

**HUNTSMAN**

BUILDING SOLUTIONS



# OPEN-CELL SPRAY FOAM

FOR A PROBLEM-FREE ROOF

The most important part of a building envelope is the roof. It protects us from rain, snow and harsh weather. The roof is also where the greatest heat loss/gain occurs, which is why the Building Code requires the highest insulation value for this part of the building envelope. A poorly built and insulated roof can result in numerous problems: poor ventilation, heat loss/gain, ice dams, condensation, mold, water infiltration, etc. For both residential and commercial roofing, open-cell spray foam is a simple, effective and lasting solution for insulating roofs and avoiding all of these problems.



With an average R-value of up to R-3.9/inch, open-cell spray foam can be applied to the required thickness to meet the Building Code<sup>1</sup> requirements. Depending on the location of the project and the type of energy efficiency program chosen, an effective R-value may be required. The HBS Building Science and Engineering team is available to make the calculation since the effective R-value is calculated specifically for each building/assembly. Open-cell spray foam is typically sprayed from the interior and offers seamless, continuous insulation. Considering the many features and details of a roof, including skylights, recessed lights, plumbing vents and chimneys, envelope continuity is often very difficult to achieve with traditional materials. Open-cell spray foam expands more than 100 times its initial volume in 5 seconds and creates an airtight seal around all these joints. Consequently, whether your project is new construction, a renovation, a cathedral ceiling, or a flat roof, open-cell spray foam is an ideal choice.

## NEW BUILDINGS-APPLICATION

In most cases, insulation is sprayed from the inside. For a cathedral roof or flat roof, open-cell spray foam is the ideal solution. Cathedral roofs are often problematic due to there being not enough space to insulate, poor ventilation, condensation, etc. Open-cell spray foam adheres completely

to the roof substrate, preventing air leakage through the assembly and reducing the risk of condensation forming. Furthermore, the product will not settle or shift over time, and will maintain its properties during the lifetime of the building.

If the roof structure and geometry allow space for venting, or the asphalt shingle manufacturer requires the roof to be vented, simply mount a rigid support panel (vent baffle) between the roof rafters, leaving an air space of at least 1.0" (25 mm) above the panel, if that's what the Code requires, for ventilation between the ridge and soffit vents. Open-cell spray foam can then be sprayed directly to the underside of the rigid vent baffle. Continuity of the air barrier is key in this application. See HBS typical details for more information.

If there isn't enough space for venting, or if the roof geometry is too complex for adequate venting, like a hip roof, the product can be sprayed directly to the underside of the roof sheathing or decking. This creates an unvented roof assembly, which has been in the residential building code since 2004. Open-cell spray foam acts as an air barrier, fully sealing the roof in addition to providing optimal insulation. Numerous studies demonstrate the excellent performance of unvented roof assemblies<sup>2,3,4</sup>. It is always recommended that an inspection of the roof be performed at least every two years to detect any deficiency in the shingles or roof membrane to prevent water damage.

*For an attic or flat roof, the product can be applied from inside of the attic, directly to the attic floor or ceiling finish. The attic will then be vented and unconditioned.*



*If you want a conditioned attic to use for storage, to install mechanical ventilation systems, or even to turn your attic into a living space, open-cell spray foam can be sprayed directly onto the roof deck, with no venting. The soffits and ridge vent will have to be sealed and the attic can then be conditioned and will be completely sealed from the outside air. The same concept can be applied to a flat roof. Venting between open-cell spray foam and the roof sheathing is optional.*



*By sealing an attic with spray foam insulation, wind uplift damage can be reduced or eliminated altogether during severe weather.*

## RENOVATION

Whether you are renovating the inside or the outside, by replacing the shingles and decking, the interior ceiling, or want to make your home more energy-efficient, it is possible to insulate an existing roof sufficiently, even when space is limited. All of the techniques described previously can apply in a roof renovation as well. Open-cell spray foam's primary advantage in a renovation is its ability to provide an air seal. The structures of old buildings are often very leaky and do not provide adequate thermal envelope performance; but with open-cell insulation, it is now very simple to air seal and insulate an old roof to meet modern standards.

## ADVANTAGES

- Continuous air seal – reduces heat loss/gain and eliminates air infiltration and exfiltration
- Good adhesion over the entire surface - will not settle or move over time
- Quickness of installation – saves time for project's completion
- Suitable for all roof structures – fewer complications, simple application
- Fungi resistant – does not support mold growth
- Durable - will not deteriorate over time
- Third-party evaluated products
- Greenguard Gold Certified for indoor air quality
- Installed by Huntsman Building Solutions authorized applicators
- Acoustic Properties - reducing outdoor/indoor sound transmission.



## REFERENCES

1. International Codes (I-Codes)
2. Building Science Digest 102, Understanding Attic Ventilation;
3. Building Science Digest 149, Unvented Roof Assemblies for All Climates;
4. SPFA, AY 141, Spray Polyurethane Foam in Unvented Cathedral Ceilings and Cathedralized Attics;

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