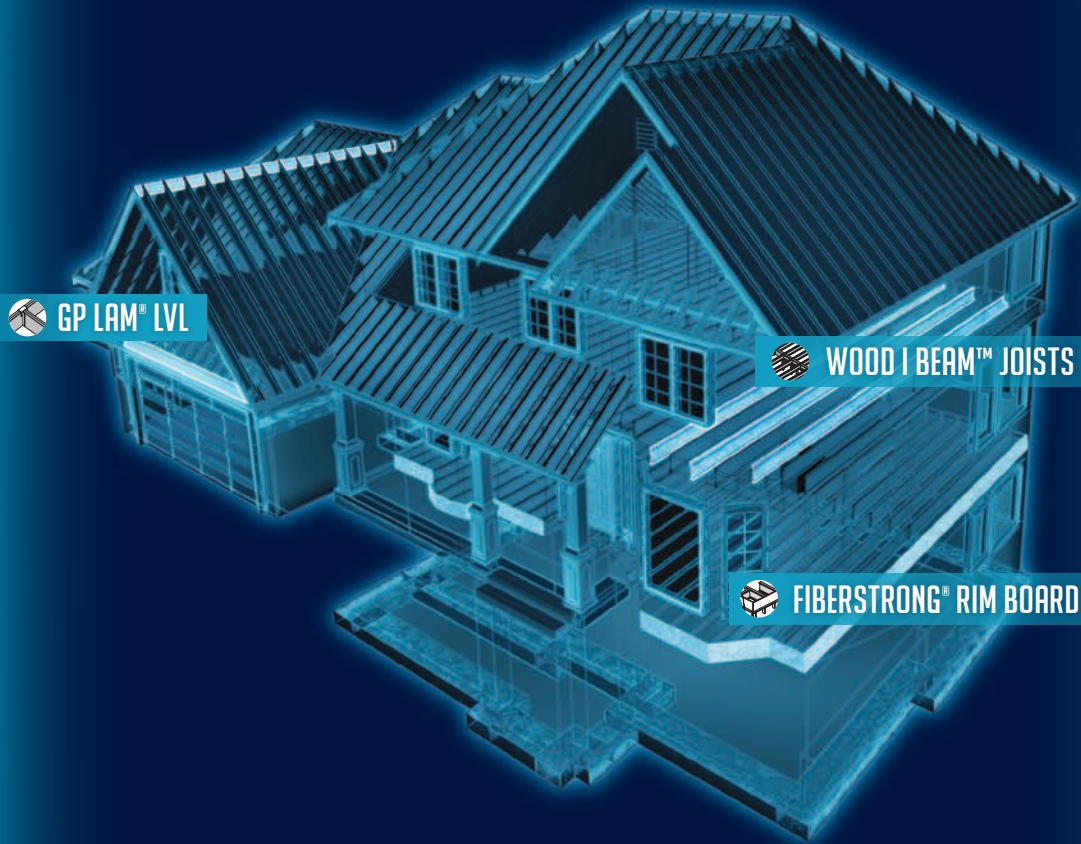


INSTALLATION GUIDE

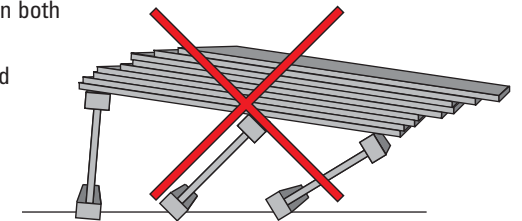


**WHAT YOU DON'T
SEE MATTERS™**

**UNITED STATES INSTALLATION INSTRUCTIONS
FOR RESIDENTIAL FLOOR SYSTEMS**

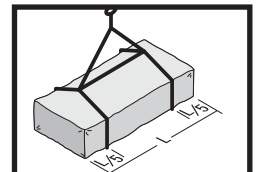
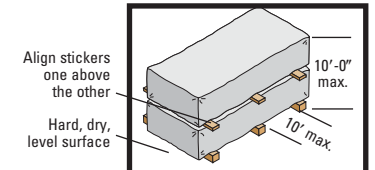
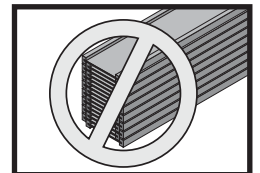
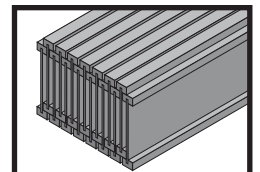
SAFETY

1. Walking on the joists should not be permitted until they are properly braced.
2. Lateral restraint, such as an existing deck or braced end wall, must be established at the ends of the bay. Alternatively, temporary or permanent sheathing may be nailed to the first 4 feet of the joists at the end of the bay.
3. All hangers, rim boards, rim joists and blocking at the supports of the joists must be installed and nailed properly.
4. During installation, a minimum 1x4 temporary brace at least 8 feet long is required. Temporary bracing members should be spaced at no further than 10'-0" o.c. and nailed to each joist with two 8d nails (10d box nails if bracing thickness exceeds 1"). Lap bracing ends and anchor them to temporary or permanent sheathing. Remove the temporary bracing as the permanent sheathing is attached.
5. The ends of cantilevers must be temporarily braced on both the top and bottom flanges.
6. Never overload sheathed joists with loads that exceed design loads.
7. Do not ship or install any damaged I-joists.
8. When stacking construction material, stack only over beams or walls, NOT on unsheathed joists.



I-JOIST STORAGE AND HANDLING

1. CAUTION: Wrap and joists are slippery when icy or wet.
2. Store bundles upright on a smooth, level, well-drained and supportive surface to protect from the weather (sun and precipitation). Keep covered and strapped until installed.
3. Keep bundles above ground to minimize the absorption of ground moisture and allow air circulation.
4. Re-cover unused products with bundle wrap. Repair damage to bundle wrap with tape, more bundle wrap, plastic or weatherproof covering.
5. Place 2x or LVL spacers (at a maximum of 10' apart) under bundles stacked on the ground, and between bundles stored on top of one another.
6. All handling of joists with a forklift or crane should be done carefully by lifting from below the bottom of the bundle.
7. Joists should remain upright (web vertical) during handling.
8. Avoid excessive bowing during all phases of handling and installation (i.e., measuring, sawing, or placement).
9. Damage may result if the I-joist is twisted or a load is applied to it while it's lying flat.
10. An MSDS is available at www.builditbetter.com.
11. When handling I-joists with a crane on the job site ("picking"), take a few simple precautions to prevent damage to the I-joists and injury to your work crew. Pick I-joists in 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.



