

Multi-Ply Fastening

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws

Truss-Ply Fastening, Multi-Ply Wood Members, Engineered-Lumber Products and Solid-Sawn Lumber

Codes/Standards: IAPMO UES ER-192" (including City of LA Supplement), State of Florida FL13975

US Patent 9,523,383

For more information, see pp. 101–102, C-F-2023 Fastening Systems catalog



SDW EWP-PLY Screw



SDW TRUSS-PLY Screw

Installation:

- SDW screws install best with a low-speed ½" drill motor and a T40 6-lobe bit. The matched bit included with the screws is recommended for best results.
- Predrilling is typically not required. SDW screws may be installed through metal truss plates as approved by the truss designer, provided the requirements of ANSI/TPI 1-2014 Section 8.9.2 are met (predrilling required through the plate using a maximum of ⅜" bit).

- Screw heads that are countersunk flush to the wood surface are acceptable if the screw has not spun out.
- Individual screw locations may be adjusted up to 3" to avoid conflicts with other hardware or to avoid lumber defects.

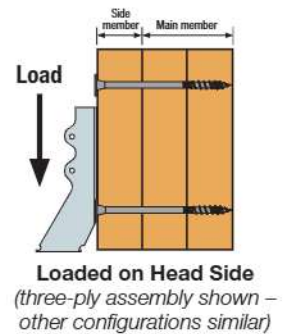
Notes to the designer:

1. Allowable loads are based on testing per ICC-ES AC233. Maximum allowable withdrawal load for DFL/SP/SCL is 200 lb. and for SPF/HF withdrawal is 150 lb. where the entire thread length is engaged into the main member.
2. Allowable loads in tables are shown at the load duration factor of $C_D = 1.00$ and shall be multiplied by all applicable adjustment factors per the NDS. Loads may be increased for load duration per the building code up to a $C_D = 1.6$.
3. For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on p. 128.
4. Maximum fastener spacing is recommended not to exceed 24" on center, as approved by a qualified designer.
5. Structural composite lumber (SCL = LVL, PSL or LSL) having a minimum 0.8E designation for lateral and withdrawal loading shall have an equivalent specific gravity of 0.50 minimum for lateral and 0.42 for withdrawal loading.
6. Tabular loads in this document are based on the capacity of the Simpson Strong-Tie SDW fasteners. The capacity of the multi-ply assembly must be checked by a qualified designer.
7. For a top-loaded, solid sawn 2x, multi-ply assembly that is evenly loaded across the entire assembly width, the recommended fastener detail is two rows of SDW screws where the spacing between fasteners in a row is 32". For a top-loaded, SCL (1¾") multi-ply assembly that is evenly loaded across the entire assembly width, the recommended spacing between SDW screws in a row is 24" o.c.; use two rows for up to 18"-deep members and three rows for members deeper than 18".
8. Visit strongtie.com/drawings and search for SD3-M for additional multi-ply fastening detail sheets and load tables in DWG, PDF or DXF format.

SDW Truss-Ply Screw — Allowable Shear Loads — DFL, SP, SPF, HF Lumber and 2x Truss Loaded on Head Side

Assembly	Model No.	Nominal Screw Length (in.)	Thread Length (in.)	Nominal Side Member Thickness (in.)	Main Member Penetration ¹ (in.)	Reference DFL/SP Allowable Shear Loads (lb.)	Reference SPF/HF Allowable Shear Loads (lb.)
Two-ply 2x/truss	SDW22300	2 15/16	1 7/16	1 1/2	1 3/8	325	255
Three-ply 2x/truss desert	SDW22438	4 3/8	1 7/16	1 1/2	2 7/8	400	325
Three-ply 2x/truss	SDW22458	4 3/8	1 7/16	1 1/2	2 7/8	400	325
Four-ply 2x/truss desert	SDW22600	6	1 7/16	1 1/2	4 1/2	400	340
Four-ply 2x/truss	SDW22638	6 3/8	1 7/16	1 1/2	4 1/2	400	340

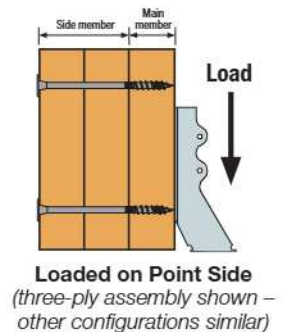
1. For minimum penetration into main (outermost) member of 1 1/8", use 235 lb. for DFL/SP and 210 lb. for SPF/HF.



