

EWP INSTALLATION GUIDE



TABLE OF CONTENTS

3

Product Notes

4

Design Notes

5

Installation Notes

6

Wood I-Joist Installation to Wood
Top Flange Hangers
Common Nailing Errors
Correct Slant Nail Installation

7

Support Height & Lateral Stability
Welded Top Flange
Nailer Installations

8-10

Nails

11-12

Joining Multi-Ply Engineered Wood
(EWP) Beams with WSWH Screws

13

Joining Multi-Ply Engineered Wood
(EWP) Beams with WS Screws

14

LSSH General Slope / Skew Hangers

15

TMP / TMPH Variable Pitch Connectors

16

Footnotes

EWP INSTALLATION GUIDE

Product Notes

- MiTek's Product Catalog reflects the most current information available at the time of printing. However, we are continually improving our products through better engineering design and development and recommend visiting our website for the latest on-line version of the catalog. MiTek reserves the right to change specifications, designs, and models at any time without notice and liability for such changes. MiTek's catalog may not be reproduced in whole or in part without the prior written approval of MiTek .
- MiTek's Product Catalog reflects changes to product design and allowable loads to some MiTek products. The information presented in this publication supersedes all previously published product catalogs.
- MiTek's Product Catalog was designed as a general reference for the MiTek Product Line. Various specialized publications have also been developed for design professionals, truss manufacturers, contractors, and building material distributors. Consequently, product information may vary from one publication to another due to product development testing and revisions to code evaluation report upgrades. We recommend visiting our website for the latest on-line version of these specialized publications.
- The type and quantity of fasteners used to install MiTek products is critical to connector performance. To achieve the allowable loads presented in MiTek's Product Catalog, all specified fasteners must be used and proper installation procedures observed. Verify that the dimensions of the supporting members are sufficient to receive the specified fasteners. All product modifications will void the warranty unless prior written consent from MiTek has been obtained.
- Some connector models are listed more than once to indicate installation and/or fastener options.
- New products or updated product information are designated in **blue**.
- Throughout MiTek's Product Catalog, dimensions are expressed in inches and loads in pounds unless specifically noted otherwise.
- Some MiTek products show both nail fastening and bolt schedules. In those cases, specific loads for each has been identified. Nail and bolt values cannot be combined unless noted otherwise.
- Load values for 8d, 10d, 16d, and 20d designations in the fastener schedules throughout MiTek's product catalog refer to common wire nails unless noted otherwise. Nails shall conform to a recognized national standard, such as ASTM F1667, as prescribed by the model building codes.
- Diamond holes are for optional nailing for maximum listed capacity or for temporary hanger fastening during installation.
- Fastener installation may cause wood to split and reduce a fastener's ability to transfer loads into the supporting member. **If wood splitting occurs, consider pre-drilling holes not exceeding 75% of the nail diameter (per the National Design Specification for Wood Construction (NDS) Section 11.1.6.3).**
- Bolts specified in this catalog are through-bolts and must conform to requirements for ASTM A 307 Grade A, or ASME SAE Grade 2, or better unless noted otherwise.
- Anchor Bolts must conform to ASTM F 1554.
- MiTek connectors listed in MiTek's Product Catalog are manufactured for specific sizes of standard dimensional lumber, plated trusses, or structural composite lumber. **For applications involving unusual supporting conditions environments, contact MiTek. Wood shrinkage or expansion, caused by lack of moisture or excessive moisture, may adversely affect connector installation. Evaluate potential shrinkage or expansion to ensure proper connector installation and performance.**

(Continued on page 4)

EWP INSTALLATION GUIDE

Product Notes (continued)

- The load values listed in MiTek's product catalog are based on installation to wood with a moisture content of less than 19%, and used in dry service conditions. Load reductions, in accordance with the applicable local Building Code, shall be taken where wood moisture content is greater than 19% at the time of installation or where used in wet service conditions.
- Unless otherwise noted, MiTek products may not be bent or cut for any reason unless prior written consent from MiTek has been obtained.

Field alterations may significantly reduce the published allowable load values in this catalog.



THIS IS A REQUIREMENT ONLY FOR THE STATE OF CALIFORNIA.

Based on our experience, we do not believe that our products when used as intended present an exposure risk of ingestion, inhalation or by absorption through the skin to any of Prop 65's current list of chemicals. Nonetheless, out of an abundance of caution, and in the event our MiTek products are misused or used in ways we do not foresee, we are taking the precaution of placing a short-form Prop 65 warning on the labels of our retail packaged products, and in some instances, on signs posted in the California retail locations where our products are sold to consumers without labels.

MiTek manufactures and supplies some products that are not intended as consumer products, and are sold through professional construction supply channels and/or delivered directly to job sites. These products will not carry the Prop 65 warning. To learn more about the California Proposition 65, visit www.P65Warning.ca.gov. For MiTek specific questions please contact MiTek Customer Service at 800-328-5934 with any questions or visit our website, www.MiTek-us.com.

Design Notes

- Some products have allowable loads that can be applied in several directions (F₁, F₂, and uplift is a common example). When these products have F₁, F₂ and/or uplift loads applied simultaneously, it is necessary to make the following check:

$$\frac{F_1 \text{ applied}}{F_1 \text{ allowable}} + \frac{F_2 \text{ applied}}{F_2 \text{ allowable}} + \frac{\text{Uplift applied}}{\text{Uplift allowable}} \leq 1.0$$

- Alternatively, for simultaneous loads in more than one direction for embedded truss anchors, LUGT girder tiedowns, hurricane angles and connectors, and rafter ties; the applied load in each direction shall not exceed 75% of the listed allowable load in the corresponding direction.
- Unless otherwise noted, the allowable loads shown in MiTek's Product Catalog are based on Allowable Stress Design methodology. Multiply seismic and wind ASD values by 1.4 or 1.6 respectively to obtain LRFD values.
- Connector capacities may exceed the allowable capacity of the wood members involved in the connection. A qualified designer should verify that all wood members (supporting and supported) have been properly designed for the connector.
- Verify that the size of the supporting member can accommodate the connector's specified fasteners.
- Some illustrations in MiTek's Product Catalog may not reflect additional mechanical reinforcements which may be required to reduce cross grain tension or wood member bending under loading. The design professional is responsible for determining if additional mechanical reinforcement is required during construction.
- MiTek recommends the hanger height be 60% of the joist height for stability during construction.
- Allowable loads of different connector models cannot be combined to resist loads at a single connection location. For special considerations, consult MiTek Customer Service.

