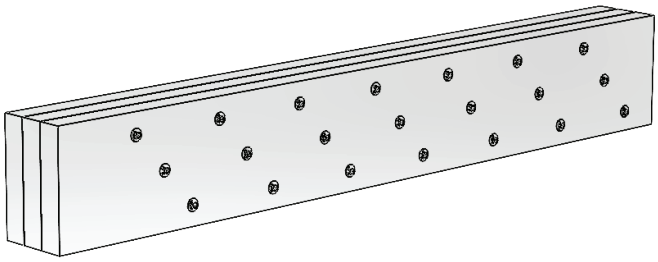
U2 Fasteners™

TECH BULLETIN



Multi-Ply Beams

U2 Fasteners' 25/64" Black Flat Head Screws are designed for wood-to-wood connections. The fasteners are partially threaded, self-drilling, dowel-type fasteners that are manufactured with carbon steel using standard cold-forming processes and are subsequently heat-treated and coated with a proprietary black nano coating. U2 Fasteners' 25/64" Black Flat Head Screws are Torx-driven screws with a washer head with Talon Grip™ on the bottom-side of the head and reamer threads above the cutting threads.

NOTES:

1. Connection capacities for multi-ply beams are based on U2 Fasteners 25/64" Black Flat Head Screws DrJ Engineering Report ENG-2404-324.
2. Multi beam connections for manufactured structural composite lumber (MFR) are based on a specific gravity (G) of 0.50 as listed in the tables.
3. Capacities are designed at 100% stress level. Adjustments in stress level for duration of load may apply where permissible by code.
4. A design professional shall be consulted when designing multi-ply beams or connections not shown in this bulletin.
5. Nominal design values are for connections in seasoned wood to a moisture content of 19% or less and used under continuously dry conditions (refer NDS 10.3.3).
6. Multi-ply beams are assumed to bear fully on supports of the same width or wider than the total width of the beam.
7. Single side-loaded beams and beams with unequal side loads applied on opposite faces may undergo torsion when loaded. A design professional shall be consulted to consider the effects of torsion on multi-ply beams.
8. In addition to the fasteners specified in **TABLE 1** and **TABLE 2**, a row of fasteners shall be provided at the ends of beams and on each side of any splice location.
9. The design loads in the tables do not consider any effects of splicing in the plies. Consult a design professional to design splices and to confirm the required connectors and connection geometry.
10. Do not use multi-ply beams as diaphragm chords or drag-ties unless specifically designed to do so by a design professional.
11. Always consult a design professional for the sizing and specification of the multi-ply beam and for the design of the joist hangers or brackets.
12. Fastener installations shall comply with NDS 12.1.5.6 embedment requirements.
13. All installations shall comply with current NDS requirements.

REFERENCES:

- DrJ ENG-2404-324 25-64 Screw US Design Value Report
- IAMPO UES ER-454

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TABLE 1. Multiple Sawn Lumber and Engineered Wood Beam

Fastener	# Screw Rows	Fastener Spacing (in)	Allowable Face Mounted Loads Per Foot (PLF)						
			MFR Lumber G=0.5			Sawn Lumber with Varying Specific Gravity Values			
			Assembly per Table 3			S.Pine G=0.55	D.Fir G=0.50	SPF G=0.42	Assembly per Table 3
			A	B	C				
CONSTRUCTION SCREW 25/64 x 3-3/8"	2	24	378			459	378	301	D
	2	16	567			689	567	452	
	2	12	756			918	756	602	
	3	24	567			689	567	452	
	3	16	851			1033	851	677	
	3	12	1134			1377	1134	903	
CONSTRUCTION SCREW 25/64 x 5"	2	24		378	378	459	378	301	E
	2	16		567	567	689	567	452	
	2	12		756	756	918	756	602	
	3	24		567	567	689	567	452	
	3	16		851	851	1033	851	677	
	3	12		1134	1134	1377	1134	903	
CONSTRUCTION SCREW 25/64 x 6-3/4"	2	24		378	378	459	378	301	F
	2	16		567	567	689	567	452	
	2	12		756	756	918	756	602	
	3	24		567	567	689	567	452	
	3	16		851	851	1033	851	677	
	3	12		1134	1134	1377	1134	903	

