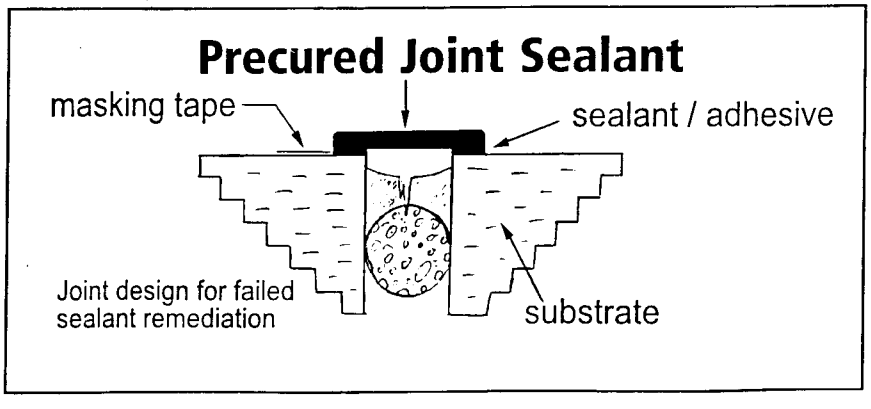
The Evolution of Pre-cured Elastomeric Joint Sealant

By Robert Hagen

"Just recently, over the past five years or so, pre-cured sealant extrusions have found their way into the construction industry in North America."

Extruded seals have been used in countless applications for many years. Just recently, over the past five years or so, pre-cured sealant extrusions have found their way into the construction industry in North America. In the past, wet applied bridge joints were utilized when the width of a joint was too small for the movement capability of the joint sealant. These wet applied bridge joints, which are still used today, are difficult to install and it is nearly impossible to achieve an aesthetically pleasing uniform joint. At present pre-cured elastomeric extrusions are replacing many wet applied bridge joints due to their ease of installation. Furthermore, due to the thin sealant adhesive layer required, in conjunction with pre-cured seals, joint deformation during cure is minimized. Use of pre-cured joint seals, however, is not limited to just this one application. Pre-cured joint seals have proven themselves especially useful in remedial applications.



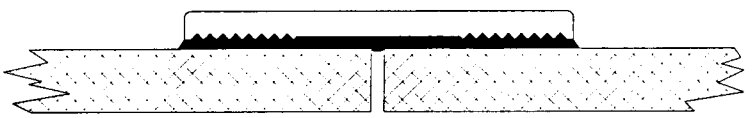
When a pre-cured seal is used to repair a failed joint there is no need to remove the old failed sealant, which saves time and reduces the overall project cost. This becomes especially evident when soft and sensitive substrates are involved.

There are several basic types of pre-cured joint sealant on the market today. They range from polyurethane and polysulfides to silicone rubber extrusions. Each technology offers different unique chemical as well as physical characteristics. Silicone extrusions, while having some drawbacks, one of those being paint-ability, have positioned themselves in the forefront of construction. Paint-ability, often considered to be silicones #1 drawback, is not an issue on anodized aluminum, glass, or other solid surface facades. Realistically, unless the paints used over any sealant have the same expansion and compression characteristics as those experienced by the joint, it is a lost cause from the start. To further minimize this drawback some manufactures now offer elastomeric silicone

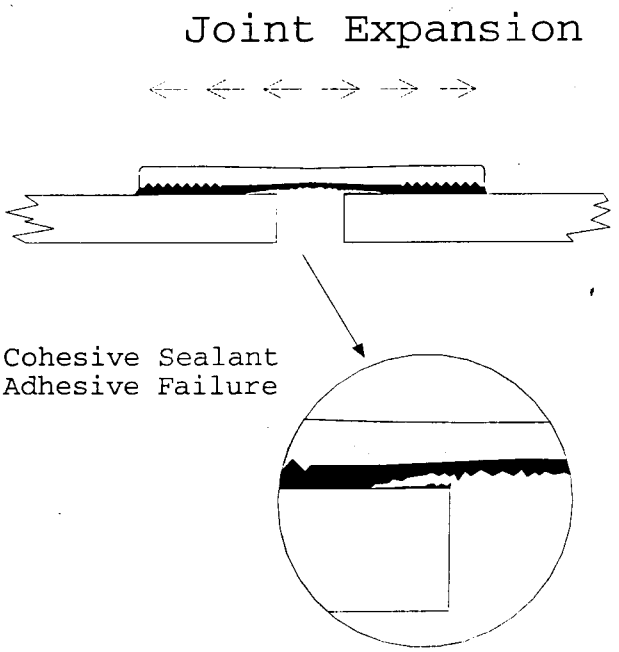
The Importance of Adhesive Sealant Selection when using Preformed Seals on Butt Joints.

Next to compatibility, the substrate sealant adhesive selection is probably the most important step of successfully sealing a butt or narrow joint. When selecting a sealant adhesive it is important to choose one which has less tear strength than the preformed joint seal to be used. When the proper sealant adhesive is used it is not necessary to use bond breaker tape to create an artificial wide joint instead, one can adhere the seal across the entire width of the seal and a substrate.

Initial Installation prior to Joint Movement



Once the joint begins to move the sealant aedhesive will encounter cohesive failure within itself, automatically creating its own artificial joint.



If the adhesive sealant selected has a greater tear strength than the joint seal, then bond breaker tape must be used. Otherwise the extruded seal will fail prior to the sealant adhesive.