EWP INSTALLATION GUIDE

Installation Notes

- Use proper safety equipment during connector installations. Always wear gloves when handling connectors.
- All welding should be done in accordance with the American Welding Society (AWS) Standard by a certified welder. **Caution: Welding galvanized steel may produce harmful fumes and should only be performed in well-ventilated environments.**
- The proper type and quantity of fasteners must be used to install MiTek products. To achieve the published allowable loads, install with the fasteners specified for that particular product. Some products allow for alternate nail installations. Refer to the "Optional Nails for Face Mount Hangers" chart for load adjustments when using alternate nailing. All specified fasteners must be properly installed prior to applying load to the connection.
- Drill bolt holes a minimum of 1/32" and a maximum of 1/16" larger than the diameter of the bolt to be installed (per the 2018 NDS®, Section 11.1.3).
- Washers should always be used under the head or nut of a bolt when not in contact with the connector unless noted otherwise.
- It is permissible to use gun nails to install some connectors as long as the nail length and diameter are the same and are installed through all pre-punched nail holes. MiTek recommends the use of nail guns featuring hole-locating mechanisms. Please note that many nail guns use fasteners that are shorter than the common nail size and load reductions will result. Contact MiTek Engineering. **Caution: Always follow nail gun manufacturer's safety guidelines.**
- Joists installed in hangers should bear fully on the connector seat and shall be cut to fit against the header with a gap no greater than 1/8" between the joist end and header face.
- Multiple-ply members must be properly fastened together to distribute loads as a single member.
- Top mount hangers shall be installed with the back of the hanger tight to the face of the header.
- Top mount hangers installed in floor systems may produce unevenness. This will vary based on thickness of the top flange and nail heads. **If a problem is anticipated, the effects can be mitigated by dapping or notching the beam or cutting the subfloor at hanger locations. Face mount hangers will eliminate this problem.**

WARRANTY

MiTek Inc. ("MiTek") warrants its MiTek catalog Products to be free from material defects in manufacture and design, and further warrants that they will perform within the design limitations of its published building code approvals for the applications described, when properly installed and maintained. These warranties do not cover Product deterioration due to environmental conditions, Products that have been modified or damaged, improperly installed or used outside of published design limitations or for other applications. In the event any Product is shown to not conform to these warranties, MiTek's sole obligation, and Customer's sole and exclusive remedy, shall be, at MiTek's option, to replace the non-conforming product or refund the full purchase price paid by Customer to MiTek therefor. MITEK MAKES NO OTHER PRODUCT WARRANTIES, EXPRESS OR IMPLIED, OF ANY KIND, AND PARTICULARLY EXCLUDES ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MITEK BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, REGARDLESS OF THE LEGAL THEORY OF RECOVERY, EVEN IF IT WAS AWARE OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY CASE, MITEK's MAXIMUM LIABILITY SHALL NOT EXCEED THE PURCHASE PRICE PAID BY CUSTOMER FOR THE NON-CONFORMING PRODUCT. Some states restrict consequential or other liability damage limitations, so some of the above limitations may not apply to you. MiTek reserves the right to change this warranty periodically. Consult MiTek's website www.MiTek-US.com or contact MiTek for a current warranty statement.

EWP INSTALLATION GUIDE

WOOD I-JOIST INSTALLATION TO WOOD

Sloped I-Joists

Use sloped seat hangers and beveled web stiffeners whenever the slope exceeds the following: 1/2:12 for seat bearing lengths of 2-1/2" or less; 3/8:12 for bearing lengths between 2-1/2" and 3-1/2"; and 1/4:12 for bearing lengths in excess of 3-1/2".

Multiple I-Joist Plies

Fasten together multiple plies of wood I-Joists, in accordance with the manufacturer's installation guidelines, such that the joists act as a single unit.

Fasteners

Install only the specified nails. The flanges of wood I-Joists may split if larger diameter nails or longer nails are installed. Do not install nails larger than 16d common wire nails (0.162" diameter) into the web stiffeners in the wood I-Joist.

I-Joist Rotation

It may be necessary to install straps, blocking, or sheathing to restrain torsional rotation of a supporting wood I-Joist when using top mount I-Joist hangers.

Backer Blocks

Pattern the nails used to install backer blocks or web stiffeners in wood I-Joists to avoid splitting the block. The nail pattern should be sufficiently spaced to avoid the same grain line, particularly with solid sawn backer blocks. Backer blocks must be installed on wood I-Joist acting as the header, or supporting member. Install in accordance with the I-Joist manufacturer's installation guidelines. The nails used to install hangers mounted to an I-Joist header must penetrate through the web and into the backer block on the opposite side.

TOP FLANGE HANGERS

The thickness of the hanger metal and nail heads on top mount hangers must be evaluated for the effect on subsequent sheathing. Ensure that the top mount hanger is installed so the flanges of the hanger are not over-spread which tends to elevate the supported I-Joist

causing uneven floor surfaces and squeaking. Similarly, ensure that the hanger is installed plumb such that the face flanges of the hanger are mounted firmly against the wide-face surface of the header.



FLUSH FRAMING



⚠️ HANGER OVER-SPREAD



⚠️ HANGER NOT PLUMB

COMMON NAILING ERRORS

⚠️ WRONG ANGLE

When a nail is driven into the bottom flange of the wood I-Joist parallel to the glue lines, separation of veneers can occur which substantially reduces the design loads of the connection.



⚠️ NAIL TOO LONG

When using nails longer than MiTek's recommended nails, bottom flange splitting may occur. Also, this can raise the wood I-Joist off the seat, resulting in uneven surfaces and squeaky floors along with reduced allowable loads.



CORRECT SLANT NAIL INSTALLATION

Always secure wood I-Joist using 10d (0.148") x 1-1/2" nail driven at a 30° to 45° angle and firmly seated

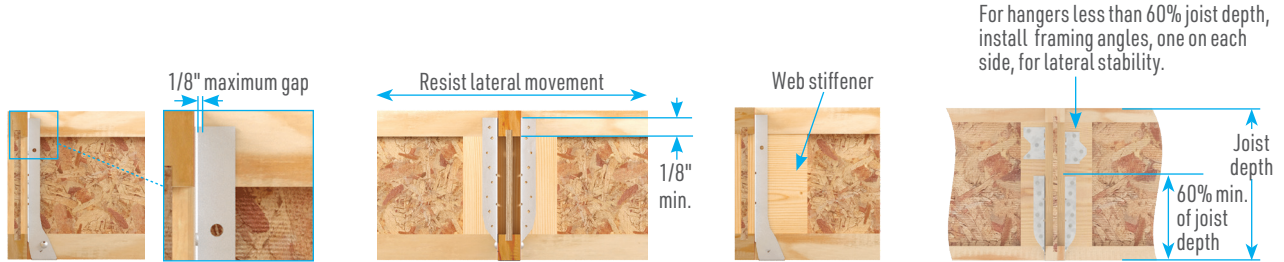


EWP INSTALLATION GUIDE

SUPPORT HEIGHT & LATERAL STABILITY

Hangers for joists **without web stiffeners** must support the I-Joist's top flange and provide lateral resistance with no less than 1/8" of contact with the top flange. MiTek recommends that hangers for joist

with web stiffeners should be 60% of the joist height for stability during construction. If this cannot be accomplished, potential joist rotation must be resolved by other means.

