Roseburg

Engineered Wood Products

Commercial Design & Installation Guide

ROSEBURG FRAMING SYSTEM®

RFPI®-Joist • RigidLam® LVL
RigidLam® LVL Columns • RigidRim® Rimboard

CANADA - LIMIT STATES DESIGN

Conscientious Stewards Of Our Environment.

These five words are the foundation for every action Roseburg takes in its interactions with the environment. The phrase means not just taking care of the lands, but making them better for future generations. Harvesting a tree is easy; studying how our harvest activity impacts everything around it and finding ways to improve upon the environment is more difficult.

We have been up to the task.

We are not only in the business of producing quality wood products, but also in the business of conserving and enhancing the wonderful natural resources that each of us enjoys. Visit any of our harvest sites, and you'll see these words in action.

While using tractors and skidders may often be the easiest and least expensive alternative for removing logs, we look at other, more environmentally-friendly harvesting options such as helicopter logging to protect the soils that grow our trees. Often, you'll find us placing large, woody debris in streams to enhance the fish spawning habitat, or replacing old culverts with larger, better-placed culverts to provide better fish passage.

Roseburg was among the first in the industry to set aside some of its own land in order to study and improve upon fish habitat. Several years ago, we began working with Oregon State University and other agencies on a company-owned area near the Hinkle Creek Watershed to gain current research on the effects of logging on fish. We are now lobbying other companies to replicate the study on their own lands.

Finally, it's important to note that we are a highly self-sufficient manufacturer. We now own more than 600,000 acres of timberland, which supply the majority of wood fiber we need to produce our products. The ability to rely on our own forests gives us the flexibility to match our resources to our product mix. We take a great deal of pride in our partnership with the natural world. However, we don't go to all of this effort and expense simply because it makes us feel good; we do it because it's the right thing to do.

- We manage our natural resources in a responsible manner
- Our EWP products enable builders to use timber resources more efficiently
- We offer composite panels and plywood products that have no added urea formaldehyde
- We have biomass cogeneration plants which use wood waste material from our mills to produce clean energy for our plants and nearby communities
- We produce a broad array of products that are SCS and EPP certified
- Our integrated manufacturing facilities dramatically reduce vehicle carbon emissions
- We plant over 5 million tree seedlings annually
- We are progressively involved in stream research and enhancement

Design Support

The various charts and tables in this literature are based on accepted, typical residential loading conditions, on center spacing, deflection criteria and/or spans. **This printed information allows the end user to identify and install properly sized Roseburg EWP without the need for specific design or engineering calculations.** Design software; however, such as Simpson Strong-Tie® Component Solutions™, allows the user to input project-specific information into the software which may give a less restrictive solution than the generic information in the printed literature. Rest assured that both the literature and the Component Solutions™ software are based on the appropriate design properties listed in the current code reports.

For additional assistance with specific product design questions, product availability, and Roseburg representative locations, please visit our website at www.Roseburg.com, or contact us at 1-800-347-7260.

Important

All Roseburg Engineered Wood Products are intended and warranted for use in dry-service conditions (i.e. where the average equilibrium moisture content of solid-sawn lumber is less than 16%).


RIDDLE EWP PLANT


CHESTER EWP PLANT

ENGINEERED WOOD PRODUCTS

Roseburg's engineered wood plants are located in Riddle, Oregon and Chester, South Carolina. These state-of-the-art facilities are focused on ensuring the highest quality standards are maintained.

Roseburg's signature trademarks of vertical integration capabilities and cutting-edge manufacturing practices help ensure that quality Engineered Wood Products are produced. Our production capacity, complete product offering, focus on service and product availability, commitment to the EWP business, and acceptability of the product by builders and homeowners all translate into significant advantages for our clients.

ROSEBURG FRAMING SYSTEM®

The Roseburg Framing System® consists of: RFPI® Joists used in floor and roof construction; RigidLam® LVL which is used for headers, beams, studs and columns; and RigidRim® Rimboard. All of the components are engineered to the industry's highest standards to help contractors build solid, durable, and better performing framing systems compared to ordinary dimension lumber.

As an acting member of APA–The Engineered Wood Association, Roseburg has adopted the Performance Standard for wood I-Joists, the Performance Standard for rimboard and the Performance Standard for laminated veneer lumber (LVL). Adherence to the strict APA quality standards assures Roseburg engineered wood product quality and consistency for the market. All engineered wood products described in this document meet the APA standards.

This guide emphasizes residential applications, including technical information on span ratings, installation details, cantilever designs, architectural specifications and engineering design properties. However, much of the basic information can be used for other construction applications. Review by a design professional is required for applications beyond the scope of this document. The Roseburg Framing System®, combined with other wood components produced by Roseburg, offers one of the most complete framing packages available from a single manufacturing supplier today.

WHAT DOES ROSEBURG'S EWP PROGRAM HAVE TO OFFER?

- Dependable supply of engineered wood
- Experienced sales, technical, engineering and customer service teams
- A commitment to quality and predictable performance
- A complete framing package with RFPI-Joists, RigidLam LVL, and RigidRim Rimboard

THE COMPANY

Since 1936, Roseburg has served the industry providing quality products for residential, commercial, industrial applications. Our natural resource base, state-of-the-art manufacturing facilities, talented and experienced associates, and reputation for quality products and service have been keys to our clients' success.

Integrated manufacturing, wide variety of wood products, and over 600,000 acres of forestlands throughout Southern Oregon, North Carolina and Virginia are assets that will support our strategic growth plans well into the 21st Century.

Safety & Construction Precautions

WARNING: I-joists and LVL beams are not stable until completely installed, and will not carry any load until fully braced and sheathed.

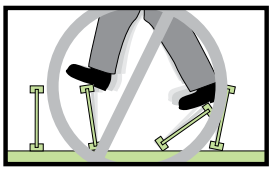
AVOID ACCIDENTS BY FOLLOWING THESE IMPORTANT GUIDELINES:

1. Brace and nail each I-joist as it is installed, using hangers, blocking panels, rimboard, and/or cross-bridging at joist ends.
2. When the building is completed, the floor sheathing will provide lateral support for the top flanges of the I-joists. Until this sheathing is applied, temporary bracing, often called struts, or temporary sheathing must be applied to prevent I-joist rollover or buckling.

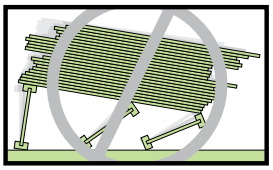
   Temporary bracing or struts must be 1 x 4 inch minimum, at least 8 feet long, spaced no more than 8 feet on center, and must be secured with a minimum of two 8d nails fastened to the top surface of each I-joist. Nail bracing to a lateral restraint at the end of each bay. Lap ends of adjoining bracing over at least two I-joists. Or, sheathing (temporary or permanent) can be nailed to the top flange of the first feet of I-joists at the end of the bay.
3. For cantilevered I-joists, brace top and bottom flanges, and brace ends with closure panels, rimboard, or cross-bridging.
4. Install and nail permanent sheathing to each I-joist before placing loads on the floor system. Then, stack building materials over beams or walls only. See APA Technical Note number J735 "Temporary Construction Loads Over I-Joist Roofs and Floors" for additional information regarding proper stacking of building materials.
5. Never install a damaged I-joist or LVL beam.

Improper storage or installation, failure to follow applicable building codes, failure to follow span ratings for RFPI®-Joists or RigidLam® LVL, failure to properly use allowable hole sizes and locations, or failure to use web stiffeners when required can result in serious accidents. Follow these installation guidelines carefully.

These are general recommendations and in some cases additional precautions may be required.



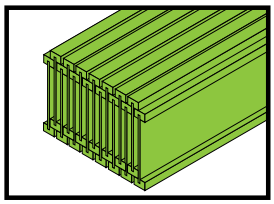
Do not allow workers to walk on I-joists or LVL beams until they are fully installed and braced, or serious injuries can result.

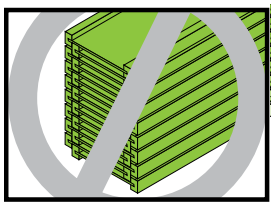


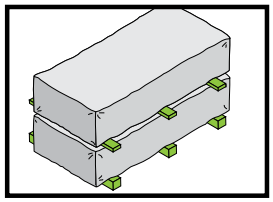
Never stack building materials over unsheathed I-joists. Stack only over braced beams or walls.

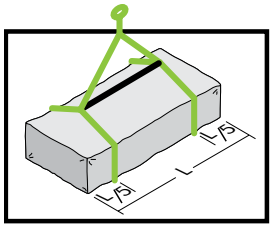
Storage & Handling Guidelines

- Do not drop I-joists or LVL off the delivery truck. Best practice is use of a forklift or boom.
- Store bundles upright on a smooth, level, well-drained supportive surface.
- Do not store I-joists or LVL in direct contact with the ground. Bundles should be a minimum of 6" off the ground and supported every 10' or less.
- Always stack and handle I-joists in their upright position only.
- Place 2x or LVL spacers (at a maximum of 10' apart) between bundles stored on top of one another. Spacers above should be lined up with spacers below.
- Bundles should remain wrapped, strapped, and protected from the weather until time of installation.
- Do not lift I-joist bundles by top flange.
- Avoid excessive bowing or twisting of I-joists or LVL during all phases of handling and installation (i.e. measuring, sawing or placement). Never load I-joists in the flat-wise orientation.
- Take care to avoid forklift damage. Reduce forklift speed to avoid "bouncing" the load.
- When handling I-joists with a crane ("picking"), take a few simple precautions to prevent damage to the I-joists and injury to your work crew:
  - Pick I-joists in the bundles as shipped by the supplier.
  - Orient the bundles so that the webs of the I-joists are vertical.
  - Pick the bundles at the 5th points, using a spreader bar if necessary.
- Do not stack LVL bundles on top of I-Joist bundles.
- NEVER USE A DAMAGED I-JOIST OR LVL. All field repairs must be approved by a Design Professional.









RFPI®-Joists Are Engineered to Make the Job Easier

RFPIs are the ideal choice for designers and builders who want to provide their customers with high-quality floor systems. They provide consistent performance for the most demanding residential applications.

SIMPLE TO INSTALL

I-joists save builders time, and money. I-joists are typically precut and shipped to the jobsite ready to install. This minimizes jobsite cutting and material waste. I-joists can be cut and fastened with traditional framing tools and fasteners – no special tools are required. Since I-joists can typically be used at greater joist spacings than lumber, fewer pieces must be cut and handled on the jobsite, making I-joist installation less costly and less wasteful for the builder.

DESIGN FLEXIBILITY

The availability of long lengths allows multiple span installations thus speeding construction by eliminating the need to lap joists over bearing walls or support beams. This also means fewer pieces to handle. The availability of long lengths and relatively deep joists also gives designers the freedom to create more open spaces and reduces the need for supporting walls, columns, or beams.

LIGHTWEIGHT

Because I-joists typically weigh less than half of comparable conventional framing lumber, they can be installed quickly and efficiently.

DIMENSIONALLY STABLE

I-joists will not warp, twist, or shrink, and are more uniform in their dimensions than sawn lumber joists. The floor vibration criteria combined with their straightness and uniformity provides a stiffer, more uniform floor with fewer squeaks, and higher customer satisfaction.

WEB HOLES

The OSB webs in Roseburg's I-joists permit holes to be easily cut on the jobsite to permit the passage of electrical wiring, plumbing and ductwork. This cannot always be accomplished with sawn lumber joists where the mechanical systems must be passed under the joist system. Roseburg also provides knockout holes along the length of the joists to facilitate the installation of electrical wiring or light plumbing lines. These knockouts can easily be removed with a hammer as needed.

APA QUALITY ASSURED

The APA trademark ensures superior I-joist quality and consistent performance. All products are subject to the proven quality assurance program of APA.

RESOURCE FRIENDLY

Wood I-joists use up to 50% less wood fiber in their production than conventional lumber joists, allowing more efficient use of our natural resources.

Floor System Performance

It is always a good idea to consider the performance (i.e., vibration, bounce etc.) of **any floor system**. Currently, floor joists are designed using the CCMC design procedures for vibration controlled spans.

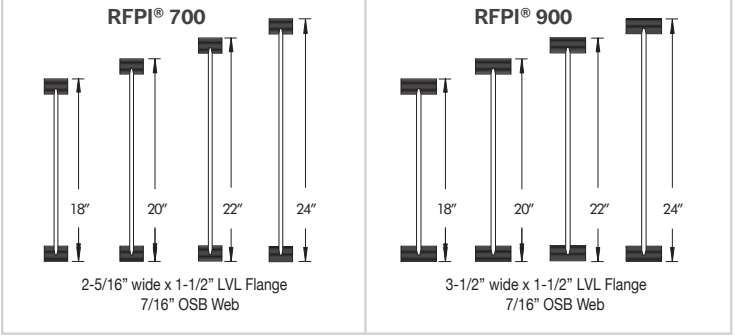
Floor performance can be enhanced by using the concepts of **fundamental natural frequency** and **damping** when designing floor systems. The **fundamental natural frequency** (FNF) is a measure of how the floor vibrates when you walk on it and is measured in cycles per second (called a Hertz or Hz). **Damping** is a measure of how quickly a floor stops vibrating and is expressed as a percent between 1 and 100 (most residential floors have a range between 5% – 25% damping).

Our bodies are extremely sensitive to vibrations below 9 Hz so the ideal floor would have a high FNF with high damping. Most problem floors have a combination of a low FNF (below 9 Hz) and a low damping (around 5%). The following list will help you determine the effect of different parameters on floor performance. **It is the combination and interaction of these parameters that determines how the floor "feels".**

DESIGN PARAMETERS	EFFECT ON FNF	EFFECT ON DAMPING
Longer Spans	**significantly lowers**	little or no effect
Higher "L over" deflection limit (L/480 vs. L/360)	**significantly increases**	little or no effect
Using an absolute upper limit on live load deflection (Usually between 1/3" to 1/2" max)	**significantly increases**	little or no effect
Using deeper I-joists	increases	little or no effect
Reduced on-center spacing	increases	little or no effect
Adding perpendicular partition walls	little or no effect	**significantly increases**
Increasing overall weight of floor	**significantly lowers**	**significantly increases**
INSTALLATION PARAMETERS		
Unlevel bearings (walls, beams & hangers)	**significantly lowers**	**significantly lowers**
Direct applied sheet-rock ceiling	**significantly increases**	**significantly increases**
Thicker sub-floor	increases	increases
Screw & Glued sub-floor	increases	increases
T&G sub-floor	increases	increases
RETROFIT PARAMETERS		
I-joist mid span blocking (one row)	little or no effect	increases
2x4 flat on I-joist bottom (perpendicular)	little or no effect	increases
2x4 strong back on I-joist bottom (perpendicular) (vertical 2x4 nailed to side of flat 2x4)	increases	**significantly increases**

RFPI®-Joist Design Properties

I-JOIST DIMENSIONS



FACTORED RESISTANCES[1][2][3][4][5] - STANDARD TERM

Roseburg Designation	EI[6]x10⁶ lb-in²	M[7] lb-ft	V[8] lbs	VLC[9] lbs/ft	K[10]x10⁶ lb	Weight lb/ft
18" RFPI 700	1,245	17,380	4,064	3,190	11.34	3.85
20” RFPI 700	1,579	19,293	4,325	3,190	12.60	4.10
22” RFPI 700	1,955	21,189	4,633	2,610	13.86	4.36
24” RFPI 700	2,375	23,069	4,830	2,538	15.12	4.61
18" RFPI 900	1,849	26,744	4,554	3,190	11.34	4.80
20” RFPI 900	2,337	29,696	4,648	3,190	12.60	5.21
22” RFPI 900	2,886	32,624	4,751	2,610	13.86	5.47
24” RFPI 900	3,496	35,518	4,830	2,538	15.12	5.67

1. Factored resistances are based on Limit States Design in accordance with CSA O86-14.
2. All resistance values include the resistance factor and reliability normalization factor (Kr).
3. Design values shall not be increased for load-sharing.
4. Duration of load, service and treatment factors = 1.0.
5. Full lateral support of compression flange is required.
6. Bending stiffness of the I-joist.
7. Factored Moment Resistance of a single I-joist.
8. Factored Shear Resistance of the I-joist.
9. Vertical Load Capacity when continuously supported.
10. Coefficient of shear deflection (K), used to calculate deflections for I-joist application. Equations 1 and 2 below are provided for uniform load and center point load conditions for simple spans.

Uniform Load:

$$[1]\ \delta = \frac{5\omega\ell^4}{384EI} + \frac{\omega\ell^2}{K}$$

Center-Point Load:

$$[2]\ \delta = \frac{P\ell^3}{48EI} + \frac{2P\ell}{K}$$

where:

δ = calculated deflection (in)
ω = uniform load (lb/in)
ℓ = design span (in)
P = concentrated load (lb)
EI = bending stiffness of the I-joist (lb-in²)
K = coefficient of shear deflection (lb)

TABLE 1: FACTORED REACTION CAPACITIES - STANDARD TERM WITH AND WITHOUT WEB STIFFENERS (W.S.)[a][b]

Roseburg Designation	End Reaction (lbs)				Intermediate Reaction (lbs)			
	1-3/4” Bearing		3-1/2” Bearing		3-1/2” Bearing		5-1/4” Bearing	
	No W.S.	With W.S.	No W.S.	With W.S.	No W.S.	With W.S.	No W.S.	With W.S.
18" RFPI 700	1,776	3,473	2,604	4,064	4,333	6,393	4,775	7,063
20” RFPI 700	1,720	3,630	2,502	4,325	4,333	6,393	4,775	7,063
22” RFPI 700	NA	3,788	NA	4,633	NA	6,550	NA	7,269
24” RFPI 700	NA	3,946	NA	4,830	NA	6,550	NA	7,269
18" RFPI 900	2,328	4,057	2,786	4,554	4,735	8,066	5,485	9,013
20” RFPI 900	2,131	4,206	2,683	4,648	4,735	8,066	5,485	9,013
22” RFPI 900	NA	4,349	NA	4,751	NA	8,531	NA	9,502
24” RFPI 900	NA	4,498	NA	4,830	NA	8,531	NA	9,502

Table 1 Notes:

a. The tabulated values are for the standard term of load duration (K_D = 1.0). All values are permitted to be adjusted for other load durations as permitted by the code provided that the adjusted values do not exceed the factored compressive resistance perpendicular to grain (Q_r) of the bearing plate supporting the I-joist in accordance with CSA O86. Interpolation between bearing lengths is permitted.

b. Web stifffeners, if required, shall be installed per "Web Stiffener Requirements" shown elsewhere in this design guide.

