

The Sealed Attic System with DuPont™ Tyvek® AtticWrap™

BUILDING SCIENCE BULLETIN



DuPont Building Science has pioneered the research and development of wall system dynamics and secondary weather barrier systems. Over 30 years ago DuPont invented Tyvek®, a true miracle of science, and continues to lead and invent new products and techniques to improve the building envelope. DuPont™ Tyvek® AtticWrap™ is the first product designed for the roof to help protect the structure and to help reduce air leakage and radiant heat flow through the ceiling. This revolutionary membrane helps provide energy savings and enhances attic moisture control, while still providing a ventilated roof system.

When properly installed over the top of rafters or trusses, Dupont™ Tyvek® AtticWrap™ helps provide a vapor-permeable air and water barrier that stops airflow while still allowing attic moisture to escape by diffusion. At the same time, Tyvek® AtticWrap™ forms vent channels beneath the roof sheathing that generate a dynamic air flow from soffit to ridge. This concentrated roof ventilation helps dissipate attic moisture in cold weather, and helps reduce heat build-up in warm weather, much more efficiently than traditional attic ventilation. The cooling effect is further enhanced by a metalized surface on Tyvek® AtticWrap™. When installed facing downwards (into the attic), this feature helps reduce the radiant heat buildup that is normally emitted through the roofing materials. It also helps reflect radiant heat back into the living space in cold climates. This reduction in radiant heat flow cuts down the energy costs to condition the living space below.

Two methods of installing Tyvek® AtticWrap™ using DuPont™ RafterCap (above left) and furring strips to create an air channel (right).



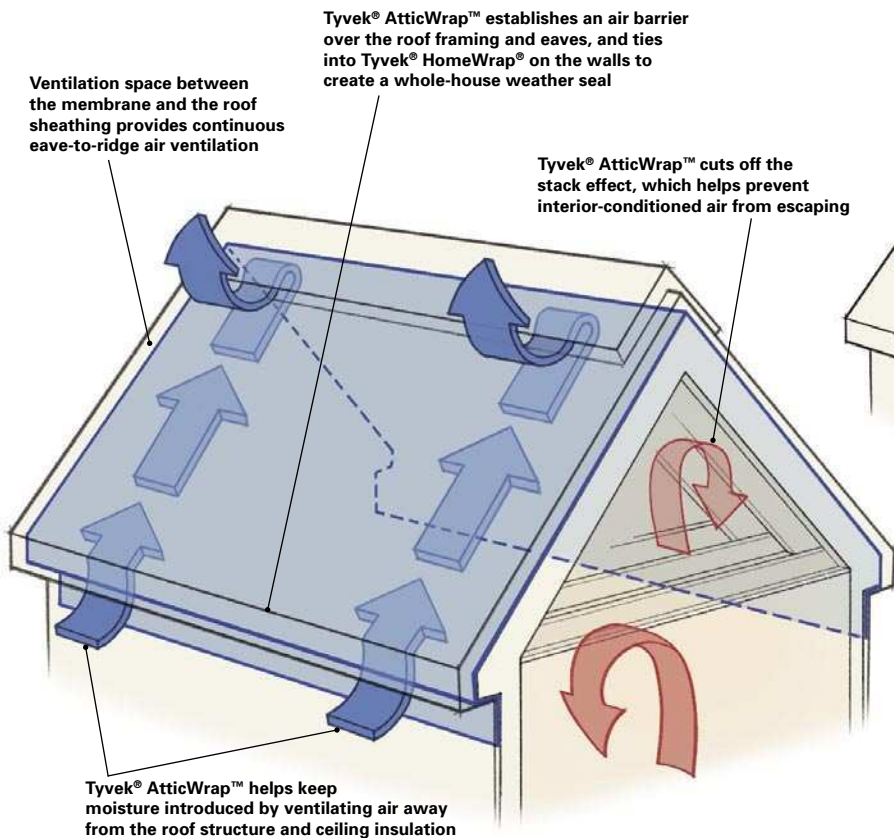
The miracles of science™

The Sealed Attic Concept Understanding the dynamics of how heat and moisture flow through the attic space – both in a conventional attic and in a Sealed Attic – is the key to understanding the building science behind DuPont™ Tyvek® AtticWrap™. Knowing how the Sealed Attic System works is easy, but the concept can be hard to grasp. That’s because we are used to thinking about wall systems that have an air barrier (housewrap) and a thermal barrier (insulation) in one contiguous assembly that we call the “building envelope.” A Sealed Attic, which is vital to completing a continuous, whole-house building envelope, has an air barrier at the roof line, while the thermal barrier typically exists in the ceiling plane. In this configuration, the two still work together to help reduce heat and moisture migration, yet are separated by the open area of “semi-conditioned” attic space.