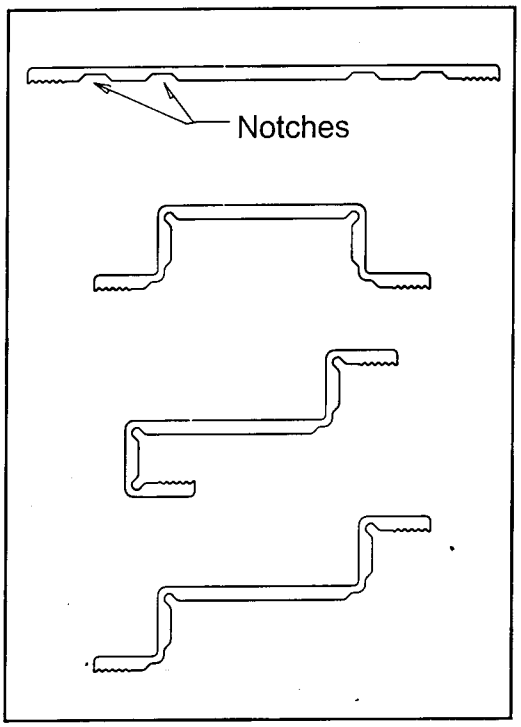
coatings which make it possible to change the color of any joint where silicone has been used as a sealant. Moreover, unlike organic materials, silicones have excellent aging characteristics which makes it possible for the manufacturers to keep the thickness very thin. This in turn minimizes expansion and contraction forces and creates a more pleasing appearance due to the relatively low profile, which looks less like a "band aid joint".

Among the silicone based pre-cured joint seals, there are two different silicone technologies available for use in construction applications. They are High Consistency silicone Rubber (HCR) and ultra low modulus liquid silicone rubber extrusion. They both exhibit distinctive physical properties which make them ideally suited for many construction applications. As a matter of fact, high consistency silicone rubber was originally developed with a low compression set for use as compression seals, HCR extrusions have been successfully used in Europe as expansion joint seals for over 20 years. Liquid silicone extrusions, based on RTV (Room Temperature Vulcanization) silicone technology, though still relatively new, have a much higher compression set with a considerably lower modulus of elasticity than HCR extrusions. In addition, some RTV silicone extrusions offer extremely high movement capabilities while offering exceptional tear resistance.

Pre-cured silicone joint seals are readily available in many standard sizes and colors. Manufacturers also offer custom color and custom design extrusions to fit many different application requirements. Beside butt joints and remedial work over failed sealant, silicone extrusions have been successfully used on window perimeters, mullions, roofs, general building maintenance and fillet beads for showers/tubs, just to name a few. The unique product features and design capabilities make pre-cured silicone extrusions ideally suited for a great variety of applications. Some of the more important features of preformed silicone joint seals include:

continued on page 4

The Evolution of Pre-cured Elastomeric Joint Sealant
Continued from page 3



- High tear resistance
- Ease of installation
- Color fast formulations
- Wide operational temperature range
- Insensitive to ultraviolet exposure or weathering
- Capable of sealing high movement joints
- Reduced stresses at bond line, make them well suited for soft and sensitive substrates such as EIFS

As pre-cured silicone joint seals have become more accepted by the construction industry, manufacturers have made an effort to continually improve and expand their product lines. Initially the product was only available in a few colors and sizes. Today there are many more standard sizes and colors. Additionally, most manufacturers offer custom colors and widths as well as a variety of specially designed profiles. In the custom design area, advancements allow for special extrusions with one or more notches, which makes it possible to follow complex bends and corners on a buildings substrate. Furthermore, profiles are also available with different surface textures designed to match the appearance of stucco and many other surfaces. Manufacturers can even supply custom designed molded three dimensional shapes which can be used at termination points of an extrusion or at intersections.

In light of the fact that preformed sealant extrusions have been successfully used for failed sealant repair and are slowly being accepted by the industry as a viable alternative to cutting out old failed sealant, more and more contractors, architects, consultants and specifiers are taking a closer look at the benefits of using preformed joint seals. Though preforms are not the answer to every sealing problem, they have even started to find uses in new construction. As extruded sealant becomes further established in the construction industry it is easily imaginable that changes in basic joint design will occur in order to take advantage of some of their benefits in new construction.

On a final note, we can almost certainly conclude that preformed silicone joint seals are here to stay. Though it is not likely that preformed joint sealant will replace all other sealing systems, their share of the market will continue to grow. The scope and magnitude of their use in the construction industry will greatly depend upon the collaboration between contractors, specifiers, architects, consultants and the manufacturers. ■

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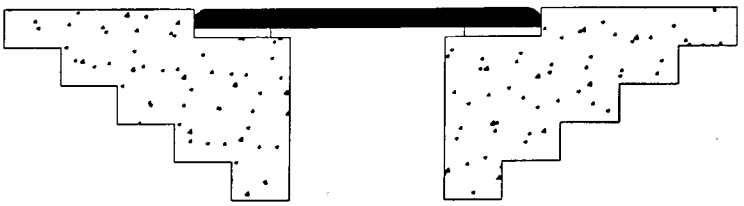
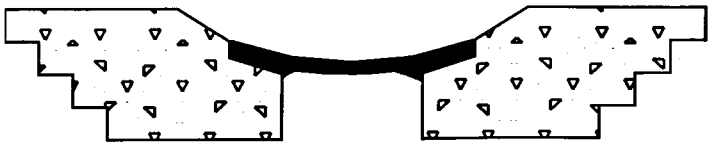
Examples of possible joint designs

Example 1



Simple Bridge Joint with Prefabricated Recess for Flush Installation of Preformed Seals

Example 2



Architectural Joint Design in "U" Configuration, also with Recess for Flush Installation