US Patent #12,345,437 B2

INSULAIR®

Rafter Vent Mat

ADVANCED
Extrusion Technology

A Division of Advanced Building Products, Inc.®

WWW.INSULAIR.NET | WWW.ADVANCEDBUILDINGPRODUCTS.COM

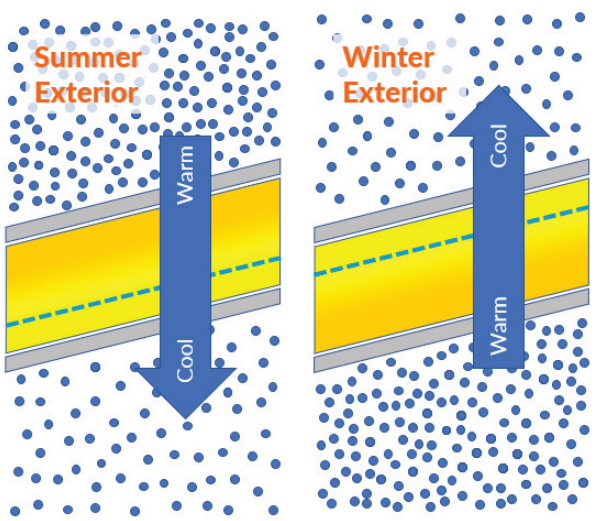
ADVANCED
Building Products Inc.

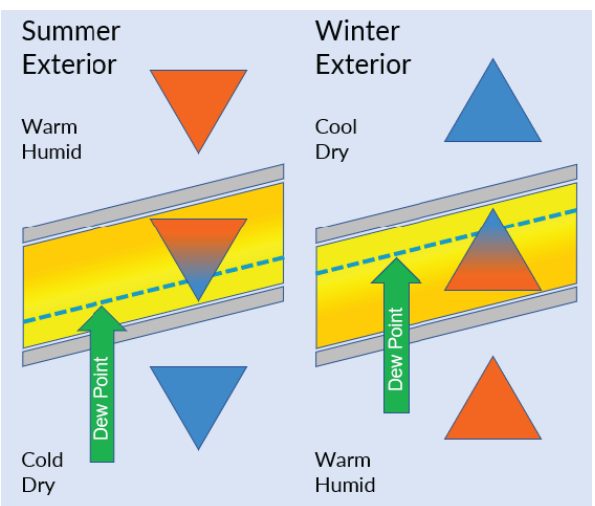
The Quest for Energy Efficiency

Energy efficiency is a key concern among architects, builders, and homeowners. In the quest to become more energy efficient, homeowners are choosing spray foam insulation for their attic spaces. Spray foam is a great option; however, while spray foam insulation offers excellent performance potential, its effectiveness depends heavily on proper assembly design and execution. In some roof applications, optimal performance is achieved by maintaining a gap, or airspace, between the underside of the roof deck and the cold side of the spray foam insulation.

Insulair® by Advanced Building Products is a simple, effective solution to this critical airspace challenge. The product features compression-resistant, entangled net technology with a 95% open-weave structure designed to maintain a consistent one-inch air space. A heat-bonded filter fabric is permanently attached to one side of the net, providing an ideal surface for spray foam adhesion while still allowing continuous airflow through the assembly.

Insulair® is supplied in roll form and installs along the underside of the roof deck from the soffit to the ridge. This continuous installation path promotes convective airflow, helping to manage moisture and reduce the risk of condensation buildup beneath the roof deck. Before exploring the ***Insulair®*** system in greater detail, it is important to understand the building science behind why maintaining this airspace is so essential.





The Science Behind Moisture Migration

90% of all residential building failures are caused by moisture related issues. Whether we are talking about sidewall moisture, or moisture issues in the roofing structure, moisture will find its way into a building structure. When it does, most homeowners insurance policies only cover
$5,000.00 for moisture related damages. This is why it is so important to detail roofs and walls for moisture intrusion.

When we consider moisture migration, the underlying science is straightforward. Warm air contains more water vapor than cool air, while cooler air holds significantly less moisture. Because of this difference, warm, moisture-laden air naturally migrates toward cooler, drier air. In the summer, this movement typically occurs from the exterior toward the interior of a building. In winter, the process reverses, with warm interior air moving outward toward colder exterior conditions. The force driving this movement of moisture is known as vapor drive.

What the experts say...

