Lightning and Metal Roofing

We live in an electronic age, surrounded by electronics. Whether it is our television, computer or even the lights we read by, our lives are dependent on electricity in both our homes and workplace. Taking this into consideration, a lightning strike on an occupied building is a concern not only for the electronics surrounding us, but for the risk of fire caused by that strike. Concern over the use of metal roofs in construction has raised the issue of whether metal roofs attract lightning strikes more than other roof material types.

Research provides us verifiable detail that the material used in roof construction does not influence the risk of a lightning strike. There are several other factors that may influence the risk of a lightning strike, including detail where a metal roof may actually be beneficial in a lightning strike scenario.

In general, lightning is a flow of negatively charged electrons from the clouds seeking a path of least resistance to the positively-charged earth surface. While lightning's drama is the flash of light, the average length of a lightning flash is only about 30 microseconds. While short in duration, the impact of a strike can be tremendous. If the electrical charge is strong enough and no continuous direct path is available, lightning can also arc from one material to another. Resistance to this electrical flow generates heat energy that may cause explosions, fires, and other significant damage.

Considerable research has gone into the science of lightning protection. Most notable is the creation of a standard to determine the hazard level and where lightning protection is most required and how lightning protection should be installed.

In assessing lightning strike risk, two areas of concern are:

- **Probability** of a lightning strike
- **Consequence** of a lightning strike

Lightning Strike Probability

Building strike probability is influenced by several factors:

Area Topography

Lightning strike probability increases when the building sets on an elevated site — such as a hilltop — as lightning is drawn towards the highest object in a strike area.

Building Height

A tall building, relative to other structures nearby, is more likely to receive a lightning strike. The presence of a tall structure close to a lower height building will tend to reduce the strike chance to the smaller building.

Building Size

Buildings covering a larger surface area provide a more accessible lightning strike target.

Thunderstorm Frequency / Severity

Certain geographic areas are more prone to storms that lead to lightning activity.

Summary

Based on all available evidence, a metal roof is no more likely to be struck by lightning than any other roofing material type. In fact, the largest benefit of using metal roofing related to a lightning strike is that the roof material performs as a noncombustible material, so the risks associated with the use of metal roofing during a lightning event make it one of the most desirable roofing construction materials available. As an electrical conductor and a noncombustible material, the risk associated with a metal roof use may even be a more desirable construction option. A metal roof spreads the force of the electricity out, rather than concentrating it all in one place.

A lightning protection grounding system may be considered for highly storm-prone regions. A grounded metal roof, in accordance with the National Fire Protection Agency requirement — NFPA 780 (Standard for the Installation of Lightning Protection Systems; 2017 edition), will make any building less prone to lightning strike damage. A lightning protection system gives electrical discharges an easy path to earth, usually routing it around the outside of a structure. Lightning rods (air terminals, terminals, or strike termination devices are trade terms) are commonly made of copper or aluminum.

NOTE: Use only aluminum lightning protection system components with a DECRA roof system to avoid galvanic corrosion — Copper MUST NOT come in contact with a DECRA roof, as well as rainwater running over copper and onto a DECRA roof.

Building location and materials used are factors that should always be discussed with a professional installer and considered when considering a lightning protection system in accordance with NFPA 780. Lightning protection is a highly specialized trade that is governed by industry safety standards. There are many requirements that dictate an installer's qualifications along with a host of NFPA, Underwriters Laboratories (UL) and International Electrotechnical Commission IEC standards to which adherence is necessary. Ongoing lightning protection system maintenance is required to make sure all connections are secure and that system electrical continuity is maintained.