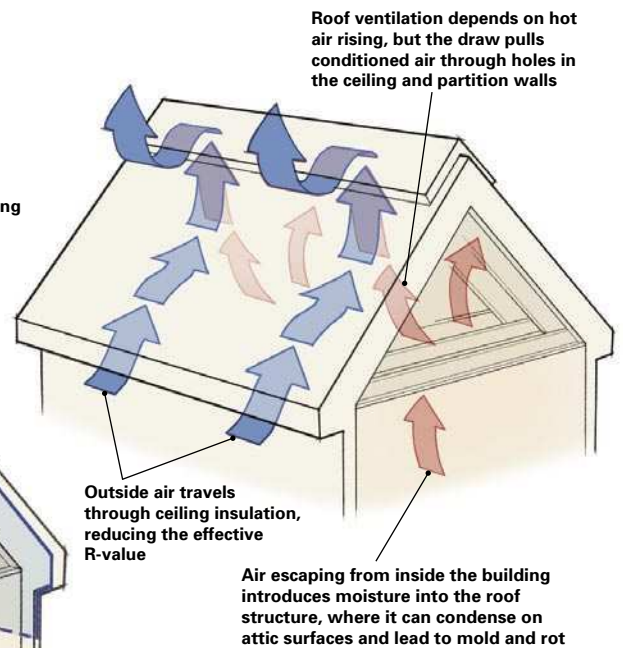
Conventional Attics Even when a polyethylene air/vapor barrier is installed on the ceiling, numerous penetrations – such as cracks along interior walls, holes for electrical lines routed through the attic, plumbing vent penetrations, can lights, chimneys, and others – breach the ceiling air seal. In short, ceilings leak like sieves, with the air driven under pressure by the “stack effect.” As buoyant hot air rises, it creates a positive pressure against the ceiling that pushes air through all the holes and into the vented attic. This in turn creates a negative pressure at the lower levels of a house, which pulls unconditioned air through cracks near the foundation and floors. The result is a powerful pressure driver that pushes warm air out of the home and pulls cold air inside. The warmer the air, the more moisture it can carry, so all that escaping air carries a significant

SEALED ATTIC SYSTEM VS TRADITIONAL VENTING

SEALED ATTIC SYSTEM



TRADITIONAL ROOF VENTING



moisture load. Moisture from cooking, breathing, showering, and other indoor sources is at risk of condensing on attic surfaces, leading to severe moisture damage in the attic.

Because of these problems, roof ventilation is required by building codes to remove moisture in the attic, and is vital for maintaining a cold roof that minimizes the formation of ice dams. Roof ventilation is also required by roofing manufacturers to maintain product warranties. Heat degrades asphalt-based materials, and roof ventilation helps dissipate the heat build-up in roofing materials. Ventilation not only extends the life of the roofing, but helps reduce cooling loads wherever air conditioning is used.

