

# Prevent Ice Dams

with Low-Voltage Radiant Heat



White Paper





Residents in the northern half of the United States often see significant ice build-up on their roof's edges in the winter months. These ice dams are created by two basic elements: snow and heat. Snow that accumulates on the roof will melt due to heat loss from the home due to inadequate insulation. Solar energy also prompts melting. Just look at the difference of ice dam build-up on the north side of your home's roof versus the south's edge. As the day's temperature cools the water created from the melted snow freezes, pushing under roofing. Each day it melts the problem worsens, compiling ice in to dramatic ice dams which then create huge icicles from the roof's edge.

Eventually, water can enter the house causing ceiling, wall and floor damage while prompting mold growth. Outside, icicles can damage rain gutters with their weight while posing serious safety hazards when they fall.

There are many "fixes" to the annual ice dam dilemma: adding insulation to the attic, creating a "cold roof" by insulating between the roof's rafters to try and create an equal temperature on the roof as the outside, installing membranes under the roofing and installing the often-seen zig-zag electric cables.

Each of these can somewhat contribute to improved conditions but none are a total answer to eliminate ice dams. Attic insulation will reduce the house's heat loss to the attic space. This, in turn, keeps the attic space cooler which helps prevent the roof to warm. But it doesn't eliminate the radiant heat from the sun which causes much of the problem.

The same can be said for the effort to insulate the inside of the attic roof between the rafters. Yes, this will complement the attic insulation's efficiency but outside the sun is still shining, which causes the snow to melt and eventually re-freeze and expand under your shingles or other roofing material.

Roofing membranes installed under the roofing material can help to some degree, but in severe cases it merely acts as an avenue for the melted snow to be forced upward as the freezing, thawing, freezing cycle continues until the water reaches several feet up the roof's pitch to seep through the roof and trickle down the inside of the roof to eventually enter the home through the soffits, walls and ceilings. Homeowners experiencing this often see rust spots on drywall fasteners, and stains around windows, doors and interior ceilings.

The zig-zag electrical cables sometimes seen on roofs were originally intended to keep gutters clear. Their effectiveness on roofing systems is marginal. They cannot effectively handle a large amount of snow, as their melted valleys fill with snow and eventually becomes ice.

Homeowners need to realize, and understand, that ice dams are created by two heat sources: heat loss from the attic's inside to the roof and passive solar radiant heat from outside to the roof. Thin cables simply are not the solution, especially in real winter conditions. The solution is to fight solar radiant heat with effective, extra-low voltage radiant heat.

STEP® Roof Deicing is a heating solution to prevent snow buildup and ice damming on roofs, valleys, eaves, and gutters. It comes in 9" or 12" wide flat mats designed to be installed between all types of roofing material - from shingles to metal – and any waterproofing underlayment. When used with metal roofing, STEP Heat Retention Membrane is applied over the heating elements, protecting the elements

while greatly improving performance and operating cost. Delivered in a roll, the mats can be cut to size and field wired on site for easy installation.

This thin, flexible heating element is installed horizontally on the roof, custom-fit for each application. It may be bent three or four inches over the eave to prevent the formation of icicles.

STEP Roof Deicing heating elements are powered by an extra-low voltage (24 V) EPI-LX-R power supply. They have added protection by a chemically inert and dielectric insulation. This liner protects against physical damage and aggressive materials, which enables the installation under any rooftop and configuration, including new construction, remodeling and existing roofs.

The heating elements are made of a homogeneous, semi-conductive polymer, which by nature is self-regulating. This self-regulating, positive temperature coefficient (PTC), Nano-technology allows them to heat with maximum power in cold environments and use less electricity as their temperature increases. The result is a dramatic drop in power consumption, reducing operating costs by as much as 60% compared to conventional electric cable systems.

STEP Gutter De-Icing™ is often an effective companion product. It is a low-voltage 3" wide gutter heater designed to solve problems with snow buildup, ice damming and icicles. It is used in downspouts to drain water that would otherwise freeze in gutters.