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# Snowmelt Systems And The Art Of The Best Guess

Technology can be used to keep walkways, driveways, and other critical areas dry, clear, and safe during winter months.

During winter months, all variety of weaponry is used to wage war against icy-precipitation accumulations. Salt, chemicals, shovels, and plows with heavy blades are frequently the first line of defense. In the process, many exterior concrete surfaces are chipped, cracked, and chemically attacked. Nearby plantings don't fare so well, either. The result is often marginal at best. Meanwhile, accumulation continues.

It doesn't have to be that way. Snowmelt technology can be used to heat concrete, stone, brick pavers, and even asphalt, keeping walkways, driveways, and other areas dry and clear. For commercial applications, especially those deemed critical areas, such as hospital and senior-housing entry areas and helicopter pads, snowmelt warmth performs a valuable, even life-saving function.

Typically, snowmelt systems entail moving a heated water/antifreeze solution underground, from a heat

exchanger to cold surfaces outside. There is also electric technology. Snowmelt systems can be activated when weather reports call for freezing precipitation. Or, a micro-processor control can activate automatically.

Snowmelting has several benefits. Icy surfaces are no longer a concern; the areas are maintenance free. Facility costs can be reduced because ice-melting chemicals aren't required. The chemicals kill landscaping and increase building cleanup when they are tracked inside. They also degrade concrete and asphalt. With today's litigious society, snowmelt systems don't cost money; they save it. The cost of a snowmelt system is more than returned with one avoided lawsuit.

## WHAT'S INVOLVED

PEX tubing is a great product for snowmelting applications, although some care must be taken to protect the

tubing from jobsite puncture, crushing, or exposure to the sun's light.

"That's why we use a lot of Onix EPDM tubing [a Watts Radiant brand, Springfield, MO] with aluminum oxygen barrier and layers of Kevlar; it's much more resistant to jobsite abuse and UV radiation," said Dave Yates, president of York, PA-based F. W. Behler Inc. "And for winter installations, it stays flexible, meaning we can work with it easily, even at below-freezing temperatures. We've also used Watts ProMelt electric snowmelt cables at commercial facilities," he added. For more than three decades, Yates and his crews have installed snowmelt systems. "I've never once had a customer question the investment," he reported.

Kolyn Marshall, system-engineering manager for Watts Radiant, likes to say "engineering is the art of the best guess." This statement may seem to be rather contra-

dictory. After all, engineering is the essence of absolutes.

“Engineers study and chart predictable performance and use that information,” explained Marshall. “Engineering is an art form that takes a known condition and makes it repeatable. A steel beam eventually breaks,” he added. “We bend enough beams to know when that beam fails.”

But what happens when the conditions are constantly changing? “This is where the art of the best guess comes in,” said Marshall. “Nothing fits this better than when trying to design a snowmelt system.”

#### CONSTANT CHANGE

Weather forecasters are all too familiar with how hard it is to predict what the next hour or day or week will bring when it comes to atmospheric conditions.

Marshall explained that when an engineer sets out to design a snowmelt system, a first task is to look at weather data for a given area. How cold does it get? How much snow usually falls? What’s the density of this snow?

Because of the unpredictability of nature, it’s necessary for snowmelt-system designers to be creative in their approach. After all, snowfall amounts may range from a few inches to a few feet.

How are these wild swings in snowfalls managed? With what’s referred to as a confidence factor. Historical data provides a fairly good indication of what a typical snowfall amount is with the periodic 5-yr., 10-yr., and 100-yr. oddity. The confidence level, set between 75% and 100%, indicates how confident the designed level of snowfall will actually occur.

“So, if the snowfall amount for a given area is 12 in., but it’s known to be a five-year event, my design might have a 90% confidence,” said Marshall. “Or, if we know a 12-in.



Watts Onix EPDM tubing with aluminum oxygen barrier and layers of Kevlar is resistant to jobsite abuse and UV radiation.

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snowfall happens routinely, then we may bump this to 98% or even 100%. The higher the confidence level, the higher the calculated load.”

ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Atlanta) categorizes snowmelt systems into three main groups: Class 0, 0.5, and 1. These refer to the amount of snow that will actually accumulate during the melting process.

A Class 0 will generally allow full accumulation before melting, while a Class 1.0 will try to keep pace with the rate of snowfall, providing a completely snow-free area all the time. Performance needs generally drive the classification. Residential will be either a Class 0 or 0.5. Light commercial will generally be a Class 0.5, while areas deemed critical, such as hospitals or loading docks, will be a Class 1.0.

#### CONTROLS MAKE THE DIFFERENCE

Control strategies go a long way toward reducing the snowmelt time factor. With today’s smart controls, such as tekmar’s (a Watts brand) latest snowmelt control, melt time is reduced by allowing the system to start before the snow falls.

The WiFi Snow Melting Control 670 includes a smart feature that checks the local weather forecast based on a ZIP code and then anticipates snowfalls by pre-heating the particular slab in advance of the snowfall. This smart feature virtually eliminates the risk of snow accumulation on the slab, while also significantly reducing energy costs compared to snowmelt systems that pre-heat continuously throughout the winter season.

Every year engineers and design professionals gain a little more understanding about how snowmelt systems perform and how Mother Nature behaves. With each new season, new data is added, making guesswork a bit more accurate. **CA**


#### DATA CACHE

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- **Circle 6** on the Reader Service Card.
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- Tekmar, [tekmarcontrols.com](http://tekmarcontrols.com)


- FW. Behler Inc., [fwbebler.com](http://fwbebler.com)
- ASHRAE, [ashrae.org](http://ashrae.org)

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