	0	0	0	2
		26	0	0	0	0	0	1	0	0	2
		28	0	0	0	0	0	1	0	1	X
		30	0	0	0	0	0	2	0	1	X
		32	0	0	0	0	0	2	0	1	X
		34	0	0	1	0	0	2	0	2	X
		36	0	0	1	0	1	X	1	2	X
		38	0	0	1	0	1	X	1	X	X
		40	0	0	2	0	1	X	1	X	X
	14"	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	1
		30	0	0	0	0	0	0	0	0	1
		32	0	0	0	0	0	0	0	0	2
		34	0	0	0	0	0	1	0	0	2
		36	0	0	0	0	0	1	0	1	2
		38	0	0	0	0	0	1	0	1	X
		40	0	0	0	0	0	2	0	1	X
	16"	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	WS
		30	0	0	0	0	0	0	0	0	WS
		32	0	0	0	0	0	0	0	0	1
		34	0	0	0	0	0	0	0	0	1
		36	0	0	0	0	0	WS	0	0	1
		38	0	0	0	0	0	WS	0	0	1
		40	0	0	0	0	0	1	0	WS	2

KEY TO TABLE

0 . . . . No Reinforcement Required

WS . . . . Web Stiffeners at Support

1 . . . . Web Stiffeners Plus One Reinforcer

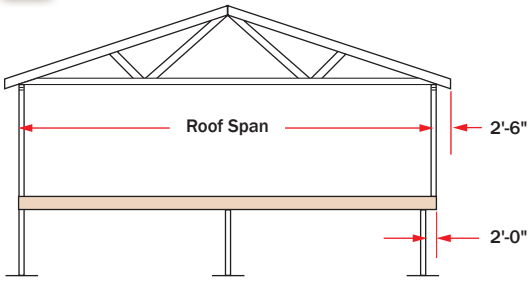
2 . . . . Web Stiffeners Plus Two Reinforcers

X . . . . Use Deeper Joists or Closer Spacing

Notes:

1. Cut 48" long reinforcers to match the joist depth. Use 23/32" APA 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 page 4.
4. Use the BC CALC® software to analyze conditions that are not covered by this table.

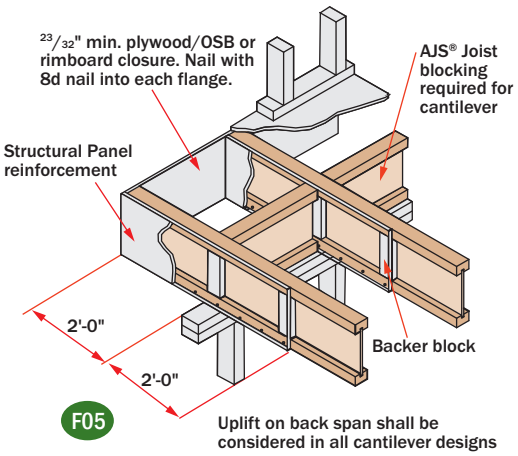
Reinforced Load Bearing Cantilever Detail



- The tables and details on pages 9 and 10 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.**

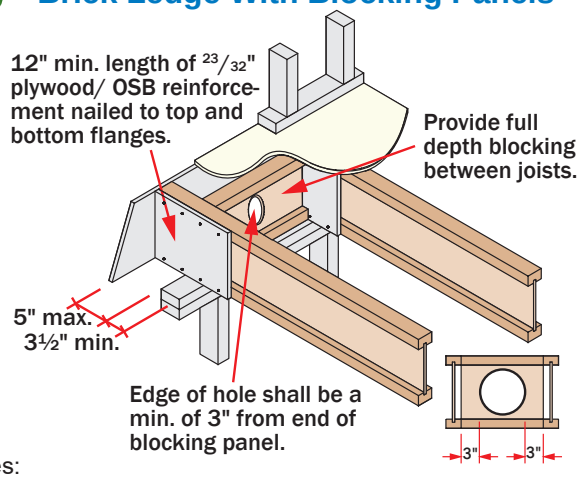
PLYWOOD / OSB REINFORCEMENT (If Required per Table on page 9)

- $^{23}/_{32}$" Min. x 48" long plywood / OSB rated sheathing must match the full depth of the AJS® Joist. Nail to the AJS® 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.
- These requirements assume a 100 PLF wall load and apply to AJS® Joists. Additional support may be required for other loadings. See BC CALC® software.
- Contact Boise Cascade EWP Engineering for reinforcement requirements on AJS® Joist depths greater than 16".



