

MAKING IT STICK: Fasteners & Adhesives

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Walls hold up the building—but what holds up the walls? Today contractors have a wide variety of fasteners and adhesives from which to choose, according to the needs of each installation.

Standard gypsum wallboard, of course, is usually applied via “single nailing” directly to wood framing members (ceilings are applied first, then sidewalls). However, “double nailing” is an alternative method of attachment designed to minimize nail pops.

Double nailing requires installers to double-up on the field nails. The total quality of nails used does not double, however, since maximum nail spacing is increased to 12” o.c., and conventional nailing is used on the perimeter.

Application is accomplished by first single nailing the field of the board, starting at the center and working towards the ends and edges. Another nail is then driven about 2”-2½” near each of the first nails. The first series of nails are then struck again to assure the board is drawn tightly to the nail member.

Still another nail-on installation technique is the “floating angle” method. Here the use of perimeter nails is eliminated at interior corners, and also where walls and ceilings meet. This method reduces stress and strain on the board if framing settles.

For nail-on installations, use these

guidelines for various wallboard thicknesses:

Thickness Limitations

- | | |
|------|---|
| ¼” | Apply only to existing surfaces, and not directly to nailing members (except when used with other thicknesses in double-layer systems tested for specific purposes). Surfaces must be sound, and not spaced more than 16” o.c. On ceilings, ¼” wallboard must be adhesively applied, as well as nailed. |
| 3/8” | Do not use on nailing members more than 16” o.c. When applied to ceilings, wallboard must be installed with paper-bound edges at right angles to the nailing members, and must not be used to support insulation. |

1/2”-5/8” Do not use on nailing members more than 24” o.c. When applied to ceilings with nailing members that exceed 16” o.c., wallboard must be applied with paper-bound edges at right angles to those members.

If wallboard ceiling panels are nailed to cross furring, these members must have a maximum cross-section of 2” x 2” (nominal) with the same spacing limitations as cited in the chart above.

Whenever fire resistive construction is required, nail spacing specified in the fire test should be followed.

Screw Applications

Screws are often preferred over nails, because screws hold wallboard tight against the furring when applied as recommended. Today most wallboard screws can be easily and quickly driven with an electric screw gun, equipped with adjustable screw-depth control and a Phillips bit.

If framing is spaced up to 16”, screws are spaced 12” o.c. (maximum) on ceilings and 16” o.c. (maximum) on walls. For framing that is spaced 24” o.c., screw spacing must not exceed 12” o.c. for both walls and ceilings.

Several types of screw heads are made for various fastening applications (see Figure 1). Common designs include bugle heads, trim heads, pan heads,

oval heads, lath heads, low profile heads, pancake heads, and hex washer heads. Of these, bugle heads (with a deep Phillips recess) are the basic all-purpose design, providing controlled penetration without fracturing wallboard paper.

Because walls move for many reasons, thread design is also an important consideration. Improperly seated or stripped-out screws are subject to popping, which in turn damages the wall or ceiling finish. Therefore, the thread design must provide both clamp



Drywall screws anchor gypsum wallboard panels to framing lumber with greater holding power than drywall nails which can loosen and eventually “pop” through wallboard surfaces. Sharp screw threads drive quickly and hold fast to prevent costly callbacks.

ing strength and vibration resistance.

Another consideration when selecting drywall screws is the tip. Many contractors today prefer “drilling” points that extrude through steel framing with speed and consistency, cutting the waste some associate with non-drilling needle-point screws.

Recently, a process was introduced by Gold Bond Building Products of Charlotte, N.C., that surface-treats screws to improve the adherence of joint compounds used to fill the screw-head dimple. The finish also enhances the screw’s corrosion resistance.

As with nails, when installing wallboard by screws it is recommended to start at the center and work toward each end and edge, spacing the screws as suggested for each type of application, or in accordance to fire test on fire rated assemblies.

Adhesives, Compounds, and Tapes

A variety of adhesives have also been developed for different applications—applied by caulking guns, and for use alone or in combination with nails or screws.

The “MC” or modified contact adhesive is designed to apply regular or pre-finished gypsum wallboard panels to wood studs and joists, steel studs, existing walls and ceilings, rigid polyurethane foam insulation, masonry surfaces, or to another gypsum wallboard for double-layer systems.

