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
- 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 Factory Mutual Research (FM) 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 systems that qualify for a Class 1 rating from Factory Mutual Research. A suitable cover board under the membrane can keep the fasteners from rocking and protect the roof.

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 improve puncture resistance by supporting the membrane.

**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 reduces 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.

Mold needs organic material to grow

Mold requires four factors for growth: spores, proper temperature, moisture and an organic food source. The first two, spores and proper temperatures, are universally present in roof systems. The third, moisture, can be partly controlled through proper building design. Adequate roof ventilation and vapor retarders can help reduce condensation and moisture retention in the roof system, but can’t eliminate it entirely. One element that we can practically limit is the organic food source. A cover board which contains primarily inorganic elements, such as gypsum board with fiberglass facings, can help to resist mold growth when compared to other roof board substrates with high amounts of organic materials.

**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 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.
one or more layers of high-density material, such as a gypsum cover board, can help attenuate outside noise and significantly raise the Sound Transmission Class (STC) of the roof assembly. For more details on STC 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
• 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 gypsum board finished with fiberglass mat. It is the clear choice in almost any roofing application.