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Coatings Contribute to Long-Term Reliability

Choose Those That Meet the Industry's Highest Standards

BY DEAN LEWIS

When consumer advocacy organizations rate automobiles, they address two basic categories: initial quality and long-term reliability. Although few models receive high marks in both categories, it is clear that both are of equal importance.

The same is true of fenestration products. The quality of the basic design—as evaluated through testing for structural integrity under wind loading, resistance to water penetration and resistance to air infiltration—is of major importance. But so is the ability of various components to stand up to years of in-service exposure. The coating applied to the basic framing material is key to product longevity.

Externally applied coatings are typically organic (hydrocarbon-based) paints, such as acrylics, polyesters, siliconized polyesters and fluoropolymers, and often supplied as factory-applied baked-on liquid or powder coatings. Depending upon the substrate to which they are applied, the coatings must meet the appropriate AAMA standard referenced within NAFS. These standards describe laboratory test methods and performance criteria for various critical parameters. Through a set of increasingly stringent performance criteria, they are categorized as being basic performance, high-performance or superior performance—i.e., “good,” “better” or “best.” This allows a specifier to choose the most cost-effective match for the type and location of a given project.

For some criteria, the requirements are the same for all three levels. For others, the time of exposure to the test condition lengthens

and/or the permitted latitude of results narrows. In some cases, additional stressors are added for higher-performing coatings as well. An important example is outdoor weather exposure testing to determine resistance to ultraviolet (UV) light, which can cause fading.

Coatings for Aluminum Profiles

For coatings on aluminum profiles, the good/better/best triumvirate is addressed by AAMA 2603, AAMA 2604 and AAMA 2605—all three of which were updated in 2013. All three standards test for color uniformity, specular gloss, dry film hardness, film adhesion, impact resistance, chemical resistance, resistance to corrosion caused by humidity and salt spray, and resistance to color fading or deterioration due to weathering. For others, exposure conditions vary. For example, exposure time to the corrosive influences of high humidity and salt spray increases across 2603, 2604 and 2605 from 1,500 hours to 3,000 hours to 4,000 hours, respectively. Weathering test duration also increases from one year to five years to ten years, respectively.

Coatings for Thermoplastic Profiles

The good/better/best suite of standards for organic coatings on thermoplastic profiles (such as PVC) is AAMA 613, AAMA 614 and AAMA 615—all of which were also updated in 2013. All three standards set forth equal performance requirements for the following:

- Color uniformity (no variation outside of established limits);

- Dry film hardness (no rupture when tested per ASTM D 3363);
- Dry and wet film adhesion (pass per ASTM D3359);
- Cold crack cycle (15 cycles of exposure to 100°F followed by exposure to -10°F, with no change in performance) per ASTM D2247 or D4585;
- Oven aging (verifies hardness and adhesion after exposure to 140°F for seven days then high humidity for 96 hours); and
- Heat build-up due to solar radiation (per ASTM D 4803).

Again, other test conditions vary to determine good/better/best performance.

Coatings for Thermoset Profiles

The good/better/best series for coatings for fiber reinforced thermoset profiles, such as those made of fiberglass, is AAMA 623, 624 and 625, which were updated in 2010. These standards test and evaluate for color uniformity, specular gloss, dry film hardness and film adhesion (before and after oven aging), humidity and impact resistance, resistance to abrasion and cold cracking, chemical resistance, and color fading or deterioration due to weathering in very nearly the same ways spelled out in 613, 614 and 615, respectively.

Specifying or buying fenestration products finished to meet these standards helps ensure that the coatings perform their mission under constant exposure to environmental onslaughts. ■

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