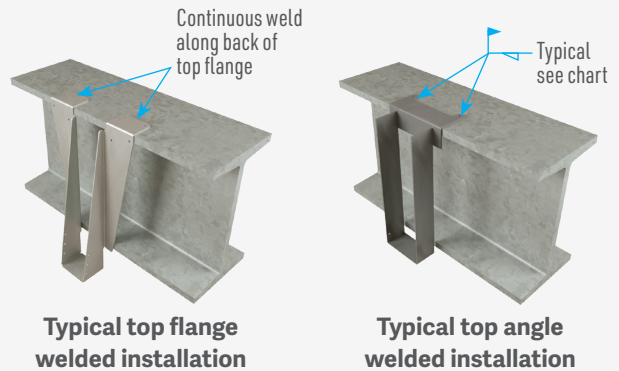


(Top flange support requirements can be verified in EWP Top Mount Hangers charts under Web stiffener Req'd. column of MiTek's Product Catalog)

WELDED TOP FLANGE

- Weld sizes and lengths shown on chart.
- Weld-on applications produce maximum allowable load listed. **Uplift loads do not apply to this application.**
- All welding should be done in accordance with the American Welding Society (AWS) Standard by a certified welder.

Caution: Welding galvanized steel may produce harmful fumes and should only be performed in well-ventilated environments.



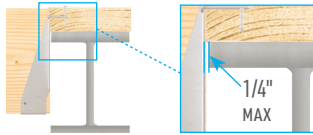
Top Angle Weld Length Chart

MiTek Welded Hanger Series	Weld Length	Top Angle Steel Gauge	Weld Size
SW	3"	14 - 10 gauge	1/8"
BPH, FWH, HBPH, PHM, SWH	4"	7 gauge	3/16"
FWHBP, FWHFM, FWHH, KLB, KHW, PHXU	6"	3 gauge	1/4"
KB, KGB, KHGB, KHHB, KGLS, KGLST, KGLT, KHGLS, KHGLST	8"		
HLBH, KHGLT	10"		

Weld shall be distributed evenly.

EWP INSTALLATION GUIDE

NAILER INSTALLATIONS



CORRECT ATTACHMENT

Avoid direct contact between hangers and steel beams which may cause squeaks

Correct Hanger Attachment to Nailer

A nailer or sill plate is considered to be any wood member attached to a steel beam, concrete block wall, concrete stem wall, or other structure unsuitable for nailing, which is used as a nailing surface for top mount hangers to hold beams or joists.

Nailer Sized Correctly

Top flange of hanger is fully supported and recommended nails have full penetration into nailer, resulting in a carried member hanging safely at the proper height. The nailer must be sized to fit the support width as shown and be of sufficient thickness to satisfy recommended top flange nailing requirements. A design professional must specify nailer attachment to steel beams.

WRONG NAILER SIZE CAUSES COMPONENT FAILURE



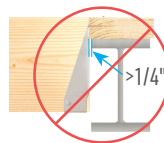
! TOO NARROW

Top flange not fully supported can cause nail break-out. Or, by fully supporting top flange, hanger is tilted back, causing lifting of carried member which results in uneven surfaces and squeaky floors.



! TOO THIN

Top flange nailing cannot fully penetrate nailer, causing reduced allowable loads. Never use hangers which require multiple face nails since the allowable loads are dependent on all nail holes being used.



! TOO WIDE

Loading can cause cross grain breaking of nailer. The recommended nailer overhang is 1/4" maximum per side.

NAILS

Proper fasteners are a critical component in a sound wood frame structure. To ensure successful installations of its connectors, MiTek offers a full range of structurally-rated nails. All galvanized nails supplied by MiTek are Hot-dipped for greater corrosion resistance. Any MiTek connector requiring a NA16D-RS or NA20D nail is shipped with the nails attached to the connector in convenient poly bags.

Finish: on page 9 **Materials:** ASTM A 123; ASTM A 153 (HDG)

NA11 .131 x 1-1/2"



N8-GC .131 x 1-1/2"



N10C .148 x 3"



N10C-GC .148 x 3"



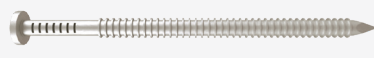
NA9D .148 x 1-1/2"



N10-GC .148 x 1-1/2"



NA16D-RS .148 x 3-1/2"



NA16D .162 x 2-1/2"



N16C .162 x 3-1/2"



N16C-GC .162 x 3-1/2"



NA20D .192 x 2-1/2"



EWP INSTALLATION GUIDE

NAILS

Installation:

→ Allowable shear values assume nail embedment into the wood of the entire nail or 10 nail diameters (whichever is less). Otherwise, the nail must be embedded at least 6 nail diameters, with the load reduced using the equation below:

$$\text{Reduced Load} = \frac{\text{Published Load} \times \text{Actual Penetration}}{\text{Nail Diameter} \times 10}$$

→ Load reductions may occur if nails are used other than those specified. See the chart "Optional Nails for Face Mount Hangers" on page 10 for load reduction factors regarding nail substitutions.

→ For pneumatic nail use, reference MiTek's technical bulletins.

Gun-Nails:

It is permissible to use nail guns to install connectors.

Note:

- Many nail guns use fasteners smaller than the common nail size specified with MiTek product, allowable load must be reduced accordingly.
- Drive through pre-punched nail holes only.
- Do not over drive.
- Recommend the use of guns featuring hole locating mechanisms.