*"No one argues that it is a dumb idea to shove a bunch of fiberglass batts into a cathedral ceiling, with no provisions for ventilation air to remove moisture that leaks in from the interior. The results are often catastrophic."**

Joe Lstiburek
Founding Principal, Building Science Corporation

*Lstiburek, Joseph (2010). Don't Be Dense – Cellulose and Dense-Pack Insulation. *Building Science Insights, 043.*

Condensation & Dew Point

All air contains some amount of water vapor. Warm, moist air naturally moves through buildings by air leakage and vapor diffusion. As this air cools, it's ability to hold moisture decreases and when it is cooled to its dew point (aka condensation point), it becomes fully saturated (100% relative humidity).

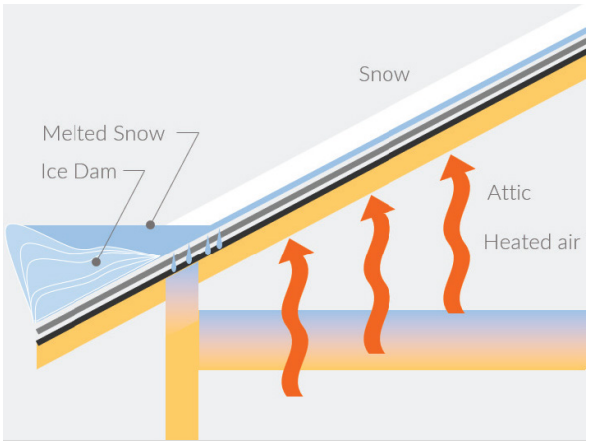
Condensation forms when moist air comes into contact with a surface whose temperature is below the air's dew point. In attic spaces, this commonly occurs on the underside of roof decking or on other cold surfaces, including the cold side of insulation if installed in the rafters (e.g. cathedral ceilings). If left unmanaged, this moisture can lead to mold growth, material deterioration and long-term building performance issues--which is what we would then call a restoration problem.

Moisture Buildup Within the Insulation System

In warm, sunny climates, roof assemblies may occasionally dry because solar heat helps drive moisture outward. However, not all areas of a roof receive consistent sun exposure. Shaded roof sections, north-facing slopes, and complex roof geometries often remain cooler and are unable to dry effectively.

In addition, any breach in the interior air or vapor control layer—such as gaps at the ceiling plane—allows warm, moisture-laden air to migrate into the roof assembly. As this vapor moves through or around insulation and encounters colder surfaces, it can condense on the underside of roof sheathing. Over time, this repeated moisture exposure can saturate the wood, leading to mold growth, material deterioration, and eventual rot.

Once moisture becomes trapped within the roof assembly, long-term damage is likely unless the underlying causes are addressed.



How Do Roof Assemblies Fail?

Roof and attic moisture problems are most commonly caused by one or more of the following conditions:

Lack of Balanced Ventilation

A balanced ventilation system requires equal amounts of Net Free Vent Area (NFVA) at both the soffit (intake) and ridge (exhaust). When intake and exhaust are not properly balanced, airflow is restricted, reducing the roof's ability to remove heat and moisture.

Interrupted Airflow From Soffit to Ridge

A continuous, unobstructed air channel from the soffit to the ridge is critical. This airflow path is frequently compromised by misplaced or compressed insulation, blocking ventilation pathways and allowing heat and moisture to accumulate.

Vapor Control Layers Installed in the Wrong Location

Installing vapor-impermeable materials in unintended locations, such as non-permeable baffles or channel vents, can trap moisture within the assembly. In these cases, the vapor control layer effectively ends up in the wrong place, preventing proper drying.

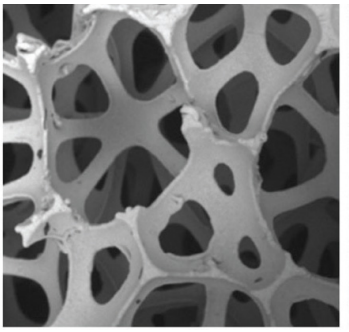
Leaky Interior Air/Vapor Barriers in Cathedral Ceilings

Interior air and vapor barriers are often compromised by recessed lighting, electrical boxes, duct penetrations, tongue-and-groove ceilings, and other finish materials. These openings allow warm, moist indoor air to leak into the roof assembly, where condensation can occur on colder surfaces.

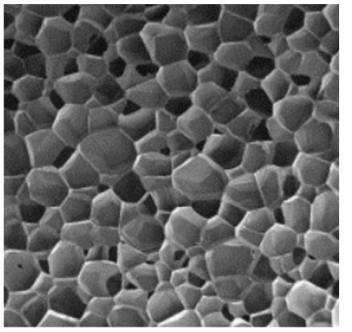
What is *Insulair®*?

