SEALANT *Installation* GUIDE

This guide was created to provide best practices for installation guidance on how to properly install sealant. The goal is to minimize sealant installation failures due to incorrect joint design and sealant selection. It is just as important to correctly design the joint to maximize performance as it is to install the sealant properly.

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STEP 1 Analyze Joint Movement

Allowing for joint movement is necessary because all substrates will move due to temperature expansion and contraction. Joint movement measurement is critical to determine the type of sealant to use, if the sealant is capable of performing as expected and to ensure the joint will properly expand and contract in adverse weather conditions.

STEP 2 Capabilities

Environmental stresses such as UV light, temperature extremes, humidity/moisture levels, physical stress and other variable loads all affect joint performance.

ASTM C920 can be used to determine if the sealant has enough “stretch” to handle the dynamic joint in question. ASTM C920 incorporates a number of tests that determine cyclical movement on a number of substrates, accelerated weathering, peel strength, staining and fade resistance. Some sealants will work better than others on certain substrates. See specific product details to determine which sealant is best for your desired application.

STEP 3 Prior to Installation

Confirm sealant is within its shelf life and review sealant precautions prior to application.

It is recommended to remove old or damaged sealant from a joint prior to installing new sealant. Remove sealant by cutting away product with a knife or razor and follow steps below for preparing the substrate. NOTE: Old silicone sealant must be completely removed as it will affect adhesion of newly applied sealant or could cause areas of failure.

Substrate preparation should be completed on the same day of sealant application. Surfaces must be clean (free of any material that may prevent adequate adhesion), stable (substrate must be able to handle joint movement), dry (free of ice, frost and standing water) and primed (if required by sealant or needing additional substrate stabilization) prior to sealing. Be sure to test any product on the substrate for compatibility before installation.

Surface sealers and coatings often end up repelling sealants. Whenever possible, sealers and coatings should be applied after the sealant is cured, as it is extremely difficult to apply such materials onto the surface without contaminating the joints.

If you would like to install a butt joint, be sure to correctly determine joint movement, due to its high risk of joint failure when not properly designed.

STEP 4 Filling the Joint

Backing materials such as open cell, closed cell, bicellular backer rods or bond breaker tape/backing tape are used to control the depth and shape of the sealant. Backing material functions as a bond breaker to eliminate three-sided adhesion, helps shape the sealant to allow for less stress on substrates during joint movement and allows the sealant to expand and contract properly.

Backer rods should be approximately 25% wider than the gap and should be firmly placed at a consistent depth not less than 1/8" and not to exceed 1/2" in thickness. The backer rod helps push sealant against the substrate to create a larger bonding area.

Bond breaker tape should be used where the joint is too shallow to fit a backer rod. The bond breaker tape will need to be sized appropriately. If it is too large, the tape will wrap around the sides of the joint eliminating bonding area required for proper adhesion.

Open-cell backer rods should not be used where moisture absorption into the backer rods can be a problem, including horizontal and submerged joints. Closed cell backer rods should be inserted using a blunt tool to avoid puncturing it as this could cause bubbling in the sealant.

Joints should be completely filled with sealant to ensure there are no air bubbles. If no backer rod is used, be sure sealant has adhered to both sides of the joint.

STEP 5 Tooling

Tooling is used to shape the sealant (See ideal bead section). Tooling may not be recommended for all sealants, see specific product directions. All directions on the product label should be followed as described. When tooling, only use aides such as water, soap or oils sparingly as they an affect curing. Feathering a sealant can cause premature aging or a color change. If feathering is required, painting should be considered.

STEP 6 Cleanup

Clean uncured polymer-based sealants with acetone or isopropyl alcohol. Follow solvent vendor's precautions when using solvents. Clean uncured water-based sealants with water. After curing, excess sealant must be cut or scraped away as they are difficult to remove.

STEP 7 Cure Time and Paintability

Make sure to vary your wait time based on the humidity level, as reactive sealants will cure slower when it is cooler and less humid, and water-based sealants will dry slower when it is cooler or more humid. Once a skin is formed bead can be tested for durability and may be painted over. Check specific product information for preferred type of paint, how long to wait after application before applying paint, and if compatibility tests are recommended for paint.

