

## How to use pre-cured silicone sealant

### Consider product for renovation applications

By Jason Bakus

Different types of liquid applied sealants have been used over the years in the construction industry. These wet sealants include acrylic, polyurethane, polysulfide, silicone, modified silicone, siliconized polyurethane and other technologies. While these wet sealants have been used successfully, pre-cured joint sealants are becoming more popular.

To produce pre-cured joint sealants, a manufacturer extrudes sealant material and allows it to cure to a rubbery, elastomeric product in a controlled manufacturing environment. Pre-cured joint sealants are packaged in cured form, often in rolls, instead of typical liquid-form packaging such as tubes or pails.

Install pre-cured joint sealants using a thin layer of wet sealant on each side as the adhesive to attach the material to the substrate they seal. With the outer edges adhered to the substrate, the middle of the pre-cured sealant, not bonded to the substrate, acts as the area for expansion and contraction.

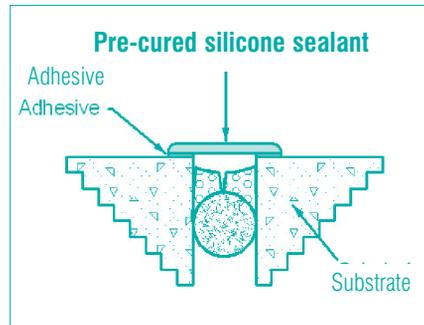
Several types of pre-cured joint sealants have been used during the years, ranging from polyurethane and polysulfide to silicone. Each type offers special chemical and physical characteristics.

Silicone pre-cured joint sealants have been most commonly used in construction applications for several reasons. First, silicones have excellent aging characteristics, and are more resistant to ultraviolet light and weathering than organic materials such as polyurethanes because of their molecular structure and high bond energy. They have a longer effective life span than these organic materials. Because silicones do not degrade when exposed to the elements, it is possible for manufacturers to produce very thin material at 1-to-2 millimeters. Thin pre-cured joint sealant minimizes expansion and

contraction forces on the substrate and creates the pleasing appearance of a flat profile. Additionally, the movement capability for silicone pre-cured joint sealant can be as high as plus-200 percent to minus-75 percent, significantly higher



Pre-cured silicone sealant



Repair joint



Repair joint installation



Exterior insulation and finish systems joint repaired using textured pre-cured silicone sealant.

than wet sealant. This combination of high movement capability and thin material allows pre-cured silicone sealant to easily handle multidirectional movement. Additional advantages include a wide operational temperature range and resistance to color fading. For these reasons, silicone may be a preferred pre-cured sealant.

During the past two decades, pre-cured silicone sealants have been used mainly for renovation applications. One example: repair of failed standard sealant joints. To repair a failed traditional sealant joint with pre-cured silicone sealant, you don't need to remove the old sealant. Installation is easy; simply apply the pre-cured sealant over the old joint using a thin layer of silicone adhesive on each side of the pre-cured sealant. Then press the pre-cured sealant into place to ensure contact between it and the adhesive, as well as between the adhesive and the substrate. Once it has been pressed into place, remove excess adhesive and complete the installation.

Pre-cured silicone sealant may decrease the time required to complete a project and reduce overall project cost. Labor costs may be lower as several labor-intensive steps may be removed from the process. For example, the old sealant does not need to be removed. The substrate does not need to be abraded to ensure complete removal of the old sealant. Also,

pre-cured sealants do not need to be tooled after installation.

This system for repairing failed sealant joints is especially useful with soft substrates such as exterior insulation and finish systems. With EIFS, removal of the old sealant will damage the substrate and ruin the integrity of the joint. For this reason, many EIFS manufacturers recommend the use of pre-cured silicone sealant when repairing EIFS sealant joints. Several pre-cured silicone sealant manufacturers have the ability to produce textured material to match an EIFS system, giving the repaired joint a better appearance.

