
Introduction

When considering what coating chemistry will fit your project best, physical properties are important to consider. In this document, we are going to dive into the physical property differences between Acrylic and Silicone roof coatings. The following numbers are pulled directly from Marlin Coatings posted Technical Data Sheets for our Acrylic and Silicone Coatings.

Solids by Weight - Solids content in a roof coating is directly related to labor costs. Coatings with less solids content will yield fewer dry mils than a higher solids coating. Our Silicone Top Coat has a solids content of 95%, meaning that 95% of the wet mils applied to the roof will remain after full cure. Our Acrylic Top Coat has a solids content of 66%. As an example of mil yield, if we were to apply Acrylic Top Coat at a rate of 24 wet mils, the dry mil thickness would be 15.84 mils. An additional drawback of a lower solids content is that you can not apply the coating as thick as a higher solids coating due to shrinkage. If you were to apply Acrylic Top Coat at 50 wet mils, there is a high likelihood of cracking and additional adverse affects on the substrate due to the shrinkage. All of these factors combined requires most Acrylic projects to be applied in 2 - 3 coats depending on the DFT (Dry Film Thickness) requirements.

Durometer Hardness - Silicone Top Coat has a Durometer Hardness of 37, while Acrylic Top Coat has a Durometer Hardness of 50-55. "The Shore durometer is a device for measuring the hardness of a material, typically of polymers, elastomers, and rubbers. Higher numbers on the scale indicate a greater resistance to indentation and thus harder materials. Lower numbers indicate less resistance and softer materials." Since Acrylic has a higher test result, it is less likely to be damaged than a Silicone.

Tensile Strength - This reading reflects the maximum stress that a material can withstand while being stretched or pulled before breaking. Silicone Top Coat comes in at 250, while Acrylic Top Coat comes in at 270 (± 22).

Elongation - This reading is a way to measure the ductility of a specimen through the application of tension. Silicone Top Coat comes in at 236, while Acrylic Top Coat comes in at 231 (± 22).

Tensile & Elongation - I purposefully did not elaborate past the published test data for these two physical properties for one important reason. In regard to roof coatings, tensile data is useless without looking at elongation data, and vice versa. Its important to find a product that has a good balance between these two test points because a high tensile and low elongation will preform poorly, and vice versa. Consumers should be weary of any product that do not balance these two data points.

Permeability - This reading reflects the state or quality of a material or membrane that causes it to allow liquids or gases to pass through it. Silicone Top Coat comes in at 10.7, while Acrylic Top Coat comes in at 15 (± 4). Both Acrylic and Silicone offer excellent weather resistance, however as we can see from the data that silicone has superior moisture resistance, while Acrylic coatings are more "breathable." Again, it is important to note that each of these coatings, applied properly, offer excellent weather resistance.

Marlin Coatings

Acrylic vs. Silicone - Physical Properties

Solar Reflectance Index - SRI incorporates both solar reflectance and thermal emissivity in a single value. SRI measures the roof's ability to reject solar heat, defined such that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. Silicone Top Coat has a initial SRI Value of 113, white Acrylic Top Coat has a initial SRI value of 108. However, looking at the two parts that make up the SRI value may be more beneficial. Silicone has a Solar Reflectance Initial value of .89 and a Thermal Emittance of .90, while Acrylic Top Coat has a Solar Reflectance Initial value of .86 and a Thermal Emittance of .89. Overall, SRI is a very important data point to consider due to its direct relationship with energy costs. If you're interested in lowering your energy bills by using a roof coating, pay close attention to this number!