NOTE: 1. Applied load from joist are assumed to be uniform. 2. Fastener capacity is based on fastener spacing, not joist spacing. 3. 1-1/2" min thread length

TABLE 2. Multi-Ply Beam Point Load

Fastener	# Screw Rows	Max Point Load to One Side of Member*						
		MFR Lumber G=0.5			Sawn Lumber with Varying Specific Gravity Values			
		Assembly per Table 3			S.Pine G=0.55	D.Fir G=0.50	SPF G=0.42	Assembly per Table 3
		A	B	C				
CONSTRUCTION SCREW 25/64 x 3-3/8"	4	1512			1836	1512	1204	D
	6	2268			2754	2268	1806	
	8	3024			3672	3024	2408	
CONSTRUCTION SCREW 25/64 x 5"	4		1512	1512	1836	1512	1204	E
	6		2268	2268	2754	2268	1806	
	8		3024	3024	3672	3024	2408	
CONSTRUCTION SCREW 25/64 x 6-3/4"	4		1512	1512	1836	1512	1204	F
	6		2268	2268	2754	2268	1806	
	8		3024	3024	3672	3024	2408	

NOTE: 1. 1-1/2" min thread length 2. Screws shall be sized to penetrate laminations from both sides.
*Note when applying loads on both faces of built up beam, screws determined from TABLE 2 shall be installed on both sides 1" offset for rows on opposite face.

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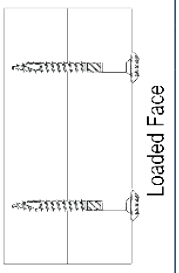
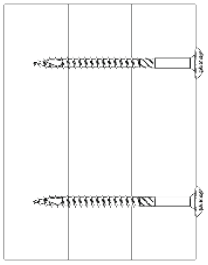
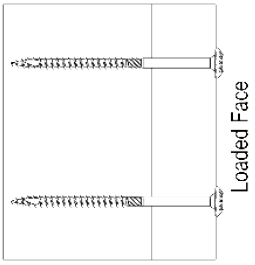
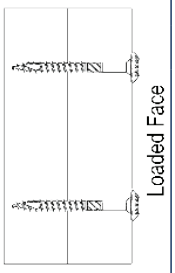
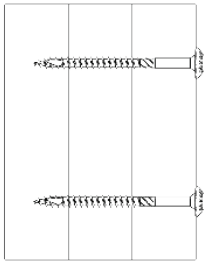
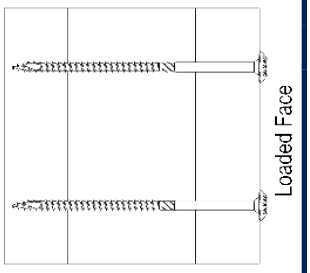
TABLE 3. Multi-Ply Beam Assembly Configurations

MFR Lumber			Sawn Lumber		
A 2 x 1-3/4"	**B** 3 X 1-3/4"	**C** 1-3/4" to 3-1/2"	**D** 2 X 1-1/2"	**E** 3 X 1-1/2"	**F** 4 X 1-1/2"
					

NOTE: Load applied to the face the screw head.