SDW Truss-Ply Screw — Allowable Shear Loads — DFL, SP, SPF, HF Lumber and 2x Truss Loaded on Point Side

Assembly	Model No.	Nominal Screw Length (in.)	Thread Length (in.)	Nominal Side Member Thickness (in.)	Main Member Penetration ¹ (in.)	Reference DFL/SP Allowable Shear Loads (lb.)	Reference SPF/HF Allowable Shear Loads (lb.)
Two-ply 2x/truss	SDW22300	2 15/16	1 7/16	1 1/2	1 3/8	325	255
Three-ply 2x/truss desert	SDW22438	4 3/8	1 7/16	3	1 3/8	275	255
Three-ply 2x/truss	SDW22458	4 3/8	1 7/16	3	1 3/8	275	255
Four-ply 2x/truss desert	SDW22600	6	1 7/16	4 1/2	1 3/8	275	255
Four-ply 2x/truss	SDW22638	6 3/8	1 7/16	4 1/2	1 3/8	275	255

1. For minimum penetration into main member of 1 1/8", use 235 lb. for DFL/SP and 210 lb. for SPF/HF.



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Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)



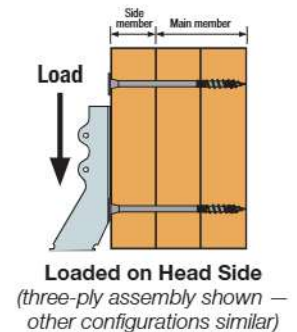
Lumber Fastening in Dry Climates

The highlighted regions on this map may experience drier conditions which can result in reduced lumber thickness (scant lumber) due to wood shrinkage. To help ensure optimum thread penetration into the main (outermost) member without excessive protrusion, Simpson Strong-Tie offers the 4 3/8" and 6" lengths of the SDW screw, which are sized for the thinner members common in these "desert" climates. It is the responsibility of the truss manufacturer or contractor/installer to determine the appropriate fastener length for any given application. See tables and footnotes for minimum required penetration. Please see the Strong-Drive SDW Truss-Ply and SDW EWP-Ply product information on p. 125 for specific product length details.

SDW EWP-Ply Screw — Reference Allowable Shear Loads — LVL, PSL and LSL Loaded on Head Side

Assembly	Model No.	Nominal Screw Length (in.)	Thread Length (in.)	Nominal Side Member Thickness (in.)	Main Member Penetration ¹ (in.)	Equivalent Specific Gravity 0.50 Allowable Shear Loads (lb.)	SPF/HF Allowable Shear Loads (lb.)
Two-ply 1 3/4" SCL	SDW22338	3 3/8	1 1/16	1 3/4	1 1/8	400	255
Three-ply 1 3/4" SCL	SDW22500	5	1 1/16	1 3/4	3 1/4	400	325
Four-ply 1 3/4" SCL	SDW22634	6 3/4	1 1/16	1 3/4	5	400	385
Two-ply 3 1/2" SCL	SDW22634	6 3/4	1 1/16	3 1/2	3 1/4	400	—

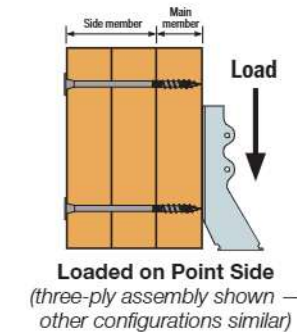
1. For minimum penetration into main (outermost) member of 1 1/2", use 300 lb.



