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Vent a Metal Roof? Absolutely

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Did you know that venting underneath the roof surface can prevent problems with condensation, ice damming and increase energy efficiency? A ventilated system causes warmer air to move through the system and escape through the ridge while cooler air enters at the eave. This phenomenon has tremendous benefits and an excellent payback.

Condensation

A brief lesson on condensation and dew point temperature: Condensation occurs when dew point is reached. What is dew point? Dew point temperature is the point at which saturated air can no longer hold water in the form of vapor and it condenses into water droplets against a cool surface. We've all witnessed this phenomenon when the air against a cold glass of ice water forms droplets on the outside of the glass. The same thing can happen as warm vapor-filled air escapes up through our ceiling and into a cold attic or on to the back of a cold roofing product. Ventilation provides a means for that water vapor to escape before it condenses in an attic or on the backside of a roofing product, like a metal panel.

How many of us have had that moment lying in bed staring at the ceiling and we see that brownish water spot on the sheetrock and think. We think, " ____ (insert expletive here), a roof leak!" But it might not be a "leak."

Often water damage perceived as a roof leak is actually caused by condensation within the attic, walls or underneath the roof material. If water vapor accumulates in any of these areas it can condense to form water droplets, which will eventually cause serious damage to wood, insulation, sheetrock, etc. In coastal areas, the damaging effects of water condensing under the metal panel are intensified by the corrosive nature of the humid air and salt. That moist air needs a way to escape and one way to assist with this problem is by ventilating.

Ice Damming

Ice dams are formed in snow climates when warm areas of a roof cause snow and ice to melt.

After melting the water then runs down the roof to an area where the roof is very cold, re-freezing into ice. Eventually enough water has frozen, forming a wall of ice, which prevents water from running down the roof surface. This water inevitably backs up and finds a way into the building. Ice dams can also cause serious problems when they eventually break loose and damage gutters, roof penetrations, and possibly people and property below.

The solution to ice dams is to keep the roof temperature even, preventing warm and cold spots. Without ventilation, eave overhangs tend to be very cold and roof areas above the living spaces within the building tend to be warmer. This scenario lends to the formation of ice dams. By venting underneath the roof surface, any warm air escaping the building can exit through the ridge while being replaced by cooler air entering at the eave. This keeps the roof at an even temperature so that ice dams never form.

Although ventilation can help prevent the formation of ice dams it won't prevent sliding snow, which can still cause serious problems. An engineered snow retention system should always be considered.

Energy Efficiency

If you have ever worked in an attic space on a hot summer day you know how miserable that is. Obviously roofs get hot from the sun and that heat enters the building. Metal panels as well as other roofing products radiate that heat to the surrounding air and materials. If there is a vented air space underneath the roof material, then the heat exiting the material warms the surrounding air molecules.

The molecules rise, escape through the ridge and are replaced by cooler air entering at the eave. This drastically decreases the heat that enters the attic space or building by as much as 50 percent according to studies done at Oak Ridge National Testing Laboratories.

This decrease in entering heat equates to savings in cooling costs. Those same studies from the testing lab showed as much as a 25 percent decrease in cooling costs. The resulting savings

makes for an incredibly rapid payback to the cost of adding a vented space under the roof surface. An added benefit is that we conserve our limited resources, ensuring a better future for all of us and generations to come.

Doing It the Right Way

Many factors play into the design of a ventilation system including determining the height of the air space needed and the size of the input and exhaust. Some rules of thumb when installing a ventilation system are:

- Intake and exhaust should always exceed the size of your vented space.
- Intakes and exhaust should be increased in size to accommodate for losses to function created by screening as screening can significantly reduce airflow.
- The vented air space under the roofing product should be sized according to rafter length and roof slope.
- Steeper slopes tend to vent better than lower slopes and shorter lengths also tend to vent better than longer lengths. So, steep short lengths require less of a ventilation space than low-sloped long lengths.
- Cut up roofs with dormers and valleys also create challenges when designing ventilation because eave intake areas are limited.
- When designing ventilation for your roof you should consult with an expert to get a properly designed system.

To sum it up, metal roofs benefit in many ways from a ventilation system. A metal roof shouldn't be installed without first giving these benefits consideration.

Terry Anderson is CEO of Anderson Associates Consulting Inc. and president of American Fork, Utah-based T.R.A.-MAGE Inc. He gives credit to Dr. William Miller of Oak Ridge Testing Laboratories and Dr. Nigel Cherry of Redlands Testing Lab, London, for their work on ventilation.