

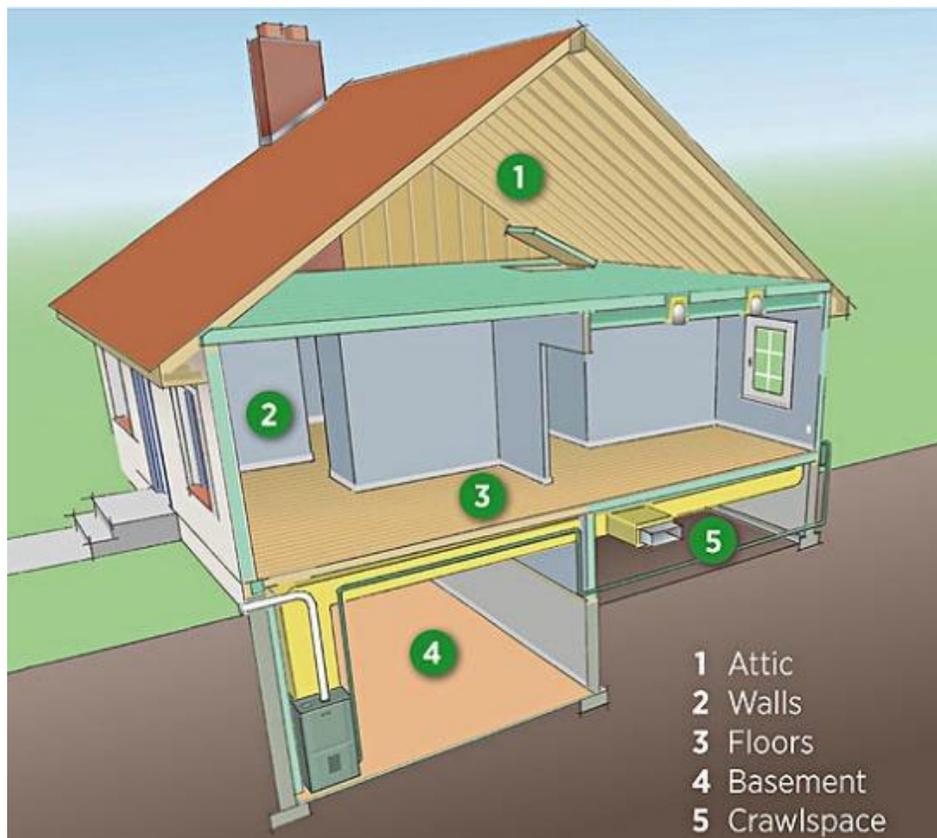
Residential Buildings: Benefits of Closed-Cell Spray Polyurethane Foam

As homeowners continue to face rising energy costs and other economic challenges, there is a strong case for improved energy performance in residential construction. Whether you're building a new home or renovating one, you want high quality insulation that also air seals and resists moisture. Consequently, many homeowners, architects and builders are specifying closed-cell spray polyurethane foam (ccSPF) insulation due to its consistent and unparalleled airtightness, thermal performance, moisture control and structural benefits.

Evaluating Insulation for Residential Construction

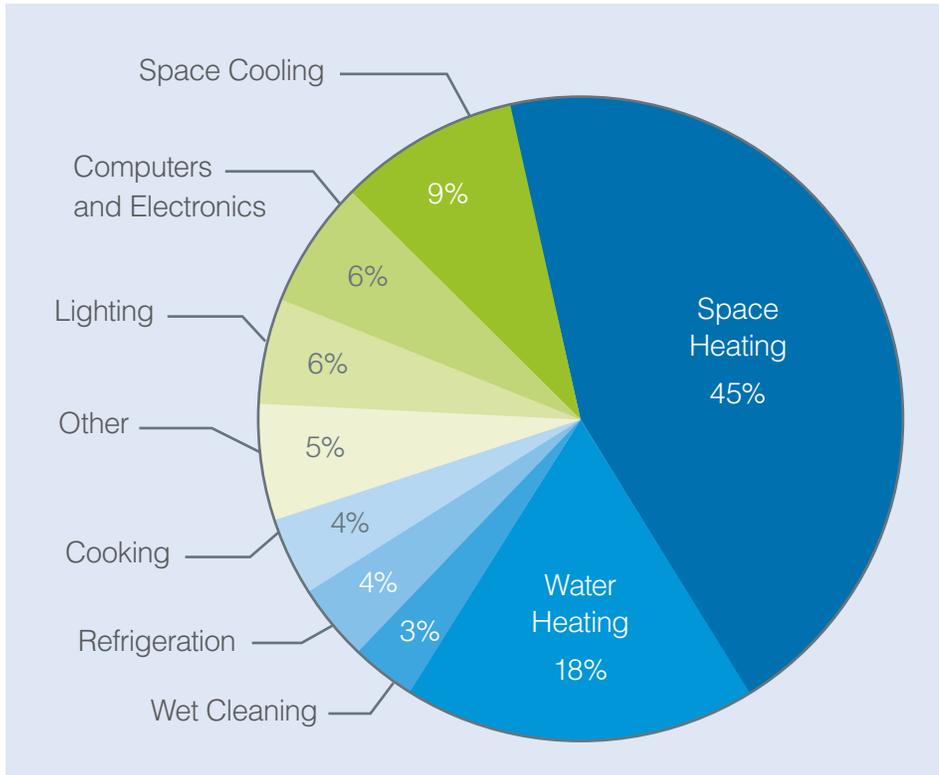
Why is insulating and air sealing so important? A typical 2,500-square-foot home has more than a half mile of cracks and crevices.¹ According to the Department of Energy (DOE), air infiltration accounts for 30% or more of a home's heating and cooling costs and can contribute to problems with moisture, noise, dust, and the entry of pollutants, insects,

and rodents.² Heating and cooling (space conditioning) account for 50-70% of the energy used in an average American home.³ Therefore, it's not surprising that homeowners want insulation that can address these challenges, while meeting or exceeding building code requirements.