Troubleshooting

- Joints that are too narrow for joint movement will push sealant out during substrate expansion or split from too much expansion during substrate contraction which may cause leaks.
- Wide joints can handle more movement but need backing material to form a seal not thicker than 1/2" with large attachment areas on each substrate.
- Do not fill nail holes. Do not tool, smear, feather or wipe the bead to a thin consistency or it will need to be painted.
- High relative humidity will slow the cure for water-based sealants.
- Cold, dry air will slow the cure for moisture-cured and solvent-based sealants.
- Hot, humid conditions will cause moisture-curing sealants to skin more quickly.
- Hot, dry conditions will cause both water-based and solvent-based sealants to skin more quickly.
- Frost conditions can deter adhesion of the sealant to all substrates.
- Wet conditions (areas with standing water) should be dried to allow for sealant contact with the substrate surface.

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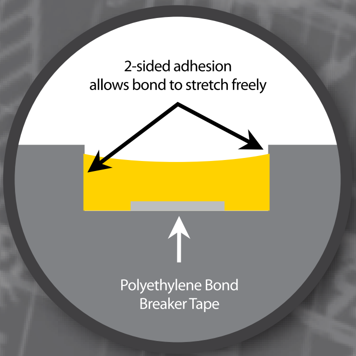
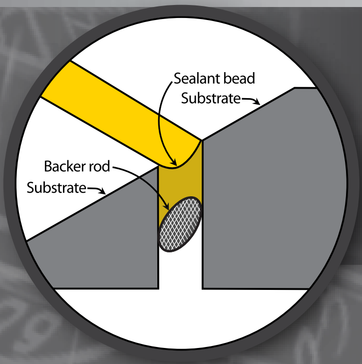
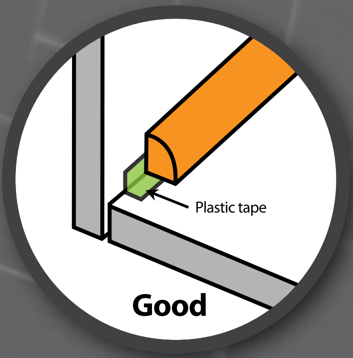


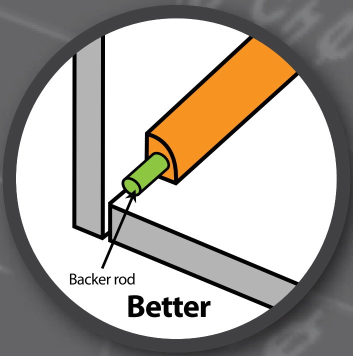


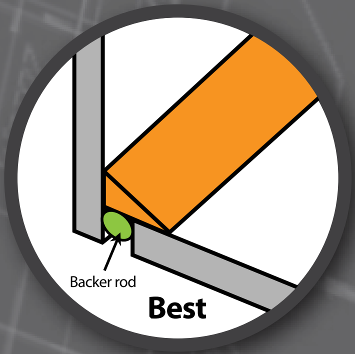
IDEAL SEALANT BEAD
SHOULD NOT HAVE AIR POCKETS

Ideal Joint Design

An ideal sealant bead should not have any air pockets. It should also form an hourglass shape twice as wide as it is deep, allowing the bead to stretch without tearing or pulling away from the substrate. Best practices include designing the joint opening to accommodate movement.







Consider Temperature

In colder temperatures, the initial joint width should be larger to accommodate sealant compression. In warmer temperatures, the initial joint width should be larger to accommodate joint expansion during cooler weather. NOTE: The use of backer rod or bond breaker tape is highly recommended for all joints to reduce the risk of failure.

Estimated Movement

Find the joint movement in the table to the right based on your intended substrate.

Joint Width = Joint Movement x (100/Class of Sealant)

It is recommended to install joints at the midpoint of temperature extremes, allowing for minimum initial joint movement.

For more detailed information on joint design, we recommend reviewing the most recent additions of 1) ASTM C1193 Standard Guide for Use of Joint Sealants and 2) ASTM C1472 Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width.

SUBSTRATE	JOINT MOVEMENT for a 10 foot panel*, in 1/16 inch units
WOOD (PARALLEL TO GRAIN)	0.38 to 0.45
BRICK MASONRY/MORTAR	0.60 to 1.15
MARBLE	0.70 to 1.80
GRANITE	1.01 to 1.08
LIMESTONE	1.02
GLASS - PLATE	1.15
CONCRETE	1.25 to 1.79
STAINLESS STEEL	1.29 to 2.21
STEEL	1.41 to 1.66
COPPER	2.05 to 2.18
ALUMINUM	2.69 to 3.07
FRP	3.20
PVC	6.91 to 14.08
POLYURETHANE	7.37
POLYCARBONATE	8.32 to 8.96
ACRYLIC	8.70 to 9.60

*For temperature swings of 120°F typical in most areas of the USA.

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