Allowable Floor Clear Spans For RFPI®-Joists Standard Term

40 PSF LIVE LOAD AND 35 PSF DEAD LOAD - GLUED SUBFLOOR & NO DIRECTLY APPLIED CEILING

Joist Depth	Joist Series	Simple Span				Multiple Span			
		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.
18"	RFPI 700	26'-5"	24'-6"	23'-4"	22'-1"	27'-11"	25'-10"	24'-7"	23'-4"
20"	RFPI 700	28'-3"	26'-2"	24'-11"	23'-7"	29'-10"	27'-7"	26'-3"	24'-1"
22"	RFPI 700	30'-0"	27'-9"	26'-5"	25'-0"	31'-8"	29'-3"	27'-11"	24'-1"
24"	RFPI 700	31'-8"	29'-3"	27'-10"	26'-4"	33'-11"	30'-11"	29'-5"	24'-1"
18"	RFPI 900	29'-0"	26'-9"	25'-5"	24'-0"	30'-8"	28'-3"	26'-10"	25'-5"
20"	RFPI 900	31'-0"	28'-7"	27'-2"	25'-8"	32'-11"	30'-2"	28'-8"	27'-1"
22"	RFPI 900	33'-2"	30'-3"	28'-9"	27'-2"	35'-8"	32'-0"	30'-5"	28'-9"
24"	RFPI 900	35'-7"	32'-0"	30'-4"	28'-8"	38'-4"	34'-5"	32'-1"	30'-4"

50 PSF LIVE LOAD AND 45 PSF DEAD LOAD - GLUED SUBFLOOR & NO DIRECTLY APPLIED CEILING

Joist Depth	Joist Series	Simple Span				Multiple Span			
		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.
18"	RFPI 700	26'-5"	24'-6"	23'-4"	22'-1"	27'-11"	25'-10"	23'-10"	19'-0"
20"	RFPI 700	28'-3"	26'-2"	24'-11"	23'-7"	29'-10"	27'-7"	23'-10"	19'-0"
22"	RFPI 700	30'-0"	27'-9"	26'-5"	23'-9"	31'-8"	28'-8"	23'-10"	19'-0"
24"	RFPI 700	31'-8"	29'-3"	27'-10"	23'-9"	33'-11"	28'-8"	23'-10"	19'-0"
18"	RFPI 900	29'-0"	26'-9"	25'-5"	24'-0"	30'-8"	28'-3"	26'-10"	24'-4"
20"	RFPI 900	31'-0"	28'-7"	27'-2"	25'-8"	32'-11"	30'-2"	28'-8"	24'-4"
22"	RFPI 900	33'-2"	30'-3"	28'-9"	27'-2"	35'-8"	32'-0"	30'-5"	25'-9"
24"	RFPI 900	35'-7"	32'-0"	30'-4"	28'-8"	38'-4"	34'-5"	32'-1"	25'-9"

100 PSF LIVE LOAD AND 45 PSF DEAD LOAD - GLUED SUBFLOOR & NO DIRECTLY APPLIED CEILING

Joist Depth	Joist Series	Simple Span				Multiple Span			
		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.
18"	RFPI 700	21'-10"	19'-9"	18'-7"	15'-0"	23'-8"	18'-2"	15'-1"	12'-0"
20"	RFPI 700	23'-8"	21'-5"	18'-10"	15'-0"	24'-3"	18'-2"	15'-1"	12'-0"
22"	RFPI 700	25'-5"	22'-8"	18'-10"	15'-0"	24'-3"	18'-2"	15'-1"	12'-0"
24"	RFPI 700	27'-1"	22'-8"	18'-10"	15'-0"	24'-3"	18'-2"	15'-1"	12'-0"
18"	RFPI 900	24'-7"	22'-2"	20'-10"	19'-2"	26'-7"	23'-2"	19'-4"	15'-5"
20"	RFPI 900	26'-7"	24'-0"	22'-6"	20'-1"	28'-10"	23'-2"	19'-4"	15'-5"
22"	RFPI 900	28'-7"	25'-10"	24'-2"	20'-9"	31'-0"	24'-7"	20'-5"	16'-3"
24"	RFPI 900	30'-6"	27'-7"	25'-10"	21'-6"	32'-10"	24'-7"	20'-5"	16'-3"

Notes

1. Joist spans have been calculated in accordance with CSA O86-19 with CCMC vibration concluding report dated September 4, 1997.
2. Use appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis for other loading, including concentrated loads.
3. Spans listed are clear distances between supports.
4. **Web stiffeners are required to achieve the spans in this table.**
5. The spans are based on a minimum bearing length of 1-3/4" at end supports and 3-1/2" at intermediate supports and have been limited to the bearing resistance of SPF wall plate.
6. Uniform load deflection is based on composite action with glued sheathing and has been limited to the following:
   - 40 psf live load and 35 psf dead load – L/480 on the live load and L/240 on the total load.
   - 50 psf live load and 45 psf dead load – L/600 on the live load and L/240 on the total load.
   - 100 psf live load and 45 psf dead load – L/600 on the live load and L/240 on the total load.
7. Long term deflection (creep) has not been considered.
8. Elastomeric adhesives for gluing of the subfloor shall conform to CGSB Standard CAN-CGSB-71.26-M88.
9. Provide lateral support at points of bearing to prevent twisting of I-joists.
10. Multiple span lengths shown require adequate bottom flange lateral bracing.
11. Multiple spans are for continuous I-joists spanning over three or more supports where the shortest span is at least 50% of the longest span. Use appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis for other multiple span conditions.
12. Use in dry service conditions only.

Allowable Roof Clear Spans Standard Term

RFPI 700 (2-5/16" WIDE X 1-1/2" FLANGES)

Spacing (in)	Loads (psf)		18"		20"		22"		24"	
			Low Slope	High Slope	Low Slope	High Slope	Low Slope	High Slope	Low Slope	High Slope
	LL	DL	6/12	12/12	6/12	12/12	6/12	12/12	6/12	12/12
12	20	10	43'-0"	39'-10"	46'-7"	43'-2"	50'-0"	46'-4"	53'-5"	49'-6"
		15	43'-0"	39'-6"	46'-7"	42'-9"	50'-0"	45'-11"	53'-5"	49'-0"
	30	10	37'-5"	34'-9"	40'-7"	37'-7"	43'-7"	40'-5"	46'-6"	43'-2"
		15	37'-5"	34'-9"	40'-7"	37'-7"	43'-7"	40'-5"	46'-6"	43'-2"
	40	10	33'-11"	31'-6"	36'-9"	34'-1"	39'-6"	36'-8"	42'-2"	39'-1"
		15	33'-11"	31'-6"	36'-9"	34'-1"	39'-6"	36'-8"	42'-2"	39'-1"
	50	10	31'-5"	29'-2"	34'-0"	31'-7"	36'-7"	34'-0"	39'-0"	36'-3"
		15	31'-5"	29'-2"	34'-0"	31'-7"	36'-7"	34'-0"	39'-0"	36'-3"
16	20	10	39'-0"	36'-2"	42'-3"	39'-2"	45'-4"	42'-1"	48'-5"	44'-11"
		15	39'-0"	35'-10"	42'-3"	38'-9"	45'-4"	41'-8"	48'-5"	44'-5"
	30	10	33'-11"	31'-6"	36'-9"	34'-1"	39'-6"	36'-8"	42'-2"	39'-1"
		15	33'-11"	31'-6"	36'-9"	34'-1"	39'-6"	36'-8"	42'-2"	39'-1"
	40	10	30'-9"	28'-7"	33'-3"	30'-11"	35'-9"	33'-3"	38'-2"	35'-6"
		15	30'-9"	28'-7"	33'-3"	30'-11"	35'-9"	33'-3"	38'-2"	35'-6"
	50	10	28'-5"	26'-5"	30'-10"	28'-8"	33'-1"	30'-9"	35'-4"	32'-10"
		15	28'-5"	26'-5"	30'-10"	28'-8"	33'-1"	30'-9"	35'-4"	32'-10"
19.2	20	10	36'-7"	34'-0"	39'-8"	36'-10"	42'-7"	39'-6"	45'-6"	42'-2"
		15	36'-7"	33'-8"	39'-8"	36'-5"	42'-7"	39'-2"	45'-6"	41'-9"
	30	10	31'-10"	29'-7"	34'-6"	32'-1"	37'-1"	34'-5"	39'-7"	36'-9"
		15	31'-10"	29'-7"	34'-6"	32'-1"	37'-1"	34'-5"	39'-7"	36'-9"
	40	10	28'-10"	26'-10"	31'-3"	29'-1"	33'-7"	31'-2"	35'-10"	33'-4"
		15	28'-10"	26'-10"	31'-3"	29'-1"	33'-7"	31'-2"	35'-10"	33'-4"
	50	10	26'-8"	24'-10"	28'-11"	26'-11"	31'-1"	28'-11"	33'-2"	30'-10"
		15	26'-8"	24'-10"	28'-11"	26'-11"	31'-1"	28'-11"	33'-2"	30'-10"
24	20	10	33'-11"	31'-6"	36'-9"	34'-1"	39'-6"	36'-8"	42'-2"	39'-1"
		15	33'-11"	31'-2"	36'-9"	33'-9"	39'-6"	36'-3"	42'-2"	38'-9"
	30	10	29'-6"	27'-5"	31'-11"	29'-8"	34'-4"	31'-11"	36'-8"	34'-1"
		15	29'-6"	27'-5"	31'-11"	29'-8"	34'-4"	31'-11"	36'-8"	34'-1"
	40	10	26'-8"	24'-10"	28'-11"	26'-11"	31'-1"	28'-11"	33'-2"	30'-10"
		15	26'-8"	24'-10"	28'-11"	26'-11"	31'-1"	28'-11"	32'-1"	30'-0"
	50	10	24'-8"	23'-0"	26'-9"	24'-11"	28'-9"	26'-9"	29'-2"	28'-0"
		15	24'-8"	23'-0"	26'-5"	24'-11"	27'-1"	25'-7"	27'-1"	25'-7"

RFPI 900 (3-1/2" WIDE X 1-1/2" FLANGES)

Spacing (in)	Loads (psf)		18"		20"		22"		24"	
			Low Slope	High Slope	Low Slope	High Slope	Low Slope	High Slope	Low Slope	High Slope
	LL	DL	6/12	12/12	6/12	12/12	6/12	12/12	6/12	12/12
12	20	10	49'-0"	45'-6"	53'-0"	49'-2"	56'-11"	52'-9"	60'-8"	56'-3"
		15	49'-0"	45'-0"	53'-0"	48'-8"	56'-11"	52'-3"	60'-8"	55'-9"
	30	10	42'-8"	39'-7"	46'-2"	42'-10"	49'-7"	46'-0"	52'-10"	49'-1"
		15	42'-8"	39'-7"	46'-2"	42'-10"	49'-7"	46'-0"	52'-10"	49'-1"
	40	10	38'-8"	35'-11"	41'-10"	38'-10"	44'-11"	41'-8"	47'-11"	44'-6"
		15	38'-8"	35'-11"	41'-10"	38'-10"	44'-11"	41'-8"	47'-11"	44'-6"
	50	10	35'-9"	33'-3"	38'-9"	36'-0"	41'-7"	38'-8"	44'-4"	41'-2"
		15	35'-9"	33'-3"	38'-9"	36'-0"	41'-7"	38'-8"	44'-4"	41'-2"
16	20	10	44'-5"	41'-3"	48'-1"	44'-7"	51'-7"	47'-10"	55'-0"	51'-1"
		15	44'-5"	40'-10"	48'-1"	44'-2"	51'-7"	47'-5"	55'-0"	50'-6"
	30	10	38'-8"	35'-11"	41'-10"	38'-10"	44'-11"	41'-8"	47'-11"	44'-6"
		15	38'-8"	35'-11"	41'-10"	38'-10"	44'-11"	41'-8"	47'-11"	44'-6"
	40	10	35'-0"	32'-6"	37'-10"	35'-2"	40'-8"	37'-9"	43'-4"	40'-4"
		15	35'-0"	32'-6"	37'-10"	35'-2"	40'-8"	37'-9"	43'-4"	40'-4"
	50	10	32'-4"	30'-1"	35'-0"	32'-7"	37'-7"	35'-0"	40'-2"	37'-4"
		15	32'-4"	30'-1"	35'-0"	32'-7"	37'-7"	35'-0"	40'-2"	37'-4"
19.2	20	10	41'-9"	38'-9"	45'-2"	41'-11"	48'-6"	45'-0"	51'-8"	48'-0"
		15	41'-9"	38'-4"	45'-2"	41'-6"	48'-6"	44'-6"	51'-8"	47'-6"
	30	10	36'-4"	33'-9"	39'-3"	36'-6"	42'-2"	39'-2"	45'-0"	41'-9"
		15	36'-4"	33'-9"	39'-3"	36'-6"	42'-2"	39'-2"	45'-0"	41'-9"
	40	10	32'-10"	30'-7"	35'-6"	33'-1"	38'-2"	35'-6"	40'-9"	37'-10"
		15	32'-10"	30'-7"	35'-6"	33'-1"	38'-2"	35'-6"	40'-9"	37'-10"
	50	10	30'-4"	28'-3"	32'-10"	30'-7"	35'-4"	32'-10"	37'-8"	35'-1"
		15	30'-4"	28'-3"	32'-10"	30'-7"	35'-4"	32'-10"	37'-8"	35'-1"
24	20	10	38'-8"	35'-11"	41'-10"	38'-10"	44'-11"	41'-8"	47'-11"	44'-6"
		15	38'-8"	35'-6"	41'-10"	38'-5"	44'-11"	41'-3"	47'-11"	44'-0"
	30	10	33'-7"	31'-3"	36'-4"	33'-10"	39'-0"	36'-3"	41'-8"	38'-8"
		15	33'-7"	31'-3"	36'-4"	33'-10"	39'-0"	36'-3"	41'-8"	38'-8"
	40	10	30'-4"	28'-3"	32'-10"	30'-7"	35'-4"	32'-10"	37'-8"	35'-1"
		15	30'-4"	28'-3"	32'-10"	30'-7"	35'-4"	32'-10"	37'-8"	35'-1"
	50	10	28'-1"	26'-2"	30'-5"	28'-4"	32'-8"	30'-5"	34'-10"	32'-5"
		15	28'-1"	26'-2"	30'-5"	28'-4"	32'-8"	30'-5"	34'-10"	32'-5"

Notes:

1. The design is in accordance with CSA O86-14.
2. Spans listed represent the worst case of simple or multiple span.
3. Spans listed are clear horizontal distances between supports.
4. **Web stiffeners are required to achieve the spans in this table.**
5. Use in dry service conditions only.
6. Provide continuous lateral support for top flange.
7. Provide lateral support at points of bearing to prevent twisting of joists.
8. Maximum deflection is limited to L/180 at total load, L/360 at live load.
9. Slope roof joists at least 1/4" in 12" to minimize ponding.
10. Provide vertical support at each bearing point, min. 1-3/4" at end supports, 3-1/2" at interior supports.

Allowable Floor Uniform Load For RFPI®-Joists (PLF)

Joist Clear Span (ft)	RFPI 700 (2-5/16" wide x 1-1/2" flanges)												RFPI 900 (3-1/2" wide x 1-1/2" flanges)											
	18"			20"			22"			24"			18"			20"			22"			24"		
	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load
	L/600 Live	L/240 Total		L/600 Live	L/240 Total		L/600 Live	L/240 Total		L/600 Live	L/240 Total		L/600 Live	L/240 Total		L/600 Live	L/240 Total		L/600 Live	L/240 Total		L/600 Live	L/240 Total	
14	302	-	355	-	-	355	-	-	363	-	-	363	405	-	448	-	-	447	-	-	473	-	-	473
15	254	-	331	313	-	331	-	-	339	-	-	339	343	-	418	-	-	417	-	-	442	-	-	441
16	215	-	311	265	-	310	-	-	318	-	-	317	293	-	392	358	-	391	-	-	414	-	-	414
17	183	-	292	227	-	292	275	-	299	-	-	299	252	-	369	308	-	368	369	-	390	-	-	389
18	157	-	276	195	-	276	237	-	282	282	-	282	218	-	348	267	-	348	321	-	368	-	-	368
19	136	-	261	169	-	261	205	-	267	245	-	267	189	-	330	233	-	329	281	-	348	331	-	348
20	118	-	248	147	-	248	179	-	254	214	-	253	166	-	313	204	-	313	246	-	331	291	-	330
22	91	224	225	114	-	225	139	-	230	166	-	230	129	-	284	159	-	284	193	-	300	229	-	300
24	71	175	206	89	-	206	109	-	211	131	-	211	102	249	260	126	-	260	153	-	275	182	-	275
26	57	139	190	72	175	190	88	-	194	105	-	194	82	199	240	102	-	240	123	-	253	147	-	253
28	46	112	170	58	141	176	71	174	180	86	-	180	66	161	223	83	202	222	101	-	235	121	-	235
30	38	91	147	48	115	164	59	142	168	71	-	168	55	132	208	68	166	207	83	203	219	100	-	219
32	32	75	129	40	95	144	49	118	157	59	142	157	46	109	194	57	137	194	70	169	205	84	203	205
34	26	62	114	33	79	127	41	98	139	49	119	147	38	91	177	48	115	182	59	142	193	71	171	192
36	22	52	101	28	67	113	35	83	124	42	100	135	33	77	157	41	97	172	50	120	182	60	145	181
38	19	44	90	24	56	101	30	70	111	36	85	121	28	65	140	35	82	156	43	102	172	52	123	171
40	17	37	81	21	48	90	26	60	99	31	73	108	24	55	126	30	70	140	37	87	155	45	106	163
42	-	-	-	18	41	81	22	51	90	27	63	98	21	48	114	26	61	127	32	75	140	39	91	152
44	-	-	-	-	-	-	19	44	81	24	54	89	18	41	103	23	52	115	28	65	127	34	79	138
46	-	-	-	-	-	-	-	-	-	21	47	81	16	35	94	20	45	105	25	57	115	30	69	126
48	-	-	-	-	-	-	-	-	-	-	-	-	14	31	86	18	39	96	22	49	105	26	60	115
50	-	-	-	-	-	-	-	-	-	-	-	-	13	27	79	16	34	88	19	43	97	23	53	106

Allowable Roof Uniform Load For RFPI®-Joists (PLF)

Joist Clear Span (ft)	RFPI 700 (2-5/16" wide x 1-1/2" flanges)												RFPI 900 (3-1/2" wide x 1-1/2" flanges)											
	18"			20"			22"			24"			18"			20"			22"			24"		
	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load	Unfactored loads based on deflection		Factored Total Load
	L/360 Live	L/180 Total		L/360 Live	L/180 Total		L/360 Live	L/180 Total		L/360 Live	L/180 Total		L/360 Live	L/180 Total		L/360 Live	L/180 Total		L/360 Live	L/180 Total		L/360 Live	L/180 Total	
14	-	-	355	-	-	355	-	-	363	-	-	363	-	-	448	-	-	447	-	-	473	-	-	473
15	-	-	331	-	-	331	-	-	339	-	-	339	-	-	418	-	-	417	-	-	442	-	-	441
16	-	-	311	-	-	310	-	-	318	-	-	317	-	-	392	-	-	391	-	-	414	-	-	414
17	-	-	292	-	-	292	-	-	299	-	-	299	-	-	369	-	-	368	-	-	390	-	-	389
18	262	-	276	-	-	276	-	-	282	-	-	282	-	-	348	-	-	348	-	-	368	-	-	368
19	227	-	261	-	-	261	-	-	267	-	-	267	315	-	330	-	-	329	-	-	348	-	-	348
20	197	-	248	246	-	248	-	-	254	-	-	253	276	-	313	-	-	313	-	-	331	-	-	330
22	152	-	225	190	-	225	-	-	230	-	-	230	214	-	284	265	-	284	-	-	300	-	-	300
24	119	-	206	149	-	206	182	-	211	-	-	211	169	-	260	210	-	260	255	-	275	-	-	275
26	95	186	190	119	-	190	146	-	194	175	-	194	136	-	240	169	-	240	206	-	253	245	-	253
28	77	150	170	97	-	176	119	-	180	143	-	180	111	217	223	138	-	222	168	-	235	201	-	235
30	63	123	147	80	155	164	98	-	168	118	-	168	91	178	208	114	-	207	139	-	219	166	-	219
32	53	101	129	66	128	144	81	-	157	98	-	157	76	147	194	95	185	194	116	-	205	139	-	205
34	44	84	114	56	107	127	68	132	139	82	-	147	64	123	177	80	155	182	98	191	193	118	-	192
36	37	71	101	47	90	113	58	112	124	70	-	135	54	104	157	68	131	172	83	161	182	100	-	181
38	32	60	90	40	76	101	50	95	111	60	115	121	47	88	140	58	112	156	72	138	172	86	166	171
40	28	51	81	35	65	90	43	81	99	52	99	108	40	76	126	50	96	140	62	118	155	74	143	163
42	-	-	-	30	56	81	37	70	90	45	85	98	35	65	114	44	82	127	54	102	140	65	124	152
44	-	-	-	-	-	-	32	60	81	39	74	89	30	56	103	38	71	115	47	89	127	57	108	138
46	-	-	-	-	-	-	-	-	-	34	64	81	27	49	94	34	62	105	41	77	115	50	94	126
48	-	-	-	-	-	-	-	-	-	-	-	-	24	43	86	30	54	96	37	68	105	44	82	115
50	-	-	-	-	-	-	-	-	-	-	-	-	21	37	79	26	48	88	32	59	97	39	73	106