Energy.gov: Adding insulation in the areas shown here may be the best way to improve your home's energy efficiency.⁴

How We Use Energy in Our Homes



Energy.gov: Source: 2010 Buildings Energy Data Book, Table 2.1.1 Residential Primary Energy Consumption, by year and fuel type.⁵

To assist you when evaluating an insulation product, here are some important considerations:

- Thermal insulation performance (R-value)
- Impact moisture has on the insulation and the structure
- How well the insulation stops air flow, or its air barrier qualities
- How stable its R-value is over a range of temperature conditions
- How well the R-value is maintained in windy conditions

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[®] (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-solstice.com.



Why ccSPF is a Better Insulation Technology

Closed-cell spray polyurethane foam, also known as medium-density spray foam, can be used to insulate and air seal wall-cavities, floors, ceilings, basements and attics in all climate zones. It is also used to insulate exterior walls and as a roofing system. Professional SPF contractors spray it 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.

With a proven performance record, ccSPF offers an “all-in-one” solution providing superior thermal insulation, while helping prevent moisture and air infiltration. Let’s take a closer look at some of the advantages of ccSPF in addressing key evaluation considerations for residential insulation.

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



- **Superior Thermal Insulation**

Performance: Resists heat transfer better than many other insulation materials (R-values are typically >6.0 per one inch of thickness). Many alternative insulation systems, such as fiberglass batts, require separate air barriers and additional sealing to perform at labeled R-values.

- **Outstanding Water/Moisture**

Resistance: Impermeable to moisture and serves as a vapor retarder without additional materials.⁷ CcSPF is the only cavity insulation approved by U.S. Federal Emergency Management Agency (FEMA) as resistant to floodwater damage.⁸ This is one of the reasons ccSPF is also a preferred choice for homes facing severe weather conditions. By preventing or reducing air infiltration that can generate condensation, it can also help minimize mold and mildew growth.

- **Excellent Air Barrier Properties:**

Prevents air leakage which improves energy efficiency and reduces the load on heating and cooling systems. HVAC sizing can be reduced providing cost savings without the loss of efficiency and comfort.⁹ Because of its unique ability to adhere to other materials, ccSPF provides a monolithic airtight structure that reduces unwanted air movement throughout the home.

- **Reliable R-values:**

Offers excellent rigidity and self-adhering properties. CcSPF won’t shrink or settle over time when properly installed — even under wide temperature ranges. This reduces the potential for R-value degradation after installation — a significant problem with other insulations that tend to slip down the stud cavity reducing their effectiveness.

- **Strong “Wind Washing” Resistance:**

Prevents air from passing through it. The ability of insulation to trap air is key to its performance. If air can easily pass through, it extracts heat and reduces insulation effectiveness — a process called “wind washing.” According to DuPont™, “tests have shown that, when outside air moves into the wall through any tiny crack or crevice resulting from normal construction practices, the fibrous insulation can lose up to 63% of its installed R-value.¹⁰” Wind washing can dramatically reduce the performance of fibrous insulation. The effectiveness of ccSPF as an air barrier helps prevent wind washing, allowing it to maintain its R-value even in high wind conditions. Eliminating air flow through the insulation also reduces drafts, providing greater occupant comfort.



In addition, ccSPF insulation:

- Improves structural strength (ccSPF is rigid and adheres to exterior sheathing and studs).
- Absorbs sound and reduces noise transmission
- Impedes the entry of insects and pests
- Can qualify* for rebates, tax credits and green certification

Along with its exceptional 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 designers, builders and homeowners familiarize themselves with ccSPF insulation. Visit Honeywell's "Choosing the right insulation" information sheet to compare ccSPF to other insulation options. Consult and work with experienced SPF contractors who are trained and certified in ccSPF installation.

Consider specifying ccSPF insulation that utilizes Honeywell blowing agent technology for your next residential building project. Also, discuss the latest ccSPF blowing agent technology with a Honeywell representative or visit www.honeywell.com for more information.

Sources:

1. ABAA: <http://www.prnewswire.com/news-releases/honeywell-greenfiber-to-partner-on-enovateimpro-contractor-program-92962419.html>.
2. Department of Energy (DOE): <http://www.ornl.gov/sci/roofs+walls/insulation/fact%20sheets/Air%20sealing%20technology%20fact.pdf> (2000).
3. DOE: Where Does My Money Go? Sourced Oct. 16, 2012 http://www.energystar.gov/index.cfm?c=products.pr_pie (2009).
4. Energy.gov: <http://energy.gov/energysaver/articles/tips-insulation>.
5. Energy.gov: <http://energy.gov/energysaver/articles/tips-your-homes-energy-use>.
6. Significant New Alternatives Policy (SNAP) program. EPA website. www.epa.gov/ozone/snap/foams/lists/comm.html.
7. Two inches of ccSPF qualifies as a 1 perm vapor retarder according to ASTM E-96. Perm ratings vary by manufacturer; please consult manufacturer literature.
8. FEMA Technical Bulletin 2-08 (replaces 2-93): Flood Damage-Resistant Materials Requirements (August, 2008). www.FEMA.gov.
9. Canadian Urethane Foam Contractors Association. www.cufca.com.
10. DuPont: http://www2.dupont.com/Tyvek_Weatherization/en_US/tech_info/improves_insulation.html.

*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.
® Energy Star is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy.

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12-11-EBA
February 2013 Printed in U.S.A.
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