How garage doors benefit from cool coatings

ADD THE "COOL" FACTOR TO YOUR SALES PITCH

By Brent Fletcher, AkzoNobel

Cool coatings are often used for metal roofing to lower air conditioning costs, reduce peak energy demand, and help mitigate urban heat island effects. Garage doors can also benefit from these special coatings, which improve the doors' appearance, performance, and durability.

Coatings like AkzoNobel's Cool Chemistry Series are specially formulated with solar-reflective pigments to deliver the highest thermal efficiency. They are most often used for metal roofing because their surfaces endure direct and intense solar radiation. Vertical applications, such as garage doors, sustain less concentrated solar exposure, but the benefits of thermal efficiency are still significant.

How Cool Chemistry works

Cool Chemistry coatings improve the total solar reflectance (TSR) of a substrate. TSR is the percentage of all solar radiation that is reflected immediately from a surface. A surface with high TSR will reflect more radiation and stay cooler.

The solar radiation that is not reflected will be absorbed by the surface and converted into heat. This heat may be emitted in the form of infrared energy. The release of absorbed heat is known as thermal emittance.

When paint is applied to a metal substrate (like steel garage doors), that surface becomes a more efficient emitter of heat. In other words, a higher percentage of the absorbed heat will be released from a painted substrate than from bare metal. The painted surface will therefore be cooler.

Since lighter colors are more reflective than darker colors, the color of the paint also influences thermal efficiency. However, Cool Chemistry formulations use special pigmentation that can reflect more radiation, even when darker colors are used.

A solution for garage doors

When solar energy hits the metal surface of an insulated garage door, a portion of that energy is reflected off the surface (TSR), and a portion is absorbed. Once the energy is absorbed, it cannot be further transferred because there is a layer of insulation behind the metal substrate. Thus, the heat is trapped.

Seasonal cycles of hot and cold weather cause the metal to thermally expand and contract, and the result is visible bowing of the metal surface. Since darker colors absorb more heat, the incidence and degree of bowing is greater on darker garage doors.

Ten years ago, this metal distortion discouraged manufacturers from offering doors in dark colors. If darker colors were offered, manufacturers needed to mitigate the distortion by fabricating with higher-gauge steel or by adding struts to the sections. This resulted in heavier doors, which required larger springs to lift them. The additional weight also increased operational wear and tear that would shorten the life of the product.

Making dark colors possible

But today, when Cool Chemistry formulations are used, colors like charcoal, black, dark brown, and hunter green reflect heat more effectively. Therefore, garage door manufacturers can now design and produce dark-colored doors with fewer concerns about metal distortion.

The benefits to garage door manufacturers and building owners are significant. With Cool Chemistry coatings, garage door manufacturers can use the same gauge steel on all light- and dark-colored doors and eliminate struts to produce doors that are lighter weight and more cost effective.

The doors also operate more reliably and have a longer life. Equally important, Cool Chemistry formulations have expanded the design possibilities for garage doors, allowing darker colors to be considered to provide distinction and visual impact in the overall design of a garage or building. ■

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VERY COOL: Cool coatings bring several benefits to garage doors. Photo courtesy of Clopay.