

SELF-ADHERING TPO MEMBRANES

evolve

TO MEET INDUSTRY DEMANDS

By Jim Burkett

You've seen or at least heard about them for years. They go by a variety of names. They're wide. They're narrow. They're smooth. They're granulated. They save time. They're "green."

"They" actually refer to three words that can make a roofer's life much simpler: self-adhering membranes.

Self-adhering membranes have been around for decades. Their "all-in-one" nature inherently makes them extremely efficient to install since the need to apply a bonding adhesive and wait for it to properly flash off is completely eliminated. They can be installed over a variety of approved substrates, and installation is simple: roll out the membrane, fold it back, peel off the release liner, set the membrane, and roll it with a weighted roller.

Self-adhering membranes originated as modified asphalt and were granule-, smooth-, or aluminum-foil-surfaced. Self-adhering membranes as a general category gained acceptance in specific geographic regions because of their adaptability, ease of application, cost, and environmental friendliness. The category began to gain credibility, and eventually it was clear that the concept of self-adhering membranes had long-term viability.

Introduced to the marketplace almost a decade ago, self-adhering TPO membranes typically feature a fabric-reinforced TPO roofing membrane, factory-applied adhesive, and a silicone-treated release liner. These membranes continue to gain popularity with the rise in demand for volatile-organic-compound (VOC)-compliant or green building products. In the proper conditions, they use no separate adhesives, flames, or hazardous materials during

application and are ideal for installations where a high-performance, fully adhered system with low or sometimes no VOCs is preferred.

Unlike early forms of self-adhering membranes, the TPO manufacturing process allowed for a variety of membrane widths; and when that process was applied to self-adhering membranes, it opened up a new world of application possibilities. For example, the first self-adhering TPOs were introduced in 2003 in widths of 18¾ in and 37 in, used primarily for flashing walls and curbs. As the coating technology advanced, larger sizes, including 6- and 10-ft widths, were used for deck applications. A single roll of self-adhering TPO membrane could cover a large area of the roof, creating a significant reduction in installation time and labor costs compared to standard products.

Self-adhering TPO membranes are designed to be installed as fully adhered systems. In-

stallation should always comply with the manufacturer's published specifications, but the following steps are often included:

1. Prepare the approved substrates; they must be clean, dry, smooth,



Photo 1 — Self-adhering TPO membranes are easy to install since the bonding adhesive is preapplied to the membrane. Peeling off the release liner exposes the hot-melt adhesive.

and free of materials that may affect adhesion or damage the membrane.

2. Approved primers should be applied on vertical surfaces, including concrete, masonry, and other porous and irregular substrates, or on all surfaces when the temperature drops below a certain point. Consult with the individual manufacturer for temperature recommendations and use of primers.
3. Unroll and position the self-adhering TPO membrane to cover the approved substrate and allow it to relax for about half an hour.
4. Fold the outer half of the membrane back, exposing the release liner. Remove the release liner by pulling it at a low angle, exposing the preapplied, hot-melt adhesive. Roll or mate the membrane into the substrate starting in the middle of the panel and working out to both edges/sides to minimize wrinkling of the panel.
5. Using a broom, apply positive downward pressure to the membrane, working from the center out to the edges of the membrane to remove any trapped air and to increase contact points with the substrate. Use a weighted roller in the final rolling stages.
6. Repeat the same procedure on the other half of the membrane.

Roofing contractors of every size were attracted to self-adhering TPO. It could compete with conventional mechanically fastened and fully adhered installations on larger projects because of the wider membrane, fewer installation steps, and elimination of separators, overlayers, or recover boards in many cases. But it also continued to appeal to smaller contractors or contractors completing smaller projects because of its ease of installation and lower barrier to entry.

Since the new self-adhering TPO membrane used the same base membrane as conventional applications, self-adhering TPO offered compliance with the same LEED®, Energy Star®, and other municipal, regulatory, or environmental requirements for surface reflectance and energy efficien-



Photo 2 — Applying pressure to the membrane with a broom removes trapped air and increases contact points between the membrane and the substrate.

cy, while also eliminating the need for additional surface coatings. Self-adhering TPO membranes became an option for a growing array of applications—private or public, big or small.

