

Silicone or Urethane?

Quite often we get the question from architects and contractors concerning the differences between a urethane-based sealant and a silicone-based sealant. The question is a good one and unfortunately the answer can be simple or as complex as one would like to make it. I generally prefer the simple answer in that it leaves the customer with a simple, but clear understanding as to the practical reasons for choosing one chemistry over another.

The simple answer goes like this. A silicone based sealant carries a longer term warranty ranging from 10 to 20 years as opposed to the standard 5 year urethane warranty common in the industry. Yes, you will generally pay more for the silicone material. But by choosing a silicone with longer term warranties, the life cycle cost of sealing your building could be greatly reduced. Would you rather seal your building two to three times over a twenty year period or just once? **Both chemistries are capable of sealing your building and providing the waterproofing desired.** So the simple answer basically comes down to warranty period and what makes sense concerning life cycle cost for your particular building.

A somewhat more involved answer will touch on the differences in adhesion properties, application and appearance differences, and base polymer properties with respect to weatherability.

- **Adhesion properties** are also mostly determined by specific formula differences among manufacturers and generalizations can not be made across sealant chemistries. The best way to determine adhesion performance is to make inquiries to specific manufacturers and do the work up front on large projects utilizing the testing services supplied at no charge by most reputable sealant manufacturers.
- The same thinking applies to **application, handling characteristics, appearance, and color availability**. These properties are determined more by individual formulation variations and will need to be assessed by the applicator as to preference and suitability.
- **The base polymer** used in silicone sealant compounding is poly-di-methylsiloxane which is inherently stable when exposed to UV light – meaning it will not degrade or deteriorate. Some like to say that the silicone polymer is inorganic and because it has no organic components to deteriorate when exposed to typical weathering conditions. The inorganic portion being silica atoms or as the more commonly known mineral (sand). Most people understand the definition of inorganic to refer to the absence of carbon in a molecular structure. Silicone polymers do in fact contain carbon atoms thereby exclude them from the purely inorganic family of materials.
- Nonetheless, the silicone based polymer does have a significant difference when compared to a urethane polymer that being the Si-O (silica-oxygen) bond as opposed to the C-O (carbon-oxygen) bond found in urethane sealants. The Si-O bond being much more UV stable than the C-O bond, hence **better inherent weatherability of the silicone based sealant** regardless of formula variation. The less UV stable C-O bond can be improved upon through the addition of UV protectors, anti-oxidants, UV absorbers, etc. Thus the weatherability of the urethane based material is more determined by the formula differences among manufacturers as opposed to the base polymer used.

In conclusion, the choice between silicone and urethane will invariably come down to one of cost and warranty period when one factors out personal preference and formula specific differences. However, one should not overlook perhaps the most important factor to consider when choosing the proper sealant for the job: the services provided by the sealant manufacturer may ultimately have much more to do with your success than your choice of sealant chemistry. In the next issue of the Master Caulksmith we will touch on services provided by sealant manufacturers and how you the contractor can benefit by taking advantage of those services.

If there is a subject you would like to see discussed and published on the Master Caulksmith section at Pecora.com, simply direct your request or question via e-mail to Cannonr@pecora.com. I appreciate the opportunity to share my many years of sealant knowledge and experience in the interest of supporting those who strive for perfection throughout the waterproofing industry.

