



ALLJoist®

SPECIFIER GUIDE

Includes AJS®
140 / 150 / 20 / 190 / 25
and Versa-Lam® Beams

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.

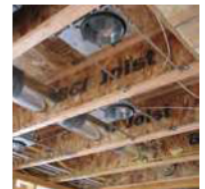
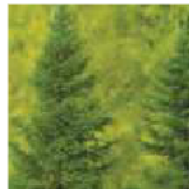
2x3 Flanges AJS® 140 / 150 / 20 / 190
2x4 Flanges AJS® 25



Versa-Lam® LVL 2.1 Design Guide information included - Eastern US.

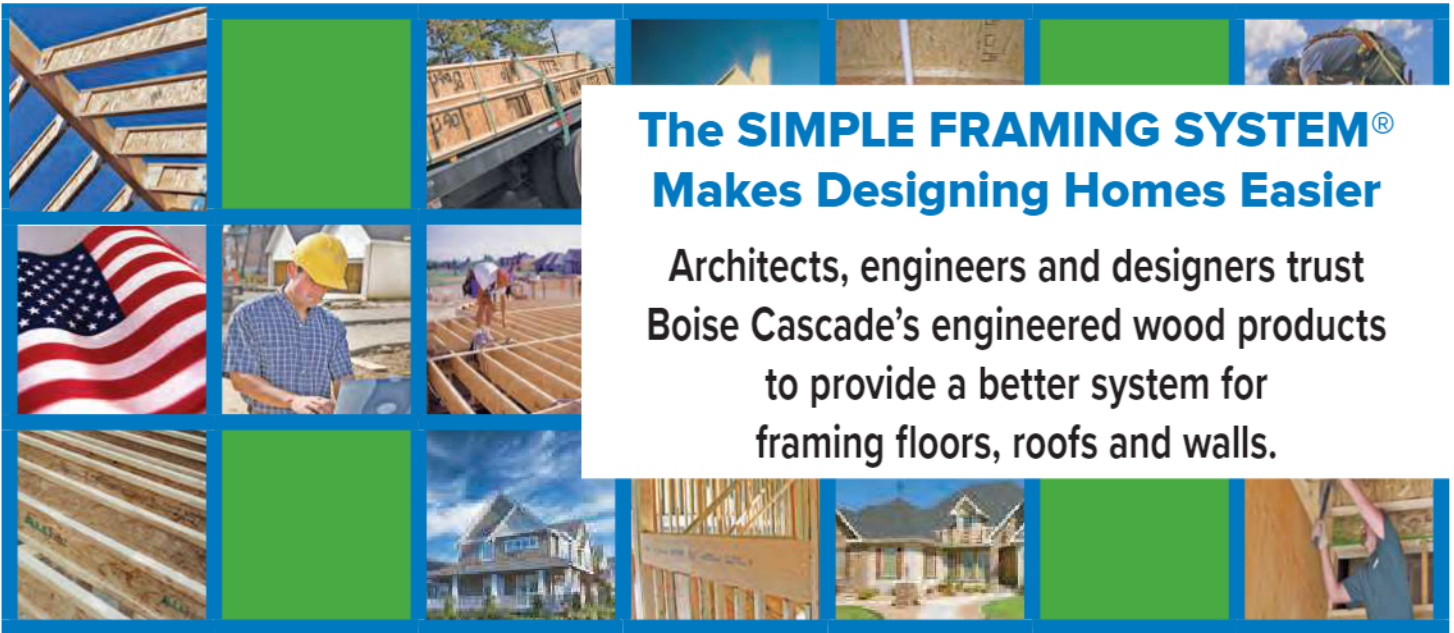
US Version

product manufactured in
St. Jacques, New Brunswick Canada



Boise Cascade®
ENGINEERED WOOD PRODUCTS





**The SIMPLE FRAMING SYSTEM®
Makes Designing Homes Easier**

Architects, engineers and designers trust Boise Cascade's engineered wood products to provide a better system for framing floors, roofs and walls.

It's the SIMPLE FRAMING SYSTEM®, featuring beams, joists and rim boards that work together as a system, so you spend less time cutting and fitting. In fact, the SIMPLE FRAMING SYSTEM® uses fewer pieces and longer lengths than conventional framing, so you'll complete jobs in less time.

**You'll Build Better Homes
with the
SIMPLE FRAMING SYSTEM®**

Now it's easier than ever to design and build better floor systems. When you specify the SIMPLE FRAMING SYSTEM®, your clients will have fewer problems with squeaky floors and ceiling gypsum board cracks. The SIMPLE FRAMING SYSTEM® also means overall better floor and roof framing than dimension lumber allows.

**Better Framing
Doesn't Have to Cost More**

Boise Cascade Engineered Wood Products' SIMPLE FRAMING SYSTEM® often costs less

than conventional framing methods when the resulting reduced labor and materials waste are considered. There's less sorting and cost associated with disposing of waste because you order only what you need. Although our longer lengths help your clients get the job done faster, they cost no more.

Environmentally Sound

As an added bonus, floor and roof systems built with AJS® Joists require about half the number of trees as those built with dimension lumber. This helps you design a home both you and future generations will be proud to own.

**What Makes the SIMPLE
FRAMING SYSTEM® So Simple?**

☑ Floor and Roof Framing with AJS® Joists

Light in weight, but heavy-duty, AJS® Joists have a better strength / weight ratio than dimension lumber. Knockouts can be removed for cross-ventilation and wiring.

☑ Ceilings Framed with AJS® Joists

The consistent size of AJS® Joists helps keep gypsum board flat and free of unsightly nail pops and ugly shadows, while keeping finish work to a minimum.

☑ Versa-Lam® LVL Beams for Floor and Roof Framing

These highly-stable beams are free of the large-scale defects that plague dimension beams. The result is quieter, flatter floors (no camber) and no shrinkage-related call-backs.

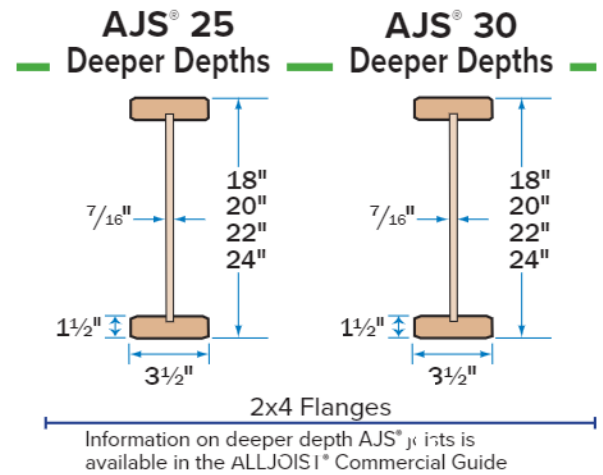
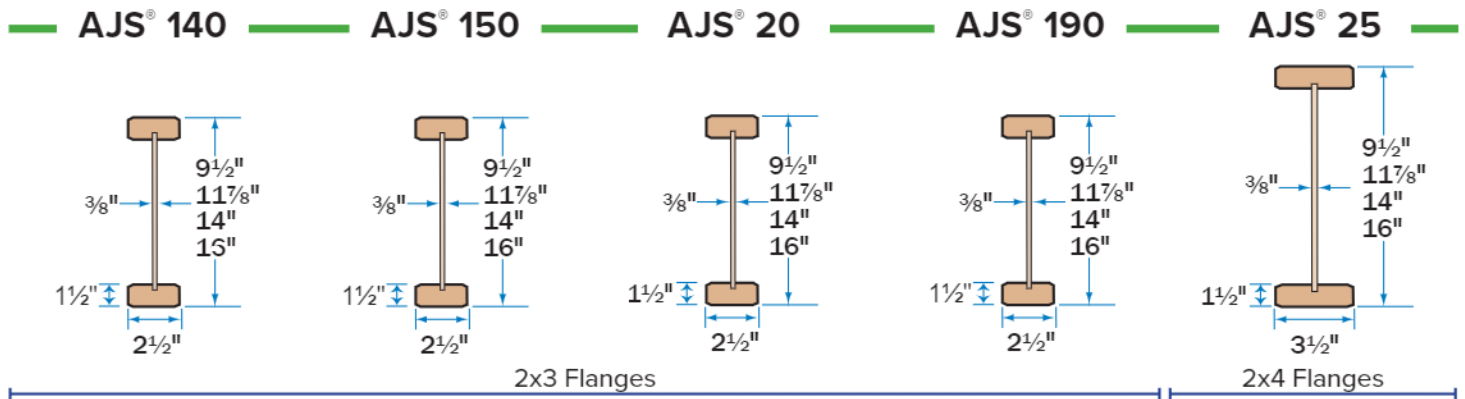
☑ Boise Cascade® Rimboard

Boise Cascade Engineered Wood Products offer several engineered rimboard products regionally, including Boise Cascade® Rimboard OSB, Boise Cascade® Kimboard and Versa-Rim® (check supplier or Boise Cascade EWP representative for availability). These products work with AJS® Joists to provide a solid connection at the critical floor/wall intersection.

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 Lifetime Guarantee Back Cover



ALLJOIST® Product Architectural Specifications

EVALUATION SUBJECT: AJS® Series Prefabricated Wood I-Joist

1.0 Evaluation Scope:

Compliance with the following codes:

- International Building Code® (IBC®)
- International Residential Code® (IRC®)

Properties Evaluated: Structural.

2.0 Uses: The AJS® Joists are prefabricated wood I-joists used as floor joists, roof rafters and blocking panels to support code-required loads. Prefabricated wood I-joists described in this report comply with Section 2303.1.2 of the IBC® and Section R502.1.4 of the IRC®, for allowable stress design.

3.0 Description:

3.1 General: The AJS® Series prefabricated wood I-joists have solid-sawn lumber or composite lumber flanges and oriented strand board (OSB) webs. The top and bottom flanges are parallel, creating constant-depth joists. The web-to-web joints of the I-joists are square butt joints and conform to the specifications in the approved quality control manuals. The web-to-flange connection is a proprietary grooved connection, also conforming to the approved quality control manuals. The I-joists are available in various lengths and depths. See ICC-ES® / APA® ESR-1144 Table 1 for full description of the AJS® I-Joists.

3.2 Material Specifications:

3.2.1 Flange: The flanges of the I-joists are sawn lumber or composite lumber conforming to the specifications in the approved quality control manuals. The composite lumber flanges are 3/8 inch by 2 1/2 inch (38 by 64 mm) space-

pine fir (SPF) and are used interchangeably with any of the sawn lumber flanges of the same dimensions. The sawn lumber flange material, grade, width and depth are noted in ESR-1144, Table 1.

3.2.2 Web: Web material for the I-joists is 3/8-inch-thick (10mm) or 7/16-inch-thick (11mm) OSB conforming to Exposure 1 requirements of DCC PS-2, with further requirements set forth in the approved quality control manuals and manufacturing standards.

3.2.3 Adhesive: Adhesives used in the fabrication of the I-joists are exterior-type, heat durable adhesives complying with ASTM D 2559 and ASTM D 5057 and are specified in the quality control manuals and the manufacturing standards.

4.0 Design and Installation: Design of the prefabricated wood I-joists described in this report shall be in accordance with the applicable code. Additionally, the design and installation of the prefabricated wood I-joists shall comply with Sections 4.1 through 4.12 listed in ESR-1144 which include 4.1 Allowable Structural Capacity, 4.2 Fasteners, 4.3 Web Stiffeners, 4.4 Lateral Support, 4.5 Holes in I-Joist Web, 4.6 Duration of Load, 4.7 In-Service Moisture Conditions, 4.8 Repetitive-Member Use, 4.9 Member Spans, 4.10 Deflection, 4.11 Blocking Panels, & 4.12 Cantilevered Joists, and the manufacturer's installation instructions.

5.0 Conditions or Use: The AJS® Series I-joists described in this report comply with, or are suitable alternatives to what is specified in, those codes listed under ESR-1144, Section 1.0 Evaluation Scope of these specifications, subject to the following conditions:

- 5.1** AJS® joists must be installed in accordance with this report and the manufacturer's installation instructions.
- 5.2** Drawings and design details verifying compliance with this report must be submitted to the code official when requested. The drawings and calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3** Flanges of the I-joist may not be cut or notched, unless an engineered design prepared by a registered design professional is submitted to the code official for approval.
- 5.4** The AJS® joists are manufactured by Boise Cascade Wood Products, L.L.C. at their plant in St. Jacques, New Brunswick, Canada under an approved quality control program with inspections by APA – The Engineered Wood Association (AA-649).

6.0 Evidence Submitted:

Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Wood I-joists (AC14).

7.0 Identification:

AJS® I-joists are identified by a stamp indicating the joist model; company name (Boise Cascade Wood Products, L.L.C.); manufacturing location; evaluation report number (ESR-1144); and the name and logo of the inspection agency (APA).

AJS® Joists in Commercial Projects. The 16" and deeper depth AJS® joists are intended for commercial projects with heavier design loads and longer spans. All commercial projects utilizing AJS® joists shall have an engineer or architect of record.

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 expectations is critical. **Vibration** is usually the cause of most complaints. Installing lateral bracing 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 tri-ke, 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.

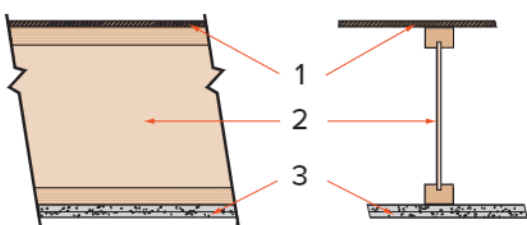
Joist Depth	ALLJOIST® Series	★★★THREE STAR★★★				★★★★FOUR STAR★★★★				CAUTION ★ MINIMUM STIFFNESS ALLOWED BY CODE ★ CAUTION			
		12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
9 1/2"	140	17'-9"	16'-3"	15'-4"	13'-11"	13'-11"	12'-8"	11'-11"	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'-11"	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"	22'-2"	21'-1"	19'-3"	17'-2"
1 1/8"	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'-9"
	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'-7"	15'-5"	14'-7"	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"
1 1/4"	140	23'-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'-10"	18'-7"	19'-2"	17'-6"	16'-5"	15'-3"	26'-5"	22'-10"	20'-10"	18'-7"
	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"
1 1/2"	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"	23'-7"	22'-5"	19'-3"	21'- "	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'-7"	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 ALLJOIST® 25 joists).
- Table values assume that 23/32" minimum 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 Fire Resistance 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. Minimum 2 1/2-inch G&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. ALLJOIST® Joists at 24" o.c. or less.
3. Two layers 1/2" Type C or two layers 5/8" Type X gypsum board.

SOUND ASSEMBLY COMPONENTS

When constructed with resilient channels:

- Add carpet & pad to fire assembly;
- Add 3/2" glass fiber insulation to fire assembly;
- Add an additional layer of minimum 5/8" sheathing and 9 1/2" glass fiber insulation to fire assembly;

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

AJS® Joists

NOTE

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

NO MIDSPAN BRIDGING IS REQUIRED FOR AJS® JOISTS

FOR INSTABILITY:
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 rim board in AJS® floor systems.

F01 F02

AJS® rim joist, see page 6.

F07

Boise Cascade® Kimboard, see pages 6 and 27.

For load bearing cantilever details, see page 9.

F06 F09

AJS® blocking or 2x4 "squash" block on each side required when supporting a load-bearing wall above.

F15

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

Versa-Lam® LVL header or an AJS® header.

1½" knockout holes at approximately 12" o.c. are pre-punched.

F58

F15

See page 7 for allowable hole sizes and location.

F27A

Versa-Lam® LVL beam.

Endwall blocking as required per governing building code.

AJS Blocking is required when joists are cantilevered.

BCI® Joists, Versa-Lam® LVL, 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® LVL, ALLJOIST® and BCI® Joists must be wrapped, covered, and stored off of the ground on stickers at all times prior to installation. Versa-Lam® LVL, 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® LVL, ALLJOIST® and BCI® Joist in accordance with the Boise Cascade EWP Installation Guide will void the limited warranty.

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® 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.

PRODUCT HANDLING TO AND AT JOB SITES

There are some differences between engineered wood products and traditional lumber products in terms of product handling: Avoid handling and storing AJS® joists in the flat direction. Versa-Lam® LVL is denser and due to the coating applied to the surface, can be more apt to sliding. Please consider these differences when transporting and handling engineered wood products.



Additional floor framing details available with BC Framer® software

END BEARING DETAILS

F07

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.

F02

AJS® rim joist.

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

F01

AJS® Joist blocking.

F27A

Top Flange or Face Mount Joist Hanger

Versa-Lam® LVL

F52

One 8d nail each side at bearing

1 1/2" minimum bearing length

To limit splitting flange, start nails at least 1 1/2" from end. Nails may need to be driven at an angle to limit splitting of bearing plate.

F08

Solid block all posts from above to bearing below.

F03

Boise Cascade® Rimboard

NOTE: AJS® floor joist must be designed to carry wall above when not tacked 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).

AJS® Joist blocking.

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

F09

Load bearing wall above (stacked over wall below)

2x block.

F14

AJS® Joist Slope Cut Reinforcement

Detail shows minimum heel depth, bearing length on value to cut end of AJS® joist. AJS® Joist shall not be used as a collar or rafter tension tie.

2 x 6 min. rafter, rafter shall be supported by ridge beam or other upper bearing support.

6 min. heel depth, 12" joist spacing, 16" max. joist depth.

F05

Double Squash Block Vertical Load

Size	Joist Spacing [in]			
	12	16	19.2	24
2x4	4x6	5x4	27x9	22x1
2x6	7x13	12x10	4x83	506

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 (minimum 12" wide). Nail with 10-10d nails.

Joist Hanger

Filler block. Nail with 10-10d nails.

Backer block required where top flange joist is supported above 250 lbs. Install tight to top flange.

F58

Double AJS® Joist Connection

Filler Block (if required) See TN U-13 for requirements.

Web Filler Nailing See TN U-13 for joist specific schedule.

- Filler block not required when all load is top loaded and evenly applied to each ply except AJS-25 and 30.
- Side loads and/or uneven top loads require filler block.
- See Boise Cascade technical literature for further information.
- Fasten floor sheathing to each ply, per diaphragm nailing schedule.

F05

Sheathing or rimboard closure.

AJS® Joist blocking required for cantilever.

For load bearing cantilever, see pages 8 and 9. Uplift or backs are shall be considered in all cantilever designs.

LATERAL SUPPORT

- AJS® Joists shall be laterally supported at the ends with hangers, rimboard, AJS® rim joist or blocking panels. AJS® 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 AJS® JOISTS

- Minimum end bearing: 1 1/2" for all AJS® Joists. 3/2" is required at cantilever and intermediate supports.
- Longer bearing lengths allow higher reaction values. Refer to the building code evaluation report or the BC Client software.

NAILING REQUIREMENTS

- AJS® rim joist, rim board or closure panel to AJS® joist:
 - Rims or closure panel 1/4 inches thick, and less: 2-8d nails, one each in the top and bottom flange.
 - AJS® 140/50/20/190 rim joist: 2-1/4" 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:
 - Min. 8d nails @ 6" o.c. per IRC®.
 - Connection per design professional of record's specification for shear transfer.
- AJS® joist to support:
 - 2-8d nails, one on each side of the web, placed 1 1/2 inches minimum from the end of the AJS® Joist to limit splitting.

- Sheathing to AJS® joist:
 - Prescriptive residential floor sheathing nailing requires 6d common nails @ 6" o.c. on edges and @ 12" o.c. in the field (IRC® Table R602.3.1).
 - See closest allowable nail spacing limits on page 27 for floor diaphragm nailing specified at closer spacing than IRC®.
 - Maximum bracing spacing for full lateral stability: 18" for AJS® 140/150/20/190, 24" for larger AJS® 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
140		
150	1 1/8" or two 1/2"	2 x 1/2" or 1/2" wood panel
20	wood panels	
1-0		
25	2 x lumber	Double 2 x lumber

- Cut backer and filler blocks to a maximum depth equal to the web depth minus 1/4" to avoid a forced fit.
- For deeper AJS® Joists, stack 2x lumber or use multiple pieces of 3/4" wood panels.

WEB STIFFENER REQUIREMENTS

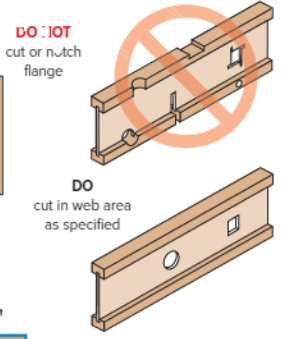
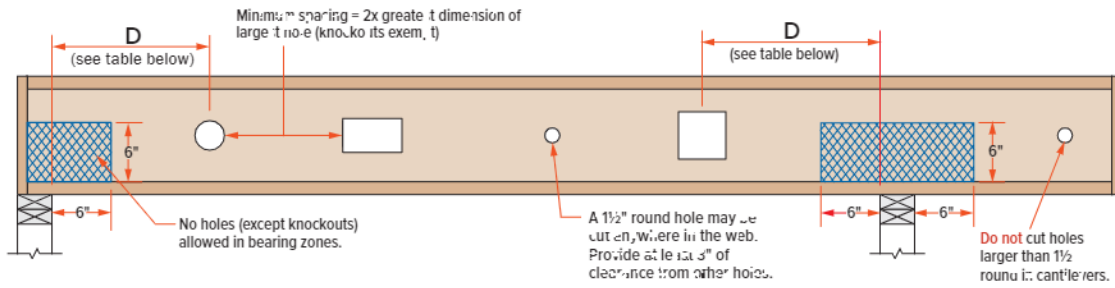
- See *Web Stiffener Requirements* on page 10.
- PROTECT AJS® JOISTS FROM THE WEATHER**
- AJS® Joists are intended for applications that provide permanent protection from the weather. Bundles of product should be covered and stored off the ground on stickers.