FIGURE 1. Minimum Spacing Geometry

(Perpendicular to grain loading)

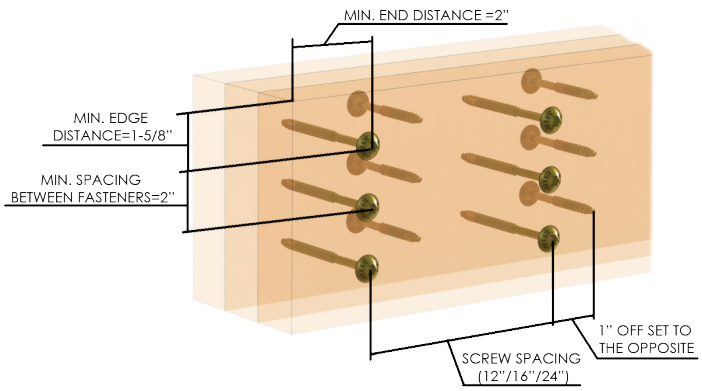


FIGURE 2. Multi-Ply Beam with One Face Loaded

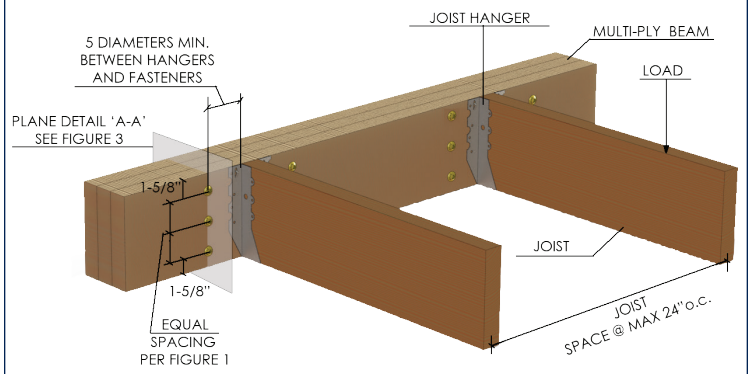


FIGURE 3. PLANE DETAIL 'A-A'

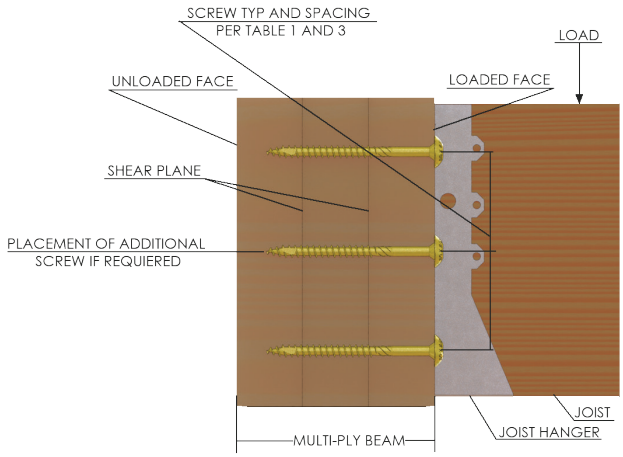
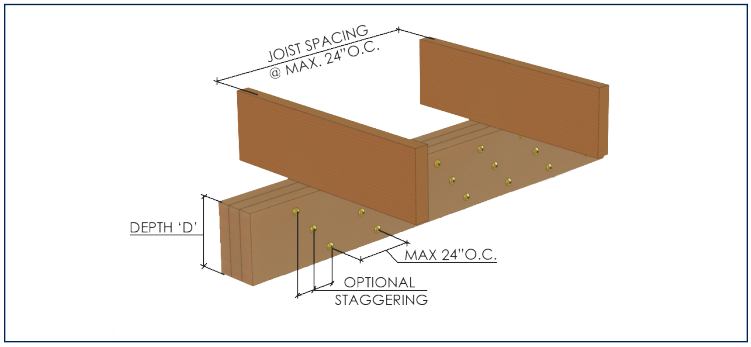


FIGURE 4. Multi-Ply Beam Top Loaded



1. Load must be applied evenly across the entire beam width. Otherwise, use connections listed for side loaded beams.
2. U2 Construction screws shall be sized to penetrate through all plies.
3. For beams with 4 or more plies, install screws on both sides 1" offset between rows on the opposite.
4. For 'D' < 12" use 2-rows, for 'D'>12" use 3-rows of U2 Construction Screws.