



**CONNECT AND PROTECT**

# Roof and Gutter De-icing Systems for Commercial Buildings

Make your roof winter safe - eliminate icicles and ice dams

  
nvent

**RAYCHEM**

# Don't Let Ice Dams Damage Your Building

## HOW DO ICE DAMS AND ICICLES FORM?

Ice dams and icicles form when accumulated snow on the roof melts and refreezes at the eaves and in the valleys. The ice dams and icicles form during the winter in these steps:

- Snow accumulates on the roof during winter snow storms.
- Snow compresses in the valleys and forms ice dams at the base of the valleys.
- Snow melt occurs between the accumulated snow and the roof surface.
- The melted snow runs down the roof to the eaves and refreezes forming ice dams and icicles.
- The water ponding builds up behind the ice dams.
- Continuous melting and refreezing of snow during the temperature cycles in winter increases the size and severity of the icicles and ice dams.

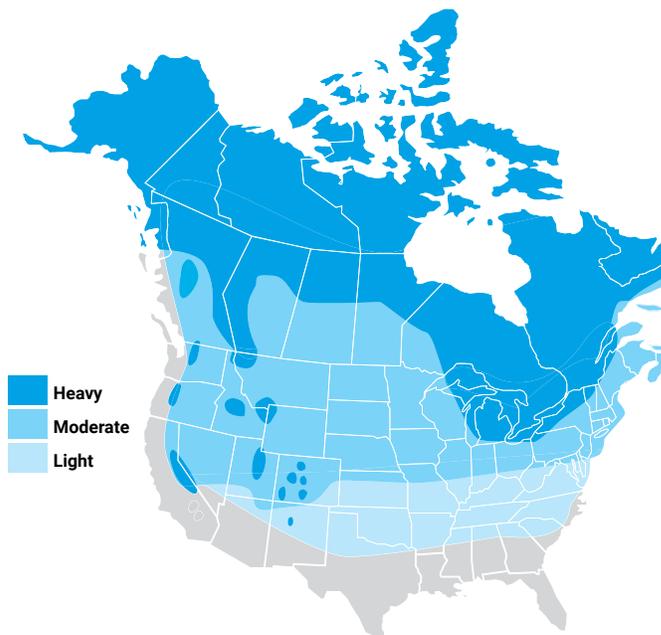
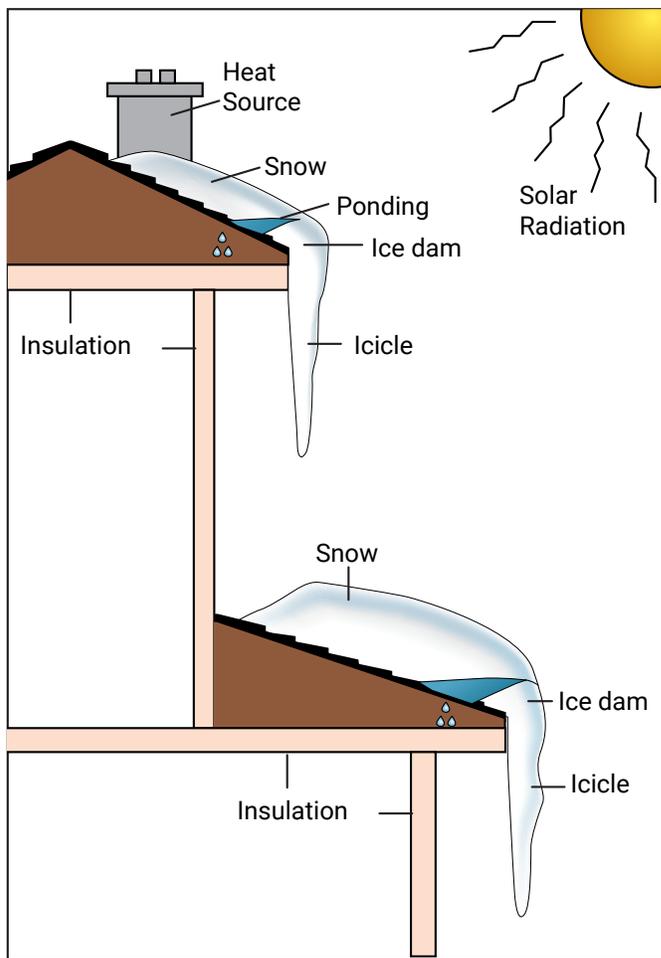
## WHY DOES IT MATTER?

- Water ponding behind the ice dams can penetrate through your roof and cause:
  - Interior water damage leading to mold and mildew
  - Structural damage
- Roof ice dams and icicles pose many hazards to people and property
  - Randomly falling icicles are dangerous for pedestrians below
  - Ice dams and icicles can also damage the roof, gutters, decks and other personal property
- Aesthetics
  - Ice dams and icicles can stain or damage the shingles, fascia, soffit and walls of your building.