Brick Ledge Load Bearing Cantilever

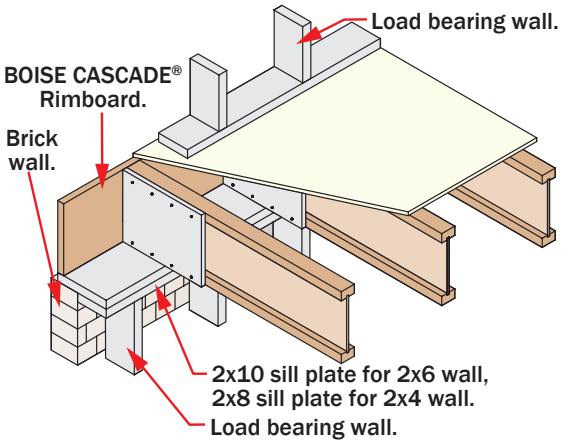
F20A Brick Ledge With Blocking Panels



Notes:

1. Use $^{23}/_{32}$" min plywood/OSB rated sheathing. Install full depth of joist with face grain parallel to joist. Plywood reinforcement to bear fully on wall plate. Nail plywood to top and bottom joist flanges with 2½" (8d) nails at 3" on center except 9½" joists, install nails at 2½" on center.
2. Provide full depth blocking between joists.
3. Edge of hole shall be at a minimum of 3" from end of blocking panel.

F20B Brick Ledge Without Blocking Panels



Notes:

1. Use $^{23}/_{32}$" min plywood/OSB rated sheathing. Install full depth of joist with face grain parallel to joist. Plywood reinforcement to bear fully on wall plate. Nail plywood to top and bottom joist flanges with 2½" (8d) nails at 3" on center except 9½" joists, install nails at 2½" on center.
2. See page 5 for joist and rimboard connection details.

Joist Depth (inches)	Roof Truss Span (ft)	Roof Live Load (psf)											
		20 psf			30 psf			40 psf			50 psf		
		Joist Spacing o.c.											
		12"	16"	19.2"	12"	16"	19.2"	12"	16"	19.2"	12"	16"	19.2"
9½"	24'	0	0	0	0	0	1	0	1	1	0	1	1
	26'	0	0	0	0	0	1	0	1	1	0	1	2
	28'	0	0	0	0	0	1	0	1	1	0	1	2
	30'	0	0	0	0	0	1	0	1	1	1	1	2
	32'	0	0	1	0	1	1	0	1	2	1	2	2
	34'	0	0	X	0	X	X	0	1	X	1	2	X
	36'	0	X	X	0	X	X	1	X	X	1	X	X
11⅞"	24'	0	0	0	0	0	0	0	0	0	0	0	1
	26'	0	0	0	0	0	0	0	0	0	0	0	1
	28'	0	0	0	0	0	0	0	0	1	0	1	1
	30'	0	0	0	0	0	0	0	0	1	0	1	1
	32'	0	0	0	0	0	0	0	0	1	0	1	1
	34'	0	0	0	0	1	1	0	1	1	0	1	1
	36'	0	0	0	0	1	1	0	1	1	0	1	X
14"	24'	0	0	0	0	0	0	0	0	0	0	0	0
	26'	0	0	0	0	0	0	0	0	0	0	0	0
	28'	0	0	0	0	0	0	0	0	0	0	0	1
	30'	0	0	0	0	0	0	0	0	0	0	0	1
	32'	0	0	0	0	0	0	0	0	0	0	0	1
	34'	0	0	0	0	0	0	0	0	1	0	0	1
	36'	0	0	0	0	0	0	0	0	1	0	1	X

Brick Ledge Reinforcement Table

Table Design Assumptions

Roof Loading: 15 psf dead load plus a 100 PLF wall self-weight, in addition to roof live load shown. Maximum 2'-6" overhangs assumed on roof trusses.

Floor Loading: 40 psf live load plus 10 psf dead load, backspans not to exceed maximum floor spans shown on page 3.

