

# Gypsum Sheathing: Keys For An Acceptable Installation



By Michael Gardner

Unlike gypsum wallboard, which is typically painted or covered with a direct-applied finish material, gypsum sheathing is never exposed and is always covered by a surface cladding.

**P**aper-faced gypsum sheathing is a gypsum board that is used as a substrate for exterior claddings. It has a non-combustible core, composed essentially of gypsum and is faced with water-repellant paper on its back, front and wrapped edges. It is manufactured with either a square or a tongue-and-groove edge.

Gypsum sheathing is manufactured to meet the requirements of ASTM C 79 (C 1396), "Standard Specification for Treated Core and Nontreated Core Gypsum Sheathing Board." It is not intended for use as a long-term exposed material and must be covered with a cladding.

## Weather conditions

While local weather conditions will determine the length of time-treated core gypsum sheathing may be exposed to the elements, it should perform satisfactorily prior to the installation of cladding for up to one month. However, if the anticipated exposure time will be extended, or severe weather conditions are predicted, the gypsum sheathing must be covered immediately with a weather-resistive barrier. Nontreated core gypsum sheathing must be covered immediately upon installation.

In many respects, the application methods for gypsum sheathing are identical to those for gypsum wallboard. As with wallboard, sheathing can be nail or screw attached, is easy to cut with a knife or a saw and can be applied to a variety of substrate types, and framing members. Like wallboard, sheathing can be incorporated into fire-resistant or sound-attenuating construction.

Unlike gypsum wallboard, which is typically painted or covered with a direct-applied finish material, gypsum sheathing is never exposed and is always covered by a surface cladding. As a result, it is not necessary to finish the joints between individual sheets of gypsum sheathing for aesthetic or appearance reasons. In addition, fire-resistive systems incorporating gypsum sheathing—in contrast to wallboard systems—are usually exempt from joint treatment and fas-

tener finishing requirements through language contained in model building code documents that specifically exempts "square edge or tongue-and-groove edge gypsum board ... or gypsum sheathing" from requirements necessitating treatment of joints. Similar guiding language also exists in the Gypsum Association's GA-600, "Fire Resistance Design Manual."

In addition, since it is not finished with joint treatment, there is no need to create a recessed area in the face of gypsum sheathing to accommodate the application of finishing materials; in contrast to an application of gypsum wallboard, no dimple is created in the face of a gypsum sheathing board at individual fastener attachment points. Nails used to install gypsum sheathing are driven through the sheathing and into supporting framing members so that their heads are even with or slightly below the surface of the gypsum sheathing. Screws used to attach gypsum sheathing are driven so that the screw heads are set even with or slightly below the gypsum sheathing face paper.

Gypsum sheathing is easily attached using staples. Because recessing a staple head below the planar surface of gypsum wallboard may likely damage its face paper, specific language in GA-216, "Application and Finishing of Gypsum Board" and ASTM C 840, "Standard Specification for Application and Finishing of Gypsum Board," prohibits the use of staples for a single layer application of gypsum wallboard. A single-layer staple application of gypsum sheathing, however, is fully allowed by both industry-accepted gypsum sheathing application standards, GA-253, "Application of Gypsum Sheathing" and ASTM C 1280, "Standard Specification for Application of Gypsum Sheathing."

## Orientation

Staples used to attach gypsum sheathing must be a minimum of 16-gauge steel and have at least a 7/16-inch (11 millimeters) crown. The length of the staple legs is a function of the thickness of the sheathing. In general, staples

should penetrate not less than 1 inch (25 millimeters) into wood framing members.

The process of determining the correct orientation of gypsum sheathing to framing members is somewhat different than the comparable process for gypsum wallboard. Gypsum wallboard—taking into account board thickness, framing spacing and type, and location—can generally be installed with bound edges either parallel or perpendicular to framing members in non-fire rated construction. Final board orientation often is a sign of a contractor's installation preference and typically reflects the impact of specific project conditions such as room size and layout.

A correct gypsum sheathing orientation, however, requires the applicator to address a broader set of requirements. Tongue-and-groove edge gypsum sheathing, for example, must always be applied with the factory-bound edges at right angles (perpendicular) to framing members so that the grooved edges are facing down and bound panel edges are interlocked. This permits the edges of the panels to function as designed.

Square-edge gypsum sheathing, like gypsum wallboard, may be installed with its factory-bound edges either parallel or perpendicular to support framing members. If it is installed with its bound edges perpendicular to framing members, the unbound (cut) edges of square-edge gypsum sheathing must be sealed or the entire sheathing surface must be covered with building felt or a similar weather-resistive barrier.

As with gypsum wallboard, gypsum sheathing that is installed as part of a fire-resistive or sound-attenuating system must be applied in accordance with the requirements of the appropriate test report or code requirement. Details of construction for a fire-resistant system must be in compliance with reports of tests of systems tested in accordance with ASTM E 119, "Standard Test Methods for Fire Tests of Building Construction and Materials," (or a code-acknowledged equivalent) by a recognized test laboratory and must meet the requirements of the fire rating specified. The

FRDM is a resource for tested fire-resistant and sound-attenuating designs that incorporate gypsum sheathing.

Gypsum sheathing is often used as a wall bracing material in residential construction or as an element of a system designed to resist lateral shear or seismic forces in either wood- or steel-frame construction. In either instance, sheathing boards must be installed in accordance with applicable building code or test report requirements. Shear values for all gypsum board products are typically contained in building code documents and code evaluation reports. Shear values are also contained in GA-253 and in GA-229, "Shear Values for Screw Application of Gypsum Board on Walls." Use of panels as a shear- or seismic-resisting element may require all edges of the panels to be backed with framing members to fully comply with the test requirements.

Wherever it is installed, gypsum sheathing should not be applied so that it rests on the ground or on an at-grade finished surface. Industry application documents contain specific language dictating separation height requirements between finished grades and the bottom edge of sheathing panels.

Two resources for determining application requirements for gypsum sheathing are the previously referenced ASTM C 1280 and GA-253. The documents contain essentially equivalent information and are referenced in model building codes.

The growth in the use of gypsum sheathing over the past two decades is indicative of its successful acceptance as a cost-effective exterior building substrate. For additional information on correct application methods for gypsum sheathing, contact the Gypsum Association. [W&C](#)

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