



Specifying modified bitumen sheet products

Options and choices complicate modified bitumen product selection

by Mark S. Graham

Currently, there are more than 900 polymer-modified bitumen sheet products available in the U.S. market for use in low-slope membrane roof systems. There are 26 ASTM International standard types and grades for these products. As a result, comparing and properly specifying polymer-modified bitumen sheet products can be challenging.

ASTM International standards

ASTM D5147, “Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material,” provides an industry-consensus method for sampling and testing polymer-modified bitumen sheet products. The standard includes test methods for overall material and coating thicknesses, load strain properties, tear strength, moisture content, water absorption, dimensional stability, low-temperature flexibility, granule embedment, compound stability and low-temperature unrolling.

The various tests included in the standard are used as the basis for testing the physical properties provided in ASTM International’s



material standards for polymer-modified bitumen sheet products. ASTM International has separate product standards for polymer-modified bitumen sheet products based on specific polymer modifier and reinforcement type.

For SBS polymer-modified bitumen sheets products, the following product standards apply:

- ASTM D6162, “Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements”

- ASTM D6163, “Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements”
- ASTM D6164, “Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements”

Within ASTM D6162 and ASTM D6163, Type I, Type II and Type III classifications differentiate among physical property characteristics. ASTM D6164 only has Type I and Type II classifications. In addition to these type classifications, each standard further differentiates between mineral granule surfacing, designated as Grade G, and smooth-surfaced sheets, designated as Grade S.

Also, for foil-surfaced, SBS polymer-modified bitumen sheet products, ASTM

D6298, “Standard Specification for Fiberglass Reinforced Styrene-Butadiene-Styrene (SBS) Modified Bituminous Sheets with a Factory Applied Metal Surface,” applies. ASTM D6298 does not contain type or grade classifications.

For APP polymer-modified bitumen sheets products, the following product standards apply:

- ASTM D6222, “Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements”
- ASTM D6223, “Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements”

Within these standards, Type I and Type II classifications differentiate among physical property characteristics. Mineral granule-surfaced sheets are further designated as Grade G, and smooth-surfaced sheets are designated as Grade S.

Also, ASTM D6509, “Standard Specification of Atactic Polypropylene (APP) Modified Bituminous Base Sheet Materials Using Glass Fiber Reinforcements,” applies to smooth-surfaced, fiberglass-reinforced, APP polymer-modified bitumen base sheets.

In addition to complying with the minimum physical property requirements, manufacturers must provide specific product marking on their packaging. Unless otherwise agreed upon by the material supplier and purchaser, each product’s packaging must be marked with the manufacturer’s name; product brand name; ASTM International designation, including type and grade, if applicable; net coverage area; and, if not evident by the product’s brand name, bitumen modifier type.

For example, a mineral granule-surfaced, SBS polymer-modified bitumen sheet product with fiberglass reinforcement having relatively high peak load and tear strength physical property values is designated as ASTM D6163, Type III, Grade G.

A limited review of manufacturers’ product literature and package markings shows many

polymer-modified bitumen sheet product manufacturers are providing incomplete ASTM International designations. This is of particular concern because polymer-modified bitumen sheet products’ compliances with applicable ASTM International standards is a requirement of most building codes, including the *International Building Code*,[®] 2018 Edition. In general, it appears manufacturers of premium products are doing better at providing the proper product markings than manufacturers of commodity products.

NRCA’s recommendations

Polymer-modified bitumen membrane sheet products can be compared, and NRCA recommends they be specified based on their ASTM International designations, including type and grade classifications, if applicable.

Furthermore, NRCA recommends manufacturers of polymer-modified bitumen sheet products provide in their product literature and package markings the appropriate ASTM International designations, including type and grade classifications, if applicable, to better facilitate product comparison and compliance with building code requirements.

When comparing polymer-modified bitumen sheet products, direct comparison can best be made between products having the same ASTM International designation and type and grade classification. Products with differing ASTM International designations are manufactured differently and, as a result, will have differing physical properties. Products with the same designation but of differing type classifications also will have differing physical property values.

