

# FOR WANT OF A DRYWALL SCREW

*Drywall screws are those vital items you buy by the thousands—but an accurate knowledge of these attachment devices can produce a better job and save money.*

**A**s steel studs revolutionized commercial construction, conventional nail fastening of drywall to stud required a change in fasteners. The first drywall screws used a type “A” point, but these often failed to penetrate the metal or required excessive drive pressure to penetrate light gauge stud (20 gauge and thinner), causing operator fatigue. A sharper point was required. Some initial styles were too sharp and broke off. The industry finally settled on a point range of 23 to 28 degrees. This became the type “S” point in wide use today. Additionally with the development of the selfdrilling screw for heavier gauges (18 gauge and thicker), the full range of metal stud thickness was accommodated. And today, with the growing knowledge that a threaded fastener increases pull-out as much as 350 percent over nails, screws are increasing in popularity for quality fastening drywall to wood, thereby eliminating nail “pops.”

Today there is a broad range of suppliers of drywall screws and a similar range of quality. Price has become foremost in the purchasing decision. However, there are two primary issues that supercede the pricing issue:

1. *The consistent quality of the board fastening, and*
2. *The speed and efficiency of board fastening.*

#### **Consistent Quality of Board Fastening**

A consistent fastening is more than just a sign of quality workmanship. It is mandatory by building codes and manufacturing specifications. Drywall screw manufacturing standards are established in the ASTM Specifications C954-86 (‘SD’ point), and C1002433 (‘S’ point), while building codes nationwide, although varying, have some standard areas that building inspectors look for:

1. *Tightness of board fastening to stud:* This is achieved through effective thread engagement. Test for loose board by pushing adjacent to the fastener.

2. *Proper recess of fastener into board:* Fastener heads should be properly seated below panel surface. This allows joint treatment to finish smooth and flush with the surrounding board.

3. *Absence of burrs and paper tear:* Board is a sandwich of two paper layers with a soft gypsum center. The paper cannot be penetrated by the fastener head, otherwise the fastening strength has been compromised. Additionally, the fastener head should clamp the paper underneath without leaving protruding burrs of paper that are difficult to finish over.

4. *Absence of fastener hole elongation, or board punctures:* Offcentered driving of screws can cause oversized holes in board, allow screws to “profile” into the board (like a nail bend)

or cause the screw gun bit tip to leave the fastener recess during driving and puncture the board. All of these cause an unprofessional appearance and require extra finish effort.

5. *Proper fastener plating:* Screws with inadequate plating or rusty appearance will be rejected. If they are not found prior to installation or prior to finish coats, “bleed-throughs” (rusting through the plaster) will cause expensive rework.

### Speed and Efficiency of Board Fastening

The most demanding “inspector” is usually the drywaller installing the board. Drywall is fastened at a fast pace and the installer has little patience to be slowed by poor quality fasteners.

Labor costs far exceed screw price savings. Poor quality fasteners cost many times more money than any potential price savings by:

1. *Having more screws end up on*

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*the ground than in the board, and,*

2. *Slowing down the operator and reducing board feet installed, and,*

3. *Fatiguing the installer and causing a like reduction in board installation.*

Most field complaints of poor quality fasteners usually fall into three areas:

1. Screw points require too much pressure to install or, worse, screws won’t penetrate studs at all.

2. Screw gun bit tips wobble in recess or leave recess during screw driving.

3. Screw heads are not smooth and easily tear paper or leave paper burrs.

### What to Look for in Quality Drywall Screws

Following are the main areas to check for drywall screw quality:

#### HEAD

**SIZE** — The outside diameter should be a minimum of .315". Heads below proper specifications do not have enough bearing surface upon the drywall paper. This causes

1. Lack of setting resistance, allowing over driving of the head through the paper, and

2. Lack of “pull-over” strength (that is, board pulling over the screw head and coming loose from the fastening).

**SMOOTHNESS** — The rim of the head should be free from burrs or sharp edges. Also, the head perimeter should have a slight flange (.025 thickness). Screws with no flange produce a sharp edge. A sharp edge or burrs on the head perimeter will cut the paper. A smooth head should recess slightly into the board while compressing the paper underneath.

**RECESS** — The Phillips recess is of a special design. It is not a standard No. 2 Phillips. Only a reduced shank drywall bit tip (Apex #446-2 or like) should be used. The recess should be centered in the head, directly mid-center of the shank. The recess should be free from internal burrs, allowing the bit tip to insert the full distance of the point taper. A good recess should not allow the inserted bit tip to “wobble” (move side to side).

A good test is the "STICK/NO STICK." The rule is that the screw should "stick" to the end of the bit tip when the gun is pointed toward the ground, but the bit tip should not "stick" (remain) in the screw recess after fastening the board. Too tight a recess can pull the bit tip out of the bit holder and slow down installation.

