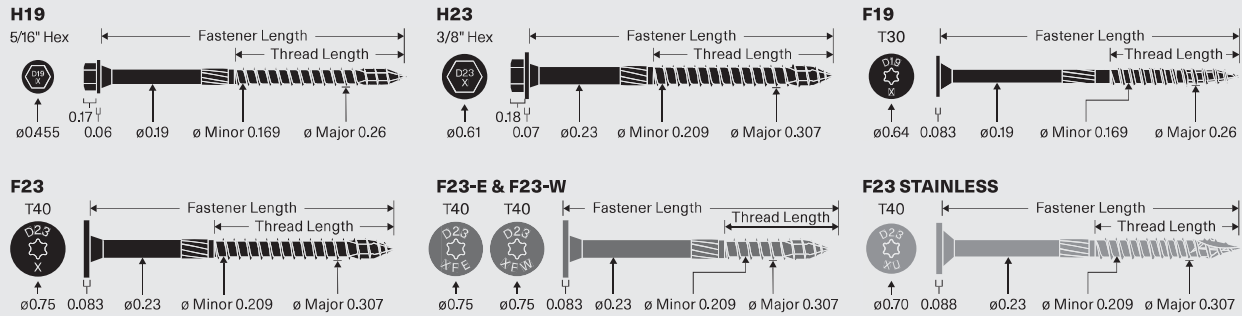


# Structural Screws

## Screw Properties and Design Values



**TABLE 1:** Reference Lateral Design Values For Single Shear Connections

PRODUCT NAME	HEAD MARKING	UNTHREADED SHANK DIAMETER (IN)	HEAD TYPE	SCREW LENGTH (IN)	THREAD LENGTH (IN)	SIDE MEMBER THICKNESS (IN)	MAIN MEMBER PENETRATION (IN)	LATERAL DESIGN VALUES (LBF) BY SPECIES (SG) AND LOAD ORIENTATION			
								HF/SPF (0.42)		DF/SP/SCL (0.50)	
								Z PERP	Z PARA	Z PERP	Z PARA
Structural H19	D19 2.9	0.19	Hex	2-7/8	1.4	1-1/2	1-3/8	305	270	435	415
	D19 4			4	2-1/4		2-1/2				
	D19 6			6	2-1/2		4-1/2				
	D19 8			8			6-1/2				
	D19 10			10			8-1/2				
Structural H23	D23 4	0.23	Hex	4	2-3/8	1-1/2	2-1/2	420	420	560	560
	D23 5			5	3		3-1/2				
Structural F19	D19 2.9	0.19	Flat	2-7/8	2	1-1/2	1-3/8	290	315	380	335
	D19 4.5			4-1/2			2-1/2				
	D19 6			6			4-1/2				
	D19 8			8			340	6-1/2	305	425	375
	D19 10			10				8-1/2			
	D19 12			12				10-1/2	370	325	465
	D19 14			14			12-1/2				
	D19 16			16			14-1/2				
	Structural F23			D23 2.9			0.23	Flat	2-7/8	1.4	1-1/2
D23 4		4	2-3/8	2-1/2							
D23 5		5	3	3-1/2	420	420			560	560	
D23 6		6	2-3/4	4-1/2							
D23 8		8		6-1/2							
D23 10		10		8-1/2							
Structural F23-E	D23 3.4 XFE	0.23	Flat	3-3/8	1-1/2	1-3/4	1-5/8	—	—	560	560
	D23 5 XFE			5			3-1/4				
	D23 6.8 XFE			6-3/4		3-1/2	3-1/4				
Structural F23-W	D23 2.9 XFW	0.23	Flat	2-7/8	1.4	1-1/2	1-3/8	365	415	405	540
	D23 4.4 XFW			4-3/8			2-7/8				
	D23 5.9 XFW			5-7/8			4-1/2	420	420	560	560
Structural F23 Stainless	D23 2.9 XU	0.23	Flat	2 7/8	1.4	1-1/2	1-3/8	330	370	425	350
	D23 4 XU			4	2-3/8		2-1/2				
	D23 5 XU			5	3		3-1/2	390	450	470	600
	D23 6 XU			6	2-3/4		4-1/2				

- Reference lateral design values apply to two-member single shear connections where both members are of the same specific gravity and the screw is oriented perpendicular to grain. When the wood members have different specific gravities, use the lower of the two.
- Values shall be adjusted by all applicable adjustment factors per NDS.
- Z Perp = lateral design value for connection with wood members loaded perpendicular to grain.
- Z Para = lateral design value for connection with wood members loaded parallel to grain.

**Structural Screws**—Screw Properties and Design Values

**TABLE 2:** Reference Withdrawal Design Values in Side Grain Applications and Head Pull-Through Design Values

PRODUCT NAME	SCREW LENGTH (IN)	THREAD LENGTH (IN)	ALLOWABLE WITHDRAWAL DESIGN VALUES (LBF/IN) <sup>1</sup>				ALLOWABLE MAXIMUM WITHDRAWAL DESIGN VALUES (LBF)		ALLOWABLE HEAD PULL-THROUGH DESIGN VALUES (LBF/IN) <sup>2</sup>		
			SPECIES (SG)				SPECIES (SG)		SPECIES (SG)		
			HF/SPF (0.42)		DF/SP/SCL (0.50)		HF/SPF (0.42)	DF/SP/SCL (0.50)	HF/SPF (0.42)	DF/SP/SCL (0.50)	
			THREAD PENETRATION (IN) <sup>3</sup>								
			1	2	1	2					
Structural H19	2-7/8	1.4	255	—	340	—	395	520	405	600	
	4	2-1/4		2-1/2		300	395	685			905
	6	2-1/2						775			1015
	8										
	10										
Structural H23	4	2-3/8	280	380	360	445	940	1090	775	1075	
	5	3					1240	1420			
Structural F19	2-7/8	2	255	—	340	—	395	520	855	975	
	4-1/2			300		395	685	905			
	6						775	1015			
	8										
	10										
	12										
	14										
16											
Structural F23	2-7/8	1.4	280	—	360	—	470	570	970	1210	
	4	2-3/8		2-3/4		380	445	940			1090
	5	3						1240			1420
	6	2-3/4						1120			1290
	8										
	10										
10											
Structural F23-E	3-3/8	1-1/2	280	—	360	—	520	625	970	1210	
	5										
	6-3/4										
Structural F23-W	2-7/8	1.4	280	—	360	—	470	570	970	1210	
	4-3/8										
	5-7/8										
Structural F23 Stainless	2-7/8	1.4	190	285	225	335	265	315	445	630	
	4	2-3/8					450	535			
	5	3					570	675			
	6	2-3/4					525	620			

Values shall be adjusted by all applicable adjustment factors per NDS Section 11.3 for wood screws. Maximum withdrawal design values based on full thread engagement, including the tip. Values based on 1-1/2" thick wood member.

lbf = pound-force  
SG = Specific Gravity

HF = Hem-Fir  
SPF = Spruce-Pine-Fir

DF = Douglas Fir  
SP = Southern Pine

SCL = Structural Composite Lumber