ALLOWABLE FLOOR SPANS

40 PSF LIVE LOAD + 20 PSF DEAD LOAD; IMPROVED PERFORMANCE (L/480)

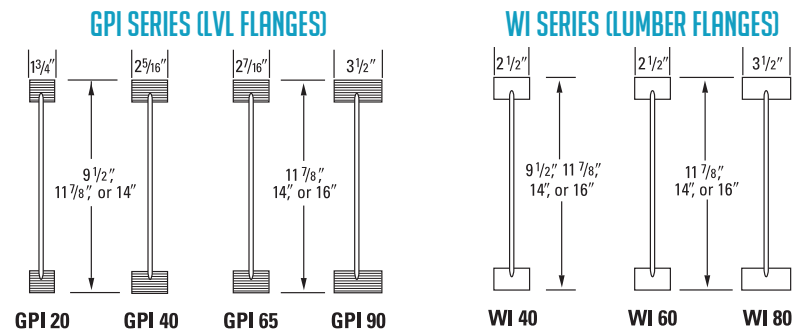
Joist Series	Joist Depth	Spacing (Simple Span)				Spacing (Multiple Span)			
		12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
GPI 20	9 1/2"	17'-01"	15'-07"	14'-09"	13'-10"	18'-07"	17'-00"	15'-07"	13'-11"
	11 7/8"	20'-05"	18'-08"	17'-08"	15'-11"	22'-03"	19'-05"	17'-09"	15'-05"
	14"	23'-03"	21'-03"	19'-06"	17'-05"	24'-08"	21'-04"	19'-03"	15'-05"
GPI 40	9 1/2"	18'-00"	16'-06"	15'-07"	14'-02"	19'-08"	17'-04"	15'-10"	14'-02"
	11 7/8"	21'-06"	19'-08"	18'-01"	16'-02"	22'-10"	19'-09"	18'-00"	16'-01"
	14"	24'-04"	21'-09"	19'-10"	17'-09"	25'-01"	21'-08"	19'-09"	17'-01"
GPI 65	11 7/8"	23'-03"	21'-03"	20'-00"	18'-08"	25'-04"	23'-01"	21'-06"	17'-02"
	14"	26'-05"	24'-02"	22'-09"	21'-03"	28'-10"	25'-11"	21'-06"	17'-02"
	16"	29'-04"	26'-09"	25'-03"	22'-03"	32'-00"	25'-11"	21'-06"	17'-02"
GPI 90	11 7/8"	26'-04"	24'-00"	22'-07"	21'-00"	28'-08"	26'-01"	24'-07"	22'-02"
	14"	29'-11"	27'-02"	25'-07"	23'-02"	32'-07"	29'-07"	27'-09"	22'-02"
	16"	33'-01"	30'-01"	28'-04"	23'-02"	36'-01"	32'-09"	27'-09"	22'-02"
WI 40	9 1/2"	18'-00"	16'-05"	14'-11"	13'-04"	18'-11"	16'-04"	14'-11"	13'-03"
	11 7/8"	21'-05"	18'-08"	17'-01"	15'-03"	21'-06"	18'-07"	17'-00"	15'-02"
	14"	23'-09"	20'-06"	18'-09"	16'-09"	23'-08"	20'-05"	18'-08"	16'-05"
	16"	25'-07"	22'-01"	20'-02"	18'-00"	25'-06"	22'-00"	20'-01"	16'-05"
WI 60	11 7/8"	22'-07"	20'-08"	19'-06"	17'-11"	24'-08"	21'-11"	20'-00"	16'-05"
	14"	25'-09"	23'-06"	22'-00"	19'-08"	27'-10"	24'-01"	20'-07"	16'-05"
	16"	28'-06"	26'-00"	23'-09"	19'-10"	30'-00"	24'-09"	20'-07"	16'-05"
WI 80	11 7/8"	24'-11"	22'-08"	21'-04"	19'-10"	27'-01"	24'-08"	22'-09"	18'-02"
	14"	28'-03"	25'-09"	24'-03"	21'-02"	30'-10"	28'-00"	24'-11"	19'-11"
	16"	31'-04"	28'-06"	26'-06"	21'-02"	34'-02"	30'-00"	24'-11"	19'-11"

NOTES:

- These span tables are based on uniform loads, as noted above; live load deflection is limited to L/480 for better performance. Floor performance is greatly influenced by the stiffness of the floor joists. Experience has shown that joists designed to the code minimum live load deflection (L/360) will result in a floor which may not meet the expectations of some end users. Floor spans for Wood I Beam joists in accordance with those given above are strongly recommended, which are based on L/480 live load deflection. (One-third stiffer than required by code.)
- Spans are clear distances between supports, and are based on composite action with glued-nailed APA Rated® sheathing or Sturd-I-Floor® panels of minimum thickness 1 9/32" (40/20 or 20 o.c.) for joist spacing of 19.2" or less, or 2 3/32" (48/24 or 24 o.c.) for a joist spacing of 24".

Adhesive must meet APA AFG-01 or ASTM D 3498. Apply a continuous line of adhesive (about 1/4" diameter) to top flange of joists. All surfaces must be clean and dry. If sheathing is nailed only (not recommended), reduce spans by 12".

- Minimum end bearing length is 1 3/4". Minimum intermediate bearing length is 3/2".**
- For multiple-span joists: End spans must be at least 40% of the adjacent span. Spans shown above cover a broad range of applications. It may be possible to exceed these spans by analyzing a specific application with FASTBeam® selection software.
- For loading other than that shown above, use FASTBeam software, or contact Georgia-Pacific Engineered Lumber Technical Services.
- Not all products are available at all distribution centers; contact Georgia-Pacific for availability.



Referenced dimensions are nominal and are used for design purposes.

WEB STIFFENERS

Web stiffeners are not required to attain the spans shown in this guide, but are required for conditions as described in this section. There are two main types of web stiffeners: bearing stiffeners and "load" stiffeners. Although both types reinforce the I-joist at locations of concentrated loads, the bearing stiffeners are located at bearing points and may also be required for hangers with side or angle nailing, or to provide lateral restraint to the I-joist in some hanger applications and at birdsmouth cuts. The load stiffeners are located away from bearing supports anywhere large point loads are applied to the top flange of the I-joist.

BEARING STIFFENERS:

- Bearing stiffeners are required:
 - When sides of the hangers or adjacent framing do not laterally brace the top flange of each I-joist.
 - For all I-joists that have a design end reaction exceeding 1550 lbs (1900 lbs for GPI 90).
- Install bearing stiffeners tight against the bottom flange of the I-joist, leaving 1/8"-1/4" gap at the top.

LOAD STIFFENERS:

- Load stiffeners are required:
 - When I-joists are designed to support concentrated loads that exceed 1500 lbs applied to the top flange between supports.
 - For concentrated loads on cantilevers that exceed 1500 lbs, but do not exceed the un-reinforced I-joist shear capacity, load stiffeners are required. If the full loading on the cantilever exceeds the shear capacity of the un-reinforced joist, cantilever reinforcement is required per the instructions in this guide.
- Install load stiffeners tight against the top flange of the I-joist, leaving 1/8"-1/4" gap at the bottom.
- The minimum bearing length for concentrated loads is 3 1/2".
- Except for pre-scored knock-outs, concentrated loads must be applied with 6" minimum horizontal distance between the edge of the load and the edge of the web hole.

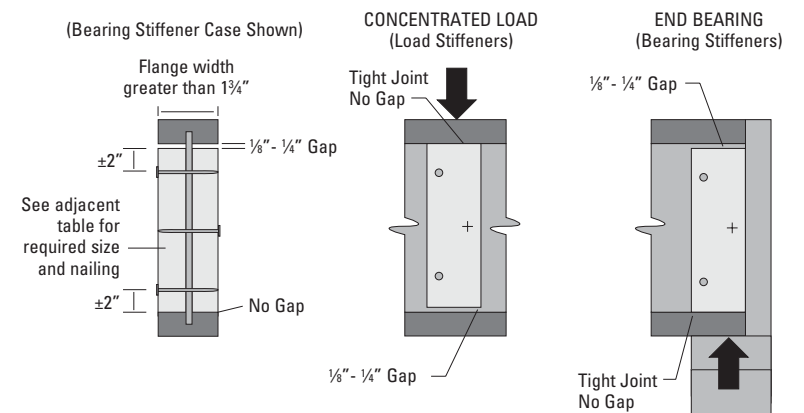
Web stiffeners may be supplied by the distributor, or may be cut in the field as required.