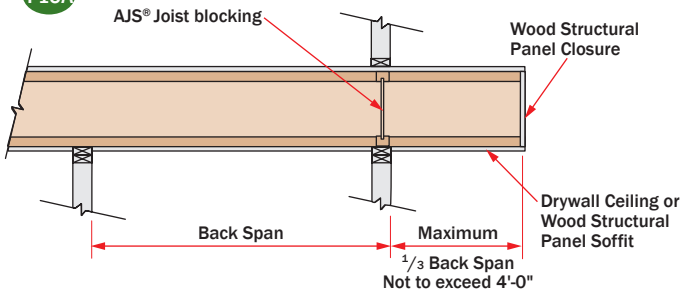
KEY TO TABLE:

0 = No Reinforcement Required
1 = Reinforcement Required One Side of Joist
2 = Reinforcement Required Both Sides of Joist
x = Use Deeper Joists or Closer Spacing

Non-Load Bearing Wall Cantilever Details

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

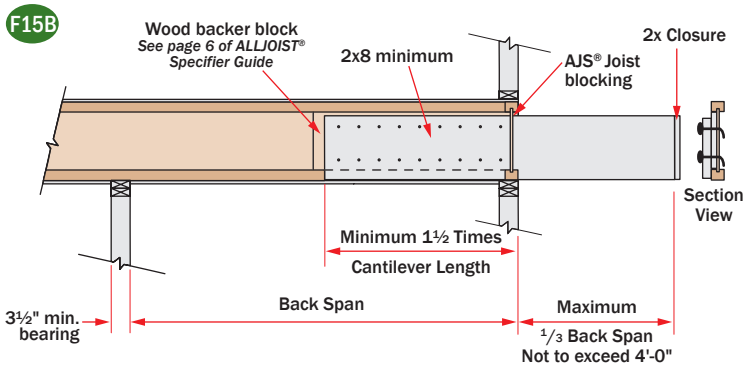
F15A



- 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 AJS® Joist by nailing through the backer block and joist web with 2 rows of 10d nails at 6" on center. Clinch all nails.

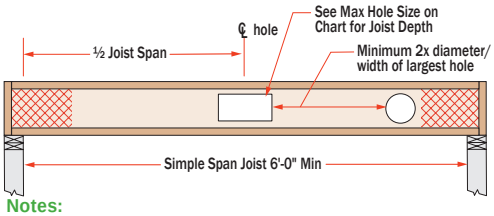
F15B



Large Rectangular Holes in AJS® Joists

Hole size table based on maximum uniform load of 40 psf live load and 15 psf dead load, at maximum spacing of 24" on-center.

Single Span Joist

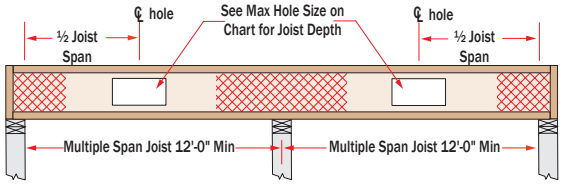


Notes:

Additional holes may be cut in the web provided they meet the specifications as shown in the hole distance chart shown above or as allowed using BC CALC® sizing software.

Joist Depth	Maximum Hole Size	
	Simple Span	Multiple Span
9½"	6" x 12"	6" x 7"
11⅞"	8" x 13"	8" x 8"
14"	9" x 16"	8" x 13"
	10" x 14"	9" x 11"
16"	11" x 16"	10" x 14"
	12" x 15"	11" x 12"

Multiple Span Joist

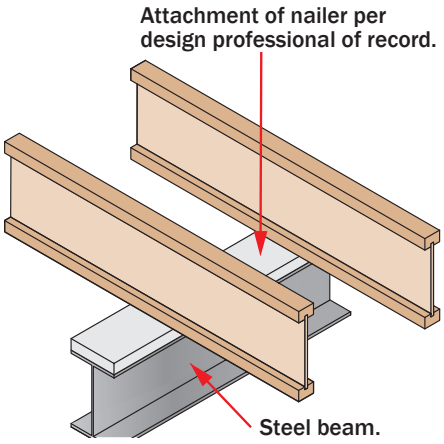


Larger holes may be possible for either Single or Multiple span joists; use BC CALC® sizing software for specific analysis.

AJS® Joists — Connection Details

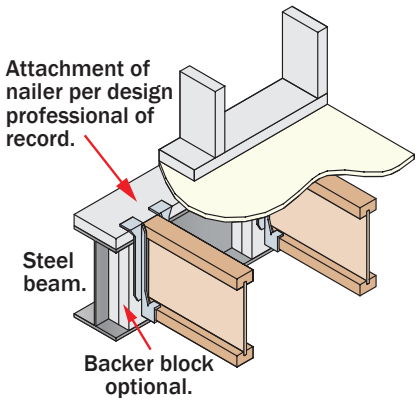
Connection on Steel Beam

F15D



Connection with Hanger on Steel Beam

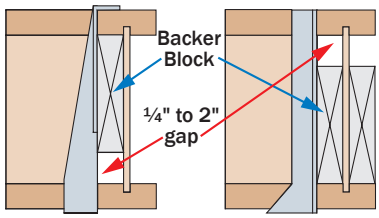
F15E



Hanger Connections to AJS Headers

F16D

- Backer blocks shall be at least 12" long per hanger.
- Nails shall be clinched when possible.
- Verify capacity and fastening requirements of hangers and connectors.

