



LVL DOUGLAS FIR

INSTALLATION GUIDE

LVL Beams, Joists, Headers, Rafters and Columns for Floor and Roof Applications.

- HANDLING, STORAGE AND INSTALLATION GUIDELINES:
- Warning: Failure to apply good building practices regarding application, handling, storage and installation of this product can result in poor performance and/or unsafe structures.
 - Murphy LVL must be properly installed and braced before any loads are applied to the structure.
 - Murphy LVL is to be used in a dry, well ventilated environment.
 - Murphy LVL is not to be used for unintended purposes such as ramps or planks.
 - Handle Murphy LVL carefully to avoid damage. Product must avoid ground contact and be stored on a clean, level surface and kept dry.
 - Use appropriate personal protection equipment for handling and working with wood products; including but not limited to eye protection and gloves.

- GENERAL NOTES
- FOR USING THIS PRODUCT GUIDE AND UNIFORM LOAD (PLF) TABLES
- Tables are for simple span beams (with a support at each end) and uniformly distributed loads.
 - Continuous lateral restraint must be provided at the top (compression) edge of the beam to prevent buckling.
 - For other span, load or restraint conditions, design the beam using iStruct® software or other competent analysis.
 - Lateral restraint is required at supports to prevent rotation of the beam.

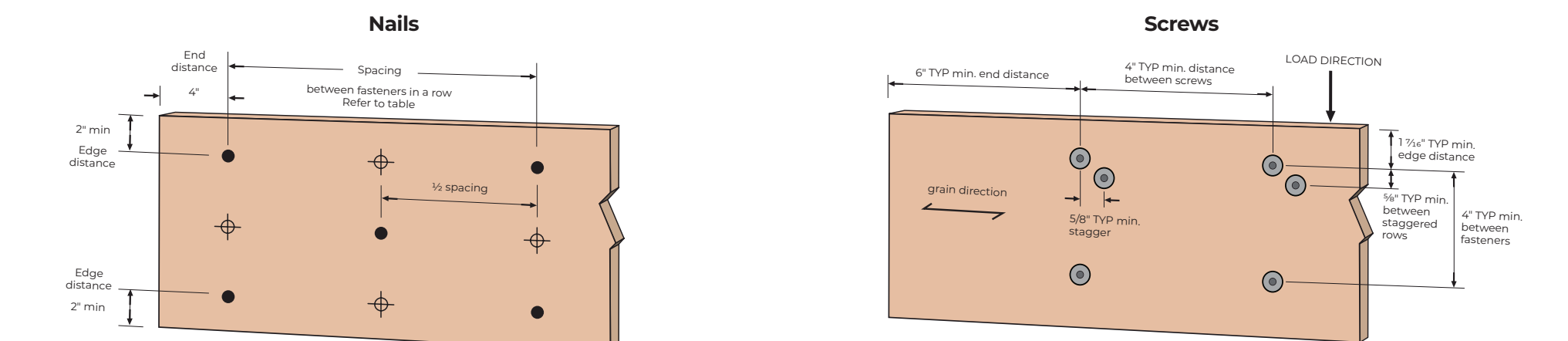
- MULTIPLE PLIES:
- Loads are for one-ply (member) 1 3/4" thick. Multiply the loads: x 2 for 2-ply beams, x 3 for 3-ply beams, x 4 for 4-ply beams
 - Beam plies (members) must be adequately connected by nails, screws or bolts as specified in this product guide or by competent analysis.
 - Two (2) or more 1 3/4" plies are recommended for depths greater than 14 inches. If a single 1 3/4" member deeper than 14" is used; pay particular attention to stability, lateral restraint and connections. Make sure these structural details are provided and properly installed.
 - 4-ply beams require bolts or long screws which are specifically manufactured to connect all the plies of a multiple ply beam. 4-ply beams must be top loaded or loaded equally from both faces unless required by a design professional.
 - Refer to the multiple ply connection information in this product guide for specific fastener information for connecting the plies. Note: Connection requirements depend on whether loads are applied equally to each ply (Typically when beam is top loaded). Or if loads are applied to one face of the multiple ply beam. For loads applied to one face, additional connections and lateral restraint may be required to avoid torsional loads/stresses in the beam.

