

Black is Back:

A BITUMINOUS PRODUCTS STORY

By Chadwick L. Collins, RRO

History repeats itself. What once was old is new again. It's the retro movement. We are consistently bombarded by things that are new twists on old familiarities. Even American car companies have blown the dust off of their muscle car designs and modernized them, giving us some new Detroit steel eye candy. Well, the roofing industry has also been bitten by the bug. Black is back! After years of bombardment from association with the undesirable fumes of asphalt, not being white, and not being "green," bituminous roofing has grown up. This is not your father's bituminous roofing. It has matured, learned a few new tricks along the way, and is ready to show why it is the most versatile roofing option on the market.

Twenty years ago, if you asked someone to describe a bituminous roof system, he or she would talk about how it's A) black and B) smells. Call a roofing manufacturer today and say you want to talk about bituminous roofing, and he starts asking about reinforcements, attachment methods, substrates, surfacing options, code requirements, and on and on. This article is intended to shed light on current options and highlights of the "new" bituminous roofing that is out there. And, in this economic climate, it is important to highlight the benefits of investing in a roof system that has been proven in real-world applications, especially when a return on investment is so vital now.

ATTACHMENT METHODS

Let us first look at one of the biggest complaints about bitumi-

nous roofing systems: its...aroma, for lack of a more positive descriptor. Anyone who has been around traditional bituminous roofing knows that the potent aromatics that assault our sense of smell are from the asphalt used to adhere the membrane plies to the substrate and to one another. While standard asphalts still produce that memorable scent, asphalt manufacturers have developed alternative asphalts (low fuming, low odor, and of course, low fuming/low odor). Thanks to these asphalt manufacturers' efforts, odors have been reduced up to 60%, and fumes up to 90%, compared to standard asphalts.¹ Not only have the possible odors and fumes going into the customer's building been reduced, but the installer's exposure to them has also been reduced (a win-win for customer satisfaction and contractor safety). This trend is additionally a result of trying to voluntarily meet LEED credit requirements for VOC content² or to comply with governing codes, such as the of the Ozone Transport Commission.³

But if no odors (or, realistically, minimal odors) are wanted, what options are there? Well, adhesives. Many manufacturers have developed one-part and two-

part adhesives that can be spread by a squeegee. For larger jobs, these adhesives can be sprayed evenly with pneumatic equipment for increased production.⁴ Not only have these adhesives become an admirable substitute for asphalt, but they can perform on par with systems installed with asphalt in regard to external fire performance and wind uplift.⁵

Bituminous roofing also offers alternative solutions when there is no staging area for a kettle/tanker or if disposing of numerous empty five-gallon pails is undesirable. Let's first discuss heat welding or torching. Torched bituminous systems have been a recent development (when you consider bituminous roofing has been around for over a century), and they offer an alternative to building owners who do not want the sight of a kettle on the premises. Torching allows the contractor to achieve a hot bond between plies without all the extra equipment of luggers, mops, hoppers, etc. Instead of having to man this equipment,



Liquid-applied flashing installed on an angled support beam of a tilt-up wall.



Cold adhesive being applied with a spray rig.

the contractor can utilize laborers to install more rolls. Coupled with the availability of adhesives that only require serpentine beads to install the insulation rather than full coverage, the installation of the roof system can be greatly expedited.

Another solution is the relatively new option of self-adhered products. These products allow a contractor to basically need only a clean substrate, the roofing materials, and a trained labor force to install the roofing system. With only the release films being discarded, it is a low waste producer. In the end, one has a very clean installation with no stringers of asphalt or adhesive/bleedout tracked over the finished product. Furthermore, self-adhered systems have no odor that can leach into the indoor space and do not disturb indoor activities.

