

SBS/SEBS RESIN TECHNOLOGY

and

ELASTOMERIC COATINGS

BY CHRISTOPHER HOSKINS

Right: The restoration option is particularly valuable to owners seeking to extend the life of a retrofitted membrane, which may otherwise be subject to code restrictions governing a third roof assembly. This Hypalon® membrane has been coated with a gray base coat with a white finish to follow.
Square D Corporation,
Knightdale, NC



A self-priming SBS coating provides corrosion protection and a leak-free environment, while substantially reducing surface temperatures and thermal movement.
Spacepark South, Nashville, TN.

Polymer advances have had a major effect upon the roofing industry. Sheet goods and coating formulations reflect this broad range of options in a sometimes confusing mix of abbreviated initials. While membrane classifications include PVC, EPDM, CSPE, PIB, and more recently, TPO, coatings are likewise grouped within common generic categories—acrylics, urethanes, silicones, aluminized asphalt, etc. In most cases, a primary resin component establishes the formulation's core with additional materials blended to complement the polymer's durability. The use of SBS resins is one area in which coatings and membranes find themselves on somewhat common ground.

Most often associated with modified bitumen, SBS polymer resins, also known as thermoplastic elastomers, have also become an established polymer in cold process roof coatings. Long regarded as the pri-

mary rubberizing agent or modifier in modified bitumen, the polymer's use as a primary resin in coating formulations has been more quietly advanced. For the purposes of this article, references to SBS or thermoplastic elastomers are based upon non-bituminous coating formulations.

Many grades of SBS, or its cousin, SEBS, are available. In an elastomeric coating application, a tri-block, copolymer SBS has been widely specified. The polymer's three blocks are comprised of two styrene chains alloyed to either end of a rubber monomer of butadiene or ethylene butadiene composition. When dispersed and heated in a solvent carrier, the styrenes provide a degree of physical crosslinking as the styrene chains bond to each other to form a molecular matrix. This builds tensile strength and elasticity while also maintaining low tension levels during elongation.

Without this low tension or modulus during elongation, adhesive integrity would be compromised on sealant applications subject to thermal movement. This combination of physical properties—high tensile strength, elasticity, and low modulus—is, therefore, ideal for metal roofing details. The resin is typically



Pigmentation options are limited, but thermoplastic elastomers are well suited for pastel applications such as this patina green at the Aldrich mansion in Warwick, Rhode Island. (Photo courtesy Roof Work Inc.)

formulated with a relatively low Shore A (ASTM D-412) hardness to provide flexibility in cold temperatures while also maximizing compatibility over a broad range of substrates.

The low perm rating enhances algae and fungi resistance and allows for a durable bond on substrates subject to ponding water.



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The formulation can be provided in a variety of colors, but titanium dioxide and carbon black, by virtue of their superior UV resistance, are preferred pigments. As a consequence, the bulk of these applications is white, gray, or black in appearance. Most commonly specified as a white elastomeric, SBS and SEBS resin formulations typically reflect over 80% of UV rays in keeping with the nation's ENERGY STAR® program. To maintain reflectivity over flat- or low-slope applications, the surface may need to be washed with water and a mild alkaline cleaner.

From a practical perspective, these formulations allow contractors to work on days during which rain is anticipated without fear of a wash off or improper cure. With a naphtha or mineral spirit carrier, the coating's cure rate is not dependent on ideal weather conditions. Although warm temperatures and air movement will accelerate the curing process, low temperatures, high humidity, and the possibility of precipitation do not preclude a successful application. Thermoplastic coatings of this type are not UV-dependent for curing purposes. This is of particular importance when applicators are traveling or when limited to rather narrow roofing seasons in Canada and the Northern U.S.

Solvent-borne thermoplastic coatings are typically one component material with an excellent storage life. They are formulated to comply with national VOC regulations and seldom require "hot," red-label solvents. Outstanding chemical resistance is a typical characteristic, although non-evaporative greases and oils present an incompatible environment. Many substrates—metal, asphalt, urethane foam, and some single-ply resurfacing systems—are available with FM and UL certifications governing hail, fire, and leak resistance. Moreover, in an industry that seldom tolerates premium pricing, thermoplastic elastomers are competitive with other coating systems.

Unlike "breathable" acrylic formulations, (most) thermoplastic elastomers will not allow moisture vapor transmission. Consequently, care must be taken to address any proposals for use over wet roof assemblies by performing infrared scans and core cuts. Otherwise, a preventative maintenance program to address blisters is destined to follow. This is seldom, if ever, an issue with metal roofs, but moisture surveys are critical to the success of any

low-perm protective coating installed over asphalt, urethane foam, and approved single-ply systems.

Although UV-stable, SBS resins will exhibit hairline checking in incrementally finer patterns over time. Older applications will eventually succumb to mil loss as the rubber monomer is shed in a pellet-like form. Routinely warranted for 10-year terms, most applications anticipate a 12- to 15-year service life, depending on coverage rates, substrate conditions, color, and location.

Most pronounced, however, is the physical property long associated with SBS—tenacious adhesion. The outstanding adhesive properties of SBS assure the long-term sustainability of the substrate. Unlike some formulation technologies, the product's cohesive strength does not exceed the strength of its adhesive bond to the substrate. The aged surface remains compatible with additional SBS re-coats or with other conventional coating systems applied in the future. Additional surface preparation consists of simple power-washing procedures prior to coating the substrate for a second warranty term. This feature helps the owner who is focused on solving immediate problems from limiting his roofing options whenever service is again required. When viewed within the context of a 20- to 30-year time frame, the life cycle cost associated with typical elastomeric coating systems is easily defended. Ease of maintenance, sustainability, and the ability to expense rather than capitalize costs contribute to an attractive sales rationale.



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Of course, technical descriptions are a poor substitute for direct experience. As thermoplastic rubber coatings approach their 18th year in use, some real world observations are in order. For a successful outcome, SBS/SEBS formulations must be blended with quality raw materials in a consistent fashion and installed by meticulous applicators over appropriate substrates. No formulation technology can eliminate the need for a skilled, ethical, and committed chain of partners assembled for the task at hand.

Coatings provide a credible option with definable values, but if rock bottom pricing or exaggerated performance claims form the basis for awarding work, let the buyer beware. On the other hand, when owners and property managers focus on maximizing long-term value, elastomeric coating systems are prepared to deliver an attractive, leak-free, and durable outcome. There are certainly many projects for which coatings are not appropriate, but the design consultant who combines time-proven materials with quality assurance measures on site can be confident of their performance. ■

ABOUT THE AUTHOR

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Additional details on Truco's rubber coatings can be found at www.truco-inc.com. A member of RCI and the RCMA, Chris' interests include tennis, gardening, and Louisiana Catahoula Hounds.



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