Preventing Ice Dams

What are ice dams?
If you’ve ever had pretty icicles hanging from the edge of your roof, you’ve had potential for ice damming. Ice dams start with ridges of ice that form when snow on the upper part of your roof melts. Water runs down the roof slope—often under the snow at the eave’s edge—and refreezes at the edge of the roof.

Icicles hanging from your eaves may look pretty, but the problem they signal can be extremely damaging to your home. Water running down the roof may not make it all the way to your eaves to run off the roof through your downspouts. Instead, it may leak into your attic, walls, and ceilings. The water can ruin your insulation, shingles, fascia, or soffits, and can cause mold and mildew in your walls and attic. Unfortunately, until the water runs through your ceiling, you may not even be aware there is a problem; by the time you notice, you may have major damage to your home.

How do ice dams form?
Ice dams form because the snow on the top of the roof is melting from the underside. In other words, the snow touching your roof is melting, while the snow on the top remains frozen. Generally the melting is caused by heat loss from the house that is warming the attic; as heat escapes the attic, it warms the roof and melts the snow. Occasionally the snowmelt may be caused by a heavy layer of snow (snow is an insulator and the snow underneath a heavy layer may warm up). The snow on the upper part of the roof melts because this part of the roof is directly above the lived-in part of your home. The water travels down the roof’s slope until it is stopped by the cold and freezes again into ice. As snow continues to melt, the water can’t get to the gutters, so it takes the path of least resistance and flows through any leaks—or works under shingles—and leaks into the attic or walls, where it causes water damage.

How can you tell if your home might be experiencing ice dam problems?
If your home was built before the mid-1970s and you haven’t thoroughly insulated, caulked, and added attic ventilation, you have the greatest potential for ice dam problems. According to Ken Wiggers, Prairie Foam Insulators, Huxley, Iowa, 1 1/2-story homes are also susceptible to ice damming. That’s because the sloped ceiling area sometimes has less space for insulation and because of the way the space is typically insulated, typically with fiberglass batts, which unless sealed on all sides, won’t effectively trap air needed for insulation. He also notes that homes with cathedral ceilings may also be underinsulated in much the same way. “Airtightness is a key element of a thermal envelope. A rated R-38 fiberglass batt or cellulose in your vault will not function as a true R-38 if air is allowed to pass through. The air permeability of some insulation materials allows warm, moist air to come into contact with the roof sheathing, which will cause snow melt on top and deterioration (from condensation) of the roof sheathing from below,” he says. If your home fits any of these descriptions, you should be extra-vigilant in checking for potential problems.

Any time there is a heavy load of snow on your roof, be sure to check frequently. If the snow is melted from the top of your roof, but is pooling near the eaves, this is a
clue that you may have a problem. Also check for stains running down exterior walls just below the eaves; and rot, rusty nail heads, and blistering paint on soffits. When you check the attic, if you find matted, compact insulation; water-stains; or rot and rusty nail heads, ice damming may be to blame. Blistered or peeling paint on interior walls may also be caused by ice damming.

**How can you prevent ice dam problems?**

Unfortunately, it’s easier said than done: Keep your roof cold through adequate insulation or ventilation. To keep your roof cold, you’ll need to close up areas that could allow warm air from your home to get into your attic. That means not only adding sufficient insulation (cellulose, fiberglass, or foam) but also to close up air leaks caused by unblocked walls; gaps in drywall; cracks around light fixtures, plumbing pipes and other ductwork, chimneys, access hatches, bathroom fans, and any other ceiling penetrations. Air leaks can be tough to stop; you’ll need to climb up into the attic, rake back insulation, and plug leaks using foam, caulk, or other methods.

“We find ductwork in attics that leaks and is poorly insulated, and many homes, both new and older, exhaust bathroom fans directly into the attic. I do not recall ever seeing a bathroom fan being exhausted to the outside, as it should be. That fan exhaust adds moisture and heat to the attic, which increases the potential for ice damming, as well as condensation and mold on the roof undersides,” says Ken.

Adequate insulation in your attic would be at least 12 inches of cellulose or fiberglass; it should be continuous and consistently deep. Be sure to check the space between the wall’s top plate and the underside of the roof sheathing; if that area is too tight to hold 12 inches of insulation, you’ll need to spray in low-density insulating foam that won’t allow air to pass through.