While all of these systems have wind uplift approvals, bituminous assemblies lost some of their “bite” when recent guideline revisions restricted the ability to increase fastener densities in insulation attachment for the perimeter and corner areas on roofs. When these revisions occurred, the majority of roofs that could increase fastening density and be acceptable in these higher-pressure areas were mechanically fastened single-ply systems. Many manufacturers have now successfully tested bituminous systems with mechanically fastened base sheets over insulation.⁶ With this testing, bituminous assemblies have the capability to increase fastening densities to achieve high uplift performance levels for perimeter and corner areas of roofs. Additionally, with one ply of these roofs being mechanically fastened, the time to install is reduced. With these abilities, coupled with the aforementioned adhesives,



Fleece-backed single-ply being set in hot asphalt onto bituminous plies.

bituminous systems have matched many of the abilities of their single-ply counterparts.

The great thing about all these possible attachment methods is that they can work together for a successful install. Mop three, cap in cold. Stick one (self-adhered), torch one. Screw one, mop one, torch one. You get the idea. These options allow systems to be designed with different aspects in mind, such as production (quickly installed systems like stick one, torch one) or final aesthetics (mop three with the cap in cold with hot-air-welded seams). While some of these combinations make phasing a job a clear option, make sure to check with manufacturers’ recommendations in regard to “phasing” roof assemblies and the contract documents.

WHAT MAINTENANCE ITEMS?

One of the challenges of bituminous systems has been uniquely shaped penetrations (angle iron, c-channel, etc.). Often in the past,

the only option was to install a penetration pan or pitch pocket to make these conditions watertight. Many manufacturers would classify these as maintenance items for various reasons. To better serve building owners looking for more maintenance-free roofs, manufacturers have now developed liquid-applied flashing systems. These are typically included in manufacturers’ guarantees and have the ability to be finished to match the surrounding roof, achieving a more aesthetic final product.

Along with manufacturer-supplied metal edge and coping products or manufacturer-approved contractor-fabricated metalwork, these liquid-applied flashing systems have brought the concept of a true edge-to-edge guarantee closer to reality. By reducing the number of exclusions on the roof and removing most of the maintenance burden that in the past has been laid at the building owner’s feet, bituminous is becoming the “worry-free” roofing system that manufacturers strive to provide to their customers. For a building owner with more inclusions in the guarantee and less maintenance, the return on investment is increased, due to lower life-cycle costs.

PICK A COLOR, ANY COLOR – AS LONG AS IT IS WHITE AND GREEN

Fine, you say, you can put it down the same way, but bituminous membranes are still black. The buzzword colors are “green”



Factory-coated white cap sheet installed. Note color difference between white cap sheet and standard color flashing material (installed on curbs).

Bituminous products going through a factory-applied coatings line.



Photovoltaic modules being installed onto an existing bituminous roofing system.

or “white,” and they are said with ever greater frequency. Bituminous systems can be coated white in the field, but single plies come coated white from the manufacturer.

Manufacturers have responded by developing methods to make bituminous products highly reflective. One such method is to apply coatings on the line at the factory to remove the step of applying them in the field. Other methods are laminating highly reflective films to the bituminous rolls (much like aluminum foil-faced products) or replacing granules with acrylic chips as the surfacing of the cap sheet. Just like single-ply, bituminous systems can have a white finish from the factory, easily meeting the LEED requirements for Solar Reflectance Index (SRI)⁷ as well as reflectivity requirements for other governing standards.

So that’s how bituminous systems are “white”; but what about “green,” you ask. First, let us acknowledge that green means

a lot of things right now: cool roofing, vegetative roofing, and photovoltaic systems. All of these fall under the “green” umbrella. Cool roofing has been explored as noted above with the reflectivity capabilities of bituminous systems, so let us focus on the other green meanings.

Now, while reduced waste from the roof installation has been highlighted, let us discuss the end of the roof cycle. How can we possibly reduce the waste created by tearing off the old roof? By replacing the roof less often. With the new attachment methods as well as the reflective coatings preventing aging of the sheets, bituminous systems’ life cycles have been extended to the point that manufacturers are regularly offering longer guarantee options (25- and 30-year terms) for these systems. Manufacturers are comfortable providing longer guarantee options because these products have been in the marketplace at least this many years. This shows that bituminous products can provide this length of service life in real-world, real-time applications. Many popular products that are promising long-term performance today are basing these claims on accelerated, controlled laboratory testing. While bituminous products go through the same or similar tests, bituminous systems’ long life claims are validated by their performance in the field.