AJS® RIM JOISTS AND BLOCKING

Joist Depth [in]	Minimum Heel Depth					
	Roof Pitch					
	6:12	7:12	8:12	9:12	10:12	12:12
2 x 4	4 1/8"	4 5/8"	5 1/4"	4 3/4"	4 3/4"	4 1/4"
2 x 6	3 3/8"	3 1/2"	2 5/8"	2 3/4"	2 3/8"	2 1/4"

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

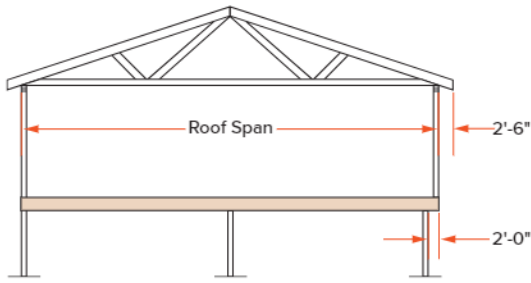
AJS® Joists are manufactured with 1/2" round perforated knockouts in the web at approximately 12" on center.



Minimum distance from support, listed in table below, is required for all holes greater than 1/2"

MINIMUM DISTANCE (D) FROM ANY SUPPORT TO THE CENTERLINE OF THE HOLE																	
Round Hole Diameter [in]		2	3	4	5	6	6 1/2	7	8	8 7/8	9	10	11	12	13		
Rectangular Hole Side [in]		-	-	2	3	4	5	6	7	8	9	10	11	12	13		
Any 9 1/2" Joist	Span [ft]	8	2'-0"	2'-5"	2'-11"	3'-5"	3'-10"	4'-0"									
		12	3'-0"	3'-6"	4'-5"	5'-1"	5'-10"	6'-0"									
		16	4'-0"	4'-11"	5'-11"	6'-10"	7'-3"	8'-0"									
Round Hole Diameter [in]		2	3	4	5	6	6 1/2	7	8	8 7/8	9	10	11	12	13		
Rectangular Hole Side [in]		-	-	-	2	3	4	5	6	7	8	9	10	11	12	13	
Any 11 1/2" 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	6 1/2	7	8	8 7/8	9	10	11	12	13		
Rectangular Hole Side [in]		-	-	-	-	2	3	4	5	6	7	8	9	10	11	12	13
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'-4"	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"	9'-10"	10'-1"	11'-3"			
Round Hole Diameter [in]		2	3	4	5	6	6 1/2	7	8	8 7/8	9	10	11	12	13		
Rectangular Hole Side [in]		-	-	-	-	-	-	2	3	4	5	6	8	9	10		
Any 16" Joist	Span [ft]	8	1'-0"	1'-4"	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'-6"	4'-3"	4'-10"	5'-5"	
		16	1'-0"	1'-4"	1'-2"	1'-2"	1'-10"	2'-2"	2'-7"	3'-4"	4'-0"	4'-2"	4'-11"	5'-3"	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'-6"	10'-10"	

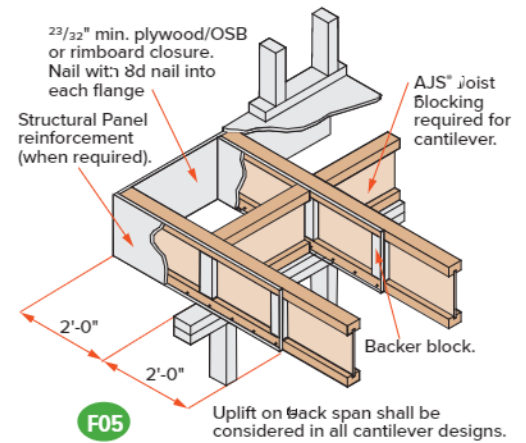
- Select a table row based on joist depth and the actual joist span rounded up to the nearest table span. Scan across the row to the column headed with the appropriate round hole diameter or rectangular hole side. Use the longest side of a rectangular hole. The table value is the closest that the centerline 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.
- 1/2" round knockouts in the web may be removed by using a short piece of metal pipe and hammer.
- Holes may be positioned vertically in the web provided they don't extend into either flange.
- This table was designed to apply to design conditions covered by uniform load PLF tables only shown elsewhere in this publication. Use BC Calc® software to check other hole sizes or holes under other design conditions, including joists supporting concentrated loads. It may be possible to exceed the limitations of this table by analyzing a specific application with the BC Calc® software.



The tables and details on pages 8 and 9 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.

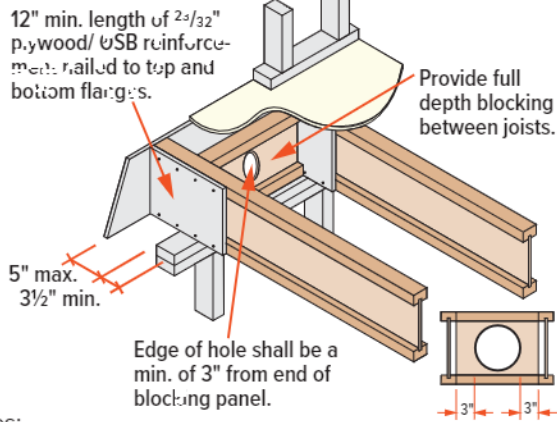
PLYWOOD / OSB REINFORCEMENT (If Required per table on page 8)

- 2 3/32" 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

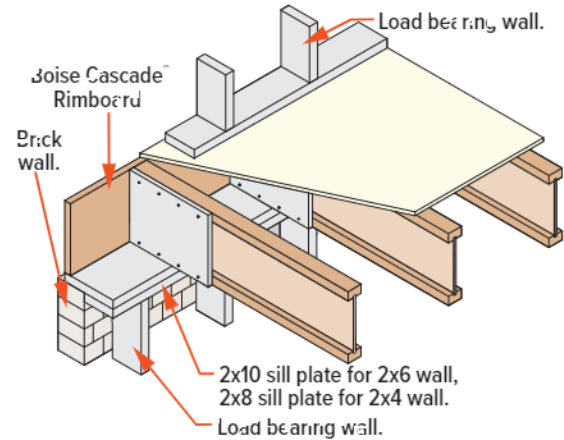
F20A Brick Ledge With Blocking Panels



Notes:

- Use 2 3/32" 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 2 1/2" (8d) nails at 3" on center except 9 1/2" joists, install nails at 2 1/2" on center.
- Provide full depth blocking between joists.
- Edge of hole shall be at a minimum of 3" from end of blocking panel.

F20B Brick Ledge Without Blocking Panels



Notes:

- Use 2 3/32" 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 2 1/2" (8d) nails at 3" on center except 9 1/2" joists, install nails at 2 1/2" on center.
- See page 6 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"
9 1/2"	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
11 7/8"	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
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	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 4.

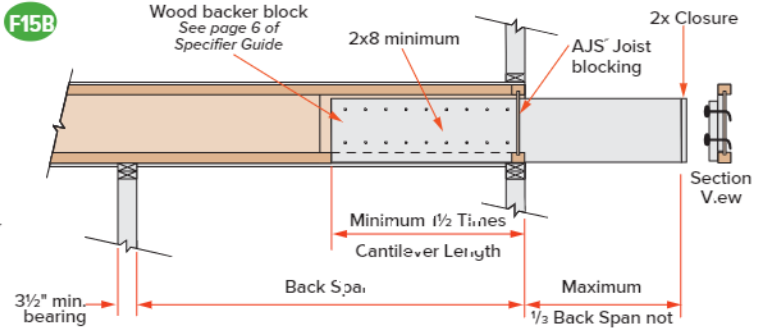
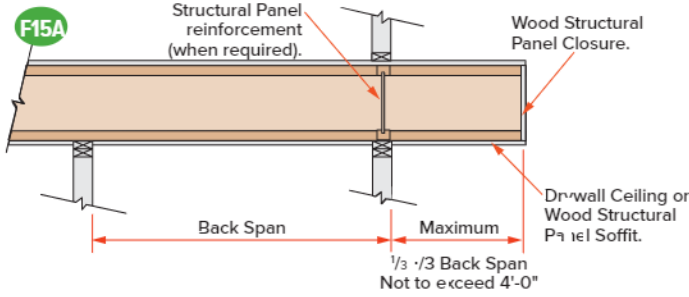
KEY TO TABLE:

- 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. Impervious moisture barrier systems shall be detailed and installed in details F15A and F15B in accordance with 2018 IBC Sections 12.2.5 and 11.3.6.

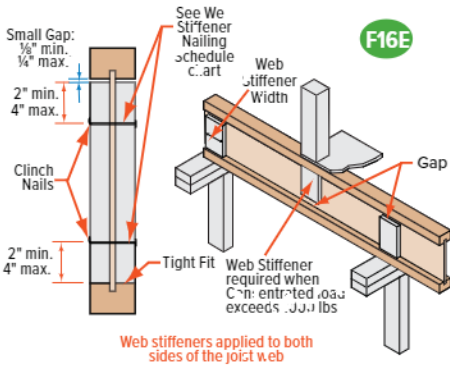
Fasten the 2x8 minimum to the AJS® Joist by nailing through the backer block and joist web with 2 rows of 10d nails at 6" on-center. Clinch all nails. For AJS® 25/30 joists, nail each side with 2 rows (4 rows total) of 16d nails at 6" on-center.



• Analyze AJS® Joist cantilever condition with BC Calc® software.

- Loading shall not exceed 60 psf live load and 10 psf dead load. At least three joist members shall be present and spaced at 24" o.c. or less.
- Lumber joist shall be No. 2 Dense Southern Pine, No. 1 No. 2 SPF, No. 2 Hem-fir, or No. 2 Douglas fir or higher grade.
- Provide positive drainage, durable materials, and venting as required in 2018 IBC sections 2.404.12.2.5 and 2304.12.2.6. Lumber joist shall be sloped.

Web Stiffener Requirements



Web stiffeners applied to both sides of the joist web

Web Stiffener Nailing Schedule		
AJS® Series	Joist Depth	Nailing
140 / 150 / 20 / 190 / 25	9 1/2" – 11 7/8"	3 10d
	14" – 16"	5 10d

NOTES

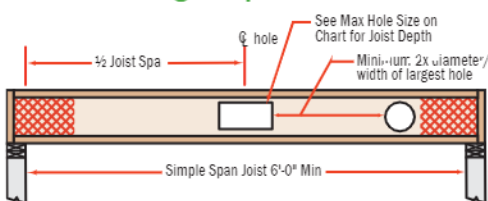
- Web stiffeners are optional except as noted below.
- Web stiffeners are always required for 18" and deeper AJS® joists at all bearing locations.
- Web stiffeners are always required in hangers that do not extend up to support the top flange of the AJS® Joist. Web stiffeners may be required with certain 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 15.
- 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 rim board or 2x lumber (AJS® 25 only).
- For Structural Capacity: Web stiffeners needed to increase the AJS® 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., AJS® 20, double 1/2" panel OK).
- Web stiffeners may be used to increase allowable reaction values. See AJS® Design Properties on page 26 or the BC Calc® software.

Web Stiffener Specifications			
AJS® Series	For Structural Capacity (Min. Thick)	Lateral Restraint in Hanger	Minimum Width
140 / 150 / 20 / 190	1"	1"	2 5/16"
AJS® 25	2x4 lumber (vertical)		

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.

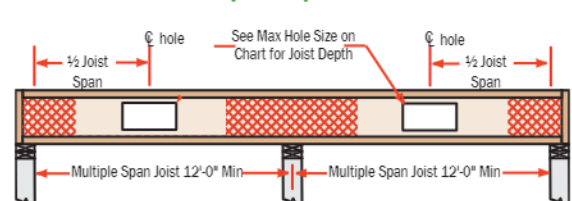
Single Span Joist



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
9 1/2"	6" x 12"	6" x 7"
11 7/8"	8" x 13"	8" x 8"
14"	3" 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.

Allowable Uniform Floor Load (in pounds per linear foot [PLF])

100% Load Duration

Span Length	AJS® 140 Series 2½" Flange Width								AJS® 150 Series 2½" Flange Width							
	9½" AJS® 140		11⅞" AJS® 140		14" AJS® 140		16" AJS® 140		9½" AJS® 150		11⅞" AJS® 150		14" AJS® 150		16" AJS® 150	
	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load
6	-	313	-	318	-	320	-	323	-	313	-	318	-	320	-	323
7	-	268	-	272	-	274	-	277	-	268	-	272	-	274	-	277
8	-	235	-	238	-	240	-	242	-	235	-	238	-	240	-	242
9	-	208	-	212	-	213	-	215	-	208	-	212	-	213	-	215
10	170	138	-	191	-	192	-	194	180	138	-	191	-	192	-	194
11	131	161	-	173	-	174	-	176	139	170	-	173	-	174	-	176
12	103	136	-	159	-	160	-	161	109	156	-	159	-	160	-	161
13	82	115	136	146	-	147	-	149	87	133	144	146	-	147	-	149
14	67	100	111	129	-	137	-	138	71	115	117	136	-	137	-	138
15	55	87	91	112	-	128	-	129	58	100	97	127	-	128	-	129
16	46	76	76	99	110	119	-	121	48	88	81	114	116	120	-	121
17			64	87	93	105	-	114	41	78	68	101	88	112	-	114
18			54	78	79	94	106	107			58	90	84	106	-	107
19			46	70	68	84	91	98			49	80	72	97	96	102
20			40	63	58	76	79	88			43	73	62	87	83	97
21					51	69	68	80					54	79	73	92
22					44	63	60	73					47	72	64	84
23							53	67					41	66	56	76
24							47	61							49	70
25							41	56							44	65
26																
27																
28																
29																
30																

- Total Load values are limited by shear, moment, or deflection equal to L/240.
- Live Load values are limited by deflection equal to L/480. For deflection limits of L/360 and L/960, multiply the Live Load values by 1.33 and 0.50 respectively.
- Both the Total Load and Live Load columns must be checked. Where a Live Load value is not shown, the Total Load value will control.
- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Table values do not consider composite action from gluing and nailing floor sheathing (composite action is considered in floor span tables on page 4).
- Total Load values assume minimum bearing lengths without web stiffeners for joist depths of 10 inches and less.
- For assistance with floor design, consult the section *About Floor Performance* on page 4.
- 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® software.

Allowable Uniform Floor Load

(in pounds per linear foot [PLF])

100% Load Duration

Span Length	AJS® 20 Series 2½" Flange Width								AJS® 190 Series 2½" Flange Width							
	9½" AJS® 20		11⅞" AJS® 20		14" AJS® 20		16" AJS® 20		9½" AJS® 190		11⅞" AJS® 190		14" AJS® 190		16" AJS® 190	
	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load
6	-	313	-	318	-	320	-	323	-	313	-	318	-	320	-	323
7	-	268	-	272	-	274	-	277	-	268	-	272	-	274	-	277
8	-	235	-	238	-	240	-	242	-	235	-	238	-	240	-	242
9	-	208	-	212	-	213	-	215	-	208	-	212	-	213	-	215
10	-	188	-	191	-	192	-	194	-	188	-	191	-	192	-	194
11	161	170	-	173	-	174	-	176	168	170	-	173	-	174	-	176
12	128	156	-	159	-	160	-	161	133	156	-	159	-	160	-	161
13	102	144	-	146	-	147	-	149	107	144	-	146	-	147	-	149
14	83	134	-	136	-	137	-	138	87	134	-	136	-	137	-	138
15	69	120	113	127	-	128	-	129	72	125	118	127	-	128	-	129
16	57	106	95	119	-	120	-	121	60	117	99	119	-	120	-	121
17	48	93	80	112	-	112	-	114	50	101	83	112	-	112	-	114
18	41	82	68	106	98	106	-	107	43	86	71	106	102	106	-	107
19			58	97	84	101	-	102			61	100	88	101	-	102
20			50	88	73	96	-	97			53	95	76	96	-	97
21			44	79	63	91	85	92			46	90	66	91	89	92
22					55	87	74	88			40	80	58	87	78	88
23					49	80	65	84					51	83	69	84
24					43	73	58	80					45	80	61	80
25							52	77					40	76	54	77
26							46	72							48	74
27							41	67							43	71
28																
29																
30																

- Total Load values are limited by shear, moment, or deflection equal to L/240.
- Live Load values are limited by deflection equal to L/480. For deflection limits of L/360 and L/960, multiply the Live Load values by 1.33 and 0.50 respectively.
- Both the Total Load and Live Load columns must be checked. Where a Live Load value is not shown, the Total Load value will control.
- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the BC CALC® software if the length of any span is less than half the length of an adjacent span.
- Table values do not consider composite action from gluing and nailing floor sheathing (composite action is considered in floor span tables on page 4).
- Total Load values assume minimum bearing lengths without web stiffeners for joist depths of 16 inches and less.
- For assistance with floor design, consult the section *About Floor Performance* on page 4.
- 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® software.

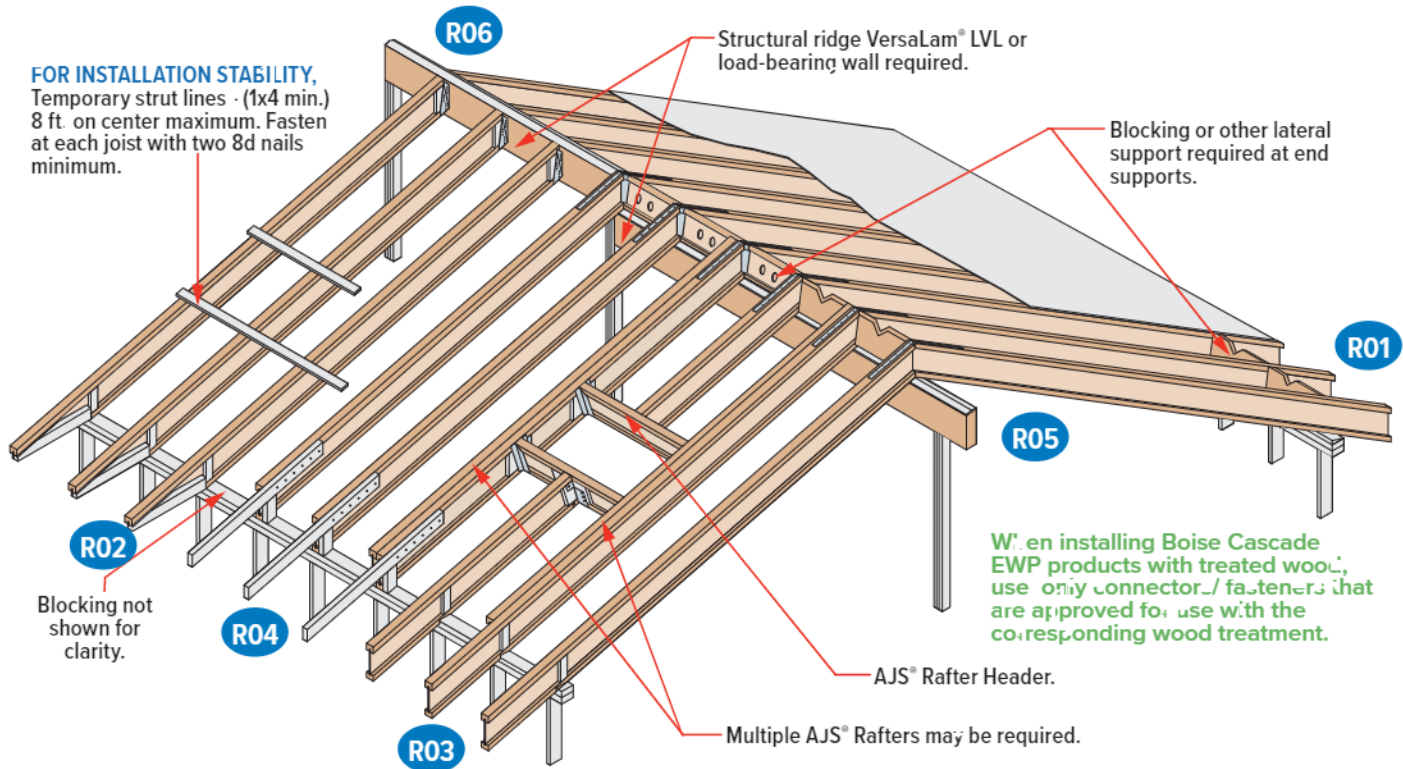
Allowable Uniform Floor Load (in pounds per linear foot [PLF])

100% Load Duration

Span Length	AJS® 25 Series 3½" Flange Width							
	9½" AJS® 25		11⅞" AJS® 25		14" AJS® 25		16" AJS® 25	
	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load	Live Load	Total Load
6	-	316	-	318	-	320	-	323
7	-	271	-	272	-	274	-	277
8	-	237	-	238	-	240	-	242
9	-	211	-	212	-	213	-	215
10	-	190	-	191	-	192	-	194
11	-	172	-	173	-	174	-	176
12	-	158	-	159	-	160	-	161
13	136	146	-	146	-	147	-	149
14	111	135	-	136	-	137	-	138
15	92	126	-	127	-	128	-	129
16	77	118	-	119	-	120	-	121
17	65	111	107	112	-	112	-	114
18	55	105	91	106	-	106	-	107
19	47	95	78	100	-	101	-	102
20	41	82	68	95	-	96	-	97
21			59	90	85	91	-	92
22			52	86	74	87	-	88
23			46	83	66	83	-	84
24			40	79	58	80	78	80
25					52	76	69	77
26					46	73	62	74
27					41	71	56	71
28							50	59
29							45	66
30							41	64



AJS® Rafter



SAFETY WARNING

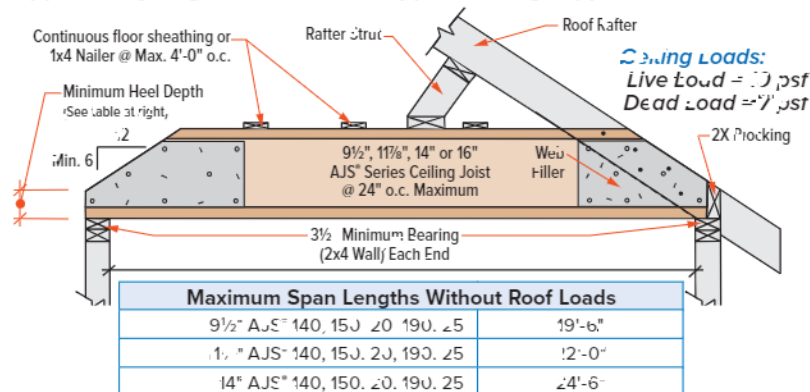
DO NOT ALLOW WORKERS ON AJS® JOISTS UNTIL ALL HANGERS, AJS® RIM JOISTS, RIM BOARDS, AJS® BLOCKING PANELS, X-BRACING AND TEMPORARY 1x4 STRUT LINES ARE INSTALLED AS SPECIFIED BELOW.