This type of adhesive should remain workable long enough for panels to be positioned adequately. Moreover, MC adhesives should offer good bridging qualities for laminating to slightly irregular surfaces while requiring a minimum of temporary nails, and little or no bracing.

Rubber-based adhesives may be used on the same surfaces cited above for MC formulas. However, they are especially recommended for combination adhesive/nail-on installations, where the rubber-based formula allows reduced use of permanent fasteners.

As for joint compounds, most manufacturers offer a line of such products, recommending they be used together in construction systems and not mixed with other brands for best results. To meet Consumer Product Safety Standards, compounds must be formulated without asbestos.

The three basic uses of joint compounds are:

- To embed the joint tape and to finish over the tape, corner bead, and nail or screw heads.
- To texture wallboard surfaces to receive paint as the final decoration.
- To laminate wall board to an existing surface such as old plaster, masonry, or a gypsum wallboard or backer board base.

All-purpose joint compounds often have vinyl-based formulas and are designed for tape application, fastener spotting, and the complete joint finishing of wallboard. Such all-purpose products can also be used to repair cracks in plaster walls, and should contain sufficient binder to secure reinforcing tape and develop the latter's strength and hardness by drying.

Compounds may come in dry-powder form, or premixed in pails or boxes. Some manufacturers offer all-purpose joint compounds in different consistencies—thicker for use with hand tools, and thinner for use in mechanical tool applications. Also on the market are "light" all-purpose compounds for-

Several types of screws heads are made for various fastening applications. A variety of adhesives have also been developed for different applications.

mulated for less weight, easier pulling and sanding, and less shrinkage than conventional compounds.

Several specialty compounds have also become available in recent years. One of the most popular is "topping" compound, designed specifically as a finish used over joint compound. These products cannot be used for embedding paper tape, or for the first coat over corner beads. But topping compounds

offer easy working and spreading characteristics, and are suitable for "floating" or finishing tape joints, spotting nail or screw heads, and finish-coating corner beads. Many contractors prefer topping compounds as their finish compounds, given the product's enhanced sanding qualities.

Another type of specialty compounds, popular among contractors, is designed not to be affected by humidity once it has set and dried. This quality can reduce joint deformities in many applications, while still firmly bonding tape to the board. Often these products feature controlled setting times, up to 180 minutes.

Joint tapes conceal and reinforce wallboard joints, and should feature a center crease to allow easy folding in either direction for use at corners. A variation is the flexible tape bead that combines joint tape with metal strips laminated to form inside or outside corners; this product is particularly useful for inside corners on cathedral ceilings, kneewalls, stairways, or any inside or outside corner less or greater than 90°. It is applied with the metal side to the

face of the wallboard, and is embedded into the joint compound.

In any application where only adhesives and no permanent fasteners are used, temporary fastening or bracing must be used until the adhesives are dry. Without such temporary fastening or bracing, positive bonding and flush panel joints cannot be assured.

Temporary fasteners may be double-headed nails, common nails driven at an angle, or drywall screws that may or may not be removed after the adhesive is set.

When any water-thinned adhesive is used, the base or finish layer must be a non-vapor retarder to allow proper drying (aluminum foil, vinyl plastic, and painted surfaces are considered vapor retarders). If a vapor-retarding material is used for both faces of a partition, there must be an air space or cavity within the partition.

In cold weather, maintain a room temperature between 50° and 70°F for 48 hours before application, and continuously thereafter until the adhesive is completely dry. Adequate heat and ventilation should be provided to ensure

