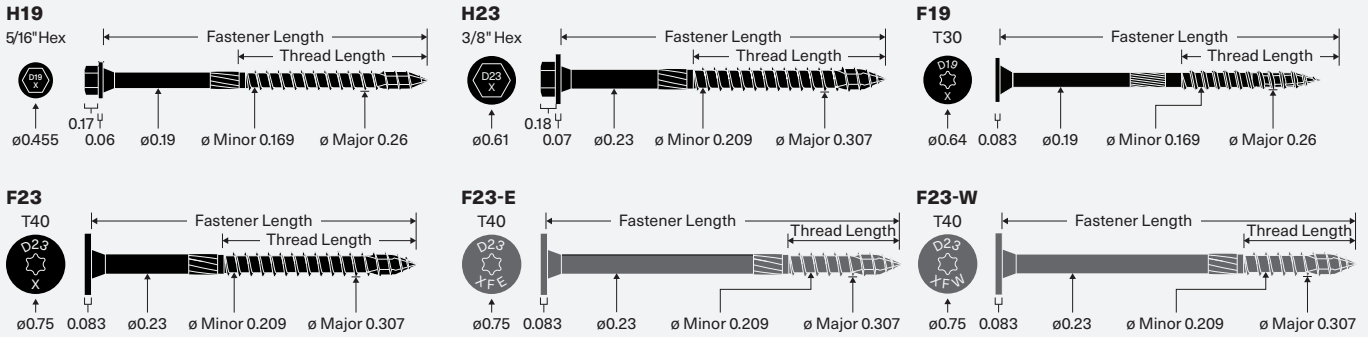


# Structural Screws

## 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	300	375	375	440
	D19 4			4	2-1/4		305	270	435	415	
	D19 6			6	2-1/2						
	D19 8			8							
	D19 10			10							
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							
	D19 6			6							
	D19 8			8							
	D19 10			10			370	325	465	365	
	D19 12			12							
	D19 14			14							
	D19 16			16							
Structural F23	D23 2.9	0.23	Flat	2-7/8	1.4	1-1/2	1-3/8	365	415	405	540
	D23 4			4	2-3/8						
	D23 5			5	3						
	D23 6			6	2-3/4		420	420	560	560	
	D23 8			8							
	D23 10			10							
Structural F23-E	D23 3.4 XFE	0.23	Flat	3-3/8	1-1/2	1-3/4	1-5/8	—	—	405	540
	D23 5 XFE			5			3-1/4			560	560
	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			420	420	560	560	
	D23 5.9 XFW			5-7/8			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					685	905			
	6	2-1/2		300		395	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						685	905			
	6										
	8										
	10										
	12										
	14										
16											
Structural F23	2-7/8	1.4	280	—	360	—	470	570	970	1210	
	4	2-3/8					940	1090			
	5	3		380		445	1240	1420			
	6	2-3/4									
	8						1120	1290			
	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										

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      HF = Hem-Fir      DF = Douglas Fir      SCL = Structural Composite Lumber  
 SG = Specific Gravity      SPF = Spruce-Pine-Fir      SP = Southern Pine