- BEARINGS:
- Make sure bearings are structurally adequate to carry the loads and are in compliance with building codes and regulations.
 - Bearing widths shown are required to support the maximum PLF loads shown. If less than maximum PLF load is applied to the beam, tabulated bearing widths may be reduced proportionally as follows: Total Load applied/Total Load from table. Refer to examples on PLF tables.
 - This value may be conservative, specific analysis may produce a better result.

MULTIPLE-MEMBER CONNECTIONS FOR SIDE-LOADED BEAMS

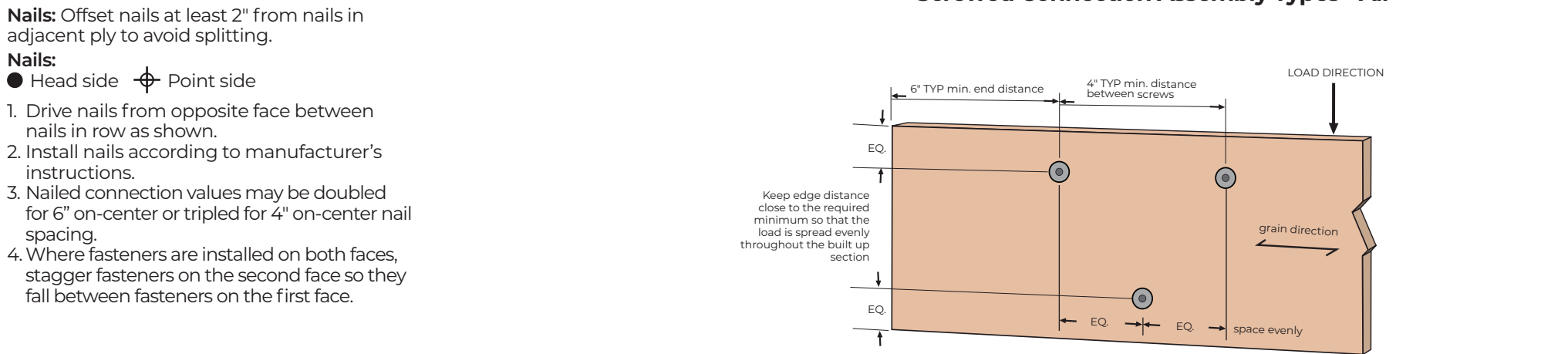
Maximum Uniform Load Applied To Either Outside Member (PLF).

Fastener Type	Fastener Placement	Rows	Fastener On-Center Spacing (in)	2-ply, 1 3/4" (3 1/2" wide)	3-ply, 1 3/4" (5 1/4" wide)	2-ply, 1 3/4"/3 1/2" (5 1/4" wide)	3-ply, 1 3/4"/3 1/2" (7" wide)
Nail Fastener Pattern ^(A)							
Assembly A							
Assembly B							
Assembly C							
Assembly D							
16d Pneumatic Nail 0.131 x 3 3/4" #							
As Shown							
2							
12							
300							
280							
3							
12							
560							
420							
420							



Spacing Requirements

Screwed Connection Assembly Types - All



Spacing Requirements

Two Fastener Staggered Uniform Load On Build-Up Assembly

Fastener Type	Fastener Placement	Rows	Fastener On-Center Spacing (in)	2-ply, 1 3/4" (3 1/2" wide)	3-ply, 1 3/4" (5 1/4" wide)	2-ply, 1 3/4"/3 1/2" (5 1/4" wide)	3-ply, 1 3/4"/3 1/2" (7" wide)	3-ply, 1 3/4"/3 1/2" (7" wide)	3-ply, 1 3/4"/3 1/2" (7" wide)
Screw Fastener Pattern ^(A)									
Assembly A									
Assembly B									
Assembly C									
Assembly D									
Assembly E									
Assembly F									