WEB STIFFENER SIZES

Joist Series	Stiffener Size	Nails
GPI 20	5/8" x 2 5/16"	(3) 10d
GPI 40	1/2" + 1/2" x 2 5/16"	(3) 10d
GPI 65	1/2" + 1/2" x 2 5/16"	(3) 10d
GPI 90	1 1/2" x 2 5/16"	(3) 12d
WI 40	1/2" + 1/2" x 2 5/16"	(3) 10d
WI 60	1/2" + 1/2" x 2 5/16"	(3) 10d
WI 80	1 1/2" x 2 5/16"	(3) 12d

Minimum stiffener width is 2 5/16"

GP JOIST WEB STIFFENER REQUIREMENTS

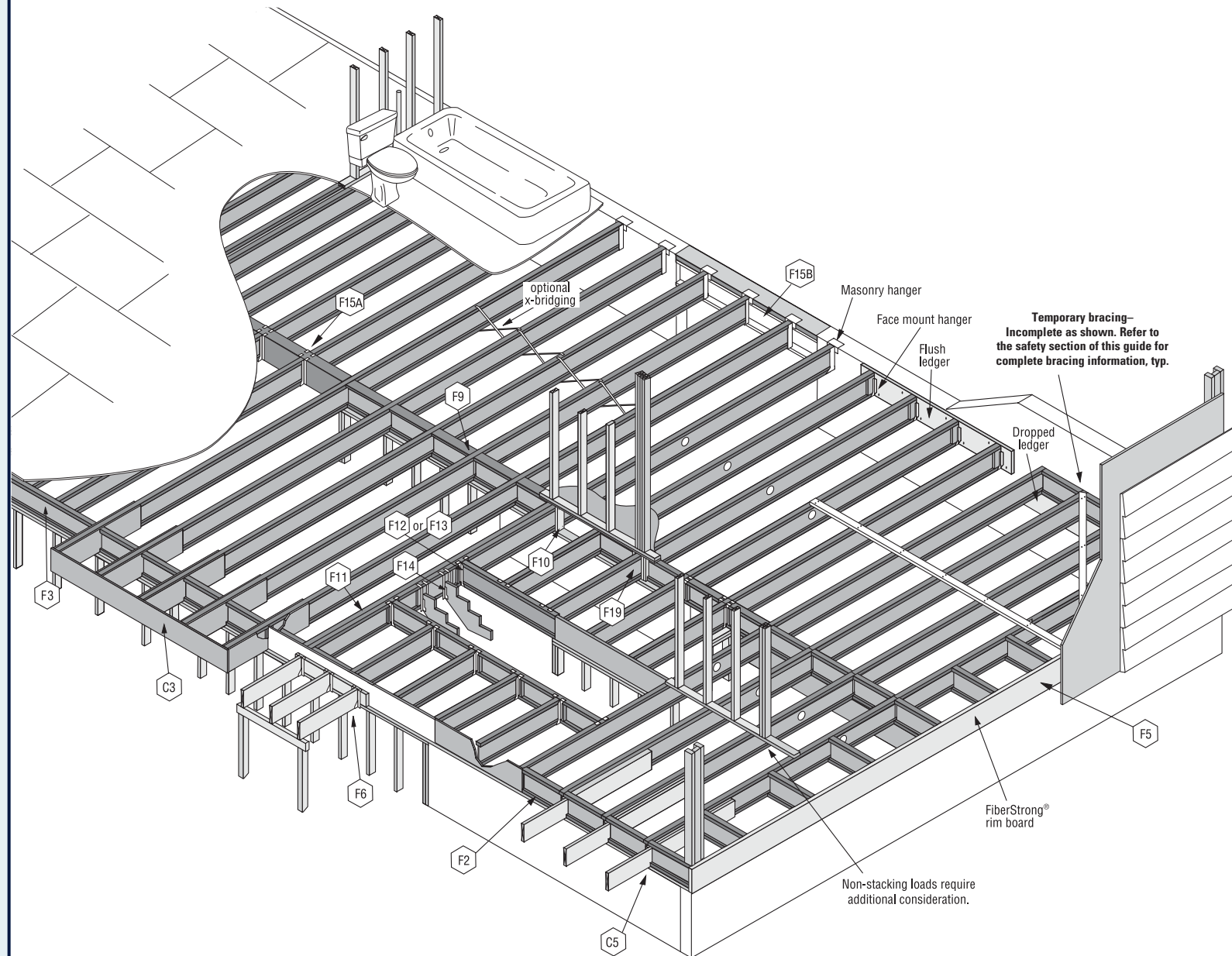


I-JOIST INSTALLATION

- Except for cutting to length, top and bottom flanges of Wood I Beam™ I-joists shall not be cut, drilled or notched.
- End bearing length must be at least 1¾". Intermediate bearings of multiple span joists shall be at least 3½". Bearing on the edge of a single 2x ledger is not adequate.
- Engineered wood must not remain in direct contact with concrete or masonry construction and shall be used in covered, dry use conditions only (moisture content less than 16%).
- Wood I Beam I-joists must be restrained against rotation at the ends of joists by use of rim joists, blocking panels, hangers, or cross bridging. To laterally support cantilevered joists, blocking panels must also be installed over supports nearest the cantilever.
- Additionally, rim joists, rim boards, blocking panels or squash blocks must be provided under all stacking exterior and interior bearing walls to transfer loads from above to the wall or foundation below.
- Wood I Beam I-joists must be supported directly on walls, beams, girders, or in hangers. Do not support I-joists by a non-structural ridge board or other non-structural framing element. Do not toe nail I-joists into supports.
- At cantilevered floor sections, the I-joists and floor framing (not the closure board) must provide the primary support to walls above.
- The top flanges of the Wood I Beam I-joists must be laterally supported at intervals not exceeding 24" o.c. Plywood or OSB subfloor nailed to the top flange of a Wood I Beam I-joist is adequate to provide lateral support. The top flanges must be kept straight within ½" of true alignment.
- Wood I Beam I-joists are produced without camber so either face of the flange can be used as the top for sheathing attachment and the location of identifying stamps does not affect performance. Vertically orient the largest dimension of the I-joist.
- Fasteners, hangers or connectors for Wood I Beam framing either from or into preservative or fire-retardant treated wood must be hot-dip galvanized, or stainless steel, as required by code and the type of treatment.
- Treating Wood I Beam I-joists is not recommended and voids the warranty, but more importantly, presents a safety and performance concern.
- When using hangers, seat I-joists firmly in hanger bottoms to minimize settlement. Provide a gap between the I-joist end and the hanger per hanger manufacturer recommendations.
- Concentrated loads shall only be applied to the upper surface of the top flange, not suspended from the bottom flange. Contact representative for exceptions.
- Any fastening, resistance to uplift or member not specifically detailed is subject to local approval.
- Due to shrinkage, common framing lumber set on edge cannot be used as blocking or rim boards. I-joist blocking panels or other engineered wood products – such as APA Rim Board® – must be cut to fit between the I-joists, and an I-joist-compatible depth selected.
- Provide permanent lateral support of the bottom flange of all I-joists at interior supports of multiple-span joists. Similarly, support the bottom flange of all cantilevered I-joists at the end support next to the cantilever extension. In the completed structure, the gypsum wallboard ceiling provides this lateral support. Until the final finished ceiling is applied, temporary bracing or struts must be used.
- If square-edge floor sheathing is used, sheathing edges must be supported between I-joists with 2x4 blocking. Glue sheathing to the blocking to minimize squeaks. Blocking is not required under structural finish flooring, such as wood strip flooring, or if a separate underlayment layer is installed.
- Nail spacing:
 - Space nails installed to the flange's top face in accordance with the applicable building code requirements or approved building plans.
 - If nails must be installed into the sides of LVL flanges, spacing shall not be closer than 3 inches o.c. for 8d box or common nails, and 4 inches o.c. for 10d box or common nails.

TYPICAL WOOD I BEAM FLOOR FRAMING AND CONSTRUCTION DETAILS

NOTE: Except for cutting to length and as shown in this or the design guide, never cut or notch the flanges.



NOTE: Unlike with some conventional lumber sizes, Wood I Beam I-joists do not require mid-span blocking or bridging for I-joist strength or stability.

FLOOR DETAILS

F2 BLOCKING PANEL, EXTERIOR
Vertical load transfer = 2000 plf max.

Wood I Beam™ blocking panel

Minimum 8d nails at 6" o.c.

F3 WOOD I BEAM™ RIM JOIST Vertical load transfer = 2000 plf max.

Wood I Beam rim joist

Provide backer for siding attachment unless nailable sheathing is used.

Minimum 1 3/4" joist bearing at wall

Minimum 8d nails at 6" o.c.

Toe-nail rim joist to top flange of joist with 10d nail.

F5 FIBERSTRONG® RIM CLOSURE
Vertical load transfer of 1 1/2" rim board = 4850 plf

Blocking where required by local codes for lateral load transfer and/or optional blocking for diaphragm nailing

Starter joist

FiberStrong rim board

One 2x4 min. with 1/2" gap at top, fasten with 8d box nails from each web into 2x...

8d nails top and bottom flange

(3) 8d nails at corners

FiberStrong rim board

Minimum 8d nails at 6" o.c. toe-nail to plate, typical

Check local building code for appropriate detail in areas of high lateral load.

