Snow Melt Systems Too Expensive? Think Again...

By George Carey

Snow melting a driveway or walkway for residences has always been considered a luxury. The perception has been that it is too expensive to install and operate. However, over these past few years, I have seen the number of snowmelt systems installed in residential homes increase quite a bit.

The scenario may be a large renovation to an existing home and they decide to replace or upgrade their driveway. Or, it may be a newly constructed home and snowmelting the driveway is part of the design. I have also noticed that very few oil companies are installing these systems. They may be delivering oil to the existing home, but when it comes to designing and installing the snowmelt system, they allow the plumbing and heating company to do the work.

There maybe some "streets smarts" in that logic. "I don't understand how it works," or "I don't want to be responsible for that snowmelt system not working!"

But you could also look at this as an opportunity to differentiate yourself from your competitors, install confidence in your customer about the breadth of knowledge your company has, change the image that some consumers have about oilheating being an "old school technology" and last but not least, an opportunity to make money.

Having said all of that, snowmelting *does* have some design issues as well as operating issues that both you *and* your customer need to discuss. First, once you get past the installation cost, the next question is how much does it cost to operate? Of course, that answer depends on a lot of issues: How much snow needs to be melted? How quickly does it need to be melted? Are you "idling" the driveway at some minimum temperature? How cold is it outside? Any wind-drifting conditions?

Based upon some standard conditions here in the New England area, here is an example of what it may cost to operate your snowmelt system during a snowstorm. If you have a driveway that is approximately 1000 square feet in size and you designed your snowmelt system to provide 200 Btu/h per square foot, you would need a boiler that is firing at approximately 1.75 gph, with an efficiency of 80-82%.

For our example, to melt the driveway adequately, the snowmelt system ran for 10 hours, so you burned 17.5 gallons of oil. If oil cost $2.75 per gallon, the customer spent $48.13 to operate the system for 10 hours. Not too overwhelming is it? Of course, I have ignored the installation costs!

How the snowmelt is controlled plays an important part in the cost of operating the system. There are many ways to operate snowmelt systems. They can be turned on and off manually, automatically or somewhere in between. From an economic standpoint, you want the system to start as soon as it detects snowfall and turn off as soon as the snow is melted off the driveway. This is probably the least expensive way to operate and still maintain all the benefits of a snowmelting system.

You want to have a conversation with your customer regarding expectations and perceptions on what their snowmelt system can (and can't) do. Some people think that when it starts snowing, they can invite their friends over for a snowmelt party. They will "flick" a switch and presto…the snow will evapo-

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Below: Even the steps in this installation are fitted for snowmelt in this house in the Montana Rockies. That's Davis Plumbing & Heating doing the installation…

rate! You want to make sure they understand that there is a "time-lag". It takes time for the snowmelt system to heat up the slab and bring it up to the set melting temperature. Once it reaches the melting temperature, the system will continue to run until the automatic snow/ice sensor senses that it is dry and shuts the system off until the next snow fall. This operation may last 4-5 hours and quite possibly longer depending upon the amount of snowfall and the outdoor temperature. You want your customer to understand this up front before the first snowfall.

Sometimes, in some applications (usually commercial and industrial), they can't wait that long for the snowmelting system to activate. Instead, they operate the system in what's known as an "idling" condition. Most snowmelt controls have a feature where you can set the snow/ice sensor to maintain the slab at some minimum temperature, typically 28-30°F. This gives the snowmelt system a "running" start so that when the snow starts falling the slab does not have to be heated from a cold starting point. This, of course, costs money. You are heating a slab all the time that is exposed to Mother Nature, so regardless of outdoor temperatures and wind speeds, you are "pumping" Btus into the ground. This is another thing your customer needs to know when discussing their expectations of the system.

In a residential application, a snowmelt system is a convenience item. You don't have to wait for the plow guy to show up, you don't have to shovel the driveway, you don't have to salt your driveway and walkway and the system can start and stop automatically. However, it does take some time to get up and going before the melting starts.

From a design standpoint, you can use anyone of the reputable radiant tubing manufacturers or their representatives to help you in designing and laying out the system. This is a service they offer all the time. They will be able to help you in calculating the actual load, selecting the right size and amount of tubing, the best way to layout the tubing, what the design water temperatures should be as well as a control and piping strategy to operate the system.

In general, there are a few design issues you want to be concerned with. The first issue is, are you going to use the existing boiler to melt the snow? Does it have the capacity to handle this extra load? If not (probably the case in most systems), are you going to dedicate a boiler to just snow melt? This does happen often, but I think a better design is to add the additional boiler to the existing boiler, piped as a multiple boiler plant. Then by adding a small plate and frame heat exchanger

which is dedicated to the snow melt system, you can have back-up capabilities, rotation and all the other features that come with a multiple boiler system.

When you think about a snowmelt system, a good description is the mixing of fire and ice. When the snowmelt system first turns on, it is very important that the slab/driveway does not get "shocked" with hot water. The control system has to monitor the heat input to the slab in a controlled manner to protect the slab. If not, the driveway will experience cracking.

The same issues exist in the boiler room. It is important to prevent large slugs of extremely cold water from entering the boiler(s). This could cause thermal stressing and eventual cracking of boiler sections. If standard, non-condensing boilers are used, the control system has to prevent flue-gas condensation from occurring for extended periods of time. If not, the system will "rot" out the flue piping and eventually the cast-iron sections. All of these issues can be handled easily with proper piping and a proper control strategy. Again, something that the radiant tubing manufacturers deal with in every system design.

If you have any questions or comments regarding snowmelting, please call me at 1-800-423-7187 or email me at gcarey@fiainc.com