Dow Performance Silicones

Impact Resistant Glazing Sealants

DOWSIL™

Tech Talk

Building codes and other agencies are increasingly requiring that windows that could be subjected to hurricanes be impact resistant. The concern is that when a window is broken, the entire building becomes vulnerable because the wind blowing through the opening can severely load the building walls. To pass the requirements of various existing or new test methods, windows near ground level must withstand two or more impacts with a large projectile; higher windows are impacted with small projectiles. After the impact the system is cycled at severe windloads. There are minor variations in the size, type and speed of the projectiles in the various methods, but all have similar protocols.

To pass the test the window must withstand the impact and must remain in the opening after the cycling. For many systems a sealant holding the infill into the frame is critical for success. Glass-based systems generally break when they are impacted by the projectiles. After the glass is broken the remaining diaphragm within the opening would pull out if it were not adhered onto the frame with an appropriate sealant. Key properties of the sealant in these systems are adhesion, strength and tear resistance. There is also the need for the product to meet the customer's application needs. Dow has sealants with proven histories in impact glazing applications.

Commercial Glazing Sealants

DOWSIL™ 995 Silicone Structural Sealant

This is the highest performing, one-part sealant available and has been used in systems utilizing large lites and high windloads. Systems using DOWSIL™ 995 Silicone Structural Sealant and large glass lites have been approved in Dade County, Fla., with windloads well over 100 psf. This high-performance, one-part sealant has been used successfully in many commercial systems where other sealants have failed.

DOWSIL™ 983 Structural Glazing Sealant

This product is for in-shop commercial glazing applications and has been approved by Dade County in at least one standard window system with a windload above 150 psf. This is also the sealant of choice for many one-of-a-kind custom projects. For larger commercial projects where the increased production rate of a two-part material offsets the additional cost of the two-part pump, this is the material of choice.

Residential Glazing Sealants

DOWSIL™ 899 Silicone Glazing Sealant

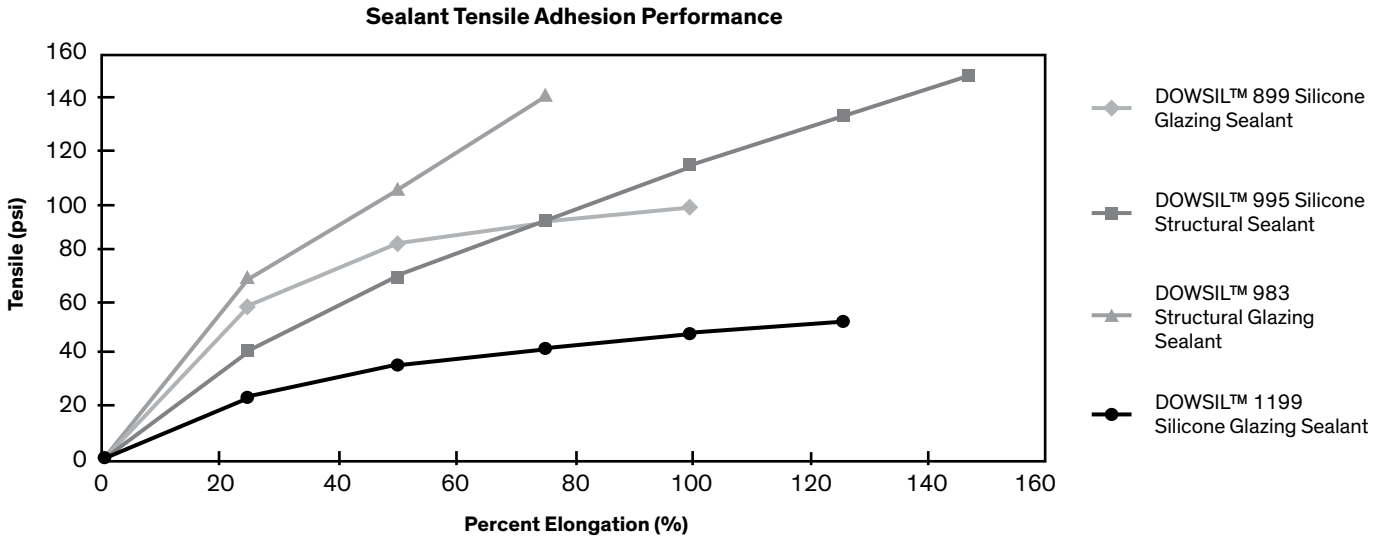
This sealant is used for residential window back-bedding. It has adequate strength and performance for many systems where window sizes may not be as large and the windload requirements are not as severe as some of the high-end commercial units. Systems using DOWSIL™ 899 Silicone Glazing Sealant have been approved by Dade County with windloads in the 60 to 90 psf range. DOWSIL™ 899 Silicone Glazing Sealant has the advantage of being clear and having a good green strength, allowing rapid window construction. However, the fast skin-over time of DOWSIL™ 899 Silicone Glazing Sealant is a disadvantage in hot, humid environments, because the sealant must be shot and the windows fabricated at almost the same time before the 3-minute skin-over time.

DOWSIL™ 1199 Silicone Glazing Sealant

Some systems using this sealant have been tested successfully in developmental tests. In the future these systems may also become officially approved for these applications. This product is a preferred sealant for residential window back-bedding due to its excellent adhesion to many surfaces including vinyl, its excellent green strength, and the fact it provides twice the working time as DOWSIL™ 899 Silicone Glazing Sealant. Success depends on the right combination of project windload, glass size, type of glazing, sealant bite, and stiffness of the glazing and the infill after fracture.

Each of these sealants has been used with properly designed systems for hurricane glazing; however, the success of any system depends upon much more than the sealant alone. Sealant strength and flexibility are important variables that need to be considered. A higher strength, more flexible sealant may perform well with a small glazing bead, whereas a lower strength sealant may require more sealant for the same windload performance in the cycling portion of the test. Figure 1 illustrates the tensile adhesion performance of each of these sealants. As can be seen, DOWSIL™ 995 Silicone Structural Sealant has both the highest strength and the greatest elongation. Therefore, it is the preferred material for the most severe applications.

Figure 1



Note: This data relates to pulling a sealant joint one time to failure and illustrates the differences betweensealants; however, it is not intended to illustrate how a material performs through repeated cycling.

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