

# Modern Gypsum Solutions for Roof & Wall Assemblies

From suburban grocery stores to downtown office high-rises, commercial buildings have the important job of sheltering their occupants as they work, learn, shop, and more. Over the years, the requirements for designing buildings that do this effectively have evolved. Designing to meet code requirements and achieve the best building performance is essential.

With this in mind, gypsum has proven itself as a versatile and reliable material that commercial builders can count on. Manufacturers have leveraged gypsum's inherent high-performance characteristics to develop solution-based materials that address all the most important commercial wall and roof design aspects, including fire resistance, durability, and weatherability. By specifying gypsum, builders can simultaneously bolster the performance of their wall and roof assemblies and simplify their processes to create high-performing buildings.

## Naturally High-Performing Walls and Roofs

Inherently non-combustible, fire resistance remains one of gypsum's biggest advantages, even decades after its first use as commercial sheathing. Unlike wood, glass mat-faced gypsum does not ignite. As the Gypsum Association explains, when gypsum is exposed to high temperatures, the material undergoes a process called calcination as steam develops from the chemically combined water in its core. This process slows flame spread and may help protect the framing behind the sheathing from losing its structural integrity.

While fire-rated wall assemblies can be achieved with wood construction, gypsum's natural ability to reduce the flame spread and limit smoke make it extremely attractive for fire-rated assemblies, and can help achieve up to 4-hour fire ratings.

In addition to fire resistance, commercial builders know that gypsum sheathing has the added benefits of noise reduction for building occupants (particularly helpful in multifamily and mixed-use applications), plus inherent strength and durability. Manufacturers have spent years leveraging these natural properties to create panel materials that make builders' lives easier. The development of sheathing with integrated weather-resistive barriers (WRB) and air barriers (AB) is one such innovation. Gypsum-integrated WRB-AB panels marry essential building envelope control layers with the durability and strength of gypsum sheathing in a single product that simplifies the construction process.

Gypsum's strength, noise attenuation, and fire resistance properties also apply to the material's use as a roof cover board. With the right product selection, gypsum roof boards can help protect commercial roof decks from

potential fire damage, reduce sound transmission, and provide a solid, level, and durable surface for everything from foot traffic to storm damage. With all this in mind, applications for successful use of gypsum are many and varied.

## **Bringing Performance to the Roof**

Though not a requirement for commercial roofs, the use of cover boards has been steadily growing for the past 30 years, thanks to an ideal combination of fire resistance, strength, and foot traffic resistance that high-performing roofs demand. The National Roofing Contractors Association has long recommended the use of cover boards for low-slope roofing installations. The panels help maintain the roof's structural integrity by mitigating damaging factors like wind uplift. But while other materials including plywood, OSB, and high-density polyisocyanurate are available to serve this purpose, gypsum's list of benefits gives it the edge. In addition to its use as a cover board, gypsum boards are also used as thermal barriers and recover boards in commercial roofing systems, demonstrating the versatility of the material in a roofing system.

Fire resistance plays an important role here. Unlike plywood or OSB cover boards that could literally add fuel to the fire, gypsum roof boards may help keep the roof assembly from becoming part of a building fire if such a situation arises.

Additionally, gypsum imparts more puncture resistance to roof assemblies that other materials can't offer. For example, third-party testing has found that some gypsum roof boards protect thermoplastic roofing membranes from puncture as much as 40% better than high-density polyisocyanurate, and up to 70% better than roofs with no cover board at all. This level of protection is essential as commercial roofs more frequently house everything from photovoltaic panels to rooftop gardens, all while having to withstand direct impacts of hail and other severe weather.

Beyond serving as a building's first line of defense against the elements, a commercial roof must now also accommodate HVAC and other equipment, along with increased foot traffic from visitors and maintenance crews. Roof boards literally and figuratively create a solid footing for all of that, and gypsum's built-in strength, durability, and fire-resistance provide additional peace of mind.

## **Roof-to-Wall Transitions**

With gypsum solidly positioned to help architects and engineers design resilient wall and roof assemblies, the trick becomes tying the two together. For both systems, this is a question of how to apply control layers for moisture and air infiltration, and how to ensure those layers form a cohesive building envelope.

On the roof, having a vapor retarder close to the roof deck helps prevent moisture intrusion through the roof assembly, but perforated steel and other roof deck materials don't always accommodate such an application. Gypsum boards applied directly to the roof deck not only act as a fire thermal barrier, but also provide a smooth

substrate for applying air barriers and vapor retarders, in addition to all the strength and durability benefits that other materials can't offer.

Similar benefits exist when applying control layers to exterior walls. Unlike most wood panels, gypsum sheathing is available with integrated weather-resistive barrier and air-barrier layers, giving builders all the benefits of resilient sheathing plus labor savings from not having to wrap the building with multiple control layers.

For both flush roof-to-wall transitions or parapet assemblies, gypsum's smooth and sturdy structure allows builders to easily bring control layers together no matter how the roof-wall junction is structured. Gypsum boards provide excellent substrates for roof system air barriers and vapor retarders, whether those control layers are applied close to the roof deck over a gypsum thermal barrier, or at the top of the assembly over a gypsum cover board if the water proofing membrane is providing the control layers. In the latter scenario, designers may choose to bring the roofing membrane up and over the parapet wall, either above or below the coping, joining the wall control layers on the sheathing side of the assembly. Regardless of the approach, gypsum panel manufacturers offer a systems solution to joining the control layers with transition membranes and liquid-applied flashing that make it easy to keep the building envelope intact.

Without these solutions, commercial builders could easily struggle with roof-to-wall transitions. Gypsum's many benefits spare builders the hassle of coordinating trades to integrate multiple control layer materials, instead helping them complete roof-to-wall transitions with confidence.

## **The Path of Least Resistance**

For both exterior walls and roofs, gypsum panels are the workhorses architects and designers need to create the most effective building envelopes efficiently. Their built-in fire and strength properties, combined with additional factory-applied control layers means builders get the benefit of maximum performance in a single material. Add to that the durability and weatherability, even the most risk-averse builders will love, and the choice is clear. Gypsum is the ideal solution for today's high-performance building needs.

To learn more about gypsum solutions visit [www.buildgp.com](http://www.buildgp.com)