How hot is hot?

Asphalts' flash-point and EVT values are of concern

by Mark S. Graham

You most likely realize properly heating asphalt in kettles or tankers and proper asphalt temperature at the point of application are important for constructing hot-applied built-up and mop-applied polymer-modified bitumen membrane roof systems. However, what you may not realize is these values are changing for specific asphalts in ways that may limit your ability to follow industry-established application guidelines.

Flash point

Asphalt's flash-point temperature is the lowest temperature at which asphalt vapors above a volatile combustible substance can ignite in air when exposed to an ignition source. Flash point is measured in a laboratory using ASTM D92, "Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester," and is unique to the asphalt supplier, production lot and type.

Clearly, asphalt suppliers need to provide more reliable, useful labeling

The U.S. product standard for roofing asphalt, ASTM D312, "Standard Specification for Asphalt Used in Roofing," establishes a minimum flash point of 500 F and indicates the actual flash point must be plainly marked on each container or bill of lading for bulk shipments. Actual flash-point temperatures well in excess of 500 F are common and desirable.

NRCA recommends asphalt kettle and tanker temperatures be maintained at a minimum of 25 degrees below the asphalt's flash-point temperature and never heated to or above the flash-point temperature to minimize the potential for kettle or tanker fires.

Some asphalt suppliers' material safety data sheets indicate maximum kettle and tanker temperatures should be maintained at a minimum of 50 degrees or more below the asphalt's flash-point temperature.

EVT

Equiviscous temperature (EVT) is the temperature at which asphalt attains the proper viscosity (flow rate) for built-up membrane application. Asphalt's EVT is measured in a laboratory using ASTM D4402, "Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer." EVT values are unique to suppliers, production lots and types. NRCA recommends asphalt be heated within 25 degrees of the asphalt's EVT on the rooftop at the point of application.

ASTM D312 does not establish minimum or maximum EVT values; however, it indicates an asphalt's actual EVT for mop and mechanical spreader applications shall be plainly marked on each container or bill of lading for bulk shipments. EVT typically is reported for a viscosity of 125 centipoise (cP) for mop application and 75 cP for mechanical spread application.

NRCA recommends asphalt manufacturers supply asphalt with sufficiently high flash-point temperatures to allow adequate heating in kettles or tankers so mopping asphalt temperatures on the rooftop are within the EVT range. NRCA suggests a minimum 125-degree differential between asphalt's EVT and flash-point temperatures for this purpose.

NRCA's concerns

NRCA's review of asphalt suppliers' current product literature and package labeling reveals few, if any, are currently supplying asphalt with an EVT-to-flash point differential that satisfies NRCA's recommended guidelines. Also, labeled EVT values have increased significantly during the years, while labeled flash-point values have stayed relatively steady or, in some instances, decreased. For some asphalts currently on the market, the EVT-to-flash point differential is as low as 20 degrees. These increases in EVT values and the decreases in the EVT-to-flash point differential place an unrealistic—if not impossible—burden on installers.

Most asphalt suppliers currently report EVT using broad ranges of values preprinted on their packaging that apply to multiple production lots. Flash-point temperatures are being reported as 500 F or 525 F minimum or "greater than" these values.

This type of reporting does not meet ASTM D312's intent nor is it giving installers the information necessary for proper installation. Clearly, asphalt suppliers need to provide more reliable, useful labeling so their asphalts comply with ASTM D312's guidelines.

Until asphalt suppliers do so, NRCA recommends designers, specifiers, hot-applied built-up and mop-applied polymer-modified bitumen membrane manufacturers, and contractors work closely with asphalt suppliers when selecting asphalt that will reasonably allow for proper installation within NRCA's guidelines.

Ideally, using asphalt with a relatively low EVT is preferred. Not only will this minimize the need for excessive heating, but it also allows for a wider, more contractor-friendly EVT-to-flash point differential and using asphalts with lower flash points.

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