

## Roofing in High Snow Load Areas

Managing roof snow and ice build up in high snow load areas (2 kPa or 40 lbs or more) is an important design consideration with any roofing material. Steep slope roofs (above 7/12), roof details such as decorative third gables with vulnerable valleys, skylights, and roofs that end over another roof or an entrance way can be particularly troublesome. The forces generated by the sliding snow can be very destructive to such roofs, damaging the roofing material in the valleys, at skylight and chimney intersections, and at the eaves. All roofing materials are vulnerable to such forces. It is wise to keep roofs in high snow load areas at lower slopes (between 4/12 and 7/12), and to limit the use of vulnerable roof protrusions and third gables towards the bottom of the roof. In high snow load areas, particular attention needs to be paid to the sealing of the warm side vapour barrier, and using sufficient insulation. A very small hole can let enough heat and vapour escape to the underside of the roof to create serious ice damming problems.

When you are dealing with a roof design that is likely to be susceptible to sliding snow damage, the best way to limit this potential damage is by the use of snow retention systems. These systems should be professionally designed by an expert in the area of snow retention control such as TRA Snow Brackets ([www.trasnowbrackets.com](http://www.trasnowbrackets.com)). These systems will be designed based on the snow-loading factor for the area and the roof slope. The idea is to keep the snow on the roof where it can harmlessly melt away in the spring rather than sliding down and doing predictable damage. Extra care with the installation of tile roofs should also be taken, especially with the vulnerable rake and hip tiles. The use of 3.5" (85mm) corrosion resistant screws, with head sizes at least 1.5 mm larger than the size of the nailing hole (or gaskets and/or washers to ensure this) for installing the rake tiles is a good upgrade from the usual 3.5" (85mm) hot dipped galvanized nail. In addition to this, a concrete compatible caulking (usually NOT a silicone product) should be used to attach the roof side of the rake tile fittings to the field tiles and to each other. Proper caulking between cap tiles should also be done. A non-rake tile raised gable fascia is a good detail to consider in high snow areas.

When snow slide damage does occur, snow bracket systems can usually be retrofit onto the existing roof material. Concrete roof tile is particularly well suited to these retrofits, due to the common use of the double batten installation system. The snow brackets can be powder coated to match the tile colour and thereby fit well into the aesthetics of the tile roof. Snow brackets should always be installed in a diagonal line, and the bottom row should be double bracketed. In some situations the use of a secondary snow retention system such as a snow fence may also be advisable to keep the top layer of the snow from avalanching off the roof. The use of snow fences should never be specified without the snow bracket system also being installed, as the forces of the snow sliding will likely rip off snow fences if the primary protection, snow bracket system is not in place. The snow bracket system works by allowing the bottom six inches (150mm) of snow to bind to the brackets, and the top snow layers can then harmlessly slide off without doing damage to roof materials. The remaining snow harmlessly melts away in the spring.