

SPRAY POLYURETHANE FOAM

The Roofing System That Can Stand Up To High-Wind Disasters

“The direct application of spray polyurethane foam to steel deck and plywood deck demonstrated uplift load resistance up to the capability of the test equipment to develop load (160-165 psf) without any sign of delamination or other damage to the foam.”

— Underwriters
Laboratories, Inc.



Spray polyurethane foam roof resists wind uplift

These two buildings in Puerto Rico are located just a few yards apart, so they both received the same degree of wind force when Hurricane Hugo stormed over the island. The building on the left received major damage as wind uplift ripped off a portion of the roof.

The building on the right has a spray polyurethane foam roof which held tight. There was no peeling, penetration or water leakage.

Polyurethane foam is self-flashing – it forms a seal that grips the building wall and roof-mounted equipment so there are no edges for the wind to lift up and peel away.

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SPFA

Spray Polyurethane Foam Alliance

Why the spray polyurethane roof can hold up when other roofing systems don't

“The performance of the spray-applied polyurethane foam roofs that were inspected was found to be outstanding. If the substrate is adequately anchored, these systems appear to offer great wind resistance. They do not exhibit a tendency to progressively fail after being impacted by missiles, and they appear to be quite resistant to water leakage after missile impact.”

—Thomas Lee Smith, AIA,
CRC National Roofing
Contractors Assoc.

“Hurricane Andrew proved the old adage of the weak link. The performance of spray polyurethane foam in high-wind conditions showed there was no weak link.”

—Charles Brandt Goldsmith,
A.I.A. Chairman, Roofing
Industry Committee on Wind
Issues

Typically, the roof is the most vulnerable part of the building subject to damage from high-wind disasters. Once the roof goes, the interior of the building is exposed to the elements. In fact, water damage to a structure and its contents is often ten times more costly than the damage to the roof itself. That's why it's important to cover your building with a roofing system that can hold up to the punishing blows of high winds.

In the aftermath of Hurricanes Hugo and Andrew, teams of roofing experts visited the storm-ravaged areas to survey the devastation. They discovered that built-up membrane roofing (BUR) systems had failed to protect many of the buildings which sustained damage.

Generally, the reason for failure is the very nature of the BUR design with overhangs, overlaps, joints, exposed edges and flashings. The wind grabs an edge of the roofing material and lifts it off the deck or literally peels back portions of the membrane. This was made easier because many of the BUR systems inspected by the experts were not adequately fastened to the deck.

Flashings were ripped off allowing water seepage and further wind destruction. There was damage from missiles (flying debris), and the BUR roofs contributed to the problem as their membranes were torn to pieces. Once the roof was blown away or penetrated, rain poured in and ruined the building's contents.

By contrast, the spray polyurethane foam roofing (SPF) systems inspected by the experts held up under the hurricane-force winds. The buildings that they protected remained dry and intact.

That's because a properly installed spray polyurethane foam is a smooth, continuous surface that grips the deck and building walls. It adheres so tight that there is no need for fasteners. It is seamless and self-flashing, so there are no joints or edges for the wind to hold onto.

Based on comparison of performance, the application of the spray polyurethane foam provided enhancement of the uplift capability of the BUR tested.

The spray polyurethane foam roof is light-weight, yet rigid—it provides extra strength to help the roof stand up to the forces of nature. It also is resilient enough to resist missile damage. The high winds pelted the spray polyurethane foam roofs with debris. The roof was penetrated with no leakage observed. The conclusions of the roofing experts' from their on-scene inspections are supported by a controlled experiment conducted by UL comparing the uplift resistance of BUR roof assemblies with spray polyurethane foam roof systems. The complete report is available from Underwriters Laboratories, Inc. or SPFA.