INSULAIR®
Rafter Vent Mat

Insulair® is a ventilation mat designed to promote continuous airflow in cathedral, vaulted, and attic roofing applications. When closed-cell spray foam is used, the airspace created by ***Insulair®*** acts as a bond breaker, preventing moisture from condensing between the underside of the roof deck and the top surface of the insulation.



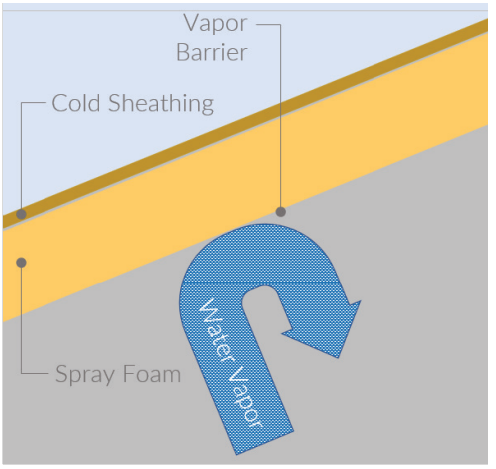
Open-Cell



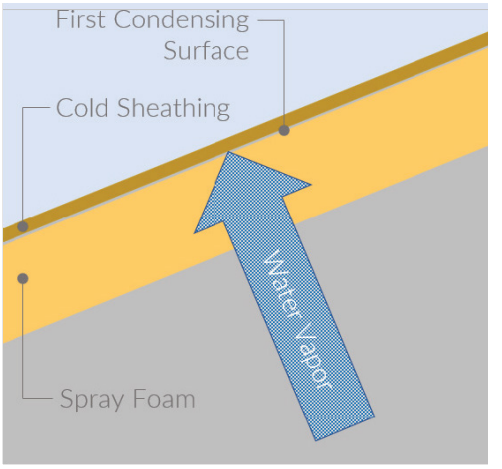
Closed-Cell

Insulair® functions much like a car engine; to operate efficiently, it requires both an intake and an exhaust. In a roof assembly, the soffit vent serves as the intake, the ridge vent serves as the exhaust, and ***Insulair®*** creates the continuous pathway needed to connect them. This design allows for proper convective airflow from the soffit all the way to the ridge.

By maintaining this airflow, ***Insulair®*** significantly reduces the likelihood of moisture becoming trapped between the roof deck and the cool side of batt or spray foam insulation. As a result, the insulation is able to perform at its intended R-value without the long-term risk of moisture-related degradation.



with Vapor Barrier



without Vapor Barrier

Recommended Applications

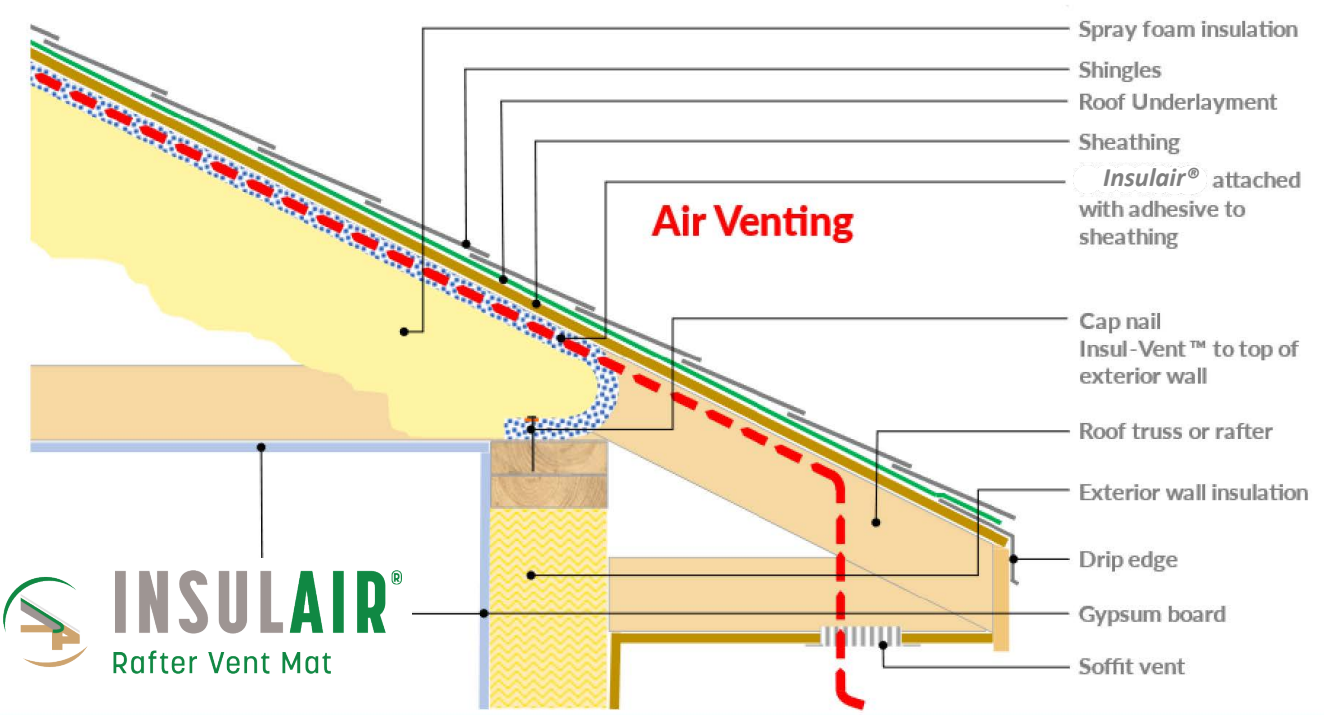
- For new construction with spray foam insulation under the roof deck.
- For retrofit of existing attic & roof deck with spray foam insulation.
- For new construction or renovation of cathedral ceiling systems.