SDW EWP-Ply Screw — Reference Allowable Shear Loads — LVL, PSL and LSL Loaded on Point Side

Assembly	Model No.	Nominal Screw Length (in.)	Thread Length (in.)	Nominal Side Member Thickness (in.)	Main Member Penetration ¹ (in.)	Equivalent Specific Gravity 0.50 Allowable Shear Loads (lb.)	SPF/HF Allowable Shear Loads (lb.)
Two-ply 1 3/4" SCL	SDW22338	3 3/8	1 1/16	1 3/4	1 1/8	400	255
Three-ply 1 3/4" SCL	SDW22500	5	1 1/16	3 1/2	1 1/2	300	255
Four-ply 1 3/4" SCL	SDW22634	6 3/4	1 1/16	5 1/4	1 1/2	300	255
Two-ply 3 1/2" SCL	SDW22634	6 3/4	1 1/16	3 1/2	3 1/4	400	—

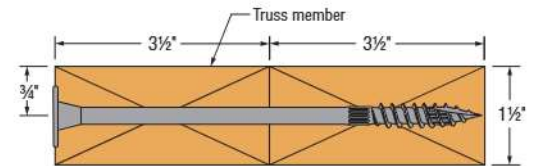
1. For minimum penetration into main member of 1 1/2", use 300 lb.



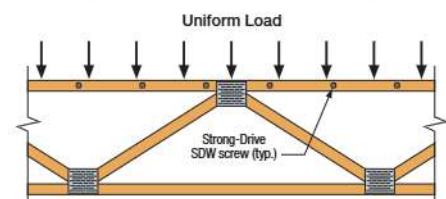
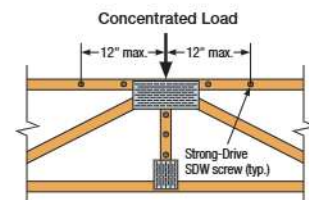
SDW EWP-Ply Screw — Allowable Shear Loads — Two-Ply 3x2 / 4x2 Parallel-Chord Trusses Loaded on Either Side

Assembly	Model No.	Nominal Screw Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)	Reference SPF/HF Allowable Shear Loads (lb.)
Two-ply 3x2 PCT	SDW22500	5	280	200
Two-ply 4x2 PCT	SDW22634	6 3/4	280	200

- To transfer uniform or concentrated loads applied to simply supported spans on assembly top chord:
 - Space screws as required to transfer half the load into the supporting truss.
 - Minimum screw spacing shall be 4" o.c.
- To transfer concentrated loads applied to simply supported spans on an assembly top chord or vertical web:
 - Concentrated loads must be applied at a panel point.
 - Screws to be installed within 12" of the concentrated load on top-chord assembly
- Gap between the trusses shall not exceed 1/4".
- Floor sheathing shall be screwed or nailed to each top-chord ply.
(Fastener spacing per the applicable Code requirements, or 12" o.c.)
- SDW screws shall not be installed in areas where lumber wane exceeds 1/4".
- Hangers on skewed girders:
 - Hanger loads not exceeding 34" o.c. on a skewed girder (resulting from uniformly spaced joists up to 24" o.c.) may be converted to a uniform load.
 - For girders with hanger load spacing in excess of 34" o.c. the loads shall be considered as concentrated loads at the applicable locations.
- Other configurations acceptable when approved by truss designer.



SDW Screw Position in Two-Ply 4x2 Truss
(two-ply 3x2 similar)



