Honeywell

A Look at Closed-Cell Spray Polyurethane Foam

Closed-cell spray polyurethane foam (ccSPF) insulation is spray-applied on site during new construction or building renovations to air seal and insulate wall cavities, crawl spaces, attics and basements. It is also used to insulate exterior walls and as a roofing system. Trained SPF contractors mix the foam ingredients at the job site. It is sprayed as a liquid that immediately expands to approximately 30 times its original volume upon installation. 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.

Not only does ccSPF provide outstanding insulating and air sealing performance, it can help prevent water damage and enhance a building's structural rigidity. The U.S. Federal Emergency Management Agency (FEMA) considers ccSPF to be a flood-damage resistant construction and insulation material.[1] In fact, ccSPF is the only cavity insulation approved by FEMA as resistant to floodwater damage.

Benefits of ccSPF Insulation

Here are just some of the many benefits of ccSPF insulation:

- Can lower energy bills* by improving energy efficiency (air seals and insulates)
- Resists heat transfer better than many other insulation materials (commonly accepted R-value is >6.0 at 1 inch of thickness*)
- Prevents air leakage which reduces the load on heating and cooling systems (HVAC sizing can be reduced providing cost savings without the loss of efficiency and comfort)[2]
- Increases structural (racking) strength[3] (adheres to exterior sheathing and studs, adding rigidity)
- Inhibits mold and mildew growth (minimizes air infiltration that can generate condensation)
- Resists shrinking or settling due to its rigidity and stability (some other insulations tend to "settle" or slip down the stud cavity over time)
- Increases occupant comfort by reducing drafts
- Absorbs sound and reduces noise transmission
- Impedes the entry of insects and pests
- Can qualify for rebates, tax credits and green certification

Closed-Cell SPF Compared to Open-Cell SPF

SPF insulation is available as "closed-cell" or "open-cell" foam. There are several major differences between the two types. Generally, ccSPF, sometimes referred to as medium-density spray foam, has application in all climate zones and is the preferred choice for many air sealing and insulation challenges, including severe weather and air barrier systems.

Open-cell SPF (ocSPF) is significantly less dense and is not as rigid as ccSPF. Whereas ccSPF resists water and is considered a vapor retarder, ocSPF is susceptible to moisture adsorption and is vapor permeable. Therefore, ocSPF may require an additional vapor retarder and is not advised for below-grade or flood-prone sites because the product will absorb water.

Advancements in SPF Blowing Agent Technology

CcSPF expands through the use of a blowing agent, which helps create tiny cells in the foam. High performance blowing agents help provide excellent insulating properties, similar to the way insulating gas is used in double-pane glass for windows. Consider specifying a ccSPF product that uses a blowing agent, such as Honeywell's Enovate® blowing agent (HFC 245fa) or Solstice™ Liquid Blowing Agent, which has improved performance and environmental properties. These Honeywell blowing agents are approved by the U.S. Environmental Protection Agency (EPA) under the Significant New Alternatives Policy[4] (SNAP) to replace ozone depleting substances. They are the preferred choice for many ccSPF products worldwide. Honeywell continues to advance SPF blowing agent technology providing leadership to meet evolving industry requirements.

Discuss the latest blowing agent technology with Honeywell or your spray polyurethane foam supplier. Visit

www.honeywell-solsticelba.com

Overview of ccSPF Benefits

This chart provides a summary of the some of the ccSPF benefits discussed in this fact sheet.

ccSPF CAPABILITY	HOME DESIGN BENEFITS	HOME BUILDER BENEFITS	CODE BENEFITS	CLIMATE BENEFITS
Impermeable to air	Controls airflow	Combined insulation and air barrier	Meets air sealing requirements	Improves overall comfort
Expands and adheres	Creates an air seal; reduces leakage	Fills voids; ensures contact with studs and walls for better insulation	Provides superior thermal and air barrier performance	Provides superior thermal performance
High R-value*	Design flexibility with compact roof and wall assemblies	Improves insulation value for small stud sizes	Highest R-value per inch*	Reduces HVAC energy required
Resists water vapor	Reduces condensation problems	Additional vapor retarder not needed	Helps prevent condensation damage	Protects moisture sensitive materials from condensation
Impermeable to water	Flood resistant	Acts as waterproofing and secondary rainwater barrier	Limits damage associated with incidental leaks or floods	Controls and protects against leakage

As you've seen, ccSPF offers a number of benefits not found in other types of insulation. Some of the qualities unique to ccSPF include: air barrier certification†, moisture resistance and increased structural strength. For additional information to help you compare and choose the right insulating material, visit Honeywell's Fact Sheet: Closed-Cell Spray Foam Insulation: Choosing the right insulation. You will find a table that compares ccSPF and ocSPF to some other insulation options.

Specify ccSPF Insulation for Your Next Project

Consider specifying closed-cell spray polyurethane foam insulation as an insulation and air barrier system for your next construction project or to improve the energy efficiency and performance of an existing building. Talk to a professional SPF contractor to learn more about the many advantages ccSPF can offer.

Also, discuss the latest in ccSPF blowing agent technology with a Honeywell representative or visit www.honeywell.com for more information.

*Savings can vary. 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. Ask your seller for a fact sheet for specific R-values.

† When a minimum of 1" is applied, closed-cell SPF qualifies as an air barrier according to ASTM E-2178 which is the test used by the Air Barrier Association of America (ABAA) to define an air barrier. To Honeywell's knowledge, no open-cell SPF product has passed this test. www.airbarrier.org.

Sources:

1. FEMA Technical Bulletin 2-08 (replaces 2-93): Flood Damage-Resistant Materials Requirements (August, 2008). www.FEMA.gov.
2. Canadian Urethane Foam Contractors Association. www.cufca.com.
3. National Association of Home Builders (NAHB), "Testing and Adoption of Spray Polyurethane Insulation for Wood Framing Construction," 5-25-92.
4. Significant New Alternatives Policy (SNAP) program: EPA website. www.epa.gov/ozone/snap/foams/lists/comm.html.

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