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. 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® Joists to within 1/2 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/extension tie. Roof rafter shall be supported by ridge beam or other upper bearing support.



If roof loads transfer to ceiling joists through struts, analyze with BC Calc® software, not exceed minimum end reaction limit stated in code (see right).

Minimum Heel Depths	Joist Depth	End Wall	
		2 x 4	2 x 6
9 1/2"	2 1/2"	1 1/2"	1 1/2"
11 1/8"	3 1/2"	2 1/2"	2 1/2"
14"	4 1/2"	3 1/2"	3 1/2"

Notes:

- 1) Details 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 - 10d (3" long) box or larger nail.
- 6) 1x4 nailers must be continuous and nailed to a braced end wall.
- 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.

Additional roof framing details available with BC Frame[™] software

R01

Z-beveled plate for slope greater than 1/4/12.

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

Rimboard / Versa-Lam[™] LVL blocking. Ventilation "V" cut: 1/3 of length, 1/2 of depth.

2x4 blocking for soffit support.

2'-6" max.

Flange of AJS[™] Joists may be birdsmouth cut only at the low end of the joist. Birds-mouth cut AJS[™] Joist flange must bear fully on plate. web stiffener required each side. Bottom flange shall be fully supported.

R03

Rimboard / Versa-Lam[™] LVL blocking. Ventilation "V" cut: 1/3 of length, 1/2 of depth.

Right fit for lateral stability.

2'-6" max.

Flange of AJS[™] Joist may be birdsmouth cut only at the low end of the joist. Birds-mouth cut AJS[™] Joist flange must bear fully on plate. web stiffener required each side.

R04

10d nails at 6" o.c.

2x4 one side for 135 PLF max. 2x6 one side for 240 PLF max.

Backer block. Thickness per corresponding AJS[™] series.

2x block.

AJS[™] blocking Holes cut for ventilation.

4'-0" horiz.

2'-6" horiz.

R05

Simpson or USP LSTA24 strap, nailing per governing building code.

Versa-Lam[™] LVL support beam.

AJS[™] blocking Holes cut for ventilation.

Double-beveled wood plate.

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

R06

Simpson or USP LSTA24 strap where slope exceeds 1/12 (trip may be required on lower slopes in high-wind areas). Nailing per governing building code.

Versa-Lam[™] LVL support beam.

Simpson LSTA24 or USP TMJ hanger.

Beveled web stiffener on each side.

R07

Backer block (minimum 12" wide). Nail with 10-10d nails.

Joist Hanger

Filler block. Nail with 10-10d nails.

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

R11

Double joist may be required when L exceeds rafter spacing.

Blocking as required.

Nail outrigger through AJS[™] web.

2" x 4" outrigger notched around AJS[™] top flange. Outrigger spacing no greater than 24" on-center.

End Wall.

L (2'-0" max.)

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 Specifier Guide.

LATERAL SUPPORT

- AJS[™] Joists must be laterally supported at end supports (including supports adjacent to overhangs) with rangers, rim board, or blocking (Versa-Lam[™] LVL, Boise Cascade[™] Rimboard or AJS[™] Joist). Metal cross bracing or other cross bracing provides adequate lateral support for AJS[™] Joists, consult governing building code for roof diaphragm connection provisions.

MINIMUM BEARING LENGTH FOR AJS[™] JOISTS

- Minimum end bearing: 1 1/2" for all AJS[™] Joists. 3 1/2" 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 1 1/4 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:
 - Min. 8d nails @ 6" o.c. per IRC[®].
 - Connection per design professional of record's specification for shear transfer.
- AJS[™] joist to support:
 - 2-8d nails, one on each side of the web, placed 1 1/2 inches minimum from the end of the AJS[™] Joist to limit splitting.

- Sheathing to AJS[™] joist:
 - Prescriptive residential floor sheathing nailing requires 8d minimum nails @ 6" o.c. on edges and @ 12" o.c. in the field (IRC[®] Table 602.3(1)).
 - See closest allowable nail spacing limits on page 24 for floor diaphragm nailing specified at close spacing than IRC[®].
 - Maximum nail spacing for minimum lateral stability: 18" for AJS[™] 140/150/20/190, 24" for larger AJS[™] joist series.
 - 14 gauge staples may be substituted for 8d nails if the staples penetrate at least 1 inch into the joist.
 - Wood screws will 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
140 150 20 190	1/8" or two 1/2" wood panels	2x 1/2" 5/8" wood panel
25	2 x 1/2" lumber	Double 2 x 1/2" lumber

- Cut backer and filler blocks to a maximum depth equal to the web depth minus 1/4" to avoid a forced fit.
- For deeper AJS[™] Joists, stack 2x lumber or use multiple pieces of 3/4" wood panels.

WEB STIFFENER REQUIREMENTS

- See *Web Stiffener Requirements* on page 9.

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 the ground on stickers.

MAXIMUM SLOPE

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

VENTILATION

- The 1 1/2 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 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

- 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.

Maximum clear span in feet and inches, based on horizontal spans.

115% and 125% Load Duration

			AJS® 140 Series 2½" Flange Width													
			9½" AJS® 140			11½" AJS® 140			14" AJS® 140			16" AJS® 140				
			4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12		
Clear Span	Live Load [psf]	Dead Load [psf]														
	12" o.c.	Non-Snow 125%	20	10	25'-2"	23'-0"	22'-0"	30'-1"	28'-5"	26'-4"	34'-4"	32'-4"	30'-0"	37'-10"	35'-11"	33'-4"
20			15	23'-10"	22'-5"	20'-8"	28'-6"	26'-9"	24'-9"	32'-5"	30'-6"	28'-2"	34'-11"	33'-10"	31'-3"	
20			20	22'-9"	21'-4"	20'-7"	27'-3"	25'-6"	23'-5"	30'-3"	29'-0"	26'-0"	32'-7"	31'-6"	29'-7"	
Snow 115%		25	10	23'-11"	22'-7"	21'-0"	28'-5"	27'-0"	25'-2"	31'-2"	30'-7"	28'-8"	33'-7"	32'-11"	31'-10"	
		25	15	22'-10"	21'-6"	19'-10"	26'-6"	25'-8"	23'-9"	29'-1"	28'-4"	27'-1"	31'-4"	30'-6"	29'-5"	
		30	10	22'-10"	21'-6"	20'-2"	26'-7"	25'-1"	24'-2"	29'-2"	28'-0"	27'-6"	31'-6"	30'-11"	30'-2"	
		30	15	21'-11"	20'-8"	19'-2"	25'-0"	24'-5"	22'-11"	27'-5"	26'-10"	25'-11"	29'-7"	28'-11"	26'-0"	
		40	10	20'-10"	19'-11"	18'-10"	23'-9"	23'-5"	22'-6"	26'-2"	25'-9"	25'-3"	28'-2"	27'-0"	27'-2"	
		40	15	19'-10"	18'-4"	17'-11"	22'-7"	22'-2"	21'-7"	24'-10"	24'-4"	23'-9"	26'-9"	26'-3"	25'-7"	
		50	10	19'-0"	18'-6"	17'-6"	21'-8"	21'-5"	21'-0"	23'-10"	23'-7"	23'-2"	25'-0"	25'-5"	25'-0"	
		50	15	18'-3"	17'-11"	17'-2"	20'-10"	20'-6"	20'-0"	22'-10"	22'-6"	22'-0"	24'-8"	24'-3"	23'-8"	
16" o.c.		Non-Snow 125%	20	10	22'-10"	21'-6"	20'-0"	27'-4"	25'-9"	23'-11"	30'-5"	29'-4"	27'-3"	32'-9"	32'-0"	30'-3"
			20	15	21'-7"	20'-3"	18'-9"	25'-6"	24'-3"	22'-5"	28'-1"	27'-2"	25'-6"	30'-3"	29'-4"	26'-2"
			20	20	20'-7"	19'-3"	17'-9"	23'-10"	23'-0"	21'-3"	26'-2"	25'-3"	24'-1"	28'-2"	27'-3"	26'-0"
	Snow 115%	25	10	21'-7"	20'-6"	19'-1"	24'-7"	24'-1"	22'-0"	27'-0"	26'-5"	25'-0"	29'-1"	28'-6"	27'-8"	
		25	15	20'-11"	19'-5"	18'-0"	22'-11"	22'-4"	21'-6"	25'-2"	24'-6"	23'-8"	27'-1"	26'-5"	25'-6"	
		30	10	20'-2"	19'-7"	18'-3"	23'-0"	22'-7"	21'-11"	25'-3"	24'-10"	24'-2"	27'-3"	26'-9"	26'-1"	
		30	15	19'-11"	18'-6"	17'-5"	21'-7"	21'-1"	20'-5"	23'-9"	23'-2"	22'-5"	25'-7"	25'-0"	24'-2"	
		40	10	19'-0"	17'-9"	17'-1"	20'-7"	20'-3"	19'-10"	22'-7"	22'-3"	21'-10"	24'-4"	24'-0"	23'-6"	
		40	15	17'-2"	16'-10"	16'-4"	19'-7"	19'-2"	18'-8"	21'-6"	21'-1"	20'-6"	23'-2"	22'-8"	22'-1"	
		50	10	16'-5"	16'-3"	15'-10"	18'-9"	18'-6"	18'-3"	20'-7"	20'-4"	20'-0"	22'-3"	21'-11"	21'-7"	
		50	15	15'-9"	15'-6"	15'-2"	18'-0"	17'-0"	17'-3"	19'-9"	19'-5"	19'-0"	21'-4"	20'-11"	20'-6"	
	18" o.c.	Non-Snow 125%	20	10	21'-5"	20'-3"	18'-9"	25'-3"	24'-2"	22'-5"	27'-9"	27'-1"	25'-7"	29'-10"	29'-2"	28'-3"
			20	15	20'-3"	19'-1"	17'-7"	23'-3"	22'-7"	21'-1"	25'-7"	24'-10"	23'-10"	27'-7"	26'-9"	25'-8"
			20	20	19'-1"	18'-1"	16'-8"	21'-9"	21'-0"	19'-11"	23'-10"	23'-0"	22'-0"	25'-9"	24'-10"	23'-0"
Snow 115%		25	10	19'-8"	19'-3"	17'-11"	22'-5"	21'-11"	21'-4"	24'-7"	24'-1"	23'-5"	26'-6"	26'-0"	25'-3"	
		25	15	18'-4"	17'-10"	16'-11"	20'-11"	20'-4"	19'-7"	22'-11"	22'-4"	21'-7"	24'-9"	24'-3"	23'-3"	
		30	10	18'-5"	18'-1"	17'-2"	21'-0"	20'-7"	20'-1"	23'-0"	22'-7"	22'-1"	24'-10"	24'-5"	23'-9"	
		30	15	17'-3"	16'-10"	16'-4"	19'-8"	19'-3"	18'-7"	21'-0"	21'-2"	20'-6"	23'-4"	22'-9"	22'-1"	
		40	10	16'-5"	16'-2"	15'-10"	18'-9"	18'-6"	18'-1"	20'-7"	20'-4"	19'-11"	22'-2"	21'-11"	21'-5"	
		40	15	15'-8"	15'-4"	14'-11"	17'-10"	17'-6"	17'-0"	19'-7"	19'-2"	18'-8"	21'-1"	20'-8"	20'-2"	
		50	10	15'-0"	14'-10"	14'-7"	17'-1"	16'-11"	16'-7"	18'-10"	18'-1"	18'-3"	20'-3"	20'-0"	19'-0"	
		50	15	14'-4"	14'-2"	13'-10"	16'-5"	16'-1"	15'-9"	18'-0"	17'-9"	17'-4"	19'-5"	19'-1"	18'-0"	
24" o.c.		Non-Snow 125%	20	10	19'-9"	18'-0"	17'-5"	22'-6"	22'-0"	20'-0"	24'-9"	24'-2"	23'-5"	26'-8"	26'-1"	25'-3"
			20	15	18'-3"	17'-8"	16'-3"	20'-10"	20'-2"	19'-4"	22'-10"	22'-2"	21'-3"	24'-7"	23'-11"	22'-11"
			20	20	17'-0"	16'-5"	15'-5"	19'-5"	18'-9"	17'-10"	21'-4"	20'-7"	19'-8"	23'-0"	22'-2"	21'-2"
	Snow 115%	25	10	17'-7"	17'-2"	16'-7"	20'-0"	19'-7"	19'-1"	22'-0"	21'-6"	20'-11"	23'-8"	23'-3"	22'-7"	
		25	15	16'-4"	15'-11"	15'-4"	18'-8"	18'-2"	17'-6"	20'-6"	20'-0"	19'-3"	22'-1"	21'-6"	20'-9"	
		30	10	16'-5"	16'-1"	15'-9"	18'-9"	18'-5"	17'-1"	20'-7"	20'-2"	19'-8"	22'-2"	21'-9"	21'-3"	
		30	15	15'-5"	15'-1"	14'-11"	17'-7"	17'-2"	16'-8"	19'-4"	18'-1"	18'-3"	20'-10"	20'-4"	19'-0"	
		40	10	14'-0"	14'-6"	14'-2"	16'-9"	16'-6"	16'-2"	18'-5"	18'-2"	17'-0"	19'-10"	19'-7"	19'-2"	
		40	15	13'-11"	13'-0"	13'-4"	15'-11"	15'-7"	15'-2"	17'-6"	17'-2"	16'-8"	18'-10"	18'-6"	18'-0"	
		50	10	13'-5"	13'-3"	13'-0"	15'-3"	15'-1"	14'-10"	16'-9"	16'-7"	16'-4"	18'-1"	17'-11"	17'-5"	
		50	15	12'-10"	12'-7"	12'-4"	14'-8"	14'-5"	14'-1"	16'-1"	15'-10"	15'-5"	17'-0"	16'-5"	15'-0"	

- Table values are limited by shear, moment, total load deflection equal to L/180 and live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Table values represent the most restrictive of simple or multiple span applications. Analyze multiple span joists with the BC Calc® 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.
- 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® software.
- Slope roof joists at least ¼" over 12" to minimize ponding.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Maximum clear span in feet and inches, based on horizontal spans.

		115% and 125% Load Duration													
		AJS® 150 Series 2½" Flange Width													
		Live Load [psf]	Dead Load [psf]	9½" AJS® 150			11⅞" AJS® 150			14" AJS® 150			16" AJS® 150		
4/12 or Less	4/12 to 8/12			8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12		
12" o.c.	Non-Snow 125%	20	10	25'-9"	24'-3"	22'-6"	30'-9"	29'-0"	26'-11"	35'-1"	33'-1"	30'-8"	38'-11"	36'-8"	34'-0"
		20	15	24'-4"	22'-10"	21'-1"	29'-2"	27'-5"	25'-3"	33'-2"	31'-2"	28'-9"	36'-10"	34'-7"	31'-11"
		20	20	23'-3"	21'-9"	20'-0"	27'-10"	26'-0"	23'-11"	31'-8"	29'-8"	27'-3"	34'-11"	32'-11"	30'-3"
	Snow 115%	25	10	24'-5"	23'-1"	21'-6"	29'-3"	27'-8"	25'-9"	33'-3"	31'-6"	29'-3"	36'-0"	34'-11"	32'-6"
		25	15	23'-3"	21'-11"	20'-4"	27'-11"	26'-3"	24'-4"	31'-2"	29'-11"	27'-8"	33'-7"	32'-9"	30'-9"
		30	10	23'-4"	22'-1"	20'-7"	27'-11"	26'-6"	24'-8"	31'-4"	30'-2"	28'-1"	33'-9"	33'-1"	31'-2"
		30	15	22'-5"	21'-1"	19'-7"	26'-10"	25'-3"	23'-6"	29'-5"	28'-9"	26'-9"	31'-9"	31'-0"	29'-8"
		40	10	21'-3"	20'-4"	19'-3"	25'-5"	24'-5"	23'-0"	28'-0"	27'-7"	26'-3"	30'-2"	29'-9"	29'-1"
		40	15	20'-11"	19'-9"	18'-5"	24'-3"	23'-8"	22'-1"	26'-8"	26'-1"	25'-2"	28'-8"	28'-2"	27'-5"
		50	10	19'-8"	18'-10"	17'-11"	23'-3"	22'-7"	21'-5"	25'-7"	25'-3"	24'-5"	27'-7"	27'-3"	26'-9"
50	15	19'-7"	18'-9"	17'-6"	22'-4"	21'-11"	21'-0"	24'-6"	24'-1"	23'-7"	26'-5"	26'-0"	25'-5"		
16" o.c.	Non-Snow 125%	20	10	23'-4"	22'-0"	20'-5"	27'-11"	26'-4"	24'-5"	31'-9"	30'-0"	27'-10"	35'-1"	33'-3"	30'-10"
		20	15	22'-1"	20'-9"	19'-2"	26'-5"	24'-10"	22'-11"	30'-1"	28'-3"	26'-1"	32'-5"	31'-4"	28'-11"
		20	20	21'-1"	19'-8"	18'-1"	25'-2"	23'-7"	21'-8"	28'-1"	26'-11"	24'-9"	30'-3"	29'-2"	27'-5"
	Snow 115%	25	10	22'-1"	20'-11"	19'-6"	26'-4"	25'-1"	23'-4"	28'-1"	28'-4"	26'-7"	31'-2"	30'-6"	29'-6"
		25	15	21'-1"	19'-10"	18'-5"	24'-7"	23'-9"	22'-0"	27'-0"	26'-3"	25'-1"	29'-1"	28'-4"	27'-4"
		30	10	21'-2"	20'-0"	18'-8"	24'-8"	24'-0"	22'-4"	27'-1"	26'-7"	25'-6"	29'-2"	28'-8"	27'-11"
		30	15	20'-3"	19'-1"	17'-9"	23'-2"	22'-8"	21'-3"	25'-5"	24'-10"	24'-1"	27'-5"	26'-9"	25'-11"
		40	10	19'-3"	18'-5"	17'-5"	22'-1"	21'-9"	20'-10"	24'-3"	23'-10"	23'-5"	26'-1"	25'-9"	25'-3"
		40	15	18'-5"	17'-11"	16'-8"	21'-0"	20'-7"	20'-0"	23'-0"	22'-7"	22'-0"	24'-10"	24'-4"	23'-8"
		50	10	17'-8"	17'-1"	16'-3"	20'-2"	19'-11"	19'-5"	22'-1"	21'-10"	21'-6"	23'-10"	23'-6"	23'-2"
50	15	16'-11"	16'-8"	15'-10"	19'-4"	19'-0"	18'-7"	21'-2"	20'-10"	20'-4"	22'-10"	22'-6"	21'-11"		
18" o.c.	Non-Snow 125%	20	10	21'-11"	20'-8"	19'-2"	26'-3"	24'-9"	22'-11"	29'-9"	28'-2"	26'-2"	32'-0"	31'-3"	29'-0"
		20	15	20'-9"	19'-6"	18'-0"	24'-10"	23'-4"	21'-6"	27'-5"	26'-7"	24'-6"	29'-7"	28'-8"	27'-2"
		20	20	19'-9"	18'-6"	17'-0"	23'-4"	22'-2"	20'-5"	25'-7"	24'-8"	23'-3"	27'-7"	26'-7"	25'-5"
	Snow 115%	25	10	20'-9"	19'-8"	18'-3"	24'-0"	23'-6"	21'-11"	26'-5"	25'-10"	24'-11"	28'-5"	27'-10"	27'-1"
		25	15	19'-8"	18'-8"	17'-3"	22'-5"	21'-10"	20'-8"	24'-7"	24'-0"	23'-1"	26'-6"	25'-10"	24'-11"
		30	10	19'-9"	18'-10"	17'-7"	22'-6"	22'-1"	21'-0"	24'-8"	24'-3"	23'-8"	26'-7"	26'-2"	25'-6"
		30	15	18'-7"	17'-11"	16'-8"	21'-2"	20'-8"	20'-0"	23'-3"	22'-8"	21'-11"	25'-0"	24'-5"	23'-8"
		40	10	17'-8"	17'-4"	16'-4"	20'-1"	19'-10"	19'-5"	22'-1"	21'-9"	21'-4"	23'-10"	23'-6"	23'-0"
		40	15	16'-9"	16'-5"	15'-8"	19'-2"	18'-9"	18'-3"	21'-0"	20'-7"	20'-1"	22'-8"	22'-2"	21'-7"
		50	10	16'-1"	15'-11"	15'-3"	18'-4"	18'-2"	17'-10"	20'-2"	19'-11"	19'-7"	21'-9"	21'-6"	21'-1"
50	15	15'-5"	15'-2"	14'-10"	17'-7"	17'-4"	16'-11"	19'-4"	19'-0"	18'-7"	20'-10"	20'-6"	19'-8"		
24" o.c.	Non-Snow 125%	20	10	20'-3"	19'-1"	17'-9"	24'-2"	22'-11"	21'-3"	26'-7"	25'-11"	24'-3"	28'-7"	27'-11"	26'-11"
		20	15	19'-2"	18'-0"	16'-8"	22'-4"	21'-7"	19'-11"	24'-6"	23'-9"	22'-8"	26'-5"	25'-7"	24'-7"
		20	20	18'-3"	17'-2"	15'-9"	20'-10"	20'-1"	18'-10"	22'-10"	22'-1"	21'-1"	24'-8"	23'-9"	22'-8"
	Snow 115%	25	10	18'-10"	18'-2"	16'-11"	21'-6"	21'-0"	20'-3"	23'-7"	23'-1"	22'-5"	25'-5"	24'-11"	24'-2"
		25	15	17'-7"	17'-1"	16'-0"	20'-0"	19'-6"	18'-10"	22'-0"	21'-5"	20'-8"	23'-8"	23'-1"	22'-3"
		30	10	17'-8"	17'-4"	16'-3"	20'-1"	19'-9"	19'-3"	22'-1"	21'-8"	21'-2"	23'-9"	23'-4"	22'-9"
		30	15	16'-7"	16'-2"	15'-5"	18'-11"	18'-5"	17'-10"	20'-9"	20'-3"	19'-7"	22'-4"	21'-10"	21'-1"
		40	10	15'-9"	15'-6"	15'-2"	18'-0"	17'-8"	17'-4"	19'-9"	19'-5"	19'-1"	21'-3"	20'-11"	20'-6"
		40	15	15'-0"	14'-8"	14'-4"	17'-1"	16'-9"	16'-4"	18'-9"	18'-5"	17'-11"	20'-1"	19'-3"	18'-3"
		50	10	14'-5"	14'-2"	14'-0"	16'-5"	16'-2"	15'-11"	18'-0"	17'-9"	17'-2"	18'-6"	18'-0"	17'-5"
50	15	13'-9"	13'-7"	13'-3"	15'-9"	15'-5"	15'-1"	16'-9"	16'-2"	15'-5"	17'-0"	16'-5"	15'-8"		

- Table values are limited by shear, moment, total load deflection equal to L/180 and live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Table values represent the most restrictive of simple or multiple span applications. Analyze multiple span joists with the BC Calc 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.

