

Severe Weather Preparedness: A Q&A Conversation with FM Approvals

As part of a company-wide focus on severe weather preparedness in March and April 2021, we sat down (virtually) with Phil Smith, the vice president and manager of building materials with FM Approvals, to learn more about what they do and how the Very Severe Hail (VSH) classification came to be.

Who is FM Approvals?

FM Approvals is a third-party testing and certification laboratory with the unique focus of testing products for property loss prevention using rigorous standards.

Who is FM Global?

FM Global is one of the world's largest property insurance companies; they believe the majority of loss is preventable, not inevitable, based on scientific research and risk engineering.

How do they work together?

FM Global, through their loss prevention data sheets, recommends the use of FM Approved roof systems. These exacting standards help reduce the chance of property loss due to fire, weather conditions, and failure of electrical or mechanical equipment

What is the Very Severe Hail classification and how did it come to be?

In 2018, insured losses from hailstorms topped \$10 billion in the United States for the 11th year in a row. Hailstorms account for 70 percent of the average annual property losses from severe convective storms in the US, according to the National Center for Atmospheric Research.

Hail resistance is one of the performance requirements included in Approval Standard 4470 (“Single Ply, Polymer-Modified Bitumen Sheet, Build-Up Roof (BUR) and Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction”). In the past, the hail resistance classifications included Moderate Hail (MH) and Severe Hail (SH).

In March 2018, FM Global Property Loss Prevention Data Sheet 1-34 (Hail Damage) was updated and included a new Very Severe Hail (VSH) classification to the hail resistance design guidelines. This was a change to reflect updated data on relative hail sizes during a 15-year mean recurrence interval (MRI) and in direct reaction to the increased frequency of hail-related claims for storms with greater than 2" diameter hail. The maps for the three hail hazard areas were also updated with the new VSH classification applying to a large area in the central United States, including 14 states from Texas to the Dakotas.

Walk us through how the hail damage testing is completed.

Assemblies of various roofing materials are selected and tested using the following methods:

For Moderate Hail, using Approval Standard 4470's procedure, roof systems are tested against a two-inch in diameter steel ball dropped from a height of 81 inches in a tube section. The ball weighs 1.19 lbs. The result is an impact energy of about eight foot-pounds on the surface of the roof system being tested.

Roof systems tested for Severe Hail are impacted with the same two-inch in diameter steel ball as with Moderate Hail, but the ball is dropped from a height of 141.5 inches. The resulting energy impact is that of 14 foot-pounds on the surface of the roof assembly.

For the new Very Severe Hail designation, two-inch in diameter ice balls are propelled at the roof assembly being tested using an ice ball launcher. The ice balls are propelled at between 152-160 feet per second, with the resulting impact energy coming in at 53-58 foot-pounds on the surface of the roof assembly being tested. This impact energy is the equivalent of a hailstone measuring up to 2.5 inches (64 mm).

Why ice balls for VSH? Ice balls – as opposed to steel balls – is the most efficient way to generate the needed impact energy for a proper test.

In all three tests, the roof cover is UV conditioned for 1,000 hours and prepared for testing. For the very severe hail test, the roof cover is further heat-aged for 1,000 hours before testing.

What is the geographical reach of the VSH designation?

From the central plains states/central North Dakota south through Texas. Included in this area: North Dakota, South Dakota, Montana, Wyoming, Minnesota, Nebraska, Iowa, Colorado, Kansas, Missouri, New Mexico, Oklahoma, Arkansas, and Texas.

This area was designated as a Very Severe Hail region based on information from the National Oceanic and

Atmospheric Administration's (NOAA) National Weather Service and National Center for Environmental Protection's Storm Prediction Center.

Who is impacted by the VSH classification?

The commercial roofing industry, of course, but it goes beyond that: the concept is to help commercial property owners prevent or reduce the potential for hail loss overall.

Let's talk about the impact of the VSH designation on the commercial roofing industry. The biggest difference between roofs that meet the classification and those that don't?

The biggest difference: significantly improved resistance to impact.

Initially, manufacturers combined existing products to meet the new VSH criteria. Now we're seeing products specifically engineered to meet the VSH criteria. The industry is responding, which is always a good thing.

In 2019, there were about 1,700 VSH-rated assemblies on the market; now, following a pandemic year, there is just over 10,000 VSH-rated assemblies.

Thinking about building codes: is the VSH designation a required part of the International Building Code (IBC)?

No, currently it's not. However, FM Approved roof assemblies including those with the VSH designation will in fact meet many sections of the IBC. There's really no value if the product is FM Approved but doesn't meet the building code; at last check, an FM Approved roofing assembly meets at least 10 sections of the IBC.

Looking ahead: do you see other standards or classifications being revised or updated to account for damaging weather events?

At this point, there are no plans to modify other ratings within Approval Standard 4470. FM Approvals is researching adding a VSH rating option to Approval Standards for steep slope roofing, skylights and heat and smoke vents.

Our thanks to Phil Smith with FM Approvals for sharing this information. Complete information on the Very Severe Hail designation from FM Approvals may be found in the FM Global Property Loss Data Prevention Sheet 1-34 (Hail Damage). Visit www.fmglobaldatasheets.com; www.roofnav.com and www.fmapprovals.com.



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