Nail Specification Table

Finish ^{3,7}	Size	MiTek Stock No. ⁷	Ref. No.	Dimensions (in)		Nails Per Lb.	DF/SP Allowable Shear per Nail (Lbs.) ^{1,2,4,5}								Withdrawal Load ⁶	
				Nail Diameter	Length		Steel Gauge									
							3	7	10	12	14	16	18	20		22
HDG	8d x 1-1/2	NA11	N8	0.131	1-1/2	152	--	--	--	--	--	96	95	94	94	32
	10d x 1-1/2	NA9D	N10	0.148	1-1/2	100	--	--	139	127	119	116	114	114	113	36
	10d Common	N10C	10DHDG	0.148	3	70	--	158	139	127	119	116	114	114	113	36
	16d x 2-1/2	NA16D	N16, N16EG	0.162	2-1/2	66	194	181	161	149	141	138	137	136	--	40
	16d Common	N16C	16DHDG	0.162	3-1/2	48	194	181	161	149	141	138	137	136	--	40
	20d x 2-1/2	NA20D	--	0.192	2-1/2	41	234	207	187	175	168	--	--	--	--	47
GC	8d x 1-1/2	N8-GC	--	0.131	1-1/2	152	--	--	--	--	--	96	95	94	94	32
	10d x 1-1/2	N10-GC	--	0.148	1-1/2	100	--	--	139	127	119	116	114	114	113	36
	10d Common	N10C-GC	--	0.148	3	70	--	158	139	127	119	116	114	114	113	36
	16d Common	N16C-GC	--	0.162	3-1/2	48	194	181	161	149	141	138	137	136	--	40
SS	8d x 1-1/2	SSNA8D	SSN8	0.131	1-1/2	147	--	--	--	--	--	96	95	94	94	32
	10d x 1-1/2	SSNA10D	SSN10	0.148	1-1/2	126	--	--	139	127	119	116	114	114	113	36
	8d Common	SSN8C	SS8D	0.131	2-1/2	94	--	--	--	--	99	96	95	94	94	32
	10d Common	SSN10C	SS10D	0.148	3	67	--	158	139	127	119	116	114	114	113	36
	16d Common	SSN16C	SS16D	0.162	3-1/2	44	194	181	161	149	141	138	137	136	136	40
Bright	8d Common	8d Common	--	0.131	2-1/2	126	--	--	--	--	99	96	95	94	94	32
	10d Common	10d Common	--	0.148	3	70	--	158	139	127	119	116	114	114	113	36
	16d Sinker	16d Sinker	--	0.148	3-1/4	60	162	158	139	127	119	116	114	114	--	36
	16d Ring Shank	NA16D-RS	--	0.148	3-1/2	57	183	168	150	--	--	--	--	--	--	36
	16d Common	16d Common	--	0.162	3-1/2	48	194	181	161	149	141	138	137	136	--	40
	20d Common	20d Common	--	0.192	4	29	234	207	187	175	168	--	--	--	--	47

- 1) Loads are calculated to specifications of Part 12 of the National Design Specifications for Wood Construction (NDS[®]), 2018 Edition.
- 2) Loads apply to Douglas Fir (G=0.50) and Southern Pine (G=0.55). For Spruce-Pine-Fir (G=0.42) multiply above values by 0.86, for other wood types refer to NDS[®] or consult MiTek.
- 3) HDG = Hot-Dip Galvanized; SS = Stainless Steel; GC = Gold Coat; Bright = No Finish.
- 4) For 3 gauge steel with Fu=58,000 psi and 7 gauge thru 22 gauge steel with Fu=45,000 psi. Shear values assumes full penetration of at least 10 nail diameters.

- 5) Fastener values may be increased for duration of load.
- 6) Withdrawal loads are in pounds (lbs) per linear inch of embedment into main member.
- 7) Bright finish common and sinker nails are listed in table for reference only. MiTek does not stock these type nails.
- 8) Stainless steel 8d x 1-1/2 nails are ring shank. Other stainless steel nail sizes in table are smooth shank, and withdrawal values are in accordance with Table 12.2D of the 2018 NDS.

EWP INSTALLATION GUIDE

FASTENER IDENTIFICATION / FEATURES

Round Holes:

Always fill all (normal-size) round nail holes, unless otherwise noted.



Diamond Holes:

Optional nailing for maximum listed capacity or for temporary hanger fastening during installation.



Large Round Holes:

For concrete/masonry installation; no need to be filled when connected to wood. Large round holes may be used for manufacturing which do not require a fastener. Verify fastener schedule in product catalog.

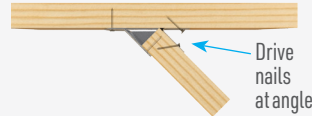


Obround Holes:

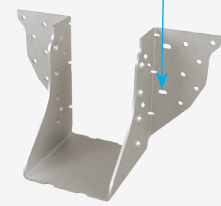
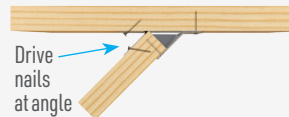
For ease of nailing at a tight location; always fill.



Right skew



Left skew



When there are **MIN** and **MAX** values:

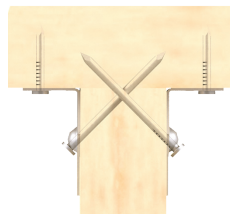
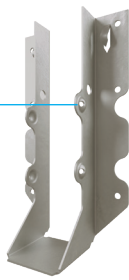
MIN: fill all round nail holes

MAX: fill all round and diamond holes



Dimple Holes:

Guide double shear nails into the joist and header at a 30° to 45° angle



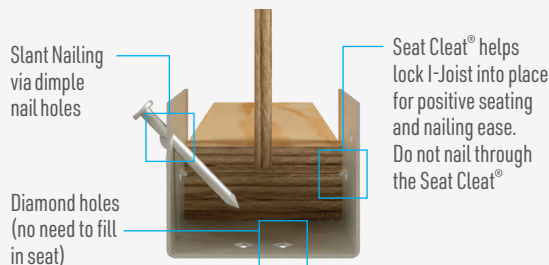
Use specified standard length common nails. 16d common and 10d common nails are 3-1/2" and 3" long respectively.