- 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® software.
- Slope roof joists at least ¼" over 12" to minimize ponding.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Maximum clear span in feet and inches, based on horizontal spans.

115% and 125% Load Duration

			AJS® 20 Series 2½" Flange Width												
			9½" AJS® 20			11⅝" AJS® 20			14" AJS® 20			16" AJS® 20			
			4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	
		Live Load [psf]	Dead Load [psf]												
		12" o.c.	Non-Snow 125%	20	10	27'-4"	25'-9"	23'-11"	32'-7"	30'-9"	28'-7"	37'-1"	35'-0"	32'-6"	41'-2"
20	15			25'-10"	24'-3"	22'-5"	30'-11"	29'-0"	26'-9"	35'-2"	33'-0"	30'-5"	39'-0"	36'-7"	33'-9"
20	20			24'-8"	23'-1"	21'-3"	29'-6"	27'-7"	25'-4"	33'-6"	31'-5"	28'-10"	37'-2"	34'-10"	32'-0"
Snow 115%	25		10	25'-11"	24'-6"	22'-10"	31'-0"	29'-3"	27'-3"	35'-3"	33'-4"	31'-0"	39'-1"	36'-11"	34'-4"
	25		15	24'-9"	23'-3"	21'-"	29'-7"	27'-10"	25'-9"	33'-7"	31'-8"	29'-4"	37'-11"	35'-1"	32'-6"
	30		10	24'-9"	23'-6"	21'-11"	29'-7"	28'-0"	26'-2"	33'-8"	31'-11"	29'-9"	37'-1"	35'-4"	33'-0"
	30		15	23'-9"	22'-5"	20'-10"	28'-5"	27'-9"	24'-10"	32'-4"	30'-6"	28'-3"	34'-10"	33'-10"	31'-4"
	40		10	22'-6"	21'-7"	20'-5"	26'-11"	25'-10"	24'-5"	30'-8"	29'-5"	27'-9"	33'-2"	32'-7"	30'-9"
	40		15	22'-2"	21'-0"	19'-7"	26'-6"	25'-1"	23'-5"	29'-3"	28'-7"	27'-7"	31'-7"	30'-11"	29'-6"
	50		10	20'-10"	20'-0"	19'-0"	24'-11"	23'-11"	22'-9"	28'-1"	27'-3"	25'-10"	30'-3"	29'-11"	28'-8"
50	15	20'-10"	19'-11"	18'-7"	24'-6"	23'-9"	22'-3"	26'-11"	26'-6"	25'-3"	29'-0"	28'-7"	27'-11"		
16" o.c.	Non-Snow 125%	20	10	24'-9"	23'-4"	21'-8"	29'-7"	27'-11"	25'-11"	33'-8"	31'-9"	29'-5"	37'-4"	35'-2"	32'-8"
		20	15	23'-5"	22'-0"	20'-4"	28'-0"	25'-4"	24'-3"	31'-10"	29'-11"	27'-7"	35'-4"	33'-2"	30'-7"
		20	20	22'-4"	20'-11"	19'-3"	26'-8"	25'-0"	23'-0"	30'-5"	28'-5"	26'-2"	33'-3"	31'-7"	29'-0"
	Snow 115%	25	10	23'-6"	22'-2"	20'-8"	28'-1"	27'-11"	25'-10"	31'-10"	29'-10"	28'-1"	34'-3"	33'-6"	31'-2"
		25	15	22'-5"	21'-1"	19'-6"	26'-9"	25'-2"	23'-4"	29'-8"	28'-8"	26'-7"	32'-0"	31'-1"	29'-5"
		30	10	22'-5"	21'-3"	19'-10"	26'-10"	25'-5"	23'-9"	29'-9"	28'-11"	27'-0"	32'-1"	31'-6"	29'-11"
		30	15	21'-6"	20'-4"	18'-10"	25'-6"	24'-3"	22'-6"	28'-0"	27'-4"	25'-8"	30'-2"	29'-5"	28'-5"
		40	10	20'-5"	19'-7"	18'-5"	24'-3"	23'-5"	22'-1"	26'-8"	26'-3"	25'-2"	28'-8"	28'-3"	27'-9"
		40	15	20'-1"	19'-0"	17'-9"	23'-1"	22'-7"	21'-2"	25'-4"	24'-10"	24'-1"	27'-3"	26'-9"	26'-1"
		50	10	18'-11"	18'-1"	17'-2"	22'-2"	21'-8"	20'-7"	24'-4"	24'-0"	23'-5"	26'-2"	25'-11"	25'-5"
50	15	18'-7"	18'-0"	16'-10"	21'-3"	20'-10"	20'-1"	23'-4"	22'-11"	22'-5"	25'-1"	24'-8"	23'-7"		
19.2" o.c.	Non-Snow 125%	20	10	23'-3"	21'-11"	20'-4"	27'-9"	25'-2"	24'-4"	31'-7"	29'-10"	27'-8"	35'-1"	33'-1"	30'-8"
		20	15	22'-0"	20'-8"	19'-1"	26'-4"	24'-8"	22'-10"	29'-11"	28'-1"	25'-11"	32'-3"	31'-2"	28'-9"
		20	20	21'-0"	19'-8"	18'-1"	25'-1"	23'-5"	21'-7"	28'-1"	26'-9"	24'-7"	30'-4"	29'-3"	27'-3"
	Snow 115%	25	10	22'-1"	20'-10"	19'-5"	26'-4"	24'-11"	23'-3"	29'-0"	28'-4"	27'-5"	31'-3"	30'-7"	29'-3"
		25	15	21'-0"	19'-10"	18'-4"	24'-8"	23'-8"	21'-11"	27'-1"	26'-4"	24'-11"	29'-2"	28'-5"	27'-5"
		30	10	21'-1"	19'-11"	18'-8"	24'-9"	23'-10"	22'-3"	27'-2"	26'-8"	25'-4"	29'-3"	28'-9"	28'-0"
		30	15	20'-2"	19'-1"	17'-8"	23'-3"	22'-8"	21'-2"	25'-6"	24'-11"	24'-1"	27'-5"	26'-10"	26'-0"
		40	10	19'-2"	18'-5"	17'-4"	22'-1"	21'-10"	20'-9"	24'-3"	23'-11"	23'-5"	26'-2"	25'-9"	25'-3"
		40	15	18'-5"	17'-10"	16'-8"	21'-0"	20'-7"	19'-11"	23'-1"	22'-8"	22'-0"	24'-11"	24'-2"	22'-11"
		50	10	17'-8"	17'-0"	16'-2"	20'-2"	19'-11"	19'-4"	22'-2"	21'-11"	21'-5"	23'-2"	22'-7"	21'-10"
50	15	17'-0"	16'-8"	15'-9"	19'-4"	19'-0"	18'-7"	21'-0"	20'-3"	19'-4"	21'-3"	20'-7"	19'-8"		
24" o.c.	Non-Snow 125%	20	10	21'-6"	20'-4"	18'-10"	25'-9"	24'-3"	22'-6"	29'-2"	27'-7"	25'-8"	31'-5"	30'-8"	28'-5"
		20	15	20'-4"	19'-1"	17'-8"	24'-4"	22'-10"	21'-1"	26'-11"	24'-0"	22'-0"	29'-0"	28'-2"	26'-8"
		20	20	19'-5"	18'-2"	16'-9"	22'-11"	21'-9"	20'-0"	25'-2"	24'-3"	22'-9"	27'-1"	26'-2"	24'-11"
	Snow 115%	25	10	20'-5"	19'-4"	18'-0"	23'-7"	23'-1"	21'-6"	25'-11"	25'-5"	24'-6"	27'-11"	27'-4"	26'-7"
		25	15	19'-4"	18'-4"	17'-0"	22'-0"	21'-5"	20'-4"	24'-2"	23'-6"	22'-8"	26'-1"	25'-4"	24'-3"
		30	10	19'-4"	18'-6"	17'-3"	22'-1"	21'-8"	20'-8"	24'-3"	23'-10"	23'-3"	26'-2"	25'-8"	25'-0"
		30	15	18'-2"	17'-8"	16'-5"	20'-9"	20'-3"	19'-7"	22'-10"	22'-3"	21'-7"	24'-5"	23'-4"	21'-11"
		40	10	17'-4"	17'-0"	16'-1"	19'-9"	19'-"	19'-1"	21'-8"	21'-3"	20'-5"	22'-2"	21'-6"	20'-8"
		40	15	16'-6"	15'-2"	15'-5"	18'-9"	18'-5"	17'-8"	19'-9"	19'-0"	18'-0"	20'-1"	19'-3"	18'-3"
		50	10	15'-10"	15'-7"	14'-11"	17'-11"	17'-5"	16'-11"	18'-2"	17'-9"	17'-2"	18'-6"	18'-0"	17'-5"
50	15	15'-2"	14'-11"	14'-7"	15'-5"	15'-11"	15'-2"	16'-9"	16'-2"	15'-5"	17'-0"	16'-5"	15'-8"		

- Table values are limited by shear, moment, total load deflection equal to L/180 and live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Table values represent the most restrictive of simple or multiple span applications. Analyze multiple span joists with the BC Calc 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.
- 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® software.
- Slope roof joists at least ¼" over 12" to minimize ponding.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Maximum clear span in feet and inches, based on horizontal spans.

			115% and 125% Load Duration												
			AJS® 190 Series 2½" Flange Width												
			9½" AJS® 190			11⅞" AJS® 190			14" AJS® 190			16" AJS® 190			
		Live Load [psf]	Dead Load [psf]	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12
12" o.c.	Non-Snow 125%	20	10	27'-9"	26'-2"	24'-3"	33'-2"	31'-3"	29'-0"	37'-9"	35'-7"	33'-0"	41'-10"	39'-6"	36'-7"
		20	15	26'-3"	24'-8"	22'-9"	31'-5"	29'-6"	27'-3"	35'-9"	33'-7"	31'-0"	39'-8"	37'-3"	34'-4"
		20	20	25'-1"	23'-6"	21'-7"	30'-0"	28'-4"	25'-9"	34'-1"	31'-11"	29'-4"	37'-10"	35'-5"	32'-7"
	Snow 115%	25	10	26'-4"	24'-11"	23'-2"	31'-6"	29'-9"	27'-8"	35'-10"	33'-10"	31'-6"	39'-9"	37'-7"	34'-11"
		25	15	25'-2"	23'-8"	21'-11"	30'-0"	28'-3"	26'-2"	34'-2"	32'-2"	29'-9"	37'-11"	35'-8"	33'-0"
		30	10	25'-2"	23'-10"	22'-3"	30'-1"	28'-6"	26'-7"	34'-3"	32'-5"	30'-3"	38'-0"	36'-0"	33'-7"
		30	15	24'-2"	22'-9"	21'-2"	28'-10"	27'-3"	25'-3"	32'-10"	31'-0"	28'-9"	36'-5"	34'-4"	31'-11"
		40	10	22'-11"	22'-0"	20'-9"	27'-5"	26'-3"	24'-10"	31'-2"	29'-11"	28'-3"	34'-7"	33'-2"	31'-4"
		40	15	22'-7"	21'-4"	19'-11"	27'-0"	25'-6"	23'-9"	30'-8"	29'-1"	27'-1"	33'-10"	32'-3"	30'-0"
		50	10	21'-3"	20'-4"	19'-4"	25'-4"	24'-4"	23'-1"	28'-11"	27'-8"	26'-3"	32'-0"	30'-9"	29'-2"
50	15	21'-3"	20'-3"	18'-11"	25'-4"	24'-2"	22'-7"	28'-10"	27'-6"	25'-8"	31'-1"	30'-6"	28'-6"		
16" o.c.	Non-Snow 125%	20	10	25'-2"	23'-9"	22'-0"	30'-1"	28'-4"	26'-4"	34'-2"	32'-3"	29'-11"	37'-11"	35'-9"	33'-2"
		20	15	23'-10"	22'-4"	20'-8"	28'-6"	26'-9"	24'-8"	32'-5"	30'-5"	28'-1"	35'-11"	33'-9"	31'-2"
		20	20	22'-9"	21'-3"	19'-7"	27'-2"	25'-5"	23'-4"	30'-11"	28'-11"	26'-7"	34'-3"	32'-1"	29'-6"
	Snow 115%	25	10	23'-10"	22'-7"	21'-0"	28'-6"	27'-0"	25'-1"	32'-6"	30'-8"	28'-7"	36'-0"	34'-1"	31'-8"
		25	15	22'-9"	21'-5"	19'-10"	27'-2"	25'-7"	23'-9"	31'-0"	29'-2"	27'-0"	34'-3"	32'-4"	29'-11"
		30	10	22'-10"	21'-7"	20'-2"	27'-3"	25'-10"	24'-1"	31'-0"	29'-5"	27'-5"	34'-4"	32'-7"	30'-5"
		30	15	21'-10"	20'-8"	19'-2"	26'-2"	24'-8"	22'-11"	29'-9"	28'-1"	26'-1"	32'-4"	31'-2"	28'-11"
		40	10	20'-9"	19'-11"	18'-10"	24'-10"	23'-10"	22'-6"	28'-3"	27'-1"	25'-7"	30'-9"	30'-1"	28'-5"
		40	15	20'-5"	19'-4"	18'-0"	24'-5"	23'-1"	21'-7"	27'-2"	26'-4"	24'-6"	29'-3"	28'-8"	27'-2"
		50	10	19'-2"	18'-5"	17'-6"	22'-11"	22'-0"	20'-11"	26'-1"	25'-1"	23'-10"	27'-10"	27'-2"	26'-3"
50	15	19'-2"	18'-4"	17'-1"	22'-9"	21'-11"	20'-5"	25'-0"	24'-5"	23'-3"	25'-7"	24'-9"	23'-7"		
19.2" o.c.	Non-Snow 125%	20	10	23'-7"	22'-3"	20'-8"	28'-3"	26'-8"	24'-9"	32'-2"	30'-4"	28'-2"	35'-8"	33'-7"	31'-3"
		20	15	22'-4"	21'-0"	19'-5"	26'-9"	25'-1"	23'-2"	30'-5"	28'-7"	26'-5"	33'-9"	31'-8"	29'-3"
		20	20	21'-4"	20'-0"	18'-4"	25'-6"	23'-10"	21'-11"	29'-0"	27'-2"	25'-0"	32'-2"	30'-2"	27'-9"
	Snow 115%	25	10	22'-5"	21'-2"	19'-9"	26'-10"	25'-4"	23'-7"	30'-6"	28'-10"	26'-10"	33'-6"	32'-0"	29'-9"
		25	15	21'-4"	20'-2"	18'-8"	25'-7"	24'-1"	22'-3"	29'-0"	27'-5"	25'-4"	31'-3"	30'-5"	28'-2"
		30	10	21'-5"	20'-4"	18'-11"	25'-7"	24'-3"	22'-8"	29'-1"	27'-7"	25'-9"	31'-4"	30'-8"	28'-7"
		30	15	20'-6"	19'-5"	18'-0"	24'-7"	23'-2"	21'-6"	27'-4"	26'-4"	24'-6"	29'-6"	28'-9"	27'-2"
		40	10	19'-6"	18'-8"	17'-8"	23'-3"	22'-4"	21'-1"	26'-0"	25'-5"	24'-0"	27'-9"	27'-0"	25'-11"
		40	15	19'-2"	18'-2"	16'-11"	22'-6"	21'-8"	20'-3"	24'-9"	23'-10"	22'-7"	25'-2"	24'-2"	22'-11"
		50	10	18'-0"	17'-3"	16'-5"	21'-6"	20'-8"	19'-8"	22'-10"	22'-3"	21'-6"	23'-2"	22'-7"	21'-10"
50	15	18'-0"	17'-2"	16'-1"	20'-7"	19'-11"	19'-0"	21'-0"	20'-3"	19'-4"	21'-3"	20'-7"	19'-8"		
24" o.c.	Non-Snow 125%	20	10	21'-10"	20'-8"	19'-2"	26'-2"	24'-8"	22'-11"	29'-9"	28'-1"	26'-1"	33'-0"	31'-2"	28'-11"
		20	15	20'-8"	19'-5"	18'-0"	24'-9"	23'-3"	21'-6"	28'-2"	26'-6"	24'-5"	31'-1"	29'-4"	27'-1"
		20	20	19'-9"	18'-6"	17'-0"	23'-7"	22'-1"	20'-4"	26'-10"	25'-2"	23'-2"	29'-0"	27'-9"	25'-3"
	Snow 115%	25	10	20'-9"	19'-8"	18'-3"	24'-10"	23'-6"	21'-10"	27'-9"	26'-9"	24'-11"	29'-11"	29'-4"	27'-7"
		25	15	19'-9"	18'-8"	17'-3"	23'-7"	22'-3"	20'-8"	25'-11"	25'-3"	23'-6"	27'-6"	26'-1"	24'-3"
		30	10	19'-10"	18'-9"	17'-6"	23'-8"	22'-6"	21'-0"	26'-0"	25'-6"	23'-10"	27'-9"	26'-9"	25'-5"
		30	15	19'-0"	17'-11"	16'-8"	22'-3"	21'-5"	19'-11"	24'-2"	23'-0"	21'-7"	24'-6"	23'-4"	21'-11"
		40	10	18'-0"	17'-3"	16'-4"	21'-2"	20'-8"	19'-7"	21'-10"	21'-3"	20'-5"	22'-2"	21'-6"	20'-8"
		40	15	17'-8"	16'-9"	15'-8"	19'-5"	18'-8"	17'-8"	19'-9"	19'-0"	18'-0"	20'-1"	19'-3"	18'-3"
		50	10	16'-8"	16'-0"	15'-2"	17'-11"	17'-6"	16'-11"	18'-2"	17'-9"	17'-2"	18'-6"	18'-0"	17'-5"
50	15	16'-2"	15'-8"	14'-10"	16'-5"	15'-11"	15'-2"	16'-9"	16'-2"	15'-5"	17'-0"	16'-5"	15'-8"		

- Table values are limited by shear, moment, total load deflection equal to L/180 and live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Table values represent the most restrictive of simple or multiple span applications. Analyze multiple span joists with the BC Calc 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. 18" joists require web stiffeners at all bearing locations.
- 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® software.
- Slope roof joists at least ¼" over 12" to minimize ponding.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Roof Span Tables

Maximum clear span in feet and inches, based on horizontal spans.