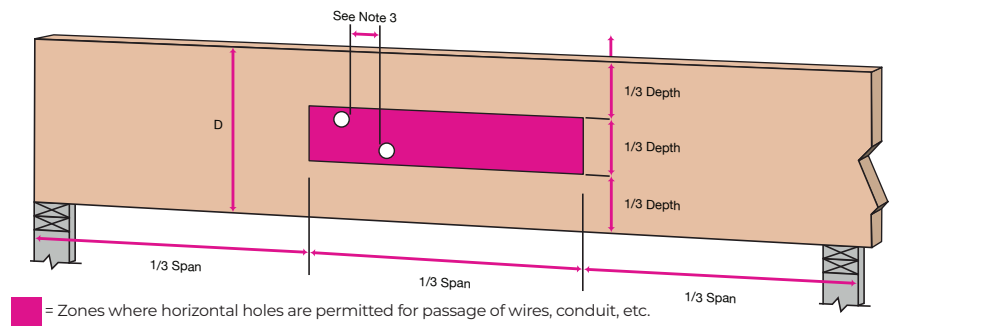
Screw Length Brand		3 3/4" SDW22338	5" SDW22500	5" SDW22500	6 3/4" SDW22634	6 3/4" SDW22634	6 3/4" SDW22634
Simpson Strong-Tie SDW EWP-Ply Screw ^(A)	As Shown	2	24	750	500 Head, 325 Point	750	500 Head, 325 Point
		9.2	1000	750 Head, 500 Point	1000	600 Head, 500 Point	600 Head, 500 Point
		16	1300	1000 Head, 750 Point	1300	1300	750 Head, 500 Point
		12	1500	1300 Head, 1100 Point	1500	1500	1000 Head, 750 Point
Screw Length Brand		3 3/4" VSWH338	5" VSWH5	5" VSWH5	6 3/4" VSWH634	6 3/4" VSWH634	6 3/4" VSWH634
Mitek WSWH Screw ^(A)	As Shown	2	24	635 Head, 600 Point	535 Head, 430 Point	535	475 Head, 380 Point
		19.2	800 Head, 755 Point	655 Head, 535 Point	670	895	590 Head, 475 Point
		16	950 Head, 905 Point	805 Head, 645 Point	805	1075	710 Head, 570 Point
		12	1270 Head, 1205 Point	1075 Head, 860 Point	1075	1430	955 Head, 765 Point
Screw Length Brand		3 1/4" FL32	5" FLO05	5" FLO05	6 3/4" FL634	6 3/4" FL634	6 3/4" FL634
FastenMaster FlatLOK-FL02 Screw ^(A)	As Shown	2	24	660	490	660	750
		19.2	825	615	825	825	1000
		16	990	735	990	990	1300
		12	1320s	980	1320	1320	1300

- 7" wide beams should be side loaded only when loads are applied to both faces to minimize rotation.
- Use 3" minimum hanger fasteners at hangers installed on Point Side of multi-ply assembly.

ADDITIONAL NOTES

- Each ply is assumed to carry same proportion of load. Loads may be applied to the head side and point side concurrently, provided the published allowable load is not exceeded for either side. (Example: a 3-ply assembly with a head side load of 755 plf and a point side load of 755 plf may be fastened together with 2 rows of screws at 16" o.c. between fasteners in a row.) To minimize rotation, 7" wide LVL may be side loaded only when loads are applied to both sides of the beam with the lesser loaded side bearing at least 25% of the overall design load.
- When hangers are installed on point side, hanger face fasteners shall be a minimum of 3" long.
- When hangers are installed on point side, hanger face fasteners shall be a minimum of 3 3/8" long.