Polyurethane foam roofing systems are custom-installed under a wide range of conditions using varying techniques. Thus, the results of these inspections do not assure that every polyurethane foam roof will perform in the same manner under these conditions. However, the results of the inspections of polyurethane foam roofs following these disasters, the professional opinions of their performance, and the UL study show that polyurethane foam roofing systems have the capacity to stand up to high-wind conditions when properly installed. A qualified polyurethane foam roofing system contractor or supplier should be consulted for further information on polyurethane foam roofing system wind performance under specific conditions.

Each geographical area has its own version of hurricanes, tornadoes and typhoons. These catastrophes cause millions of dollars of damage and, even more costly, the loss of life.

How can you help protect your building the next time Mother Nature goes on one of her inevitable rampages? Make sure it is covered with a spray polyurethane foam roofing system.

Save life, limb & property when disaster strikes

This is the scene after Hurricane Hugo whipped through a school campus in Charleston, S.C. The gymnasium in the background had a cement-wood fiber deck. Hugo pulled it up and blew away most of the roof. Debris, rain and high winds ravaged the inside of the building.

The deck you see in the photo below is a spray polyurethane foam roof on the main school building. It sustained only minor damage from flying debris and was easily repaired. There was no water leakage or collapse.

The photo below shows a close-up of Hugo's destruction to the cement-wood fiber deck of the school gymnasium. This roof was damaged beyond repair.



Prevent costly water damage

Hurricane Hugo crumpled the metal attachment on top of the American Airlines terminal in Puerto Rico. A communications dish was ripped from its mountings (right), but the spray polyurethane foam roof remained fully intact.

Another terminal 150 yards away had a EPDM roof which gave way to Hugo's heavy hand. The building's interior was exposed to the elements and saturated with water, requiring thousands of dollars in repairs.

Spray polyurethane foam roofing protected the American Airlines terminal from major damage and enabled it to stay in business.



“In the future, owners and insurers will demand roofs which are suitable for the wind conditions that can reasonably be expected to occur at the location of their building.”

—Dr. Peter Sparks,
Department of Civil
Engineering Clemson
University

“Based upon observations made during Hurricane Andrew, Hurricane Hugo and the 1990 Plainfield (Ill.) tornado, it appears that SPF roof systems have the potential to be excellent performers during high wind events.”

—Thomas Lee Smith, AIA,
CRC National Roofing
Contractors Assoc.

SPRAY POLYURETHANE FOAM

A sealed envelope of protection from destructive winds

This church survived the tornado that cut a path of destruction through Plainfield, Illinois. The building was completely covered in spray polyurethane foam. There was repairable missile damage to the exterior surface, yet the sealed spray polyurethane foam helped to strengthen the building and resist uplift from the high-force winds. Because polyurethane foam is spray-applied, it can conform to any shape and provide a sealed envelope of protection.



Photos courtesy of The National Roofing Contractors Association



“The spray polyurethane foam roof examined by the study team was on a three story building in downtown Charleston (in the aftermath of Hurricane Hugo)... In one area several linear feet of brick parapet gave way, which resulted in a loss of some metal panels and foam. However, the remainder of the roof was undamaged except for some missile damage from adjacent buildings. The SPF performed quite well.”

—Texas Tech Institute For Research Disaster

Compare roofing systems

Compare these attributes of typical BUR and SPF roofing systems and see how a spray polyurethane foam roofing system can help protect your building when hurricanes, tornadoes or other high-wind disasters strike. Consult a spray polyurethane foam roofing contractor or supplier for more information.

Build-up Membrane

- Overhangs, overlaps seams and joints
- Attached flashings
- Must be secured to the deck with fasteners
- Subject to heavy damage and penetration from flying debris
- Can lift off or peel under high wind conditions
- Peeling exposes the building's interior to water damage

Spray Polyurethane Foam Roofing System

- Smooth, continuous surface with no edges, seams or joints
- Self-flashing
- 100% adhesion – no fasteners are needed
- Sturdy and resilient – resists missile damage and penetration
- Grips the building walls and holds tight against high winds
- Protects the building's interior from leaks or water damage

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