Honeywell

CONSTRUCTION

Commercial Buildings: Benefits of Closed-Cell Spray Polyurethane Foam

With buildings accounting for 65% of U.S. electricity consumption[1] and 30% of their energy usage considered unnecessary or inefficient[2], the case for improved energy performance is garnering significant attention. Architects, builders and owners want proven insulation and air barrier materials that optimize heating and cooling efficiency, control moisture, provide occupant comfort and meet or exceed code requirements. Many are specifying closed-cell spray polyurethane foam (ccSPF) insulation for commercial construction and retrofits. With its cost-effective performance, ccSPF offers an integrated air barrier solution providing superior thermal performance, outstanding moisture control, unparalleled airtightness and even structural benefits.

What is ccSPF and how is it used?

CcSPF insulation is spray-applied by SPF professionals on site to provide a seamless, effective thermal, air and moisture barrier. 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. It can be used throughout the interior and exterior of a structure. Typical applications include roofing systems, framed cavity walls, concrete masonry units (CMUs), precast concrete walls, curtain walls, insulated panel system (IPS) walls and foundations. It can be applied to nearly any construction surface (i.e. masonry, metal, wood, plastic and more). Not only can it help improve your building's envelope performance, it provides unique advantages for severe weather conditions.

Benefits of ccSPF for Commercial Buildings

Energy performance in buildings is a complex topic that involves interplay of environmental factors, mechanical systems and the building envelope (or enclosure). By far, the most significant contributor to energy loss is an underperforming building envelope. CcSPF excels at improving envelope performance. Basically, the building envelope can be segregated into three primary areas: roofing, walls and foundations. Across these areas, there are a number of issues that impact energy performance, including: thermal drift (aging), thermal bridging, air movement and moisture. Let's take a look at how ccSPF addresses these challenges:

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. 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[3] (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.**

Roofing

One of the largest opportunities for energy savings and reduction of carbon emissions can be achieved by improving commercial building roofing assemblies. There are two major areas where ccSPF can save energy in commercial roofing systems. First, it can be used over the top of a roofing deck. Second, it can be applied to the underside of commercial roofing systems.

With this in mind, a ccSPF roofing system can provide many benefits including:

- Flexibility as a roofing material because it can be sprayed directly on a new roof substrate, used for tear-off replacement, or applied over an existing roof as an insulating re-cover.
- An estimated service life of more than 30 years, with proper roof maintenance and simple recoating.[4]
- An "all-in-one" thermal, air and moisture barrier which can simplify the roofing design and construction process. CcSPF has a commonly accepted R-value* of >6.0 at one inch of thickness.
- Suitability with other roofing systems. For instance, gravel-surfaced systems and single-ply membrane technology (i.e. fully adhered fleece-backed membranes, loose-laid ballasted) can be used with ccSPF roofing systems.
- Potential labor and insurance savings.† Since ccSPF is essentially self-flashing and installed in a single operation, it does not require large crews working with fasteners, glues or torches which may be required for more complex flashing and roofing systems.
- Compatibility with high-reflectivity coatings and vegetative green-roof systems. For example, ccSPF roofing systems can provide energy savings† through "cool roof" performance when topped with a protective, reflective coating. Cool roofs are designed to maintain a lower temperature than traditional roofs. They are light in color and reflect sunlight. CcSPF is listed in the U.S. Department of Energy (DOE) "Guidelines for Selecting Cool Roofs.[5]"
- Excellent compressive strength. It is strong enough to walk on minutes after a roofing application.[6]
- Advantages of being lightweight. Since ccSPF is lightweight and can be applied in various thicknesses to add slope and fill in low areas, it is often used to recover existing roofs without tear-off. An added benefit is a significant reduction in the amount of roofing debris to landfills.[7]

When ccSPF is applied to the underside of roofing assemblies, it provides a seamless air and thermal barrier marrying the roof and wall together. This provides significant energy efficiency benefits because of its high R-value, outstanding air sealing properties and ease of application.