F8 BEVEL CUT JOIST

Do not bevel cut joist beyond inside face of support.

Note: Wood I Beam or FiberStrong rim board blocking, or x-bridging required at bearing for lateral support.

Check local building code for appropriate detail in areas of high lateral load.

F9 BLOCKING PANEL, INTERIOR
Vertical load transfer = 2000 plf max. along load bearing wall.

Load bearing wall must stack over blocking and wall or beam below.*

When two joists meet over wall, provide 1 3/4" minimum bearing for each joist and install blocking panel to restrain both joists.

Blocking panels not required when joists are continuous over wall and no load bearing wall exists above.

Minimum 8d nails at 6" o.c.

*Non-stacking load bearing walls require additional consideration.

F10 SQUASH BLOCKS AT INTERIOR BEARING
Vertical load transfer = 2000 plf max along load bearing wall.

Load bearing wall must stack over squash blocks and wall or beam below.
Non-stacking load bearing walls require additional consideration.

Attach joist with one 10d box or sinker nail on each side of bearing.

8d nail into top flange

8d nail into bottom flange or plate

Squash block (2x4 minimum) used only if load bearing wall exists above

Bearing wall, GP Lam® LVL or glulam beam

Check local building code for appropriate detail in areas of high lateral load.

F12 FLOOR OPENING, TOP MOUNT HANGERS

BACKER BLOCKS*

Joist Series	Joist Depth	Material	Depth
GPI 20	9 1/2", 11 7/8", 14"	2 3/32"	6 1/4", 8 3/4", 10 3/4"
GPI 40	9 1/2", 11 7/8", 14"	7/8"	6 1/4", 8 3/4", 10 3/4"
GPI 65, WI 40, WI 60	9 1/2", 11 7/8", 14", 16"	1/2" + 1/2"	6 1/4", 8 3/4", 10 3/4", 12 3/4"
GPI 90, WI 80	11 7/8", 14", 16"	1 1/2" net	8 3/4", 10 3/4", 12 3/4"

*Block must be long enough to permit required nailing without splitting.

Backer Block (use if hanger load exceeds 250 lbs.)
Before installing backer to double joist, drive an additional (3) 10d nails into web where backer will fit. Clinch when possible. Install backer tight to top flange. Use (10) 10d nails, clinched when possible.

Assemble double joist per detail F11 (regular filler).

Headers can be single or double I-joists.

Backer blocks required both sides of web (per hanger manufacturer).

F14 STAIR STRINGER TO JOIST CONNECTION

Double Wood I Beam joist construction per detail F11 (full depth filler); backer block size and installation per detail F12.

Hangers for 14' (max) Stringer	Nailing Requirement
United Steel Products MSH 218 OR Simpson Strong-Tie® THA 218	Minimum (12) 10d nails into double joists or LVL header. Minimum (4) 10d x 1 1/2" nails into stringer.

For stair stringers longer than 14' or stringer reactions greater than 700 lbs., call Georgia-Pacific.

F15 JOIST TO BEAM CONNECTION

GP Lam® LVL or Glulam Beam

Properly fastened bearing plate. Plate must be flush with inside face of steel beam. Plate can overhang beam a maximum of 1/4".

Top mount hangers*

Top mount hangers*

Steel Beam

Bearing stiffeners may be required at hangers.

*Appropriate face mount hangers may be substituted. Properly fastened solid wood blocking of the steel beam also required for face mount hangers on steel beam.

F19 SQUASH BLOCKS AT CONCENTRATED LOADS

Solid block all posts to bearing below with equal number of squash blocks.

1/8" gap

F21

Use single I-joist for loads up to 2000 plf, double I-joists for loads up to 4000 plf (filler block not required)

Provide backer as required for siding and/or wall sheathing attachment

Wall sheathing as required.

APA Rim Board may be used in lieu of I-joists. Backer is not required when APA Rim Board is used.

WEB HOLES

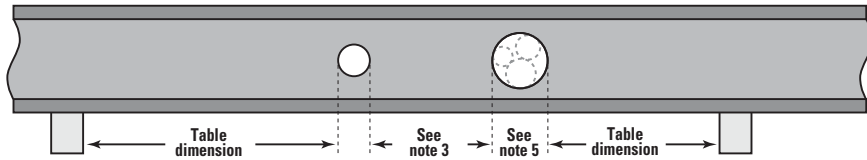
Never drill, cut or notch the flange, or over-cut the web.

Holes in webs should be cut with a sharp saw or drill bit, not by hammering (except at knockouts.)

For rectangular holes, avoid over cutting the corners, as this can cause unnecessary stress concentrations. Slightly rounding the corners is recommended. Start the rectangular hole by drilling a 1" diameter hole in each of the four corners and then make the cuts between the holes to minimize damage to I-joist.



Do not drill or cut flanges.



WOOD I BEAM™ HOLE TABLE (SIMPLE OR MULTIPLE SPAN)

Table dimension is minimum distance from inside face of support to nearest edge of hole.

Joist Depth	Joist Clear Span	Round Hole Diameter														
		2"	3"	4"	5"	6 1/4"	7"	8"	8 5/8"	9"	10"	10 3/4"	11"	12"	12 3/4"	
9 1/2"	10'	0'-6"	0'-6"	0'-9"	1'-9"	3'-3"	Not Permitted									
	12'	0'-6"	1'-3"	2'-3"	3'-3"	4'-6"	Not Permitted									
	14'	1'-0"	2'-0"	3'-0"	4'-3"	5'-9"	Not Permitted									
	16'	0'-6"	0'-6"	2'-0"	3'-6"	5'-9"	Not Permitted									
11 1/2"	12'	0'-6"	0'-6"	0'-9"	1'-9"	1'-9"	2'-6"	3'-9"	4'-6"	Not Permitted						
	14'	0'-6"	0'-6"	0'-9"	1'-9"	3'-3"	4'-0"	5'-3"	6'-0"	Not Permitted						
	16'	0'-6"	1'-3"	2'-3"	3'-3"	4'-6"	5'-6"	6'-6"	7'-6"	Not Permitted						
	18'	1'-6"	2'-6"	3'-6"	4'-6"	6'-0"	6'-9"	8'-0"	Not Permitted							
	20'	0'-9"	2'-0"	3'-3"	4'-6"	6'-3"	7'-3"	8'-9"	Not Permitted							
	22'	1'-6"	2'-9"	4'-0"	5'-6"	7'-3"	8'-3"	9'-9"	Not Permitted							
14"	24'	0'-6"	1'-9"	3'-3"	4'-9"	7'-0"	8'-3"	10'-0"	11'-3"	Not Permitted						
	12'	0'-6"	0'-6"	0'-9"	1'-0"	1'-0"	1'-0"	1'-3"	2'-0"	2'-3"	3'-6"	4'-3"	Not Permitted			
	14'	0'-6"	0'-6"	0'-9"	1'-0"	1'-0"	1'-6"	2'-6"	3'-3"	3'-9"	4'-9"	5'-9"	Not Permitted			
	16'	0'-6"	0'-6"	0'-9"	1'-0"	2'-0"	2'-9"	4'-0"	4'-9"	5'-0"	6'-3"	7'-3"	Not Permitted			
	18'	0'-6"	0'-6"	1'-0"	2'-0"	3'-3"	4'-3"	5'-3"	6'-0"	6'-6"	7'-9"	Not Permitted				
	20'	0'-6"	0'-6"	0'-9"	1'-6"	3'-0"	4'-0"	5'-3"	6'-3"	6'-9"	8'-6"	Not Permitted				
	22'	0'-6"	0'-6"	1'-6"	2'-9"	4'-3"	5'-6"	6'-9"	7'-9"	8'-3"	10'-0"	Not Permitted				
	24'	0'-6"	1'-0"	2'-3"	3'-6"	5'-3"	6'-3"	7'-9"	8'-9"	9'-3"	10'-9"	Not Permitted				
16"	26'	0'-6"	0'-6"	1'-0"	2'-6"	4'-6"	5'-9"	7'-6"	8'-6"	9'-3"	11'-3"	Not Permitted				
	28'	0'-6"	0'-9"	2'-3"	3'-9"	5'-9"	7'-0"	8'-9"	10'-0"	10'-6"	12'-6"	Not Permitted				
	14'	0'-6"	0'-6"	0'-9"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-3"	2'-6"	3'-3"	3'-6"	4'-9"	5'-9"	
	16'	0'-6"	0'-6"	0'-9"	1'-0"	1'-0"	1'-0"	1'-6"	2'-3"	2'-9"	3'-9"	4'-6"	5'-0"	6'-3"	7'-0"	
	18'	0'-6"	0'-6"	0'-9"	1'-0"	1'-0"	2'-0"	3'-0"	3'-6"	4'-0"	5'-3"	6'-0"	6'-3"	7'-6"	7'-6"	
	20'	0'-6"	0'-6"	0'-9"	1'-0"	1'-0"	1'-6"	2'-9"	3'-6"	4'-0"	5'-3"	6'-3"	6'-9"	8'-3"	8'-3"	
	22'	0'-6"	0'-6"	0'-9"	1'-0"	1'-9"	2'-9"	4'-0"	4'-9"	5'-3"	6'-9"	7'-9"	8'-3"	9'-9"	9'-9"	
	24'	0'-6"	0'-6"	0'-9"	1'-0"	2'-6"	3'-6"	4'-9"	5'-6"	6'-3"	7'-6"	8'-9"	9'-0"	10'-9"	10'-9"	
	26'	0'-6"	0'-6"	0'-9"	1'-0"	2'-0"	3'-0"	4'-6"	5'-6"	6'-3"	8'-0"	9'-3"	9'-9"	11'-9"	11'-9"	
	28'	0'-6"	0'-6"	0'-9"	1'-0"	2'-6"	3'-6"	5'-3"	6'-3"	7'-0"	8'-9"	10'-3"	10'-9"	12'-9"	12'-9"	
30'	0'-6"	0'-6"	0'-9"	1'-9"	3'-9"	5'-0"	6'-6"	7'-6"	8'-3"	10'-9"	11'-6"	11'-9"	13'-9"	13'-9"		
32'	0'-6"	0'-6"	0'-9"	1'-0"	2'-3"	3'-6"	5'-6"	6'-9"	7'-6"	9'-6"	11'-0"	11'-6"	13'-9"	13'-9"		