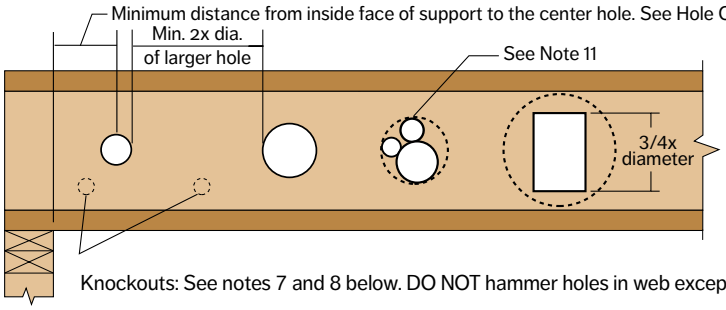
Notes:

1. Clear span is the distance between the face of the supports.
2. The loads have been calculated in accordance with CSA O86-14.
3. The two unfactored load columns are based on deflection only. The factored load column is based on strength only. All three columns must be checked. Where the unfactored load column is blank, the factored load column governs.
4. The load values are for standard term load duration and dry service conditions only. The dead load must not exceed the live load.
5. The load values above represent the worst case of uniformly loaded simple span or multiple span joists.
6. Use beam sizing software to analyze multiple span joists if the length of any span is less than half the length of an adjacent span.
7. Minimum end bearing length is 1-3/4". Minimum intermediate bearing length is 3-1/2".
8. Provide continuous lateral support for top flange. Provide lateral support at points of bearing to prevent twisting of joist.
9. **Web stiffeners are required for loads shown.**
10. This table does not account for the added stiffness from glued or nailed sheathing.
11. Use beam sizing software to analyze conditions outside of the scope of this table such as cantilevers and concentrated loads.

How To Use PLF Table:

1. Calculate actual unfactored live load, unfactored total load and factored total load in pounds per lineal foot (plf).
2. Select appropriate Clear Span.
3. Move across columns until an I-joist is located that meets or exceeds the actual unfactored live load, unfactored total load and factored total load. All three columns must be checked.

Holes For RFPI®-Joists Used In Floor Applications



Knockouts: See notes 7 and 8 below. DO NOT hammer holes in web except at knockouts.

RFPI-JOIST TYPICAL HOLES - See "HOW TO USE HOLE CHART" below.

HOLE CHART - Minimum Distance from Inside Face of Nearest Joist Support to Center of Hole [1] [2]

Joist Designation	Round Hole Diameter (in)																		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Minimum Distance from Inside Face of Nearest Support to Center of Hole (ft-in) [1] [2]																		
18" RFPI 700	0'-7"	0'-8"	0'-8"	1'-1"	2'-3"	3'-4"	4'-6"	5'-8"	6'-10"	8'-1"	9'-4"	10'-9"	12'-4"						
20" RFPI 700	0'-7"	0'-8"	0'-8"	0'-9"	0'-9"	1'-9"	2'-10"	3'-11"	5'-3"	6'-7"	7'-11"	9'-4"	10'-10"	12'-4"	13'-11"				
22" RFPI 700	0'-7"	0'-8"	0'-8"	0'-9"	0'-9"	0'-10"	1'-3"	2'-6"	3'-9"	5'-0"	6'-4"	7'-8"	9'-0"	10'-5"	11'-10"	13'-4"	15'-0"		
24" RFPI 700	0'-7"	0'-8"	0'-8"	0'-9"	0'-9"	0'-10"	0'-10"	0'-11"	2'-0"	3'-3"	4'-5"	5'-8"	6'-11"	8'-2"	9'-7"	11'-4"	13'-2"	15'-0"	17'-0"
18" RFPI 900	0'-7"	0'-11"	1'-11"	2'-11"	3'-11"	5'-0"	6'-0"	7'-1"	8'-2"	9'-4"	10'-6"	12'-1"	13'-9"						
20" RFPI 900	0'-7"	0'-8"	1'-3"	2'-2"	3'-1"	4'-0"	5'-0"	6'-2"	7'-5"	8'-8"	10'-0"	11'-5"	12'-11"	14'-5"	16'-1"				
22" RFPI 900	0'-7"	0'-8"	1'-6"	2'-4"	3'-2"	4'-1"	5'-1"	6'-3"	7'-5"	8'-7"	9'-10"	11'-1"	12'-5"	13'-9"	15'-2"	16'-8"	18'-3"		
24" RFPI 900	0'-7"	0'-8"	1'-3"	2'-2"	3'-3"	4'-3"	5'-3"	6'-4"	7'-5"	8'-6"	9'-8"	10'-10"	12'-0"	13'-3"	14'-6"	15'-10"	17'-3"	18'-8"	20'-3"

Notes:

1. Distances in this hole chart are based on uniformly loaded I-joists and allowable I-joist reactions with web stiffeners on minimum required bearing lengths. This chart conservatively accounts for the worst case created by the allowable simple or multiple floor spans shown on page 7 of this guide at on-center spacings of 12", 16", 19.2" and 24" with floor loads of 40 psf live load + 35 psf dead load or 50 psf live load + 45 psf dead load or 100 psf live load + 45 psf dead load. **Holes in conditions that fall outside of the hole chart parameters may still be acceptable. The most accurate method of determining the acceptability of a given hole is the use of appropriate software (e.g. Simpson Strong-Tie® Components Solutions™) or engineering analysis for the actual condition.**
2. Hole location distance is measured from inside face of nearest support to center of hole.
3. Use appropriate software or engineering analysis to analyze duct chase openings.

HOW TO USE HOLE CHART

1. Read across the top of Hole Chart to the desired hole size.
2. Follow this column down to the row that represents the I-joist depth and designation. This number indicates the minimum distance from the face of the nearest support to the centerline of the hole.

Example: Need a 13-1/2-inch hole in an 18" RFPI®-900 joist:

From Hole Chart,

For a 13-inch round hole, the minimum distance is 12'-1".
For a 14-inch round hole, the minimum distance is 13'-9".
Therefore the minimum distance for the 13½-inch round hole is 12'-11" (halfway between 12'-1" and 13'-9").

RULES FOR CUTTING HOLES

1. See chart for allowable hole sizes and locations. The distance between the inside edge of the nearest support and the centerline of any hole shall not be less than that shown in the chart.
2. Except for cutting to length, NEVER cut, drill or notch I-joist flanges.
3. Whenever possible center holes vertically in the middle of the web. However, holes may be located vertically anywhere in the web provided a minimum of 1/8" of web remains between the edge of the hole and the flanges.
4. The maximum size hole that can be cut into an I-joist web shall equal the clear distance between the flanges of the I-joist minus 1/4". A minimum of 1/8" should always be maintained between the top or bottom of the hole and the adjacent I-joist flange.
5. The sides of square holes or longest side of rectangular holes should not exceed three fourths of the diameter of the maximum round hole permitted at that location. Do not over-cut the sides of square or rectangular holes.
6. Where more than one hole is necessary, the distance between adjacent hole edges must be a minimum of twice the diameter of the largest round hole or twice the size of the largest square hole (or twice the length of the longest side of the longest rectangular hole) and each hole must be sized and located in compliance with the requirements of the chart.
7. Knockouts are prescored holes for the contractor's convenience to install electrical or small plumbing lines. They are 1-1/2" in diameter, and are spaced approximately 16" on center along the length of the I-joist. Where possible, it is preferable to use knockouts instead of field cutting holes. For floor applications, positioning the I-joists so the knockouts are all on the bottom of the joist, may ease the installation of electrical wiring or residential sprinkler systems. DO NOT hammer holes in web, except at knock outs.
8. A knockout is not considered a hole and may be utilized anywhere it occurs. It can be ignored for purposes of calculating minimum distances between holes.
9. 1-1/2" holes shall be permitted anywhere in a cantilevered section of an RFPI-Joist. Holes of greater size may be permitted subject to verification.
10. A 1-1/2" hole can be placed anywhere in the web provided that it meets the requirements of rule 6 on this page.
11. A group of round holes at approximately the same location shall be permitted if they meet the requirements for a single round hole circumscribed around them.
12. All holes shall be cut in a workman-like manner in accordance with the restrictions listed herein.

Web Stiffener Requirements

Web stiffeners are required for all 22" and 24" deep RFPI joist applications. Depending on the loads and spans, web stiffeners may or may not be required for 18" and 20" deep RFPI joists. The span charts and PLF tables in this guide are based on the use of web stiffeners for all series and depths. For other conditions, use appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis to determine if web stiffeners are required. A web stiffener is a block of plywood, OSB, or 2x that is added to stiffen the I-joist's web, increase the bearing surface between the web and the flange, and provide additional support for a hanger or other connector. **The proper installation of web stiffeners is very important, particularly for deeper depth I-joists which are capable of carrying large loads and developing high reactions.** When used at end or intermediate bearings, web stiffeners must be installed on both sides of the web and tight against the bottom flange of the I-joist, but with a minimum 1/8" gap between the top of the stiffener and the bottom of the top flange. **Web stiffeners must be made of Utility grade SPF (south) or better for lumber and/or Sheathing grade or better for wood structural panels.**

Web stiffeners are also required for the following:

- When sides of the hangers do not laterally brace the top flange of the I-joist.
- When I-joists are designed to support concentrated factored loads greater than 1,580 lbs applied to the I-joist's top flange between supports. In these applications only, the gap between the web stiffener and the flange shall be at the bottom flange. (See Figure B below.)

Web stiffeners may be cut in the field as required for the application.

FIGURE B

RFPI-JOIST WEB STIFFENER REQUIREMENTS

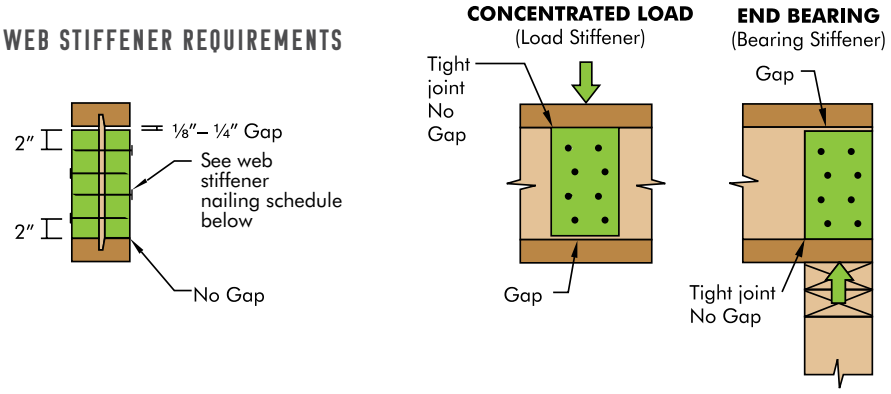
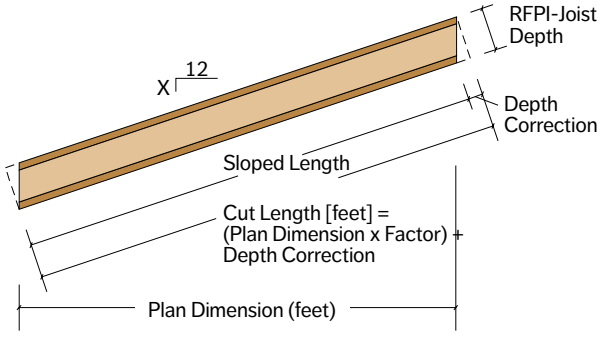


TABLE B: WEB STIFFENER NAILING SCHEDULE

RFPI®-Joist Series	Joist Depth	Minimum Web Stiffener Size	Nail Requirement
RFPI 700	18" & 20"	7/8" x 3-1/2"	8 - 8d box (0.113" dia x 2-1/2")
RFPI 700	22" & 24"	7/8" x 3-1/2"	10 - 8d box (0.113" dia x 2-1/2")
RFPI 900	18" & 20"	1-1/2" x 3-1/2" *	8 - 16d box (0.135" dia x 3-1/2")
RFPI 900	22" & 24"	1-1/2" x 3-1/2" *	10 - 16d box (0.135" dia x 3-1/2")

Slope Length Conversion Chart



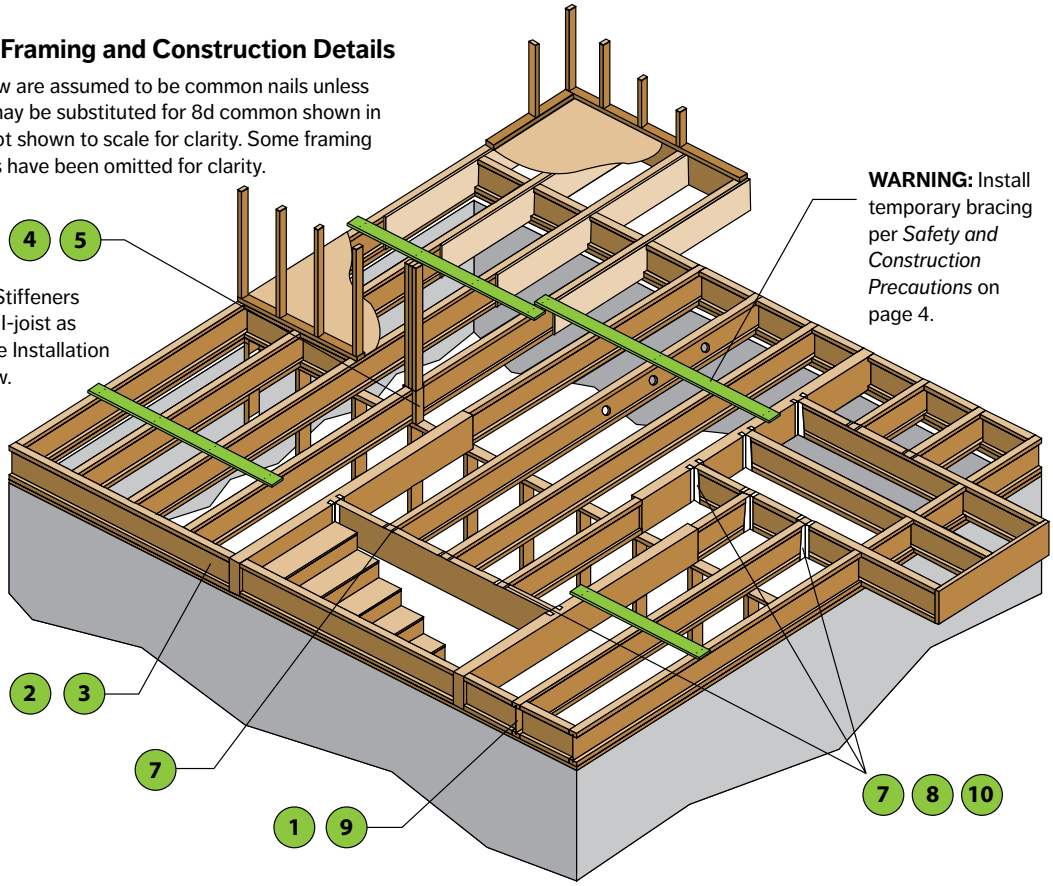
ALONG-THE-SLOPE SPANS & CUTTING LENGTHS FOR SLOPED ROOFS

Slope	Slope Factor	Joist Depth (in)			
		18	20	22	24
		Depth Correction (ft)			
1 in 12	1.00	0.13	0.14	0.15	0.17
2 in 12	1.01	0.25	0.28	0.31	0.33
2.5 in 12	1.02	0.31	0.35	0.38	0.42
3 in 12	1.03	0.38	0.42	0.46	0.50
3.5 in 12	1.04	0.44	0.49	0.53	0.58
4 in 12	1.05	0.50	0.56	0.61	0.67
4.5 in 12	1.07	0.56	0.63	0.69	0.75
5 in 12	1.08	0.63	0.69	0.76	0.83
6 in 12	1.12	0.75	0.83	0.92	1.00
7 in 12	1.16	0.88	0.97	1.07	1.17
8 in 12	1.20	1.00	1.11	1.22	1.33
9 in 12	1.25	1.13	1.25	1.38	1.50
10 in 12	1.30	1.25	1.39	1.53	1.67
11 in 12	1.36	1.38	1.53	1.68	1.83
12 in 12	1.41	1.50	1.67	1.83	2.00

Floor Framing & Construction Details

Typical RFPI®-Joist Floor Framing and Construction Details

All nails shown in the details below are assumed to be common nails unless otherwise noted. 10d box nails may be substituted for 8d common shown in details. Individual components not shown to scale for clarity. Some framing elements such as blocking panels have been omitted for clarity.



Installation Notes:

1. Except for cutting to length, top and bottom flanges of RFPI-Joists shall not be cut, drilled or notched.
2. Web stiffeners are required for all 22" and 24" deep RFPI joist applications. Depending on the loads and spans, web stiffeners may or may not be required for 18" and 20" deep RFPI joists.
3. Install joist hangers per hanger manufacturers recommendations.
4. Concentrated loads greater than those that can normally be expected in residential construction should only be applied to the top surface of the top flange. Normal concentrated loads include track lighting fixtures, audio equipment and security cameras. Never suspend unusual or heavy loads from the I-joist's bottom flange. Whenever possible, suspend all concentrated loads from the top of the I-joist. Or, attach the load to blocking that has been securely fastened to the I-joist web.
5. Any fastening, resistance to uplift or application not specifically detailed is subject to local approval.
6. I-Joist end bearing length must be at least 1-3/4". Intermediate bearings of multiple span joists must be at least 3-1/2".
7. Engineered lumber must not remain in direct contact with concrete or masonry construction and must be used in **dry-service conditions only.**
8. RFPI-Joists must be restrained against rotation at the ends of joists by use of rimboard, rim joists, blocking panels, or cross-bracing. To laterally support cantilevered joists, blocking panels must also be installed over supports nearest the cantilever.
9. Additionally, rimboard, rim joists, blocking panels, or squash blocks must be provided under all exterior walls and interior load bearing walls to transfer loads from above to the wall or foundation below.
10. Plywood or OSB subfloor nailed to the top flange of an RFPI-Joist is adequate to provide lateral support.
11. Install I-joists so that top and bottom flanges are straight and remain within ½ inch of true alignment.
12. Roseburg does not require mid-span blocking or bridging in RFPI floor or roof applications
13. RFPI-Joists are produced without camber so either flange can be the top or bottom flange; however, orienting the floor I-joists so the pre-scored knockouts are on the bottom may ease installation of electrical wiring or residential sprinkler systems.
14. See table below for recommended sheathing attachment with nails. If sheathing is to be attached with screws, the screw size should be equal to or only slightly larger than the recommended nail size. Space the screws the same as the required nail spacing. The unthreaded shank of the screw should extend beyond the thickness of the panel to assure that the panel is pulled securely against the I-joist flange. Use screws intended for structural assembly of wood structures. It is recommended to use screws from a manufacturer that can provide an ICC-ES Report (or similar) with approved application specifications and design values. Drywall screws can be brittle and should not be used.

