AEP SPAN TECHNICAL BULLETIN #5

# ADDRESSING SNOW & ICE

## INTRODUCTION

The purpose of this technical bulletin is to provide a basic review of snow & ice retaining systems and heat tape systems and present AEP Span's position regarding their use. This document also presents some of the aspects design professionals should consider when developing a project design.

## THERE ARE TWO SCHOOLS OF THOUGHT REGARDING THE RETENTION OF SNOW & ICE ON ROOFS

**1) Do Not Retain:** This approach requires that the roof be designed so that the snow & ice can melt and naturally exit off the roof. Careful attention should be used in configuring the building to prevent or minimize the possibility of retaining large accumulations of snow & ice on the roof. Also, the roof configuration itself should direct sliding snow or ice melt from discharging over entrances and walkways or other critical areas such as ground equipment and landscaping.

**2) Retain:** This approach intends to retain the snow & ice on the roof until it melts and exits the roof in a controlled manner. One concern of this approach is that amassing large accumulations of snow or ice could represent a dangerous potential should the snow & ice retaining system suddenly fail, be structurally inadequate, or be in a diminished condition due to lack of maintenance, improper installation, etc. A sudden release of large amounts of snow & ice accumulation could be dangerous, or even deadly.

## COMMON SNOW & ICE MANAGEMENT SYSTEMS UTILIZED WITH METAL ROOFING

**1) Snow & Ice Retaining System:** Mechanical components (clamps, rails, bars, or individual snow stops/ guards, etc.) used on roofs in climates where moving or falling snow or ice could create a nuisance or hazard to people, equipment, or landscaping.

**2) Heat Tape System:** An electrically-heated cable or wire used to melt snow and ice on a roof so that the snow and ice does not accumulate in critical areas. Electrically-heated cable or wire (aka "heat tape") is often used to melt snow and ice in critical areas of a roof, such as valleys, gutters, and downspouts. Such systems must be designed and installed to endure the forces of moving ice and snow and allow easy replacement since they can burn out or need repair. The self-regulating type of heat tape, which adjusts its heat output to the temperature encountered, is the most popular type.

## THERE ARE THREE PRIMARY WAYS TO ATTACH SNOW & ICE RETAINING SYSTEMS TO A METAL ROOF

**1) Seam Clamps:** These allow attachment of the retaining system to the roof panel's standing seam without penetrating the metal roof panel. This attachment method is probably the most reliable way to attach a retaining system to a metal roof system. Careful attention must be paid when locating seam clamps to ensure that the standing seam metal roof system's (including associated roof panel clips) ability to accommodate thermal expansion and contraction are not compromised by the seam clamps. In most cases seam clamps should be located mid-way between one-piece roof panel clips and at the location of two-piece clips.

**2) Adhesive:** Snow guards are attached to flat areas of the roof panels using adhesives. The strength of this type of attachment depends on how well the adhesive adheres to the metal roof panels. With painted roof panels, proper adhesion to the panel's coating can be a concern, along with the adhesives impact on panel coating warranties. Under snow retention loads there may also be the risk of coating separation from the underlying substrate.

**3) Fasteners:** Some snow guards utilize fasteners to attach them to the panel's flat areas or to the panel ribs. This approach is not normally recommended as it creates additional penetrations in the metal roof panels which can be points of possible water intrusion into the structure. These also have the potential to impede the thermal movement of the roof panel by "fixing" it to the substrate. Exposed fasteners are always a concern of any warranted roof system and should be avoided if possible.

## SUGGESTED RESPONSIBILITIES

The following are suggested responsibilities of the design professional, roof panel manufacturer, and snow retaining/ heat tape manufacturer to ensure the successful installation of these products:

**1) Design Professional:**

- The overall design of the roof system and how it will function in varying climatic conditions (including the determination of what, if any, snow & ice retention or heat tape systems are used) is the responsibility of the design professional ( i.e. architect, engineer, roofing contractor, roof consultant, etc.).
- The design professional should determine what, if any, snow & ice retention and/or heat tape systems are to be used on a project. The design professional should also consider how snow and ice will exit the roof.
- The design professional should contact the snow & ice and/or heat tape system manufacturer for recommendations of which system(s) are best suited for the project and what layout, spacing, attachment, etc. should be used to handle the anticipated snow and ice loads for the structure. As a minimum, the design snow loads required by building codes and local building authorities shall be used in this determination.
- The type of roof material, the panel finish, and the roof panel's configuration (e.g. minor ribs, embossed panels, etc.) may limit which type of snow-retaining system can be used.
- Advise the roof panel manufacturer of any increased design loads due to the weight of the retained snow and ice.

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- Include snow & ice retaining and/or heat tape system installation and layout requirements in the project documents (i.e. plans and specifications, addendums, etc.).

**3) Roof Panel Manufacturer:**

- Provide a sample roof panel or a dimensioned drawing of the roof panel when requested by the design professional so that suitable attachment of the retaining system to the roof panel can be determined.

- Though mechanically seamed panel samples are available, final seam configuration is not achievable without special tools. Dimensioned drawings of the installed roof panel configuration are typically used with these types of roof panels.

- Advise the design professional how the method of attaching the snow or ice retaining system may affect the performance of the roof system. Snow & Ice Retaining or Heat Tape

**4) Manufacturer:**

- Advise the design professional on which of their systems are best suited for the roof panel and climatic conditions of the project.

- Recommend a layout of the snow & ice retaining and/or heat tape system or supply the design professional with sufficient information to allow them to determine an appropriate system layout.

- Recommend procedures for attaching the snow & ice retaining or heat tape system to the roof panels.

- Exposed copper or other metals that react negatively to steel should be avoided at all costs to prevent dissimilar metals from interacting.

## IN SUMMARY

AEP Span's position is neutral regarding the use of snow & ice retaining and/or heat tape systems. We recommend neither for, nor against, their usage. If such devices are ultimately used, they must not impede the thermal movement (expansion & contraction) of the metal roof system, compromise its weather tightness, or be of a dissimilar metal to the roof materials.

Note that this bulletin is not intended to be a complete or exhaustive discussion of these specialty products or systems but rather to present common aspects of their use with metal roofing. The designer or manufacturer of these specialty products or systems should be consulted for project specific recommendations and guidance.

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