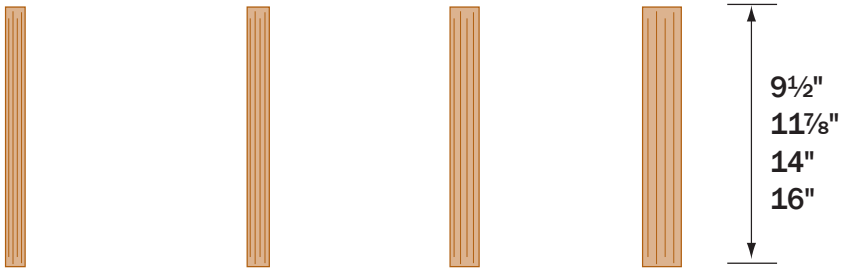


"Top Mount"
Backer block shall be tight to bottom of top flange with ¼" to 2" gap at top of bottom flange.

"Face Mount"
Backer block shall be tight to bottom of top flange with ¼" to 2" gap at top of bottom flange.

BOISE CASCADE® Rimboard

BOISE CASCADE® Rimboard Product Profiles

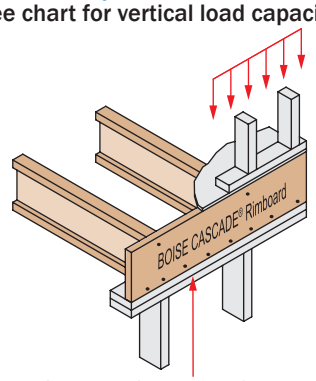


1", 1⅛" BOISE CASCADE® RIMBOARD OSB	1" BOISE CASCADE® RIMBOARD*	1 5/16" VERSA-LAM® 1.4 1800*	1¾" VERSA-LAM® 2.0 3100*

*18 – 24 inch deep rimboard are special order products, contact local supplier or Boise Cascade representative for product availability.

F07 Perpendicular

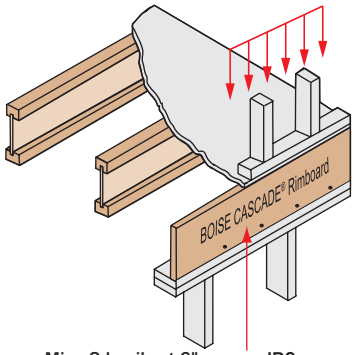
See chart for vertical load capacity.



Min. 8d nails at 6" o.c. per IRC. Connection per design professional of record's specification for shear transfer.

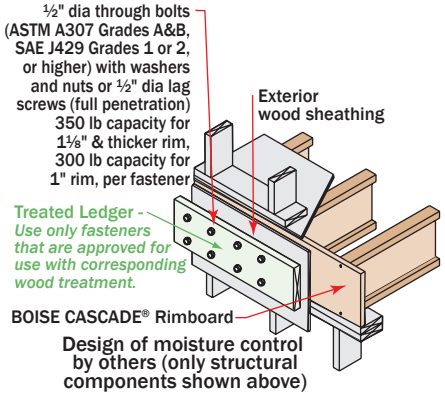
F07A Parallel

See chart for vertical load capacity.



Min. 8d nails at 6" o.c. per IRC. Connection per design professional of record's specification for shear transfer.

F56



Design of moisture control by others (only structural components shown above)

For information regarding connection of exterior decks to interior floor systems per the 2009 IRC, section 502.2.2.3, contact Boise Cascade EWP Engineering.

