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ENERGY FOCUS

Some Kinds of Household Frost More Worrisome Than Others

By Adam Wasch, Energy Outreach Consultant for CCHRC and CES

The latest cold snap in Fairbanks has created some interesting ice formations, particularly around door jams, windows, and roofs. Huge differences between indoor and outdoor temperatures cause poorly sealed homes to act like big chimneys, drawing cold air in through cracks and gaps lower down in a house and pushing warmer, vapor-laden air out the top through roof joints and other openings – a phenomenon called vapor drive. Ice forms wherever super-cold air meets with the relatively warm moist air of our indoor living spaces, whether around front doors or under eaves. One troubling ice formation in my house looks like Béla Lugosi. My cat hisses at its shadow.

Last week we wrote about vapor drive and received some questions about whether all instances of ice and frost are cause for alarm. While none are good, some ice formations are more worrisome than others. For example, in the very extreme cold it is not unusual to see frost or ice form around an otherwise weather-tight window, especially if the window is an older, single-pane unit. Similarly, poorly insulated doors can attract frost or ice that is not the result of air leaks. These cold spots are the result of condensation on a cold surface. Though not desirable, they do not necessary indicate a major break in your home's thermal envelope.

Other ice formations, however, are due to air leakage. Doors are one of the most common sources of cold air entering your home. Mass-produced doors that are not manufactured for our climate often do not hold up to the demands of subzero weather. Weatherstripping loses its elasticity and door gaskets fail to seal properly, allowing air to breeze by. Other typical culprits are electrical boxes or other inter-wall breaks for wires, plumbing, or fuel lines that can puncture a home's vapor barrier and act as conduits for outdoor air.

The most insidious ice is the ice you don't see – that is, until it melts in the spring. Water vapor that condenses and freezes between your walls or between your exterior roof and ceiling can grow and build all year long. Then, when warmer weather arrives the unseen ice melts, offering a source of moisture conducive to mold and mildew growth. Evidence of this kind of air leak can sometimes be seen by looking at the exterior of your home. Frost on exterior cladding or logs, especially where boards overlap, indicates leaks in your walls. Icicles hanging from eves that are not the result of melting snow (below chimneys, for example) might be a sign of warm air pushing through gaps in your roof. Hoar frost that hangs from gables is also a sign of trouble.

Dealing with these problems requires a systemic approach. If significant air leaks exist in the upper portions of your house, especially in the roof, trying to stem the flow of air into and out of your house by focusing only near your floor can actually increase the force of air flow through other places due to increased air pressure. This pressure could cause furnaces or stoves to back draft or draft less efficiently. When making any improvements that address air leaks, such as adding insulation or caulking to your home, it is important to start sealing from the top regions of your house and work your way down. This way, you can reduce the force of the vacuum that is responsible for sucking cold air in through crawl spaces, frames, and lower walls.

Adam Wasch promotes energy awareness for the Cooperative Extension Service (CES) and the Cold Climate Housing Research Center (CCHRC).
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