

# Benefits of Closed-Cell Spray Polyurethane Foam

Each year, thousands of buildings are damaged or destroyed due to flooding, hail and high winds. When faced with severe weather, there is a strong case for improved building performance. Severe weather can wreak havoc and can cause billions of dollars in damage. Even worse, it can lead to injuries and loss of life. Increasingly, building systems are being specified that better protect buildings and their occupants during severe weather.

It has been found that roofs, followed by windows and doors, are the most susceptible to hurricane damage.<sup>1</sup> If the roof fails, often as a result of inadequate fastening devices and sheet thicknesses, the building becomes exposed to the elements resulting in significant damage to interior and furnishings. The loss of windows and doors can also contribute to roof failure due to internal and external pressure differentials. Damage from hail, windborne debris or projectiles further contribute to building damage.

## Advantages of closed-cell spray polyurethane foam (ccSPF)

CcSPF insulation has a proven performance record during severe weather. Why is it effective? It is spray-applied on site during new construction or renovations to air seal/insulate wall cavities, crawl spaces, attics and basements. It can also be used to insulate exterior walls and as a roofing system in commercial buildings. As SPF is sprayed as a liquid, it immediately expands to many times its original volume.

As it expands into foam, it adheres and contours to the spray surface, filling in cracks and crevices that can cause air and water infiltration. As a result of its unique properties, there are four primary advantages that ccSPF provides for homes or commercial buildings in coastal areas and other regions prone to severe weather.

### These include:

- **Excellent wind uplift resistance:** CcSPF can provide significant resistance to hurricane-force winds.<sup>2</sup> The primary reason is that a ccSPF roofing system provides a smooth, continuous surface that grips the building deck and walls. It is seamless so there are no joints or edges for the wind to “uplift.” In addition, SPF is self-flashing and offers adhesion without fasteners, which has been a common point of failure in other roofing systems. In residential applications, ccSPF applied to the underside of the roof deck can increase the uplift resistance of the roof by up to three times that of standard fastening methods.
- **High structural (racking) strength:** Racking strength is the ability of a square or rectangular (wall) area to maintain its shape under duress. CcSPF insulation inside stud walls fully adheres to both the exterior sheathing and the studs, reinforcing both. With this added rigidity, there is less wall movement due to wind, vibration, and occupant activity. Research<sup>3</sup> demonstrates that ccSPF-filled walls can add from 75% to 200% racking strength to walls of OSB, plywood, light gauge metal, vinyl siding or gypsum board.
- **Outstanding water resistance:** The U.S. Federal Emergency Management Agency (FEMA) considers ccSPF to be a flood-damage resistant construction and insulation material.<sup>4</sup> It is the only cavity insulation approved by FEMA as resistant to floodwater damage. It has negligible water permeability and minimal water absorption enabling its use in exterior applications.
- **Strong hail resistance:** CcSPF roofing has been found to perform above average compared to other roofing systems in withstanding hail-related damage. A report<sup>5</sup> by the National Roofing Foundation (NRF) surveyed 140 SPF roofs ranging from new to 27 years old. It concluded that SPF roofs help prevent roof leakage associated with hail storms.

### Non-Ozone Depleting ccSPF Technology

CcSPF expands through the use of a high performance blowing agent, which helps create tiny cells in the foam. An example is Honeywell’s Enovate® blowing agent (HFC 245fa) which is approved by the U.S. Environmental Protection Agency (EPA) under the Significant New Alternatives Policy<sup>6</sup> (SNAP) to replace ozone depleting substances. Honeywell has also introduced its new Solstice™ brand of low-global-warming blowing agents, refrigerants and aerosols. Solstice Liquid Blowing Agent is also EPA SNAP approved and can increase the thermal value of highly energy-efficient spray-applied insulation foams by an additional 5%. Discuss the latest foam blowing agent technology with Honeywell or your SPF supplier. Visit [www.honeywell-solsticeba.com](http://www.honeywell-solsticeba.com).

**For additional information about these benefits, visit Honeywell’s technical paper:**

**Closed-Cell Spray Polyurethane Foam: The Right Choice When Designing Buildings for Severe Weather.**

## Additional benefits of ccSPF insulation

In addition to the benefits of ccSPF for buildings facing severe weather, it can also help:

- Lower energy bills\* by improving energy efficiency (ccSPF air seals and insulates)
- Resist heat transfer better than other insulation materials (R-values\*)
- Prevent air leakage which reduces the load on heating and cooling systems (HVAC sizing can be reduced providing costs savings without the loss of efficiency and comfort)<sup>7</sup>
- Minimize mold and mildew growth (minimizes air infiltration that can generate condensation)
- Reduce drafts and increase occupant comfort
- Absorb sound and reduce noise
- Impede entry of insects and pests
- Resist settling due to its rigidity and stability (some other insulations tend to “settle” or slip down the stud cavity over time)
- Qualify for rebates, tax credits and green certification



Talk to a professional SPF contractor and specify ccSPF insulation for your next building project.

Have confidence knowing you've selected insulation that can not only meet the demands of severe weather, but can deliver the day to day performance you expect.

### Sources:

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4. FEMA Technical Bulletin 2-08 (replaces 2-93): Flood Damage-Resistant Materials Requirements (August, 2008). [www.FEMA.gov](http://www.FEMA.gov).
5. Rene Dupuis, Structural Research, Inc. for the National Roofing Foundation (NRF): Field and Laboratory Assessments of SPF Roof Systems. Presented at the Fourth International Symposium on Roofing Technology (September, 1999). [www.nrca.net/rp/technical/techconf/fourth.aspx](http://www.nrca.net/rp/technical/techconf/fourth.aspx).
6. Significant New Alternatives Policy (SNAP) program: EPA website. [www.epa.gov/ozone/snap/foams/lists/comm.html](http://www.epa.gov/ozone/snap/foams/lists/comm.html).
7. Canadian Urethane Foam Contractors Association. [www.cufca.com](http://www.cufca.com).

\*Savings can vary. Check your SPF seller's fact sheet for specific R-values when comparing SPF to other insulations. R-value is a term used to rate an insulation's ability to resist conductive heat transfer. The higher the R-value, the greater the insulating power.

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### Honeywell Performance Materials and Technologies

101 Columbia Road  
Morristown, NJ 07962-1053  
Phone: 1-800-631-8138  
[www.honeywell-refrigerants.com](http://www.honeywell-refrigerants.com)

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