



Tel: 1-800-479-0056
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Wood Screws

Wood screws are used primarily to attach wood to wood. They have an aggressive thread profile designed to maximize the clamping force necessary to form strong joints in wood.

As they are readily available and relatively inexpensive they are also commonly used to attach a variety of non-wood objects to wood (eg hinges, hardware, locks).

For many applications, wood screws are preferred over nails for a number of reasons:

- 1) Easily removed for convenient dismantling of assembled wood and for removal of fixtures from wood.
- 2) Greater resistance to pullout. Wood screws offer only slightly better resistance to shear (lateral) forces than similarly sized driven nails. However under comparable conditions wood screws can typically handle much greater withdrawal loads.
- 3) Finished appearance and aesthetics.

THREADS and POINT

Wood screws have sharp, coarse, and widely spaced threads. They also have a gimlet point - a threaded cone point angled at 45 to 50 degrees. These features are ideally suited for easy penetration into wood and for tapping their own mating threads during installation.

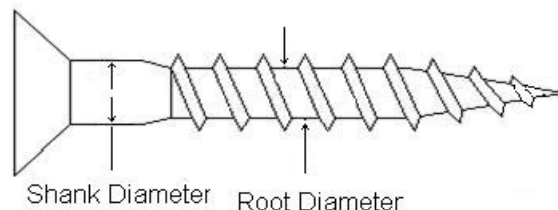


Fig.1



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Table 1 Standard Wood Screw Dimensions

Nominal Screw Dia.	TPI	Shank Dia.		Root Dia.	
		Decimal	Fraction	Decimal	Fraction
0	32	0.060	1/16	0.040	3/64
1	28	0.073	5/64	0.046	3/64
2	26	0.086	3/32	0.054	1/16
3	24	0.099	3/32	0.065	1/16
4	22	0.112	7/64	0.075	5/64
5	20	0.125	1/8	0.085	5/64
6	18	0.138	9/64	0.094	3/32
7	16	0.151	5/32	0.102	7/64
8	15	0.164	5/32	0.112	7/64
9	14	0.177	11/64	0.122	1/8
10	13	0.190	3/16	0.130	1/8
11	12	0.203	13/64	0.139	9/64
12	11	0.216	7/32	0.148	9/64
14	10	0.242	15/64	0.165	5/32
16	9	0.268	17/64	0.184	3/16
18	8	0.294	19/64	0.204	13/64
20	8	0.320	5/16	0.233	7/32
24	7	0.372	3/8	0.260	1/4

NOTES:
 1. All dimensions are in inches, unless otherwise noted.
 2. For reference only

Cut Threads

Wood screws with cut threads are tapered and approximately two-thirds of their length is threaded. The remaining one-third of the shank under the head remains unthreaded. The unthreaded portion prevents two wood pieces from separating as they are screwed together. Wood screws with cut threads have a maximum thread diameter that is no greater than the shank diameter, and the shank diameter is larger than same-sized screws with rolled threads.

Rolled Threads

Wood screws with rolled threads are not tapered and similar to screws with cut threads are threaded for about 2/3 of their length. However, their maximum thread diameter is greater



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than the shank diameter, and the shank diameter is smaller than same-sized screws with cut threads.

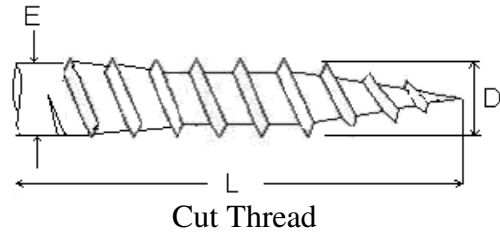
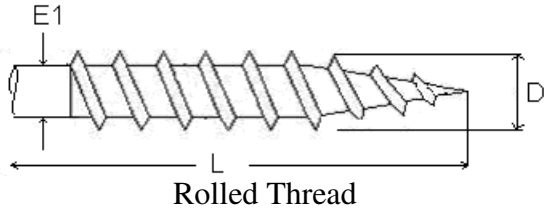