## POTENTIAL ROOF DAMAGE IN SNOW LOAD CONDITIONS

Snow load is the amount of snow on a roof for a major portion of winter, whereas snow accumulation is the actual depth of snow on the ground from a single or series of snow storms. Both conditions play a role in the severity of roof and gutter challenges you may face, and what type of solutions you should consider.

	Annual Snow Fall in (cm)	Annual Roof Snow Accumulation in (cm)
Heavy	over 100 (254)	>15 (38)
Moderate	20 - 100 (51 - 254)	6 - 15 (15 - 38)
Light	under 20 (51)	<6 (15)



# nVent RAYCHEM Roof & Gutter De-Icing Systems

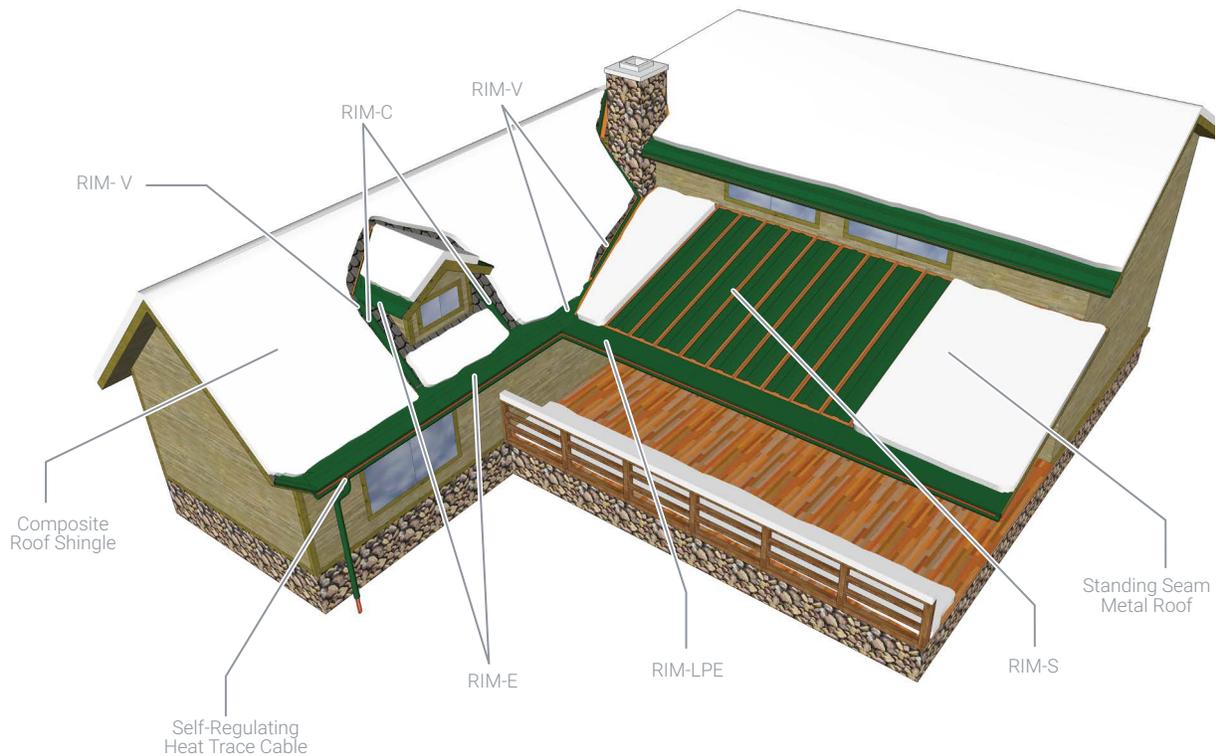
RAYCHEM roof and gutter de-icing systems include a suite of solutions that are designed to meet your application requirements. Typically the performance requirements of a system vary based on the severity of annual snow fall and the snow accumulation on a roof in a given area. Performance requirements of a system also depends on other design factors, including the weather patterns and temperature cycles, ambient temperatures, wind speeds, lake effects, elevation, northern/southern roof exposures, type of roof and roof material, overhang distance and roof features such as dormers, towers and valleys.



## 1. RAYCHEM RIM SYSTEM

The RAYCHEM Roof Ice Melt (RIM) System is a custom engineered concealed cable system that will put an end to ice build-up hazards. RAYCHEM Roof Ice Melt (RIM) System is our premiere, highest performing, aesthetically elegant roof & gutter de-icing solution ideal for new construction or renovation of residential or commercial buildings, for all snow load areas.

