



Using Screws as an Alternative to Nails in Rated Wood Stud Walls <http://www.gypsum.org/topical.html#screws>

In many areas of the country there is a trend to move away from the use of nails toward the exclusive use of screws or a combination of screws and nails for installing gypsum board on wood framing. Screws allow faster application and more consistent quality in the finished wall or ceiling. This practice, however, has raised the question of the effect of using screws on fire rated systems. Screws are spaced farther apart than nails and they are usually not as long as nails.

Over the years, many fire resistance tests have been conducted on walls with gypsum board nailed to wood studs. There have also been many tests conducted where screws were used to attach the gypsum board to both wood and metal framing. Both attachment methods have proven to be effective in holding the gypsum board on the studs in fire resistance tests of wall systems of 1 and 2 hour duration.

Screw heads are larger than nail heads, providing a greater bearing surface to support the gypsum board. Additionally, the threaded shank of the screw, even though shorter than the nail shank, provides greater holding power than a nail.

A review of fire tests on both screw and nail attached systems has led a nationally recognized independent testing laboratory to conclude that Type W screws spaced a maximum of 12 inches on center can be substituted for nails spaced 7 or 8 inches on center for the attachment of gypsum board to wood studs in fire resistance rated wall systems rated at one hour or less. The conclusion of this review also applies to the use of a combination of screws and nails with nails located at each stud along horizontal joints and 7 inches on center at vertical joints, and screws 12 inches on center to intermediate framing. Blocking at horizontal joints is not required. Screws used for this application must penetrate the wood studs a minimum of 5/8".

Many other issues pertain to the economical efficiency of screws vs. nails.

- **Screws are a forgiving fastener and may be withdrawn without damage to the frame work during remodeling and they are reusable.**
- **Screws are available in collated strips and further reduce the costs of labor, especially in ceilings and soffit installations.**
- **Screws must be used in residential applications when the interior non-loading partitions are light gauge metal, an upward trend in residential construction.**
- **Screws do not have the tendency to back out as the framing dries, while nails do have the tendency to "pop", causing callbacks.**
- **Screws, when used for sub floor and stair applications in conjunction with sub floor adhesives, eliminate squeaks, and the callbacks.**



Screws Vs. Nails Chart

tpi = threads per inch

FASTENER (Nail)	WIRE	Min. Penetration (in.)	Ultimate Load lbs.	
			Withdrawal Strength **	
			Southern Pine	Douglas Fir-Larch
6d Common	0.1130	1-1/4"	35	22
6d Ring Shank				
6d Ring Shank	0.1200	1-3/8"	37	26
8d Common	0.1310	1-1/2"	41	26
10d Common	0.1480	1-5/8"	46	29
16d Common	0.1620	1-3/4"	50	32

TPI	FASTENER (Screw) Type W	WIRE	Min. Penetration (in.)	Ultimate Load lbs.	
				Withdrawal Strength **	
				Southern Pine	Douglas Fir-Larch
8	6 x 1-1/4"	0.1380	3/4"	186	339
8	7 x 2"	0.1510	1-1/4"	291	430
8	8 x 2"	0.1640	1-1/4"	358	373
8	8 x 2-1/2"	0.1640	1-1/4"	396	528
8	10 x 4"	0.1900	1-1/4"	332	545

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DIRECTIONS: Use standard screw gun with depth sensitive nose piece. Suggested screw gun is 4 amps minimum and 0 to 4,000 rpm. Trim Head is completely seated when head is flush or slightly counter sunk with the work surface. Overdriving may result in failure of the fastener or stripping of the head recess.

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**GRABBER fasteners are not categorized as structural bolts. The figured listed above are ultimate average values achieved under laboratory conditions and apply to GRABBER Line fasteners only. An appropriate safety factor must be determined by a qualified professional for design purposes. Values are for comparison only.