Benefits

- Promotes drying in the roof assembly.
- Easy to install from the roll cut to length.
- Able to withstand extreme temperatures.
- Made with recycled content for LEED Points.

Installing *Insulair®*

INSULAIR®
Rafter Vent Mat



Product	Product Code	Thickness	Width	Length
Insulair®	INSUL116	1.0”	14.5” For 16” Rafters	35’
Insulair®	INSUL124	1.0”	22.5” For 24” Rafters	35’

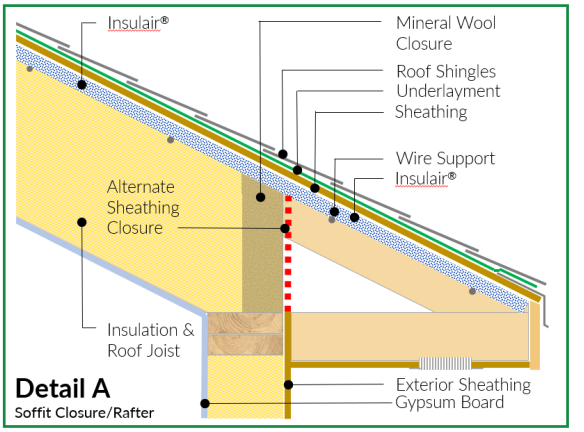
Selecting Product Width

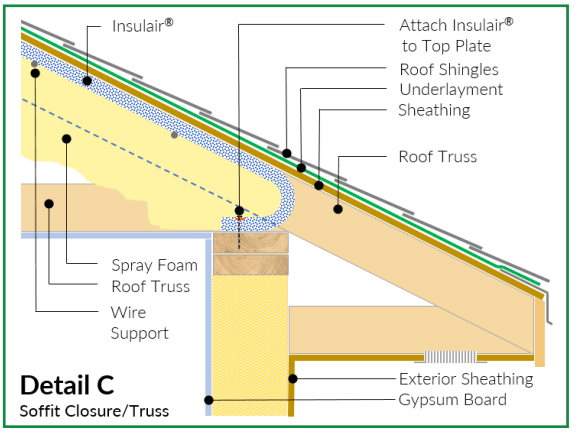
It’s important to choose the proper width of ***Insulair®*** for your application. The ***Insulair®*** 14.5” is recommended for rafters spaced at 16” O.C. The ***Insulair®*** 22.5” is recommended for rafters spaced at 24” O.C.

Step 1

Attach ***Insulair®*** to the roof plate near the soffit with the filter fabric facing toward the interior and the entangled filament against the roof deck. Run it up the underside of the roof deck and bend it into a “U” at the roof plate to create an end dam that supports foam adhesion, maintains airflow, and reduces wind washing. To prevent foam from blowing between each course of ***Insulair®*** attach an additional layer of blocking fabric, or insulation blocking.

Alternatively, you can minimize wind washing by blocking off the area between the roof plate and underside of the roof deck at soffit locations with either mineral wool, or by extending the wall sheathing.





