Selecting Quality Elastomeric Coatings

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It seems that each day a new non-asphaltic, elastomeric coating emerges onto the marketplace. Bold claims are made about durability, flexibility, and "ponded water resistance." The specifier, consultant, architect, contractor and building owner is now faced with the difficult and complex problem of selecting the best elastomeric coating for the price.

How can the decision-maker select the correct elastomeric roof coating?

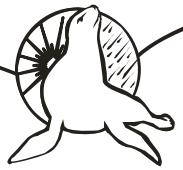
All elastomeric roof coatings are not created equal. Manufacturers try to distinguish themselves from their competitors through various techniques, most notably from the Product Data Sheet. However, after 16 years of testing all kinds of elastomeric roof coatings, I have difficulty comparing one data sheet to another. Subtle differences in test methods, ambiguity in reported data, and confusion about the meaning of "typical" properties confuses rather than clarifies the decision process. The way to make the right choice may start with the Product Data Sheet and quickly proceeds to asking specific questions about the coating.

The Right Elastomeric Coating for the Right Roof

Proper roof coating selection begins with understanding the expectations of the coating in service and this is often site specific. Will the coating be used purely for aesthetic purposes or will it be required to provide some functional properties? How mechanically sound is the roof substrate for coating? How long will the coating be expected to perform? Is solar reflectivity important? How much standing water is on the roof?

Volume Solids

Elastomeric Coatings are usually priced as cost per wet gallon. However, they are applied to a specific dry film thickness. The important parameter to understand here is volume solids. Do not confuse this with weight solids. This is a measure of the volume percent



dry coating contained in a gallon of wet coating. Simply put a roof coating at 50% volume solids selling for $20 per gallon provides the same dry film thickness and coverage as a 25% volume solids coating selling at $10 per gallon. Thus, the cost differential per gallon does not alter the material cost for the job. However, a higher volume solids coating may save in labor costs if the same mil thickness is achieved with fewer gallons.

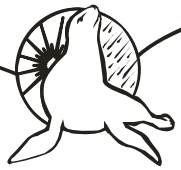
Durability

Let's define durability as how well the roof coating resists weathering, especially sunlight. ASTM methods such as G-26 are used to artificially accelerate weathering. This is a method rather than a specification, which means it describes how to conduct a test but does not list minimum values or standards. Reported values are typically after X thousand hours without cracking. The real test of durability is what is the history of that particular coating over the substrate and location for the pending job?

More in-depth questions are "What is the history of the raw materials?" and specifically the polymer used in the coating. Newer is not necessarily better! The polymer is required to provide the adhesive (stick to the substrate and hold the pigments together) and cohesive (provide elongation and tensile strength) properties. It should have been thoroughly tested, based on years of actual exterior durability.

Pigments are divided into two classes; true (high hiding power ones such as titanium dioxide) pigments and extended pigments, such as calcium carbonate. Just because a coating is opaque to light (you can't see through it) doesn't mean it is opaque to UV radiation from the sun. The true pigments are UV opaque and will protect the roof substrate. This is especially important for UV degradable substrates such as sprayed-in place urethane foam. UV blocking pigments cost as much as 20 times more than extended pigments. How much UV blocking pigments are used in the coating considered for selection?

Solar reflectance and air conditioner energy savings are becoming more important in selecting white roof coatings. Consequently, dirt pick-up resistance is important in selecting a roof coating. The coating may be white when applied, but how white does it remain after long term exposure in a severe industrial environment? Asphalt bleed-through should also be considered when coating over fresh asphaltic or modified bitumen substrates. Again, actual roofs as "proof statements" are important in making an educated decision.



Adhesion

For any coating to function properly, it must adhere. ASTM C-794 or D903 are quantitative adhesion tests and report numerical values. It is important to ask the film thickness of the coating used in the test and to obtain corresponding data for "wet adhesion." This is vitally important if there are areas of standing water on the roof. A coating that exhibits acceptable dry adhesion may delaminate when wet. An obvious, often-overlooked variable is the description of the substrate used for adhesion testing. If the coating is to be used on a metal roof, adhesion values to polyurethane foam are of little utility.

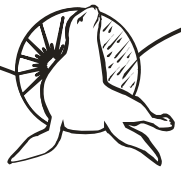
Mechanical Properties

Elongation and tensile strength properties are often used to promote one elastomeric coating over another. ASTM D-412 is often cited as the test method. Unfortunately, a coating may yield different properties depending on the sample shape and how fast it is pulled in the tester. What about low temperature properties? A coating that may provide satisfactory elongation in downtown Los Angeles may not be suitable for colder climates such as the Rocky Mountains. Moreover, a coating applied to a roofing substrate that is less dynamic, such as precast concrete, may perform satisfactorily, but crack badly over a light gauge metal deck roof system over widely spaced bar joists. Thus, substrate dynamics must be considered when making a prudent choice.

Mechanical properties are usually determined in the laboratory after a short drying and curing cycle. However, in the real world, the coating will still be required to have extension properties and low temperature flexibility at low service temperature after years of exposure. How flexible is the coating at low service temperature after X thousand hours of artificial or accelerated weathering? How flexible is the coating after 5-10 years of actual field weathering on a "real" roof? Plasticizers can be added to a coating to give excellent elongation and flexibility at low temperature. However, these will migrate out of the coating upon weathering and cause the coating to become brittle and possibly fail prematurely.

Conclusion

A prudent elastomeric roof coating selection requires three input factors. First, the consultant, specifier or contractor should have a detailed understanding of the roof to be coated, its substrate, quality and structural dynamics and the expectations of the elastomeric coating.



Second, the Product Data Sheet for the elastomeric coating should contain meaningful and scientifically accurate values for the product that correspond to some facet of the real world demands on the coating. Finally, after reading this article, the decision-maker should also be able to ask incisive questions to fully differentiate and distinguish the candidate coatings considered for the roofing job.

(Editor's Note: William A. Kirn is currently sales service manager for Elastomeric Coatings at Rohm and Haas Company, having held this position for the past 16 years. He is a registered roof consultant with the Roof Consultants Institute and a member of the Construction Specifications Institute and American Society for Testing and Materials. He is on the faculty of the Roofing Industry Educational Institute, the Board of Directors of the Roof Coatings Manufacturers Association and the Accreditation Committee of the Polyurethane Foam Contractors Division of SPI.

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