

TECH TALK *from* Georgia-Pacific Gypsum

Technical Insight from the Roof Board Experts

DensDeck® Roof Board Provides Superior Moisture Resistance

Whether it's a roof underlayment or membrane support layer, DensDeck® Roof Board moisture resistance improves roof performance.

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In the ideal world, all roofing components would be installed dry. Every manufacturer of roof components says their products should be dry when they go into a roofing assembly. And in the ideal world, interior roofing components would stay dry for the life of the roof.

In the real world, things are more complicated. Water can get into roof assemblies when they're installed, when they leak and via condensation of vapor in building components.

That's why it makes sense to specify roofing substrates that handle tough moisture conditions gracefully. Among leading roof board products, DensDeck® offers the best resistance to moisture and delivers superior mechanical performance in cycles of dampness and drying. That's in addition to the superior fire protection and compressive strength of DensDeck.

Water can be trapped during construction

The first big problem with roof construction is that it's done outdoors. The second problem is that you can't control the weather. Construction schedules—or the need to protect the building's interior—may force a contractor to work under damp conditions, and rain and dew can become trapped and retained in roofing materials.

When a roof assembly traps and holds water, it fosters the growth of mold. That can lead to long-term building environment problems. The fiberglass mats on DensDeck resist mold growth (per ASTM D 3273) to promote a healthier building, long-term.

Water destroys strength of some roof boards

Many roof boards include compressed organic fibers held together with a binder. Both perlite/cellulose fiber composites and wood fiber composites are held together with binders that break down when exposed to water.

Because of their makeup, when these products absorb water they swell and change physically. The binders that hold them together go through chemical changes and leach out or are destroyed. The board then no longer has its physical strength. (See charts.)

Even with moisture-retarding surface treatments, moisture that gets into those products will cause them to lose physical integrity. That sets the stage for wind uplift damage and impact damage from foot traffic or hail.

After a roof is sealed, water vapor can be a problem

Roofing products can get wet not only from the outside—from rain and leaks in the membrane—but also from condensing water vapor from inside the building. In cool weather, the vapor drive is from inside of the building to the outside.

A building constantly generates moisture in the form of water vapor from the breath of occupants and from normal operations. Unless there is a completely vapor-tight barrier sealing off the roof assembly, there are always opportunities for this water vapor to get into the roof assembly.

Warm air can hold more water than cold air. So when the high humidity indoor air meets the cooler underside of the roof membrane, the water vapor condenses to a liquid. It's just like setting a glass full of ice down on a napkin. Pretty soon the napkin is saturated. That water doesn't come from the glass, it comes from the air.

If a roof assembly is adequately ventilated, condensation will evaporate as part of the normal temperature cycle. But if the water is absorbed into the roof materials, it may stay trapped inside the roof assembly as a liquid. That can affect roof strength and reduce the R-value of the insulation. DensDeck resists moisture absorption better than either perlite or wood fiber. (See charts.)

Case study shows water build-up from condensation

In a recent roof performance study, Georgia-Pacific engineers cut a section out of a roof that had been in place for about eight years in a northeastern city. The roof had been constructed using ½" wood fiberboard. The top layer of membrane was in good physical shape and no leaks had been reported. But walking on the roof revealed sponginess under the membrane.

When the engineers pulled back the top membrane, the wood fiber was completely saturated. There was no strength or dimensional stability in the board itself. Even a light touch squeezed water out of it. That moisture got into the roof through condensation.

At that point, the roof had effectively failed. It hadn't leaked only because the board had been hot-mopped with asphalt to an old roof surface, which made a water barrier underneath the board. It was just a matter of time before there would be so much moisture trapped that it would start penetrating the building or blow off because the boards had lost all strength.