"Over 90% of the 10 million square feet of roofs at the Texas A&M campus are protected with SPF. Typical payback is 4.5 years."

Results of the study performed by Gerald Scott, former Director of Energy, Texas A&M University.

Walls

In walls, ccSPF can be used throughout the interior and exterior of nearly any surface. CcSPF wall insulation systems provide significant thermal performance, a continuous air and moisture barrier and improved building strength. CcSPF addresses key wall insulation challenges by providing:

- A superior, complete wall assembly which maintains an effective R-value.
- A monolithic, integral vapor and air barrier that does not require additional materials to reduce air and moisture infiltration and exfiltration.
- An ability to mitigate the "wind" and "stack effect" (air pressure) by reducing or eliminating unwanted air movement in the building envelope.
- Improved structural integrity (racking strength) for the building's walls. SPF wall panels tested according to ASTM standards were found to have greater resistance to racking than conventional panels with plywood siding. Research demonstrated that ccSPF-filled walls could add from 75% to 200% racking strength to walls of OSB, plywood, light gauge metal, vinyl siding or gypsum board.[9]
- Reduced "wind washing" by controlling air infiltration. Wind-washing occurs as unconditioned air moves within air-permeable cavity insulations, such as fiberglass, cellulose and board-stock.
- Resistance to "settling" due to its rigidity. Some other insulation tends to "settle" or slip down the stud cavity over time.
- A solution to "thermal bridging" which occurs when building components transfer heat at a significantly higher rate than surrounding insulated areas — often reducing R-value performance. "In steel stud walls, thermal bridges generated by steel components reduce their thermal performance by up to 55%.[8]" Because ccSPF systems do not require metal fasteners and can continuously cover existing thermal bridges, this can reduce or eliminate thermal bridging effects.

Slabs and Foundations

Selecting effective insulation for below-grade use is critical since it performs many functions. Not only does it insulate between the soil and building assembly, it also protects the structure from environmental challenges such as compression and expansion due to frost, moisture and water from wet soils. Some of the benefits of ccSPF for slabs and foundations include:

- Exceptional slab insulation performance using a "sandwich" strategy. After a "rough" concrete slab is poured, it is sprayed with ccSPF and then covered with an additional concrete floor slab.
- Below-grade walls can be insulated on the interior and/or exterior with ccSPF. Not only does this provide outstanding thermal performance, ccSPF is inherently moisture resistant and acts as a vapor retarder.[10] This can help minimize mold/mildew growth, reduce maintenance issues and potentially prolong building life.
- CcSPF is the only cavity insulation approved by U.S. Federal Emergency Management Agency (FEMA) as resistant to floodwater damage.[11]
- According to Building Science Corporation on the topic of below-grade construction, SPF insulation provides "the least risky interior insulation approach"[12] from the perspective of installation simplicity, water insensitivity and ease of drying.

Specify ccSPF Insulation For Your Next Commercial Project

There are many considerations when choosing an insulation/air barrier system. You want a reliable, cost-effective system that improves energy efficiency, while complying with all codes and requirements. CcSPF's many unique benefits such as self-adhesion, moisture resistance, strength, durability and outstanding air sealing/insulating capabilities make it a preferred choice.

Along with its outstanding performance characteristics, ccSPF continues to grow in popularity due to its ability to simplify the air barrier system design process, compatibility with other materials/systems and ease of application.

Consider requesting a ccSPF product that uses Honeywell blowing agent technology. Talk to a professional spray foam contractor or Honeywell representative about how ccSPF can benefit your next commercial building project.

Sources:

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*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.

† Since many variables impact ccSPF material and installation costs, it is preferable to discuss the project budget, return on investment (ROI), potential energy savings and possible rebates, tax credits or green certification (e.g. LEED credits) with the SPF manufacturer or contractor.

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Our commitment to sustainability

Honeywell Performance Materials and Technologies
101 Columbia Road
Morristown, NJ 07962-1053
Phone: 1-800-631-8138
www.honeywell-refrigerants.com

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