PERMISSIBLE HOLE LOCATIONS FOR LVL BEAMS UNDER UNIFORM LOADS



- For beam depth of 3 1/4", 5 1/2", and 7 1/4", the maximum hole diameter is 3/4", 1 1/4", and 1 1/2", respectively. For deeper beams, the maximum diameter is 2".
- For beam depth of 3-1/2", 5-1/2" and 7-1/4", the maximum hole diameter is 3/4", 1-1/8" and 1-1/2" respectively. For deeper beams, the maximum diameter is 2".
- For other hole configurations, use Simpson EWP Design Studio™ or Mitek® design software.

The following chart may be used to calculate circular holes for other span and loading conditions. Contact a design professional for analysis.

ALLOWABLE SHEAR AND MOMENT CAPACITY FOR 1 3/4" LVL BEAMS

Beam Depth	Max Hole	Design Property	Circular Hole Diameter	2"	3"	4"	5"	6"	7"
9 1/4"	6.2"	Moment (ft. lbs.)	6809	6381	6023	5060	3030	0	0
		Shear (lbs.)	4694	2884	2143	1512	991	580	0
9 1/2"	6.3"	Moment (ft. lbs.)	7142	6700	6363	5421	3455	0	0
		Shear (lbs.)	4821	3005	2257	1616	1082	654	0
11 1/4"	7.5"	Moment (ft. lbs.)	9666	9113	8831	8071	6469	3556	0
		Shear (lbs.)	5709	3860	3070	2371	1762	1343	815
11 1/2"	7.9"	Moment (ft. lbs.)	10649	10061	9787	9075	7574	4845	352
		Shear (lbs.)	6207	4168	3366	2650	2020	1475	1016
14"	9.3"	Moment (ft. lbs.)	14298	13529	13313	12730	11500	9264	5582
		Shear (lbs.)	7105	5220	4396	3625	2936	2320	1776
16"	10.7"	Moment (ft. lbs.)	18158	17205	17021	16524	15478	13576	10443
		Shear (lbs.)	8120	6277	5360	4568	3838	3172	2569
18"	12.0"	Moment (ft. lbs.)	22420	21260	21001	20469	19762	18113	15386
		Shear (lbs.)	9135	7218	6344	5526	4765	4060	3421
20"	13.3"	Moment (ft. lbs.)	27073	25685	25544	25165	24367	22395	20523
		Shear (lbs.)	10760	8222	7133	6496	5709	4974	4288
22"	14.7"	Moment (ft. lbs.)	32109	30473	30348	30010	29299	28005	25873
		Shear (lbs.)	11165	9227	8328	7474	6667	5905	5190
24"	16.0"	Moment (ft. lbs.)	37521	35677	35504	35200	34560	33395	31477
		Shear (lbs.)	12180	10235	9325	8458	7634	6851	6111

NOTES FOR Allowable Shear and Moment Capacity Table

- If the demand shear at the hole location exceeds 1/3 of the published allowable shear of the member, the maximum hole diameter shall be less than or equal to 1/3 the depth of the beam.
- Hole shall be centered in the depth of the beam.
- Minimum hole spacing shall be 2x maximum hole diameter.
- Tabulated moment capacities have been adjusted by a volume factor Cv=(2/3)
- CD=1.0 load duration was used for tabulated values.
- Refer to details in this installation guide for hole placement requirements.
- Reference document: APA Technical Note V900, equations (1) and (3) were used to calculate table values.

