

Why You Need A Metal Building for Heavy Snow

As beautiful as snow can be, it can also be troublesome - and at times, it can be outright dangerous. The weight of snow on a roof can become so heavy that it could even cause a collapse. This is why a durable and robust metal building is the best option in these types of climates.

Different Types of Snow and Snow Load

At first glance, it all just looks like snow. But if you have ever spent time shoveling it, you know better. There are different types of snow, and each type will have a different impact on snow load. Snow load is the amount of weight that snow puts on a roof.

- **Snowflakes**
Snowflakes are individual ice crystals. Snowflakes are produced when a water droplet freezes onto a particle-like dust or pollen and then falls from the clouds to the ground.
- **Hoarfrost**
Hoarfrost is a crystalline deposit of frozen water vapor formed in clear weather on grass, other vegetation, and structures such as fences and roofs. It is often grayish-white in appearance.
- **Graupel**
Sometimes supercooled water droplets come together and freeze onto already falling snowflakes. This creates little balls of rime frost that are about 0.08 to 0.20 inches in circumference.
- **Polycrystals**
Polycrystals are single snowflakes that have two or more individual ice crystals that make up their structure. These are often formed when two or more individual snowflakes merge.

The Stress of Snow and Ice on Structural Integrity

The weight of snow and ice puts stress on buildings. When the weight becomes too much, it can even cause a collapse. There are several factors that determine snow load.

- **Density**
The denser the snow is, the more it will weigh. Dry snow is not as dense and is therefore much lighter than very moist snow, which is much denser. This density of the wet snow can make it as much as seven times heavier than dry snow.
- **Accumulation**
Accumulation is the amount of snow built up on your roof, not just the snow that fell from one particular snowfall. If you have two inches of snow every day for three days, the amount on your roof is six inches of snow, not just the two that fell today.
- **Distribution**
Snow does not distribute evenly. Snow blows and drifts and can even pick up debris. This means that light snow on one part of the roof may have accumulated to quite a bit of snow on a different part of the roof.
- **Variations in Temperature**
When temperatures fluctuate, snow may thaw and then refreeze. This may not only shift weight from one area of the roof to another; it also changes the density of the snow as well.
- **Mixed Moisture**
While a light rain may help melt snow from rooftops, some heavier rains can create even more trouble. Snow can absorb the rain between frozen crystals, especially when temperatures drop again quickly.

How Snow Load For Metal Buildings is Calculated

Snow load considers many factors, including roof shape, elevations and slope, obstructions, wind exposure, thermal condition of the building, recent snow accumulation, and the building's use. An effective engineer will also consider differences in snow caused by the season, humidity, and altitude.

Snow Load Requirements

There are standard requirements for snow load, but you can also check FEMA's website and check with your local homeowners association for further guidance or information specific to your region. Snow Load calculations are based on Ground Snow Load PSF (Per Square Foot).

Below are some Standard Requirements;

10 Pounds PSF Ground Snow Load – Generally refers to rainfall.

20 Pounds PSF Ground Snow Load – Moderate Snow Fall - Minimum for Carports.

25 Pounds PSF Ground Snow Load – Moderate Snow Fall.

30 Pounds PSF Ground Snow Load – Moderate to Heavy Snow Fall.

40 Pounds PSF Ground Snow Load – Heavy Mountain Snow Fall.

43-45 Pounds PSF Ground Snow Load – Heavy Mountain Snow Fall (most required in Utah).

50 Pounds PSF Ground Snow Load – Heavy Mountain Snow Fall (5000ft+ elevation).

60 Pounds PSF Ground Snow Load – High Mountain Snow Fall (6000ft+ elevation).

90 Pounds PSF Ground Snow Load – Extreme High Mountain Snow Fall (6500ft+ elevation).

How Design Effects Snow Load

Roof design can affect snow load because it can influence how snow drifts, and how quickly it does or does not melt.

- **Roof Pitch**

Roof pitch is a way to describe how steep a roof's slant is. The higher the pitch, the more the snow will drop off of the roof rather than settle. Locations with heavy snowfall benefit the most from a high pitch.

- **Wind Load**

Many locations that have heavy snowfall also have heavy winds. Wind can have a significant impact on snowdrift and other variables. Heavy wind will affect calculating snow load as well.

- **Geometric Features**

Some geometric features catch snow and allow for it to accumulate even more, such as sawtooth and stepped roofs, while other geometric features like gable or multi-span roofs promote more snow dropping away.

- **Accessories**

There are roof accessories that help distribute the snow's weight, such as snow guards and roof cleats. There are also tools for clearing away snow, including basics like brushes and shovels.

Tools to Deal with Snow Loads

Snow is just part of life in some regions. The good news is that there are tools to help prevent or clear away the snow load from your roof.

- **Roof Rake**
A roof rake is a handheld tool with a long handle that you can use a roof rake to rake or drag the snow off your roof. It should also eliminate ice dams.
- **De-icer**
De-icers are tools that warm-up and use heat to melt away snow and ice on your roof. These are tools like a heat cable, heat tape, heated mesh, and others.
- **Snow Guards**
Snow guards are small pieces that attach to the roof in a staggered pattern that holds snow in a folding field, promoting faster melting.

Metal Buildings are Perfect for Cold Climates

A building needs to be durable and robust to survive harsh winters. As mentioned above, metal buildings provide unrivaled durability and resilience in cold climates to last through winter weather. They offer enhanced structural support and integrity under snow load in comparison to other types of buildings.

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