The RIM System consists of base panels to secure the heating cables in a fixed heat transfer position and offers a wide choice of aesthetically pleasing RIM cover panels. The RIM System includes panels specifically designed for eaves, valleys, channels, rakes and flat roof sections as shown below:



RIM-V | VALLEY PANEL



RIM-E | EAVE PANEL



RIM-LPE | LOW PITCH EAVE PANEL



RIM-S | SNOW MELT



RIM-C | CHANNEL PANEL



# RAYCHEM RIM System



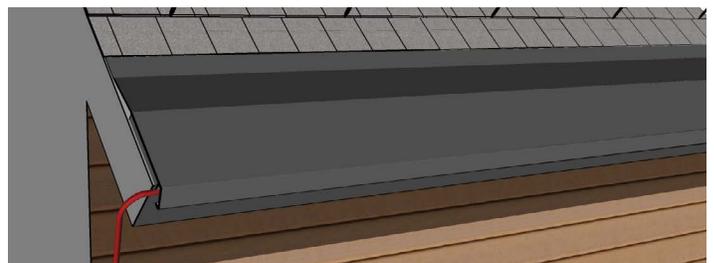
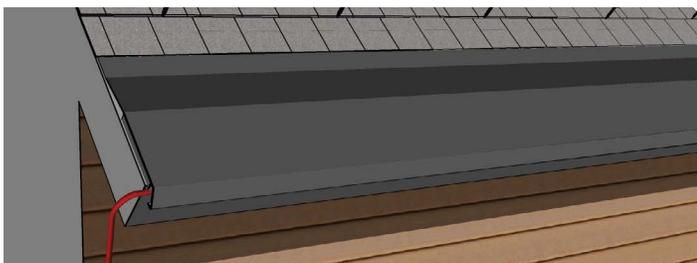
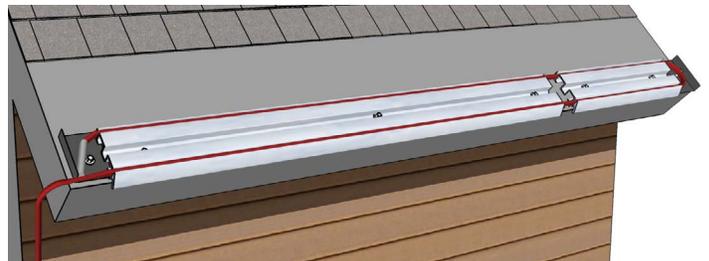
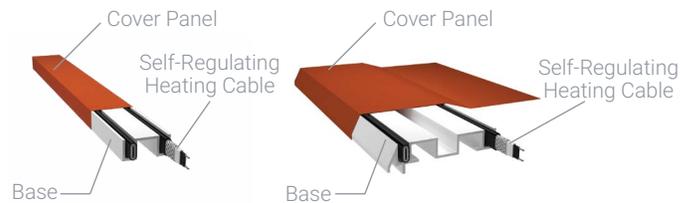
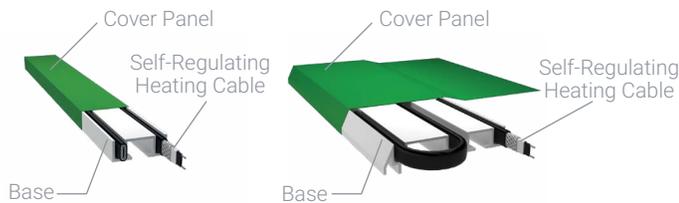
Depending on the snow load, we offer two different types of RIM systems:

## A. RIM SYSTEM - BEST FOR HEAVY SNOW LOAD AREAS

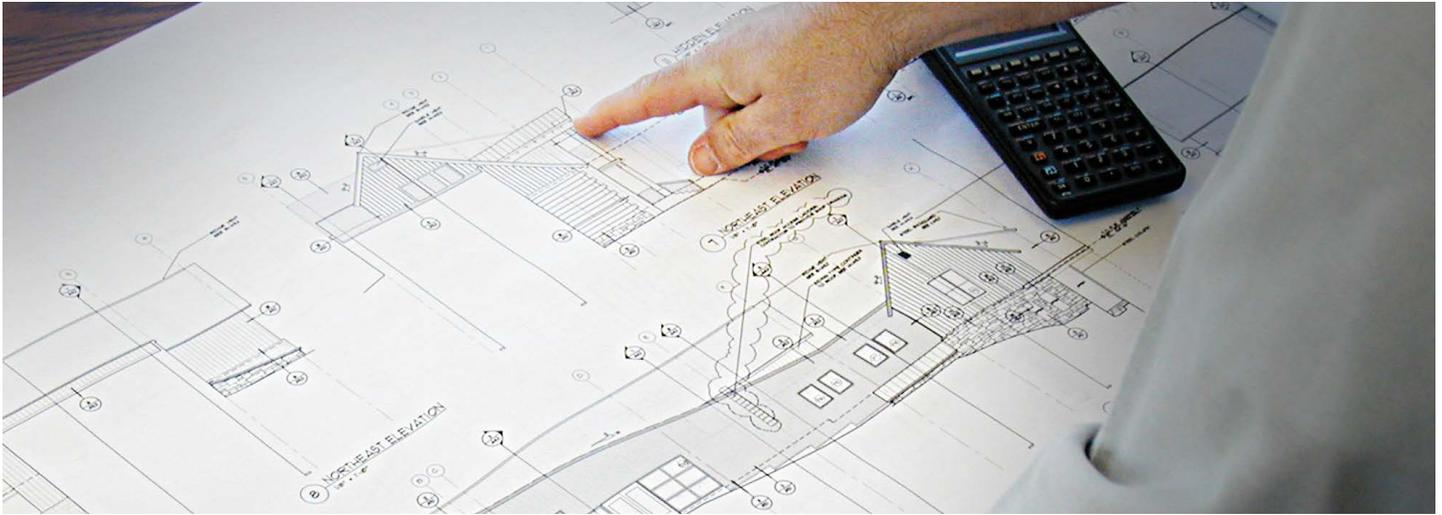
RIM System is our premiere offering where design factors such as severe wind speed, elevation, temperatures and heavy snow load areas with roof snow accumulation **over 15"** (38 cm) and annual snowfall **over 100"** (254 cm) require the most robust system. The RIM System consists of RIM panels that use high wattage self-regulating cable providing high power output required for heavy snow load areas. RIM-Eave panels embed 3 runs of self-regulating heating cable for high power output requirements.