Example below

NOTES

- Hole locations are based on worst case of simple and multiple span conditions with uniform floor loads of 40 PSF live load and 10 or 20 PSF dead load, and spans in this guide.
- Small holes not greater than 1.5" in diameter can be placed anywhere in the web, but each hole must be spaced a minimum horizontal clear distance of 2 times its diameter (but not less than 1") from any adjacent hole. No more than two small holes can be placed next to each other and/or adjacent to larger holes following the guidelines in this note. More than one group of small holes is permitted on a joist, but adjacent groups must be spaced a minimum horizontal clear distance of 12".
- For holes greater than 1.5" diameter, minimum clear distance between
 - two round holes is 2 times the diameter of the larger hole
 - a round hole and a rectangular hole is the larger of 2 times the hole diameter or twice the rectangular hole width
- For rectangular holes, the longest side may not exceed 75% of a round hole diameter permitted at that location; i.e., if an 8 inch round hole is permitted, the longest side of a rectangular hole centered at that location is 8" x 0.75 = 6".
- 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.
- For joists with more than one span, use the longest span to determine hole location in either span. For large differences in adjacent span lengths, use FASTBeam® software.
- All holes shown on this table may be located vertically anywhere within the web; a clear distance of at least 1/8" must be maintained from the hole edge to the inner surface of the closest flange.
- For other conditions use FASTBeam software. Analysis using FASTBeam software could permit larger holes, or holes closer to the supports than shown in this table.

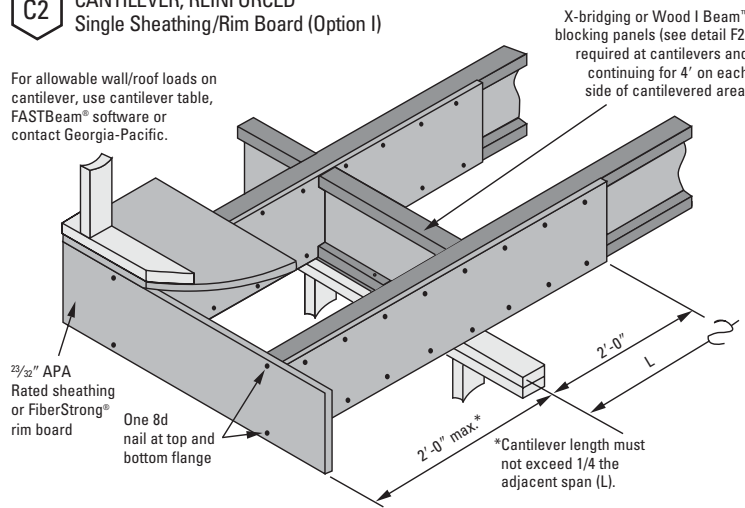
EXAMPLE:

Determine the allowable location of a 9" round hole in a 14" deep joist which spans 20'.
Enter the table in the left column and find 14" joist depth, move to the right and find 20' in the joist span column and move across the table to intersect the 9" round hole column. The nearest allowable location to either bearing is 6'-9".

CANTILEVERS FOR VERTICAL BUILDING OFFSETS (CONCENTRATED WALL LOAD FROM ABOVE)

C2 CANTILEVER, REINFORCED Single Sheathing/Rim Board (Option I)

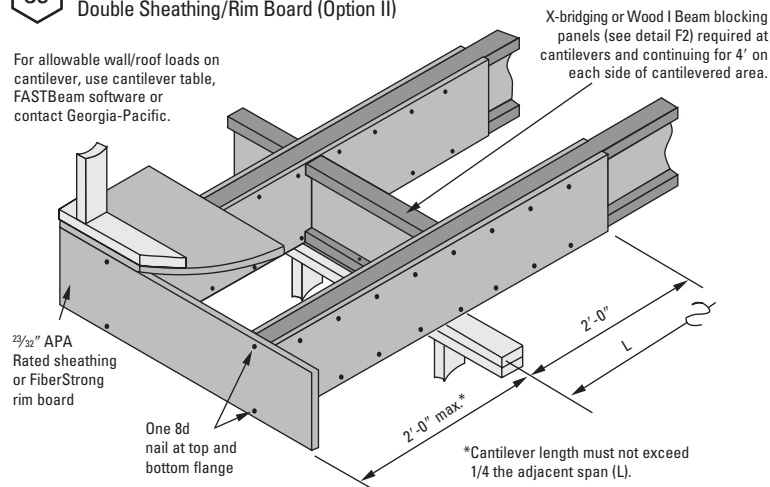
For allowable wall/roof loads on cantilever, use cantilever table, FASTBeam® software or contact Georgia-Pacific.



Note: FiberStrong rim board or 48/24 APA Rated sheathing (strength axis horizontal) required one side of joist. Depth must match full depth of joist. Nail to joist flanges with 8d nails at 6" o.c.

C3 CANTILEVER, REINFORCED Double Sheathing/Rim Board (Option II)

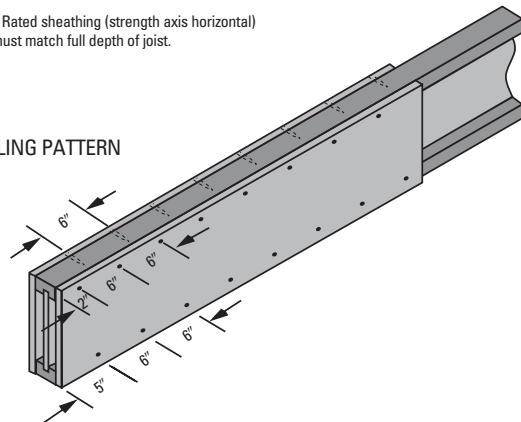
For allowable wall/roof loads on cantilever, use cantilever table, FASTBeam software or contact Georgia-Pacific.



Note: FiberStrong rim board or 48/24 APA Rated sheathing (strength axis horizontal) required both sides of joist. Depth must match full depth of joist.

