

# Designing for the impacts of Very Severe Hail

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First things first: If you don't practice in or own a building in "Hail Alley" or a building insured by FM Global, why would you need to read this article?

1. Roofs are the first line of defense against severe weather events, not just hail.
2. The geographic footprint of hailstorms has expanded, and about two-thirds of the United States experiences 1-inch or larger hailstones, with insurance claims reaching \$16.5 billion in 2020.
3. While FM requirements only apply to FM-insured buildings, the potential for damage applies to all buildings. It is not uncommon for owners and designers that do not insure buildings through FM to elect to follow FM's guidelines to protect their investments and mitigate their design risk.

And if you do practice in or own a building in Hail Alley, how will you know which Very Severe Hail (VSH) rated assembly to select out of the 16,500+ approved assemblies?

### **What in the hail is the concern?**

Roofs are the first line of defense against severe weather events, including hail. Insured losses from hail events have exceeded \$10 billion in the United States annually since 2007. The geographic footprint of hailstorms has expanded, and about two-thirds of the United States experiences 1-inch or larger hailstones. Nearly 10% more U.S. properties, more than 6.8 million, were affected by hail in 2021 than in 2020. This was due, in part, to a growing number of hail events in the eastern United States, which is more densely populated than the traditional Hail Alley states.

### **Designing roofs in VSH regions**

Given the increasing volume of severe hail events (hail greater than or equal to 2" in diameter) and the resulting property loss, damage, and financial impacts, FM Global added to the requirements in the FM Loss Prevention Data Sheet (LPDS) 1-34 Hail Damage in 2018. FM's LPDS 1-34 identified the VSH region as encompassing Oklahoma, Kansas, Nebraska, South Dakota, most of Texas, and parts of Montana, North Dakota, Minnesota, Iowa, Missouri, Arkansas, Wyoming, Colorado, and New Mexico.








When VSH assemblies (i.e., those that are designed to withstand the impact of 2" min. hail) first came to market in 2018, there were 44 approved assemblies. Innovative approaches have increased the offerings to more than 16,500, enhancing performance and expanding designers' capabilities, including adhered and mechanically attached systems, which provides flexibility to address weather

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VSH SYSTEMS. LEFT IS SIMULTANEOUSLY FASTENED 60 MIL FLEECEBACK TPO OVER GLASS MAT VSH ROOF BOARD AND POLYISO INSULATION. RIGHT IS 60 MIL FLEECEBACK TPO OVER GLASS MAT VSH ROOF BOARD ADHERED IN LOW RISE FOAM RIBBONS TO MECHANICALLY ATTACHED POLYISO INSULATION.

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| Very Severe Hail Assemblies  |   |                             |
|--|---|-----------------------------|
| System Description   | System  | Warranty                    |
| 60 mil Fleece-back TPO adhered 4" o.c. LRF over simultaneously fastened OSB/ISO (VSH)              |    | Up to 20 year NDL Guarantee |
| 60 mil Smooth TPO adhered in solvent based bonding adhesive over glass mat roof board(VSH)         |    | Up to 25 Year NDL Guarantee |
| 60 mil Fleece-back TPO adhered in splatter over glass mat roof board (VSH)                         |    | Up to 25 year NDL Guarantee |
| 60 mil Fleece-back TPO adhered in splatter over glass mat roof board (VSH)                         |    | Up to 25 year NDL Guarantee |
| 60 mil Fleece-back TPO adhered in splatter over glass mat roof board (VSH)                         |   | Up to 25 year NDL Guarantee |
| 2 ply SBS Modified torched over glass mat roof board (VSH)   |  | Up to 30 year NDL Guarantee |
| 80 mil Fleece-back TPO adhered in splatter over simultaneously fastened glass mat roof board (VSH) |  | Up to 30 year NDL Guarantee |

A SAMPLE OF AVAILABLE VSH ASSEMBLIES.

## Roofs: The first line of defense against hail

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There is more to consider than just the upfront costs of upgrading to a VSH assembly. Making the investment in a more robust roof system means less chance of roof damage that can lead to water intrusion that can cause disruption, damaged goods, mold growth, and/or loss of business. Roof damage may also lead to premature roof replacement that may not be covered by insurance.

There are many buildings that are not FM insured and still the owners have decided upon or agree to follow the requirements for VSH-rated assemblies. Taking the precautionary measures available to protect their building can provide owners and designers alike with a sense of confidence in the longevity of their investment by mitigating their risk and protecting the occupants and contents.

While FM LPSD 1-34 walks users through the process of designing a roof for hail, and RoofNav is a web-based tool to assist with rated assembly selection, there is a lot more to know about roof system design and performance. Remember that hail is just one of the criteria in the design process. Building use, wind uplift, fire ratings, climate zone, and maintenance all need to be considered and incorporated into the design. Leveraging the expertise of a building enclosure consultant will provide a roof design with longevity in mind and help mitigate risk.

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