## B. RIM2 SYSTEM - BEST FOR LIGHT TO MODERATE SNOW LOAD AREAS

RIM2 System is our energy efficient offering for areas with less severe wind speed, elevation, temperatures and moderate snow load areas with snow accumulation **6" – 15"** (15 – 38 cm) and annual snowfall **20" – 100"** (51 – 254 cm). The RIM2 System consists of RIM2 panels that use lower wattage self-regulating cable providing energy efficient solution for moderate snow load areas. RIM2-Eave panels embed 2 runs of self-regulating heating cable providing sufficient power output required for moderate snow load areas.



# Engineered Solution



## ENGINEERED SOLUTIONS

As a part of a completely engineered nVent RAYCHEM RIM System (for retrofits), we offer the following services:

**Evaluate the situation** with job site visits and architectural drawings (roof layouts and elevations).

**Prepare the design** with individual circuit layouts, optimal control systems, and RAYCHEM RIM materials.

### Supply the RIM materials, including:

- Engineering designs and installation instructions
- Metal base panel for attachment to the roof
- Safe, self-regulating heating cable
- Copper, zinc, Corten®, or Kynar® painted aluminum cover panel
- Accessory components as required (end caps, splice covers, etc.)
- Energy-efficient control system with BMS communication capabilities

## BENEFITS OF RIM SYSTEMS

### Prevents:

- Ice dam and icicle problems in eaves and valleys
- Roof damage or leaks caused by ice dams

### Provides:

- A one-time, maintenance-free solution
- The most energy efficient method available
- Self-regulating heating cable (UL Listed, CSA Certification)
- An aesthetically attractive solution with no visible cables
- A variety of colors and finishes
- Energy efficient UL control systems
- A long-term, maintenance-free solution
- Proven reliability with decades of successful operations
- 20-year warranty



# Designing a RAYCHEM RIM System

Our nVent design professionals work with Customers—architects, engineers, contractors, or building owners—to understand the design requirements for a project, and design a system suited to your project needs and budget.

## STEP 1 – CUSTOMER PROVIDES PRELIMINARY DESIGN INPUTS

- For **new construction**, provide the following to our nVent design professionals:
  - Site plan locating walkways, decks and driveways
  - Roof plan, power distribution
  - Building elevations and recommendations
- For **retrofits**, provide the following to our nVent design professionals
  - Complete the Estimate Form that will determine the basis for the design

## STEP 2 – NVENT PREPARES A SYSTEM PROPOSAL

- Prepare the design with recommended scope, RAYCHEM RIM materials layout and power requirements.

## STEP 3 – CUSTOMER REVIEWS RIM SYSTEM PROPOSAL

- Review the proposal and either confirm the scope or specify changes to the proposal as needed for the RIM System installation you desire.
- Specify wiring for future RIM System additions, as needed (Note: A retrofit RIM system installation can cost 25 – 40% more than the cost of installing a RIM system initially)

## STEP 4 – NVENT FINALIZES THE RIM SYSTEM PROPOSAL

- Implement the requested changes and make any final recommendations that are appropriate, like a control and monitoring solution or any relevant Field Support / Engineering Services that are best suited for the project.

## STEP 5 – CUSTOMER APPROVES FINAL SYSTEM DESIGN

- Approve the final system design and Field Support / Engineering Services, as applicable.

