

◆ Sealants & Caulks ◆ Firestopping ◆ Concrete Treatments, Repair Systems & Grouts ◆ Adhesives
◆ Waterproofing, Dampproofing (above & below grade) ◆ Anchors, Fasteners ◆ Tapes & Tape Sealants
◆ Fluid Sealing Materials ◆ Trade Tools, Equipment & Accessories ◆ Specialty Rubber Products

◆ Water Repellents & Coatings
◆ Corrosion Inhibitors ◆ Glass & Glazing Accessories
◆ Plastic Tooling Systems ◆ Specialty Fluids & Lubricants

UP-DATE

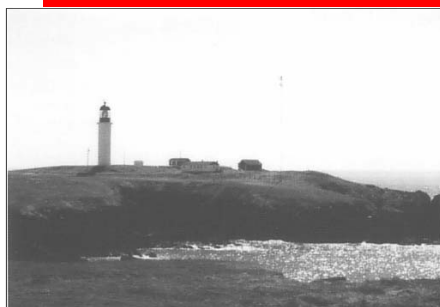


On behalf of all of us at Atlas Supply, I wanted to take this opportunity to wish you and yours Merry Christmas and a joyous and peaceful holiday season, and to say thank you for the opportunity to serve you this year. We look forward to making every effort to once again earn your trust and help with your success in the new year.

*Sincerely,
John Ittes - President*

Cape Race Lighthouse, Newfoundland, Canada - The recipient of the Titanic's distress

call... The first sight of the Promised land for thousands of immigrants, the 96-foot tall Cape Race Lighthouse has a remarkably storied past. And few of North America's lighthouses have endured worse weather, including the fury of North Atlantic storms and the penetrating moisture of 150 days of fog each year. When the steel-reinforced concrete structure was restored in 1996, the final touch was Dow Corning® All-Guard Silicone Elastomeric Coating to protect this shoreline



TECH NOTE

Selection and Use of Sealants

First in a multi-part series discussing the selection and application of commercial grade sealants.

Sealants and caulking compounds are playing an ever-increasing role in today's construction industry. Sealants perform many functions; they include but are not limited to thermal and moisture protection, transition between dissimilar building materials, and assist in performing adhesive applications. Due to the increased demand placed upon the ultimate performance sealant, it is imperative the selection, preparation, and installation of the sealant is properly performed. The complexity of high performance sealant and the diverse substrates used in sealing and weatherproofing today make this selection process more difficult. Furthermore, with the budgetary constraints placed on the construction manager, it is important that they get the most performance for the least cost. Lastly, to maintain low cost, the installation must be successfully performed the first time.

Sealant Selection

Choosing the correct sealant for a specific application depends on several different factors. Below is a list of factors that must be considered when selecting a sealant:

1. The amount of anticipated joint movement
2. The compatibility of the substrates involved
3. Structural or non-structural application
4. The temperature during application
5. The amount of anticipated joint movement during cure
6. The color(s) required
7. The compatibility to special environments (Chemicals, solvents, and gases)
8. Specification requirements

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In almost all sealant applications, either a silicone or a polyurethane will be the sealant of choice. These two types of sealant have proven to be the best on the market. Although their cost may be significantly higher than other sealants initially, in the long run, they will be more cost effective since removing or repairing failed sealants is far more expensive than doing the job right the first time.

Amount of Anticipated Joint Movement

In high movement joints, such as panel joints or butt joints of aluminum sill and head cans, brake shapes and areas with high differentials in coefficient of movement, a low modulus sealant will normally be required.

When dealing with lower movement joints, such as glass butt joints or cap beads, a medium modulus or sometimes high modulus sealant will be required.

Perimeter joints should be caulked in a low or medium modulus, although a high modulus sealant can be used in certain situations.

Both silicones and urethanes come in low, medium, and high modulus formulations.

Compatibility of the Substrate

Generally, if the following guidelines are used, you will be fairly safe in your choice of the proper sealant to substrate. There are, of course, exceptions to this format. When in doubt, consult the manufacturer. In addition, if a primer is required on special or painted finishes, again, consult the manufacturer.

Glass to Glass

Urethanes have come a long way. However, they are susceptible to ultraviolet radiation when used in conjunction with glass, especially high performance or reflective glass. Silicones, on the other hand, show no adverse effects from UV rays. Always use silicone in glass to glass applications.

Glass to Metal

It is also suggested that only silicone or urethane be used in glass to metal applications. A primer is not required with glass. However, a primer will be needed for adhesion to some metals. Certain ceramic coatings or glass can aid in reducing the UV phenomena when using urethane sealants on glass applications.

Metal to Metal

Both silicones and urethanes are compatible with most types of metals, although it would be wise to use a formulation of either a silicone or a urethane that does not need a primer, if possible. When high movement due to thermal expansion is anticipated, use a low modulus sealant.