Just as self-adhering TPO membranes were developed to meet evolving market demands, the category is evolving to stay up to date with current trends. New polyisocyanurate-facer technology incorporates

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Photo 3 — Self-adhering TPO membranes provide easy installation, high performance, low VOCs, low odor, high reflectivity, and compliance with most environmental regulatory requirements.

coated glass facers, creating increased adhesion with self-adhering TPO membranes. Recent Factory Mutual testing has resulted in FM 1-90-rated assemblies using polyisocyanurate without the need for any primers. These new technologies have tremendous impact on reducing the overall VOCs used to assemble a fully adhered roof system.

This combination of characteristics—fully adhered options, low VOCs, low odor, high reflectivity, and compliance with most environmental regulatory requirements—will make self-adhering membranes even more relevant in the future. Demand and volume of these products will continue to increase, and the product will continue to comply with increasing environmental regulations placed on today's roofing products.

Self-adhering TPO offers the same benefits that helped TPO become the fastest growing segment of the roofing market: high performance, low installed costs, versatility, continual opportunities for further development and refinement, and the transfer of certain technologies that aren't available to other roofing types.

For example, seam tape technologies that were perfected for EPDM applications matured into TPO applications and are now transitioning into self-adhering TPO offerings. Tape seam technologies are available as an alternative to the conventional heat-welded seaming technique. One manufacturer is offering its self-adhering TPO membrane in two versions: one for conventional heat-welded or taped seams and one for adhered seams through the membrane

adhesive itself. That's more seaming options than any other product type.

These self-adhering TPO offerings translate into a particularly attractive option for contractors who do not routinely install TPO. While some say that heat-welded seams perform better, current applications show that taped seams perform just as well in an adhered application. Further, they do not require the same level of expertise, practice, or financial investment to perfect. This is a direct benefit to contractors who do not desire to invest in or mobilize the equipment necessary to heat-weld the seams.


Moreover, the continual evolution of tape technology presents opportunities to eliminate heat welding at every turn, which is especially important when it comes to the details. TPO technology today

allows for all details to be completed using primer and seam tape technology. Recent seam testing of TPO membranes that were heat-welded, spliced together with primer/seam tape, and seamed with hot melt adhesives resulted in the test values shown in *Table 1*.

It is now possible to do an entire TPO application without ever having to wield a heat gun. In addition to simplified installations, these products and details also meet various long-term system requirements.

Finally and most important, all of these factors provide a new world of opportunities to building owners, specifiers, and contractors alike. When self-adhering TPO was first introduced, many manufacturers were evaluating the long-term performance before investing in them as product offerings. Now, the increased application and longevity of self-adhering TPO systems have expanded the availability of these membranes. This expansion broadens the possibilities for the roofing industry even more.

In the end, though, it comes down to product specifiers. If a quality roofing specifier is not satisfied with a product, he will not be satisfied recommending it, so he won't. He'll select another membrane instead. But as the self-adhering TPO membranes consistently meet expectations, they will gain acceptance and market share.

Self-adhering TPO membranes work. They function in today's world and will endure into tomorrow's. Self-adhering TPO membranes offer the ideal balance of adaptability, ease of installation, cost, environmental friendliness, and performance. 

SHEAR TESTING (ROOM TEMPERATURE)		
	Peak Load (lbf)	Failure Type
Heat weld	61.4	Rupture
Seam tape	129.3	Adhesive
Hot melt	120.7	Adhesive

Table 1

Jim Burkett

Jim Burkett, product development manager at GenFlex Roofing Systems, has 25 years of experience in commercial roofing, including product management roles in both single-ply and asphalt roofing systems. GenFlex is a full-line supplier of single-ply roofing products for the commercial roofing market. Visit www.genflex.com for more information.