115% and 125% Load Duration

			AJS® 25 Series — 9½" - 16" Depths ⅜" Web Thickness — ¾" Flange Width												
			9½" AJS® 25			11⅝" AJS® 25			14" AJS® 25			16" AJS® 25			
		Live Load [psf]	Dead Load [psf]	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12	4/12 or Less	4/12 to 8/12	8/12 to 12/12
12" o.c.	Non-Snow 125%	20	10	30'-5"	28'-9"	26'-8"	36'-4"	34'-3"	31'-10"	41'-4"	38'-11"	36'-2"	45'-9"	43'-2"	40'-1"
		20	15	28'-10"	27'-1"	25'-0"	34'-5"	32'-4"	29'-10"	39'-1"	36'-9"	33'-11"	43'-4"	40'-8"	37'-7"
		20	20	27'-6"	25'-9"	23'-8"	32'-10"	30'-9"	28'-3"	37'-4"	34'-11"	32'-2"	41'-4"	38'-9"	35'-7"
	Snow 115%	25	10	28'-11"	27'-4"	25'-5"	34'-6"	32'-7"	30'-4"	39'-3"	37'-1"	34'-6"	43'-5"	41'-1"	38'-3"
		25	15	27'-7"	25'-11"	24'-0"	32'-11"	31'-0"	28'-8"	37'-5"	35'-3"	32'-7"	41'-5"	39'-0"	36'-2"
		30	10	27'-8"	26'-2"	24'-5"	33'-0"	31'-3"	29'-2"	37'-6"	35'-6"	33'-2"	41'-6"	39'-4"	36'-8"
		30	15	26'-6"	25'-0"	23'-2"	31'-8"	29'-10"	27'-8"	35'-11"	33'-11"	31'-6"	39'-10"	37'-7"	34'-11"
		40	10	25'-2"	24'-1"	22'-9"	30'-0"	28'-9"	27'-2"	34'-1"	32'-9"	30'-11"	37'-10"	36'-3"	34'-3"
		40	15	24'-9"	23'-5"	21'-10"	29'-7"	28'-0"	26'-1"	33'-7"	31'-10"	29'-8"	37'-3"	35'-3"	32'-10"
		50	10	23'-3"	22'-4"	21'-2"	27'-9"	26'-8"	25'-4"	31'-7"	30'-4"	28'-9"	35'-0"	33'-7"	31'-11"
50	15	23'-3"	22'-2"	20'-9"	27'-9"	26'-6"	24'-9"	31'-7"	30'-1"	28'-2"	35'-0"	33'-4"	31'-2"		
16" o.c.	Non-Snow 125%	20	10	27'-7"	26'-0"	24'-2"	32'-11"	31'-1"	28'-10"	37'-5"	35'-4"	32'-9"	41'-6"	39'-2"	36'-4"
		20	15	26'-1"	24'-6"	22'-8"	31'-2"	29'-3"	27'-1"	35'-5"	33'-4"	30'-9"	39'-3"	36'-11"	34'-1"
		20	20	24'-11"	23'-4"	21'-5"	29'-9"	27'-10"	25'-7"	33'-10"	31'-8"	29'-1"	37'-6"	35'-1"	32'-3"
	Snow 115%	25	10	26'-2"	24'-9"	23'-1"	31'-3"	29'-7"	27'-6"	35'-6"	33'-7"	31'-3"	39'-5"	37'-3"	34'-8"
		25	15	25'-0"	23'-6"	21'-9"	29'-10"	28'-1"	26'-0"	33'-11"	31'-11"	29'-7"	37'-7"	35'-4"	32'-9"
		30	10	25'-0"	23'-8"	22'-1"	29'-10"	28'-4"	26'-5"	34'-0"	32'-2"	30'-0"	37'-8"	35'-8"	33'-3"
		30	15	24'-0"	22'-8"	21'-0"	28'-8"	27'-0"	25'-1"	32'-7"	30'-9"	28'-6"	36'-1"	34'-1"	31'-7"
		40	10	22'-9"	21'-10"	20'-7"	27'-2"	26'-1"	24'-8"	30'-11"	29'-8"	28'-0"	34'-3"	32'-10"	31'-0"
		40	15	22'-5"	21'-2"	19'-9"	26'-9"	25'-4"	23'-7"	30'-5"	28'-10"	26'-10"	33'-8"	31'-11"	29'-9"
		50	10	21'-0"	20'-2"	19'-2"	25'-2"	24'-2"	22'-11"	28'-7"	27'-5"	26'-1"	31'-8"	30'-5"	28'-11"
50	15	21'-0"	20'-1"	18'-9"	25'-2"	24'-0"	22'-5"	28'-7"	27'-3"	25'-6"	29'-7"	28'-8"	27'-4"		
19.2" o.c.	Non-Snow 125%	20	10	25'-11"	24'-5"	22'-8"	30'-11"	29'-2"	27'-1"	35'-2"	33'-2"	30'-10"	39'-0"	36'-9"	34'-2"
		20	15	24'-6"	23'-0"	21'-3"	29'-3"	27'-6"	25'-5"	33'-3"	31'-3"	28'-11"	36'-11"	34'-8"	32'-0"
		20	20	23'-5"	21'-11"	20'-2"	27'-11"	26'-2"	24'-1"	31'-9"	29'-9"	27'-4"	35'-2"	32'-11"	30'-4"
	Snow 115%	25	10	24'-7"	23'-3"	21'-8"	29'-4"	27'-9"	25'-10"	33'-5"	31'-7"	29'-5"	37'-0"	35'-0"	32'-7"
		25	15	23'-5"	22'-1"	20'-5"	28'-0"	26'-4"	24'-5"	31'-10"	30'-0"	27'-9"	35'-3"	33'-3"	30'-9"
		30	10	23'-6"	22'-3"	20'-9"	28'-1"	26'-7"	24'-10"	31'-11"	30'-3"	28'-3"	35'-4"	33'-6"	31'-3"
		30	15	22'-6"	21'-3"	19'-9"	26'-11"	25'-5"	23'-7"	30'-7"	28'-10"	26'-10"	33'-11"	32'-0"	29'-8"
		40	10	21'-4"	20'-6"	19'-4"	25'-6"	24'-6"	23'-2"	29'-0"	27'-10"	26'-4"	32'-2"	30'-10"	29'-2"
		40	15	21'-0"	19'-11"	18'-7"	25'-1"	23'-9"	22'-2"	28'-3"	27'-0"	25'-3"	29'-1"	28'-0"	26'-6"
		50	10	19'-9"	18'-11"	18'-0"	23'-7"	22'-8"	21'-6"	26'-1"	25'-5"	24'-6"	26'-10"	26'-2"	25'-3"
50	15	19'-9"	18'-10"	17'-7"	23'-3"	22'-6"	21'-0"	23'-11"	23'-2"	22'-1"	24'-8"	23'-10"	22'-9"		
24" o.c.	Non-Snow 125%	20	10	24'-0"	22'-8"	21'-0"	28'-8"	27'-0"	25'-1"	32'-7"	30'-9"	28'-6"	36'-1"	34'-1"	31'-7"
		20	15	22'-8"	21'-4"	19'-8"	27'-1"	25'-6"	23'-6"	30'-10"	29'-0"	26'-9"	34'-2"	32'-1"	29'-8"
		20	20	21'-8"	20'-3"	18'-8"	25'-10"	24'-3"	22'-3"	29'-5"	27'-6"	25'-4"	32'-7"	30'-6"	28'-1"
	Snow 115%	25	10	22'-9"	21'-6"	20'-1"	27'-2"	25'-9"	23'-11"	30'-11"	29'-3"	27'-3"	34'-3"	32'-5"	30'-2"
		25	15	21'-8"	20'-5"	18'-11"	25'-11"	24'-5"	22'-7"	29'-5"	27'-9"	25'-9"	31'-10"	30'-2"	28'-1"
		30	10	21'-9"	20'-7"	19'-3"	25'-11"	24'-7"	23'-0"	29'-6"	28'-0"	26'-2"	32'-1"	30'-11"	28'-11"
		30	15	20'-10"	19'-8"	18'-3"	24'-10"	23'-6"	21'-10"	27'-7"	26'-3"	24'-7"	28'-4"	27'-0"	25'-4"
		40	10	19'-9"	18'-11"	17'-11"	23'-7"	22'-8"	21'-5"	24'-11"	24'-3"	23'-3"	25'-8"	24'-11"	23'-11"
		40	15	19'-5"	18'-5"	17'-2"	21'-11"	21'-1"	19'-11"	22'-7"	21'-8"	20'-7"	23'-3"	22'-4"	21'-2"
		50	10	18'-3"	17'-6"	16'-8"	20'-2"	19'-8"	19'-0"	20'-9"	20'-3"	19'-7"	21'-5"	20'-11"	20'-2"
50	15	17'-11"	17'-4"	16'-3"	18'-7"	17'-11"	17'-1"	19'-1"	18'-6"	19'-8"	19'-0"	19'-8"	19'-0"	18'-2"	



Allowable Uniform Roof Load (in pounds per linear foot [PLF])

115% and 125% Load Duration

Use of these tables should be limited to roof slopes of 3½' per foot or less.
For steeper slopes see pages 16-20

Span Length	AJS® 140 Series 2½" Flange Width											
	9½" AJS® 140			11⅞" AJS® 140			14" AJS® 140			16" AJS® 140		
	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.
	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240
6	353	383	-	358	389	-	360	392	-	364	396	-
7	302	329	-	307	334	-	309	336	-	312	339	-
8	264	287	-	269	292	-	270	294	-	273	297	-
9	235	255	-	239	259	-	240	261	-	242	264	-
10	211	230	-	215	233	-	216	235	-	218	237	-
11	182	198	-	195	212	-	196	213	-	198	216	-
12	153	166	-	179	194	-	180	196	-	182	198	-
13	130	142	-	165	179	-	166	180	-	168	182	-
14	112	122	-	146	158	-	154	168	-	156	169	-
15	98	106	-	127	138	-	144	156	-	145	158	-
16	86	93	85	111	121	-	134	146	-	136	148	-
17	76	83	71	99	107	-	119	129	-	128	139	-
18	68	74	60	88	96	-	106	115	-	121	132	-
19	61	66	51	79	86	-	95	103	-	110	120	-
20	55	58	44	71	77	-	86	93	-	99	108	-
21	50	50	38	64	70	-	78	85	-	90	98	-
22	44	44	33	59	64	56	71	77	-	82	89	-
23				54	58	49	65	70	-	75	82	-
24				49	54	44	59	65	-	69	75	-
25				45	49	39	55	59	-	63	69	-
26				42	45	34	51	55	-	59	64	-
27							47	51	45	54	59	-
28							43	47	41	51	55	-
29							41	44	37	47	51	-
30										44	48	-
31										41	45	-
32												
33												
34												

- Total Load values are limited by shear, moment, or deflection equal to L/180.
- Deflection values (Deflect.) are limited by live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Both the Total Load and Deflection columns must be checked. Where a Deflection value is not shown, the Total Load value will control.
- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Slope roof joists at least ¼ inch over 12 inches to minimize ponding.
- Table values assume minimum bearing lengths without web stiffeners for joist depths of 16 inches and less.
- 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® software.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Allowable Uniform Roof Load
(in pounds per linear foot [PLF])

115% and 125% Load Duration

Use of these tables should be limited to roof slopes of 3½" per foot or less.
For steeper slopes, see pages 16-20.

Span Length	AJS® 150 Series 2½" Flange Width											
	9½" AJS® 150			11⅞" AJS® 150			14" AJS® 150			16" AJS® 150		
	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.
	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240
6	353	383	-	358	389	-	360	392	-	364	396	-
7	302	329	-	307	334	-	309	336	-	312	339	-
8	264	287	-	269	292	-	270	294	-	273	297	-
9	235	255	-	239	259	-	240	261	-	242	264	-
10	211	230	-	215	233	-	216	235	-	218	237	-
11	192	209	-	195	212	-	196	213	-	198	216	-
12	176	191	-	179	194	-	180	196	-	182	198	-
13	150	163	-	165	179	-	166	180	-	168	182	-
14	129	141	-	153	167	-	154	168	-	156	169	-
15	113	122	109	143	155	-	144	156	-	145	158	-
16	99	107	90	128	139	-	135	147	-	136	148	-
17	87	95	76	113	123	-	127	138	-	128	139	-
18	78	84	64	101	110	-	120	130	-	121	132	-
19	70	72	55	91	99	-	109	119	-	115	125	-
20	62	62	47	82	89	79	98	107	-	109	118	-
21	53	53	41	74	81	69	89	97	-	104	113	-
22	47	47	36	67	73	60	81	88	-	94	103	-
23	41	41	31	62	67	53	74	81	-	86	94	-
24				57	61	47	68	74	-	79	86	-
25				52	54	41	63	68	60	73	79	-
26				48	48	37	58	63	54	67	73	-
27				43	43	33	54	59	48	62	68	-
28							50	54	43	58	63	-
29							47	51	39	54	59	53
30							43	46	35	50	55	48
31							41	42	32	47	51	43
32										44	48	40
33										42	45	36
34												

- Total Load values are limited by shear, moment, or deflection equal to L/180.
- Deflection values (Deflect.) are limited by live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Both the Total Load and Deflection columns must be checked. Where a Deflection value is not shown, the Total Load value will control.
- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the 3C Calc® software if the length of any span is less than half the length of an adjacent span.
- Slope roof joists at least ¼ inch over 12 inches to minimize ponding.
- Table values assume minimum bearing lengths without web stiffeners for joist depths of 16 inches and less.
- 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® software.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Allowable Uniform Roof Load
(in pounds per linear foot [PLF])

115% and 125% Load Duration

Use of these tables should be limited to roof slopes of 3½" per foot or less.
For steeper slopes, see pages 16-20.

Span Length	AJS® 20 Series 2½" Flange Width											
	9½" AJS® 20			11⅞" AJS® 20			14" AJS® 20			16" AJS® 20		
	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.
	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240
6	353	383	-	358	389	-	360	392	-	364	396	-
7	302	329	-	307	334	-	309	336	-	312	339	-
8	264	287	-	269	292	-	270	294	-	273	297	-
9	235	255	-	239	259	-	240	261	-	242	264	-
10	211	230	-	215	233	-	216	235	-	218	237	-
11	192	209	-	195	212	-	196	213	-	198	216	-
12	176	191	-	179	194	-	180	196	-	182	198	-
13	162	177	-	165	179	-	166	180	-	168	182	-
14	151	164	-	153	167	-	154	168	-	156	169	-
15	136	147	128	143	155	-	144	156	-	145	158	-
16	119	129	106	134	146	-	135	147	-	136	148	-
17	105	115	89	126	137	-	127	138	-	128	139	-
18	94	99	76	119	129	-	120	130	-	121	132	-
19	84	85	65	109	119	108	113	123	-	115	125	-
20	73	73	56	99	107	94	108	117	-	109	118	-
21	63	63	48	89	97	81	103	112	-	104	113	-
22	55	55	42	81	89	71	98	106	-	99	108	-
23	48	48	37	74	81	62	90	98	-	95	103	-
24	43	43	33	68	72	55	82	90	80	91	99	-
25				63	64	49	76	83	71	87	95	-
26				57	57	44	70	76	63	81	89	-
27				51	51	39	65	71	57	75	82	-
28				46	46	35	60	66	51	70	76	69
29				41	41	32	56	60	46	65	71	62
30							53	55	42	61	66	56
31							49	50	38	57	62	51
32							45	45	34	54	58	47
33							41	41	31	50	55	43
34										47	51	39
35										45	47	36
36										42	43	33
37										40	40	30
38												

- Total Load values are limited by shear, moment, or deflection equal to L/180.
- Deflection values (Deflect.) are limited by live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Both the Total Load and Deflection columns must be checked. Where a Deflection value is not shown, the Total Load value will control.
- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Slope roof joists at least ¼ inch over 12 inches to minimize ponding.
- Table values assume minimum bearing lengths without web stiffeners for joist depths of 16 inches and less.
- 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® software.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Allowable Uniform Roof Load
(in pounds per linear foot [PLF])

115% and 125% Load Duration

Use of these tables should be limited to roof slopes of 3½" per foot or less.
For steeper slopes, see pages 16-20.

Span Length	AJS® 190 Series 2½" Flange Width											
	9½" AJS® 190			11⅞" AJS® 190			14" AJS® 190			16" AJS® 190		
	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.
	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240
6	353	383	-	358	389	-	360	392	-	364	396	-
7	302	329	-	307	334	-	309	336	-	312	339	-
8	264	287	-	269	292	-	270	294	-	273	297	-
9	235	255	-	239	259	-	240	261	-	242	264	-
10	211	230	-	215	233	-	216	235	-	218	237	-
11	192	209	-	195	212	-	196	213	-	198	216	-
12	176	191	-	179	194	-	180	196	-	182	198	-
13	162	177	-	165	179	-	166	180	-	168	182	-
14	151	164	-	153	167	-	154	168	-	156	169	-
15	141	153	134	143	155	-	144	156	-	145	158	-
16	132	143	111	134	146	-	135	147	-	136	148	-
17	121	123	94	126	137	-	127	138	-	128	139	-
18	104	104	79	119	129	-	120	130	-	121	132	-
19	89	89	68	113	123	-	113	123	-	115	125	-
20	77	77	59	107	116	98	108	117	-	109	118	-
21	67	67	51	102	111	85	103	112	-	104	113	-
22	58	58	44	93	97	74	98	106	-	99	108	-
23	51	51	39	85	86	65	94	102	-	95	103	-
24	45	45	34	76	76	58	90	98	84	91	99	-
25	40	40	30	67	67	51	86	94	75	87	95	-
26				60	60	46	80	87	67	84	91	-
27				54	54	41	75	78	60	80	88	-
28				48	48	37	69	70	54	78	84	72
29				43	43	33	63	63	48	75	81	65
30							57	57	44	70	76	59
31							52	52	40	66	70	54
32							47	47	36	61	64	49
33							43	43	33	58	59	45
34							40	40	30	54	54	41
35										49	49	38
36										45	45	35
37										42	42	32
38												

- Total Load values are limited by shear, moment, or deflection equal to L/180.
- Deflection values (Deflect.) are limited by live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Both the Total Load and Deflection columns must be checked. Where a Deflection value is not shown, the Total Load value will control.

- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Slope roof joists at least ¼ inch over 12 inches to minimize ponding.
- Table values assume minimum bearing lengths without web stiffeners for joist depths of 16 inches and less.

- 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® software.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

Allowable Uniform Roof Load (in pounds per linear foot [PLF])

115% and 125% Load Duration

Use of these tables should be limited to roof slopes of 3½" per foot or less.
For steeper slopes, see pages 16-20.

Span Length	AJS® 25 Series — 9½" - 16" Depths ¾" Web Thickness — 3½" Flange Width											
	9½" AJS® 25			11⅝" AJS® 25			14" AJS® 25			16" AJS® 25		
	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.	Total Load		Deflect.
	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240	Snow (115%)	Non-Snow (125%)	L/240
6	356	387	-	358	389	-	360	392	-	364	396	-
7	305	332	-	307	334	-	309	336	-	312	339	-
8	267	290	-	269	292	-	270	294	-	273	297	-
9	237	258	-	239	259	-	240	261	-	242	264	-
10	214	232	-	215	233	-	216	235	-	218	237	-
11	194	211	-	195	212	-	196	213	-	198	216	-
12	178	193	-	179	194	-	180	196	-	182	198	-
13	164	179	-	165	179	-	166	180	-	168	182	-
14	152	166	-	153	167	-	154	168	-	156	169	-
15	142	155	-	143	155	-	144	156	-	145	158	-
16	133	145	-	134	146	-	135	147	-	136	148	-
17	125	136	121	126	137	-	127	138	-	128	139	-
18	118	129	103	119	129	-	120	130	-	121	132	-
19	112	116	88	113	123	-	113	123	-	115	125	-
20	100	100	76	107	116	-	108	117	-	109	118	-
21	87	87	66	102	111	-	103	112	-	104	113	-
22	76	76	58	93	102	-	98	106	-	99	108	-
23	67	67	51	85	93	-	94	102	-	95	103	-
24	59	59	45	78	85	75	90	98	-	91	99	-
25	52	52	40	72	79	67	86	94	-	87	95	-
26	46	46	35	67	73	59	80	87	-	84	91	-
27	42	42	32	62	67	53	75	81	-	80	88	-
28				58	63	48	69	75	-	78	84	-
29				54	57	43	65	70	63	75	81	-
30				50	51	39	60	66	57	70	76	-
31				47	47	35	56	61	52	66	71	-
32				42	42	32	53	58	47	61	67	-
33							50	54	43	58	63	-
34							47	51	39	54	59	53
35							44	47	36	51	56	49
36							42	44	33	48	53	45
37										46	50	41
38										43	47	38

- Total Load values are limited by shear, moment, or deflection equal to L/180.
- Deflection values (Deflect.) are limited by live load deflection equal to L/240. Check the local building code for other deflection limits that may apply.
- Both the Total Load and Deflection columns must be checked. Where a Deflection value is not shown, the Total Load value will control.
- Table values apply to either simple or multiple span joists. Span is measured center to center of the minimum required bearing length. Analyze multiple span joists with the BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Slope roof joists at least ¼ inch over 12 inches to minimize ponding.
- Table values assume minimum bearing lengths without web stiffeners for joist depths of 16 inches and less. 18" joists require web stiffeners at all bearing locations.
- 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® software.
- Allowable spans and loads shall be adjusted and checked for wind load as required by local building code.

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		5' 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.

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

Δ = deflection [in]
 w = uniform load [lb/in]
 l = clear span [in]
 EI = bending stiffness [lb-in²]
 K = shear deformation coefficient [lb]

BUILDING CODE EVALUATION REPORT

- ICC-ES® / APA® ESR-1144 (IBC®, IRC®)

Connection on Steel Beam

F15D

Connection with Hanger on Steel Beam

F15E

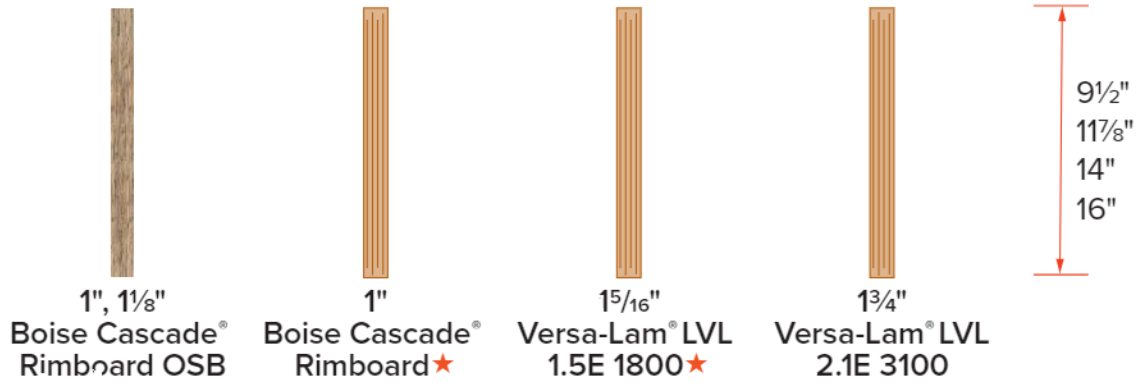
Hanger Connections to AJS Headers

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 top of bottom flange with ¼" to 2" gap at bottom of top flange.

Boise Cascade Rimboard Product Profiles



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

F07 Perpendicular

See chart for vertical load capacity.

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

F56

Exterior Wall Sheathing Max. 1/2" thickness.

AJS® Joists Perpendicular or parallel to rim.

1/2" dia through bolts (ASTM A307 Grades A&B, SAE J429 Grades 1 or 2, or higher) with washers and nuts; or 1/2" dia lag screws (full penetration), staggered.

Min. connection for 40/10 psf deck loading:

Deck Joist Length	Connection
12'-0" & less	2 row 1/2" bolt or lag screw, 24" o.c. (300 plf max.)
12'-1" - 18'-0"	2 rows 1/2" bolt or lag screw, 16" o.c. (750 plf max.)

Notes:
 - For snow loads greater than 40 psf and/or dead loads greater than 10 psf, size connection per table plus shear transfer.
 - Treat as Leaded - Use only fasteners that are approved for use with creosoting wood treatment.
 - Boise Cascade® Rimboard.

Not as:

- Design for moisture control by others (only structural component shown above).
- For information on deck lateral load connections per IRC section R507.2.2, contact Boise Cascade EWP Engineering.
- For use of proprietary screws to attach ledger, consult screw manufacturer literature.
- For further information on residential deck design, see AWC DCA 6, *Prescriptive Residential Wood Deck Construction Guide*.