Table 2

Thread & Body Diameters for Wood Screws • Cut & Rolled Thread Types										ASME B18.6.11997
Nominal Size or Basic Screw Dia.		TPI (±10%)	D Major Thread Dia.		E Body Dia. (Cut Thread)		E1 Body Dia. (Rolled Thread)		Thread Depth	
			Max	Min	Max	Min	Max	Min	Min	
2	0.086	26	0.090	0.079	0.090	0.079	0.075	0.064	0.010	
3	0.099	24	0.103	0.092	0.103	0.092	0.086	0.075	0.014	
4	0.112	22	0.116	0.105	0.116	0.105	0.095	0.084	0.016	
5	0.125	20	0.129	0.118	0.129	0.118	0.107	0.096	0.018	
6	0.138	18	0.142	0.131	0.142	0.131	0.118	0.107	0.020	
7	0.151	16	0.155	0.144	0.155	0.144	0.127	0.116	0.022	
8	0.164	15	0.168	0.157	0.168	0.157	0.136	0.125	0.023	
9	0.177	14	0.181	0.170	0.181	0.170	0.147	0.136	0.026	
10	0.190	13	0.194	0.183	0.194	0.183	0.157	0.146	0.030	
12	0.216	11	0.220	0.209	0.220	0.209	0.176	0.165	0.031	
14	0.242	10	0.246	0.235	0.246	0.235	0.201	0.190	0.035	
16	0.268	9	0.272	0.261	0.272	0.261	0.214	0.203	0.038	
Nominal Screw Length										
Tolerance on Length		Up to 5/8", Incl. +0, -0.03	Over 5/8" +0, -0.05	to 1-1/2", Incl.	Over 1-1/2 to 2-3/4", Incl. +0, -0.06	Over 2-3/4"		+0, -0.09		

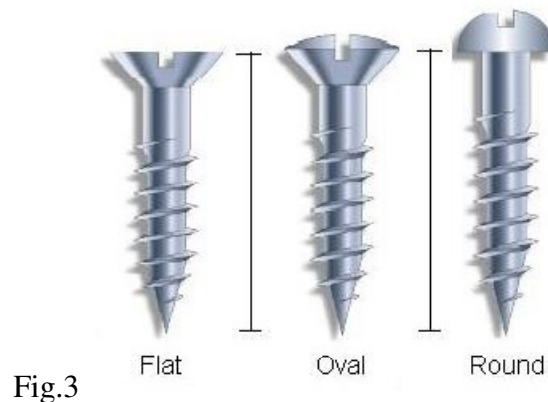
DRIVE STYLES

The most common drive styles include slot, cross recessed (Phillips) and square drives (Fig 2). Screws with Phillips or square drives have greater resistance to cam out and as such are preferred when using power drivers and thus reducing the likelihood of damaging the screw head, driver bit or wood surface. See table 3 for recommended driver bit sizes.



LENGTHS

Wood screws typically range from 1/4" to 6" in length. Lengths shorter than 1" are available in 1/8" increments; lengths from 1" to 3" are available in 1/4" increments; and screws longer than 3" are in 1/2" increments. Wood screw lengths are measured as follows: For flat heads, length is measured from the top of the head to the tip of the point; oval heads are measured from the edge where the rounded top meets the countersink surface to the tip of the point; and round heads are measured from flat bearing surface under the head to the tip of the point (see Fig 3).



HEAD TYPES

Three common head types are: flat (countersunk), oval (countersunk) and round. The standard head angle (conical bearing surface) of flat and oval heads is 82°. Flat heads are probably the most preferred because once inserted into the material the head remains flush with the surface. Furthermore, when countersunk, flat head screws can be easily concealed



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using filler or a wood plug. Oval and round heads are used when a decorative finish is preferred (see Table 3 for head dimensions).



Fig 4

Table 3. Wood Screw Head Dimensions

Nominal Screw Dia.	TPI	Basic Screw Dia.		Average Head Dia.			
				Flat & Oval		Round	
		Decimal	Fraction	Decimal	Fraction	Decimal	Fraction
0	32	0.060	1/16	0.109	7/64	0.106	7/64
1	28	0.073	5/64	0.135	9/64	0.130	1/8
2	26	0.086	3/32	0.160	5/32	0.154	5/32
3	24	0.099	3/32	0.185	3/16	0.178	11/64
4	22	0.112	7/64	0.210	13/64	0.202	13/64
5	20	0.125	1/8	0.236	15/64	0.227	7/32
6	18	0.138	9/64	0.262	17/64	0.250	1/4
7	16	0.151	5/32	0.287	9/32	0.275	9/32
8	15	0.164	5/32	0.312	5/16	0.298	19/64
9	14	0.177	11/64	0.337	11/32	0.323	21/64
10	13	0.190	3/16	0.363	23/64	0.347	11/32
12	11	0.216	7/32	0.414	13/32	0.395	25/64
14	10	0.242	15/64	0.480	31/64	0.443	7/16
16	9	0.268	17/64	0.515	33/64	0.491	31/64
18	8	0.294	19/64	0.602	19/32	0.539	17/32
20	8	0.320	5/16	0.616	39/64	0.587	19/32
24	7	0.372	3/8	0.724	23/32	0.683	11/16

NOTES:

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MATERIALS and FINISHES

Wood screws are usually made of steel, but can be found in other metals (eg brass and stainless steel). They are often coated to improve corrosion resistance and/or for aesthetics (eg zinc plating, black oxide). Keep in mind that some coatings may stain certain types of wood. Stainless steel and silicon bronze are usually recommended if the screws will be used with pressure treated woods such as "ACQ" (Alkaline Copper Quaternary). In marine environments silicon bronze is preferred for maximum corrosion resistance.