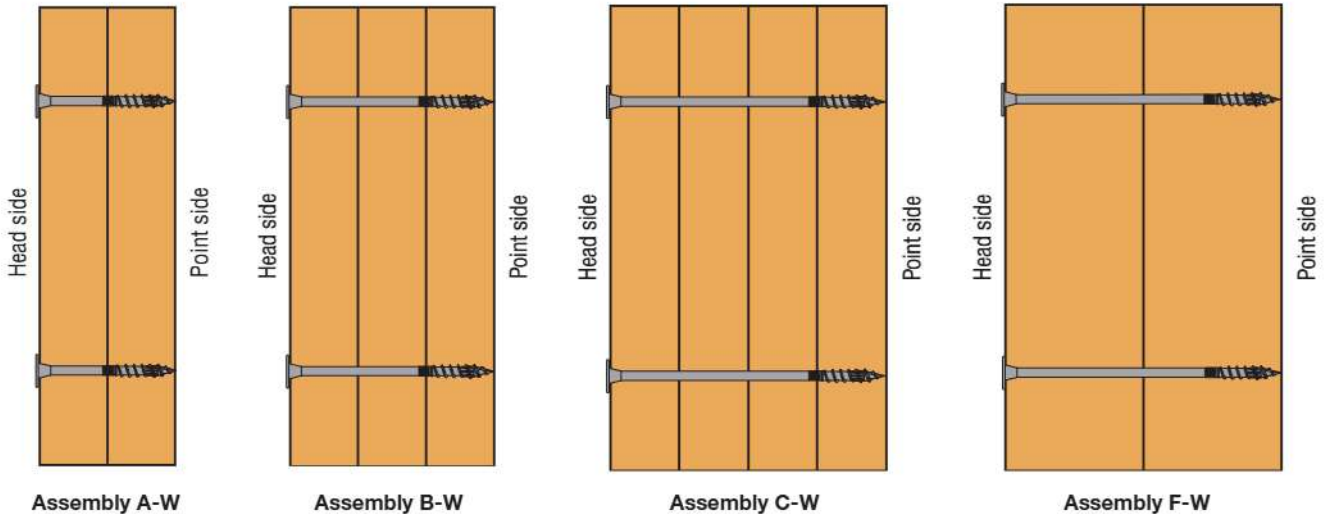
Multi-Ply Fastening

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

SDW Truss-Ply Screws — Allowable Uniform Load (plf)
Applied to Either Outside Member — Side-Loaded Multi-Ply Assemblies

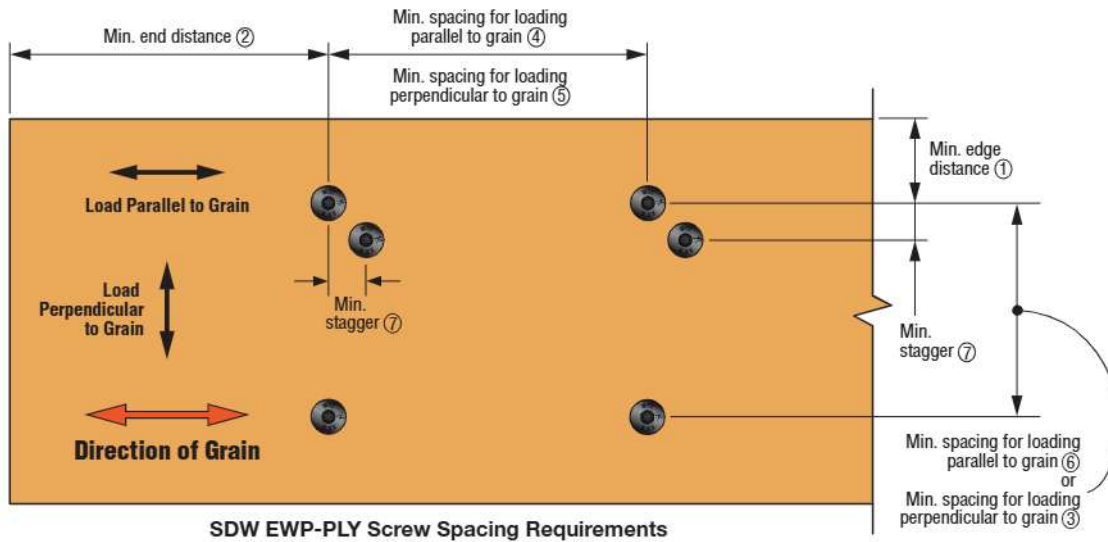
Multiple Members		Nominal Screw Length (in.)	Loaded Side	Reference DFL/SP						Reference SPF/HF					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
Assembly	Components			2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows
A-W	Two-ply 2x/Truss	2 ¹ / ₁₆	Either	1,300	1,950	975	1,465	650	975	1,020	1,530	765	1,150	510	765
B-W	Three-ply 2x/Truss	4 ³ / ₈ or 4 ¹ / ₂	Head	1,200	1,800	900	1,350	600	900	975	1,465	730	1,095	490	730
			Point	825	1,240	620	930	415	620	765	1,150	575	860	385	575
C-W	Four-ply 2x/Truss	6 or 6 ³ / ₈	Head	1,065	1,600	800	1,200	535	800	905	1,360	680	1,020	455	680
			Point	735	1,100	550	825	365	550	680	1,020	510	765	340	510

- Each ply is assumed to carry same proportion of load.
- Loads may be applied to the head side and point side concurrently provided neither published allowable load is exceeded. (Example: a three-ply DFL assembly with a head side load of 1,300 plf and point side load of 900 plf may be fastened together with 3 rows of SDW at 16" o.c. between fasteners in a row.)
- When hangers are installed on point side, hanger face fasteners shall be a minimum of 3" long.
- Tables are based on Main Member Penetration as noted on pp. 125–126.
- Hanger load spacing on the multi-ply assembly should not exceed 24" o.c. Exception: On a skewed girder, hanger loads up to 34" o.c. (resulting from joists uniformly spaced up to 24" o.c.) may be converted to a uniform load.
- For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on the next page.