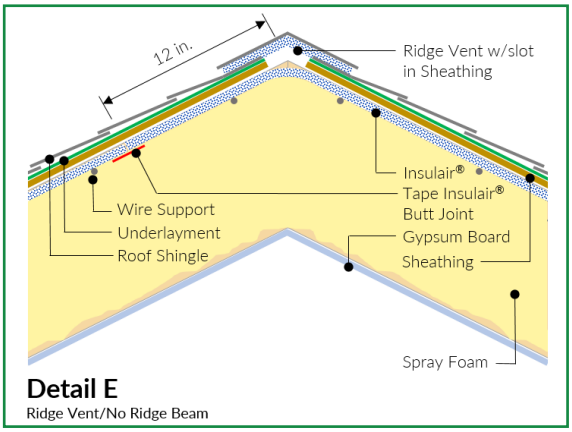
Installing *Insulair®*

INSULAIR®
Rafter Vent Mat

Step 2

Unroll ***Insulair®*** from the eaves up towards the ridge. Place the support wires approximately 12” apart below the ***Insulair®*** fabric with a friction fit created between the two roof rafters. This will keep the ***Insulair®*** snug to the underside of the roof deck.

Alternatively, you can mechanically fasten ***Insulair®***; however, take precaution that the staple or nail length will not penetrate entirely through the roof deck.

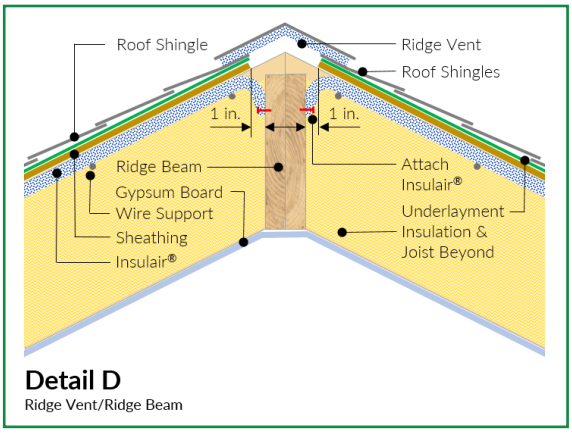


Detail E
Ridge Vent/No Ridge Beam

Step 3

Run ***Insulair®*** against the underside of the ridge location and down the other side of the roof deck for a continuous installation.

When a ridge beam is present, fold the ***Insulair®*** so it runs down the ridge board a few inches and attach with staples or nails. Again, be sure the fabric is facing outward to avoid spray foam from being able to get into the ventilation space created by ***Insulair®*** at the ridge vent location.



Detail D
Ridge Vent/Ridge Beam

Additional Considerations

In any condition that requires an end-to-end butt joint of the ***Insulair®*** material, tape the joint for all spray foam applications. Tape with flashing tape or duct tape to prevent spray foam intrusion that would block the ventilation space.

Physical Properties

Product	Insulair 1.0" x 14.5" x 35'	Roll Weight	8 lbs.	
Core Material	Polypropylene (Dimple Pattern)	Core Weight	ASTM D5261	20 oz/sq. yd.
Fabric Material	Polyester	Fabric Weight	ASTM D5261	2.06 oz/sq. yd.
Color	White	Total Weight	ASTM D5261	22.1 oz/sq. yd.
Product Width	14.5"	Core Thickness	ASTM D5199	1.00 inches
Roll Length	35'	Total Thickness	ASTM D5261	1.05 inches
Roll Area	42.29 sq. ft.	Core Openness		95%

Product	Insulair 1.0" x 22.5" x 35'	Roll Weight	12 lbs.	
Core Material	Polypropylene (Dimple Pattern)	Core Weight	ASTM D5261	20.0 oz/sq. yd.
Fabric Material	Polyester	Fabric Weight	ASTM D5261	2.06 oz/sq. yd.
Color	White	Total Weight	ASTM D5261	22.1 oz/sq. yd.
Product Width	22.5"	Core Thickness	ASTM D5199	1.00 inches
Roll Length	35'	Total Thickness	ASTM D5261	1.05 inches
Roll Area	65.625 sq. ft.	Core Openness		95%

INSULAIR®

Rafter Vent Mat

Call Advanced Building Products to assist in calculating the additional net free area created by using *Insulair®* on your next project

US Patent #8,245,437 B2

ADVANCED Extrusion Technology
A Division of Advanced Building Products, Inc.®

WWW.INSULAIR.NET | WWW.ADVANCEDBUILDINGPRODUCTS.COM

ADVANCED Building Products Inc.