MULTIPLE MEMBER CONNECTIONS

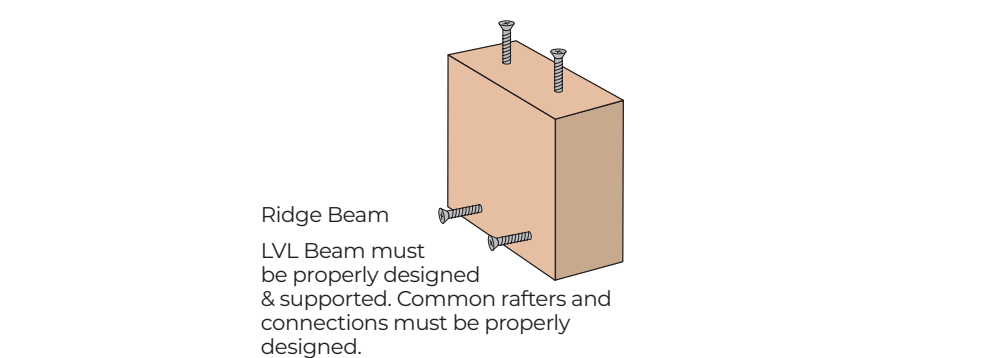
- GENERAL NOTES
- Maximum loads for fasteners are shown in the table on the facing page.
 - Connections are for uniform loads listed in this product guide. Concentrated or other load conditions require special design.
 - Make sure the load capacity of the beam meets or exceeds the load capacity of the fasteners.
 - 4-ply beams must be top loaded or loaded equally from both faces. For other load conditions, special design is required to avoid torsional stresses in the beam.
 - Do not use more than 4-ply for multiple member beams.

MULTIPLE MEMBER CONNECTIONS FOR TOP LOADED BEAMS

- Load must be equally distributed to each ply of the multiple member beam.
- Use the minimum connections; nails, bolts or screws from the SIDE LOADED table.

MULTIPLE MEMBER CONNECTIONS FOR SIDE LOADED BEAMS

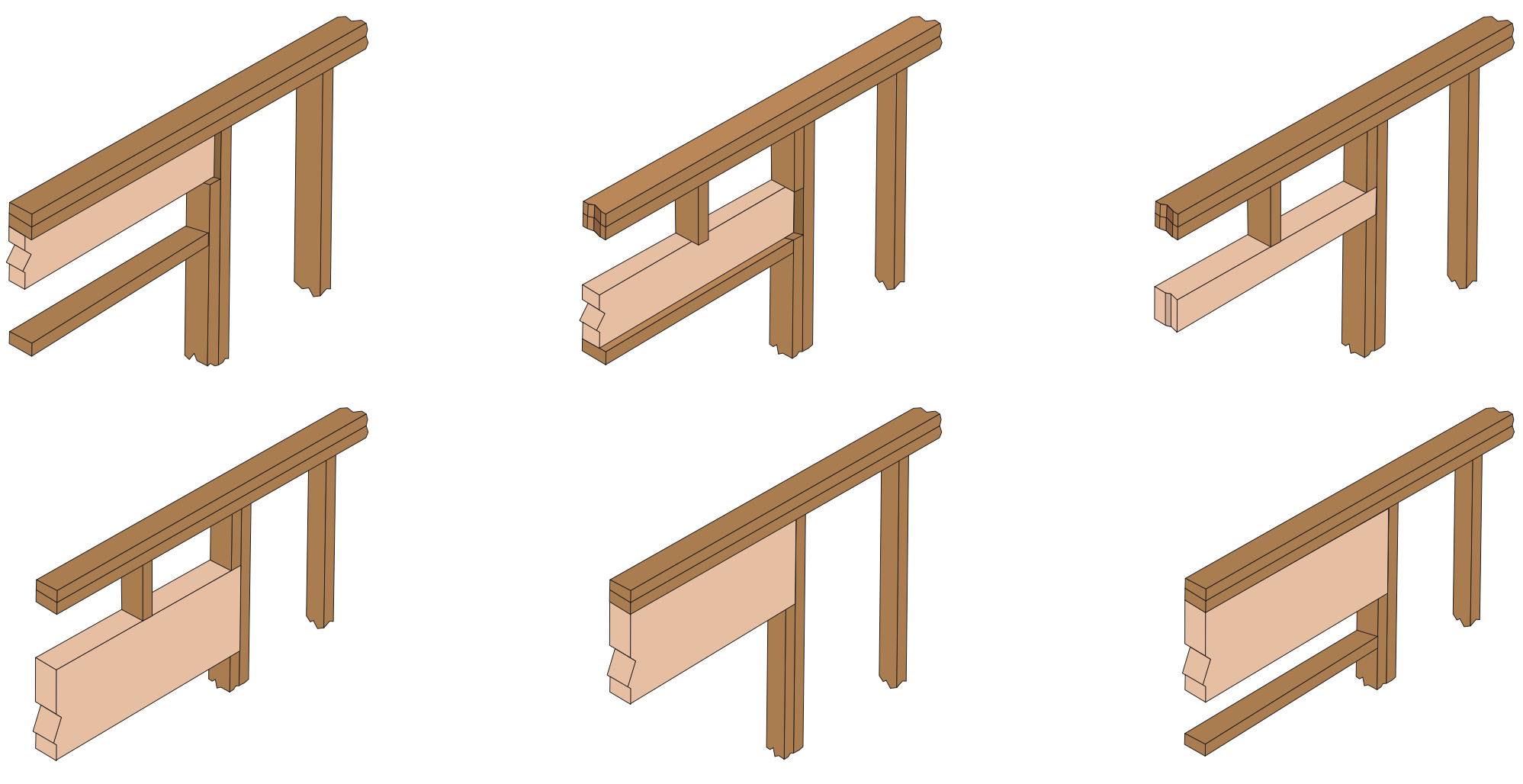
- Loads may be applied to either or both faces of the beam. Make sure load applied to either face does not exceed the value in the table.
- Minimum Uniform Loads (PLF) shown in the table are for normal load duration. Appropriate Load Duration Factors may be applied to the values as permitted by the building code.