## STEP 6 – NVENT PROVIDES THE MATERIALS FOR THE PROJECT

- Supply the RIM System materials to the customer, including:
  - Metal base panel for attachment to the roof
  - Safe, self-regulating heating cable
  - Copper, or Kynar® painted aluminum cover panel, or other custom materials
  - Accessory components as required
  - Energy-efficient UL approved control system, as applicable
- Provide the following details to the project's Electrical Engineer and/or Electrical Contractor:
  - Engineering designs and installation instructions
  - Junction box locations (per design recommendations)
  - Control panel loads and location, circuit breaker sizing
  - Material layout plans with circuit design loads and circuit breaker sizing
  - Control panel layout and system testing procedures

## STEP 7 – FIELD SUPPORT SERVICES PROVIDE PROJECT SUPPORT, AS APPLICABLE

- Perform the electrical evaluation/ testing procedure
- Train the installer to install the RIM system
- Commissioning, supervision and troubleshooting

## STEP 8 – INSTALLER INSTALLS AND TESTS THE RIM SYSTEM

- Install the RIM System per the installation instructions as per design layouts
- Conduct control panel layout and system testing procedures
- Perform commissioning tests and complete warranty documentation

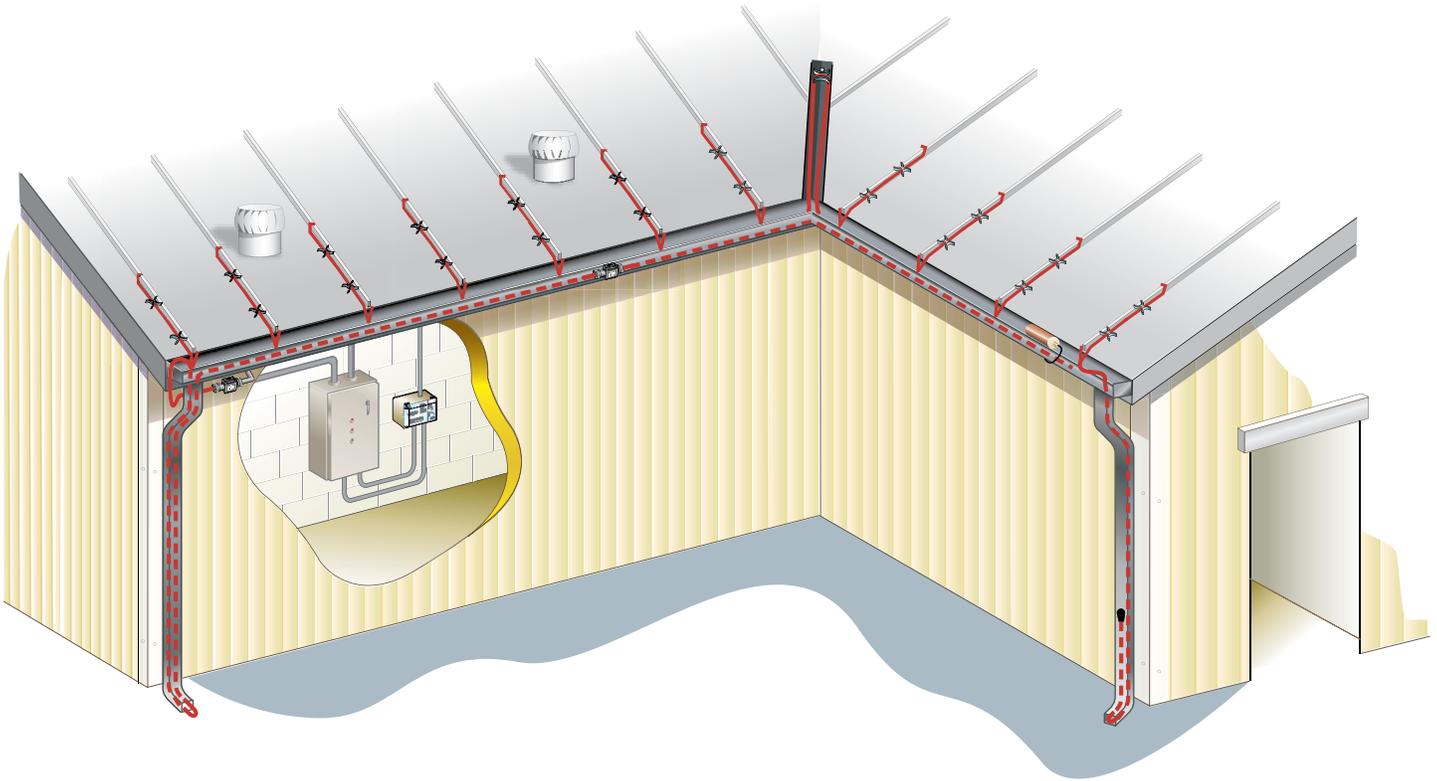
**We specialize in reviewing existing roof ice problems and creating customized RIM System solutions**



# RAYCHEM RIM in Action



# RAYCHEM Icestop System



## 2. RAYCHEM ICESTOP SYSTEM

nVent RAYCHEM IceStop self-regulating heating cable system provides a continuous melt path at the eaves and valleys to safely drain the melting ice and snow off the roof and minimizes roof ponding problems. The IceStop self-regulating heating cable is then installed in the gutters and downspouts to route the snow melt to a safe location.

The IceStop system is a simple cut-to-length solution that offers an advanced, high performing roof & gutter de-icing solution ideal for commercial buildings in light to heavy snow conditions.