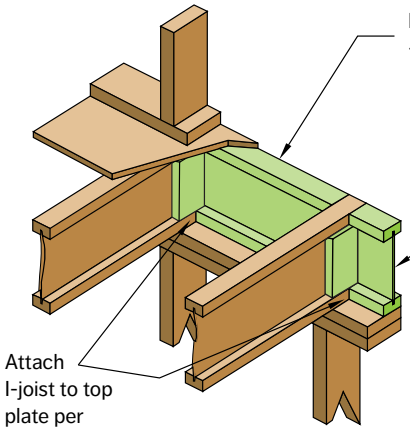
RECOMMENDED NAIL SIZE & SPACING[a]

		Flange Face Nailing (in)[b][c]		Flange Edge Nailing (in)		
Flange Material	**Fastener Diameter[d][e]**	**End Distance**	**Nail Spacing**	**End Distance**	**Nailed to one flange edge**	**Nailed to both flange edges[f]**
LVL Flange I-Joist	dia.< 0.128" (8d box or sinker, 10d box or sinker, 12d box)	3	2	3	3	6
	0.128"<dia.< 0.148" (8d com, 10d com, 12d sinker or com, 16d box or sinker)	3	3	3	3[g]	6[g]

Nailing Notes:

a. Nail spacings shown are guidelines for RFPI®-Joists used in conventional framing applications. For cases where horizontal diaphragm load capacity is required, refer to Table 4 of APA Product Report® PR-L259 for allowable diaphragm loads and the applicable RFPI®Joist series, panel grade and thickness, and nail size and spacing.
b. For conventional framing, attach sheathing to RFPI-Joist in accordance with applicable building code or approved building plan. However, do not use nails larger or spaced closer than shown in the table above.
c. If more than one row of nails is required, rows must be offset by at least 1/2" and staggered.
d. 14 gauge staples may be substituted for 8d (2-1/2") nails if staples penetrate the joist at least 1".
e. 10d (3") box nails may be substituted for 8d (2-1/2") common nails.
f. Nails on opposing flange edges must be offset one-half the minimum spacing.
g. Maximum of 0.131" diameter (8d common)

1 BLOCKING PANELS

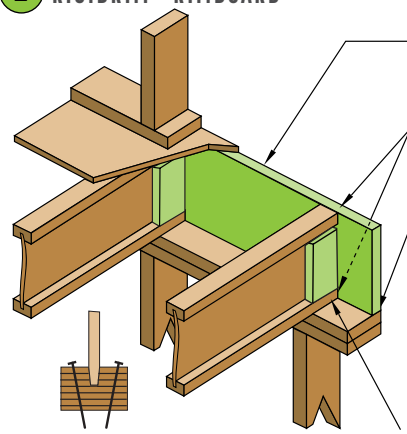


RFPI® blocking panel -or- RigidRim Rimboard

Attach blocking panel (or Rimboard) to top plate with 8d nails @ 6" o.c. (when used for lateral shear transfer, nail to bearing plate with same nailing as required for decking)

Attach I-joist to top plate per Detail 2

2 RIGIDRIM® RIMBOARD



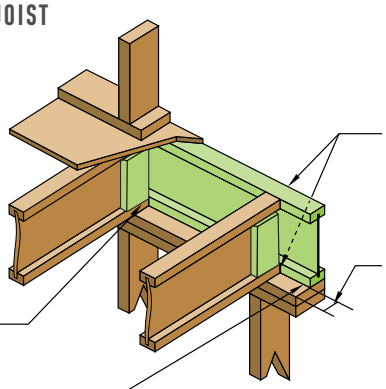
RigidRim® Rimboard (see page 18 for design properties)

One 8d nail at top and bottom flange

Attach RigidRim® Rimboard to top plate using 8d box toenails @ 6" o.c. (when used for lateral shear transfer, nail to bearing plate with same nailing as required for decking)

One 8d nail each side of the RFPI-Joist at bearing. **To avoid splitting flange,** start nails at least 1-1/2" from end of I-joist. Nails may be driven at an angle to avoid splitting of bearing plate.

3 RFPI® RIM JOIST



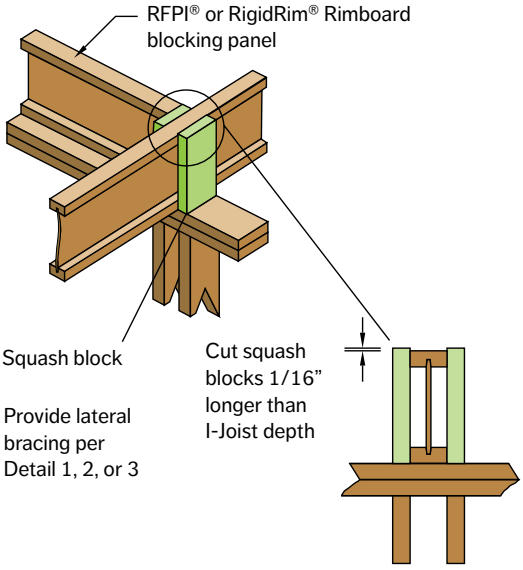
Attach rim joist to floor joist with one nail at top and bottom. Nail must provide 1 inch minimum penetration into floor joist. For rim joist with flanges 2" and wider toenails may be used.

Assure minimum required bearing length of I-joist is achieved.

Attach I-joist to top plate per Detail 2

Attach rim joist to top plate per Detail 1

4 SQUASH BLOCK DETAIL



RFPI® or RigidRim® Rimboard blocking panel

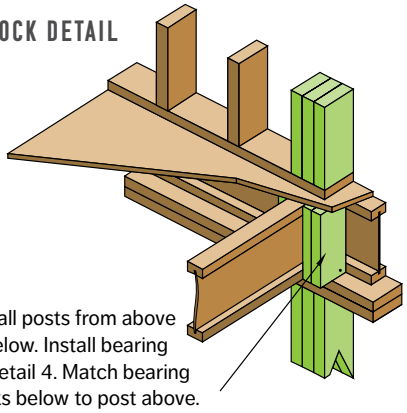
Squash block

Provide lateral bracing per Detail 1, 2, or 3

Cut squash blocks 1/16" longer than I-Joist depth

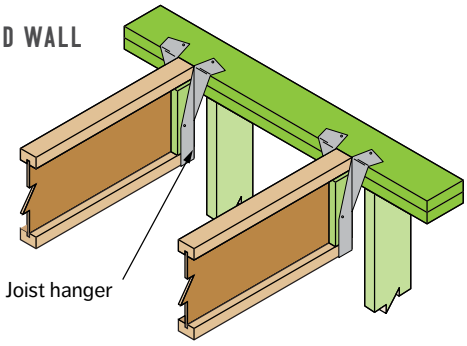
Pair of Squash Blocks	Maximum factored vertical load per pair of squash blocks (lb)	
	3-1/2" wide	5-1/2" wide
2x lumber	5,510	8,555

5 BEARING BLOCK DETAIL



Solid Block all posts from above to bearing below. Install bearing blocks per Detail 4. Match bearing area of blocks below to post above.

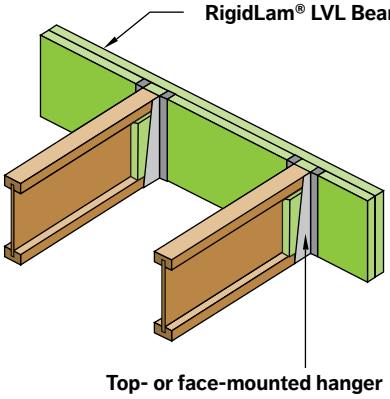
6 HANGER ON STUD WALL



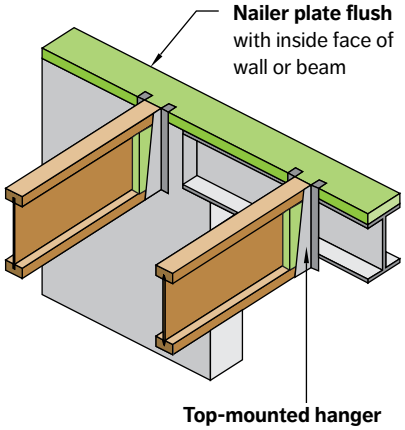
Joist hanger

Note: Web stiffeners are shown in every detail for illustrative purposes. Web stiffeners are required for all 22" and 24" deep RFPI joist applications. Depending on the loads and spans, web stiffeners may or may not be required for 18" and 20" deep RFPI joists.

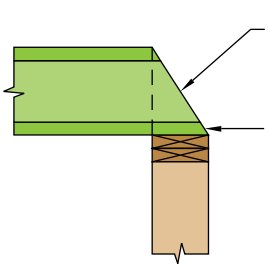
7 HANGER TO LVL BEAM DETAIL



8 HANGER TO NAILER PLATE DETAIL



9 BEVEL CUTS ON I-JOIST



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

Web stiffener not shown for clarity.

Backer Block and Header Detail

Backer block required for face-mount hangers (both sides of I-joist) & when top mount hanger factored load exceeds 360 lbs.

See charts below for backer block thickness & depth.

Install backer block tight to the top flange.

Attach backer block to web with 16 - 10d (3") common nails, clinched. See chart below for maximum capacity for this detail.

Backer block must be wide enough to permit required nailing without splitting (min. width of 12" recommended)

General Notes:

For hanger capacity see hanger manufacturer recommendations.

Verify I-joist capacity to support concentrated load from "header joist" in addition to all other loads.

If a double I-joist is required to support "header joist" load, refer to Detail 20 for filler block and double I-joist connection guidelines.

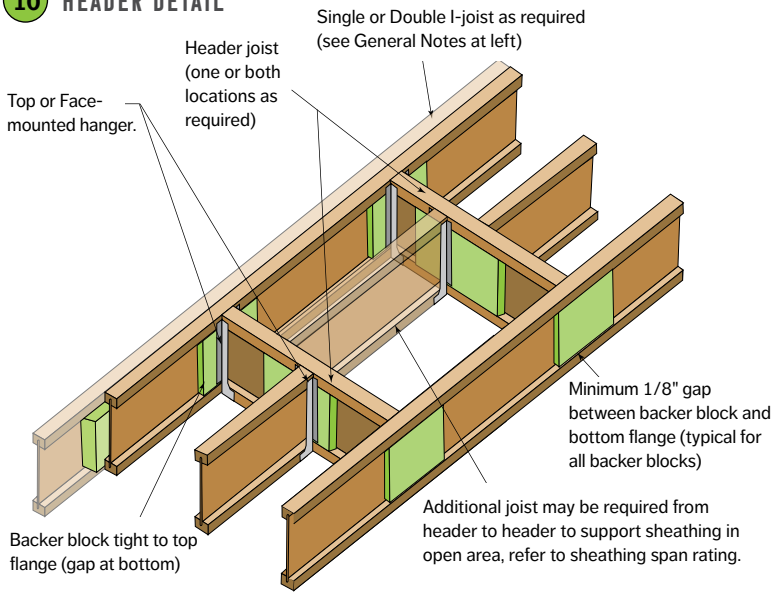
Before installing a backer block to a double I-joist, drive 4 additional 10d nails from both sides of double I-joist through the webs and filler block at backer block location. Clinch nails.

I-Joist Flange Width	Backer block Material Thickness Required[(a)(b)]	Max. factored load capacity using 16-10d com. nails
2-5/16"	1"	1,800 lbs
3-1/2"	1-1/2"	1,800 lbs

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

(b) Glue 2-ply backer blocks together with construction grade adhesive (ASTM D-3498)

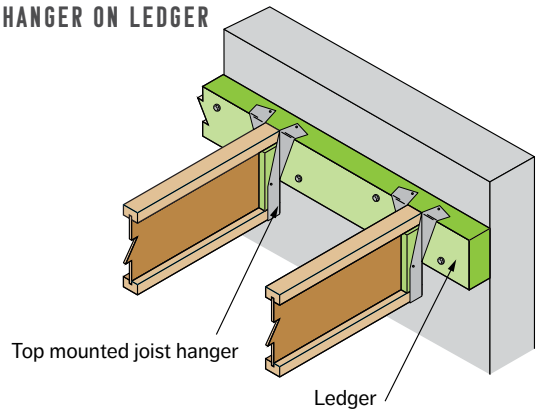
10 HEADER DETAIL



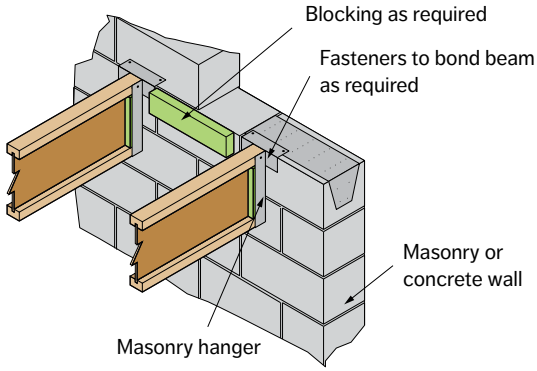
BACKER BLOCK DEPTH

Joist Depth	18"	20"	22"	24"
Top Mount Hangers - Min. Backer Block Depth	9-1/4"	9-1/4"	9-1/4"	9-1/4"
Face Mount Hangers - Req'd Backer Block Depth	14-3/4"	16-3/4"	18-3/4"	20-3/4"

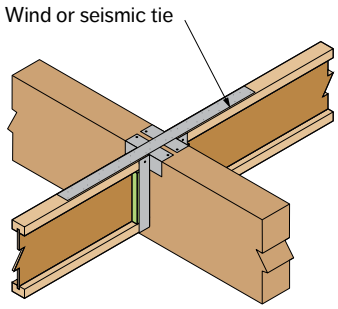
11 HANGER ON LEDGER



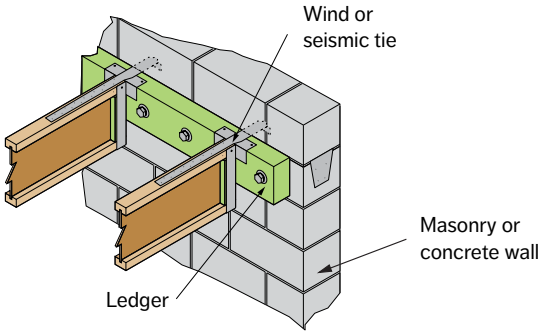
12 HANGER ON MASONRY WALL



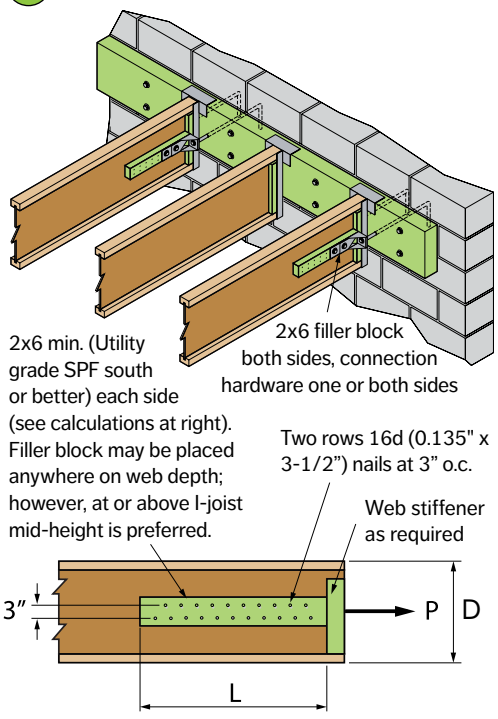
13 WIND OR SEISMIC TIE AT BUTTING JOIST



14 WALL TENSION TIE - WITH STRAPS



15 WIND OR SEISMIC WALL TENSION TIE



To calculate the length "L" of the 2x6 block (attached to both sides of RFPI joist):

1. Find required length of block based on RFPI joist shear capacity.

$$L_1 = \frac{(ZP)D}{(K_D V_A) - (V_{LL} + V_{DL})}$$

2. Find number of nails required:

$$n = \frac{ZP}{K_D V_n}$$

3. Find required length of block based on number of nails. Use 2 rows of 16d (0.135" x 3-1/2") nails at 3" o.c. with 3" end distance

$$L_2 = \frac{3n}{2} + 3$$

4. Use the larger of L_1 and L_2 to determine the minimum required length of 2x6 block.

P = Axial load (lbs) due to unfactored wind or seismic from NBCC

D = Depth of I-joist

K_D = Load duration factor = 1.15 for wind or seismic

L_1, L_2 = Length "L" of block (in.). Use larger of L_1 and L_2

Z = 1.4 for wind; 1.0 for seismic

n = Number of 16d (0.135" x 3-1/2") nails

V_A = Factored shear resistance (lbs) of RFPI joist at 100% DOL (See page 6)

V_{LL} = Design shear load due to factored gravity live load (lbs)

V_{DL} = Design shear load due to factored gravity dead load (lbs)

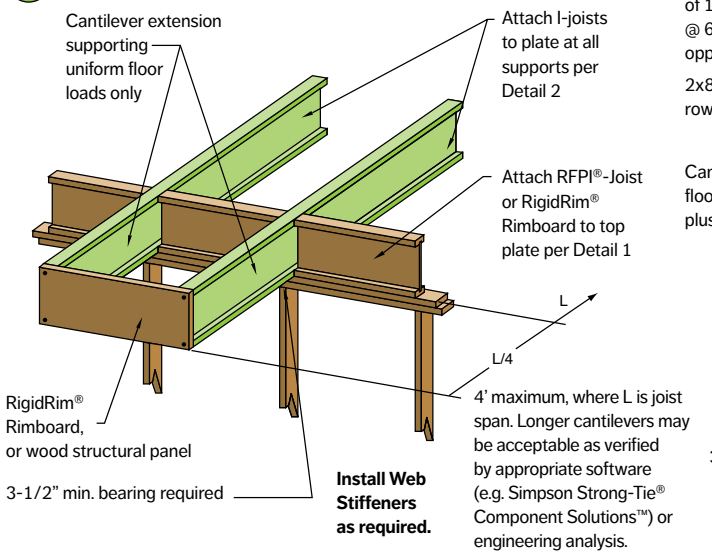
V_n = 16d (0.135" x 3-1/2") nail factored lateral resistance; see table below

RFPI Web Thickness	V_n @ 100% (lbs)
3/8"	168
7/16"	197

CANTILEVER DETAILS

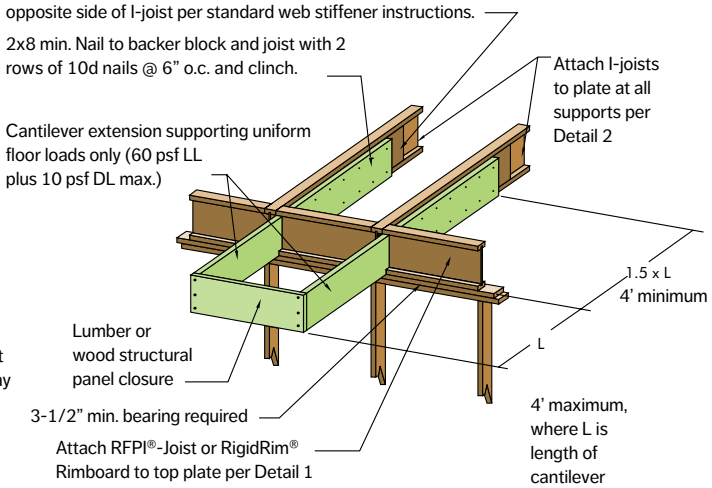
Please refer to note 8 on page 12.

