



Durability: How Cover Boards Contribute*

The proper choice of a cover board can help resist the forces that threaten roof-system durability. Here's how.

A roof is a big investment—and it protects an even bigger investment in the building and its contents. That is why durability in any roofing system translates directly into lower total cost of ownership. Durability is more than just toughness. It's also the ability to protect contents and occupants from fire, water, and noise.

Several forces challenge roof-system durability, including:

- Fire
- Sound intrusion
- Impact from hail and foot traffic
- Wind uplift

Properly chosen cover boards can help reduce the effects of all these forces.

Fire resistance is the sum of the components

Fire resistance in a roofing system comes from all roof components working together—and the choice of cover board can either enhance or detract from fire resistance. Where the decking, insulation or membrane is combustible, a noncombustible cover board can contribute to a lower-risk fire rating.

Lower-risk fire ratings can both ensure code compliance, and help reduce insurance premiums. For example, roofing systems that qualify for a Class 1 rating from FM Approvals will qualify for the lowest insurance rates from FM affiliated insurance companies. A UL Class A rating (for external fire exposure) can also help qualify for lower premiums. Those lower premiums are a direct payback for enhanced fire durability.

DensDeck® and DensDeck® Prime Roof Boards fiberglass mat gypsum panels add fire resistance in FM Class 1 and UL Class A roofing assemblies.

(For more details on fire ratings of roof assemblies with cover boards, refer to the DensDeck® Technical Guide.)

Wind uplift is a durability factor

In extreme wind situations, wind-generated forces trying to lift the roofing off a building can be hundreds of pounds per square foot (psf). For even moderate wind conditions, roofing systems must be tested to withstand at least 60 psf before failure, and 90 psf ratings are becoming a default in most applications that use Construction Specifications Institute (CSI) or American Institute of Architecture (AIA) master specifications. As with fire ratings, higher wind-uplift ratings may qualify for lower insurance premiums, and cover boards can contribute to wind-uplift durability.

Where the membrane is held down by a continuous coating of adhesive, wind performance relies on the strength of the substrate. If the membrane is bonded directly to a low-density insulation layer, uplift forces can literally pull the insulation apart. A cover board with good tensile strength, installed between the membrane and the insulation, can prevent this.

Mechanical fasteners penetrate the insulation and transfer uplift forces directly to the rigid deck. Cover boards can also enhance durability in roof systems using mechanical fasteners rather than adhesives. In these systems, wind forces may try to rock the fasteners sideways, and the fasteners can lose compression or even back out of the decking. A suitable cover board under the membrane can keep the fasteners from rocking and protect the roof.

Impact resistance withstands hail and foot traffic

The third force that tests roof system durability is impact from hail or foot traffic. Without a protective cover board, impact damages both the insulation and the membrane. The rigid cells of low-density insulation foam don't recover from impact compression, so crushing may reduce the R-value and damages the bond with the insulation board's facing layer. Insulation compression also forces the membrane to stretch, which makes it more vulnerable to puncture.

Insulation damage from hail impact is obvious. The impact damage caused by foot traffic is less immediately noticeable, but more pervasive. Foot traffic, wheelbarrows and equipment carts all generate loads that compress unprotected insulation and threaten the membrane with stretching and punctures.

Traffic damage comes first during installation of the roof itself, then from installation and maintenance of HVAC, PV systems, and other roof-top equipment. After construction, routine building maintenance continues the stress. This is why some roofing system warranties place a limit on the amount of roof-top traffic that can be tolerated.

Cover boards can protect against both hail and foot traffic damage. Installed between the membrane and the insulation, a rigid cover board with good compressive strength distributes impact to prevent insulation compression. Cover boards also improve puncture resistance by supporting the membrane.

Both DensDeck roof boards have a psi of 900, strong enough to protect the insulation from crushing and the membrane from penetrations.

Sound intrusion affects quality of life

The sound transmission properties of a roofing system are not part of the direct physical protection the roof offers, but sound transmission affects the quality of life inside the building. In general, people like it quiet inside occupied buildings and

* Information presented in this article concerning roofing systems and assemblies is presented as a general guide for illustration purposes only. Please consult the appropriate system manufacturer or design authority for system specifications and instructions for any specific system or assembly. Georgia-Pacific Gypsum does not provide roofing design services.

studies have shown that students perform better in a quiet environment. Keeping out noise from aircraft, traffic and equipment is one of the tasks of a roof system. Adding one or more layers of high-density material, such as DensDeck® and DensDeck® Prime gypsum boards, can help attenuate outside noise and significantly raise the Sound Transmission Class (STC) of the roof assembly. For more details on STC and OITC ratings of roof assemblies with and without cover boards, refer to the DensDeck® Technical Guide.

Cover board selection—look at all the forces together

If the proper cover board can improve durability in many roof systems, how do you select a cover board material? Consider these factors:

- Fire resistance for FM Class 1 and UL Class A roofing assemblies
- Strength to resist both wind uplift and impact
- Sound transmission qualities.

In resisting the forces that challenge roof-system durability, no other common cover board material delivers the all-around performance of DensDeck and DensDeck Prime roof boards. They are the clear choice in virtually any roofing application.

U.S.A.— Georgia-Pacific Gypsum LLC
Canada — Georgia-Pacific Canada LP

Sales Information & Order Placement

U.S.A. **1-855-6GP-DECK**
(647-3325)

CANADA Canada Toll Free: **1-800-387-6823**
Quebec Toll Free: **1-800-361-0486**

Technical Information

Georgia-Pacific Gypsum Technical Hotline
U.S.A. and Canada: **1-800-225-6119**
www.DensDeck.com



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CAUTION For product fire, safety and use information, go to www.gp.com/safetyinfo or call 1-800-225-6119.

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Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

FIRE SAFETY CAUTION Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.

