
GYPSUM BOARD

area separation walls

provide EFFICIENT,
ECONOMICAL

FIRE PROTECTION

Gypsum board systems help builders maintain tight construction schedules the year-round

Gypsum Board Area Separation Walls

Effective fire resistance and sound attenuation have long been important considerations in the construction of multifamily dwellings, such as townhouses, condominiums, and apartments. Both objectives can be met inexpensively through the use of gypsum board area separation walls—sometimes referred to as fire walls, party walls, or townhouse separation walls. Gypsum area separation walls are easy to erect and secure, meet all building code requirements, and have fire-resistance ratings that easily reach two hours or more.

Gypsum board area separation wall systems weigh no more than

10 pounds per square foot when erected—far less than alternate construction materials. In most cases, gypsum board's light weight eliminates the need for costly footers or foundation modifications. In fact, many



systems can be erected directly onto a poured concrete slab. And, thanks to their relatively light weight, they can be installed up to four stories in height, depending on the manufacturer.

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A Live Fire Test

Robert Brown, the Executive Vice President of the Barnes Organization, a leading homebuilder in Southeastern Pennsylvania and Southern New Jersey, offers this on gypsum area separation walls: "As a builder, nothing is more important than the safety of our home buyers. So we make sure that the building materials we use can effectively resist or contain a fire.

"About 12 to 15 years ago, we encountered a local township that had no history of working with gypsum board area separation walls; thus, town officials were skeptical of the ability of the systems to perform as designed. Our experience with gypsum board area separation wall systems indicated otherwise, so we decided to show town officials how well they worked.

"We constructed an 8' x 16' building and divided it in half with an eight-foot high gypsum board area separation wall. Under the watchful eye of the local fire department, we set the test facility on fire. The gypsum board area separation wall system performed well beyond expectation, and we were able to sell the project to town authorities as planned. Admittedly, it wasn't a completely scientific test. However, it confirmed our belief and convinced local fire officials that gypsum board area separation wall systems work as designed. We still believe that today."

Complying with codes

Any area separation wall must meet certain basic requirements. It must be:

- Continuous from the foundation to the underside of the protected roof sheathing or continue through the roof to form a parapet, and
- Designed to allow for collapse of the construction on the side of the wall exposed to fire without collapse of the separation wall.

Every model building code recognizes the suitability of gypsum board area separation wall systems for resisting fire and attenuating sound. Both solid and cavity-type area separation walls achieve sound transmission class (STC) ratings that exceed model building code requirements; certain wall system designs provide STC ratings in excess of 60.

Though gypsum has inherent fire-resistive qualities, each model building code mandates that any wall system used for area separation must first be fire tested according to a specific test standard, such as ASTM E 119, "Standard Test Method

for Fire Tests of Building Construction and Materials," or its equivalent.

Solid gypsum area separation walls

Gypsum board area separation wall systems come in two designs: solid systems and cavity-type systems. Cavity systems are constructed with components typically incorporated into either steel stud partition systems, or gypsum board shaft wall enclosures, such as those used to enclose an elevator shaft or duct shaft in a multistory nonresidential building.

Solid gypsum board-type area separation wall systems incorporate three basic components:

- One-inch-thick type X gypsum board liner panels that are 2-feet wide and either 8-, 10-, 12- or 14-foot long.
- Metal framing members, consisting of 2-inch-wide H-studs and U-shaped track.
- "Breakaway" L-shape aluminum clips that soften at relatively low temperatures.

For two-hour fire resistance, the area separation wall



A construction worker attaches an aluminum clip that connects the area separation wall to the adjacent wood frame structure.

consists of two layers of 1-inch-thick liner panels. The panels slide into a horizontal track at the foundation or floor level and into the vertical studs that hold them in place. An inverted section of track caps the wall. To continue the wall higher, a track is fastened to the capping track of the lower wall. The stacking process repeats until an inverted track caps the completed final story or roof parapet.

L-shaped aluminum clips attach the gypsum board area separation wall to the adjacent wood frame structure. The clips attach to both sides of each H-stud at each floor or roof/ceiling intersection to provide lateral support for the area separation wall. The clips are designed to soften and break when exposed to high temperatures on the fire side.



Gypsum board area separation wall liner panels can easily be trimmed with a power saw or knife to meet any size requirement.



Gypsum Board: A 'Green' Building Material

More than 40 years ago, long before recycling became popular, the gypsum industry began recycling newsprint and other paper to manufacture the paper facing for gypsum board. Today, nearly 100% of the paper used in the manufacture of gypsum board face and back paper comes from newsprint and consumer waste materials.

Gypsum board manufacturers also rely increasingly on "synthetic" gypsum as an effective alternative to natural gypsum. Synthetic gypsum results primarily from the manufacture of titanium dioxide used in paint and from the desulfurization of flue gases in fossil-fueled power plants. Today, gypsum manufacturing plants can be found adjacent to power plants, making immediate use of synthetic gypsum and, in turn, reducing the amount of fuel that would otherwise be expended in transporting the raw synthetic material.

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Gypsum Board Roof Underlayment

Using gypsum board underlayment in a roof system offers a significant increase in fire protection when used in conjunction with a gypsum board area separation wall. The codes generally allow for the elimination of a parapet in townhouse or apartment construction when a roof is covered with a Class B or C roofing material and where a layer of 5/8-inch-thick type X gypsum board is placed immediately beneath combustible roof sheathing for a distance not less than four feet on either side of the area separation wall.

Three methods of installation have been developed that comply with the code-accepted language that allows a parapet to be eliminated when gypsum board underlayment is installed: the ledger strip method, which uses 2' x 2' wood strips attached to the roof framing to support gypsum underlayment placed between the rafters; the partial roof underlayment method, in which the gypsum underlayment extends four feet beyond the area separation wall in both directions; and the full roof underlayment method, in which gypsum underlayment is installed over the entire roof surface under the sheathing. Although model codes generally permit any of these methods as an alternative to parapet construction, individual code provisions may vary.

The Gypsum Association's publication, GA-276-97, *Gypsum Board Roof Underlayment for Multi-Family Construction*, contains a complete discussion, including illustrations, on the use of gypsum board underlayment. A copy of GA-276 can be downloaded from the Association's Web site at www.gypsum.org.



During an intense fire, when one side of the wall system experiences temperatures of 1100°F or higher, the clips will soften and break away. In this way, the adjacent structure on the fire side may collapse without pulling down the fire-resistant separation wall. The clips on the opposite side of the area separation wall remain intact, since temperatures on that side will be far below the point at which the clip will soften. As a result, the fire-resistant wall system will remain standing, sparing the adjacent living space from significant damage.

In short, gypsum board area separation walls offer an excellent low-cost solution for separating townhouses, condos, and apartments. They can be erected in all seasons since there's no cure time involved, and can usually be assembled by the drywall contractors or the carpenters, reducing the number of trades required on the job. Finally, they are code compliant for both fire resistance and sound attenuation. Why use anything else?

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