Optional Nails for Face Mount Hangers

(Does not apply to slant nail hangers: HUS, JUS, MSH, MUS, THDH)

Specified Nail	Replacement Fastener	Allowable Load Adjustment Factor
		DF
10d x 1-1/2 (0.148" x 1-1/2")	8d x 1-1/2 (0.131" x 1-1/2")	0.83
10d common (0.148" x 3") 12d common (0.148" x 3-1/4")	8d common (0.131" x 2-1/2")	0.83
	10d Sinker (0.120" x 2-7/8")	0.71
	10d x 1-1/2 (0.148" x 1-1/2")	1.00
	8d common (0.131" x 2-1/2")	0.70
16d common (0.162" x 3-1/2")	10d common (0.148" x 3")	0.84
	12d common (0.148" x 3-1/4")	0.84
	10d x 1-1/2 (0.148" x 1-1/2")	0.84
	10d Sinker (0.120" x 2-7/8")	0.60
	16d Sinker (0.148" x 3-1/4")	0.84
	16d x 2-1/2 (0.162" x 2-1/2")	1.00

Typical I-Joist Nailing



Drive bend line nails into header at 45° to achieve published strength

- This chart does not apply to custom hangers or hangers modified to skew and/or slope.
- This chart applies to metal side member of 14-10Ga or thinner. For steel thicker than 14-10Ga, contact MiTek for exceptions.
- Strength adjustment factor is the multiplier to the published allowable load when a nail of different size and/or type is used in lieu of a Specified Nail.
- Roofing nails shall not be substituted for any nail size or type.
- Decking nails are not to be used as a substitution for any load carrying nails.

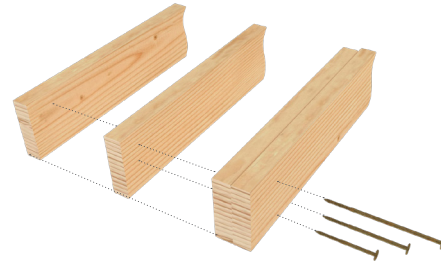
Common Nailing Errors see page 6

EWP INSTALLATION GUIDE

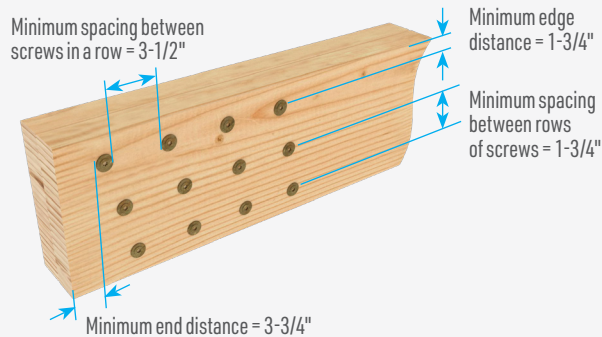
JOINING MULTI-PLY ENGINEERED WOOD (EWP) BEAMS WITH WSWH SCREWS

Installation Notes:

- Using a standard 1/2" low speed/high torque drill, install screws into the side of the outermost ply. As the threads fully engage the final ply, allow the underside of the washer head to pull the plies firmly together. Washer head will install flush with the surface of the wood, but do not overdrive as this may damage the beam.
- Refer to the information in this bulletin for proper WSWH screw size selection and fastening pattern.

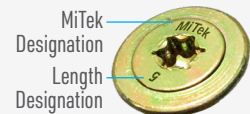


Minimum Spacing Requirements:



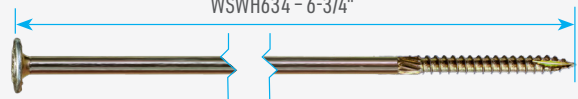
Fastener Identification

For easier selection and post installation inspection, all MiTek Structural Wood Screws carry an identifying headmarking



Screw Length

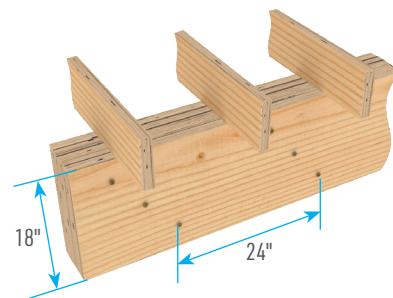
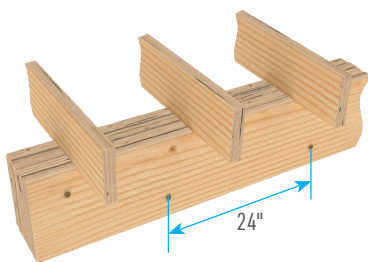
WSWH338 - 3-3/8"
WSWH5 - 5"
WSWH634 - 6-3/4"



Top Loaded Beams

Where floor joists rest on all plies of the beam, WSWH screws should be installed in two staggered rows at 24" O.C. spacing. Maintain the minimum end and edge distance as indicated above.

For beam depths of 18" or more, this pattern should be increased to three staggered rows of WSWH screws every 24" on center.



General Guidelines:

- Beams wider than 7" require special consideration by the design professional. The values on the next page do not apply.
- Excessively warped or curved lumber should never be forced into alignment by use of clamps, screws or bolts as splitting may occur, potentially decreasing the carrying capacity of the beam.
- The WSWH338, WSWH5, and WSWH634 are not designed for use with engineered wood. Refer to MiTek's Joining Multiple Member (Multi-ply) Engineered Wood (EWP) Beams Technical Bulletin as a guide for selecting the proper length wood screw for that application.
- A qualified designer or engineer should always be consulted for critical assemblies and fastening requirements.

EWP INSTALLATION GUIDE

WSWH WASHER HEAD STRUCTURAL WOOD SCREW APPLICATIONS

Fastener Size Selection by Assembly Type

(2 rows shown)



A WSWH338 = 3-3/8"



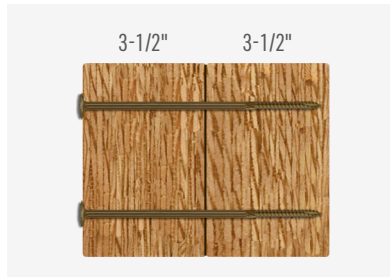
B WSWH5 = 5"



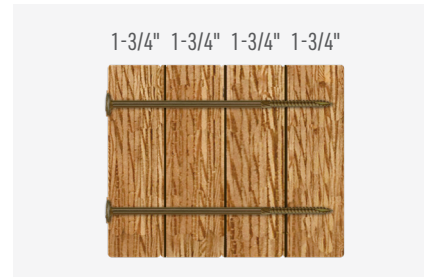
C WSWH5 = 5"



D WSWH634 = 6-3/4"



E WSWH634 = 6-3/4"



F WSWH634 = 6-3/4"

Side Loaded Beams

Where floor joists are joined to the side of the beam (typically using a joist hanger), this load chart must be used to establish the proper pattern based on the design load as determined by the engineer and noted on the plans.