## CONNECTION KITS AND ACCESSORIES

State-of-the-art non-heat shrink nVent RAYCHEM RayClic connection kits and accessories are vital parts of the IceStop roof and gutter de-icing system. Conventional heat shrink based kits are also available.

## BENEFITS OF ICESTOP SYSTEMS

- Simple cut-to-length design
- Self-regulating energy efficient cable
- Safe to use on modern membrane roofs due to low cable temperatures
- Ideal for gutters of any size
- Reliable state-of-the-art connection kits
- Proven reliability with decades of successful operations
- 10-year warranty



RayClic-PC Power Connection



RayClic-LE Lighted End Seal



Self-Regulating cable





# nVent RAYCHEM Control Systems

nVent RAYCHEM RIM and IceStop systems are controlled by state-of-the-art control systems.

## RAYCHEM ACS-30 CONTROL SYSTEM

The nVent RAYCHEM ACS-30 Control System is a state-of-the-art, multi-circuit electronic distributed control and monitoring system. It is supplied as a complete modular system, ready for field connections to convenient power distribution panels and temperature sensor input helping reduce the cost of electric heat trace cable installation. The advanced RAYCHEM User Interface Terminal (ACS-UIT3) uses touch screen technology to provide fast, intuitive programming, monitoring and alarm annunciation. The RAYCHEM ACS-30 may be integrated into your Building Management System (BMS) using the RAYCHEM ProtoNode multiple protocol gateways.



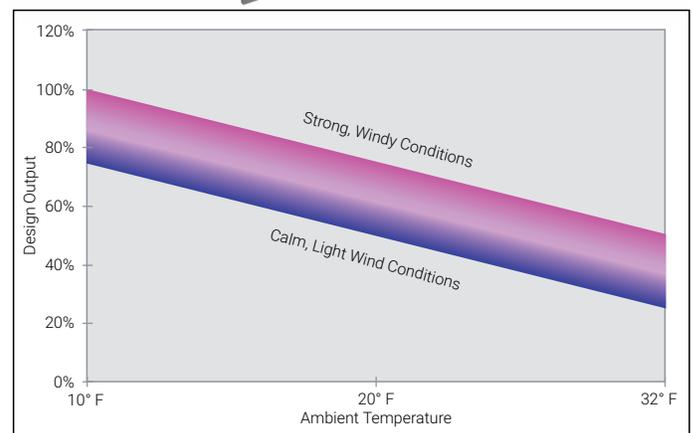
## RAYCHEM HECS CONTROL SYSTEM

The nVent RAYCHEM High Efficiency Control System (HECS) is designed to provide ground-fault protection to each circuit and to optimize energy requirements. The temperature controllers each use temperature sensors located in representative locations. The temperature controllers only turn on when the factory set ambient temperature sensor falls below the set point of 34°F. At temperatures below 34°F, the temperature controllers modulate the power to the RIM heating cables through solid state relays and maintain temperatures at 38-42°F. As temperatures drop below 34°F and winds kick-up, the ambient temperature and wind speed controller modulates the heating cable output based on the weather conditions, resulting in significant energy savings.

Since snow fall does not normally occur at temperatures below 10°F, the controller shuts off the RIM System and adds to the energy conservation program.



Weather Conditions	Percent of Steady State of Power
27-30°F with light winds	20-25%
27-30°F with strong winds	35-50%
20-25°F with light winds	40-60%
20-25°F with strong winds	50-70%
10-15°F with light winds	60-90%
10-15°F with strong winds	100%



HECS Performance for Different Ambient Temperatures and Wind Conditions

## OUR PRODUCT RANGE ALLOWS YOU TO CHOOSE THE RIGHT SOLUTION FOR YOUR APPLICATION AND BUDGET!

### IceStop

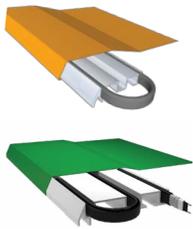


RAYCHEM's high performing, cut-to-length roof & gutter de-icing IceStop Heating Cable System is often specified for buildings and offer reliable state-of-the-art connection kits and control systems. These systems are ideal for commercial buildings in light to heavy snow load areas.. Ideal for these conditions/desired features:

- Large commercial buildings
- 120 V or 208-277 V; 12 W/ft@ 30°F
- Gutter >6" in width
- Hazardous Locations (Fuel Loading Areas)
- Fluoropolymer jacket
- Advanced control options
- Light to heavy snow load areas



### Roof Ice Melt (RIM)



RAYCHEM's premiere, highest performing, aesthetically elegant roof & gutter de-icing solution is designed with cables that are concealed in panels. Ideal for these conditions/desired features:

- All building types
- Better aesthetics with concealed cable
- 120 V or 208-277 V; up to 36 W/ft @ 30°F
- Gutter >6" in width
- Mechanical cable protection
- Available in 32 colors or copper
- Standard & Custom options
- Advanced control options
- ALL snow load areas

