



**Georgia-Pacific**  
Gypsum

## Controlling Hail Damage in Roof Systems\* Cover board choice can protect roofing investments.

Reducing or preventing roof damage from hail impact can save hundreds of thousands of dollars in a single storm. And one approach to that damage control is to add an impact-absorbing layer to your roofing system. The right substrate can dramatically reduce damage—and repair costs—from both hail impact and foot traffic involved in normal roof maintenance. DensDeck® or DensDeck® Prime Roof Boards deliver the impact resistance that’s needed in a roofing substrate.

### Hail in Nebraska is serious business

Here’s a case study from the manager of roofing programs for a major retailer with over 130 million square feet (12,077,000 m<sup>2</sup>) of low slope roofing.

“At a Nebraska facility, golf ball sized hail had crushed foam insulation layers and completely destroyed the single-ply roof. When we rebuilt that roof, we added ¼” (6.4 mm) DensDeck between the foam insulation and the membrane. In a subsequent storm, hailstones 4” (102 mm) in diameter destroyed trees, automobiles and roofs of all types. But our store came out with no fractures in the membrane.”

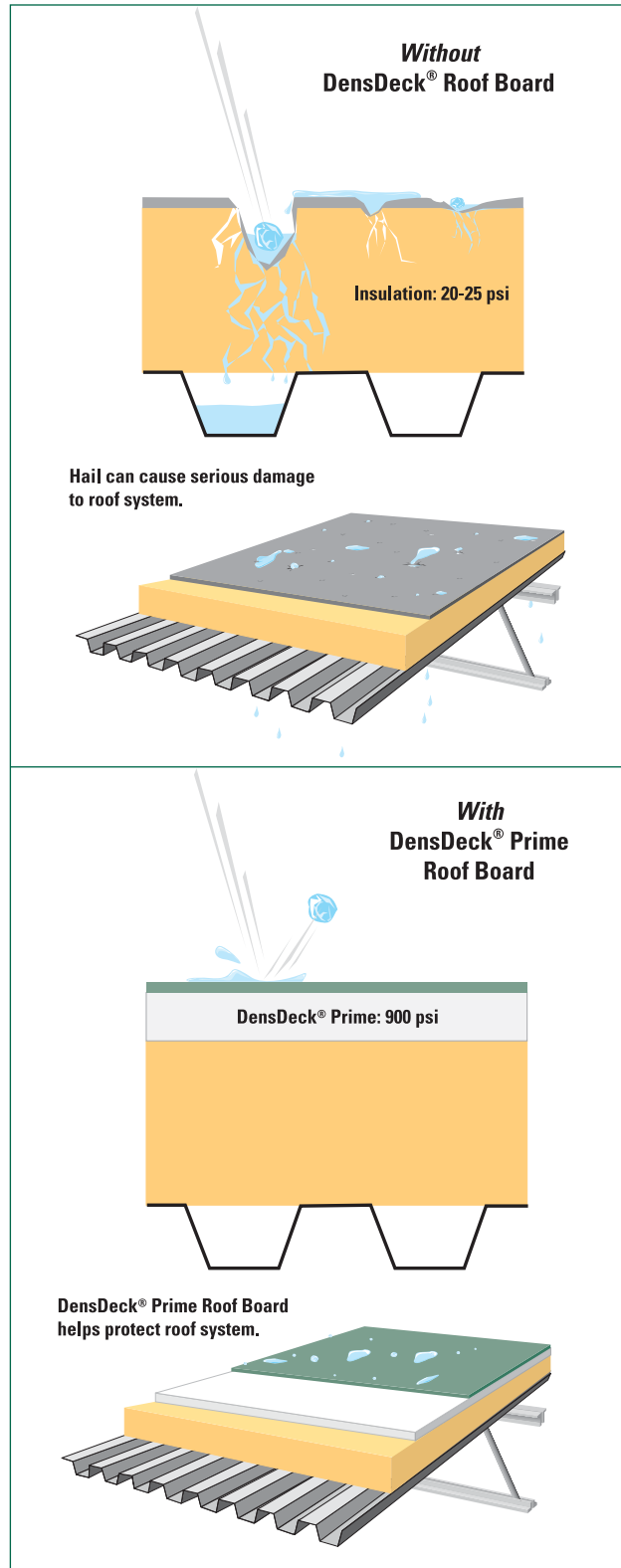
The manager added, “We opened the membrane because we wanted to see if the DensDeck was broken or dimpled, and whether it needed to be replaced before the next storm. Our conclusion was that the DensDeck substrate survived completely and was ready for the next hailstorm. We now specify DensDeck in roofs in areas where hail is common.”

### Single-ply roofs are vulnerable

Modern single-ply roofs typically consist of a flexible membrane over a layer of polyisocyanurate foam insulation. But where traditional built-up roofs have heavy layers of asphalt and fabric to absorb the impact of hail or foot traffic, single-ply roofs concentrate their impact resistance in one flexible layer. Since even the multiple layers of hardened bitumen in a traditional roof can be broken up by hail impact, single-layer roofs have two potential vulnerabilities.

After extended weather and UV exposure, some membranes can lose physical properties and become more brittle. This makes them more vulnerable to impact damage and punctures. Exposure is worse if the insulation has been crushed by previous impact or foot traffic. When the foam is compressed, the plates and fasteners may cut into the membrane.

\* 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.



### Roofing board can absorb impact

Adding roofing board as a protective substrate between the foam insulation and the roofing membrane can moderate both these problems. But the board needs particular properties.

First, the board needs the right degree of compression strength. Wood fiberboard typically resists compression loads of 20 to 30 psi. That's too low to protect the foam insulation from large hail. DensDeck® or DensDeck® Prime Roof Boards handle compression loads up to 900 psi. That's hard enough to protect the foam insulation from the impact of even very large hailstones, but it still flexes enough to cushion the membrane itself.

Those properties were confirmed at Factory Mutual in simulated-hail-impact testing that used 2" (51 mm) frozen ice balls, impacting at approximately 27 lbf (120 N) (energy roughly

created at 75 mph) to single ply assemblies which included DensDeck or DensDeck Prime Roof Boards as a coverboard under the membranes. These tests demonstrated that including DensDeck Roof Boards above the insulation provided additional protection for the membranes to pass the most severe level of simulated hail-impact testing employed by FM.

The manager went on to include this additional caveat: "Impact resistance also depends on choosing a good membrane. The best underlayment in the world won't eliminate damage to an excessively brittle membrane."

You can't control the weather, but you can control the way your roof handles impact. Consider adding DensDeck or DensDeck Prime Roof Boards to your roofing systems to reduce damage – and repair costs – from both hail impact and the foot traffic involved in normal roof maintenance.

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#### Sales Information & Order Placement

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#### Technical Information

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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.