16 RFPI®-JOIST INTERIOR CANTILEVER DETAIL



17 LUMBER CANTILEVER DETAIL FOR BALCONIES

Backer block equal to or deeper than cantilever extension member. See Detail 10 for backer block thickness. Install backer block tight to bottom flange. Minimum of 1/4" gap between backer block and top of I-joist. Nail with 2 rows of 10d nails @ 6" o.c. and clinch. Install web stiffener as required above backer block and on opposite side of I-joist per standard web stiffener instructions.



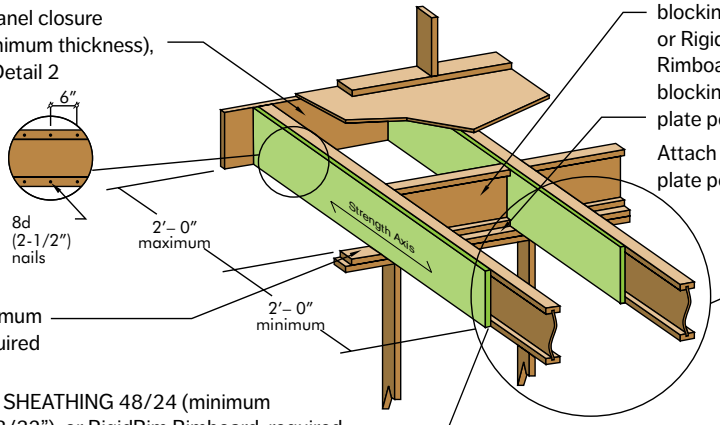
18 CANTILEVER DETAIL FOR VERTICAL BUILDING OFFSET

Use appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis to determine required reinforcement.

METHOD 1

Sheathing Reinforcement One Side

RigidRim® Rimboard or wood structural panel closure (23/32" minimum thickness), attach per Detail 2

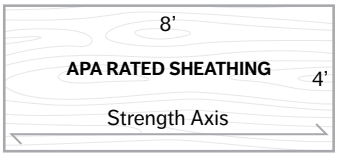


Attach RFPI®-Joist blocking panel or RigidRim® Rimboard blocking to top plate per Detail 1

Attach I-joists to plate per Detail 2

3-1/2" minimum bearing required

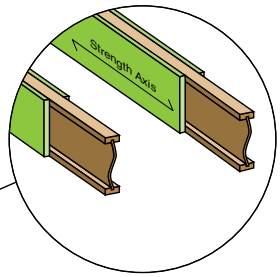
APA RATED SHEATHING 48/24 (minimum thickness 23/32"), or RigidRim Rimboard, required on sides of I-joist. Depth shall match the full height of the I-joist. Nail with 8d nails at 6" o.c., top and bottom flange. Install with face grain horizontal. Attach I-joist to plate at all supports per Detail 2.



METHOD 2

Sheathing Reinforcement Two Sides

Use same installation as Method 1 but reinforce both sides of I-joist with sheathing or RigidRim Rimboard



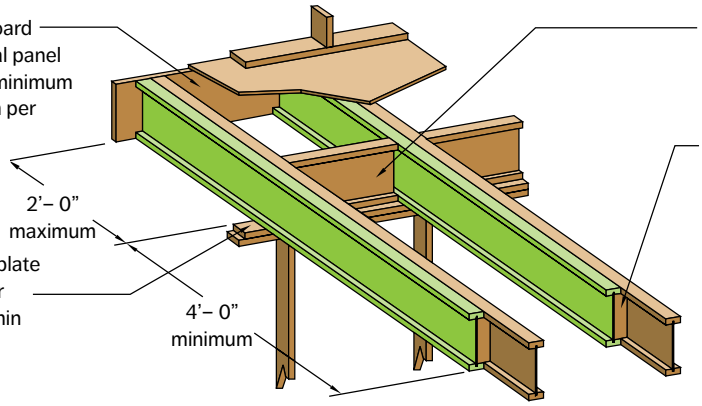
Use nailing pattern shown for Method 1 with opposite face nailing offset by 3"

Reinforcement does not function as a web stiffener. Install web stiffeners as required prior to attaching reinforcement.

19 CANTILEVER DETAIL FOR VERTICAL BUILDING OFFSET

ALTERNATIVE METHOD 2 Double RFPI®-Joist

RigidRim® Rimboard or wood structural panel closure (22/32" minimum thickness), attach per Detail 2



Attach I-joists to plate at all supports per Detail 2. 3-1/2" min bearing required

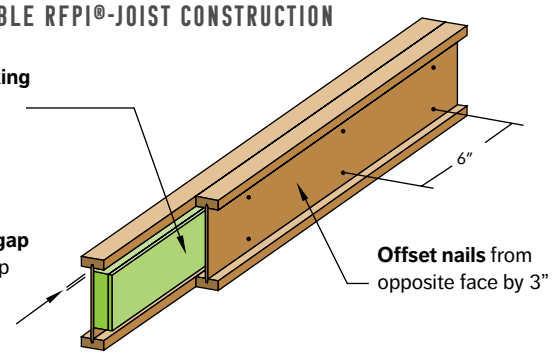
Attach RFPI®-Joist blocking panel or RigidRim® Rimboard blocking to top plate per Detail 1

Block I-joists together with filler blocks for the full length of the reinforcement, sized and attached in accordance with Detail 20 below. For I-joist flange widths greater than 3 inches place an additional row of 10d nails along the centerline of the reinforcing panel from each side. Clinch when possible.

Filler block does not function as a web stiffener. If web stiffeners are required it is recommended to install continuous filler block and install web stiffener below filler block prior to attaching I-joist reinforcement. Leave a 1/4" gap between top of filler block and bottom of top I-joist flange. Web stiffeners must be tight between top of bottom flange and bottom of filler block.

20 DOUBLE RFPI®-JOIST CONSTRUCTION

Filler blocking per Table A



1/8"-1/4" **gap** between top flange and filler block

Offset nails from opposite face by 3"

Notes:

1. Filler blocks do not function as web stiffeners. Install web stiffeners as required.
2. Support back of I-joist web during nailing to prevent damage to web/flange connection.
3. Leave a 1/8"-1/4" gap between top of filler block and bottom of I-joist top flange.

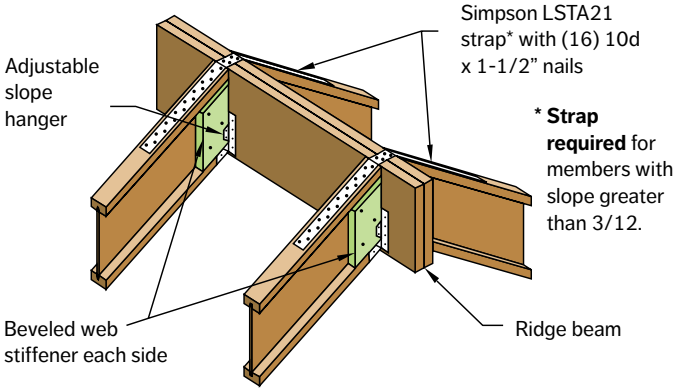
TABLE A: FILLER BLOCK REQUIREMENTS FOR DOUBLE RFPI®-JOIST CONSTRUCTION

Flange Width	Joist Depth	Joist Series	Min. Net Filler Block Thickness	Recommended Min Filler Block Size
2-5/16"	18"	700	2"	9-1/4"
	20"	700	2"	9-1/4"
	22"	700	2"	9-1/4"
	24"	700	2"	9-1/4"
3-1/2"	18"	900	3"	9-1/4"
	20"	900	3"	9-1/4"
	22"	900	3"	9-1/4"
	24"	900	3"	9-1/4"

4. For side-loaded conditions or cantilever reinforcement, filler block is required between joists for full length of double members.
5. Nail joists together with two rows of 10d nails at 6" o.c. (staggered) on each side of the double I-joist. Total of 8 nails per foot required.
6. The maximum factored load that may be applied to one side of the double joist using this detail is 860 lbs/ft.

Roof Framing & Construction Details

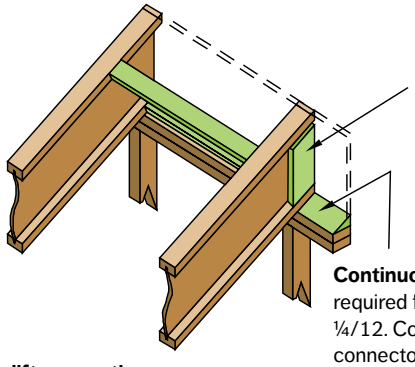
21 RIDGE JOIST CONNECTION - 12/12 MAXIMUM SLOPE



Uplift connections may be required.

22 UPPER END, BEARING ON WALL

RFPI®-Joist blocking panel, x-bracing, 23/32" APA Rated Sheathing 48/24, or proper depth of rimboard as continuous closure. (Validate use of x-bracing with local building code.)

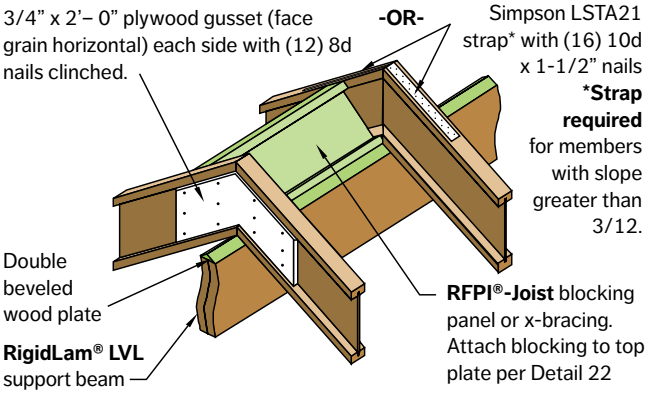


Attach blocking panel (or Rimboard) to top plate with 8d nails @ 6" o.c. (when used for lateral shear transfer, nail to bearing plate with same nailing as required for decking)

Continuous beveled wood plate required for slopes greater than ¼/12. Code recognized slope connectors may be substituted. For slopes greater than 4/12 connectors are required to resist lateral thrust.

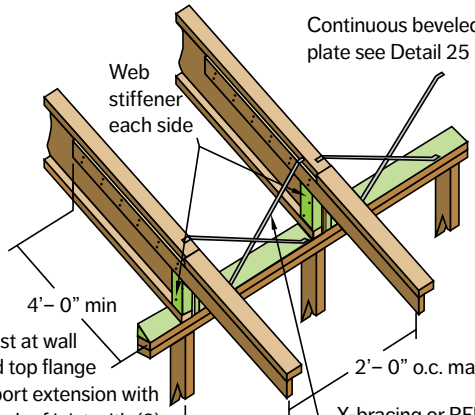
Uplift connections may be required.

23 RFPI®-JOISTS ABOVE RIDGE SUPPORT BEAM



Uplift connections may be required.

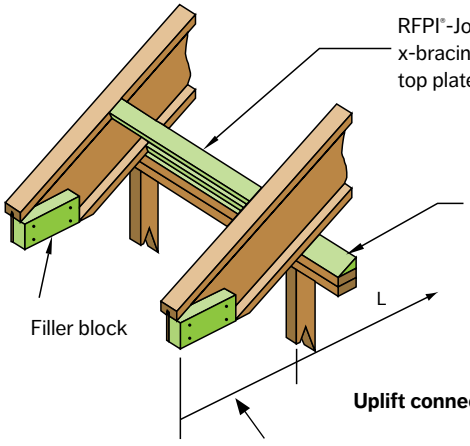
24 OPTIONAL OVERHANG EXTENSIONS



Stop RFPI®-Joist at wall line and extend top flange with 2x4. Support extension with 2x4 nailed to web of joist with (2) rows of 8d nails at 4" o.c. clinched. Extend 2x4 support at least 4' into joist span and nail to top flange with 8d nails at 8" o.c.

Uplift connections may be required.

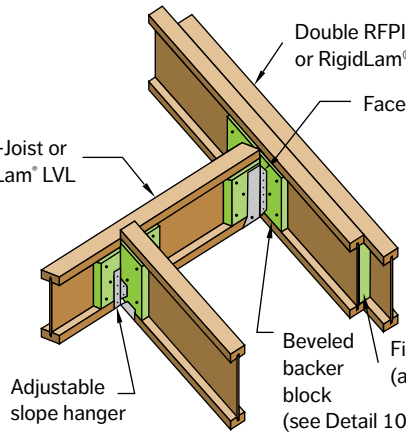
25 RFPI®-JOISTS ON BEVELED PLATE



Uplift connections may be required.

L/4 (max.). Longer cantilevers may be acceptable as verified by appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis.

26 ROOF OPENINGS, FACE MOUNTED HANGERS



Uplift connections may be required.

RigidRim® OSB & LVL Rimboard Specifications

As a component of the Roseburg Framing System®, RigidRim® Rimboard allows your customers to quickly frame the perimeter of their floor system and is one of the most cost-effective methods to properly transfer vertical and horizontal loads around the I-joist and directly into the supporting walls. RigidRim Rimboard is dimensionally stable and resists shrinking and warping. It also provides a smooth nailing surface for the attachment of exterior sheathing, siding and ledgers. Refer to page 19 for additional framing information. RigidRim Rimboard is currently available in the following materials, thicknesses and grades*:

1-1/8" RigidRim® OSB Rimboard

1-1/8" RigidRim® Plus OSB Rimboard

1-1/2" & 1-3/4" 1.4E RigidRim® LVL Rimboard

*Not all products are available in all markets. Contact your Roseburg EWP representative for availability.

The RigidRim OSB Rimboard products are available in lengths up to 24 ft, and the 1.4E RigidRim LVL Rimboard is available in lengths up to 60 ft. All Rimboard products are available in all of the standard I-joist depths.

RigidRim Rimboard is manufactured in accordance with *ANSI/APA PRR 410 Standard for Performance-Rated Engineered Wood Rim Boards* which meets or exceeds the requirements given in the ICC-ES Acceptance Criteria for Wood-Based Rim Board Products, AC 124. Furthermore, the 1.4E LVL rimboard is included in ICC-ES code report ESR-1210. See Table 1 below for RigidRim Factored Resistances. All RigidRim Rimboard products have been tested in the edgewise bending orientation and therefore may be designed for applications to support loads over window and door openings. See Table 2 below for edgewise bending Specified Strengths. Refer to APA publication D340 CA *APA Performance-Rated Rim Board - Canadian Limit States Design* for additional information and allowable spans for OSB rimboard.

TABLE 1: RIGIDRIM RIMBOARD FACTORED RESISTANCES [1][2][3]

	Rimboard Thickness (in)	Horizontal Load (plf)	Vertical Load (plf)	1/2" Lag Screw Load (lbs)[4]	Post Load (lbs)
RigidRim® OSB	1-1/8"	219 (8d box or common)	7,033[5]/4,640[6]	584	5,075[7]
RigidRim® Plus OSB	1-1/8"	243 (8d box or common)	7,033[5]/4,640[6]	584	5,075[7]
1.4E RigidRim® LVL	1-1/2"	262 (8d box or common)	7,105[5]/NA[6]	667	5,075[5]
1.4E RigidRim® LVL	1-3/4"	262 (8d box or common)	7,975[5]/NA[6]	667	5,075[5]

1. All design properties assume:
   • Rimboard nailing of 8d (2-1/2") nails @ 6" on-center
2. All design values, except Horizontal Load, are based on a Standard Term load duration and should be adjusted for other load durations in accordance with the applicable code. Horizontal Load may not be adjusted for duration of load.
3. The 16d (3-1/2") (box or common) nails used to connect the bottom plate of a wall to the rimboard through the sheathing do not reduce the horizontal load capacity of the rimboard provided that the 8d (2-1/2") nail spacing (sheathing to rim board) is 6" o.c. and the 16d (3-1/2") nail spacing (bottom plate to sheathing to rimboard) is in accordance with the prescriptive requirements of the applicable code
4. Allowable load for lag screw installed perpendicular to wide face of rimboard.
5. Depth ≤ 16"
6. 16"< Depth ≤ 24". Allowable load for intermediate depths can be found in APA publication W345 CA.
7. Depth ≤ 24"

TABLE 2: RIGIDRIM RIMBOARD EDGEWISE SPECIFIED STRENGTHS

	Flexural Stress	Modulus of Elasticity	Horizontal Shear	Compression Perpendicular to Grain
RigidRim® OSB & RigidRim® Plus OSB	1,110 psi [1]	0.55 x 10^6 psi	502 psi	1,001 psi
1.4E RigidRim® LVL	4,158 psi [1]	1.4 x 10^6 psi	372 psi	1,019 psi

1. Specified edgewise bending stress is applicable only to a span of 4' or less

Available RigidLam® LVL Grades and Sizes*

RigidLam LVL Grades: 1.6E , 2.1E and 2.3E
RigidLam LVL Thicknesses: 1-1/2", 1-3/4", 3-1/2", 5-1/4" and 7"
RigidLam LVL Depths: 3-1/2", 4-3/8", 5-1/2", 7-1/4", 9-1/4", 9-1/2", 11-1/4", 11-7/8", 14", 16", 18", 20", 22" & 24"
RigidLam LVL Column Sizes: 3-1/2" x 3-1/2", 3-1/2" x 5-1/2", 3-1/2" x 7" 5-1/4" x 5-1/4", 5-1/4" x 5-1/2", 5-1/4" x 7", 7" x 7"

* Not all grades and/or sizes available in all markets.
Contact your Roseburg EWP representative for availability.

Moisture Repellent Sealer

RigidLam LVL is coated with a wax-based moisture repellent sealer that is formulated specifically for LVL to provide temporary protection against moisture issues during normal storage and construction schedules. It is applied to all six sides of the LVL during the manufacturing process. After the sealer dries, it is inert and clear in appearance.

