

## Low Modulus Silicone Roof Coatings

### Information pertaining to GE Enduris\* roof coatings

In the 1960s, General Electric's Silicone Division was developing silicone products suitable for the demands of commercial-grade construction applications. In 1963, GE launched a silicone rubber sealant which became rapidly specified and used in the construction industry and

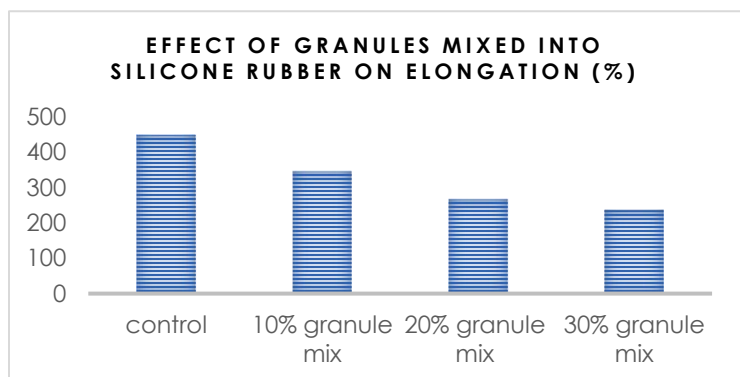


shortly thereafter introduced another innovative product called *GE Silicone Rubber Roof Coating (SRRC)*. The first public use of SRRC was on the roof of the GE Pavilion building at the 1964 World's Fair in New York.

By 1969, the world's largest silicone roof was completed in Everett, MA, the home of GE's aircraft division; total roof area exceeded five acres. At that time, the roofs being coated were predominantly spray-applied polyurethane foam; however, there were other types as well including a novel pre-coated plywood system co-marketed by GE & Weyerhaeuser.

### Adaptation

A lot has changed since the early 60s, and so have performance requirements for silicone coatings. One early adaptation came decades ago when the embedment of roofing granules into the coating became commonplace. While the addition of granules offered slip-resistance and a level of abrasion protection, the elasticity of the coating suffered. Knowing that reduced elasticity could lead to undesirable effects at seams and transitions, precisely where movement needs accommodating; GE scientists took to the first step to increase the coating's



flexibility by lowering its modulus when GE SRRC evolved into GE SCM3300 in the 1970s.



The effect on the elongation capacity of varying levels of granules mixed into the rubber.

## Modulus

The ASTM C717 terminology standard and C920 specification as well as the ISO 11600 specification define and classify elastomeric construction materials by “modulus” based on flexibility performance in tests designed to assess a material's ability to accommodate repetitive movement. Sometimes called ‘Strain Energy’, modulus is simply a reflection of a material's stress-strain profile. “High modulus” materials are stronger and stiffer (ex. a car spring) whereas “low modulus” materials are softer yet more flexible (ex. a slinky).

The importance of additional flexibility (lower modulus) comes to the forefront as it relates to restorative coating of single-ply membranes and metal roofs. In such applications, it is recognized that in the field of the roof, a coating's tensile strength and elongation profile are less critical whereas adhesion performance is paramount as the coating “borrows” the tensile strength of the substrate to which it is adhered.

At joints, seams and transitions however, the ability of the coating system to accommodate movement becomes very important as these locations are where leaks are most likely to develop. As the old saying goes; “it's all in the details” and obviously, they become a prime focus on any project.



## Trends in Restorative Coating

In the decades since SRRC was first introduced, numerous single-ply sheet goods such as EPDM, PVC and TPO roof systems have emerged and found widespread use. Metal roofs have also continued to occupy a healthy market share. As these various types of roof systems age and require attention, it has become commonplace to coat them as a way to extend their life at a fraction of the cost of complete replacement.

In addition, regulatory pressure to reduce volatile organic compounds (VOCs) in liquid-applied materials has become more widespread. In January 2014, California's South Coast Air Quality Management District (SCAQMD) and Bay Area Air Quality Management District (BAAQMD) went live with a significant reduction in allowable VOCs lowering the limit from 250 to 100 g/L.

In response to such industry trends and recognizing the need to accommodate “the details” of restorative coating projects, GE chemists and engineers have used 50+ years of silicone knowledge and roofing experience to advance the original SRRC product into today's high-performance GE *Enduris*\* 3500; a low VOC, high solids, low modulus 100% silicone roof coating.