Connector	Nailing Parallel to Glue Line	Multiple Rows of Nails
8d Box	3"	4"
8d Common	3"	4"
10d and 12d Box	4"	5"
10d and 12d Common	4"	5"
16d Common	5"	6"

- Move several rows 1/2" and snap in an equal arrangement.
- Minimum nail spacing may be reduced to 12" for 11/2" wide members.
- Nail penetration shall not exceed 21/2" for 10d and 12d nor 2" for 16d.

LVL HEADER ASSEMBLY EXAMPLES



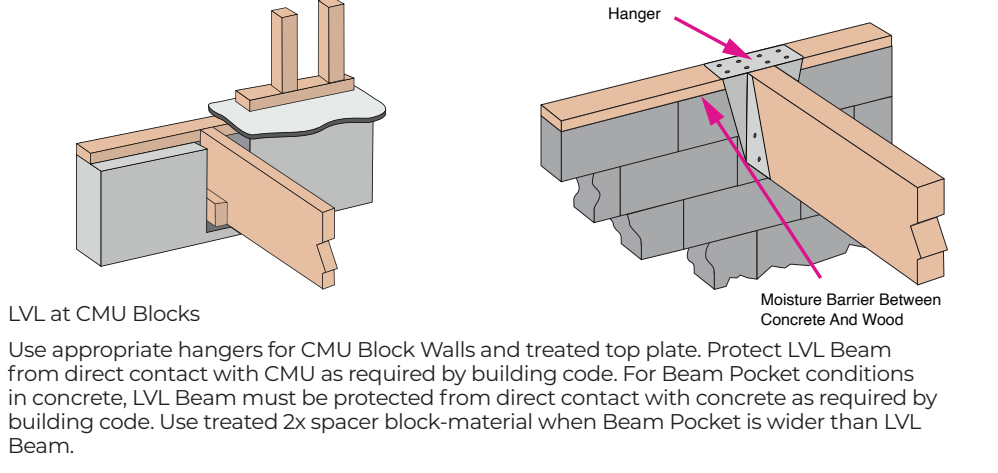
WARNING! DON'T DO

Tapered Bottom Cuts
Bird-Mouth Cuts are not permitted in LVL LVL without review by a licensed design professional.