RigidLam® LVL - Specified Strengths[1,2,3]

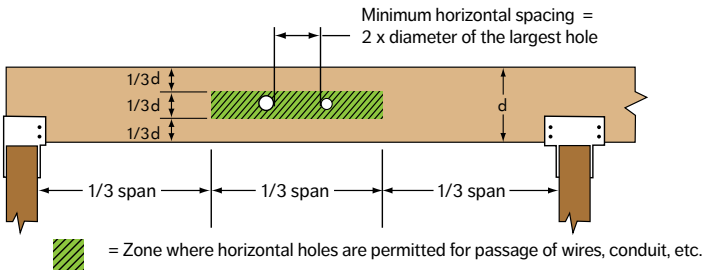
		1.6E LVL	2.1E LVL	2.3E LVL
True Modulus of Elasticity (MOE)[2] – Edgewise or Flatwise	E (psi) =	1,600,000	2,100,000	2,300,000
Apparent Modulus of Elasticity (MOE)[2] – Edgewise or Flatwise	E (psi) =	1,500,000	2,000,000	2,200,000
Bending – Edgewise[4]	F_b edge (psi) =	4,158	5,729	5,729
Bending – Flatwise[5]	F_b flat (psi) =	4,064	5,013	5,729
Horizontal Shear - Edgewise	F_v edge (psi) =	409	539	539
Horizontal Shear - Flatwise	F_v flat (psi) =	198	223	221
Compression Perp. To Grain - Edgewise	$F_{c\ perp}$ edge (psi) =	1,047	1,365	1,365
Compression Perp. To Grain - Flatwise	$F_{c\ perp}$ flat (psi) =	1,177	1,177	1,177
Compression Parallel to Grain	$F_{c\ para}$ (psi) =	3,112	4,788	4,788
Tension Parallel to Grain[6]	F_t (psi) =	2,318	3,245	3,245
MOE for stability calculations	E_{min} (psi) =	1,325,714	1,740,000	1,905,714

1. These allowable design stresses apply to dry service conditions.
2. Specified design stresses are for standard term load duration and may be adjusted (with the exception of modulus of elasticity) using load duration factors in accordance with the code.
3. Tabulated values do not include the resistance factor ϕ
4. The tabulated values are based on a reference depth of 12 inches. For other depths, when loaded edgewise, the allowable bending stress (Fb) shall be modified by a depth factor, $K_{zb} = (12/d)^{1/8}$ for Douglas fir LVL (Mill #1055) or $K_{zb} = (12/d)^{1/5}$ for Southern Pine LVL (Mill #1125), where d is the LVL depth in inches. For depths less than 3-1/2 inches, multiply the tabulated value by 1.17 for DF LVL or 1.28 for SP LVL.
5. Tabulated F_b flat values are based on a thickness of 1-3/4". For other thicknesses, when loaded flatwise, multiply F_b flat by $(1.75/t)^{1/5}$, where t is the LVL thickness in inches. For thicknesses less than 1-3/4", use the tabulated value.
6. The specified tensile strength, f_t , is based on a standard length of 20'. For other lengths, multiply by $K_{Zt} = (20/L)^{1/9}$, where L = length (ft). For lengths less than 4', multiply by $K_{Zt} = 1.196$.

STORAGE, HANDLING & INSTALLATION

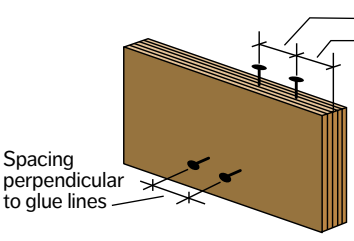
- Do not drop RigidLam LVL off the delivery truck. Best practice is use of a forklift or boom.
- RigidLam LVL should be stored lying flat and protected from the weather.
- Keep the material a minimum of 6" above ground to minimize the absorption of ground moisture and allow circulation of air.
- Bundles should be supported every 10' or less.
- RigidLam LVL is for use in covered, dry conditions only. Protect from the weather on the jobsite both before and after installation.
- 1-1/2" x 14" and deeper and 1-3/4" x 16" and deeper must be a minimum of two plies unless designed by a design professional for a specific application.
- RigidLam LVL headers and beams shall not be cut, notched or drilled except as shown below. Heel cuts may be possible. Contact your Roseburg Forest Products representative.
- It is permissible to rip RigidLam LVL to a non-standard depth provided it is structurally adequate for the applied loads. Use appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis to analyze non-standard depths.
- Protect RigidLam LVL from direct contact with concrete or masonry.
- Ends of RigidLam LVL bearing in concrete or masonry pockets must have a minimum of 1/2" airspace on top, sides and end.
- RigidLam LVL is manufactured without camber and therefore may be installed with either edge up or down.
- Do not install damaged RigidLam LVL.
- Do not walk on beams until they are fully braced, or serious injuries may result.

PERMISSIBLE HORIZONTAL ROUND HOLE LOCATION FOR RIGIDLAM® LVL BEAMS



- For beam depths (d) of 4-3/8, 5-1/2, and 7-1/4 inches, the maximum hole diameter is 1, 1-1/8, and 1-1/2 inches, respectively.
- For deeper beams, the maximum hole diameter is 2 inches.
- Diagram applies for simple and multi-span applications with uniform loading.
- No more than 3 holes per span are permitted.
- Holes should not be cut in cantilevers.
- Note: Larger holes, more holes and/or holes that are located outside of the shaded area shown may be permissible as verified by appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or engineering analysis.

MINIMUM NAIL SPACING FOR RIGIDLAM LVL BEAMS

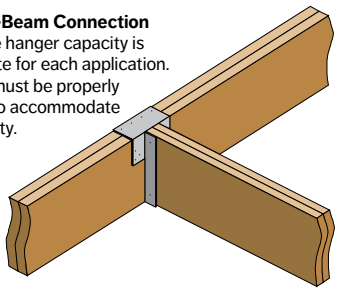


If more than one row of parallel nails is required for edge nailing, the rows must be offset at least 1/2" and staggered.

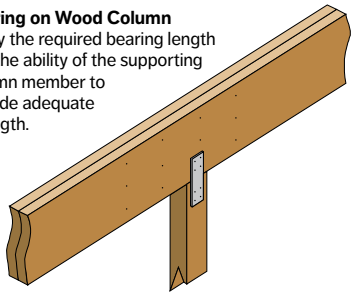
Nail Size	Minimum Parallel Spacing	Minimum Parallel End Distance	Minimum Perpendicular Spacing
8d Box	2"	1-1/2"	2"
8d Common	3"	2"	2"
10d & 12d Box	3"	2"	2"
10d & 12d Common	4"	3"	3"
16d Sinker	4"	3"	3"
16d Common	6"	4"	3"

RigidLam LVL Bearing Details

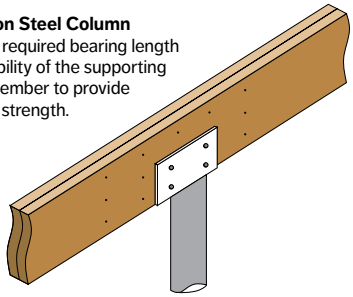
Beam-to-Beam Connection
Make sure hanger capacity is appropriate for each application. Hangers must be properly installed to accommodate full capacity.



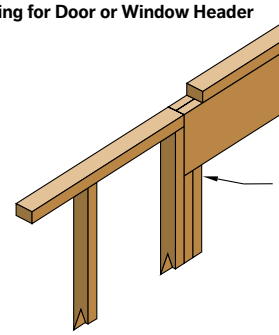
Bearing on Wood Column
Verify the required bearing length and the ability of the supporting column member to provide adequate strength.



Bearing on Steel Column
Verify the required bearing length and the ability of the supporting column member to provide adequate strength.

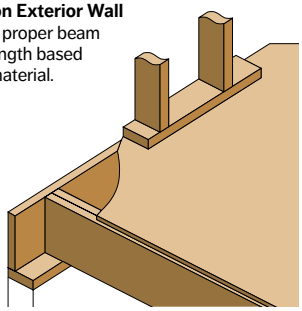


Bearing for Door or Window Header

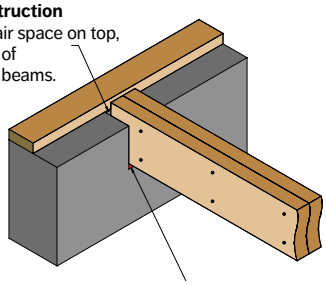


Use software or engineering analysis to determine the number of jack studs required to support header.

Bearing on Exterior Wall
Check for proper beam bearing length based on plate material.



Pocket Construction
Provide 1/2" air space on top, sides and end of RigidLam LVL beams.



Provide moisture barrier between RigidLam LVL beams and concrete.

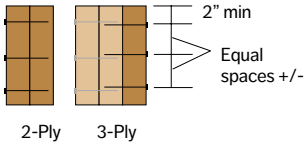
Fastening Recommendations For Multiple Ply Members

TOP LOADED MEMBERS - 2 & 3 PLY

For 12" deep (or less) members, nail plies together with 2 rows of 16dx3-1/2" com. nails at 12" o.c. (add 1 row for 16d sinkers).

For 14", 16" or 18" deep members, nail plies together with 3 rows of 16dx3-1/2" com. nails at 12" o.c. (add 1 row for 16d sinkers).

For 20", 22" or 24" deep members, nail plies together with 4 rows of 16dx3-1/2" com. nails at 12" o.c. (add 1 row for 16d sinkers).

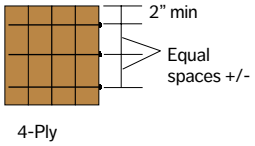


TOP LOADED MEMBERS - 4 PLY

For 4-Ply Top Loaded members, it is recommended to connect the plies together with appropriate wood screws. See page 21 for approved wood screws.

The recommended fastener spacing is two rows at 24" o.c. for up to and including 16" deep members, and 3 rows at 24" o.c. for members up to and including 24" deep. If the fastener point penetrates a minimum of 75% of the 4th ply, they may be applied from one side of the beam; otherwise, the fasteners must be applied from both sides and staggered.

Load must be applied evenly to all 4 plies; otherwise, use connections for side loaded members.



SIDE LOADED MEMBERS

MAXIMUM FACTORED UNIFORM LOAD APPLIED TO EITHER OUTSIDE PIECE - POUNDS PER LINEAL FOOT

1-1/2" Thick Pieces in Member	Nail Size	Nailed				Bolted					
		2 rows 10d common at 12" o.c.		3 rows 10d common at 12" o.c.		2 rows 1/2" bolts at 24" o.c.		2 rows 1/2" bolts at 12" o.c.		3 rows 1/2" bolts at 12" o.c.	
		1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL
2 - 1-1/2"	10d com. (0.148" x 3")	716	716	1,074	1,074	628	668	1,256	1,336	1,884	2,004
3 - 1-1/2"	10d com. (0.148" x 3")	537	537	806	806	471	501	942	1,002	1,413	1,503
4 - 1-1/2"	1/2" dia. bolts	-	-	-	-	419	445	837	891	1,256	1,336
1-3/4" Thick Pieces in Member	**Nail Size**	**Nailed**				**Bolted**					
		2 rows 16d common at 12" o.c.		3 rows 16d common at 12" o.c.		2 rows 1/2" bolts at 24" o.c.		2 rows 1/2" bolts at 12" o.c.		3 rows 1/2" bolts at 12" o.c.	
		1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL	1.6E LVL	2.1E & 2.3E LVL
2 - 1-3/4"	16d com. (0.162" x 3-1/2")	864	864	1,296	1,296	734	780	1,468	1,560	2,202	2,340
3 - 1-3/4"	16d com. (0.162" x 3-1/2")	648	648	972	972	551	585	1,101	1,170	1,652	1,755
4 - 1-3/4"	1/2" dia. bolts	-	-	-	-	489	520	979	1,040	1,468	1,560
2 - 3-1/2"	1/2" dia. bolts	-	-	-	-	1,466	1,560	2,932	3,120	4,398	4,680

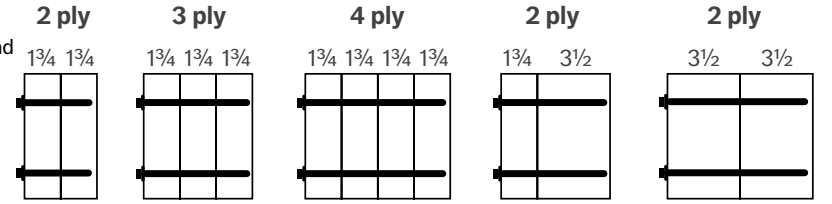
RIGIDLAM LVL EQUIVALENT SPECIFIC GRAVITY VALUES FOR FASTENER DESIGN

	Face			Edge		
	Douglas-fir		SP	Douglas-fir		SP
	1.4E & 1.6E LVL	2.1E & 2.3E LVL	1.6E & 2.1E LVL	1.4E & 1.6E LVL	2.1E & 2.3E LVL	1.6E & 2.1E LVL
Withdrawal - nail	0.50	0.50	0.50	0.47	0.50	0.43
Dowel Bearing - nail	0.50	0.50	0.55	0.50	0.50	0.49
Dowel Bearing - bolt	0.47	0.50	0.55	Not applicable		

- Use appropriate software (e.g. Simpson Strong-Tie® Component Solutions™) or beam/header Quick Reference Tables or PLF load tables to size the beam.
- The table values apply to common (A307) bolts. Bolt holes must be centered at least two inches from the top and bottom edges of the beam. Bolt holes must be the same diameter as the bolts. Washers must be used under the bolt heads and nuts. Offset or stagger rows of bolt holes by one-half of the bolt spacing.
- The specified nailing applies to both sides of a three-piece beam.
- 7 inch wide beams may not be loaded from one side only. They must be loaded from both sides and/or top-loaded.
- The side loaded table values for nails may be doubled for 6" o.c. spacing and tripled for 4" o.c. spacing.
- Duration of load factors (e.g. 115%, 125% etc...) may be applied to the table values.

Fastening Recommendations For Multiple Ply LVL Members (cont.)

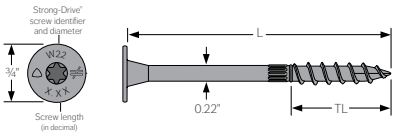
- The wood screws listed are approved for use in connecting multiple plies of RigidLam® LVL together and may be used as an alternative to the nailing or bolting guidelines on the previous page.
- Pre-drilling of the LVL members is not required for the screws listed below.
- Carefully review and adhere to the design and installation information available from each of the screw manufacturers listed below.



The diagrams above are for illustrative purposes only, screws may need to be applied to both sides. Refer to the manufacturers' information for the appropriate design and installation guidelines.

Simpson SDW Wood Screws

SIMPSON Strong-Tie® CONNECTORS



Model No.	L (in)	TL (in)	Head Stamp Length
SDW22338	3-3/8	1-9/16	3.37
SDW22500	5	1-9/16	5.00
SDW22634	6-3/4	1-9/16	6.75

- Code Evaluation Report – IAPMO ER-0192
- For SDW design and installation information or hanger information, refer to the current Simpson Strong-Tie literature, www.strongtie.com or contact Simpson Strong-Tie at 800-999-5099.

MiTek WSWH Washer Head Structural Wood Screws

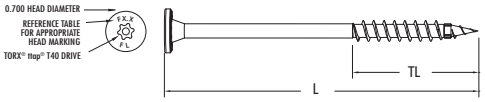
MiTek®

Model No.	L (in)	SH (in)	T (in)
WSWH338	3-3/8	1-1/8	2
WSWH5	5	2-3/4	2
WSWH634	6-3/4	4-1/2	2

- Code Evaluation Report: ICC-ES ESR-2761
- For WSWH design and installation information or hanger information, refer to the current MiTek Structural Product Catalog, www.MiTek.ca or contact MiTek at 800-268-3434.

FastenMaster FlatLOK™ Wood Screws

FastenMaster FlatLOK™ Structural Wood Screw



Product	L (in)	TL (in)	Head Marking
FL312	3-1/2	2	F3.5FL
FL005	5	2	F5.0FL
FL634	6-3/4	2	F6.75FL

- Code Evaluation Report – DrJ - TER 1501-08
- For FlatLOK design and installation information, refer to the current FastenMaster literature, www.fastenmaster.com or contact FastenMaster at 800-518-3569.

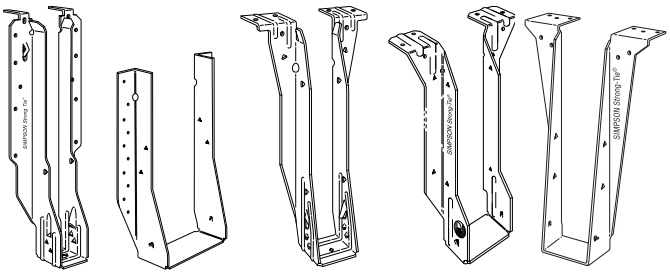
I-Joist Framing Connectors

Factored Resistance (lbs)- Standard Term

SIMPSON Strong-Tie® CONNECTORS

FACE MOUNT HANGERS

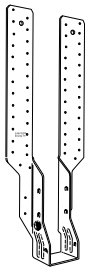
Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	IUS2.37/9.5	1,690	4-5/8"	9-1/2"	MIU4.75/9	3,230
	11-7/8"	IUS2.37/11.88	1,820		11-7/8"	MIU4.75/11	3,230
	14"	IUS2.37/14	1,820		14"	MIU4.75/14	3,485
	16"	IUS2.37/16	1,935		16"	MIU4.75/16	3,485
	18"	MIU2.37/18	3,485		18"	MIU4.75/18	3,485
	20"	MIU2.37/20	3,485		20"	MIU4.75/20	3,485
	22"	MIU2.37/20	3,485		22"	MIU4.75/20	3,485
	24"	MIU2.37/20	3,485		24"	MIU4.75/20	3,485
3-1/2"	11-7/8"	IUS3.56/11.88	1,685	7"	11-7/8"	HU412-2	4,225
	14"	IUS3.56/14	1,685		14"	HU414-2	4,690
	16"	IUS3.56/16	1,685		16"	HU414-2	4,690
	18"	MIU3.56/18	2,745		18"	HU414-2	4,690
	20"	MIU3.56/20	2,745		20"	HU414-2	4,690
	22"	MIU3.56/20	2,745		22"	HU414-2	4,690
	24"	MIU3.56/20	2,745		24"	-	-



IUS MIU ITS MIT LBV

TOP FLANGE HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	ITS2.37/9.5	1,690	4-5/8"	9-1/2"	MIT359.5-2	2,420
	11-7/8"	ITS2.37/11.88	1,690		11 7/8"	MIT3511.88-2	2,420
	14"	ITS2.37/14	1,690		14"	MIT3514-2	2,420
	16"	ITS2.37/16	1,690		16"	MIT4.75/16	2,420
	18"	MIT3518	2,420		18"	B4.75/18	3,910
	20"	MIT3520	2,420		20"	B4.75X (H=20)	3,910
	22"	LBV2.37X (H=22)	3,125		22"	B4.75X (H=22)	3,910
	24"	LBV2.37X (H=24)	3,125		24"	B4.75X (H=24)	3,910
3-1/2"	11-7/8"	ITS3.56/11.88	1,690	7"	11-7/8"	B7.12/11.88	3,910
	14"	ITS3.56/14	1,690		14"	B7.12/14	3,910
	16"	ITS3.56/16	1,690		16"	B7.12/16	3,910
	18"	MIT418	2,745		18"	B7.12/18	3,910
	20"	MIT420	2,745		20"	B7.12/20	3,910
	22"	HIT422	2,745		22"	B7.12/22	3,910
	24"	HIT424	2,745		24"	B7.12/24	3,910



THAI Series

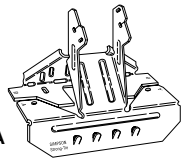
ADJUSTABLE HEIGHT HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"-14"	THAI3522	1,735	4-5/8"	9-1/2"-14"	THAI-2	2,800
3-1/2"	9-1/2"-14"	THAI422	1,735	-	-	-	

THAI-2 are special order. Specify width.