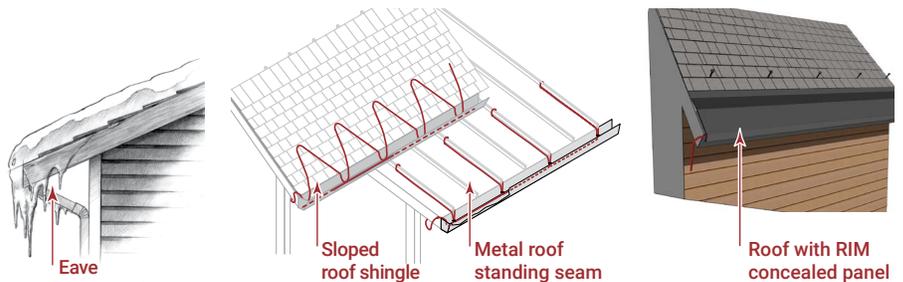


## WE CAN SOLVE YOUR ICE DAM ISSUES, BUT FIRST WE NEED A LITTLE BIT OF INFORMATION!

By indicating your preferred solution and providing details about the building type, roof type, pitch, eave overhang distance, gutters, downspouts, valleys, voltage, circuit breaker size, what type of control you may be interested in...

we can best guide you to the right solution to fit your needs with a complete bill of materials that a distributor can quote on quickly.

Use the form on the right, or try our new on-line design tool: **RAYCHEM Roof & Gutter De-Icing Calculator** available on **nVent.com** in the Commercial or Residential 'Resources' section.



# Roof & Gutter System Estimate Form

Email completed form to your nVent Sales Rep for a complete Bill of Materials and quote!

Need Quote For:  HEATING CABLE SYSTEM  RIM CONCEALED SYSTEM  BOTH

CHECK OUT OUR ONLINE ROOF & GUTTER DE-ICING DESIGN TOOL at [www.nVentthermal.com](http://www.nVentthermal.com) by selecting the Commercial or Residential segment -> Resources and click on the Roof & Gutter De-icing Calculator design tool.