BOISE CASCADE® Rimboard Properties

Product	Vertical Load Capacity						Maximum Floor Diaphragm Lateral Capacity [lb/ft]	Specific Gravity for Lateral Nail Design	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]
	16" Depth & Less	18" & 20" Depth & Less	22" & 24" Depth & Less	16" Depth & Less	18" & 20" Depth & Less	22" & 24" Depth & Less						
1" BOISE CASCADE® RIMBOARD (2) & 1" BOISE CASCADE® RIMBOARD OSB (2)	3300	1650	1650	3500	3500	3500	180	0.5	Limited span capabilities, see note 2			
1⅛" BOISE CASCADE® RIMBOARD OSB (2)	4400	3000	3000	3500	3500	3500	180	0.5	Limited span capabilities, see note 2			
1 5/16" VERSA-LAM® 1.4 1800 (1)	6000	5450	—	4450	4450	—	Permitted per building code for all nominal 2" thick framing blocked and unblocked diaphragms (4" nail spacing & greater)	0.5	1800	1,400,000	225	525
1¾" VERSA-LAM® 2.0 3100 (1)	5700	4300	—	4300	3900	—	Permitted per building code for all nominal 2" thick framing blocked and unblocked diaphragms (4" nail spacing & greater)	0.5	2800	2,000,000	285	750

Product	Closest Allowable Nail Spacing - Narrow Face [in]					
	8d Box	8d Common	10d & 12d Box	16d Box	10d, 12d Common & 16d Sinker	16d Common
1" BOISE CASCADE® RIMBOARD (2)	3	3	-	-	-	-
1" or 1⅛" BOISE CASCADE® RIMBOARD OSB (2)	3	3	See note 2 for nailing information			
1 5/16" VERSA-LAM® 1.4 1800 (1)	3	3	3	3	4	6
1¾" VERSA-LAM® 2.0 3100 (1)	2	3	3	3	4	6

Notes

1. Per ICC ESR-1040.
2. See *Performance Rated Rim Boards, APA EWS #W345K* for further product information.
3. Not all products and depths may be available, check with Boise Cascade representative for product availability.

AJS® Design Properties

AJS® Joist Series	Depth [inches]	Weight [plf]	Moment M_r [ft-lbs]	EI x 10^6 [lb-in^2]	K x 10^6 [lbs]	Shear V_r [lbs]	End Reaction [lbs]				Intermediate Reaction [lbs]			
							1½" Bearing		3½" Bearing		3½" Bearing		5¼" Bearing	
							No WS(1)	WS(2)	No WS(1)	WS(2)	No WS(1)	WS(2)	No WS(1)	WS(2)
AJS® 140	9½	2.2	2450	182	5.2	1160	950	1240	1175	1480	2350	2450	2350	2450
	11⅞	2.5	3175	310	6.6	1490	955	1335	1215	1595	2390	2800	2390	2800
	14	2.8	3825	457	7.8	1790	960	1420	1250	1700	2430	3130	2430	3130
	16	3.1	4435	623	9.0	2065	970	1500	1285	1800	2465	3435	2465	3435
AJS® 150	9½	2.2	2820	194	5.2	1160	950	1240	1175	1480	2350	2450	2350	2450
	11⅞	2.5	3650	331	6.6	1490	955	1335	1215	1595	2390	2800	2390	2800
	14	2.8	4390	487	7.8	1790	960	1420	1250	1700	2430	3130	2430	3130
	16	3.1	5090	664	9.0	2065	970	1500	1285	1800	2465	3435	2465	3435
AJS® 20	9½	2.5	3395	232	5.2	1160	950	1240	1175	1480	2350	2450	2350	2450
	11⅞	2.8	4400	394	6.6	1490	955	1335	1215	1595	2390	2800	2390	2800
	14	3.0	5295	578	7.8	1790	960	1420	1250	1700	2430	3130	2430	3130
	16	3.3	6140	786	9.0	2065	970	1500	1285	1800	2465	3435	2465	3435
AJS® 190	9½	2.5	3895	244	5.2	1160	950	1240	1175	1480	2350	2450	2350	2450
	11⅞	2.8	5045	414	6.6	1490	955	1335	1215	1595	2390	2800	2390	2800
	14	3.0	6070	608	7.8	1790	960	1420	1250	1700	2430	3130	2430	3130
	16	3.3	7040	827	9.0	2065	970	1500	1285	1800	2465	3435	2465	3435
AJS® 25	9½	3.1	5370	322	5.3	1160	950	1240	1175	1480	2600	2850	2600	2850
	11⅞	3.4	6960	545	6.7	1490	955	1335	1215	1595	2690	3190	2690	3190
	14	3.7	8380	798	7.9	1790	960	1420	1250	1700	2770	3500	2770	3500
	16	3.9	9720	1082	9.1	2065	970	1500	1285	1800	2850	3800	2850	3800

NOTES:

(1) No web stiffeners required.
(2) Web stiffeners required.
(3) Not applicable, web stiffeners required.