DOUBLE REINFORCEMENT NAILING PATTERN

Nail to joist flanges with 8d nails at 6" o.c. Offset nailing on opposite side of flange to avoid splitting.



GP LAM® LVL FASTENING REQUIREMENTS

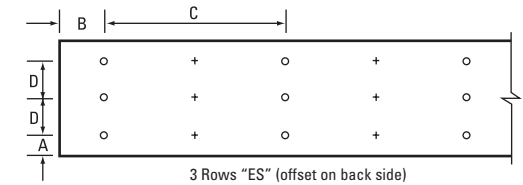
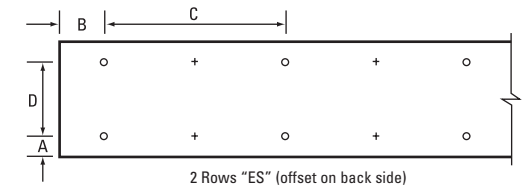
GENERAL NOTES:

1. Confirm the adequacy of the beam (depth and width) for carrying the designated load.
2. Stress level for nail, bolt and screw values is 100%. Increases of 15% for snow loaded roof conditions or 25% for non-snow roof conditions are permitted.
3. Top and bottom rows of fasteners should be as shown in the fastener clearances detail. For staggered fastening patterns, the maximum end distance applies to all rows.
4. All fasteners must have the length fully embedded, but must not be over-driven, countersunk, or over-tightened.
5. Bolt holes are to be 1/32" to 1/16" diameter larger than the bolts. Bolts must meet or exceed ASTM A 307 or SAE J429 Grades 1 or 2. Every bolt must extend through the full width of the member. Use washers not less than a standard cut washer under the head and nut meeting ANSI B18.22.1.
6. 7" wide beams should only be side-loaded when loads are applied to both sides, when the lesser side load plf is at least 25% of the opposite side, or when the beam is otherwise restrained to minimize rotation.
7. For beam depths < 7 1/4", the maximum beam width must not exceed the beam depth and all fasteners must be staggered up to one-half the required o.c. spacing. For depths ≥ 7 1/4", the maximum beam thickness is 7".
8. Fastening recommendations are based on the 2005 National Design Specification for Wood Construction (NDS) or fastener manufacturer's design information.
9. SDS structural screws are produced by Simpson Strong-Tie Company, Inc., WS structural screws are produced by United Steel Products Company, and TrussLok structural screws are produced by FastenMaster-OMG, Inc. Structural screws must be installed per manufacturer's recommendations.

FASTENER CLEARANCES FOR MULTIPLE-PLY MEMBERS

Fastener	A		B		C		D
	Min.	Min.	Max.	Min.	Max.	Min.	
10d & 16d Nails	2"	2"	6"	4"	12"	3"	
Bolts & Screws	2"	4"	12"	4"	24"	3"	

Spacings closer than those above may be acceptable, but require special consideration. Contact your technical representative.



MINIMUM FASTENING REQUIREMENTS FOR TOP LOADED MEMBERS

Fastener Type	LVL Depth	3 1/2" Wide		5 1/4" Wide		7" Wide	
		Diagram	Diagram	Diagram	Diagram	Diagram	Diagram
		2-Ply 1 1/4"	3-Ply 1 1/4"	1 1/4" + 3 1/2"	4-Ply 1 1/4"	2-Ply 1 1/4" + 3 1/2"	2-Ply 3 1/2"
10d (0.128" x 3") Nails	7 1/4" ≤ d < 14"	3 rows @ 12" o.c.	3 rows @ 12" o.c. (ES)	3 rows @ 12" o.c.	-	3 rows @ 12" o.c. (ES)	-
	d ≥ 14"	4 rows @ 12" o.c.	4 rows @ 12" o.c. (ES)	4 rows @ 12" o.c.	-	4 rows @ 12" o.c. (ES)	-
16d (0.162" x 3 1/2") Nails	7 1/4" ≤ d < 14"	2 rows @ 12" o.c.	2 rows @ 12" o.c. (ES)	2 rows @ 12" o.c.	-	2 rows @ 12" o.c. (ES)	-
	d ≥ 14"	3 rows @ 12" o.c.	3 rows @ 12" o.c. (ES)	3 rows @ 12" o.c.	-	3 rows @ 12" o.c. (ES)	-
1/2" Through Bolts	d ≥ 7 1/4"	2 rows @ 24" o.c.	2 rows @ 24" o.c.		2 rows @ 24" o.c.		-
SDS 1/4" x 3 1/2", WS35, 3 3/8" TrussLok		2 rows @ 24" o.c.	2 rows @ 24" o.c. (ES)	2 rows @ 24" o.c.	-	2 rows @ 24" o.c. (ES)	-
SDS 1/4" x 6", WS6		-	-	-	2 rows @ 24" o.c. (ES)		-
5" TrussLok		-	2 rows @ 24" o.c.		-	-	-
6 3/4" TrussLok		-	-	-	2 rows @ 24" o.c.		-

NOTES:

1. Minimum fastening requirements for depths less than 7 1/4" require special consideration. Please contact your technical representative.
2. Three general rules for staggering or offsetting for a certain fastener schedule: (1) if staggering or offsetting is not referenced, then none is required; (2) if staggering is referenced, then fasteners installed in adjacent rows on the front side are to be staggered up to one-half the o.c. spacing, but maintaining the fastener clearances above; and (3) if "ES" is referenced, then the fastener schedule must be repeated on **each side**, with the fasteners on the back side offset up to one-half the o.c. spacing of the front side (whether or not it is staggered).

SIDE LOADED MEMBER

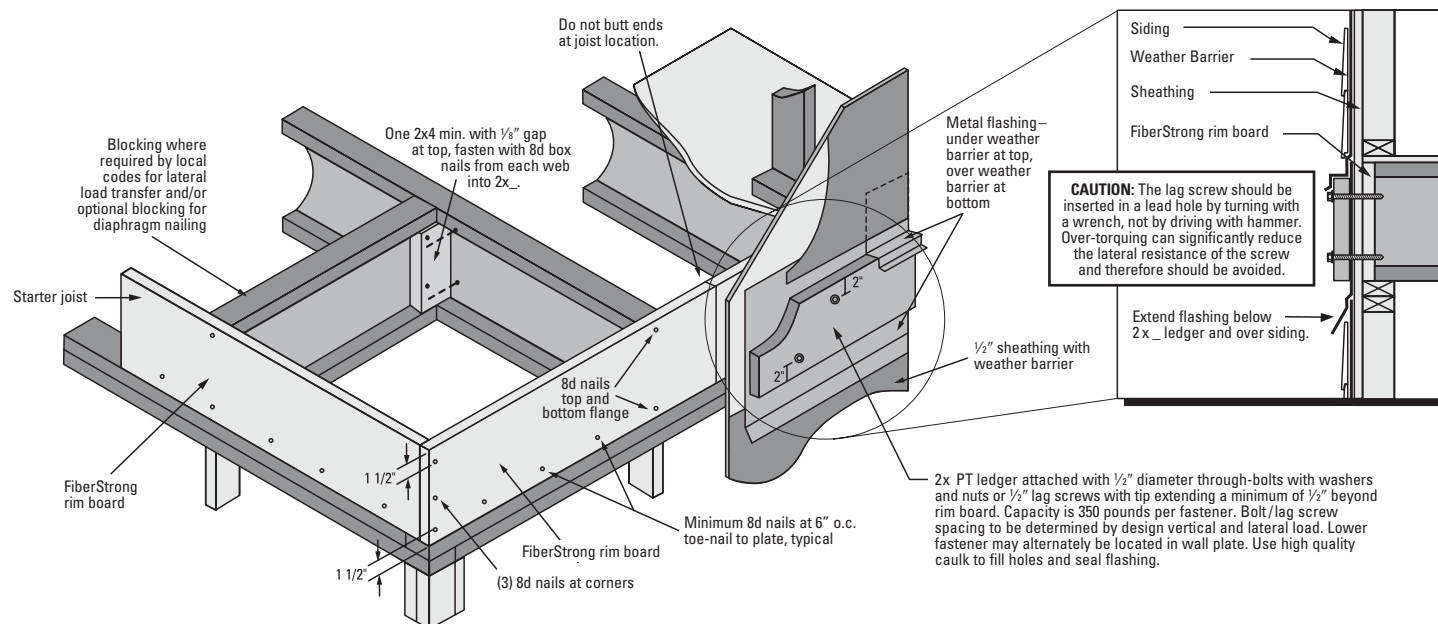
For side loaded members additional fasteners may be required. Please refer to the GP Engineered Lumber Product Guide.