Boise Cascade Rimboard Properties

Product	Vertical Load Capacity		Maximum Floor Diaphragm Lateral Capacity [lb/ft]	Allowable Design Values			
	Uniform [plf]	Point [lb]		Flexural Stress [lb/in ²]	Modulus of Elasticity [lb/in ²]	Horizontal Shear [lb/in ²]	Compression Perpendicular to Grain [lb/in ²]
1" Boise Cascade® Rimboard ⁽²⁾ 1" Boise Cascade® Rimboard OSB ⁽²⁾	3300	3500	180	Limited span capabilities, see note 2			
1 5/16" Boise Cascade® Rimboard OSB ⁽²⁾	4400	3500	180	Limited span capabilities, see note 2			
1 5/16" Versa-Lam® LVL 1.5E 1800 ⁽¹⁾	6000	4450	Permitted per building code for all nominal 2" thick framing floor diaphragms	1800	1,400,000	225	525
1 3/4" Versa-Lam® LVL 2.1E 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" Boise Cascade® Rimboard ⁽²⁾ 1" Boise Cascade® Rimboard OSB ⁽²⁾	1 5/16" Boise Cascade® Rimboard OSB ⁽²⁾	1 5/16" Versa-Lam® LVL 1.5E 1800 ⁽¹⁾	1 3/4" Versa-Lam® LVL 2.1E 3100 ⁽¹⁾
8d Box (0.113"Ø x 2.5")	3	3	3	3
8d Common (0.11"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.			
16d Box (0.135"Ø x 3.5")				
10d & 12d Common & 16d Spike (0.148"Ø x 3", 3.25")				
16d Common (0.162"Ø x 3.5")				

- Notes**
1. See ICC-ES®/APA® ESR-1040 for further information.
 2. See *Performance Rated Rim Boards*, APA® Form No. W345N for further product information.

An Introduction to Versa-Lam® LVL Products



When you specify Versa-Lam® laminated veneer headers/beams, you are building quality into your design. They are excellent as floor and roof framing supports or as headers for doors, windows and garage doors and columns.

Because they have no camber, Versa-Lam® LVL products provide flatter, quieter floors, and consequently, the builder can expect happier customers with significantly fewer call backs.

Versa-Lam® LVL Beam Architectural Specifications

Scope: This work includes the complete furnishing and installation of all Versa-Lam® LVL beams as shown on the drawings, herein specified and necessary to complete the work.

Materials: Primarily Southern Pine or Douglas fir veneers, laminated in a press with all grain parallel with the length of the member. Glues used in lamination are phenol formaldehyde and isocyanate exterior-type adhesives which comply with ASTM D2552.

Design: Versa-Lam® LVL beams shall be sized and detailed to fit the dimensions and loads indicated on the plans. All designs shall be in accordance with allowable values developed in accordance with ASTM D5456 and listed in the governing

code evaluation service's report and section properties based upon standard engineering principles. Verification of design of the Versa-Lam® LVL beams by complete calculations shall be available upon request.

Drawings: Additional drawings showing layout and detail necessary for determining fit and placement in the buildings are (are not) to be provided by the supplier.

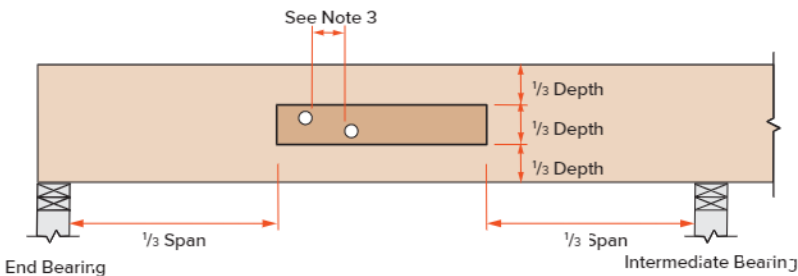
Fabrication: Versa-Lam® LVL beams shall be manufactured in a plant evaluated for fabrication by the governing code evaluation service and under the supervision of a third-party inspection agency listed by the corresponding evaluation service.

Storage and Installation: Versa-Lam® LVL beams, if stored prior to erection, shall be stored on stickers spaced a maximum of 15 ft apart. Beams shall be stored on a dry, level surface and protected from the weather. They shall be handled with care so they are not damaged.

Versa-Lam® LVL beams are to be installed in accordance with the plans and Boise Cascade EWP's Installation Guide. Temporary construction loads which cause stresses beyond design limits are not permitted. Erection bracing shall be provided to assure adequate lateral support for the individual beams and the entire system until the sheathing material has been applied.

Codes: Versa-Lam® LVL beams shall be evaluated by a model code evaluation service.

Allowable Holes in Versa-Lam® LVL Beams



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
5½"	¾"
7¼"	1"
9¼" 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, use EC Calc® sizing software (www.BCCalc.com) or contact Boise Cascade EWP Engineering.

BEARING AT CONCRETE/MASONRY WALLS

Provide moisture barrier and lateral restraint at bearing.

1/2" air space required between concrete and wood.

B01

BEARING FOR UCOR OR WINDOW HEADER

Strap per code if top plate is not continuous over header.

Trimmers

B02

BEAM TO BEAM CONNECTOR

Verify hanger capacity with hanger manufacturer.

B03

BEARING AT COLUMN

Versa-Lam® LVL column.

Column connector per design professional of record.

B04

SLOPE SEAT CUT

Sloped seat cut. Not to exceed inside face of bearing.

Blocking not shown for clarity.

B06

BEVEL CUT

DO NOT bevel cut Versa-Lam® LVL beyond inside face of wall without approval from Boise Cascade EWP Engineering or BC Calc® software analysis.

B07

BEAM TO CONCRETE/MASONRY WALLS

Wood top plate must be flush with inside of wall.

Hanger.

Moisture barrier between concrete and wood.

B08

BEARING FRAMING INTO WALL

Strap per code if top plate is not continuous.

B09

INSTALLATION NOTES

- Minimum of 1/2" air space between beam and 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 on pages 30-32 of this guide.
- Versa-Lam® LVL 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 (2)		1/2" Dia. Through Bolt (1)			5/8" Dia. Through Bolt (1)		
	2 rows 16d Sinker @ 12" o.c.	3 rows 16d Sinker @ 12" o.c.	2 rows @ 24" o.c. staggered	2 rows @ 18" o.c. staggered	2 rows @ 12" o.c. staggered	2 rows @ 24" o.c. staggered	2 rows @ 18" o.c. staggered	2 rows @ 12" o.c. staggered
1 3/4" Versa-Lam® LVL (Depth of 18" and less)								
2	470	505	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
3 1/2" Versa-Lam® LVL								
2 (3)	use bolt schedule		85	175	N/A	115	225	N/A
1 3/4" Versa-Lam® LVL (Depths of 24" and less)								
Number of Members	Nailed (2)		1/2" Dia. Through Bolt (1)			5/8" Dia. Through Bolt (1)		
	3 rows 16d Sinker @ 12" o.c.	4 rows 16d Sinker @ 12" o.c.	3 rows @ 24" o.c. staggered	3 rows @ 18" o.c. staggered	3 rows @ 12" o.c. staggered	3 rows @ 24" o.c. staggered	3 rows @ 18" o.c. staggered	3 rows @ 12" o.c. staggered
	3 rows 16d Sinker @ 12" o.c.	4 rows 16d Sinker @ 12" o.c.	3 rows @ 24" o.c. staggered	3 rows @ 18" o.c. staggered	3 rows @ 12" o.c. staggered	3 rows @ 24" o.c. staggered	3 rows @ 18" o.c. staggered	3 rows @ 12" o.c. staggered
2	705	940	755	1010	1515	840	1120	1685
3 (2)	525	705	565	755	1135	630	840	1260
4 (4)	use bolt schedule		505	670	1010	560	745	1120

1. Design values apply to common bolts that conform to AWS/AASHTO standards A307, A308, A325, A327, A330, A331, A332, A333, A334, A335, A336, A337, A338, A339, A340, A341, A342, A343, A344, A345, A346, A347, A348, A349, A350, A351, A352, A353, A354, A355, A356, A357, A358, A359, A360, A361, A362, A363, A364, A365, A366, A367, A368, A369, A370, A371, A372, A373, A374, A375, A376, A377, A378, A379, A380, A381, A382, A383, A384, A385, A386, A387, A388, A389, A390, A391, A392, A393, A394, A395, A396, A397, A398, A399, A400, A401, A402, A403, A404, A405, A406, A407, A408, A409, A410, A411, A412, A413, A414, A415, A416, A417, A418, A419, A420, A421, A422, A423, A424, A425, A426, A427, A428, A429, A430, A431, A432, A433, A434, A435, A436, A437, A438, A439, A440, A441, A442, A443, A444, A445, A446, A447, A448, A449, A450, A451, A452, A453, A454, A455, A456, A457, A458, A459, A460, A461, A462, A463, A464, A465, A466, A467, A468, A469, A470, A471, A472, A473, A474, A475, A476, A477, A478, A479, A480, A481, A482, A483, A484, A485, A486, A487, A488, A489, A490, A491, A492, A493, A494, A495, A496, A497, A498, A499, A500, A501, A502, A503, A504, A505, A506, A507, A508, A509, A510, A511, A512, A513, A514, A515, A516, A517, A518, A519, A520, A521, A522, A523, A524, A525, A526, A527, A528, A529, A530, A531, A532, A533, A534, A535, A536, A537, A538, A539, A540, A541, A542, A543, A544, A545, A546, A547, A548, A549, A550, A551, A552, A553, A554, A555, A556, A557, A558, A559, A560, A561, A562, A563, A564, A565, A566, A567, A568, A569, A570, A571, A572, A573, A574, A575, A576, A577, A578, A579, A580, A581, A582, A583, A584, A585, A586, A587, A588, A589, A590, A591, A592, A593, A594, A595, A596, A597, A598, A599, A600, A601, A602, A603, A604, A605, A606, A607, A608, A609, A610, A611, A612, A613, A614, A615, A616, A617, A618, A619, A620, A621, A622, A623, A624, A625, A626, A627, A628, A629, A630, A631, A632, A633, A634, A635, A636, A637, A638, A639, A640, A641, A642, A643, A644, A645, A646, A647, A648, A649, A650, A651, A652, A653, A654, A655, A656, A657, A658, A659, A660, A661, A662, A663, A664, A665, A666, A667, A668, A669, A670, A671, A672, A673, A674, A675, A676, A677, A678, A679, A680, A681, A682, A683, A684, A685, A686, A687, A688, A689, A690, A691, A692, A693, A694, A695, A696, A697, A698, A699, A700, A701, A702, A703, A704, A705, A706, A707, A708, A709, A710, A711, A712, A713, A714, A715, A716, A717, A718, A719, A720, A721, A722, A723, A724, A725, A726, A727, A728, A729, A730, A731, A732, A733, A734, A735, A736, A737, A738, A739, A740, A741, A742, A743, A744, A745, A746, A747, A748, A749, A750, A751, A752, A753, A754, A755, A756, A757, A758, A759, A760, A761, A762, A763, A764, A765, A766, A767, A768, A769, A770, A771, A772, A773, A774, A775, A776, A777, A778, A779, A780, A781, A782, A783, A784, A785, A786, A787, A788, A789, A790, A791, A792, A793, A794, A795, A796, A797, A798, A799, A800, A801, A802, A803, A804, A805, A806, A807, A808, A809, A810, A811, A812, A813, A814, A815, A816, A817, A818, A819, A820, A821, A822, A823, A824, A825, A826, A827, A828, A829, A830, A831, A832, A833, A834, A835, A836, A837, A838, A839, A840, A841, A842, A843, A844, A845, A846, A847, A848, A849, A850, A851, A852, A853, A854, A855, A856, A857, A858, A859, A860, A861, A862, A863, A864, A865, A866, A867, A868, A869, A870, A871, A872, A873, A874, A875, A876, A877, A878, A879, A880, A881, A882, A883, A884, A885, A886, A887, A888, A889, A890, A891, A892, A893, A894, A895, A896, A897, A898, A899, A900, A901, A902, A903, A904, A905, A906, A907, A908, A909, A910, A911, A912, A913, A914, A915, A916, A917, A918, A919, A920, A921, A922, A923, A924, A925, A926, A927, A928, A929, A930, A931, A932, A933, A934, A935, A936, A937, A938, A939, A940, A941, A942, A943, A944, A945, A946, A947, A948, A949, A950, A951, A952, A953, A954, A955, A956, A957, A958, A959, A960, A961, A962, A963, A964, A965, A966, A967, A968, A969, A970, A971, A972, A973, A974, A975, A976, A977, A978, A979, A980, A981, A982, A983, A984, A985, A986, A987, A988, A989, A990, A991, A992, A993, A994, A995, A996, A997, A998, A999, A1000.
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 (less side shall be no less than 25% of opposite side).

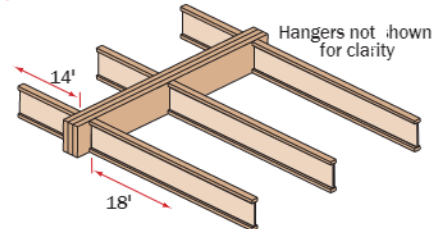
Top-Loaded Applications			
For top-loaded beams and beams with side loads less than shown in Side-Loaded Applications table above			
Ply	Depth	Nailing (2)	Maximum Uniform Load From One Side
(2) 1 3/4" plies	Depths 1 1/8" & less	2 rows 16d box/sinker nails @ 12" o.c.	400 plf
	Depths 1 1/4" - 1 1/2"	3 rows 16d box/sinker nails @ 12" o.c.	600 plf
	Depth = 2 1/4"	4 rows 16d box/sinker nails @ 12" o.c.	800 plf
(3) 1 3/4" plies (1)	Depths 1 1/8" & less	2 rows 16d box/sinker nails @ 12" o.c.	300 plf
	Depths 1 1/4" - 1 1/2"	3 rows 16d box/sinker nails @ 12" o.c.	450 plf
	Depth = 2 1/4"	4 rows 16d box/sinker nails @ 12" o.c.	600 plf
(4) 1 3/4" plies	Depths 1 1/8" & less	2 rows 1/2" bolts @ 24" o.c., staggered	335 plf
	Depth = 2 1/4"	3 rows 1/2" bolts @ 24" o.c., staggered every 8"	505 plf
	Depths 1 1/4" & less	2 rows 1/2" bolts @ 24" o.c., staggered	855 plf
(2) 3 1/2" plies	Depth 2 1/4" - 2 1/2"	3 rows 1/2" bolts @ 24" o.c., staggered every 8"	1285 plf

1. The nail schedules shown apply to both sides of a 3-member beam.
2. 16d box nails = 0.135" diameter x 3.5" length, 16d sinker nails = 0.148" diameter x 3.25" length.
3. Beams wider than 7" must be designed by the engineer of record.
4. All values in these tables may be increased by 15% for slow-load roofs and by 25% for non-slow-load roofs unless the building code allows.
5. Use allowable load tables or BC Calc® software to size beams.
6. An equivalent specific gravity of 0.5 may be used when designing specific connections with Versa-Lam®.
7. Connection values are based upon the NDS, 2018 Edition.
8. FastenMaster TrussLOK® simplifies Strong-Tie® DW, SDS, and UWS screws; may also be used to connect multiple member Versa-Lam® LVL beams, contact Boise Cascade EWP Engineering for further information.

Designing Connections For Multiple Versa-Lam® LVL Members

When using multiple ply Versa-Lam® LVL 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® LVL floor beam.

Given: Beam shown below is supporting residential floor load (40 psf live load, 10 psf dead load) and is spanning 13' 0". Beam depth is limited to 14".



Find: A multiple 1 3/4" ply Versa-Lam® LVL has an 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 3-5 of this guide or BC Calc® to size beam.
A Triple Versa-Lam® LVL 2.1 3100 1 3/4" 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 = $(18' / 2) \times (40 + 10 \text{ psf}) = 450 \text{ plf}$
4. Go to the **Multiple Member Connection Table, Side-Loaded Applications, 1 3/4" Versa-Lam® LVL, 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: 1/2" diameter 2 rows @ 12" staggered
755 plf is greater than 450 plf OK

Versa-Lam® LVL Floor Load Tables

Versa-Lam® LVL 2.1E 3100
(100% Load Duration)

KEY TO TABLE:

Top Figure - Allowable Total Load [plf]
Middle Figure - Allowable Live Load [plf]
Bottom Figure - Minimum Required Bearing Length at End / Intermediate Supports [inches]

SPAN (ft)	1¾" Versa-Lam® 2.1E 3100				Double Ply 1¾" Versa-Lam® 2.1E 3100 or 3½" Versa-Lam 2.1E 3100					Triple Ply 1¾" Versa-Lam® 2.1E 3100 or 5¼" Versa-Lam® 2.1E 3100					Quadruple Ply 1¾" Versa-Lam® 2.1E 3100 or 7" Versa-Lam® 2.1E 3100								
	7¼"	9½"	11⅞"	14"	7¼"	½"	11⅞"	14"	1½"	18"	9½"	11⅞"	14"	16"	18"	20"	11⅞"	14"	16"	18"	20"	24"	
6	763 693	763	1424	1795	1525	2*26	2*49	3590	3387	4794	1389	1273	5384	6580	1151	1188	5697	7179	8773	9588	9584	5,700	
	18,440	24,610	33,820	41,103	18,440	24,610	33,820	41,103	51,260	55,138	24,610	33,820	41,103	51,260	55,138	55,138	33,820	41,103	51,260	55,138	55,138	55,138	55,138
7	636	877	1,600	1444	1271	17*3	232*	2888	3482	4107	2630	3481	4331	5,220	6160	6157	464*	5775	6964	8,113	829	8,010	
	45	77	142	905	17	4	11	10	14	11	10	11	10	11	10	11	10	11	10	11	10	11	
8	462	746	975	1207	924	1492	1957	2454	2886	3402	2237	2936	3622	4328	5103	5384	3914	4829	5771	6811	7178	7170	
	31	60	73	621	321	4	10	10	14	11	10	11	10	11	10	11	10	11	10	11	10	11	
9	329	649	846	1137	658	1297	1692	2074	2463	2884	1946	2537	3111	3694	4320	4702	3385	4148	4926	5,670	6376	6368	
	2.2	477	5	444	4	954	10	10	14	11	10	11	10	11	10	11	10	11	10	11	10	11	
10	15/3	2,2/5.6	2,9/7.3	3,6/8.9	1,5/3	2,2/5.6	2,9/7.3	3,6/8.9	4,3/10.6	5,1/12.4	2,2/5.6	2,9/7.3	3,6/8.9	4,3/10.6	5,1/12.4	5,5/13.8	2,9/7.3	3,6/8.9	4,3/10.6	5,1/12.4	5,5/13.8	5,5/13.8	
	24	5.7	7.5	909	484	1055	1485	1817	2148	2502	1582	2234	2726	32.2	37.5	430*	2978	3633	4296	50.3	5734	5,260	
11	183	401	665	808	365	803	133	1617	1904	2209	1204	1995	2425	2856	3313	3800	2659	3203	3800	4417	5067	5,000	
	15/3	17,443	2,877	3,485	1,5,3	17,443	2,877	3,485	4,111	4,711	17,443	2,877	3,485	4,111	4,711	5,413	2,877	3,485	4,111	4,711	5,413	5,5,138	
12	141	320	585	728	281	623	1190	1456	1719	1977	955	1555	2184	2564	2965	3390	1940	2317	2718	3148	3593	4519	4,664
	15/3	15,360	2,7,68	3,4,84	1,5,3	15,360	2,7,68	3,4,84	3,9,99	4,6,114	15,360	2,7,68	3,4,84	3,9,99	4,6,114	5,2,13	2,7,68	3,4,84	3,9,99	4,6,114	5,2,13	5,5,138	
13	111	246	470	662	221	493	941	1524	1850	2189	739	1301	1886	2326	2683	3,059	188*	2647	3191	3,770	4,780	4390	
	76	168	318	504	172	356	635	1009	1456	1983	503	903	1513	2185	2748	3,259	127*	2017	2913	3,770	4,780	4390	
14	88	198	380	585	176	396	729	1170	1480	1833	594	1139	1756	2128	2449	2706	1519	2342	2837	3265	3,715	4,760	
	15/3	15,3	2,1,5.1	2,8,7.3	1,5,3	15,3	2,1,5.1	2,8,7.3	3,6,8.9	4,4,11.1	15,3	2,1,5.1	2,8,7.3	3,6,8.9	4,4,11.1	5,1,12.5	2,1,5.1	2,8,7.3	3,6,8.9	4,4,11.1	5,1,12.5	5,5,13.8	
15	61	135	251	404	123	270	514	800	1189	1578	457	811	1230	1783	2242	2706	1029	1640	2378	3,000	3,710	3800	
	5	11	211	330	100	221	420	675	982	1359	322	633	913	1315	1873	2039	844	1350	1964	2718	3,000	3800	
16	58	122	257	414	117	265	514	829	1151	1396	387	776	1243	1717	2285	2664	1027	1658	2403	2780	3150	3560	
	15/3	15,3	1,6,4	2,6,6.4	1,5,3	15,3	1,6,4	2,6,6.4	3,6,8.9	4,3,10.7	15,3	1,6,4	2,6,6.4	3,6,8.9	4,3,10.7	4,9,12.2	1,6,4	2,6,6.4	3,6,8.9	4,3,10.7	4,9,12.2	5,5,13.8	
17	41	92	170	281	83	183	355	562	820	38	275	526	843	1230	1707	2279	701	1124	1560	2277	3,038		
	77	147	236	369	93	294	473	691	962	130	240	410	603	844	1137	1445	1931	2588	3382	4274	5275		
18	92	181	294	480	185	361	587	865	1134	177	342	581	881	1298	1753	2251	723	1155	1513	2268	2735	3160	
	65	124	201	328	100	245	410	588	820	994	373	602	882	1230	1650	2100	458	702	1176	1640	2200		
19	78	153	250	407	130	307	500	739	1016	134	260	420	610	879	1248	1630	504	750	1179	1630	2248	2991	
	55	106	172	270	90	210	340	504	704	166	319	515	706	1000	1400	1900	405	606	880	1200	1680		
20	66	131	215	347	110	263	429	636	895	119	294	464	644	954	1343	1878	523	789	1272	1790	2237	2809	
	47	92	148	243	75	183	296	435	639	82	275	444	652	913	1300	1860	360	592	870	1218	164	2178	
22	58	161	280	485	120	290	470	678	900	120	293	483	719	1000	1379	1900	390	544	800	1155	1839	2476	
	15/3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	1,5,3	
24	71	123	210	320	110	249	400	582	823	110	223	370	550	785	1070	1440	297	495	708	1000	1400	1800	
	54	87	140	220	80	190	310	450	640	83	160	260	360	540	730	1000	240	340	500	720	978	1400	
26	50	90	150	240	70	160	260	380	540	70	172	288	433	617	844	1170	230	380	577	823	1150	1850	
	42	69	110	180	60	130	200	280	400	60	127	200	305	430	583	800	160	250	407	573	717	900	
28	35	60	100	160	50	110	180	260	360	50	100	160	240	340	490	670	130	200	320	460	620	800	
	25	45	80	130	40	90	150	220	310	40	80	130	200	280	380	530	110	180	267	378	510	870	
30	25	45	80	130	40	90	150	220	310	40	80	130	200	280	380	530	110	180	267	378	510	870	

- Total Load values are limited by shear, moment or deflection equal to L/210. Total Load values are the capacity of the beam in addition to its own weight.
- Live Load values are limited by deflection equal to L/360. Check the local building code for other deflection limits that may apply.
- Where a Live Load value is not shown, the Total Load value will control.
- Table values represent the most restrictive of simple or multiple span applications. Span is measured center to center of the supports. Analyze multiple span beams with BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Table values assume that lateral support is provided at each support and continuously along the top edge and applicable compression edges of the beam.