Additional information regarding polymer-modified bitumen sheet products is provided in *The NRCA Roofing Manual: Membrane Roof Systems—2019*. 🌱🌿

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ASTM International committee develops standard to improve drone safety

ASTM International's Committee F38 on Unmanned Aircraft Systems has developed a new standard that provides requirements for parachute recovery systems (PRSs) used to improve human safety while operating drones.

The standard, ASTM F3322-18, "Standard Specification for Small Unmanned Aircraft System (sUAS) Parachutes," outlines requirements for testing and validating PRS documentation. According to ASTM International committee members, the requirements may help drone operators seek approval from civil aviation authorities to fly small drones over people. Applicable to multirotor, single-rotor, hybrid, vertical takeoff/landing and fixed-wing drones, the standard specifically defines the design, fabrication and test requirements of installable, deployable PRSs integrated into drones to lessen the impact energy of a drone if it fails to sustain normal, safe flight.

Committee member Alan Erickson, chief technology officer for Indemnity Inc., Anchorage, Alaska, says the standard creates a framework for PRS manufacturers, drone manufacturers and drone operators that integrates the drone, parachute components and testing of the entire system.

"The standard includes a rigorous design and testing matrix due to the simple fact that a PRS may be the only failsafe in a critical system failure," Erickson says. "When applied correctly, a PRS will enable industry growth in a way that provides civil aviation authorities and civilian populations with a high level of confidence in sUAS."

Additional information about the committee's standard development is available at www.astm.org/committee/F38.htm.



ICC releases 2018 International Green Construction Code®

Together with ASHRAE, the Illuminating Engineering Society and the U.S. Green Building Council, the International Code Council (ICC) has released the 2018 *International Green Construction Code* (IgCC®).

IgCC is a model code that provides a whole systems approach to the design, construction and operation of buildings and includes cost-effective measures that result in reduced operating costs, better indoor environments, less impact on natural resources, and improved neighborhood connections and walkability. The code correlates with ICC's International Energy Conservation Code, ASHRAE Standard 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings," and other referenced standards. IgCC is intended to help governments streamline code development and adoption, saving time and money, and create uniformity among adopting jurisdictions.

"Building safety codes help our communities prepare for the future," says Dominic Sims, ICC's CEO. "Taking into account the latest technologies and cost-effective strategies for dealing with resource scarcity, the IgCC helps cities, states and countries build stronger, smarter, sustainably and more resiliently."

The 2018 IgCC can be purchased at shop.iccsafe.org.

SPFA updates spray polyurethane foam LCA and EPDs

The Spray Polyurethane Foam Alliance (SPFA) has completed a mandatory five-year update to its Life Cycle Assessment (LCA) and Environmental Product Declarations (EPDs) for three spray polyurethane foam (SPF) product formulations: open-cell low-density insulation, closed-cell medium-density insulation and roofing foams.

Developed in 2013 in conjunction with thinkstep, Stuttgart, Germany, SPFA's ISO-compliant SPF LCA and EPDs were the first to be published industry-wide. The SPF LCA update complies with the 2018 Insulation Product Category Rule and includes the original three product formulations, as well as a fourth product formulation—low-pressure two-component closed-cell insulation and sealant foams.

SPFA also completed two SPF EPDs. An EPD updated from its 2013 version includes hydrofluorocarbon- (HFC-) based blowing agents for closed-cell foams, and a new EPD includes hydrofluoroolefin- (HFO-) based (low global warming potential) blowing agents. Both are based on the results of the LCA and allow SPF contractors to help sustainable building designers obtain proper credit from sustainable building programs for using spray foam insulation.

"This current update is key for the industry as it brings our LCA and EPDs current and addresses a major shift within our industry toward more environmentally sound blowing agents, which dramatically reduce negative impacts to the Earth and climate," says Rick Duncan, SPFA's technical director.

SPFA's updated SPF LCA and EPDs are available at www.sprayfoam.org/technical/spfa-research-projects.