F5

F6

FIBERSTRONG® RIM CLOSURE AND DECK ATTACHMENT

Vertical load transfer of rim board = 4850 plf

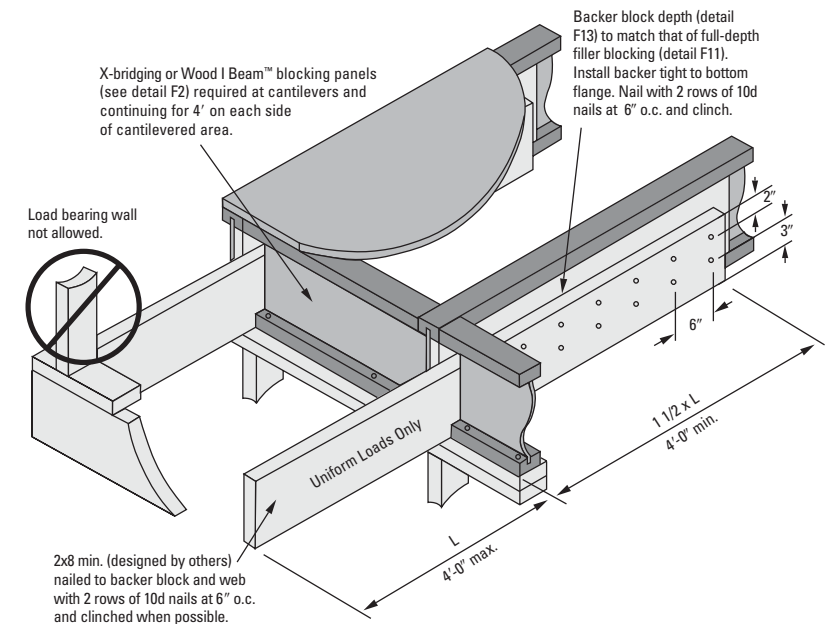


Check local building code for appropriate detail in areas of high lateral load.

CANTILEVERS FOR BALCONIES (NO WALL LOAD FROM ABOVE)

C5

CANTILEVER, DROPPED



INSTALLING A GLUED-NAILED FLOOR SYSTEM

1. Snap a chalk line across the I-joists four feet in from the wall for panel edge alignment and as a boundary for spreading glue.
2. Wipe any mud, dirt, water, or ice from I-joist flanges before gluing.
3. Spread only enough glue to lay one or two panels at a time, or follow specific recommendations from the glue manufacturer.
4. Lay the first panel with tongue side to the wall, and nail in place. This protects the tongue of the next panel from damage when tapped into place with a block and sledgehammer.
5. Apply a continuous line of glue (about 1/4-inch diameter) to the top flange of a single I-joist. Apply glue in a winding pattern on wide areas, such as with wide flange joists and double I-joists.
6. Apply two lines of glue on I-joists where panel ends butt to assure proper gluing of each end.
7. After the first row of panels is in place, spread glue in the groove of one or two panels at a time before laying the next row. Glue line may be continuous or spaced, but avoid squeeze-out by applying a thinner line (1/8 inch) than used on I-joist flanges.
8. Tap the second row of panels into place, using a block to protect groove edges.
9. Stagger end joints in each succeeding row of panels. A 1/8-inch space between all end joints and 1/8-inch at all edges, including T&G edges, is recommended. (Use a spacer tool or an 8d common nail to assure accurate and consistent spacing.)
10. Complete all nailing of each panel before glue sets. Check the manufacturer's recommendations for allowable cure time. (Warm weather accelerates glue setting.) Use 6d ring- or screw-shank nails for panels 3/4-inch thick or less, and 8d ring- or screw-shank nails for thicker panels. Space nails per the table at right. Closer nail spacing may be required by some codes, or for diaphragm construction. The finished deck can be walked on right away and will carry construction loads without damage to the glue bond.

APA RATED® STURD-I-FLOOR® PANELS FASTENER SCHEDULES FOR WOOD I BEAM JOISTS™

Span Rating (Maximum Joist Spacing) (in.)	Panel Thickness ⁽²⁾ (in.)	Fastening: Glue-Nailed ⁽³⁾		
		Nail Size and Type	Supported Panel Edges	Intermediate Supports
16	23/32 ⁽⁵⁾	6d ring- or screw-shank ⁽⁴⁾	12	12
20	23/32 ⁽⁵⁾	6d ring- or screw-shank ⁽⁴⁾	12	12
24	23/32, 3/4	6d ring- or screw-shank ⁽⁴⁾	12	12
	7/8	8d ring- or screw-shank ⁽⁴⁾	6	12

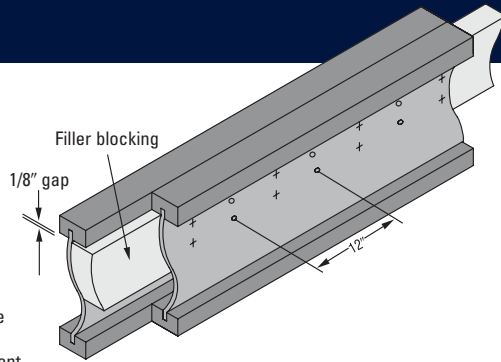
- (1) Special conditions may impose heavy traffic and concentrated loads that require construction in excess of the minimums shown.
- (2) Panels in a given thickness may be manufactured in more than one Span Rating. Panels with a Span Rating greater than the actual joist spacing may be substituted for panels of the same thickness with a Span Rating matching the actual joist spacing. For example, 19/32-inch-thick Sturd-I-Floor panels 20 oc may be substituted for 17/32-inch-thick Sturd-I-Floor panels 16 oc over joists 16 inches on center.
- (3) Use only adhesives conforming to APA Specification AFG-01, or ASTM D3498 applied in accordance with the manufacturer's recommendations. If OSB panels with sealed surfaces and edges are to be used, use only solvent-based glues; check with panel manufacturer.
- (4) 8d common nails may be substituted if ring- or screw-shank nails are not available.
- (5) Recommended minimum thickness for use with I-joists.
- (6) Minimum nail spacing into wide face of top flange is 2" for 10d box, 12d box, 8d and smaller nails (3" for 10d and 12d common).

Important Note: Floor sheathing must be field glued to the I-joist flanges in order to achieve the allowable spans. If sheathing is nailed only, reduce I-joist spans in the Span Table by 1 foot.

DOUBLE I-JOISTS

F11 DOUBLE JOIST CONSTRUCTION WITH FILLER

- Support back of web during nailing to prevent damage to web-flange connection.
- Leave 1/8" gap between top of filler blocking and bottom of top flange.
- Block solid between joists. For all applications except cantilever reinforcement, filler need not be one continuous length, but must extend the entire length of span. For double I-joist cantilever reinforcement C4, filler must be one continuous piece extending the full length of the reinforcement.
- Place joists together and nail from each side with 2 rows of 10d (16d for WI 80 and GPI 90) nails at 12" o.c., clinched when possible. Stagger rows from opposite sides by 6".



Note: Filler blocks and fastening between joists can be omitted when double joists are loaded evenly from above to the tops of both joists, such as when a parallel bearing wall is directly centered over the double joist.