Metal to Concrete

Neutral cure silicones and urethanes are acceptable in metal to concrete applications. Ideally, a urethane with primerless adhesion to both of these substrates would be best. Neutral cure silicones typically can be more expensive.

When choosing a sealant, it is advisable to choose one that does not need a substrate primer even though primers, when used correctly, can perform very well. The problem is that there are many variables in primer application that can lead to sealant failure. Some of these problems include contaminated primer, using the wrong primer, too much primer, not enough primer, and not enough or too much time between primer application and sealant application.

In some instances, the manufacturers of certain concrete or composite panels will specify a certain brand and type of sealant for their panels. The sealant used to seal the building joints will come in contact with the sealant used by the glazier. The two must be compatible.

Sealant to Sealant

It is not uncommon to caulk to a cured sealant and generally, this will not cause a problem. Silicones will adhere to silicones and all other like sealants will also adhere to themselves. The problem arises when dissimilar sealants are used. The chemical reaction that occurs in a polyurethane while curing, has an adverse effect

Remember this:

- You CAN apply a silicone to a cured polyurethane.
- You CANNOT apply a polyurethane to a cured silicone

on cured silicone sealants. This is a very important factor when sealing perimeter joints that come in contact with building or expansion joints. You must be sure that a

situation will not occur where you will be applying a polyurethane to a cured silicone sealant.

When this condition can not be avoided, you can apply polyurethane to a cured silicone if you first apply fresh silicone to the cured silicone joint and caulk before the new silicone cures. Check with sealant manufacturer.

Structural or Non-Structural Applications

The term structural in a sealant application refers to glass to glass butt glazing either horizontally or vertically, or both together, without the use of an exterior stop or mullion.

Silicones are the only sealant that can be used in this situation (see Glass to Glass section). Not only are silicones the only sealant compatible with structural glazing, but only certain types of silicones are permissible in structural applications.

There are no state or federal codes on the type or modulus of silicones required in structural applications. Extensive work has been performed by major manufacturers regarding structural applications dealing with installation, performance, and in determining correct testing procedures. More recently, testing methods have been developed to evaluate structural glazing materials. One manufacturer may recommend a medium modulus neutral cure silicone while another may recommend a high modulus acetoxycure silicone.

Another important factor that should be investigated is the compatibility of the spacers and setting blocks that will come in contact with the structural silicone. Blocks and spacers should be made of either silicone, silicone compatible rubber, or a silicone compatible foam glazing spacer. Failure to use compatible materials can result in adhesion failure of the sealant and/or discoloration of the sealant.

Temperature During Application

All sealant manufacturers will tell you not to apply their sealant at temperatures of 40°F or less. This is a good rule to follow, but we all know that this is not always possible. If you find yourself in a position where you have no

choice but to apply the sealant and the temperature is not cooperating, certain steps can be taken to minimize the chance of sealant failure (See Figures 22, 23, and 24.)

The reason manufacturers will tell you not to apply their sealant at or below 40°F is due to moisture or invisible frost. Moisture can be removed from a joint by using either isopro-

panol alcohol or solvent wipe in conjunction with a dry rag wipe. Another, and more effective method, is to heat the joint area or the entire room, if conceivable, with a heat gun. temperatures that will exceed the temperature experienced in any climate around the world. Silicones have an even consistency in both hot and cold conditions. Urethanes, on the other hand, will become very hard to gun at low temperatures and have a slight tendency to sag at high temperatures. This can be overcome by either heating or cooling the sealant before use, if possible. Where this condition exists, check with the sealant manufacturer.

If the ambient temperature is not expected to rise above 40°F, a two-part sealant should be considered. A two-part sealant cures through the aid of a catalyst and is not dependent on atmospheric moisture or heat; neither of

Cure rates will double for every 10°F of temperature drop below 70°F

which is found at temperatures below 40°F.

Amount of Anticipated Joint Movement During Cure

Both urethanes and silicones have joint capabilities of at least ±25%. This percentage is determined AFTER the sealant is fully cured. It is estimated that if the same sealant were measured during the curing process, the movement capability would be reduced to 10% or less.

This becomes a problem when sealing substrates with high coefficients of expansion, such as aluminum to aluminum. Early movement of such a joint, will sometimes put enough stress on the uncured sealant to cause cracking or crazing. If gone unnoticed in an area such as a sill or head, it can splice the joint, thus leading to cracking and other serious problem.

If this type of movement is anticipated in a joint, you should consider using a two-part urethane since two-part sealants will have a more predictable curing time compared to one-part sealants. Also available, is a cured silicone tape made specifically for sill and head can splice joints.

The most important thing to remember—no matter what type of sealant you choose—is to always check for failure before it becomes inaccessible (for example, check the splice sleeve before stacking the rest of the metal).