- Moment, shear and reaction values based upon a load duration of 100% and may be adjusted for other load durations.
- Design values listed are applicable for Allowable Stress Design (ASD).
- No additional repetitive member increase allowed.

BUILDING CODE EVALUATION REPORT

- ICC ESR 1144 (IBC, IRC)

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

Δ = deflection [in]
w = uniform load [lb/in]
l = clear span [in]
EI = bending stiffness [lb-in^2]
K = shear deformation coefficient [lb]

VERSA-LAM® Design Values

Grade	Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in^4]
VERSA-STUD® 1.7 2650	1½	3½	1.5	998	776	5.4
		5½	2.4	1568	1821	20.8
		7¼	3.2	2066	3069	47.6
VERSA-LAM® 2.0 3100	1¾	3½	1.8	1164	1058	6.3
		5½	2.8	1829	2486	24.3
		7¼	3.7	2411	4189	55.6
		9¼	4.7	3076	6636	115.4
		9½	4.8	3159	6979	125.0
		11¼	5.7	3741	9605	207.6
		11⅞	6.0	3948	10638	244.2
		14	7.1	4655	14517	400.2
		16	8.1	5320	18682	597.3
		18	9.1	5985	23337	850.5
		24	12.2	7980	40183	2016.0
	3½	5½	5.6	3658	4971	48.5
		7¼	7.4	4821	8377	111.1
		9¼	9.4	6151	13272	230.8
		9½	9.6	6318	13958	250.1
		11¼	11.4	7481	19210	415.3
		11⅞	12.1	7897	21275	488.4
		14	14.2	9310	29035	800.3
		16	16.2	10640	37364	1194.7
		18	18.3	11970	46674	1701.0
		20	20.3	13300	56952	2333.3

Grade	Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in^4]
VERSA-LAM® 2.0 3100	5¼	5¼	8.0	5237	6830	63.3
		5½	8.4	5486	7457	72.8
		7¼	11.0	7232	12566	166.7
		9¼	14.1	9227	19908	346.3
		9½	14.5	9476	20937	375.1
		11¼	17.1	11222	28814	622.9
		11⅞	18.1	11845	31913	732.6
		14	21.3	13965	43552	1200.5
		16	24.4	15960	56046	1792.0
		18	27.4	17955	70011	2551.5
		20	30.4	19950	85428	3500.0
		24	36.5	23940	120549	6048.0
	7	9¼	16.6	12303	26544	461.7
		9½	17.1	12635	27916	500.1
		11¼	20.2	14963	38419	830.6
		11⅞	21.4	15794	42550	976.8
		14	25.2	18620	58069	1600.7
		16	28.8	21280	74728	2389.3
		18	32.4	23940	93348	3402.0
		20	36.0	26600	113904	4666.7
		24	43.2	31920	160732	8064.0

VERSA-LAM® Design Properties

Design Property	Grade	Modulus of Elasticity E(x 10^6 psi)(1)	Bending F_b (psi)(2)(3)	Horizontal Shear F_v (psi)(2)(4)	Tension Parallel to Grain F_t (psi)(2)(5)	Compression Parallel to Grain $F_{c\|\|}$ (psi)(2)	Compression Perpendicular to Grain $F_{c\perp}$ (psi)(1)(6)	Equivalent Specific Gravity for Fastener Design (SG)
VERSA-LAM® Beams	2.0 3100	2.0	3100	285	2150	3000	750	0.5
VERSA-LAM® Studs	1.7 2650	1.7	2650	285	1650	3000	750	0.5
VERSA-LAM® Columns	1.8 2750	1.8	2750	285	1825	3000	750	0.5

1. This value cannot be adjusted for load duration.
2. This value is based upon a load duration of 100% and may be adjusted for other load durations.
3. Fiber stress bending value shall be multiplied by the depth factor, $(12/d)^{1/9}$ where d = member depth [in].
4. Stress applied perpendicular to the gluelines.
5. Tension value shall be multiplied by a length factor, $(4/L)^{1/8}$ where L = member length [ft]. Use L = 4 for members less than four feet long.
6. Stress applied parallel to the gluelines.

* Design properties are limited to dry conditions of use where the maximum moisture content of the material will not exceed 16%.