1. Building Type & Conditions: (check all that apply)	<input type="checkbox"/> House	<input type="checkbox"/> Small shop / strip mall	<input type="checkbox"/> High-rise residential / multi-use bldg.	<input type="checkbox"/> Commercial building
	<input type="checkbox"/> New Construction	<input type="checkbox"/> Retrofit		
	Annual Snow Fall	<input type="checkbox"/> less than 100 inches	<input type="checkbox"/> more than 100 inches	
2. Area Name:				
3. Type of Roof:	<input type="checkbox"/> Sloped Roof Shingle	<input type="checkbox"/> Sloped Roof Shingle	<input type="checkbox"/> Sloped Roof Shingle	<input type="checkbox"/> Sloped Roof Shingle
	Metal Roof-Seams <input type="checkbox"/> 18" <input type="checkbox"/> 24" <input type="checkbox"/> _____"	Metal Roof-Seams <input type="checkbox"/> 18" <input type="checkbox"/> 24" <input type="checkbox"/> _____"	Metal Roof-Seams <input type="checkbox"/> 18" <input type="checkbox"/> 24" <input type="checkbox"/> _____"	Metal Roof-Seams <input type="checkbox"/> 18" <input type="checkbox"/> 24" <input type="checkbox"/> _____"
	<input type="checkbox"/> Don't Trace Roof	<input type="checkbox"/> Don't Trace Roof	<input type="checkbox"/> Don't Trace Roof	<input type="checkbox"/> Don't Trace Roof
4. Roof Pitch:	<input type="checkbox"/> Less than 3/12 <input type="checkbox"/> Equal to or more than 3/12	<input type="checkbox"/> Less than 3/12 <input type="checkbox"/> Equal to or more than 3/12	<input type="checkbox"/> Less than 3/12 <input type="checkbox"/> Equal to or more than 3/12	<input type="checkbox"/> Less than 3/12 <input type="checkbox"/> Equal to or more than 3/12
5. Length of Roof Edge:	_____ feet	_____ feet	_____ feet	_____ feet
6. Eave Overhang Distance:	<input type="checkbox"/> 0" <input type="checkbox"/> 12" <input type="checkbox"/> 24" <input type="checkbox"/> 36"	<input type="checkbox"/> 0" <input type="checkbox"/> 12" <input type="checkbox"/> 24" <input type="checkbox"/> 36"	<input type="checkbox"/> 0" <input type="checkbox"/> 12" <input type="checkbox"/> 24" <input type="checkbox"/> 36"	<input type="checkbox"/> 0" <input type="checkbox"/> 12" <input type="checkbox"/> 24" <input type="checkbox"/> 36"
	<input type="checkbox"/> _____"	<input type="checkbox"/> _____"	<input type="checkbox"/> _____"	<input type="checkbox"/> _____"
7. Gutters:	Total Length: _____ ft Depth: _____ inches Width: _____ Inches	Total Length: _____ ft Depth: _____ inches Width: _____ Inches	Total Length: _____ ft Depth: _____ inches Width: _____ Inches	Total Length: _____ ft Depth: _____ inches Width: _____ Inches
	<input type="checkbox"/> No Gutters	<input type="checkbox"/> No Gutters	<input type="checkbox"/> No Gutters	<input type="checkbox"/> No Gutters
	<input type="checkbox"/> Use CCB (Cable Cover Bracket) in gutters	<input type="checkbox"/> Use CCB (Cable Cover Bracket) in gutters	<input type="checkbox"/> Use CCB (Cable Cover Bracket) in gutters	<input type="checkbox"/> Use CCB (Cable Cover Bracket) in gutters
8. Downspouts:	Number of Downspouts: _____ Average Downspout Length: _____ ft	Number of Downspouts: _____ Average Downspout Length: _____ ft	Number of Downspouts: _____ Average Downspout Length: _____ ft	Number of Downspouts: _____ Average Downspout Length: _____ ft
	<input type="checkbox"/> Single Run in Downspout <input type="checkbox"/> Loop Run in Downspout <input type="checkbox"/> No Preference	<input type="checkbox"/> Single Run in Downspout <input type="checkbox"/> Loop Run in Downspout <input type="checkbox"/> No Preference	<input type="checkbox"/> Single Run in Downspout <input type="checkbox"/> Loop Run in Downspout <input type="checkbox"/> No Preference	<input type="checkbox"/> Single Run in Downspout <input type="checkbox"/> Loop Run in Downspout <input type="checkbox"/> No Preference
9. Valleys:	Number of Valleys: _____ Average Valley Length: _____ ft	Number of Valleys: _____ Average Valley Length: _____ ft	Number of Valleys: _____ Average Valley Length: _____ ft	Number of Valleys: _____ Average Valley Length: _____ ft
10. Roof Drains:	Number of Drains: _____ Roof Drain Diameter (Largest): _____ <input type="checkbox"/> Use RIM-DT for drains	Number of Drains: _____ Roof Drain Diameter (Largest): _____ <input type="checkbox"/> Use RIM-DT for drains	Number of Drains: _____ Roof Drain Diameter (Largest): _____ <input type="checkbox"/> Use RIM-DT for drains	Number of Drains: _____ Roof Drain Diameter (Largest): _____ <input type="checkbox"/> Use RIM-DT for drains
11. Voltage:	<input type="checkbox"/> 120 V <input type="checkbox"/> 208 V <input type="checkbox"/> 240 V <input type="checkbox"/> 277 V	<input type="checkbox"/> 120 V <input type="checkbox"/> 208 V <input type="checkbox"/> 240 V <input type="checkbox"/> 277 V	<input type="checkbox"/> 120 V <input type="checkbox"/> 208 V <input type="checkbox"/> 240 V <input type="checkbox"/> 277 V	<input type="checkbox"/> 120 V <input type="checkbox"/> 208 V <input type="checkbox"/> 240 V <input type="checkbox"/> 277 V
12. Circuit Breaker Size:	<input type="checkbox"/> 15 A <input type="checkbox"/> 20 A <input type="checkbox"/> 30 A	<input type="checkbox"/> 15 A <input type="checkbox"/> 20 A <input type="checkbox"/> 30 A	<input type="checkbox"/> 15 A <input type="checkbox"/> 20 A <input type="checkbox"/> 30 A	<input type="checkbox"/> 15 A <input type="checkbox"/> 20 A <input type="checkbox"/> 30 A
13. RIM Cover Panel:	<input type="checkbox"/> Kynar® Painted Aluminum	<input type="checkbox"/> Kynar® Painted Aluminum	<input type="checkbox"/> Kynar® Painted Aluminum	<input type="checkbox"/> Kynar® Painted Aluminum
	<input type="checkbox"/> Copper	<input type="checkbox"/> Copper	<input type="checkbox"/> Copper	<input type="checkbox"/> Copper
14. Controllers:	<input type="checkbox"/> Ambient Temperature Only	<input type="checkbox"/> Ambient Temperature Only	<input type="checkbox"/> Ambient Temperature Only	<input type="checkbox"/> Ambient Temperature Only
	<input type="checkbox"/> Ambient & RIM Panel Temperature (HECS)	<input type="checkbox"/> Ambient & RIM Panel Temperature (HECS)	<input type="checkbox"/> Ambient & RIM Panel Temperature (HECS)	<input type="checkbox"/> Ambient & RIM Panel Temperature (HECS)
	<input type="checkbox"/> Gutter Moisture & Temperature Sensor	<input type="checkbox"/> Gutter Moisture & Temperature Sensor	<input type="checkbox"/> Gutter Moisture & Temperature Sensor	<input type="checkbox"/> Gutter Moisture & Temperature Sensor
15. Notes:				
16. Customer name:				<b>BUSINESS CARD</b>
Company:				
Phone:				
Email:				
Project name:				
Project location:				

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