PLAN AHEAD AND PLAY WELL WITH OTHERS

Speaking of 25 to 30 years down the road, what is next for bituminous products? Well, the near future appears to be looking at two very “green” options: vegetative systems and photovoltaic systems.

First, let us examine how bituminous systems and vegetative systems fit together. Actually, it is one of bituminous systems’ tried and true aspects that makes them ideal for vegetative roofing: redundancy. While most roofing professionals inherently

are trying to get water off the roof (and keep water out of the building), vegetative roofing needs water on the roof to live. So with all that moisture, it would make sense to want multiple waterproofing plies to keep the building watertight. Additionally, garden systems are going to require increased maintenance, which means increased foot traffic and a need for a robust roof.


Most bituminous systems only have one downfall—lack of an integrated root barrier for these assemblies. If only there were a naturally root-resistant roof material that was compatible with bituminous roofs. That is why many manufacturers have created true hybrid systems that have one or more bituminous plies and are then capped with a fleece-backed single ply. While this hybrid assembly is also a good option to achieve the high reflectivity discussed earlier, most single-ply products provide a natural root barrier, while the multiple plies provide the “belts and suspenders” that will help garden roof designers not lose sleep worrying about leaks.

While everyone is familiar with the old rigid-panel photovoltaic systems, new thin-film cells are gaining traction in the marketplace. Many manufacturers are developing thin-film options that directly bond to single-ply pieces to create modules. With bituminous products learning how to play nice with single-ply products, bituminous roofs will be able to easily accept thin-film panels adhered to fleece-backed, single-ply modules with the use of adhesives or even hot asphalt. This will allow for easy installation on new roof assemblies as well as retrofit existing bituminous systems. Bituminous products’ long life cycle is also an asset as it compares to the known life cycle of photovoltaic panels. With the investment that goes into a solar array, a building owner should find comfort in the fact that his roof can keep up with the lifespan of his panels.



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CONCLUSION

Versatile. That should be the new word for bituminous systems. This roofing line has grown up, learned new tricks, learned from others' roofing products, as well as how to work hand in hand with others' roofing lines. Bituminous roofing has longer life cycle capability, opportunity to reduce waste (on the front end and across the life cycle), and is finding ways to support cutting-edge roofing trends so that it will not have another comeback, but instead, it will be here to stay. So harness your inner Johnny Cash and crank up the AC/DC, because black is back! 

FOOTNOTES

- 1) Percentages per Owens Corning's pages for its Trumbull TruLo® Max and TruLo® Lo Odor asphalts. Links at www.owenscorning.com/trumbull/application/roofing_asphalts.asp.
- 2) *LEED 2009 for New Construction & Major Renovation*. U.S. Green Building Council, Inc., 2009. USGBC: LEED. April 28, 2009. U.S. Green Building Council, Inc., July 16, 2009. www.usgbc.org/ShowFile.aspx?DocumentID=5546.

- 3) Ozone Transport Commission Model Rule for Adhesives and Sealants, Limit Bituminous Adhesives, Primers, and Sealants to 300 g/L of VOC, www.otcair.org.
- 4) Hennes-Johnson Equipment Company Model 4520, listed at an application rate of five gallons per minute, www.hassen-johnson.com. With an adhesive coverage rate of two gallons per square, this rate equates to 150 squares per hour.
- 5) RoofNav v3.0 shows 22 systems as of July 16, 2009, with wind uplift of 600 psf or greater with a cap ply

fully adhered to a base ply with a full application of a polyurethane adhesive. RoofNav is the property of FM Approvals LLC. <https://roofnav.fmglobal.com/RootNav/Login.aspx>.

- 6) RoofNav v3.0 shows 1,016 systems as of July 16, 2009, with mechanically attached multi-ply roof covers having a wind uplift rating of 90 psf on steel decks. RoofNav is the property of FM Approvals LLC. <https://roofnav.fmglobal.com/RootNav/Login.aspx>.
- 7) *LEED 2009 for New Construction & Major Renovation*.

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