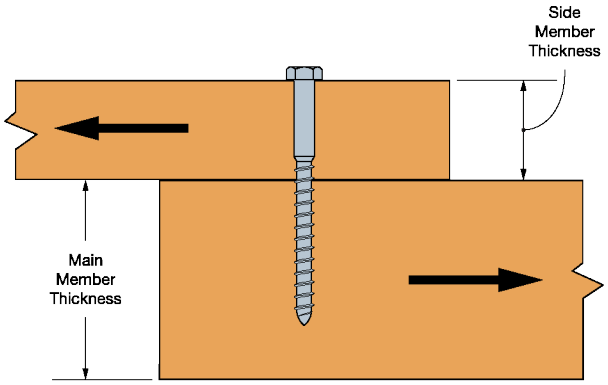
Fastener Designer: Solutions Report

Report Generated: August 1, 2019



Lateral Load Parallel to Grain

Input

Input	Strong-Drive® SDWS LOG Screw
Design Method	Allowable Stress Design (ASD)
Code	NDS 2012/2015
Main Member Thickness, t_m (in)	4
Side Member Thickness, t_s (in)	2
Dowel Length, l (in)	6.0
Main Member Bearing Angle, θ_m (deg)	0
Side Member Bearing Angle, θ_s (deg)	0
Main Member Specific Gravity, G_m (deg)	0.5
Side Member Specific Gravity, G_s (deg)	0.5
Actual Diameter, D (in)	0.197
Load (lb)	4309
Load Duration Factor, C_D	1.6
Temperature Factor, C_t	1
Wet Service, C_M	1
End Grain Factor, C_{eg}	1

Calculation

Calculation	Strong-Drive® SDWS LOG Screw
Dowel Root Diameter, D_r (in)	0.177
Main Member Dowel Bearing Length, l_m (in)	4.000
Side Member Dowel Bearing Length, l_s (in)	2.000
Main Member Dowel Bearing Strength, F_{em} (psi)	4637
Side Member Dowel Bearing Strength, F_{es} (psi)	4637
Dowel Bending Yield Strength, F_{yb} (psi)	175000
$R_e = \frac{F_{em}}{F_{es}}$	1
$R_t = \frac{l_m}{l_s}$	2.00
$k_1 = \frac{\sqrt{R_e + 2R_e^2(1 + R_t + R_t^2) + R_t^2 R_e^3} - R_e(1 + R_t)}{1 + R_e}$	0.68
$k_2 = -1 + \sqrt{2(1 + R_e) + \frac{2F_{yb}(1 + 2R_e)D^2}{3F_{em}l_m^2}}$	1.04
$k_3 = -1 + \sqrt{\frac{2(1 + R_e)}{R_e} + \frac{2F_{yb}(2 + R_e)D^2}{3F_{em}l_s^2}}$	1.14

Penetration Check

Penetration Check Detail	Strong-Drive® SDWS LOG Screw
Penetration, p (in)	4.00
Minimum Penetration Requirement, P_{min} (in)	6D = 1.18
Minimum Penetration Requirement Met	Yes

End/Edge Distance and Spacing

End Distance, Edge Distance, and Spacing	Strong-Drive® SDWS LOG Screw
	See figure below the fastener image for end distance, edge distance, and spacing requirements

Calculated Reference Design Value

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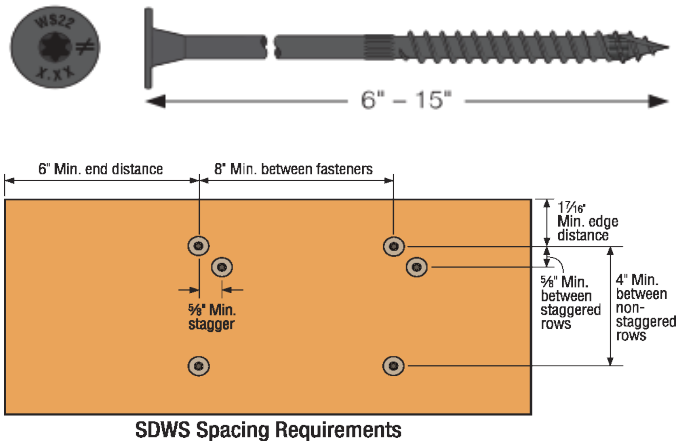
Yield Mode	Yield Limit Equation	Strong-Drive® SDWS LOG Screw	
		Yield Limit, Z	Reduction Term, R_D
Mode I_m	$Z = \frac{Dl_m F_{em}}{R_d}$	Z = 1446 lb	R_D = 2.3
Mode I_s	$Z = \frac{Dl_s F_{es}}{R_d}$	Z = 723 lb	R_D = 2.3
Mode II	$Z = \frac{k_1 Dl_s F_{es}}{R_d}$	Z = 491 lb	R_D = 2.3
Mode III_m	$Z = \frac{k_2 Dl_m F_{em}}{(1+2R_e)R_d}$	Z = 500 lb	R_D = 2.3
Mode III_s	$Z = \frac{k_3 Dl_s F_{em}}{(2+R_e)R_d}$	Z = 275 lb	R_D = 2.3
Mode IV	$Z = \frac{D^2}{R_d}\sqrt{\frac{2F_{em}F_{yb}}{3(1+R_e)}}$	Z = 227 lb	R_D = 2.3
Minimum Yield Value		Z = 227 lb	
Tested Yield Value		Z = 265 lb	
Adjusted Yield Value		Z = 424 lb	

Solution

Supply (11) 0.195" × 6" Strong-Drive® SDWS LOG Screws SDWS19600



SDWS Spacing Requirements

Strong-Drive® SDWS LOG Screw

Structural Wood-to-Wood Connections

The Strong-Drive SDWS Log screw is a structural wood screw available in longer lengths and is designed for log-home construction and general interior applications.These 0.220"- and 0.195"- diameter structural fasteners require less torque to install than comparable fasteners.The large diameter head pulls logs down easily, eliminating the need to use extra washers.

Features:

- Serrated thread reduces log splitting and damage.
- Patented SawTooth™ point ensures fast starts, reduces installation torque and eliminates the need for pre-drilling in most applications.
- Deep 6-lobe T-40 recess reduces cam-out, making driving easier.
- Large washer head provides maximum bearing area(0.75" head diameter).
- Size identification on all SDWS screw heads.
- Low-profile head makes countersinking easy.

Codes/Standards: IAPMO-UES ER-192; City of Los Angeles PR25906

Product Information: Strong-Drive SDWS LOG Screw

U.S. Patents: 9,523,383