- Table values for Minimum Required Bearing Lengths are based on the allowable compression design value perpendicular to grain for the beam and the Total Load value shown. Other design considerations, such as a weaker support material, may warrant longer bearing lengths. Table values assume that support is provided across the full width of the beam.
- For 2-ply, 3-ply or 4-ply beams; double, triple or quadruple Allowable Total Load and Allowable Live Load values. Minimum Required Bearing Lengths remain the same for any number of plies.
- 1¼ inch members deeper than 14 inches are to be used as multiple-member beams only.
- 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 BC Calc® software.

Versa-Lam® LVL Roof Load Tables

Versa-Lam® LVL 2.1E 3100
(115% Load Duration)

KEY TO TABLE:

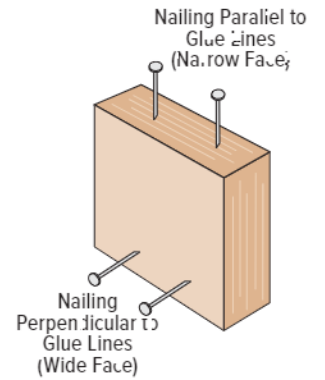
- Top Figure** - Allowable Total Load [plf]
- Middle Figure** - Allowable Live Load [plf]
- Bottom Figure** - Minimum Required Bearing Length at End / Intermediate Supports [inches]

SPAN (ft)	1½" Versa-Lam® 2.1E 3100				Double Ply 1½" Versa-Lam® 2.1E 3100 or 3½" Versa-Lam® 2.1E 3100				Triple Ply 1½" Versa-Lam® 2.1E 3100 or 5½" Versa-Lam® 2.1E 3100						Quadruple Ply 1½" Versa-Lam® 2.1E 3100 or 7" Versa-Lam® 2.1E 3100							
	7½"	9½"	11½"	14"	7½"	9½"	11½"	14"	16'	18'	9½"	11½"	14"	16"	18"	20"	11½"	14"	16"	18"	20"	24"
6	878	1223	1639	2065	1755	2446	3278	4130	4796	4794	3669	4917	6195	7194	7191	7188	6556	8260	9592	9588	9584	9576
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	2/5	2.8/7	3.8/9.4	4.7/11.8	2/5	2.8/7	3.8/9.4	4.7/11.8	5.5/13.8	5.5/13.8	2.8/7	3.8/9.4	4.7/11.8	5.5/13.8	5.5/13.8	5.5/13.8	3.8/9.4	4.7/11.8	5.5/13.8	5.5/13.8	5.5/13.8	5.5/13.8
	731	1009	1335	1661	1463	2018	2670	3323	4007	4107	3027	4006	4984	6010	6160	6157	5341	6646	8013	8213	8209	8201
8	2/4.9	2.7/6.8	3.6/8.9	4.4/11.1	2/4.9	2.7/6.8	3.6/8.9	4.4/11.1	5.4/13.4	5.5/13.8	2.7/6.8	3.6/8.9	4.4/11.1	5.4/13.4	5.5/13.8	5.5/13.8	3.6/8.9	4.4/11.1	5.4/13.4	5.5/13.8	5.5/13.8	5.5/13.8
	598	858	1126	1389	1197	1717	2252	2779	3321	3591	2575	3379	4168	4981	5387	5384	4505	5558	6642	7182	7178	7170
9	1.8/4.6	2.6/6.6	3.5/8.6	4.3/10.6	1.8/4.6	2.6/6.6	3.5/8.6	4.3/10.6	5.1/12.7	5.5/13.8	2.6/6.6	3.5/8.6	4.3/10.6	5.1/12.7	5.5/13.8	5.5/13.8	3.5/8.6	4.3/10.6	5.1/12.7	5.5/13.8	5.5/13.8	5.5/13.8
	440	747	974	1194	880	1493	1947	2387	2835	3190	2240	2921	3581	4252	4785	4782	3894	4774	5670	6380	6376	6368
10	1.5/3.8	2.6/6.4	3.4/8.4	4.1/10.3	1.5/3.8	2.6/6.4	3.4/8.4	4.1/10.3	4.9/12.2	5.5/13.8	2.6/6.4	3.4/8.4	4.1/10.3	4.9/12.2	5.5/13.8	5.5/13.8	3.4/8.4	4.1/10.3	4.9/12.2	5.5/13.8	5.5/13.8	5.5/13.8
	324	637	857	1046	648	1274	1714	2092	2472	2869	1912	2571	3138	3709	4304	4301	3429	4184	4945	5738	5734	5726
11	1.5/3.1	2.4/6.1	3.3/8.2	4/10	1.5/3.1	2.4/6.1	3.3/8.2	4/10	4.7/11.9	5.5/13.8	2.4/6.1	3.3/8.2	4/10	4.7/11.9	5.5/13.8	5.5/13.8	3.3/8.2	4/10	4.7/11.9	5.5/13.8	5.5/13.8	5.5/13.8
	245	526	765	931	489	1052	1531	1861	2192	2543	1577	2296	2792	3288	3814	3907	3062	3723	4383	5085	5209	5201
12	1.5/3	2.2/5.6	3.2/8.1	3.9/9.8	1.5/3	2.2/5.6	3.2/8.1	3.9/9.8	4.6/11.6	5.4/13.4	2.2/5.6	3.2/8.1	3.9/9.8	4.6/11.6	5.4/13.4	5.5/13.8	3.2/8.1	3.9/9.8	4.6/11.6	5.4/13.4	5.5/13.8	5.5/13.8
	189	417	674	838	378	834	1347	1676	1968	2276	1252	2021	2514	2952	3414	3579	2694	3353	3936	4552	4772	4764
13	1.5/3	1.9/4.8	3.1/7.8	3.9/9.7	1.5/3	1.9/4.8	3.1/7.8	3.9/9.7	4.5/11.3	5.2/13.1	1.9/4.8	3.1/7.8	3.9/9.7	4.5/11.3	5.2/13.1	5.5/13.8	3.1/7.8	3.9/9.7	4.5/11.3	5.2/13.1	5.5/13.8	5.5/13.8
	149	330	573	762	297	660	1146	1524	1785	2060	991	1719	2287	2678	3089	3301	2292	3049	3571	4119	4402	4394
14	1.5/3	1.7/4.1	2.9/7.2	3.8/9.5	1.5/3	1.7/4.1	2.9/7.2	3.8/9.5	4.5/11.2	5.1/12.9	1.7/4.1	2.9/7.2	3.8/9.5	4.5/11.2	5.1/12.9	5.5/13.8	2.9/7.2	3.8/9.5	4.5/11.2	5.1/12.9	5.5/13.8	5.5/13.8
	119	265	493	674	238	531	987	1349	1634	1880	796	1480	2023	2450	2821	3063	1973	2697	3267	3761	4084	4076
15	1.5/3	1.5/3.6	2.7/6.7	3.6/9.1	1.5/3	1.5/3.6	2.7/6.7	3.6/9.1	4.4/11	5.1/12.7	1.5/3.6	2.7/6.7	3.6/9.1	4.4/11	5.1/12.7	5.5/13.8	2.7/6.7	3.6/9.1	4.4/11	5.1/12.7	5.5/13.8	5.5/13.8
	96	216	416	586	193	432	832	1173	1505	1730	649	1248	1759	2258	2595	2857	1664	2346	3011	3459	3809	3801
16	1.5/3	1.5/3.2	2.4/6	3.4/8.5	1.5/3	1.5/3.2	2.4/6	3.4/8.5	4.3/10.9	5/12.5	1.5/3.2	2.4/6	3.4/8.5	4.3/10.9	5/12.5	5.5/13.8	2.4/6	3.4/8.5	4.3/10.9	5/12.5	5.5/13.8	5.5/13.8
	79	178	344	515	158	356	689	1029	1327	1601	535	1033	1544	1990	2402	2677	1377	2058	2653	3202	3569	3561
17	1.5/3	1.5/3	2.1/5.3	3.2/7.9	1.5/3	1.5/3	2.1/5.3	3.2/7.9	4.1/10.2	4.9/12.3	1.5/3	2.1/5.3	3.2/7.9	4.1/10.2	4.9/12.3	5.5/13.8	2.1/5.3	3.2/7.9	4.1/10.2	4.9/12.3	5.5/13.8	5.5/13.8
	65	148	288	455	131	297	576	910	1173	1468	445	864	1365	1760	2201	2517	1152	1820	2346	2935	3356	3348
18	1.5/3	1.5/3	1.9/4.8	3/7.5	1.5/3	1.5/3	1.9/4.8	3/7.5	3.9/9.6	4.8/12	1.5/3	1.9/4.8	3/7.5	3.9/9.6	4.8/12	5.5/13.8	1.9/4.8	3/7.5	3.9/9.6	4.8/12	5.5/13.8	5.5/13.8
	52	115	220	354	104	230	441	709	1037	1443	345	661	1063	1555	2165	-	882	1418	2074	2886	-	-
19	1.5/3	1.5/3	1.7/4.3	2.8/6.9	1.5/3	1.5/3	1.7/4.3	2.8/6.9	3.6/9.1	4.5/11.4	1.5/3	1.7/4.3	2.8/6.9	3.6/9.1	4.5/11.4	5.5/13.7	1.7/4.3	2.8/6.9	3.6/9.1	4.5/11.4	5.5/13.7	5.5/13.8
	46	106	207	336	92	211	413	672	936	1171	317	620	1008	1404	1757	2147	827	1344	1872	2342	2862	2991
20	1.5/3	1.5/3	2.3/5.6	3.3/8.2	1.5/3	1.5/3	2.3/5.6	3.3/8.2	4.1/10.2	5.1/12.9	1.5/3	2.3/5.6	3.3/8.2	4.1/10.2	5.1/12.9	5.5/13.8	2.3/5.6	3.3/8.2	4.1/10.2	5.1/12.9	5.5/13.8	5.5/13.8
	67	132	217	57	134	265	434	645	869	200	397	651	967	1303	1593	529	868	1289	1738	2124	2576	-
22	1.5/3	1.5/3	1.9/4.7	3/7.5	1.5/3	1.5/3	1.9/4.7	2.8/6.9	3.7/9.3	5.1/13.3	1.5/3	1.9/4.7	2.8/6.9	3.7/9.3	4.5/11.3	1.5/3	1.9/4.7	2.8/6.9	3.7/9.3	4.5/11.3	5.5/13.8	5.5/13.8
	51	101	167	42	101	202	333	497	704	152	303	500	746	1056	1334	404	667	994	1408	1779	2357	-
24	1.5/3	1.5/3	1.6/4	1.5/3	1.5/3	1.5/3	1.6/4	2.3/5.9	3.3/8.3	1.5/3	1.5/3	1.6/4	2.3/5.9	3.3/8.3	4.2/10.4	1.5/3	1.6/4	2.3/5.9	3.3/8.3	4.2/10.4	5.5/13.8	-
	42	80	130	37	83	161	261	385	542	125	241	391	578	813	1100	321	521	770	1083	1467	-	-
26	1.5/3	1.5/3	1.5/3.4	1.5/3	1.5/3	1.5/3.4	2/5	2.8/7.1	1.5/3	1.5/3	1.5/3.4	2/5	2.8/7.1	3.8/9.6	1.5/3	1.5/3.4	2/5	2.8/7.1	3.8/9.6	1.5/3	1.5/3.4	5.4/13.5
	62	103	60	124	207	311	443	91	186	310	466	665	910	248	413	622	887	1214	1837	-	-	
28	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.7/4.4	2.5/6.2	1.5/3	1.5/3	1.5/3	1.7/4.4	2.5/6.2	3.3/8.4	1.5/3	1.5/3	1.7/4.4	2.5/6.2	3.3/8.4	1.5/3	1.5/3	5.1/12.6
	49	83	47	99	166	251	359	71	148	249	376	539	740	197	332	502	718	986	1594	-	-	
30	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3	1.5/3
	42	68	43	83	135	200	283	64	125	203	301	425	578	166	270	401	566	770	1305	-	-	

- Total Load values are limited by shear, moment or deflection equal to L/180. Total Load values are the capacity of the beam in addition to its own weight.
- Live Load values are limited by deflection equal to L/240. Check the local building code for other deflection limits that may apply. Flat and low slope roofs may require more restrictive deflection limits, consult project's design professional of record.
- Where a Live Load value is not shown, the Total Load value will control.
- Table values represent the most restrictive of simple or multiple span applications. Span is measured center to center of the supports. Analyze multiple span beams with BC Calc® software if the length of any span is less than half the length of an adjacent span.
- Table values assume that lateral support is provided at each support and continuously along the top edge and applicable compression edges of the beam.
- Table values for Minimum Required Bearing Lengths are based on the allowable compression design value perpendicular to grain for the beam and the Total Load value shown. Other design considerations, such as a weaker support material, may warrant longer bearing lengths. Table values assume that support is provided across the full width of the beam.
- For 2-ply, 3-ply or 4-ply beams, double, triple or quadruple Allowable Total Load and Allowable Live Load values. Minimum Required Bearing Lengths remain the same for any number of plies.
- 1½ inch members deeper than 14 inches are to be used as multiple member beams only.
- 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 BC Calc® software.

Closest Allowable Nail Spacing

Versa-Lam® LVL Products Nail Size	Nailing Parallel to Glue Lines (Narrow Face) ⁽¹⁾						Nailing Perpendicular to Glue Lines (Wide Face)	
	Versa-Lam® LVL 1½"		Versa-Lam® LVL 1¾"		Versa-Lam® LVL 3½" & 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")	6	4	6	3	2	2	2	2



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).

- Offset and stagger nail rows from floor sheathing and wall sole plate
- Simpson Strong-Tie A35 and LP14 connectors may be attached to the side Versa-Lam® LVL/ Versa Rim® LVL. Use nails as specified by Simpson Strong-Tie

Versa-Lam® LVL Design Values

Grade	Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in ⁴]	Grade	Width [in]	Depth [in]	Weight [lb/ft]	Allowable Shear [lb]	Allowable Moment [ft-lb]	Moment of Inertia [in ⁴]
Versa-Stud® 1.8E 2650	1½	3½	1.5	998	776	5.4	Versa-Lam® LVL 2.1E 3100	5¼	5¼	8.0	5,237	6,830	63.3
		5½	2.4	1,568	1,821	20.3			5½	8.4	5,486	7,457	72.8
		7¼	3.2	2,066	3,039	47.6			7¼	10.0	7,232	12,560	166.7
3½	1.8	1,164	1,058	6.3	9¼	14.1			9,227	19,908	346.3		
5½	2.8	1,829	2,486	24.3	9½	14.5			9,476	20,937	375.1		
7¼	3.7	2,411	4,189	55.6	11¼	17.1			11,122	28,814	622.4		
9¼	4.7	3,076	6,636	115.4	11⅞	18.1			11,845	31,913	732.6		
9½	4.8	3,159	6,979	125.0	14	21.3			13,965	33,552	120.5		
11¼	5.7	3,741	9,605	207.6	16	24.4			15,460	56,446	1,192.0		
11⅞	6.0	3,948	10,638	244.2	18	27.4		17,955	70,011	1,551.5			
14	7.1	4,655	14,517	400.2	20	30.4		17,950	85,228	350.0			
16	8.1	5,320	18,682	597.3	24	36.5		23,930	120,549	3048.0			
18	9.1	5,985	23,337	850.5	7	9¼		16.6	12,303	26,544	461.7		
24	12.2	7,980	40,183	2016.0		9½		17.1	12,635	27,916	500.1		
5½	5.6	3,658	4,971	48.5		11¼		20.2	14,963	38,419	830.6		
7¼	7.4	4,821	8,377	111.1		11⅞		21.4	15,794	42,550	976.8		
9¼	9.4	6,151	13,272	230.8		14		25.2	18,620	58,069	1600.7		
9½	9.6	6,318	13,928	250.1		16		28.8	21,280	74,728	2389.3		
11¼	11.4	7,481	19,210	415.3		18	32.4	23,940	93,348	3402.0			
11⅞	12.1	7,897	21,275	488.4		20	36.0	26,600	113,904	4666.7			
14	14.2	9,310	29,035	800.3		24	43.2	31,920	160,732	8064.0			
16	16.2	10,640	37,364	1194.7									
18	18.3	11,570	46,674	1701.0									
20	20.3	13,300	56,952	2333.3									

Versa-Lam® LVL Allowable Stress Values

Design Property	Grade	Modulus of Elasticity True (Shear-Free) E _T (x 10 ⁶ psi) ⁽¹⁾⁽²⁾	Modulus of Elasticity Apparent E _m (x 10 ⁶ psi) ⁽¹⁾⁽²⁾	Modulus of Elasticity for Stability E _{min} (x 10 ⁶ psi) ⁽¹⁾⁽²⁾	Bending F _b (psi) ⁽¹⁾⁽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⊥} (psi) ⁽¹⁾⁽⁶⁾	Equivalent Specific Gravity for Fastener Design (SG)
Versa-Lam® LVL Beams	2.1E 3100	2.1	2.0	1.1	3100	285	1950	3000	750	0.5
Versa-Lam® LVL Studs	1.8E 2650	1.8	1.7	0.9	2350	285	1500	3000	750	0.5
Versa-Lam® LVL Columns	1.8E 2650	1.8	1.7	0.9	2650	285	1650	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. F_b stress bending value shall be multiplied by the depth factor, (12/d)^{0.9} where d = member depth [in].
 4. Stress applied perpendicular to the glue lines.
 5. Tension value shall be multiplied by a length factor, (4/L)^{0.9} where L = member length [ft]. Use L = 4 for members less than four feet long.
 6. Stress applied parallel to the glue lines.
 7. True or shear-free modulus of elasticity does not account for shear deformation.
 8. E_{min} is the reference modulus of elasticity for beam and column stability calculations. It is calculated using E_{min} = E_T in accordance with Appendix D of the 2018 NDS. When calculating E_{min}, the coefficient of modulus of elasticity, COV_E, may be taken as 0.10, and the adjustment factor to convert E to a pure bending basis may be taken as 1.05.
- * Design properties are limited to dry conditions of use where the maximum moisture content of the material will not exceed 16%.

