Ask Jon Eakes

MYTH: THE MORE ATTIC VENTILATION IN WINTER THE BETTER.

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Not true for all parts of Canada!In certain regions (most of the data is from the National Research Council in the Saskatoon area) it appears that the only effective way to stop continuous accumulation of frost in the attic is to not ventilate at all during the worst of winter, but to seal the attic shut. This solution, found by trial and error, works only in certain geographical areas. There are four elements that appear to be involved:1. Too much moisture leaks into the attic for the cold climate to handle. The ceiling is not well enough sealed.2. The winter air in these regions have too low a drying capacity. Low drying capacity, not the same as high relative humidity, is a measure of the absolute amount of water that air under certain temperature and humidity conditions can accept before reaching saturation. Did you get that? Air with 80 percent relative humidity in cold weather has less drying capacity than air with 80 per cent relative humidity in warm weather. Or to put in another way, air with 90 per cent relative humidity at 25 degrees Celsius has the same drying capacity as air with 20 per cent relative humidity at minus five degrees Celsius. Or more simplified yet, cold air does not dry out water problems as fast as warm air will.3. Below freezing temperatures and well insulated attics mean that water vapour quickly freezes (frost, not condensation). Ice evaporates more slowly than water, slowing down still further the drying process in the attic.4. Uninterrupted periods of time under these conditions lead to serious accumulation of frost. If the above conditions exist, but are interrupted by occasional warm spells, the small accumulations we be carried off during the warm spells and you will have no problem. If there are no warm breaks for two or three months a small leak can become a serious problem.Sealing the attic shut for the winter appears to effectively stop the air flow, the major source of moisture accumulation. Some initial moisture will leak in but with no air escaping from the attic (neither air flow nor air changes) it will soon stop, leaving only a light frost on the underside of the roof. The minute quantities of moisture filtering through the building materials by diffusion will be partly offset by the same vapour diffusion process through the roof. (Ice can and does turn to vapour during freezing temperatures, and then diffuses through the roof or the wall siding -- just as ice cubes shrink in the freezer. But none of this happens too fast.) Whatever accumulation remains when outside temperatures approach thawing can be eliminated by opening up the attic vents just before the spring thaw.A study of meteorological statistics from weather stations throughout Canada indicate attic temperature and humidity conditions similar to those of the Saskatoon area are found between the 4,900 Degree Day Celsius and 6,600 Degree Day Celsius lines shown on the map. If you live in these areas you might seriously consider sealing the attic when all else fails. In colder areas north of this gray area, it is probably a good idea to seal off the attic. In fact in the far north it is common to make roofs with sealed slabs: plywood, foam insulation, plywood. In areas with drying capacities similar to Toronto, south of the gray areas you should not have to consider this technique at all.This is not a technique you can try and then forget about. You must open up the attic in the spring, just as you olden the basement or crawl space ventilators. Keep in mind that this is an experimental technique; within a given region houses will differ from each other in how they respond. I have explained it here in such detail because, strange as it seems, it does appear to work and may be the best solution in certain cases. Here is one subject on which I would especially like to collect information from homeowners. Does the map properly reflect conditions in your region? If you have experimented with closing up your attic, did it work?

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