

TECHNICAL ADVISORY BULLETIN



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To: GAF Commercial Sales, GAF Commercial Contractors, Field Services

From: Technical Services Department

Subject: Roof Color Impact On Condensation In Roof Systems

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What Are Some Of The Things That Can Affect The Amount Of Moisture In A Roof Assembly?

The moisture content of a roof assembly can fluctuate significantly over the life of the roof depending on many factors including:

- Interior and exterior temperatures.
- Interior and exterior humidity conditions.
- Under deck ventilation.
- Amount of and location of insulation.
- Use of vapor retarders / air barriers in the roof assembly.

The potential for condensation and buildup of moisture in a roof system from interior moisture sources has always been a design issue that must be accounted for in the roofing system design – and the color, reflectivity and emissivity of the roof surface can affect the potential for condensation and buildup of moisture in a roof system.

What Are Some Of The Concern With Moisture Buildup?

Moisture build up in the roof assembly can result in...

- Deck deterioration including rotting wood decks and corrosion of metal decks.
- Mold growth.
- Deterioration and loss of R-value of insulation.
- Deterioration of the roof assembly membrane.

Where Has Moisture Buildup Within Roof Systems Been The Biggest Issue?

In buildings with high humidity or periods of excessive moisture generation that is not addressed in the design of the building envelope. Some examples are:

- Apartment / condo buildings (showers, cooking, air humidifiers, etc., produce high levels of interior moisture).
- Swimming pools, interior spaces with hot tubs, food processing paper mills, and foundries.
- New construction with high interior construction moisture (i.e. from freshly pour concrete, space heaters, drywall installation, etc.).
- A compact ceiling assembly where there is typically drywall, batt insulation, roof deck and membrane with little or no insulation above the deck; no vapor retarder or air barrier in the system; and little or no ventilation below the deck.

How Is Moisture In A Roof Assembly Related To Roof Color?

Changing the color of a roof membrane from dark or non-reflective surface to a light color or reflective surface:

- Reduces the roof surface temperature.
- Reduces the amount of time and the degree to which the roof is in a “drying” mode.

With a source of interior humidity, the reduced roof surface temperature and the associated reduction in the cyclic drying the roof system experiences can result in additional moisture and liquid water building up in the roof assembly.

Why Are Light Color, Reflective Roofs Being Installed?

The use of light color reflective roofing has increased dramatically, driven in part by requirements to meet reflectivity mandates such as the California Energy Commission’s Title 24, Part 6.

Reflective roof surfaces typically are cooler than non-reflective roof surfaces and because of this, they:

- Conserve energy by reducing the cooling load on the building.
- Can contribute to reducing urban summertime temperatures by a few degrees (which lessens the impact of what’s called the “heat island effect”).

What Should Be Done Based On The Type Of Construction For A Roof Assembly?

New Construction

Taking into consideration the effect of roof color on the roof surface temperature, the design professional must evaluate the anticipated interior and exterior conditions and design the proper moisture vapor control. Components of this evaluation should include:

- Dew point calculations to ensure there will not be a condensation problem.
- Determination on the need for a vapor retarder, air barrier, or underside roof deck ventilation.

Tear-off and recover

The roofing professional involved in a re-roofing project should:

- Evaluate the existing roof assembly for signs of condensation issues (water stains wet or deteriorated insulation, deck deterioration, mold, etc.).
- Confirm if there are interior vents. If present, they should be properly ducted to the outside and in good conditions so they do not allow moisture to enter the roof system.

A roof design professional or climate control specialist should be consulted to evaluate the existing conditions and develop a design to address any moisture issues in the roof assembly. If the roof color is being changed, they must address the effect of changing the roof surface temperature.

How Can Moisture Be Controlled?

Some things that can be done to help control moisture accumulation in the roofing assembly include:

- Add insulation above the deck to change the dew point location in the roof assembly.
- Use at least two layers of insulation with staggered joints to prevent moisture migration through the joints in the insulation.
- Add a vapor retarder or air barrier to the system at the proper location within the assembly.
- Add ventilation below the deck to remove moisture before it enters the roofing system (always check with local codes to confirm below deck venting requirements are met).
- Use a fully adhered membrane system to minimize moisture migration within the roofing system.

Are There Any Other Effects To Be Concerned With?

Adding insulation or installing a light color reflective roof can change the effectiveness of the HVAC system by reducing the load on the system. This reduction in design load can result in:

- An oversized air conditioning system that may not cycle properly.
- Longer off cycles that increase the interior relative humidity, generating more moisture available to be driven into the roofing system.

How Does Interior Moisture Or Condensation Affect A GAF Roof Guarantee?

GAF guarantees do not cover damage caused by moisture infiltration or condensation from the interior of the building.

- Interior moisture control is considered a design issue.
- Damage caused by interior moisture or condensation is not a roofing materials defect or a defect in the workmanship of the roof assembly installation.

Where Can I Get More Information?

GAF Technical Services can assist you... with these and other questions you may have regarding your new roof installation. GAF Technical Services can be contacted at **800-ROOF-411** (800-766-3411). Also, the GAF website is a great resource for just about any question you may have or for additional information you may require. Please visit: www.gaf.com.