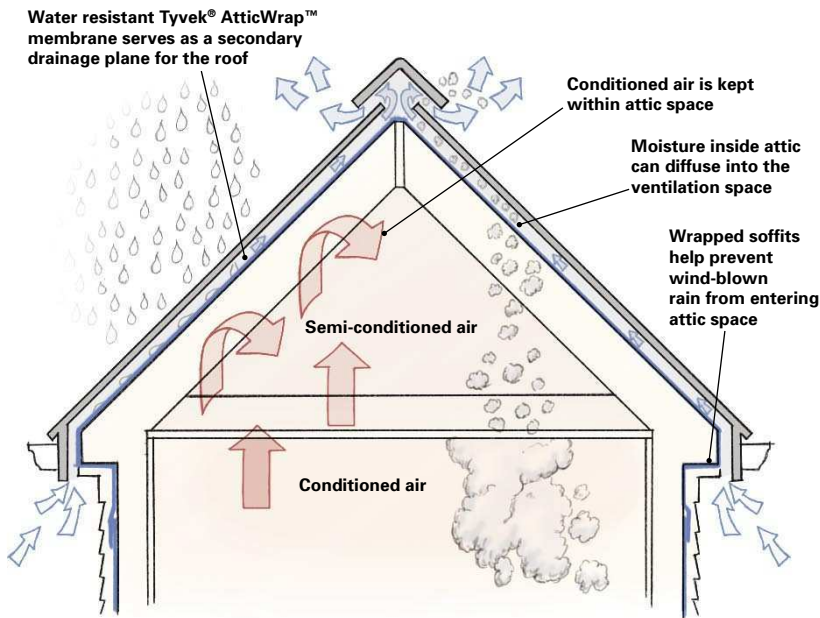
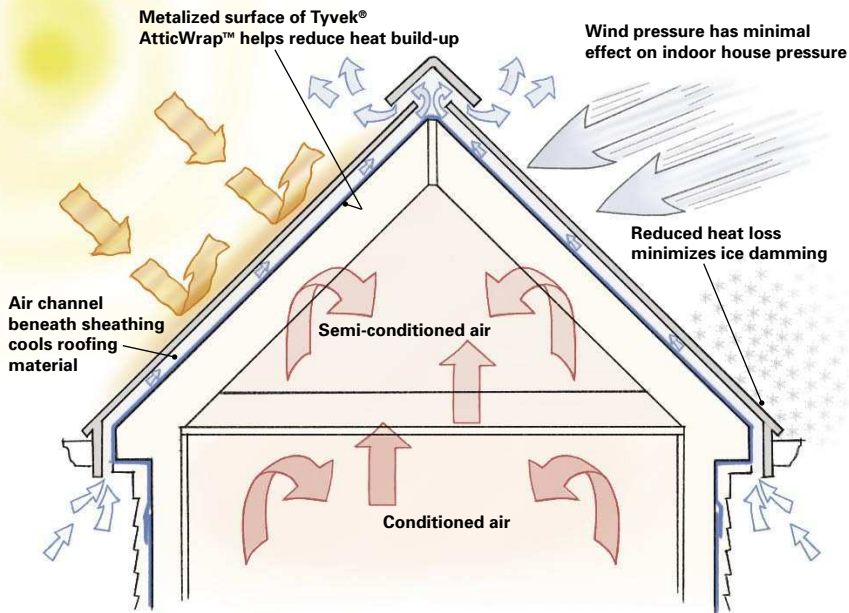
Traditional attic ventilation works by pulling outdoor air through the lower soffit vents. In theory, this air is drawn upwards to a continuous ridge vent. In reality, the air drawn through soffit vents is subject to innumerable air currents, depending on the wind speed and direction. Cold air blows over the surface and through ceiling insulation, which literally takes away R-value. Eventually, ventilation air makes its way to the ridge vent, but only after the moisture it has picked up has had ample opportunities to condense on cool attic surfaces. Conventional attic ventilation also introduces dust, dirt, and pollen into the attic, and worse, soffit and gable vents are notorious for allowing wind-driven rain to enter the attic and soak ceilings in high-wind zones.



Tyvek® AtticWrap™ is rolled out in overlapping layers as work progresses from bottom to top (photo above) and can easily accommodate valleys and hips (photo left). The overlaps include an integrated adhesive strip (photo below) that allows for a tight airseal between successive layers, maintaining the integrity of Tyvek® AtticWrap™ as an air barrier.



BENEFITS OF A SEALED ATTIC SYSTEM



The Best of Both Worlds A Sealed Attic System solves the problems associated with traditional attics. In particular, as a continuous, airtight (yet vapor permeable) membrane above rafters or trusses completely shuts down the “stack effect.” So, while the ceiling plane may still be full of holes, there is no force driving air and moisture through the ceiling. The result is a motionless, “semi-conditioned” attic space with no air flow from outside to rob attic insulation of its R-value. Any interior moisture that does migrate through the leaky ceiling easily diffuses through the microporous structure of the DuPont™ Tyvek® AtticWrap™ membrane, where it is whisked away by the force of the roof ventilation. **That’s why Tyvek® AtticWrap™ provides the best of both worlds – both an airtight attic and a fully vented roof.**

Our Specialist Network A national group of over 160 highly-trained field representatives is available to assist customers with their installations. From the latest updates on building codes to on-site consulting and training, your local DuPont™ Tyvek® Specialist will help make sure each installation is done right.

For more information:
 1-800-44-TYVEK
www.tyvek.com

Product Replacement: DuPont will replace any Tyvek® product damaged during installation by weather or normal handling if it is installed according to procedures published by DuPont. If you have any questions, call DuPont™ Tyvek® at 1-800-44-TYVEK.

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