Figure 22

APPLYING SEALANT AT MEDIAN TEMPERATURE

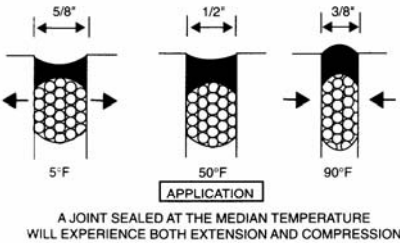


Figure 23

APPLYING SEALANT AT LOWEST TEMPERATURE

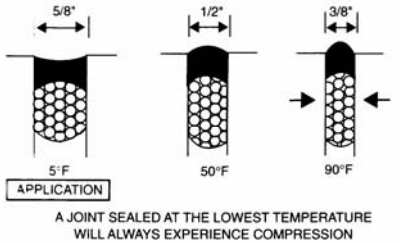
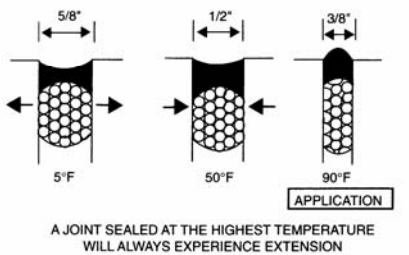


Figure 24

APPLYING SEALANT AT HIGHEST TEMPERATURE



Both silicones and urethanes have working

Dow Corning® 1199 SSL Silicone Sealant

The "no-contest" seam sealer for better windows and doors



Acrylic seam sealers have a reputation of shrinking by as much as 35%, leaving seam gaps that allow air and water infiltration, and they have limited flexibility in cold weather. These factors can lead to shorter service life, resulting in premature failure and customer complaints. They also emit high odor volatile organic compounds (VOCs) in the curing process.

The end of shrinkage problems

Now you have an alternative choice...an easy choice.

Outstanding adhesion

The silicone seam sealer - Dow Corning® 1199 SSL Silicone is a one-part, semi-self-leveling (SSL) sealant specially formulated for use as a narrow joint seam sealer on window and door sashes and frames that are mechanically fastened, mitered or slip jointed. Because it is semi-self-leveling, it flows into narrow cracks and crevices, yet resists run-off when properly applied. It offers outstanding adhesion to most common substrates, including anodized and mill-finish aluminum substrates, such as Duranar® and Duracron® coatings. It also provides aggressive adhesion to vinyl and thermal break materials.

An environmental advantage

Silicone durability

Easy to use

Outstanding process savings



The 1199 SSL Silicone Sealant manual pump system is an inexpensive alternative to cartridge purchases or investment in more expensive pumping systems. It allows you to refill cartridges from a 5-gallon (16.8 kg) pail, providing an easy transition to the product. Air assisted pumps are also available. Call us at Atlas Supply for more details.

DOW CORNING

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Color (s) Required

Both silicones and urethanes come in basic colors such as black, white, bronze, aluminum and some precast colors. These standard colors will make up most of the sales for either product. There will be a time, though, when these colors will be unsuitable for a certain project or job.

Today's painted finishes come in an almost indefinite selection of colors and are usually produced in limited quantity for a specific project. Finding a sealant in a suitable color or exact match of one of these off-paint finishes can only be attained by either using a two-part polyurethane blended with a color pack of the exact color or, if the order is large enough, the major sealant manufacturers will produce a one-part silicone or one-part urethane especially formulated in that particular color.

Silicones will require a minimum order of the particular color. This can be cost prohibitive when dealing with smaller projects.

The two-part urethanes can be a more practical choice when trying to match colored paint finishes since they use a separate color pack with the common color formulation.

A sealant should not be selected, however, just for the ease of color matching. The other factors outlined in this topic must also be considered.

Compatibility to Special Environments

Although not encountered very often in the caulking trade, special environments will require special sealants. Examples of such environments would include: food service areas; aquariums; potable water containers; sealant locations that will come in contact with solvents or oils; corrosive gasses; and areas that are sealed from atmospheric contact.

Special silicones are made for both aquarium and food contact areas. These sealants are formulated to be nontoxic to both fish and people. Furthermore, some of today's urethanes offer the specifier options for portable water situations.

Areas that are exposed to corrosive gases or solvents are usually sealed in a polysulfide sealant depending on the particular environment.

When sealants must be applied in restrictive atmospheric situations, a two-part polyurethane or a two-part polysulfide (see the previous paragraph), which will cure by chemical reaction and is not dependent on moisture from the atmosphere, should be used.

Specification Requirements

Last, and certainly not least, are conformance to specifications. The specifications can include U.S. Federal Inspections, ASTM standards and specific performance standards for particular installations. Most specifications for sealants include grades (pourable and non-sag), movement capabilities, and uses for sealants. □

By Kurt Zintner



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Inside this issue:

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