Length (in)	MiTek Stock No.	No. of Screws Vertical Column	Spacing Between Screws in a Row (in)	Allowable Uniform Load Applied to Either Outside Member by Assembly Type (lbs/lineal ft) (See Graphics) ^{1,2,3,4,5}													
				EWP Wood Specific Gravity $G \geq 0.50$						EWP Wood Specific Gravity $G \geq 0.42$							
				A	B	C	D	E	F	A	B	C	D	E	F		
3-3/8	WSWH338	2	24	600								525					
			19.2	755	--	--	--	--	--	655	--	--	--	--	--	--	--
			16	905						785							
		3	12	1205						1050							
			24	905						785							
			19.2	1130	--	--	--	--	--	985	--	--	--	--	--	--	--
5	WSWH5	2	24		430	535							325	545			
			19.2	--	535	670	--	--	--	--	410	685	--	--	--	--	
			16		645	805					490	820					
		3	12		860	1075					655	1090					
			24		645	805					490	820					
			19.2	--	805	1005	--	--	--	--	615	1025	--	--	--	--	
6-3/4	WSWH634	2	16		965	1210							735	1230			
			12		1285	1610					980	1640					
			24				380	715	380					290	730	290	
		3	19.2	--	--	--	475	895	475	--	--	--	--	365	910	365	
			16				570	1075	570					435	1090	435	
			12				765	1430	765					580	1455	580	
3	24				570	1075	570					435	1090	435			
	19.2	--	--	--	715	1345	715	--	--	--	--	545	1365	545			
	16				860	1610	860	--	--	--	--	655	1640	655			
				1145	2150	1145						870	2185	870			
Head Side Multiplier ⁶				1.06	1.25	1	1.25	1	1.25	1.19	1.67	1	1.67	1	1.67		

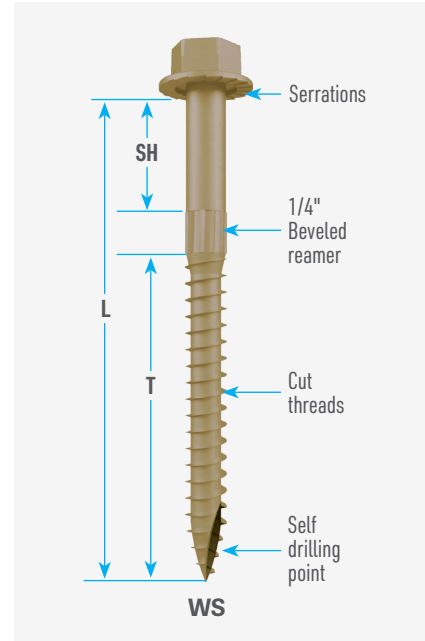
Footnotes on page 16

EWP INSTALLATION GUIDE

JOINING MULTI-PLY ENGINEERED WOOD (EWP) BEAMS WITH WS SCREWS

Installation Notes:

- For 2 ply members, wood screws shall be installed with the screw heads in the loaded ply.
- For 3 or 4 ply members, wood screws shall be installed in both outer plies.
- Designer shall specify all wood screws locations.
- Increase edge and end distances if wood splitting occurs.
- Stagger all screws installed into the opposite face.
- A minimum of 2 rows of screws shall be used for all members with $H = 5\text{-}1/2\text{'}$ and larger.



Size (in)	MITek Stock No.	Dimensions (in)			Multiple Members Installation Figure ^{2,8}	DF/SP Maximum Allowable Uniform Loads that can be applied to either outside member (Lbs. Per Lineal Ft.) ^{1,3,4,5,6}					
		L	SH	T		12" O.C.		18" O.C.		24" O.C.	
						2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows
1/4 x 3-1/2	WS35	3-1/2	3/4	2-1/2	1	970	1460	650	970	485	730
					2	730	1095	485	730	365	545
					4	730	1095	485	730	365	545
					5	650	970	430	650	325	485
1/4 x 6	WS6 ⁷	6	1-3/4	4	3	650	970	430	650	325	485
					6	1940	2920	1300	1940	970	1460

Footnotes on page 16

FIGURE 1



WS35 installed in (2) 1-3/4" Ply

FIGURE 2



WS35 installed in (3) 1-3/4" Ply

FIGURE 3



WS6 installed in (4) 1-3/4" Ply

FIGURE 4



WS35 installed in (1) 1-3/4", (1) 3-1/2" Ply

FIGURE 5



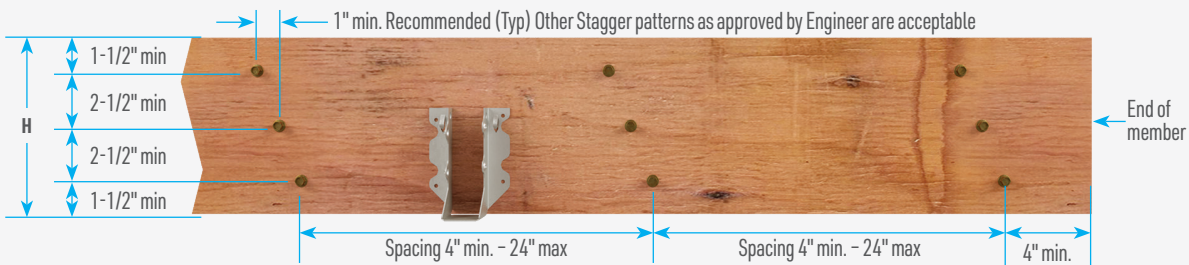
WS35 installed in (2) 1-3/4", (1) 3-1/2" Ply

FIGURE 6



WS6 installed (2) 3-1/2" Ply

Recommended Row Guidelines



EWP INSTALLATION GUIDE

LSSH GENERAL SLOPE / SKEW HANGERS

The LSSH series connects rafters to ridge beams in vaulted roof structures. This series is field adjustable to meet a variety of skew and/or slope applications. Slopes and skews 0° to 45°.

Installation:

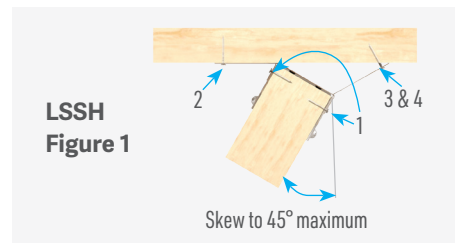
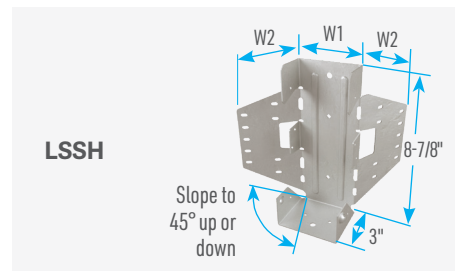
→ Use all specified fasteners.