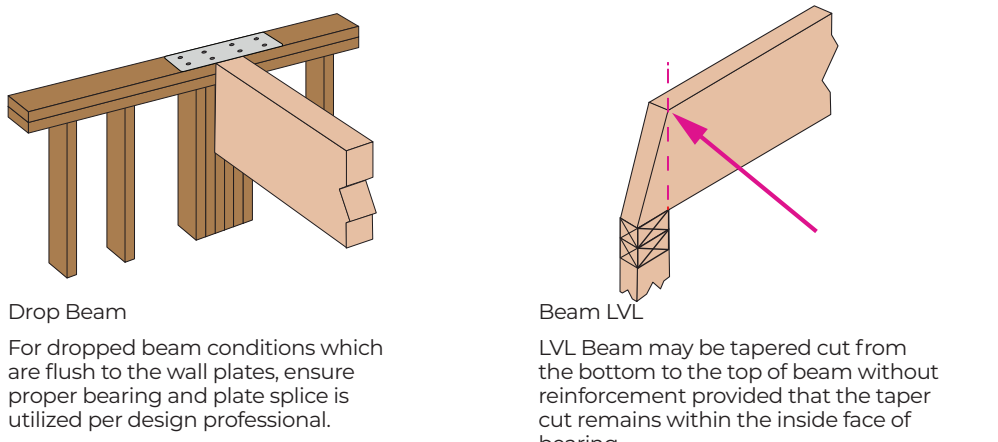
Hip & Valley Cuts
Hip & Valley Rafter is required to be full depth (uncut) at inside edge of bearing.

Notches and holes
Only circular holes are permitted.
DON'T: Cut rectangular or any other holes. Drill larger holes than permitted. Drill holes except in permitted zones. Notch LVL beams.
Cope or notch beams over support.

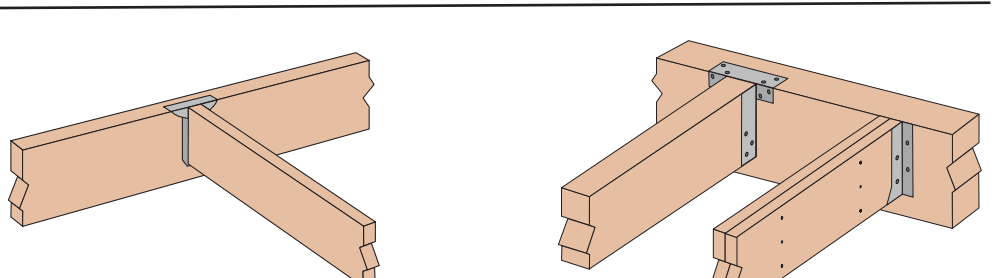
LVL at CMU Blocks



Drop Beam



Beam LVL



Single and Multi-Ply Flush Beam Conditions

For Single and Multi-Ply beam to beam connection, ensure the appropriate face mount or top flange hanger is used. Consult hanger manufacturer for capacities and connection requirements.

CERTIFIED RAW MATERIAL

Upgrading the renewable raw material to FSC products.

Currently, Murphy LVL wood use comes from FSC certified forests. It secures future growth of forests, and indicates the sustainability of wood. Our chain of custody management systems enables us to monitor the origin and logistics chain of the wood we purchase throughout the entire value chain. Our network allows for efficient, reliable logistics.

SOFTWARE

Murphy LVL may be designed using Simpson EWP Design Studio™ and Mitek® design software. (Contact your Murphy LVL distributor).

TRADEMARK CREDITS

- Simpson EWP Studio™ is a registered trademark of Simpson Strong-Tie Company, Inc.
- Murphy™ is a registered trademark of Murphy Engineered Wood.
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- FastenMaster® and TruSLOK® are registered trademarks of OMC, Inc.
- Mitek® is a registered trademark of Mitek USA, Inc.
- USP Structural Connectors™ is a registered trademark of Mitek® USA, Inc.

Murphy LVL provides competitive and environmentally friendly wood products for the construction industry and distribution partners. The products are manufactured from Douglas Fir, a sustainable raw material of premium quality. Murphy LVL Douglas Fir is manufactured by Murphy Engineered Wood.

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