continued on back

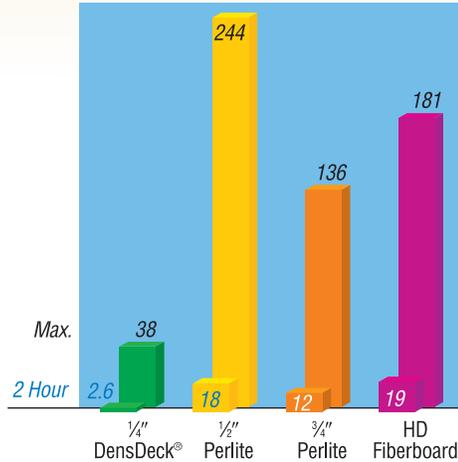
DensDeck® resists moisture absorption and retains strength

The core of DensDeck® is solid gypsum, treated with proprietary, patented processes that make DensDeck the only moisture-resistant, gypsum core roof board on the market. In the presence of high humidity water vapor, DensDeck absorbs about 10 percent of the moisture that perlite absorbs and only about three percent of the moisture absorbed by wood fiberboard.

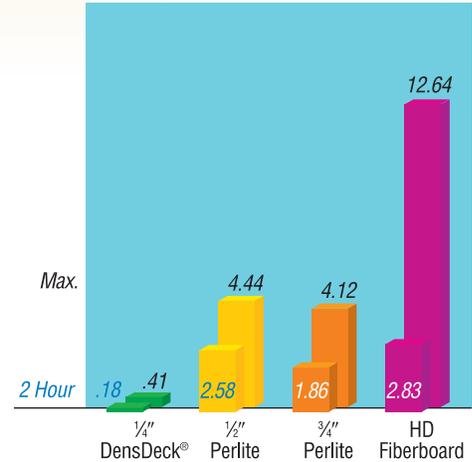
DensDeck is available with both silicone-treated and non-silicone containing cores. The non-silicon product is environmentally suitable for sensitive painting and bonding operations such as those found in the automotive industry. That further extends the moisture resistance, fire resistance and mechanical strength that DensDeck offers.

DensDeck also retains its full mechanical strength through dampness and drying cycles, both during installation and under normal building operational cycling. That's important for resisting wind uplift and for supporting foot traffic, especially where the board is bridging the flutes in a steel roof. It means your roof stays functional longer with better wind performance and impact over the long haul.

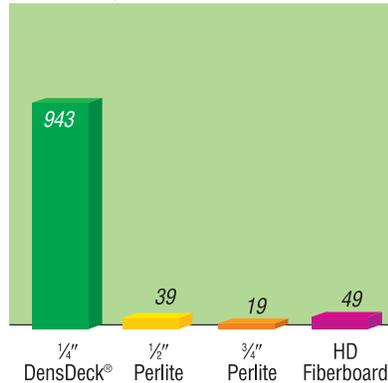
Water Absorption
(% by weight)



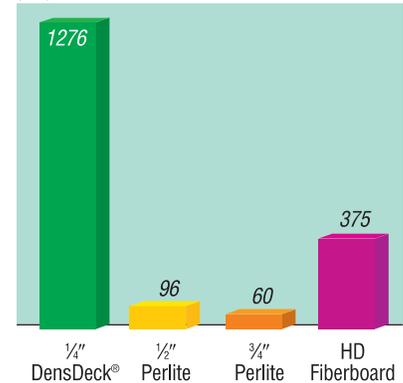
Moisture Absorption
(moisture gained from 50% to 90% relative humidity)



Compressive Strength
(maximum PSI)



Modulus of Rupture
(PSI)



SALES INFORMATION AND ORDER PLACEMENT

U.S.A. Midwest: 1-800-876-4746 West: 1-800-824-7503
South: 1-800-327-2344 Northeast: 1-800-947-4497

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.gpgypsum.com

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Unless otherwise stated in our written warranty for these products, our sole liability for any product claim shall be limited to reimbursement of the cost of repair or replacement of the affected product, up to a maximum amount of two times the original purchase price for the affected product. We shall not be responsible under any circumstances for lost profits, damage to a structure or its

contents, or indirect, incidental, special or consequential damages. Claims shall be deemed waived if they are not submitted to us in writing within ten (10) days after discovery of a product defect/circumstance giving rise to a claim.

CAUTION: For product fire, safety and use information, go to gp.com/safetyinfo.

HANDLING AND USE

CAUTION: This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

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

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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.