VARIABLE PITCH - SINGLE I-JOISTS

Width	Depth	Hanger	Down Load
2-5/16"	ALL	VPA35	1,855
3-1/2"	ALL	VPA4	1,855

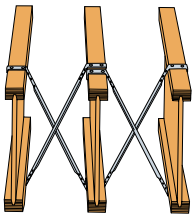


VPA

Orange highlighted hangers require web stiffeners at I-joist ends.

TENSION BRIDGING FOR I-JOIST

Joist Height	Joist Spacing (in)								
	12	16	19.2	24	30	32	36	42	48
9-1/2"	TB20	TB27	TB27	TB30	TB36	TB36	TB42	TB48	TB54
11-7/8"	TB20	TB27	TB27	TB30	TB36	TB36	TB42	TB48	TB54
14"	TB27	TB27	TB27	TB36	TB36	TB42	TB42	TB48	TB54
16"	TB27	TB27	TB30	TB36	TB42	TB42	TB42	TB48	TB54
18"	TB27	TB30	TB30	TB36	TB42	TB42	TB48	TB54	TB56
20"	TB30	TB30	TB36	TB36	TB42	TB42	TB48	TB54	TB56
22"	TB30	TB36	TB36	TB36	TB42	TB42	TB48	TB54	TB56
24"	TB36	TB36	TB36	TB42	TB42	TB48	TB48	TB54	TB56



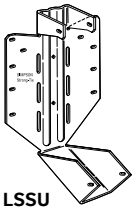
SKEWED 45° HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	SUR/L2.37/9	2,805	4-5/8"	9-1/2"	HSUR/L4.75/9	2,350
	11-7/8"	SUR/L2.37/11	2,805		11-7/8"	HSUR/L4.75/11	2,965
	14"	SUR/L2.37/14	2,805		14"	HSUR/L4.75/14	2,965
	16"	SUR/L2.37/14	2,805		16"	HSUR/L4.75/16	2,965
3-1/2"	11-7/8"	SUR/L410	2,875	7"	11-7/8"	HU412-2X	2,745
	14"	SUR/L414	2,895		14"	HU414-2X	2,745
	16"	SUR/L414	2,895		16"	HU414-2X	3,050
	18"	SUR/L414	2,895		18"	HU414-2X	3,050
	20"	SUR/L414	2,895		20"	HU414-2X	3,050
	22"	-	-		22"	HU414-2X	3,050
	24"	-	-		24"	-	-

HU4-X are special order. Specify angle and direction.

FIELD SLOPE AND SKEW

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"-14"	LSSR2.37Z	1,200	4-5/8"	9-1/2"-14"	LSU3510-2	2,030
3-1/2"	9-1/2"-14"	LSSR410Z	1,835	7"	-	-	-



LSSU

LSSR

LVL Framing Connectors

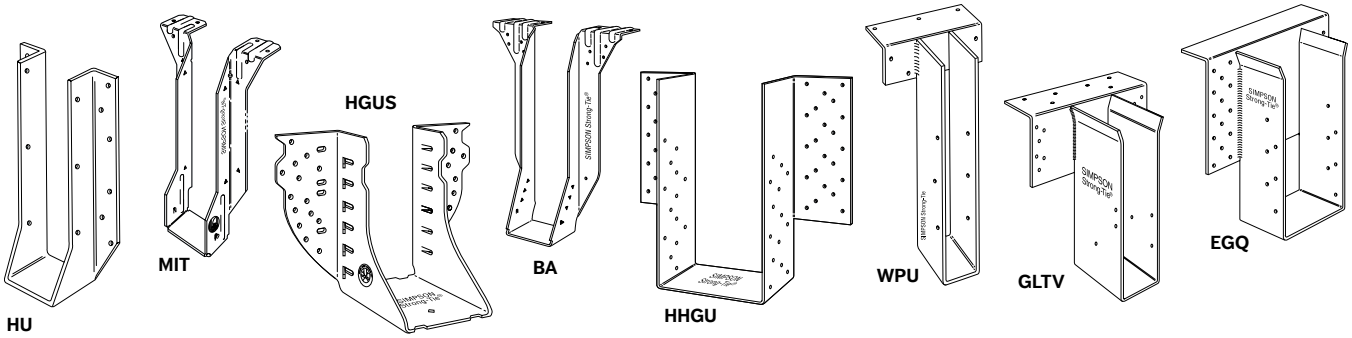
Factored Resistance (lbs)- Standard Term

SIMPSON Strong-Tie® CONNECTORS

FACE MOUNT LVL HANGERS

Single Ply-1-3/4" wide			Double Ply-3-1/2" wide			Triple Ply-5-1/4" wide			Quadruple-Ply 7" wide		
Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load
9-1/4"	HU9 HUS1.81/10	4,830 6,405	9-1/4"	HHUS410 HGUS410	9,855 14,645	9-1/4"	HHUS5.50/10 HGUS5.50/10	10,545 14,645	9-1/4"	HHUS7.25/10 HGUS7.25/10	10,770 15,760
9-1/2"	HU9 HUS1.81/10	4,830 6,405	9-1/2"	HHUS410 HGUS410	9,855 14,645	9-1/2"	HHUS5.50/10 HGUS5.50/10	10,545 14,645	9-1/2"	HHUS7.25/10 HGUS7.25/10	10,770 15,760
11-1/4"	HU11 HUS1.81/10	4,830 6,405	11-1/4"	HHUS410 HGUS412	9,855 14,995	11-1/4"	HHUS5.50/10 HGUS5.50/12	10,545 14,995	11-1/4"	HHUS7.25/10 HGUS7.25/12	10,770 16,110
11-7/8"	HU11 HUS1.81/10	4,830 6,405	11-7/8"	HHUS410 HGUS412	9,855 14,995	11-7/8"	HHUS5.50/10 HGUS5.50/12	10,545 14,995	11-7/8"	HHUS7.25/10 HGUS7.25/12	10,770 16,110
14"	HU14 HUS1.81/10	5,255 6,405	14"	HHUS410 HGUS414	9,855 16,400	14"	HHUS5.50/10 HGUS5.50/14	10,545 16,400	14"	HGUS7.25/14 HGU7.25-SDS	18,200 20,320
16"	HU14 HUS1.81/10	5,255 6,405	16"	HHUS410 HGUS414	9,855 16,400	16"	HGUS5.50/14 HGU5.50-SDS	16,400 20,320	16"	HGUS7.25/14 HHGU7.25-SDS	18,200 26,665
18"	- -	- -	18"	HHUS410 HGUS414	9,855 16,400	18"	HGUS5.50/14 HGU5.50-SDS	16,400 20,320	18"	HGUS7.25/14 HHGU7.25-SDS	18,200 26,665
20"	- -	- -	20"	HGUS414 HGU3.63-SDS	16,400 20,320	20"	HGU5.50-SDS HHGU5.50-SDS	20,320 26,665	20"	HHGU7.25-SDS -	26,665 -
22"	- -	- -	22"	HGUS414 HGU3.63-SDS	16,400 20,320	22"	HHGU5.50-SDS -	26,665 -	22"	HHGU7.25-SDS -	26,665 -
24"	- -	- -	24"	HGUS414 HGU3.63-SDS	16,400 20,320	24"	HHGU5.50-SDS -	26,665 -	24"	HHGU7.25-SDS -	26,665 -

HGU AND HHGU Hangers specify height



TOP FLANGE LVL HANGERS

Single Ply-1-3/4" wide			Double Ply-3-1/2" wide			Triple Ply-5-1/4" wide			Quadruple-Ply 7" wide		
Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load
9-1/4"	LBV1.81/9.25 WPU1.81/9.25	3,905 6,390	9-1/4"	LBV3.56/9.25 HB3.56/9.25	3,905 9,335	9-1/4"	HB5.50/9.25 GLTV5.50/9.25	9,335 10,455	9-1/4"	HB7.12/9.25 GLTV49.25-2	9,335 10,455
9-1/2"	MIT9.5 LBV1.81/9.5	3,490 3,905	9-1/2"	LBV3.56/9.5 HB3.56/9.5	3,905 9,335	9-1/2"	HB5.50/9.5 GLTV5.59	9,335 10,455	9-1/2"	HB7.12/9.5 GLTV49.5-2	935 10,455
11-1/4"	LBV1.81/11.25 WPU1.81/11.25	3,905 6,390	11-1/4"	LBV3.56/11.25 HB3.56/11.25	3,905 9,335	11-1/4"	HB5.50/11.25 GLTV5.50/11.25	9,335 10,455	11-1/4"	HB7.12/11.25 HGLTV411.25-2	9,335 13,070
11-7/8"	MIT11.88 BA1.81/11.88	3,490 4,990	11-7/8"	BA3.56/11.88 HB3.56/11.88	4,990 9,335	11-7/8"	HB5.50/11.88 HGLTV5.511	9,335 13,070	11-7/8"	GLTV411.88-2 EGQ7.25-SDS3	10,455 27,305
14"	MIT1.81/14 LBV1.81/14	3,490 3,905	14"	BA3.56/14 GLTV3.514	4,990 10,455	14"	HB5.50/14 EGQ5.50-SDS3	9,335 27,305	14"	GLTV414-2 EGQ7.25-SDS3	10,455 27,305
16"	MIT1.81/16 B1.81/16	3,490 5,265	16"	BA3.56/16 GLTV3.516	4,990 10,455	16"	HB5.50/16 EGQ5.50-SDS3	9,335 27,305	16"	HGTLV416-2 EGQ7.25-SDS3	13,070 27,305
18"	- -	- -	18"	HB3.56/18 HGLTV3.518	9,335 13,070	18"	HGLTV5.518 EGQ5.50-SDS3	13,070 27,305	18"	HGLTV418-2 EGQ7.25-SDS3	13,070 27,305
20"	- -	- -	20"	HGLTV3.520 EGQ3.62-SDS3	13,070 24,915	20"	EGQ5.50-SDS3 -	27,305 -	20"	EGQ7.25-SDS3 -	27,305 -
22"	- -	- -	22"	HGLTV3.520 EGQ3.62-SDS3	13,070 24,915	22"	EGQ5.50-SDS3 -	27,305 -	22"	EGQ7.25-SDS3 -	27,305 -
24"	- -	- -	24"	HGLTV3.520 EGQ3.62-SDS3	13,070 24,915	24"	EGQ5.50-SDS3 -	27,305 -	24"	EGQ7.25-SDS3 -	27,305 -

HGU AND HHGU Hangers specify height

General Notes

1. Loads shown for I-Joist Framing Connectors are based on SPF species supports and are conservative for Douglas Fir, Southern Pine and all LVL supports. Loads shown for LVL Framing Connectors are based on RigidLam® LVL beam-to-beam connections. For other support conditions refer to the current Simpson Strong-Tie *Wood Construction Connectors Canadian Limit States* catalog. Joist or beam reaction should be checked by a qualified designer to ensure proper hanger selection.
2. Refer to current Simpson Strong-Tie *Wood Construction Connectors* catalog to verify allowable loads and fastener size and quantity.
3. Loads shown are gravity (floor) loads. Other load durations may apply. Refer to the current version of *Wood Construction Connectors* for allowable increases.
4. Top Flange Hanger configurations and thickness of top flange needs to be considered for flush frame conditions.
5. All loads shown are based on 16d common nails into the header and all nail holes filled (Exceptions: IUS and ITS use 10d common nails and some hangers use SDS screws which are supplied with the hanger).

All hangers listed are manufactured by Simpson Strong-Tie® Co., Inc. For additional information, refer to the current Simpson Strong-Tie literature, www.strongtie.com or contact Simpson Strong-Tie at 800-999-5099.

I-Joist Framing Connectors

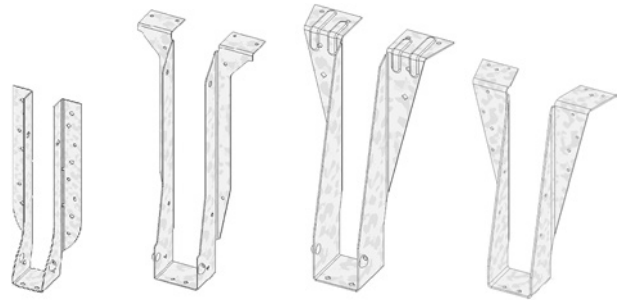
Factored Resistance (lbs)- Standard Term

MiTek®

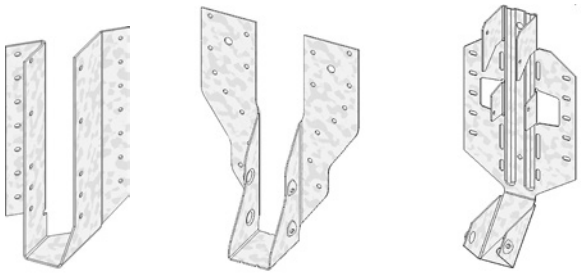
FACE MOUNT HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	THF23925	2,600	4-5/8"	9-1/2"	THF23925-2	4,115
	11-7/8"	THF23118	2,600		11-7/8"	THF23118-2	5,380
	14"	THF23140	3,460		14"	THF23140-2	5,245
	16"	THF23160	3,460		16"	THF23160-2	5,245
	18"	THF23180	4,895		18"	THF23160-2	5,245
	20"	THF23180	4,895		20"	THF23160-2	5,245
	22"	THF23180	4,895		22"	THF23160-2	5,245
	24"	THF23180	4,895		24"	THF23160-2	5,245
3-1/2"	11-7/8"	THF35112	4,115	7"	11-7/8"	HD7120	3,670
	14"	THF35140	5,245		14"	HD7140	5,875
	16"	THF35157	5,245		16"	HD7160	6,475
	18"	THF35165	5,245		18"	HD7180	6,475
	20"	THF35165	5,245		20"	HD7180	6,475
	22"	THF35165	5,245		22"	HD7180	6,475
	24"	THF35165	5,245		24"	HD7180	6,475

MiTek Notes: (1) Loads assume maximum nailing schedule for single I-Joists.



THF TFL THO BPH



SKH MSH LSSH

TOP FLANGE HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	TFL2395	1,960	4-5/8"	9-1/2"	THO23950-2	4,570
	11-7/8"	TFL23118	1,960		11-7/8"	THO23118-2	4,570
	14"	TFL2314	1,960		14"	THO23140-2	5,090
	16"	TFL2316	1,960		16"	THO23160-2	5,090
	18"	TFI3518	3,290		18"	THO23180-2	5,090
	20"	TFI3520	3,290		20"	THO23200-2	5,090
	22"	XPHM2322	4,450		22"	XPHM2322-2	4,665
	24"	XPHM2324	4,450		24"	XPHM2324-2	4,665
3-1/2"	11-7/8"	THO35118	2,620	7"	11-7/8"	BPH71118	4,305
	14"	THO35140	3,385		14"	BPH7114	4,305
	16"	THO35160	3,385		16"	BPH7116	4,305
	18"	TFI418	3,290		18"	BPH7118	4,305
	20"	TFI420	3,290		20"	BPH7120	4,305
	22"	TFI422	4,175		22"	BPH7122	4,305
	24"	TFI424	4,175		24"	BPH7124	4,305

MiTek Notes: (1) Hangers are special order. Consult USP for pricing and lead times.

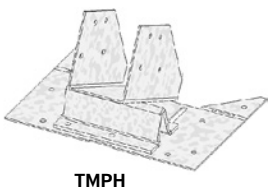
ADJUSTABLE HEIGHT HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	MSH2322	2,750	4-5/8"	9-1/2"	MSH2322-2	2,830
	11-7/8"	MSH2322	2,750		11-7/8"	MSH2322-2	2,830
	14"	MSH2322	2,750		14"	MSH2322-2	2,830
	16"	MSH2322	2,750		16"	MSH2322-2	2,830
	18"	MSH2322	2,750		18"	MSH2322-2	2,830
	20"	MSH2322	2,750		20"	MSH2322-2	2,830
	22"	MSH2322	2,750		22"	MSH2322-2	2,830
	24"	MSH2322	2,750		24"	MSH2322-2	2,830
3-1/2"	11-7/8"	MSH422	2,525	7"	11-7/8"	MSH422-2	5,230
	14"	MSH422	2,525		14"	MSH422-2	5,230
	16"	MSH422	2,525		16"	MSH422-2	5,230
	18"	MSH422	2,525		18"	MSH422-2	5,230
	20"	MSH426	3,405		20"	MSH422-2	5,230
	22"	MSH426	3,405		22"	MSH426-2	5,230
	24"	MSH426	3,405		24"	MSH426-2	5,230

VARIABLE PITCH - SINGLE I-JOISTS

Width	Depth	Hanger	Down Load
2-5/16"	9-1/2" - 24"	TMP23	2,175
		TMPH23	4,100
3-1/2"	11-7/8" - 24"	TMP4	2,175
		TMPH4	4,100

TMP



TMPH

SKEWED 45° HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2"	SKH2320L/R	2,700	4-5/8"	9-1/2"	SKH2320L/R-2[1]	4,175
	11-7/8"	SKH2320L/R	2,700		11-7/8"	SKH2320L/R-2[1]	4,175
	14"	SKH2324L/R	3,645		14"	SKH2324L/R-2[1]	3,885
	16"	SKH2324L/R	3,645		16"	SKH2324L/R-2[1]	3,885
	18"	SKH2324L/R	3,645		18"	SKH2324L/R-2[1]	3,885
	20"	--	--		20"	--	--
	22"	--	--		22"	--	--
	24"	--	--		24"	--	--
3-1/2"	11-7/8"	HD410_ SK45L/R_BV[1,2]	5,875	7"	11-7/8"	HD7120_ SK45L/R_BV[1,2]	3,670
	14"	HD414_ SK45L/R_BV[1,2]	6,475		14"	HD7140_ SK45L/R_BV[1,2]	5,875
	16"	HD414_ SK45L/R_BV[1,2]	6,475		16"	HD7160_ SK45L/R_BV[1,2]	6,475
	18"	HD414_ SK45L/R_BV[1,2]	6,475		18"	HD7160_ SK45L/R_BV[1,2]	6,475
	20"	HD414_ SK45L/R_BV[1,2]	6,475		20"	HD7180_ SK45L/R_BV[1,2]	6,475
	22"	HD418_ SK45L/R_BV[1,2]	6,475		22"	HD7180_ SK45L/R_BV[1,2]	6,475
	24"	HD418_ SK45L/R_BV[1,2]	6,475		24"	HD7180_ SK45L/R_BV[1,2]	6,475

MiTek Notes: (1) Bevel cut required on end of joist to achieve design loads. (2) Hangers are special order. Consult USP for pricing and lead times.

TOP FLANGE HANGERS

Single I-Joist				Double I-Joist			
Width	Depth	Hanger	Down Load	Width	Depth	Hanger	Down Load
2-5/16"	9-1/2" - 14"	LSSH23	1,990	4-5/8"	9-1/2" - 14"	--	--
	16" - 24"	LSSH23	1,990		16" - 24"	--	--
3-1/2"	11-7/8" - 14"	LSSH35	2,390	7"	11-7/8"	--	--
	16" - 24"	LSSH35	2,390		16"	--	--

MiTek Notes: (1) Supplemental lateral support connection recommended when hanger height is less than 60% of joist height.