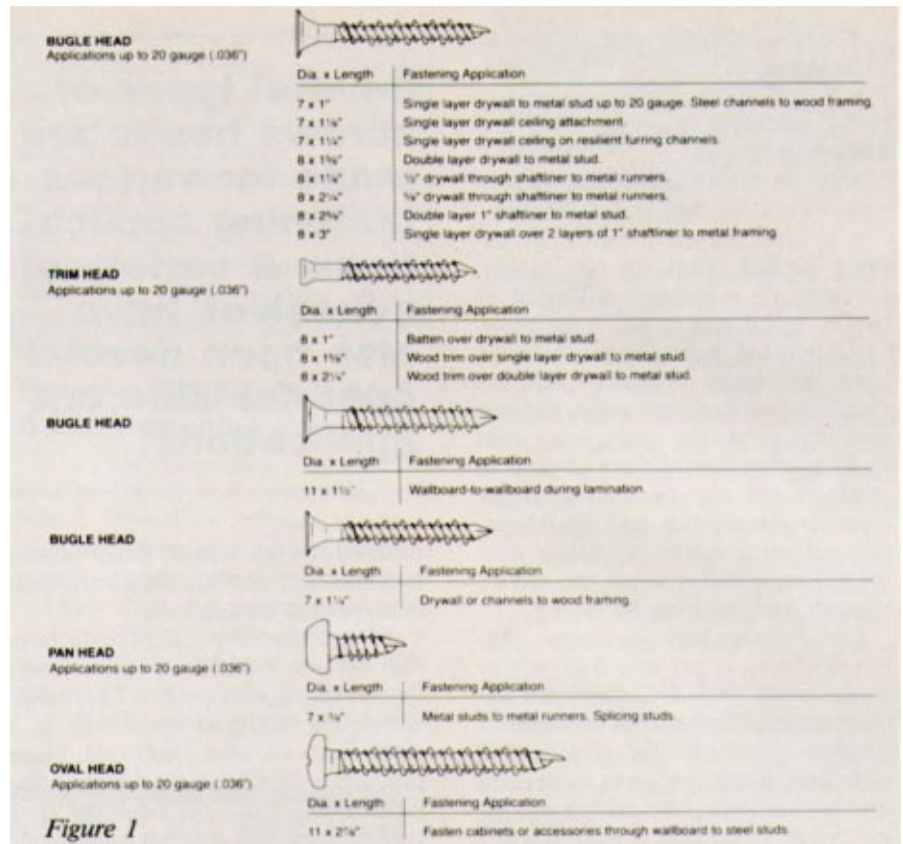


Figure 1

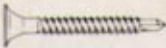



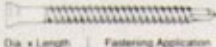
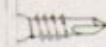

complete drying within 72 hours. Furthermore, sufficient cross-ventilation must be provided, and proper precautions taken against sparks and open flames that could not ignite flammable adhesives.

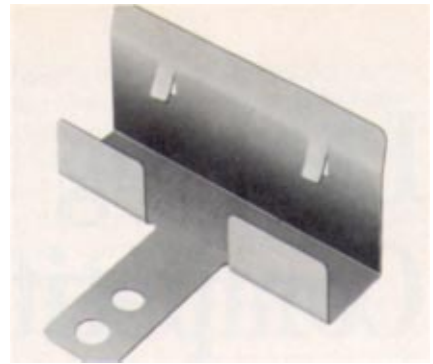
Press-On Fasteners

A recent development is the introduction of press-on fasteners that eliminate wooden corner and ceiling backing or deadwood. The one-ounce, 1 1/2" x 1 1/2" galvanized steel fastener can substitute for one of three 2x4 or 2x6 studs at every outside corner; two or more studs and blocking at every partition intersection; and several hundred lineal feet of deadwood ceiling back-up lumber.

One manufacturer, the Preston Corporation of Hot Springs, AR, claims these fasteners can reduce 10 percent of the framing lumber in single-family structures. Thus, for every 1200-square-foot house built, contractors would save 50 2x4 studs and 155 feet of back-up lumber, along with 10 percent of the framing time.


Press-on fasteners can increase structural integrity, and produce straighter corners and ceilings since wallboard is not restricted to following the contour of the wood. Available insulation area

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Press-on fasteners, which eliminate wooden corner and ceiling backing or deadwood, save builders both time and money while strengthening building structures.

is also increased, since insulation can run the full length into outside corners and behind partition intersections. In addition, removal of non-structural lumber allows easier plumbing and electrical installations.

The fasteners are fire-rated, shear-tested, and accepted by all the housing-related building-code bodies. 

This article was adapted with permission from "Gypsum Wallboard Construction," by Gold Bond Building Products, Charlotte, NC.