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. 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:

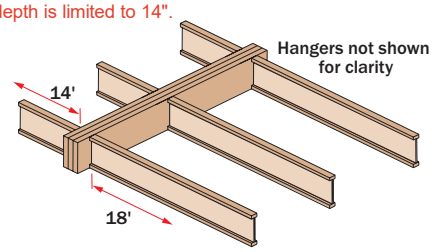
Plies	Depth	Nailing	Maximum Uniform Load From One Side
(2) 1¾" plies	Depths 11⅞" & less	2 rows 16d box/sinker nails @ 12" o.c.	400 plf
	Depths 14" - 18"	3 rows 16d box/sinker nails @ 12" o.c.	600 plf
	Depth = 24"	4 rows 16d box/sinker nails @ 12" o.c.	800 plf
(3) 1¾" plies (2)	Depths 11⅞" & less	2 rows 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 1/2" bolts @ 24" o.c., staggered	335 plf
	Depth = 24"	3 rows 1/2" bolts @ 24" o.c., staggered every 8"	505 plf
(2) 3½" plies	Depths 18" & less	2 rows 1/2" bolts @ 24" o.c., staggered	855 plf
	Depth 20" - 24"	3 rows 1/2" 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 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".



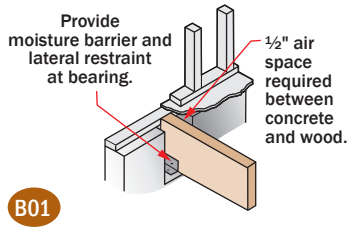
Find: A multiple 1¾" ply VERSA-LAM® that is adequate to support the design loads and the member's proper connection schedule.

1. Calculate the tributary width that beam is supporting:
   14' / 2 + 18' / 2 = 16'
2. Use PLF tables on pages 30-32 of ASG 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

VERSA-LAM® Beam Details/Allowable Nailing/Holes

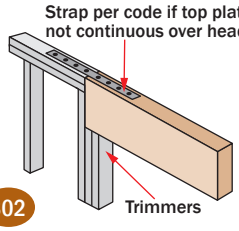
VERSA-LAM® Beam Details

Bearing at concrete/masonry walls



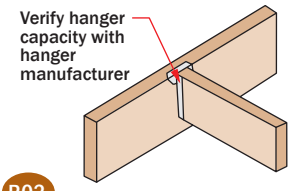
B01

Bearing for door or window header



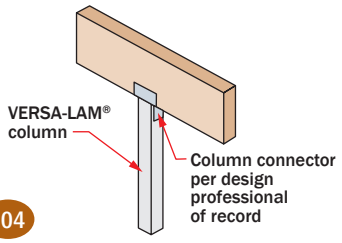
B02

Beam to beam connector



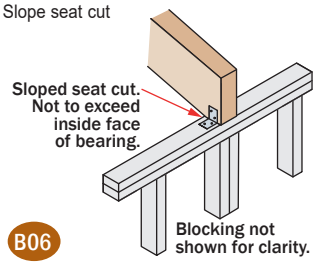
B03

Bearing at column



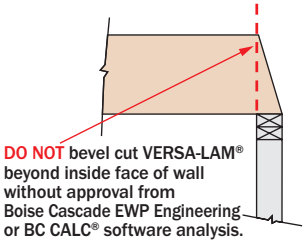
B04

Slope seat cut



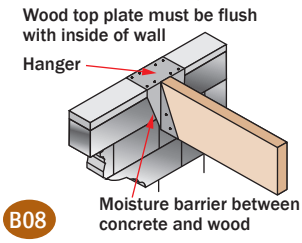
B06

Bevel cut



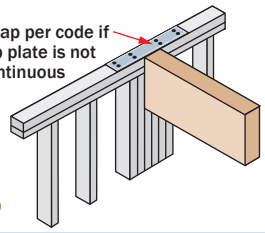
B07

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).

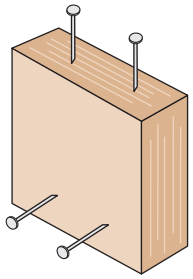
Closest Allowable Nail Spacing

VERSA-LAM® & VERSA-RIM® Products

Nail Size	Nailing Parallel to Glue Lines (Narrow Face)(1)						Nailing Perpendicular to Glue Lines (Wide Face)	
	VERSA-LAM® 1.4 1800 Rimboard 1 5/16"		VERSA-LAM® 1¾"		VERSA-LAM® 3½" & Wider		All Products	
	O.C. [inches]	End [inches]	O.C. [inches]	End [inches]	O.C. [inches]	End [inches]	O.C. [inches]	End [inches]
8d Box	3	1½	2	1	2	½	2	½
8d Common	3	2	3	2	2	1	2	1
10d & 12d Box	3	2	3	2	2	1	2	1
16d Box	3	2	3	2	2	1	2	1
10d & 12d Common	4	3	4	3	2	2	2	2
16d Sinker	4	3	4	3	2	2	2	2
16d Common	6	4	6	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.