**SHANK** — The screw shank should be straight and should be perpendicular to the head. Bent or "cocked" screws cause eccentric (out of round) driving and can cause the bit tip to leave the Phillips recess.

## **BODY**

**THREADS** — Threads should have well formed edges (crest apex). These cut into metal easier, increase thread engagement (holding power) and reduce chance of strip-out or pull-out.

Type "S" screws (sharp point) should have a twin lead, that is, two threads making a double helix. This drives faster and increases the amount of thread engaged in the metal. Very important is that one of the threads (lead thread) is well formed all the way to the point. This is necessary in that the sharp point penetrates the metal, but it is the lead thread which "pulls" the screw into the stud. The second thread (following thread) should stop somewhere between the shank and end of the point. Rolling both threads to the point usually creates a dull point that will not penetrate easily.

The "SD" (selfdrilling) threads are usually a finer (closer together) single lead. Cutting into thicker gauge material, they reduce possibility of "seize-up" to the screw gun.

## **POINTS**

**"S" POINT** — Some screws can be too sharp. Too steep an angle produces a "needle" point. This causes the point to be hard completely through with no ductile (soft) core. Hence the point breaks off when contacting the metal and leaves a blunt end that will not drill. In opposition to this, some points are too rounded or blunt and penetrate slowly, or not at all. Usually this is caused by both threads being rolled to the point thereby reducing the point angle, or by continuing to manufacture screws on worn-out thread-rolling dies.

**"SD" POINTS** — Self drilling flutes should have sharp edges that easily produce chips of metal upon first drill rotations into the metal. A screw that

"walks" (runs across the metal before starting to drill) is unacceptable. With most "SD" points being forged (formed, not milled), attention must be given to the width of the flutes. The flutes should be approximately 15 percent of the diameter of the thread o.d. Flutes too side cause strip-out, flutes too small cause excessive driving torque.

## **PLATING**

Screws should be treated to be corrosion resistant. Any treatment should not inhibit adhesion to joint finishing compounds or plaster and shall not bleed through decorative finishes. Standard coating for type "S" drywall screws is either black or gray phosphate. A fast inspection method is to twist the screw into a tightly held rag. The screw should not show any bare metal after performing this step. Plating on type "SD" screws can be either zinc or phosphate. Generally zinc plated "SD" screws are used on outer perimeter structural walls. Standard zinc has some better corrosion resistance over standard drywall screw phosphate but can interfere with adhesion properties of joint compounds.

## **PACKING**

Although not directly part of the screw, packing should be part of a cost consideration.

**BOX** — Boxes should be clearly marked as to contents. "S" points should be clearly identified from "SD"

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points to prevent the wrong product being delivered to the jobsite. Boxes should also have an easily resealable lid to eliminate screw spillage when the job is completed. Bulk cartons should be made from at least 200 lb. test. Sides should not split open and spill screws. Cartons should be able to stack four or five high without crushing.

**PALLETS** — If screws are purchased in pallet quantities, stays (side supports) should be fastened to pallet bottom and top to insure that they remain in place. This allows the pallet, not the boxes, to carry the weight from pallets stacked on top. Pallets should be of proper design to stack four (4) high, thereby saving storage space


## **SUPPLIER**

Your choice of supplier is as important as your screw selection. Fly-By-Night suppliers may offer cheaper prices, but are not there to back-up quality claims. The costs of a jobsite shut down by poor quality screws or late deliveries far exceed any potential screw savings.

## **PROBLEMS NOT CAUSED BY SCREWS**

Fastening problems are some times incorrectly attributed to the screw when other areas may be suspect. Some points to check when questioning screw performance are:

1. Bit tip wear — worn bit tips will wobble in the screw recess causing driving problems. For best bit tip life, a maximum “XX” hardness is recommended.
2. Screwgun wear — The bit holder adapter can wear causing the same driving problems as a worn bit tip.
3. Screwgun speed — For ‘SD’ point screws, a 2500 rpm gun is recommended. Guns faster or slower can cause excess heat build-up at the screw point and thereby burning-off the drill flutes. Recommended screwguns for ‘S’ point screws should range from 2500 to 4000 rpm.

As with any purchase, price should be only part of the decision. Quality, performance and operator acceptance should be added to the list of decision points. This article has been written to assist the drywall screw buyer in making a comprehensive decision. 

*Editor's Note: Of all the mechanical attachments in a modern construction job that are pretty much taken for granted, the drywall screw certainly must rank near the top. Yet the design and production know how that goes into these screws would amaze even veteran construction people.*

*Truth is, there is a broad range of drywall screw types and suppliers, and this story was especially written for Construction Dimensions so that contractors would have a source of information that shows just how important it is to select the right screw for a particular job.*

**About the Author:** Mark Farrell is vice president of marketing for Compass International, Inc., a major supplier of construction fasteners in North America, and of drywall screws for two decades. He was instrumental in the development and marketing of his company's products since the 1960's.