Steps: (See LSSH Figure 1)

1. Position LSSH connector against plumb-cut end of joist. Fasten joist side flanges on both sides with 10d (0.148") x 1-1/2" nails. Bend seat up to fit against joist bottom and drive (1) 10d (0.148") x 1-1/2" nail through bottom seat into joist bottom flange. Drive (2) 10d (0.148") x 1-1/2" nail at downward angle through dimpled nailing guides.
2. Lean connector and rafter end against ridge beam at desired position. Install 10d (0.148" x 3") or 16d (0.162" x 3-1/2") nails through nail holes into ridge beam at right 90° angle. If skewing the rafter, only drive nails into ridge beam on inside flange.
3. Bend flange to desired angle.
4. Hammer outside flange until edge touches header. Fasten outside flange to ridge by driving 10d (0.148" x 3") or 16d (0.162" x 3-1/2") nails through nail holes.

→ Web stiffeners are required for all wood I-Joist installations.

→ Designer may consider adding a tension restraint for the supported member for roof slopes exceeding 6/12.



Rafter Width (in)	MiTek Stock No.	Ref. No.	Steel Gauge	Dimensions (in)		Fastener Schedule ^{2,3,4}				DF/SP Allowable Loads (Lbs.)				
				W1	W2	Header		Rafter		Floor		Roof		Uplift ¹
						Qty	Type	Qty	Type	100%	115%	125%	160%	
SLOPED ONLY HANGERS														
1-1/2	LSSH15-TZ	--	18	1-9/16	1-3/4	6	10d	7	10d x 1-1/2	720	820	885	565	
1-1/2	LSSH210-TZ	--	18	1-9/16	1-3/4	10	10d	7	10d x 1-1/2	1200	1370	1395	410	
1-3/4	LSSH179-TZ	--	18	1-13/16	1-5/8	10	10d	7	10d x 1-1/2	1200	1370	1395	880	
2 - 2-1/8	LSSH20-TZ	--	18	2-1/8	2-1/2	10	10d	7	10d x 1-1/2	1200	1370	1395	795	
2-1/4 - 2-5/16	LSSH23-TZ	--	18	2-5/16	2-3/8	10	10d	7	10d x 1-1/2	1200	1370	1395	795	
2-1/2	LSSH25-TZ	--	16	2-9/16	2-3/4	18	16d	12	10d x 1-1/2	2095	2095	2095	945	
2-5/8	LSSH26-TZ	--	16	2-11/16	2-5/8	18	16d	12	10d x 1-1/2	2095	2095	2095	945	
3	LSSH31-TZ	--	16	3-1/8	3-3/4	18	16d	12	10d x 1-1/2	2645	3000	3090	1310	
3-1/2	LSSH35-TZ	--	16	3-9/16	3-1/2	18	16d	12	10d x 1-1/2	2645	3000	3090	1310	
SKEWED HANGERS or SLOPED & SKEWED HANGERS														
1-1/2	LSSH15-TZ	--	18	1-9/16	1-3/4	6	10d	7	10d x 1-1/2	620	620	620	510	
1-1/2	LSSH210-TZ	--	18	1-9/16	1-3/4	10	10d	7	10d x 1-1/2	1200	1370	1395	880	
1-3/4	LSSH179-TZ	--	18	1-13/16	1-5/8	10	10d	7	10d x 1-1/2	1200	1370	1395	880	
2 - 2-1/8	LSSH20-TZ	--	18	2-1/8	2-1/2	10	10d	7	10d x 1-1/2	1200	1230	1230	795	
2-1/4 - 2-5/16	LSSH23-TZ	--	18	2-5/16	2-3/8	10	10d	7	10d x 1-1/2	1200	1230	1230	795	
2-1/2	LSSH25-TZ	--	16	2-9/16	2-3/4	14	16d	12	10d x 1-1/2	1610	1610	1610	945	
2-5/8	LSSH26-TZ	--	16	2-11/16	2-5/8	14	16d	12	10d x 1-1/2	1610	1610	1610	945	
3	LSSH31-TZ	--	16	3-1/8	3-3/4	14	16d	12	10d x 1-1/2	1610	1610	1610	1310	
3-1/2	LSSH35-TZ	--	16	3-9/16	3-1/2	14	16d	12	10d x 1-1/2	1610	1610	1610	1310	

Footnotes on page 16

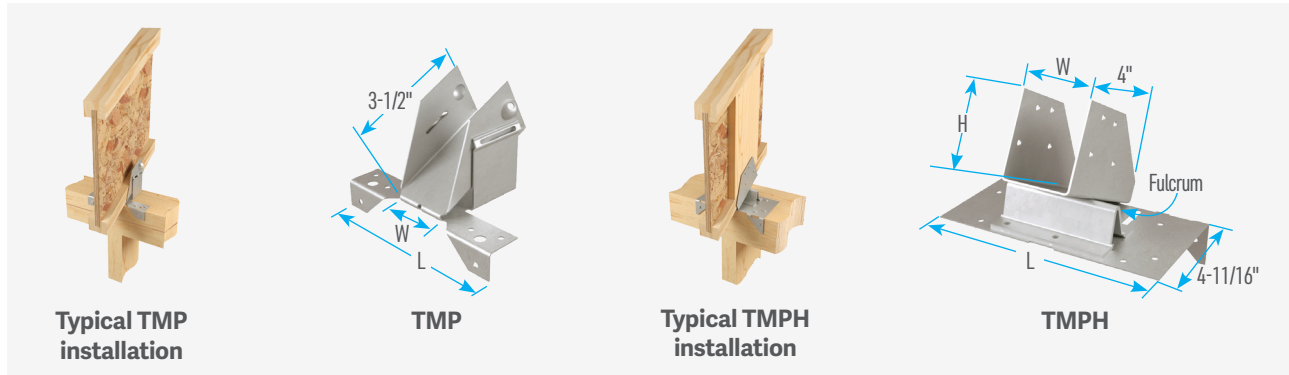
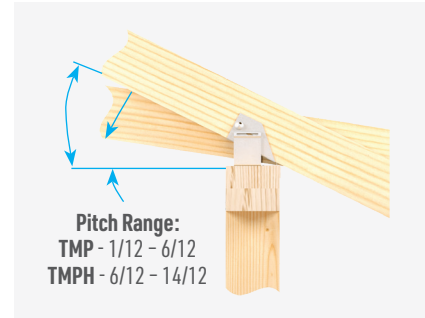
EWP INSTALLATION GUIDE

TMP / TMPH VARIABLE PITCH CONNECTORS

The TMP and TMPH are designed to make rafter-to-plate connections and eliminate time-consuming bird's-mouth notching or bevel plate installation.