Column Length [ft]	Allowable Axial Load (lb)														
	3½" x 3½"			3½" x 4¾"			3½" x 5¼"			3½" x 5½"			3½" x 7"		
	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%
4	14,700	16,090	16,930	18,390	20,130	21,180	22,070	24,165	25,430	23,130	25,320	26,640	29,450	32,240	33,920
5	12,270	13,150	13,660	15,350	16,440	17,090	18,425	19,740	20,515	19,300	20,680	21,490	24,580	26,330	27,365
6	10,080	10,650	10,980	12,610	13,320	13,740	15,140	15,995	16,495	15,860	16,750	17,280	20,195	21,335	22,000
7	8,310	8,705	8,930	10,400	10,890	11,170	12,480	13,075	13,415	13,080	13,700	14,050	16,650	17,435	17,890
8	6,930	7,205	7,370	8,660	9,010	9,210	10,405	10,825	11,070	10,900	11,340	11,600	13,880	14,440	14,760
9	5,840	6,050	6,160	7,300	7,560	7,710	8,770	9,080	9,260	9,190	9,510	9,700	11,700	12,115	12,350
10	4,980	5,135	5,225	6,230	6,420	6,540	7,480	7,715	7,850	7,830	8,080	8,220	9,975	10,290	10,470
11	4,290	4,410	4,480	5,360	5,520	5,600	6,445	6,625	6,730	6,750	6,940	7,050	8,595	8,835	8,975
12	3,730	3,825	3,880	4,660	4,780	4,850	5,600	5,745	5,830	5,870	6,020	6,100	7,475	7,665	7,775
13	3,270	3,350	3,390	4,090	4,190	4,240	4,915	5,030	5,095	5,150	5,270	5,340	6,555	6,710	6,795
14	2,890	2,950	2,990	3,610	3,690	3,740	4,340	4,435	4,490	4,550	4,650	4,700	5,790	5,915	5,990
Column Length [ft]	3½" x 7¼"			5¼" x 5¼"			5¼" x 5½"			5¼" x 7"			5¼" x 7¼"		
	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%
	4	30,500	33,390	35,130											
5	25,460	27,270	28,340												
6	20,910	22,090	22,780	33,070	36,220	38,110	34,670	37,950	39,930						
7	17,250	18,060	18,530	29,420	31,730	33,085	30,830	33,240	34,660						
8	14,370	14,960	15,290	25,875	27,570	28,565	27,110	28,880	29,930	34,525	36,790	38,115	35,760	38,090	39,480
9	12,120	12,540	12,790	22,690	23,970	24,715	23,770	25,110	25,900	30,275	31,985	32,980	31,360	33,130	34,160
10	10,330	10,660	10,840	19,930	20,920	21,495	20,880	21,920	22,520	26,600	27,920	28,685	27,550	28,920	29,710
11	8,900	9,150	9,300	17,585	18,375	18,820	18,420	19,250	19,720	23,465	24,510	25,125	24,310	25,400	26,010
12	7,740	7,940	8,050	15,590	16,220	16,585	16,340	16,990	17,380	20,805	21,650	22,130	21,550	22,420	22,930
13	6,790	6,950	7,040	13,895	14,410	14,700	14,560	15,100	15,400	18,545	19,225	19,620	19,210	19,920	20,320
14	6,000	6,130	6,200	12,450	12,870	13,115	13,040	13,480	13,740	16,615	17,180	17,500	17,210	17,790	18,130
15				11,210	11,560	11,760	11,740	12,110	12,320	14,960	15,425	15,695	15,490	15,980	16,260
16				10,135	10,430	10,600	10,620	10,930	11,110	13,525	13,920	14,150	14,010	14,420	14,650
17				9,205	9,455	9,600	9,650	9,910	10,060	12,285	12,620	12,810	12,730	13,070	13,270
18				8,395	8,610	8,735	8,800	9,020	9,150	11,205	11,495	11,655	11,610	11,900	12,070
19				7,685	7,870	7,975	8,050	8,250	8,360	10,260	10,505	10,645	10,620	10,880	11,030
20				7,060	7,220	7,310	7,400	7,560	7,660	9,420	9,635	9,760	9,760	9,980	10,110
21				6,505	6,645	6,725	6,820	6,960	7,050	8,680	8,870	8,980	8,990	9,190	9,300
22															

- 1) Table assumes that the column is braced at column ends only. Effective column length is equal to actual column length.
- 2) Allowable loads are based upon one-piece (solid) column members used in dry service conditions. BC Calc® sizing software (www.BCCalc.com) may be used for multi-piece column design.
- 3) Allowable loads are based on an eccentricity value equal to 0.167 multiplied by either the column thickness or width (worst case).
- 4) Allowable loads are based on axially loaded columns using the design provisions of the 2018 National Design Specification (NDS) for Wood Construction. Table capacity values based upon a buckling length coefficient, K_{ce} , equal to 1.0

- 5) Load values are not shown for short lengths due to loads exceeding common connector capacities. Load values are not shown for longer lengths if the controlling slenderness ratio exceeds 50 (per NDS).
 - 6) Lateral loads (wind loading) are not considered in this table. BC Calc® sizing software (www.BCCalc.com) may be used for out of plane lateral load column application design.
- (rotation free, translation fixed at each column end per NDS Appendix G). A K_{ce} coefficient of 1.0 conservatively models typical wood column applications. For other end fixity conditions, contact Boise Cascade EW, Engineering. For side or other combined bending and axial loads, see provisions in 2018 NDS.

Versa-Stud® LVL 1.8E 2650

Reference Design Values

Product	Bending F_b [psi]	Compression Parallel to Grain F_c [psi]	Compression Perp to Grain $F_{c\perp}$ [psi]	Modulus of Elasticity - Apparent E [psi]	Horizontal Shear F_v [psi]
Versa-Stud® 1.8E 2650 1½" x 5½"	2865	3000	450	1,700,000	285
Spruce Pine Fir (North) # 1 / 2 Grade 2 x 6	1138	1150	425	1,400,000	135
Hem-Fir # 2 Grade 2 x 6	1105	1300	405	1,300,000	150
Western Woods # 2 Grade 2 x 6	878	900	335	1,000,000	135

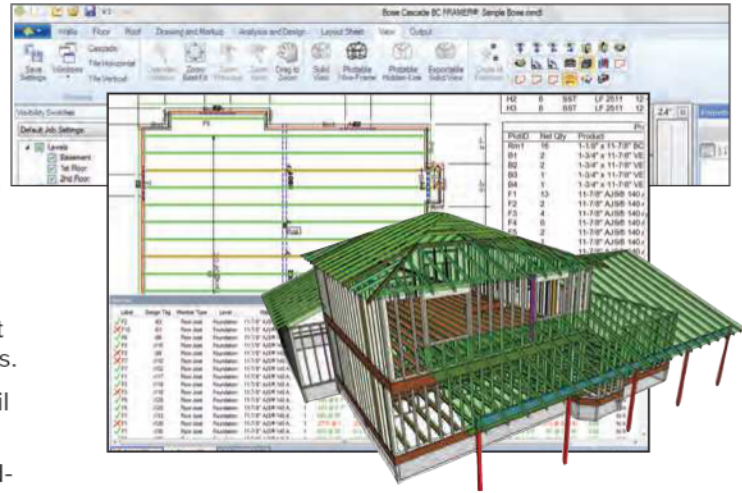
- Design values are for loads applied to the narrow face of the studs.
- Dimension lumber values per NDS Supplement, Design Values for Wood Construction, 2018 Edition

- Repetitive member factors have not been applied to the bending values. Depth (size) factors per ICC-ES®/APA® ESR-1040 and 2018 NDS have been applied to the corresponding bending values.

For further design information, please see Versa-Stud 1.8E 2650 Eastern Wall Guide.



BC Framer® helps customers create floor and roof framing layouts quickly. This easy-to-use computer-aided 3D drafting program frames layouts and creates piece and price reports. It also draws framing drawings that use Boise Cascade's engineered wood products (EWP) and develops schedules. BC Framer's editing and drawing tools allow flexibility when modifying framing layouts. You can also customize the layout drawing with framing details, notes, symbols, and accessories.



Information can also be obtained at 1-800-405-5969 or email us at EWPSupport@BC.com.

Technical Specs. This program is designed to work on stand-alone computers.

RECOMMENDED HARDWARE

- CPU: 2.8GHz 6th Gen+ Core i7 or Xeon v4+
- L2 Cache: 3iMB/Core
- RAM: 16GB
- Video: Full support for DirectX 9; Single monitor 512MB; Dual monitor 1GB (Resolution 1366x768 Minimum)
- Free Storage: 80GB (average 6,000-8,000 jobs)
- Operating Systems: Windows 10 (Pro or Enterprise Edition 64-bit)*, Windows 8.1 (Professional Edition 64-bit), Windows 7, Professional Edition 64-bit,

*Apple Mac or Windows Emulator not supported
Actual specifications vary by user and will be assessed prior to installation.

BC Calc® Sizing Software

BC Calc® is now a web-based application available at www.bccalc.com and can be used on Windows or Apple operating systems via internet Explorer, Edge, Chrome or Safari browsers as well as on iOS and Android tablets. An offline version is available to BC Connect® or registered BC Calc® users for use without an internet connection or in cases of limited connection availability. It can be downloaded once users have signed in to the application.

In addition to BCI® & AJS® Joists, Versa Lam® LVL, and BOISE GLULAM®, BC Calc® also offers the analysis of solid sawn lumber and timber members. Thus BC Calc® is the only program needed to analyze structural wood members.



Boise Cascade has provided BC Calc® free of charge to the design community since 1994.

COMPUTER REQUIREMENTS

PC with any current version of MS Windows®, along with an internet connection. For questions regarding BC Calc®, call 1-800-405-5969 or email EWPSupport@BC.com.

To Download BC CALC US, www.bccalc.com

SELECTED PRODUCT
5-1/8" x 6" BOISE GLULAM® Combination #3 DF

Reaction	Line	Rear	Star	Wind	Roof Line
RT, 3-1/2"		4,125.0	2,044.0		
		4,115.0	7,026.0		

Load Summary

Tag	Description	Load Type	Ref. Stat	End	100%	90%	100%	100%	100%	100%	100%	100%
1	Standard Load	Uplift (Roof)	L	00-00-00	00-06-00	15	30					14-00-00

Reaction Summary (Down / Uplift) (lb)

Reaction	Line	Rear	Star	Wind	Roof Line
RT, 3-1/2"		4,125.0	2,044.0		
		4,115.0	7,026.0		

Control Summary

Req. Moment	Value	% Allow.	Location	Discipline	
End Shear	8,537.0 lb	69.2%	115%	4	15-09-04
Total Load Defl.	0.206 (1.904")	65.5%	n/a	4	15-09-04
Live Load Defl.	0.330 (1.201")	72.8%	n/a	5	16-08-04
Span / Depth	19.9	n/a	n/a	0	00-00-00

Heating Supports

Req. V-Moment	Value	% Allow.	Location	Discipline	
RT, V-Moment	4 x 7	11,160 lb	93.5%	53.2%	Unspecified
RT, V-Moment	4 x 7	11,142 lb	n/a	80.8%	Unspecified

Notes
Design meets Code minimum (L19) Total load deflection criteria.
Design meets Code minimum (L24) Live load deflection criteria.
Calculations assume members to fully laterally brace.

Single Joist - Top Flange

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9 1/2"	20/140/150/190	ITS2.56/9.5	1006	6-10d	—
	25	ITS3.56/9.5	1006	6-10d	—
11 7/8"	20/140/150/190	ITS2.56/11.88	1020	6-10d	—
	25	ITS3.56/11.88	1020	6-10d	—
14"	20/140/150/190	ITS2.56/14	1032	6-10d	—
	25	ITS3.56/14	1032	6-10d	—
16"	20/140/150/190	ITS2.56/16	1048	6-10d	—
	25	ITS3.56/16	1048	6-10d	—

Single Joist - Face Mount

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9 1/2"	20/140/150/190	IUS2.56/9.5	950	8-10d	—
	25	IUS3.56/9.5	1006	10-10d	—
11 7/8"	20/140/150/190	IUS2.56/11.88	1020	10-10d	—
	25	IUS3.56/11.88	1020	12-10d	—
14"	20/140/150/190	IUS2.56/14	1032	12-10d	—
	25	IUS3.56/14	1032	12-10d	—
16"	20/140/150/190	IUS2.56/16	1048	14-10d	—
	25	IUS3.56/16	1048	14-10d	—


Double Joist - Top Flange

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9 1/2"	20/140/150/190	MIT39.5-2	2125	8-16d	2-10dx1 1/2"
	25	B7.12/9.5	2720	14-16d	6-16d
11 7/8"	20/140/150/190	MIT311.88-2	2170	8-16d	2-10dx1 1/2"
	25	B7.12/11.88	2930	14-16d	6-16d
14"	20/140/150/190	MIT314-2	2210	8-16d	2-10dx1 1/2"
	25	B7.12/14	3120	14-16d	6-16d
16"	20/140/150/190	MIT5.12/16	2255	8-16d	2-10dx1 1/2"
	25	B7.12/16	3305	14-16d	6-16d

Double Joist - Face Mount

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9 1/2"	20/140/150/190	MIU5.12/9	2125	16-16d	2-10dx1 1/2"
	25	HU410-2	2680	18-16d	8-16d
11 7/8"	20/140/150/190	MIU5.12/11	2170	20-16d	2-10dx1 1/2"
	25	HU412-2	2930	22-16d	8-16d
14"	20/140/150/190	MIU5.12/14	2210	22-16d	2-10dx1 1/2"
	25	HU414-2	3120	26-16d	12-16d
16"	20/140/150/190	MIU5.12/16	2255	24-16d	2-10dx1 1/2"
	25	HU414-2	3305	26-16d	12-16d

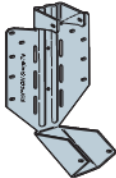
Face Mount Skewed 45° Joist Hanger



SUR/L

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	SUR/L2.56/9	1139	14-16d	2-10dx1½"
	25	SUR/L410	1076	14-16d	6-16d
11⅞"	140/150 20/190	SUR/L2.56/11	1174	16-16d	2-10dx1½"
	25	SUR/L410	1101	14-16d	6-16d
14"	140/150 20/190	SUR/L2.56/14	1204	18-16d	2-10dx1½"
	25	SUR/L414	1123	18-16d	8-16d
16"	140/150 20/190	SUR/L2.56/14	1235	18-16d	2-10dx1½"
	25	SUR/L414	1127	18-16d	8-16d


Field Slope and Skew Joist Hanger



LSSU

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	LSSUH310	1480	14-10d	12-10dx1½"
	25	LSSU410	1480	14-10d	12-10dx1½"
11⅞"	140/150 20/190	LSSUH310	1595	14-10d	12-10dx1½"
	25	LSSU410	1595	14-10d	12-10dx1½"
14"	140/150 20/190	LSSUH310	1600	14-10d	12-10dx1½"
	25	LSSU410	1625	14-10d	12-10dx1½"
16"	140/150 20/190	—	—	—	—
	25	—	—	—	—

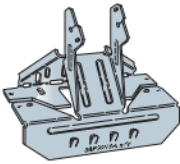
Adjustable Height Joist Hanger



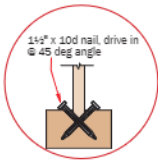
THAI

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	THAI322	1330	6-10d	2-10dx1½"
	25	THAI422	1330	6-10d	2-10dx1½"
11⅞"	140/150 20/190	THAI322	1432	6-10d	2-10dx1½"
	25	THAI422	1432	6-10d	2-10dx1½"
14"	140/150 20/190	THAI322	1525	6-10d	2-10dx1½"
	25	THAI422	1525	6-10d	2-10dx1½"
16"	140/150 20/190	—	—	—	—
	25	—	—	—	—

Variable Pitch Joist Connector



VPA



1½" x 10d nail, drive in @ 45 deg angle

Joist Depth	AJS®	Hanger	Capacity [lbs]	Fastener	
				Top Plate	Rafter
9½"	140/150 20/190	VPA3	1006	9-10d	2-10dx1½"
	25	VPA4	1006	11-10d	2-10dx1½"
11⅞"	140/150 20/190	VPA3	1020	9-10d	2-10dx1½"
	25	VPA4	1020	11-10d	2-10dx1½"
14"	140/150 20/190	VPA3	1032	9-10d	2-10dx1½"
	25	VPA4	1032	11-10d	2-10dx1½"
16"	140/150 20/190	VPA3	1048	9-10d	2-10dx1½"
	25	VPA4	1048	11-10d	2-10dx1½"



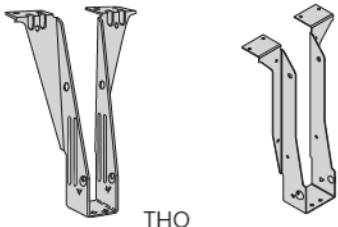
For more information, call Simpson Strong-Tie at 1-800-999-5099 or visit their website at www.strongtie.com

General Notes

- **Bold Italic hangers require web stiffeners.**
- Capacity will vary with different nailing criteria and/or support conditions, contact supplier or Simpson Strong-Tie for further information.
- Capacity values shown are either hanger capacity values (see support requirements below) or AJS® end nail capacity values whichever is less.
- All capacity values are downward loads at 1/8" load duration.
- Use sloped seat hangers and avoid web stiffeners when AJS® Joist slope exceeds ¼" per foot.
- Leave 1/8" clearance (¼" maximum) between the end of the supported joist and the head of the hanger.

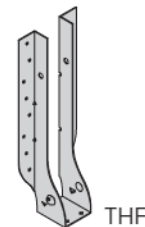
- At max design capacity shown, hangers may exceed standard 1/8" deflection by 1/8".
 - For proper installation of the VPA, the 2-10dx1½" joist nails through the bend tabs must be installed at approximately a 45-degree angle.
- Support Requirements**
- Support materials used to be Boise Cascade structural composite lumber or solid lumber (Douglas fir or southern pine species).
 - Minimum support width for single- and double-joist top mount hangers is 3".
 - Minimum support width for face mount hangers with 10d and 16d nails is 1¾" and 2", respectively.

Single Joist - Top Flange



Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	TFL2595	1006	6-10d	2-10dx1½"
	25	THO35950	1048	10-10d	2-10dx1½"
11⅞"	140/150 20/190	TFL25118	1020	6-10d	2-10dx1½"
	25	THO35118	1068	10-10d	2-10dx1½"
14"	140/150 20/190	TFL2514	1032	6-10d	2-10dx1½"
	25	THO35140	1086	12-10d	2-10dx1½"
16"	140/150 20/190	TFL2516	1048	6-10d	2-10dx1½"
	25	THO35160	1107	12-10d	2-10dx1½"

Single Joist - Face Mount



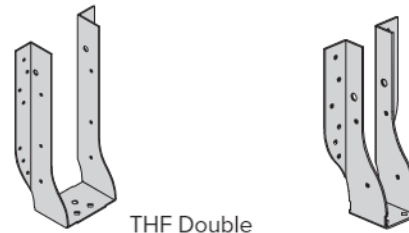
Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	THF25925	1062	12-10d	2-10dx1½"
	25	THF35925	1062	12-10d	2-10dx1½"
11⅞"	140/150 20/190	THF25112	1085	14-10d	2-10dx1½"
	25	THF35112	1085	16-10d	2-10dx1½"
14"	140/150 20/190	THF25140	1105	18-10d	2-10dx1½"
	25	THF35140	1105	20-10d	2-10dx1½"
16"	140/150 20/190	THF25160	1127	22-10d	2-10dx1½"
	25	THF35157	1127	22-10d	2-10dx1½"

Double Joist - Top Flange



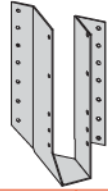
Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	THO25950-2	2237	10-16d	6-10d
	25	BPH7195	2690	10-16d	6-10d
11⅞"	140/150 20/190	THO25118-2	2300	10-16d	6-10d
	25	BPH7118	3060	10-16d	6-10d
14"	140/150 20/190	THO25140-2	2355	12-16d	6-10d
	25	BPH7114	3260	10-16d	6-10d
16"	140/150 20/190	THO25160-2	2412	12-16d	6-10d
	25	BPH7116	3452	10-16d	6-10d

Double Joist - Face Mount



Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	THF25925-2	1390	12-10d	6-10d
	25	HD7100	1690	12-10d	6-10d
11⅞"	140/150 20/190	THF25112-2	1855	16-10d	6-10d
	25	HD7120	2255	16-10d	6-10d
14"	140/150 20/190	THF25140-2	2210	20-10d	6-10d
	25	HD7140	2820	20-10d	8-10d
16"	140/150 20/190	THF25160-2	2255	24-10d	8-10d
	25	HD7160	3305	24-10d	8-10d

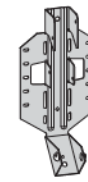
Face Mount Skewed 45° Joist Hanger



SKH

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	SKH2520L/R	992	14-10d	10-10dx1½"
	25	SKH410L/R	1062	16-16d	10-16d
11⅞"	140/150 20/190	SKH2520L/R	1003	14-10d	10-10dx1½"
	25	SKH410L/R	1085	16-16d	10-16d
14"	140/150 20/190	SKH2524L/R	1014	16-10d	10-10dx1½"
	25	SKH414L/R	1105	22-16d	10-16d
16"	140/150 20/190	SKH2524L/F	1029	16-10d	10-10dx1½"
	25	SKH414L/R	1127	22-16d	10-16d

Field Slope and Skew Joist Hanger



LSSH

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	LSSH25	1420	14-16d	12-10dx1½"
	25	LSSH35	1420	14-16d	12-10dx1½"
11⅞"	140/150 20/190	LSSH25	1530	14-16d	12-10dx1½"
	25	LSSH35	1530	14-16d	12-10dx1½"
14"	140/150 20/190	LSSH25	1630	14-16d	12-10dx1½"
	25	LSSH35	1630	14-16d	12-10dx1½"
16"	140/150 20/190	LSSH35	1725	14-16d	12-10dx1½"
	25	LSSH35	1725	14-16d	12-10dx1½"

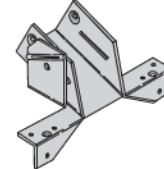
Adjustable Height Joist Hanger



MSH

Joist Depth	AJS®	Hanger	Capacity [lbs]	Nailing	
				Header	Joist
9½"	140/150 20/190	MSH322	1270	16-10d	4-10dx1½"
	25	MSH422IF	1270	22-10d	4-10d
11⅞"	140/150 20/190	MSH322	1367	16-10d	4-10dx1½"
	25	MSH422IF	1367	22-10d	4-10d
14"	140/150 20/190	MSH322	455	16-10d	4-10dx1½"
	25	MSH422IF	455	22-10d	4-10d
16"	140/150 20/190	MSH322	1413	16-10d	4-10dx1½"
	25	MSH422IF	1413	22-10d	4-10d

Variable Pitch Joist Connector



TM

Joist Depth	AJS®	Hanger	Capacity [lbs]	Fastener	
				Top Plate	Rafter
9½"	140/150 20/190	TMP25	1175	6-10d	4-10dx1½"
	25	TMP4	1175	6-10d	4-10dx1½"
11⅞"	140/150 20/190	TMP25	1215	6-10d	4-10dx1½"
	25	TMP4	1215	6-10d	4-10dx1½"
14"	140/150 20/190	TMP25	1250	6-10d	4-10dx1½"
	25	TMP4	1250	6-10d	4-10dx1½"
16"	140/150 20/190	TMP25	1285	6-10d	4-10dx1½"
	25	TMP4	1285	6-10d	4-10dx1½"



For more information, contact Mitek USP Structural Connectors at 1-800-326-5934 or mitek-US.com

General Notes

- Shaded hangers require web stiffeners at joist ends. Web stiffeners may be required for non-shaded hangers by Boise Cascade.
- Capacities will vary with different nailing criteria and/or support conditions. Contact Mitek USP Structural Connectors for further information.
- Capacity values shown are either hanger capacity values (see support requirements below), or AJS® Joist end reaction capacities - whichever is less.
- All capacity values are downward loads at 100% load duration.
- Use sloped joist hangers and bevel web stiffeners when AJS® Joist slope exceeds ¼" per foot.

- Leave 1/16" clearance (1/8" maximum) between the end of the supported joist and the head of the hanger.
- For AJS® Joist applications, consult Mitek USP for capacity reduction.

Support Requirements

- Support material assumed to be Boise Cascade structural composite lumber, or sawn lumber (Douglas fir or southern pine species)
- Minimum support width for single- and double-joist top mount hangers is 3" (1½" for THO hangers).
- Minimum support width for face mount hangers with 10d and 16d nails is 1¾" and 2", respectively.

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

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