Orange highlighted hangers require web stiffeners at I-joist ends.

LVL Framing Connectors

Factored Resistance (lbs)- Standard Term

MiTek®

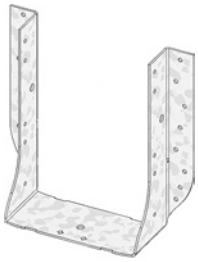
FACE MOUNT LVL HANGERS

Single Ply-1-3/4" wide			Double Ply-3-1/2" wide			Triple Ply-5-1/4" wide			Quadruple-Ply 7" wide		
Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load
9-1/4", 9-1/2"	HD17925 HUS1791	5,710 9,030	9-1/4", 9-1/2"	THD410 THDH410[1]	11,540 14,760	9-1/4", 9-1/2"	THD610 THDH610[1]	12,455 12,645	9-1/4", 9-1/2"	THD7210 THDH7210[1]	12,455 12,645
11-1/4", 11-7/8"	HD17112 HUS179[1]	5,915 9,030	11-1/4", 11-7/8"	THD410 THDH412[1]	11,540 16,130	11-1/4", 11-7/8"	THD610 THDH612[1]	12,455 15,465	11-1/4", 11-7/8"	THD7210 THDH7212[1]	12,455 12,645
14"	HD1714 HUS179[1]	5,925 9,030	14"	THD410 THDH414[1]	11,540 17,570	14"	THD610 THDH614[1]	12,455 17,570	14"	THD7210 THDH7214[1]	12,455 17,570
16"	HD1714 THF17157	5,925 5,195	16"	THD412 THDH414[1]	11,540 17,570	16"	THD612 THDH614[1]	13,785 17,570	16"	HD7120 THDH7214[1]	4,675 17,570
18"	HD1714 THF17157	5,925 5,195	18"	THD412 THDH414[1]	11,540 17,570	18"	THD612 THDH614[1]	13,785 17,570	18"	HD7140 THDH7214[1]	7,485 17,570
20"	HD1714 THF17157	5,925 5,195	20"	THD414 THDH414[1]	11,540 17,570	20"	THD614 THDH614[1]	13,785 17,570	20"	HD7140 THDH7214[1]	7,485 17,570
22"	HD1714 THF17157	5,925 5,195	22"	HD418 THDH414[1]	8,250 17,570	22"	THD614 THDH614[1]	13,785 17,570	22"	HD7180 THDH7214[1]	8,250 17,570
24"	THF17157 HDQ1714IF	5,195 6,730	24"	HD418 --	8,250 --	24"	THD614 THDH614[1]	13,785 17,570	24"	HD7180 THDH7214[1]	8,250 17,570

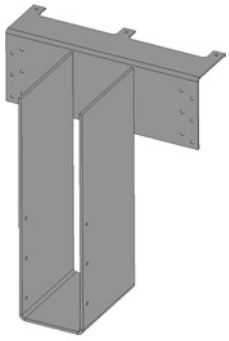
MiTek Note: (1) Joist nails need to be toe nailed at a 30° to 45° angle to achieve listed loads.

HUS

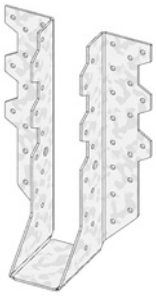
THDH



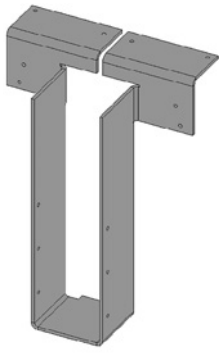
HD



HLBH



THD



PHXU

TOP FLANGE LVL HANGERS

Single Ply-1-3/4" wide			Double Ply-3-1/2" wide			Triple Ply-5-1/4" wide			Quadruple-Ply 7" wide		
Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load	Depth	Hanger	Down Load
9-1/4"	BPH17925 PHXU17925	4,890 6,370	9-1/4"	HBPH35925 HLBH35925	11,005 14,940	9-1/4"	HBPH55925 HLBH55925	10,405 14,940	9-1/4"	HBPH71925 HLBH71925	10,405 14,940
9-1/2"	BPH1795 PHXU1795	4,890 6,370	9-1/2"	HBPH3595 HLBH3595	11,005 14,940	9-1/2"	HBPH5595 HLBH5595	10,405 14,940	9-1/2"	HBPH7195 HLBH7195	10,405 14,940
11-1/4"	BPH17112 PHXU17112	4,890 6,370	11-1/4"	HBPH35112 HLBH35112	11,005 14,940	11-1/4"	HBPH55112 HLBH55112	10,405 14,940	11-1/4"	HBPH71112 HLBH71112	10,405 14,940
11-7/8"	BPH17118 PHXU17118	4,890 6,370	11-7/8"	HBPH35118 HLBH35118	11,005 14,940	11-7/8"	HBPH55118 HLBH55118	10,405 14,940	11-7/8"	HBPH71118 HLBH71118	10,405 14,940
14"	BPH1714 PHXU1714	4,890 6,370	14"	HBPH3514 HLBH3514	11,005 14,940	14"	HBPH5514 HLBH5514	10,405 14,940	14"	HBPH7114 HLBH7114	10,405 14,940
16"	BPH1716 --	4,890 --	16"	HBPH3516 HLBH3516	11,005 14,940	16"	HBPH5516 HLBH5516	10,405 14,940	16"	HBPH7116 HLBH7116	10,405 14,940
18"	-- --	-- --	18"	HBPH3518 HLBH3518	11,005 14,940	18"	HBPH5518 HLBH5518	10,405 14,940	18"	HBPH7118 HLBH7118	10,405 14,940
20"	-- --	-- --	20"	HBPH3520 HLBH3520	11,005 14,940	20"	HBPH5520 HLBH5520	10,405 14,940	20"	HBPH7120 HLBH7120	10,405 14,940
22"	-- --	-- --	22"	PHXU3522 HBPH3522	9,575 11,005	22"	XHLBH55221 --	14,940 --	22"	HBPH7122 HLBH7122	10,405 14,940
24"	-- --	-- --	24"	PHXU3524 HBPH3524	9,575 11,005	24"	XHLBH55241 --	14,940 --	24"	HBPH7124 HLBH7124	10,405 14,940

MiTek Note: (1) Hangers are special order. Consult MiTek for pricing and lead times.

General Notes

1. Loads shown for I-Joist Framing Connectors are based on SPF species supports and are conservative for Douglas Fir, Southern Pine and all LVL supports. Loads shown for LVL Framing Connectors are based on RigidLam® LVL beam-to-beam connections. For other support conditions refer to the current MiTek *Structural Connectors Limit States Design* catalog. Joist or beam reaction should be checked by a qualified designer to ensure proper hanger selection.
2. Refer to current MiTek product catalog to verify allowable loads and fastener size and quantity.
3. Loads shown are gravity (floor) loads. Other load durations may apply. Refer to the current MiTek product catalog for allowable increases.
4. Top Flange Hanger configurations and thickness of top flange needs to be considered for flush frame conditions.

All hangers listed are manufactured by Mitek®. For more information refer to the current USP literature, www.uspconnectors.com or contact USP at 800-328-5934.

Explanation Of Important EWP Terms

1. **Live Load, Dead Load & Total Load:** Most people would feel very uncomfortable in buildings if there were no consideration to deflection or sag even though they were designed to safely support their total design load. That's because all structures (buildings, bridges, floors, etc.) can safely deflect well beyond the limits that make us feel uncomfortable. Limiting deflection is considered a "serviceability" requirement because it is independent of strength. In floor design, limiting sag is also necessary to prevent cracking in the sheet rock (on the bottom of the joists) due to load being applied and removed during the day.

   To do this, it is necessary to define that portion of the load that varies and that portion of the load that is always present. By definition, Live Load is people, furniture and pets etc. that can be moved on and off the floor. Dead Load is defined as the weight of the floor system itself or any other load that is permanently attached to the floor. Together, the dead load and the live load make up the total load.

2. **L/360, L/480:** A method used to limit the maximum allowable deflection (or sag) when designing joists and beams. Specifically, the term L is the span of the joist or beam expressed in inches and the ratio L/480 would be the maximum allowable deflection the joist would be expected to deflect. It does not represent what the actual deflection of the joist is in the field, just the maximum value it would be allowed to deflect under full design load.

   The "L over" ratio is always associated with either live load or total load. The most common values are:

Floors:	Live Load – L/480 (or L/360)	Total Load – L/240
Roofs:	Live Load – L/240	Total Load – L/180

   For example, a typical residential floor (40 psf LL / 10 psf DL) with RFPI-Joists would be designed to an L/480 Live Load limit and an L/240 Total Load limit. For an 18' span, this would be equivalent to:

   $\frac{L}{480} = \frac{18' \times 12}{480} = \frac{216}{480} = 0.45$" Allowable Live Load Deflection *And* $\frac{L}{240} = \frac{18' \times 12}{240} = \frac{216}{240} = 0.90$" Allowable Total Load Deflection

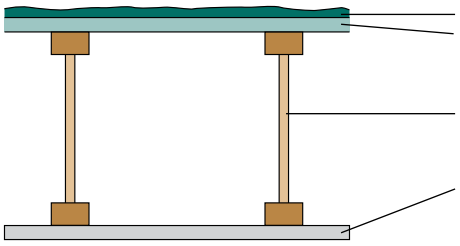
   The actual Live Load deflection of the floor system would be determined with a surveyor's transit taking readings before and after a true 40 psf load (i.e., cinder blocks) was applied. The deflection reading obtained in the field must be less than (or equal to) the 0.45". The same applies to the 0.9" under a true 50 psf load.

3. **PSF Load:** This is the design load, in pounds per square foot that is "applied" to the entire floor or roof area. By code, most residential floors must be designed to support a live load of 40 psf. The live load for roofs is determined by local code and depends on the amount of annual snow expected for that region where the house is.

   The design dead load psf is determined by the weight of each component of the floor or roof. A typical residential floor will have a dead load of 10 psf but depending on the components used, it can be as high as 20–24 psf. Dead load psf is based on standard material weights found in any of the National Model Building Codes. A typical method for calculating dead load is shown below:

Figure 1

DEAD LOAD CALCULATION FOR TYPICAL RESIDENTIAL FLOOR



CARPET & PAD	= 1.2 psf
T&G SUB-FLOOR	= 2.7 psf
Assume 11-7/8" **RFPI-20 I-Joist** @16" o.c. (2.37 plf ÷ 1.33')	= 1.8 psf
5/8" Sheet Rock **CEILING**	= 2.8 psf
MISCELLANEOUS (ductwork, wiring, etc.)	= 1.5 psf
TOTAL DEAD LOAD	**= 10 psf**

TYPICAL BUILDING MATERIAL WEIGHTS

Floors		
Hardwood - 1" thick	4.0	psf
Concrete - 1" thick		
Regular	12.0	psf
Lightweight	8.0-12.0	psf
Gypcrete - 3/4" thick	6.5	psf
Sheet vinyl	0.5	psf
Carpet and pad	1.0	psf
3/4" ceramic or quarry tile	10.0	psf
Linoleum or soft tile	1.5	psf
1/2" mortar bed	6.0	psf
1" mortar bed	12.0	psf

Ceilings		
Acoustical fiber tile	1.0	psf
1/2" gypsum board	2.2	psf
5/8" gypsum board	2.8	psf
Plaster - 1" thick	8.0	psf
Metal suspension system (including tile)	1.8	psf

Insulation - 1" Thick		
Polystyrene foam & Styrofoam	0.2	psf
Foamglass	0.8	psf
Rigid fiberglass	1.5	psf
Glass wool	0.1	psf
Rock wool	0.2	psf

Douglas-fir Sheathing		
1/2" plywood	1.5	psf
5/8" plywood	1.8	psf
3/4" plywood	2.3	psf
1/2" OSB	1.7	psf
5/8" OSB	2.0	psf
3/4" OSB	2.5	psf
7/8" OSB	2.9	psf

Miscellaneous		
Mechanical ducts	2.0-4.0	psf
Stucco - 1" thick	10.0	psf

Roofing Materials		
Asphalt shingles	2.5	psf
Wood shingles	2.0	psf
Clay tile	9.0-14.0	psf
Slate - 3/8" thick	15.0	psf

Weights of Douglas-Fir Framing - PSF

Nominal Size	Joist Spacing			
	12"	16"	19.2"	24"
2x4	1.4	1.1	0.9	0.7
2x6	2.2	1.7	1.4	1.1
2x8	2.9	2.2	1.8	1.5

Weights of Sprinkler Lines

Size of Pipe	Schedule 40		Schedule 10	
	Dry (plf)	Wet (plf)	Dry (plf)	Wet (plf)
1"	1.7	2.1	1.4	1.8
1-1/2"	2.7	3.6	2.1	3.1
2"	3.7	5.2	2.7	4.2

Software Tools

Roseburg offers a software tool that will aid you in generating accurate, professional layout drawings and member calculations. This software tool includes the Component Solutions™ (CS) EWP Studio Software Suite provided by Simpson Strong-Tie®.

As a supplier of connectors for engineered wood products, Simpson Strong-Tie has been involved in the structural building industry for decades. This experience has provided invaluable insights into the needs of designers and suppliers, resulting in the latest addition to the Simpson Strong-Tie® software product line for light-frame construction. Choose Simpson Strong-Tie® Component Solutions™ EWP Studio™ for your EWP design needs.

COMPONENT SOLUTIONS™ EWP STUDIO™

CS EWP Studio is a state-of-the art EWP analysis program. Whether you are looking for a single-member sizing utility or a robust layout and design solution, CS EWP Studio offers a wide range of tools and functions to meet your design, supply and reporting needs.

DESIGN TOOL

The Design tool is a powerful yet easy-to-use single-member sizing feature that enables you to size Roseburg engineered wood products for almost any structural condition. You provide a description of the spans, supports and loads of a specific sizing problem, and CS EWP Studio will deliver pass/fail information and even present you with a list of multiple product solutions. After selecting a product, you can print out a professional, easy-to-read calc sheet.

The program designs RFPI®-Joists at their optimum on-center spacing and RigidLam® LVL beams at their optimum depth. Rectangular or circular holes can be analyzed for RFPI Joists and circular holes can be analyzed for RigidLam® LVL at a given size and location. Cantilever reinforcements can be utilized for RFPI®-Joists used in load-bearing cantilever applications.

RigidLam® LVL columns and studs can be sized using any combination of axial and lateral loading and a variety of default and custom bracing conditions for individual stud and column members.

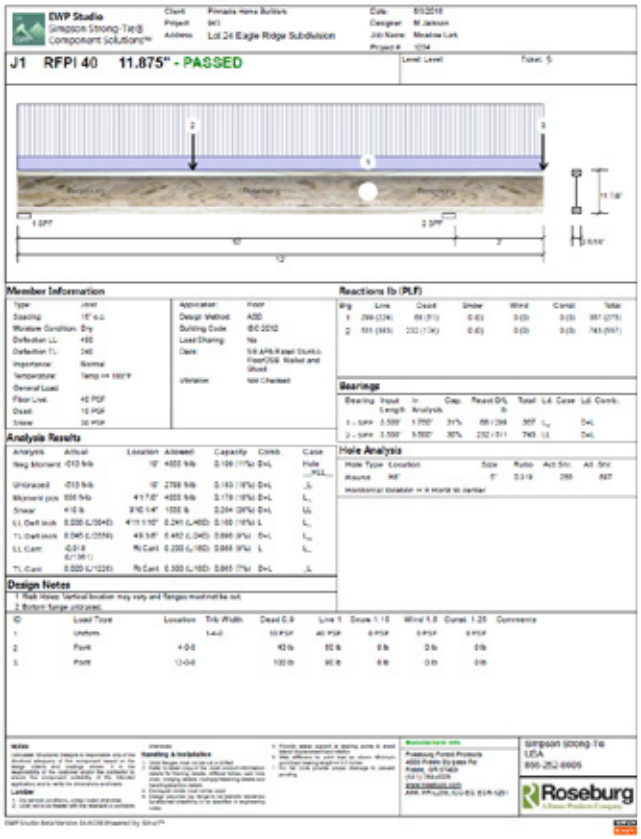
PLAN TOOL

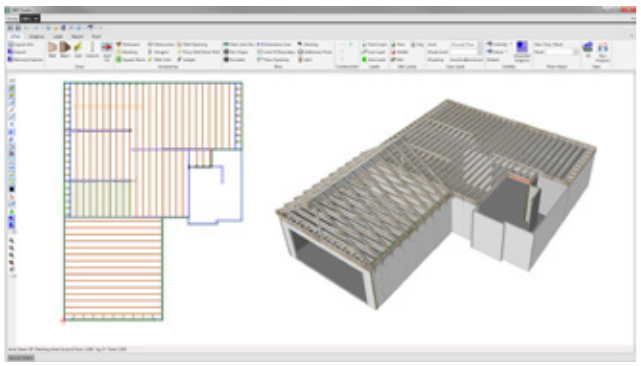
The Plan tool is the complete automation system for Roseburg engineered wood products. The Plan tool software is available to qualified users who use the software to promote and support the sale of Roseburg engineered wood products. The Plan tool includes all of the analysis functionality within the Design tool as well as additional features for creating a 3D model, defining floor and roof systems, generating layouts, and reporting. With this effective tool, the designer describes the building geometry and specifies the framing layout while the software does the analysis, including the following:

- Developing loads throughout the structure
- Sizing all framing members for Roseburg engineered wood products
- Specifying hangers
- Generating placement plans
- Generating material cut lists and hanger schedules

Installing and updating CS EWP Studio is easy and can be done online. Check back occasionally to ensure you are using the most up-to-date version of the software.

Simpson Strong-Tie provides all training and software support necessary to successfully learn and implement these software programs. You can obtain more information about the Component Solutions™ programs at https://www.strongtie.com/products/connectors/ics/component-solutions-software or by contacting Simpson Strong-Tie at 1-866-252-8606.





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CODE REPORT INDEX

Roseburg EWP Code Reports	Product
ICC ESR-1251 *(with LABC/LARC supplement, CBC/CRC supplement including DSA & OSHPD, and FBC supplement)*	I-JOIST
ICC ESR-1210 *(with LABC/LARC supplement, CBC/CRC supplement including DSA & OSHPD, and FBC supplement)*	LVL & LVL Rim
APA PR-L259 (U.S.) and APA PR-L259C (Canada)	I-JOIST
APA PR-L289 (U.S.) and APA PR-L289C (Canada)	LVL
APA PR-L270	LVL STUDS
Florida FL2440	I-JOIST & LVL
CCMC 13323-R (Canada)	I-JOIST
CCMC 13310-R (Canada)	LVL

The code reports listed above are available at Roseburg.com, in the Engineered Wood Products section under Code Reports.

An electronic version of this Design Guide can be found at www.Roseburg.com under "Design Guides" in the Engineered Wood section.

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MAKING LIVES BETTER
FROM THE GROUND UP.

PRODUCT & PERFORMANCE WARRANTY

Roseburg Forest Products warrants that its **RFPI®-Joists, RigidLam® laminated veneer lumber (LVL)** and **RigidRim® Rimboard** will be free from manufacturing errors and defects in workmanship and materials in accordance with our specifications.

Furthermore, we warrant that these products, when properly stored, installed and used in dry use service conditions, will meet or exceed our performance specifications for the expected life of the structure.

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