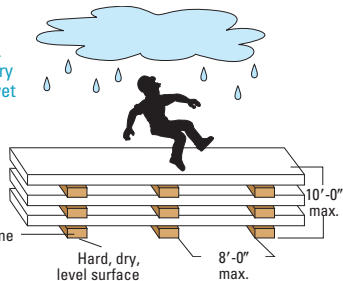
Joist Series	Joist Depth	Regular Filler Blocking Use in detail F12	Full-Depth Filler Blocking Use in details C4, F13, F14 & R7
GPI 20	9 1/2"	2x6	2x6
	11 7/8"	2x6	2x8
	14"	2x8	2x10
GPI 40	9 1/2"	2x6 + 3/8" OSB/Plywood	2x6 + 3/8" OSB/Plywood
	11 7/8"	2x6 + 3/8" OSB/Plywood	2x8 + 3/8" OSB/Plywood
	14"	2x8 + 3/8" OSB/Plywood	2x10 + 3/8" OSB/Plywood
GPI 65 WI 40 WI 60	9 1/2"	2x6 + 5/8" OSB/Plywood	2x6 + 5/8" OSB/Plywood
	11 7/8"	2x6 + 5/8" OSB/Plywood	2x8 + 5/8" OSB/Plywood
	14"	2x8 + 5/8" OSB/Plywood	2x10 + 5/8" OSB/Plywood
	16"	2x8 + 5/8" OSB/Plywood	2x12 + 5/8" OSB/Plywood
GPI 90 WI 80	11 7/8"	(2) 2x6	(2) 2x8
	14"	(2) 2x8	(2) 2x10
	16"	(2) 2x8	(2) 2x12

LVL STORAGE, HANDLING, AND INSTALLATION

You're purchasing a premium Georgia-Pacific product—protect your investment! Proper product care minimizes problems. Failure to follow good procedures for storage, handling and installation could result in unsatisfactory performance and unsafe structures. When handling Georgia-Pacific products use personal protective equipment for eyes, hands and feet.

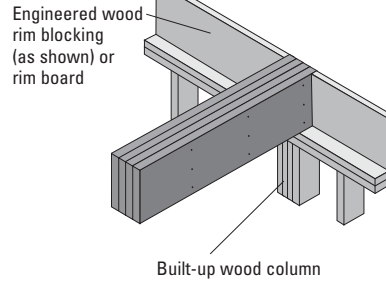
- GP Lam LVL should be stored and handled lying flat and protected from the weather (sun and precipitation). Keep covered until installed.
- Keep the LVL above ground to minimize the absorption of ground moisture and allow air circulation.
- Re-cover unused products with bundle wrap. Repair damage to bundle wrap with tape, more bundle wrap, plastic or weatherproof covering.
- GP Lam LVL is only to be used in covered, dry use conditions only (moisture content less than 16%). When in contact with concrete or masonry, protect LVL per code.
- GP Lam LVL is produced without camber so either edge can be used as the top (edgewise orientation).
- Nails installed in the narrow face of the LVL must be spaced no closer than 3" (8d), 4" (10-12d, 16d sinker) and 8" (16d).
- Do not ship or install any damaged LVL.**
- Deeper LVL depths have a greater potential for cupping and damage from improper storage and handling.**
- Except for cutting to length, LVL shall not be cut, drilled or notched, except as shown in the design guide. Heel cuts may be possible. Contact your GP Lam representative.
- 1 3/4" plies that are deeper than 14" require multiple plies, or must be full-depth blocked or full-depth restrained on both sides of the ply at intervals not exceeding 24" o.c.
- Lateral support of LVL compression edge is required at intervals not exceeding 24" o.c. and at bearing locations.
- Do not splice LVL like dimension lumber. LVL ends must butt over a support that provides the bearing required at each end of the LVL.
- Fasteners, hangers or connectors for LVL framing either from or into preservative or fire-retardant treated wood must be hot-dip galvanized, or stainless steel, as required by code and the type of treatment.
- Treating GP Lam LVL is not recommended, voids the warranty and could present a safety and performance concern.

CAUTION: Wrap and LVL may be slippery when icy or wet

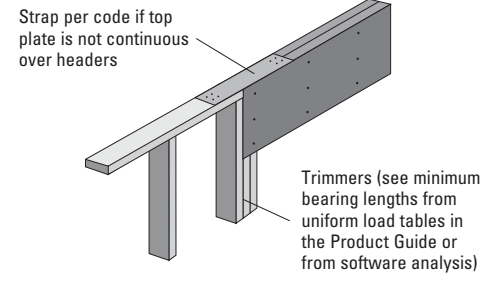


BEARING DETAILS CONFIRM THE REQUIRED BEARING AREA IS PROVIDED BY A SUPPORT THAT HAS ADEQUATE STRENGTH TO CARRY THE LOAD.

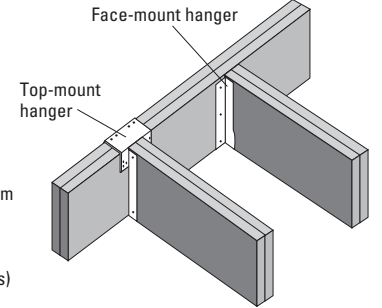
B1 BEARING AT WALL



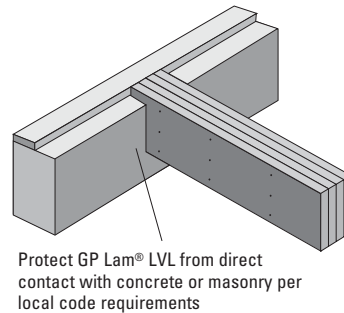
B2 BEARING FOR DOOR OR WINDOW HEADER



B3 BEAM-TO-BEAM CONNECTION

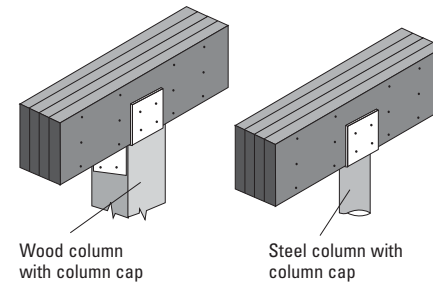


B4 BEARING AT CONCRETE WALL



B5 BEARING AT WOOD OR STEEL COLUMN

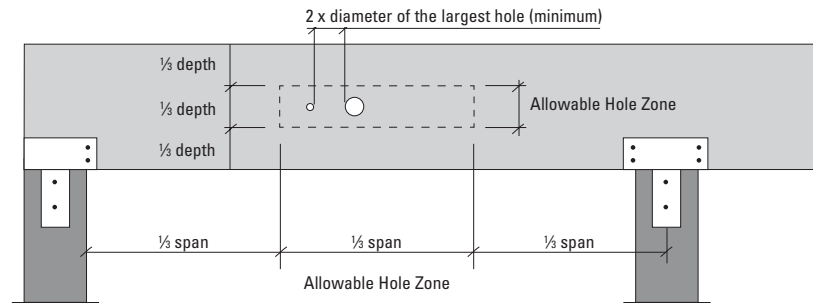
Side plates are required for lateral restraint (if at beam ends) and side plate connections may be required for lateral load transfer.



BEARING AREA IS EXTREMELY CRITICAL AND MUST BE CONSIDERED FOR EACH APPLICATION.

Multiple plies of GP Lam® LVL can be fastened together to form a beam or header of the required size, up to a maximum width of 7" for 1 3/4" and 3 1/2" thick plies.

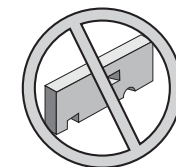
LVL ALLOWABLE HOLES



GENERAL NOTES

- The Allowable Hole Zone is suitable for uniformly loaded beams using maximum loads for any tables in the LVL User's Guide. For other load conditions or hole configurations, please contact your GP Lam LVL representative.
- Holes in cantilevers require additional analysis.
- Required hole clearance and the effects of beam deflection must be considered to prevent problems with utilities that penetrate the holes.
- Maximum hole diameter is:

Beam Depth	Maximum Round Hole Diameter
3 1/2" - 7"	3/4"
7 1/4" - 9 1/4"	1 1/2"
9 1/2" - 16"	2"
Deeper than 16"	3"



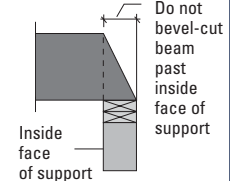
Do not cut, notch or drill holes in GP Lam LVL except as indicated in illustration for allowable holes



Do not overhang seat cuts on GP Lam LVL beams from inside face of support member



Do not notch underside of beam at bearing location



Do not bevel-cut beam past inside face of support