Installation:

- Use all specified fasteners.
- Position connector on top plate. Fasten connector to outside of top plate with specified nails. Insert rafter into rafter pocket. Adjust rafter and pocket to correct pitch. Fasten rafter to connector with specified nails. Installing the **TMP** require driving specified nails through the opposing slots in the pocket. **TMPH** installation involves sliding the fulcrum until it supports the pocket at the desired pitch and nailing down through the fulcrum base into the top plate to lock the fulcrum into position.



TMP Chart

Rafter Width (in)	MiTek Stock No.	Ref. No.	Steel Gauge	Dimensions (in)		Fastener Schedule ²				DF/SP Allowable Loads (Lbs.) ¹	
				W	L	Plate		Rafter		Download (100/115/125)	Uplift 160%
						Qty	Type	Qty	Type		
1-1/2	TMP2	VPA2	18	1-9/16	5-9/16	6	10d	4	10d x 1-1/2	1705	245
1-3/4	TMP175	VPA25	18	1-13/16	5-9/16	6	10d	4	10d x 1-1/2	1705	245
2 or 2-1/8	TMP21	VPA2.06, VPA2.1	18	2-1/8	6-3/8	6	10d	4	10d x 1-1/2	1705	245
2-5/16	TMP23	VPA35	18	2-3/8	6-3/8	6	10d	4	10d x 1-1/2	1705	245
2-1/2 or 2-5/8	TMP25	VPA3	18	2-11/16	6-3/8	6	10d	4	10d x 1-1/2	1705	245
3	TMP31	--	18	3-1/8	7-5/16	6	10d	4	10d x 1-1/2	1705	245
3-1/2	TMP4	VPA4	18	3-9/16	7-5/16	6	10d	4	10d x 1-1/2	1705	245

TMPH Chart

Rafter Width (in)	MiTek Stock No.	Ref. No.	Dimensions (in)			Fastener Schedule ³				DF/SP Allowable Loads (Lbs.) ¹										
			W	H	L	Plate		Rafter ²		According to Pitch										Uplift 160%
						Top Qty	Side Qty	Type	Type	6/12	7/12	8/12	9/12	10/12	11/12	12/12	13/12	14/12		
1-1/2	TMPH2	VPA2	1-9/16	2-1/2	6-9/16	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330
1-3/4	TMPH175	VPA25	1-13/16	2-3/8	6-9/16	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330
2 or 2-1/8	TMPH21	VPA2.06, VPA2.1	2-1/8	2-5/8	7-3/8	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330
2-5/16	TMPH23	VPA35	2-3/8	2-1/2	7-3/8	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330
2-1/2 or 2-5/8	TMPH25	VPA3	2-11/16	2-5/16	7-3/8	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330
3	TMPH31	--	3-1/8	2-11/16	8-9/16	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330
3-1/2	TMPH4	VPA4	3-9/16	2-1/2	8-9/16	8	2	10d	8	10d x 1-1/2	3190	3290	3390	3140	2900	2710	2520	2230	1950	330

Footnotes on page 16

FOOTNOTES

SIDE LOADED BEAMS (PAGE 12)

- 1) Allowable loads are derived from tested fastener values as reported in ICC-ES ESR-2761.
- 2) The uniform loads in this table relate only to the capacity of the fastener to transfer shear loads between plies. The equivalent specific gravity (SG) and the capacity of the EWP should be verified with manufacturer's literature.
- 3) Values listed reflect 100% load duration. ($C_D=1.0$) The designer may apply adjustment factors to increase or decrease these loads per the NDS based on conditions for each assembly.
- 4) Load values depicted assume all uniform load is applied to the outermost ply.
- 5) To minimize rotation, 7" wide beams shall 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.
- 6) When the uniform load is applied to the outermost ply with the screw head, listed allowable loads can be multiplied by this value.

JOINING MULTI-PLY ENGINEERED WOOD (EWP) BEAMS WITH WS SCREWS (PAGE 13)

- 1) Based on Zscrew = 243 pounds in Douglas Fir-Larch with a side member thickness of not less than 1-3/4".
- 2) Load values depicted assume all uniform load is applied to the most narrow outside ply only.
- 3) Except for Figure 6 installation, load values neglect any contribution of screws installed to opposite side, even if they extend significantly into the loaded ply.
- 4) Loads are for normal (100%) duration of load, and may be increased in accordance with the code.
- 5) Uniform loads in table represent the capacity of the fasteners. The capacity of the LVL or PSL beam may be less and should be checked by a qualified designer or with the manufacturer's literature.
- 6) A qualified designer shall ensure the adequacy of a 7" wide beam to resist the applied load on one edge; otherwise, the loads shall be uniformly distributed across the width or applied equally on both sides.
- 7) Wood screws longer than 3-1/2" are not recommended for use with Parallam® PSL or TimberStrand® LSL.
- 8) For Figures 2, 3, 5, and 6: Stagger the screws on opposite face by half minimum spacing requirements.

LSSH GENERAL SLOPE / SKEW HANGERS (PAGE 14)

- 1) Uplift loads have been increased 60% for wind or seismic loads; no further increase shall be permitted.
- 2) Stainless steel ring shank nails must be used with stainless steel connectors to achieve tabulated allowable loads.
- 3) For exterior applications, hot-dip galvanized (HDG) fasteners must be used.
- 4) **NAILS:** 10d x 1-1/2 nails are 0.148" dia. x 1-1/2" long, 10d nails are 0.148" dia. x 3" long, 16d nails are 0.162" dia. x 3-1/2" long.

TMP (PAGE 15)

- 1) Allowable loads may not be increased for duration of load adjustments.
- 2) **NAILS:** 10d x 1-1/2 nails are 0.148" dia. x 1-1/2" long, 10d nails are 0.148" dia. x 3" long.

TMPH (PAGE 15)

- 1) Allowable loads may not be increased for duration of load adjustments.
- 2) Web stiffeners are required for all Wood I-Joist installations.
- 3) **NAILS:** 10d x 1-1/2 nails are 0.148" dia. x 1-1/2" long, 10d nails are 0.148" dia. x 3" long.