Multi-Ply Fastening

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)



SDW Truss-Ply and EWP-Ply Screw Spacing Requirements

Condition	Direction of Load to Grain	ID	Minimum Distance or Spacing (in.)
Edge Distance	Perpendicular	①	1 ⁷ / ₁₆
	Parallel	①	1 ⁷ / ₁₆
End Distance	Perpendicular	②	6
	Parallel	②	6
Spacing Between Fasteners in a Row	Perpendicular	③	4
	Parallel	④	8
Spacing Between Rows of Fasteners	Perpendicular	⑤	4
	Parallel	⑥	4
Spacing Between Staggered Rows	Perpendicular or Parallel	⑦	5 ⁸ / ₁₆

1. For axial loading only, use the following minimum dimensions: end distance = 3¹/₄", edge distance = 1³/₈", spacing parallel to grain = 2¹/₄", spacing perpendicular to grain = 1³/₈".

SDW EWP-Ply Screws – Reference Allowable Uniform Load (plf) Applied to Either Outside Member – Side-Loaded Multi-Ply LVL, PSL, and LSL Assemblies

Multiple Members		Nominal Screw Length (in.)	Loaded Side	12" o.c.		16" o.c.		24" o.c.	
Assembly	Components			2 Rows	3 Rows	2 Rows	3 Rows	2 Rows	3 Rows
A-W	Two-ply SCL	3 ³ / ₈	Either	1,600	2,400	1,200	1,800	800	1,200
B-W	Three-ply SCL	5	Head	1,200	1,800	900	1,350	600	900
			Point	900	1,350	675	1,015	450	675
C-W	Four-ply SCL	6 ³ / ₈	Head	1,065	1,600	800	1,200	535	800
			Point	800	1,200	600	900	400	600
F-W	Two-ply 3 ¹ / ₂ " SCL	6 ³ / ₈	Either	1,600	2,400	1,200	1,800	800	1,200

- Each ply is assumed to carry same proportion of load. Loads may be applied to the head side and point side concurrently provided neither published allowable load is exceeded. (Example: a three-ply assembly with a head side load of 1,300 plf and point side load of 1,000 plf may be fastened together with three rows of SDW at 16" o.c. between fasteners in a row.)
- When hangers are installed on point side, hanger face fasteners shall be a minimum of 3" long.
- Tables are based on main member penetration as noted in single-fastener load tables.

Multi-Ply Fastening

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

Allowable Loads for Side-Loaded Multi-Ply Beam Assemblies per Screw

For side-loaded assemblies of structural composite lumber or sawn lumber, allowable loads in a single fastener format can be calculated from the information on pp. 125–128. See the figures on pp. 125–126 for side-load terminology. Assembly descriptions are on p. 127. The figure here is for fastener spacing relative to the side load.

As an example calculation, a three-ply beam or truss is to be fastened where the plies are of the same material and vertically-screw-laminated. The beam or truss is loaded on one face with a 2,400 lb. point load via a face-mount hanger. It is assumed that the face ply carries one-third of the load (800 lb.), and the remaining two-thirds of the load is transferred to the next two plies via the fasteners. The calculation for the allowable load applied to the outside ply of a multi-ply beam or truss is:

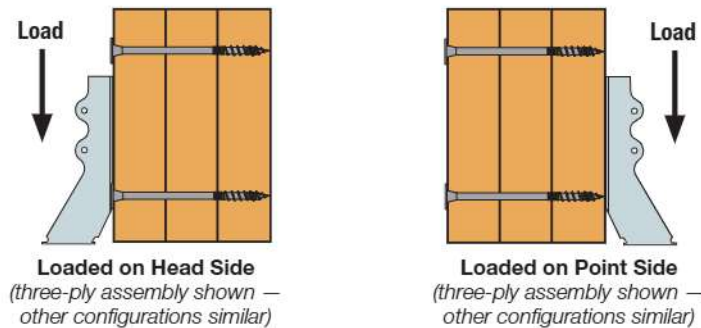
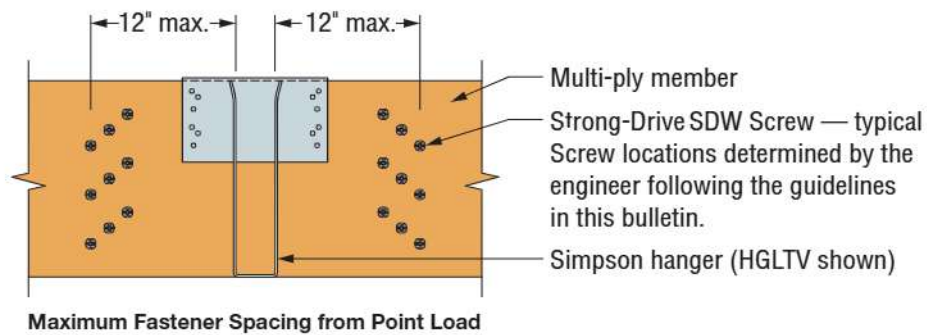
$$P_{allow} = Z \left(\frac{n}{n-1} \right)$$

P_{allow} = allowable load that can be applied to the outside of the multi-ply truss or beam per fastener

Z = allowable shear per fastener in SCL or lumber from pp. 125–126

n = number of plies

For the SDW EWP-Ply screw assembling SCL and the SDW Truss-Ply screw assembling sawn lumber or lumber trusses, the calculation provides the loads shown on p. 130.



Load Applied to Outside Multi-Ply Beam

Multi-Ply Fastening

Strong-Drive® SDW TRUSS-PLY and EWP-PLY Screws (cont.)

SDW EWP-Ply Screw — Allowable Loads for Side-Loaded Multi-Ply SCL Assemblies

Assembly Illustration	SCL Components (Plies-thickness) (in.)	Model No.	Nominal Screw Length (in.)	Reference Allowable Loads for Side-Loaded Multi-Ply Truss or Beam per Screw (P_{allow} , lb.)	
				Head Side	Point Side
A-W	(2) 1¾	SDW22338	3¾	800	800
B-W	(3) 1¾	SDW22500	5	600	450
C-W	(4) 1¾	SDW22634	6¾	533	400
F-W	(2) 3½	SDW22634	6¾	800	800

1. Loads based on equivalent specific gravity of 0.50.
2. Allowable loads include a load duration factor of $C_D = 1.00$ and may be increased up to $C_D = 1.60$ per the building code when applicable.
3. SDW EWP-Ply allowable shear loads are from p. 126.
4. Notes to the designer (p. 125) are applicable.
5. For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on p. 128. For assembly descriptions, see p. 127.

SDW Truss-Ply Screw — Allowable Loads for Side-Loaded Multi-Ply Lumber Assemblies

Assembly Illustration	Assembly Description	Model No.	Nominal Screw Length (in.)	Reference Allowable Loads for Side-Loaded Multi-Ply Assembly per Screw (P_{allow} , lb.)			
				DFL/SP		SPF/HF	
				Head Side	Point Side	Head Side	Point Side
A-W	Two-ply 2x/truss	SDW22300	2½ ¹⁶	650	650	510	510
B-W	Desert Three-ply 2x/truss	SDW22438	4¾	600	410	485	380
B-W	Three-ply 2x/truss	SDW22458	4¾	600	410	485	380
C-W	Desert Four-ply 2x/truss	SDW22600	6	530	365	450	340
C-W	Four-ply 2x/truss	SDW22638	6¾	530	365	450	340

1. Loads based on specific gravity of 0.50 for DFL/SP and 0.42 for SPF/HF.
2. Allowable loads include a load duration factor of $C_D = 1.00$ and may be increased up to $C_D = 1.60$ per the building code when applicable.
3. SDW Truss-Ply allowable shear loads are from p. 125.
4. Notes to the designer (p. 125) are applicable.
5. For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on p. 128. For assembly descriptions, see p. 127.