Nailing Parallel to Glue Lines (Narrow Face)



Nailing Perpendicular to Glue Lines (Wide Face)

Nailing Notes

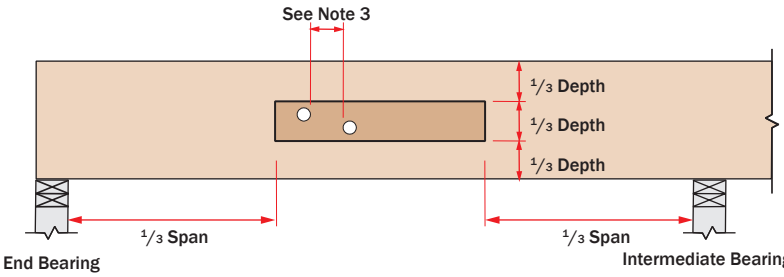
1) For 1¾" thickness and greater, 2 rows of nails (such as for a metal strap) are allowed (use ½" minimum offset between rows and stagger nails).

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"

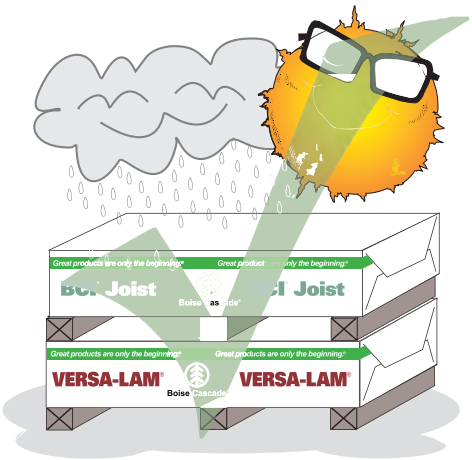


6. These limitations apply to holes drilled for plumbing or wiring access only. The size and location of holes drilled for fasteners are governed by the provisions of the *National Design Specification® for Wood Construction.*
7. Beams deflect under load. Size holes to provide clearance where required.
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.

Handling and Storage of Engineered Wood Products

Site Storage

Protect AJS® Joists and VERSA-LAM® from the weather.



Keep at least 3½" off the ground, more in wetter areas. Align stickers one above another and space a maximum of 15 feet apart.

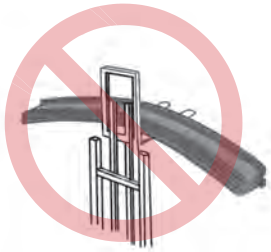
Leave AJS® Joists banded together until ready to install.

Site Handling

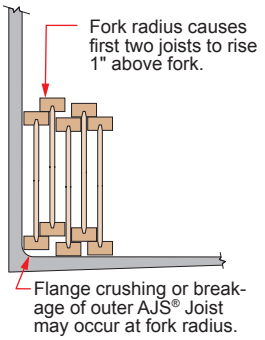
Unload from truck carefully using appropriate equipment.

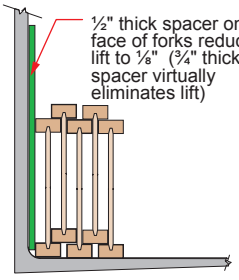
DO NOT lift AJS® Joists by top flange.

Do not drop AJS® Joists from height.



Avoid lifting AJS® Joists horizontally.





This damage can be prevented by making sure that all joists are sitting on the flat portion of the forks. This can be accomplished by making sure that the forks are not fully extended into the unit. A spacer may be required on the front face of the forks in order to assure that the joists sit on the flat portion of the forks and do not come in contact with the radius area of the forks. This procedure will equalize the pressure on the flanges of all joists.

AJS® Fork Radius Crushing

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.

If in doubt ask! For the closest Boise Cascade EWP distributor/support center, call 1-800-232-0788

The information in this document pertains to use in the UNITED STATES ONLY, Allowable Stress Design. Refer to the ALLJOIST Specifier Guide Canada for use in Canada, Limit States Design.

Your Dealer is:

If no dealer is listed, call 1-800-232-0788

For information about
Boise Cascade Engineered Wood Products,
including sales terms and conditions,
warranties and disclaimers,
visit our website at www.BCewp.com

Boise Cascade
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Great products are only the beginning.®

AIG US 08/29/2013 r 11/20/2018