PILOT HOLES and COUNTERSINKING

When using wood screws to join two pieces of hardwood together, pre-drilling a pilot hole is recommended to prevent the wood from splitting. Also, choose a screw with proper length to maximize strength of the joint. It should be as long as possible without going through the adjoining piece of wood. There are many opinions as to the ideal depth for pilot holes (see Table 4 for recommended untapered pilot hole sizes in soft and hard woods). In hard wood, it is recommended to drill the pilot hole as deep as the full screw penetration. With tapered drill bits, follow the manufacturers recommendation regarding pilot hole size and depth. Drilling a tapered hole too deep may compromise the screw's withdrawal load by reducing thread engagement in the wood.

To countersink flat and oval head screws, use an 82° countersink to create the countersunk recess. The body diameter of the countersink should be the same or slightly larger than the head diameter of the screw to ensure that a uniform bearing surface is created (see Table 2 for suggested countersink sizes). Countersink units are also available that attach to regular drill bits in order to drill both a pilot hole and countersunk recess in a single step.



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Table 4. Wood Screw Pilot Holes & Countersink Sizes & Driver Bit Sizes

Size	Untapered Pilot Hole Size				Countersink size	Driver Bit Size	
	Body (cut)	Body (Rolled)	Soft Wood	Hard Wood		Phillips	Square
0	1/16	3/64	1/64	1/32	1/4	0	-
1	5/64	1/16	1/32	1/32	1/4	0	-
2	5/64	1/16	1/32	3/64	1/4	1	-
3	3/32	5/64	3/64	1/16	1/4	1	0
4	7/64	3/32	3/64	1/16	1/4	1	0
5	1/8	3/32	1/16	5/64	3/8	2	1
6	9/64	7/64	1/16	5/64	3/8	2	1
7	5/32	1/8	1/16	3/32	3/8	2	1
8	5/32	1/8	5/64	3/32	3/8	2	2
9	11/64	9/64	5/64	7/64	3/8	2	2
10	3/16	5/32	3/32	7/64	1/2	3 FH/OH; 2 RH	2
12	7/32	11/64	7/64	1/8	1/2	3	3
14	15/64	13/64	7/64	9/64	5/8	3	3
16	17/64	13/64	9/64	5/32	5/8	3	-
18	19/64	15/64	9/64	3/16	3/4	4	-
20	5/16	1/4	11/64	13/64	3/4	4	-
24	3/8	19/64	3/16	7/32	1	4	-

NOTES:

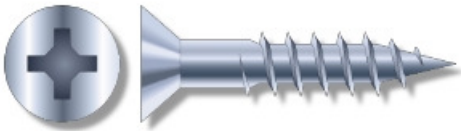
1. all dimensions are in inches unless otherwise specified.
2. Use #3 Phillips driver bit for #10 flat and oval heads and #2 bit for #10 round heads.
3. Body pilot hole size is average body diameter of screw, based on Cut or Rolled threads, rounded to nearest 64th.
4. Countersink size is maximum head diameter rounded up to nearest 8th (#0 and #24 rounded up to nearest 4th).
5. For reference only.



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TYPES

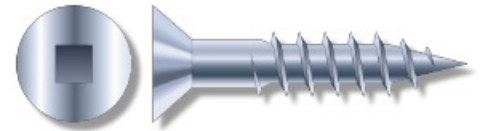
Flat Head Wood Screws



Material: Steel; [Stainless Steel](#)
Plating: Zinc, Black Oxide



Material: Steel
Plating: Zinc

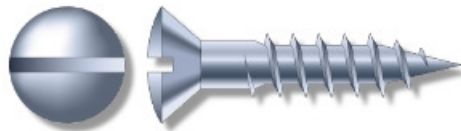


Material: Steel
Plating: Zinc

Oval Head Wood Screws

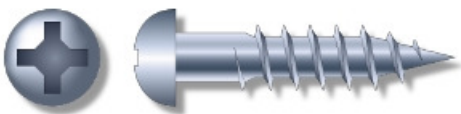


Material: Steel; Stainless Steel
Plating: Zinc,

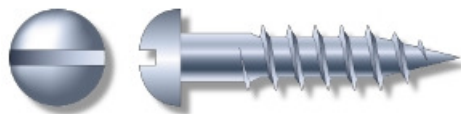


Material: Steel
Plating: Zinc

Round Head Wood Screws



Material: Steel
Plating: Zinc,



Material: Steel
Plating: Zinc