

# The Case for Air Barriers in Building Construction

The expectation for improved energy efficiency and building performance continues to grow. To help meet this expectation, well-designed air barrier systems are becoming increasingly vital to the overall building envelope. There are a variety of air barrier solutions to consider when specifying a system that will meet energy codes and deliver or exceed desired performance. One such solution is closed-cell spray polyurethane foam (ccSPF). An excellent choice for air barrier assemblies, ccSPF is helping architects, engineers, contractors and owners/developers meet air barrier performance requirements more easily.

## What are Air Barriers?

Air barriers control the unintended movement of air into and out of a building enclosure. Air barrier systems are made up of a number of materials that provide a complete barrier to air leakage throughout the building enclosure. A building enclosure includes all “six sides” of a building — exterior walls, roof and foundation floor — and may also include separations within the structure. An air barrier system essentially “wraps” the building shell. It protects the building from detrimental air leakage effects which can negatively impact occupant comfort, indoor air quality, energy usage, and the structure’s life span.

## Why are Air Barriers Important?

Why do air barrier systems matter? Here are just some of the reasons:

- The International Energy Conservation Code (IECC) and a growing number of state energy codes (e.g. Massachusetts, Wisconsin and Michigan, to name a few) require the use of air barriers.
- A growing number of municipal authorities having jurisdiction (AHJs) and green-building trade groups are calling for their use. Some federal agencies and large building owner and developer groups require them.
- Energy efficiency and occupant comfort — two key ingredients of sustainable design — are driving the use of air barriers across the construction industry.
- With today’s high energy costs and concerns about Indoor Environmental Quality (IEQ), air barriers are one of several construction systems with an increasingly critical role.

An opportunity exists to increase understanding about air barriers, including how to properly specify, design and construct them. Although many designers, builders and proponents of more energy efficient buildings recognize the benefits of air barriers, there is a need for broader awareness of air barrier/insulation effectiveness, the value of blocking air movement through the building and how best to accomplish it.

## Advancements in SPF Technology

Spray foam 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<sup>2</sup> (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. To learn more, visit

[www.honeywell-solsticelba.com](http://www.honeywell-solsticelba.com)

# Benefits of Air Barrier Systems

There are many benefits that a well-designed air barrier system, such as one that specifies ccSPF, can deliver. Air barrier systems can help:

- Buildings operate more efficiently. For example, air barrier systems are estimated to reduce air leakage in nonresidential buildings by up to 83 percent, save on gas bills by more than 40 percent and cut down on electrical consumption in excess of 25 percent.<sup>1</sup>
- Reduce heating, ventilating, air-conditioning (HVAC) mechanical equipment size — a savings\* which could help offset the cost of additional enhancements to the building envelope. (Note: the escape of conditioned air, both in the summer and winter, causes building mechanical systems to work harder to condition occupied spaces).
- Improve indoor air quality (IAQ) by helping keep external pollutants out of building interiors.
- Enhance occupant comfort by reducing air drafts and unplanned temperature fluctuations.
- Minimize water vapor (which can condense and turn into liquid water) from being transported by air movement between the exterior and interior of the building envelope. Subsequently, this helps prevent corrosion and mold growth.
- Meet increasingly stringent building/energy conservation codes and standards.
- Qualify for energy rebates, tax credits and other sustainability/green building designations and recognition, such as Leadership in Energy and Environmental Design (LEED) certification or Energy Star® certification.\*

The effectiveness of air barrier systems vary depending on many factors, including the type of assembly, the material choices, the installation quality and how well the system is integrated into the overall building enclosure system.

## Why Specify ccSPF Air Barrier Systems?

There are many considerations when designing an effective air barrier system that complies with all codes and requirements. CcSPF's 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 design process, compatibility with other materials/systems and ease of application. Consequently, it is suggested that design professionals familiarize themselves with ccSPF for air barrier applications. Construction professionals and building owners should consult and work with experienced air barrier contractors who are trained and certified in ccSPF application. Talk to a professional SPF contractor and consider specifying ccSPF insulation as your next air barrier system.

### Sources:

1. National Institute of Standards and Technology (NIST): Investigation of the Impact of Commercial Building Envelope Air Tightness on HVAC Energy Use; sponsored by Department of Energy; (2005). NIST website - NIST Engineering Laboratory.
2. 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).

\*Savings can vary. Check your SPF seller's fact sheet for specific R-values when comparing SPF to other insulations.  
© Energy Star is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy.



## What Makes ccSPF So Effective?

According to many design experts and builders, ccSPF is one of the leading materials that helps meet (and in many cases, exceed) air barrier code and performance requirements. Why is it so effective? CcSPF insulation is spray-applied on site during new construction or renovations to provide an effective thermal and air barrier. It is used to air seal/insulate wall cavities, crawl spaces, attics and basements. It is also used to insulate exterior walls and as a roofing system. It is sprayed as a liquid that immediately expands to many (approx. 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. R-values\* are typically >6.0 per one inch of thickness.

The information provided herein are believed to be accurate and reliable, but are presented without guarantee or warranty of any kind, express or implied. User assumes all risk and liability for use of the information and results obtained. Statements or suggestions concerning possible use of materials and processes are made without representation or warranty that any such use is free of patent infringement, and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated herein, or that other measures may not be required.



## 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)

12-11-EBA  
February 2013 Printed in U.S.A.  
© 2013 Honeywell International Inc.  
All rights reserved.



# Honeywell