Pre-cured silicone sealants also are used in applications where wet-applied sealant bridge joints have been used in the past. These bridge joints have been used in butt-joint applications where the joint depth does not meet the minimum  $\frac{1}{4}$  inch for bonding to the substrate. This is commonly found in applications such as leaky aluminum window systems. These wet-applied sealant bridge joints may be difficult to install and nearly impossible to create in a consistent and uniform manner. Additionally, since the industry standard thickness for a wet-sealant bridge joint is 6 millimeters and pre-cured silicone sealant is typically produced at a thickness of 2 millimeters, the pre-cured silicone sealant may be more aesthetically pleasing. Furthermore, due to the thin adhesive layer required with the pre-cured sealant system, the adhesive cures rapidly, virtually eliminating joint deformation. This is evident when comparing the cure time of a few hours for the adhesive used with the pre-cured silicone sealant to a 6-millimeter-thick wet-sealant bridge joint, taking several weeks to cure completely. Indeed, this prolonged cure time frequently causes many wet-sealant joints to develop ripples or folds as the joint expands and contracts before the wet-sealant reaches complete cure. This situation may damage the integrity of these joints. Such factors, combined with ease of application, may cause pre-cured silicone sealant to replace wet-applied sealant in many bridge-joint applications.

When the width of the joint is not sufficient to handle the movement it experiences, pre-cured silicone sealants may be preferable. This occurs frequently in buildings lacking an adequate number of expansion joints on the exterior substrate, causing the joints to expand and contract beyond the movement capability of any wet sealant. In this case, pre-cured silicone joint sealant works well because the material can handle the extreme movement in these types of joints.

Windows where the opening does not leave adequate space for a working perimeter sealant joint represents another example of this phenomenon. The pre-cured silicone sealant system creates its own artificial joint width to handle the movement because the sealant adhesive is only used on the edges of the material. This allows the pre-cured silicone sealant to effectively seal this and similar applications.

Aluminum window systems are an application where pre-cured silicone sealants have been used to repair major water-intrusion problems. When these systems fail, it can be difficult to seal these leaks with traditional wet sealant because most aluminum window systems contain numerous metal-to-metal joints and other potential areas for leaks. Pre-cured silicone sealant can be applied over the leaking areas in these systems and—when using a color-matched material—the pre-cured sealant may not be noticeable.

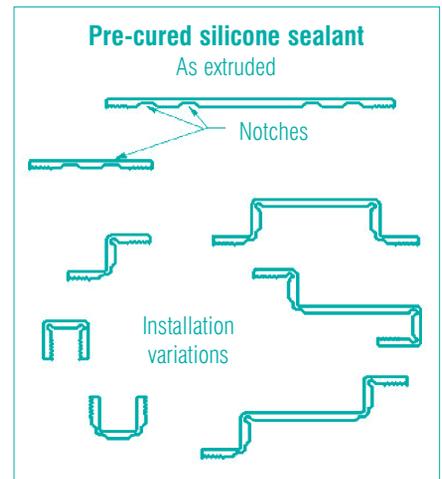
Pre-cured silicone sealants, readily available in many standard sizes and colors, can be used successfully in many other applications including:

- Curtain-wall seals
- Skylights
- Roofing and parapet seals
- Recreational vehicle, marine and transportation seals
- Heating, ventilation and air-conditioning system seals
- Seals for showers and tubs.

Custom-design materials can be produced with one or more notches in the extrusion. These notches allow the pre-cured silicone sealant to follow complex bends on a building in applications such



Pre-cured silicone sealant installed in an aluminum window system.



Installation variations of the notched material.

as inside and outside corners, parapet caps and window mullions.

With myriad custom options available for pre-cured silicone sealant, virtually any waterproofing application problem can be solved using these products.

Finally, pre-cured silicone sealant may result in more energy efficiency. The majority of buildings have numerous leaks throughout the structures, most in joint areas. Buildings need to be pressurized, resulting in higher heating and cooling costs because of these leaks. Virtually any leak can be sealed using pre-cured silicone sealant, drastically reducing the amount of air required to keep a building pressurized.

Manufacturers expect that the market share for pre-cured silicone sealants will continue to grow. However, the scope and magnitude of the use of these materials in the construction industry greatly depend upon collaboration between them and their contractors, architects, engineers and clients. **8**