Ken also suggests that adding foam insulation on the underside of the roof and around all poorly insulated ductwork—as an even better way to take care of any problems. “Application of foam to the underside of the roof keeps the roof cold; we have solved many ice damming problems here in Iowa with that single application.” He notes that many homeowners and owners of commercial buildings, who continue to have problems even with high-R-value cellulose or fiberglass insulation, have gone to foam insulation.

Adequate ventilation may also help prevent ice damming, according to some experts, while others say that if minimal heat escapes into the attic, ventilation isn’t critical. It’s also important to remember that if your roof is carrying a heavy load of snow, the ventilation holes may be plugged. Some experts recommend that ventilation provided by soffit and ridge vents running continuously along the length of the house, rather than by power vents, turbines, roof vents, and gable louvers, which are not as efficient. According to Ken, the ventilation recommendation isn’t grounded with adequate research, “It seems to be a myth, first recommended by the Federal Housing Administration (FHA) in 1942. Ventilation isn’t needed in many cases, if the proper insulation is correctly installed.”

**What about new homes?**

New houses can be designed to include plenty of insulation, a roof ventilation system, and a continuous air barrier separating the living space from the underside of the roof.
Ken recommends spraying foam insulation on the underside of the roof in some homes, such as homes with complex roof designs (vaulted ceilings, 4/12 pitch roofs, parallel trusses, or with ductwork in the attic). In other homes, where there is plenty of room to work in the attic, he recommends spraying the flat ceiling to seal the roof area from the living area. It is important to make your insulation decisions by consulting with an expert who understands the value of protective insulation and proper ventilation in preventing ice damming.

**What other solutions are promoted to prevent ice damming (and do they work)?**

There are a number of options, most of which have caveats for use. These include:

* **Snow rake.** This is a telescoping aluminum pole with an aluminum scraper mounted at a right angle. The idea is to pull the snow off your roof with a rake before it begins to melt. Raking will take a toll on your shingles, because shingles are brittle in the winter. It’s also dangerous to get up on the roof to use the rake. Rakes are advised only for single-story homes, and you shouldn’t stand on a ladder to use the rake.

* **Electric heating cables.** These can be found at local home stores, but may or may not be allowed by your building code. The idea is that they are supposed to keep your roof warm, so that snow doesn’t pile up. The downsides: They can wear out shingles by making them brittle, water may refreeze in the gutter unless you route the meltwater away, they may be a fire hazard, and according to an article by Paul Fissette in *Smart Homeowner* magazine, “I’ve never seen them work to fix an ice dam problem.”

* **Adhesive ice and water barrier.** Adding this self-sealing, waterproof underlayment can only be done when re-roofing (some building codes require this barrier). It is usually attached for the 3 to 6 feet up the roof from the gutter. Then you shingle over the top of this barrier. The plus: water shouldn’t leak through the barrier. The downside that the ice dams may occur higher on the roof’s surface and water may leak into your roof at the higher point.

* **Sheet metal ice belts.** These are 2-foot-wide strips of metal that are put on top of the shingles at the edge of the roof. They are not an attractive addition to your roofline, but this type of eave-flashing sometimes works to shed ice and snow. However, they won’t stop problems that occur higher on the roof.

* **Hire a roofing company to steam the snow off.** A steamer is like a big pressure washer using hot water. This may cost upwards of $300 and may have to be repeated every time a load of snow lands on your roof.

**Any other cautions about ice dams?**

There are several precautions you should take. First, it’s dangerous for anyone to be on a roof in when there’s ice and snow up there. Not only are you risking your own safety, but it is highly probable that you could damage the roof or your home. Second, any time you “tighten up” a home, whether to prevent ice dams or for other reasons, it’s possible you could cause ventilation problems. Especially if you have either natural gas or propane in your home, you risk causing backdraft, exhaustion, or combustion problems, which can lead to carbon monoxide poisoning.

If it’s necessary to get up on your roof, or if you plan to tighten up your home, be sure to call a professional for assistance.
For more information, contact Ken Wiggers, Prairie Foam Insulators, at www.prairiefoam.com, 800-272-3668.