

## Caulking and Sealant Information

### General Information:

Most caulking materials are classified as a waterproof filler and sealer. Properly applied caulking will seal joints and cracks from the intrusion of water, air, dust, insects, pollution and noise. Choosing the right caulk and correctly applying it will reduce failures by keeping shrinkage and splitting to a minimum.

### Choosing the Correct Caulk:

Understanding the characteristics and limitations of caulk is vital to the caulking's performance. How the caulk will react to ultraviolet light and its compatibility to the substrate are two important factors in determining your selection. Another essential factor to consider is whether you are using the caulk indoors or outdoors. Using certain types of caulk indoors may emit volatile organic compounds (VOCs) impacting the air quality.

One of the most important factors when selecting a caulk is the movement capacity. This is crucial if the joint is expected to move. There are three types of caulk to consider when movement is a factor:

- low-movement
- medium-movement caulk
- high-movement caulk

**Low-movement** – Limited to joints that are not subjected to constant expansion and contraction or deflection. Low movement caulk is not very flexible once it sets and is negatively affected by sunlight and extremes of both hot and cold.

**Medium-movement** – Ideal for slow moving joints such as masonry control joints. Recommended for use where the maximum movements are below 25 percent of the joint width.

**High-Movement** – Suitable for large or fast moving joints, such as those between dissimilar materials like metal and concrete. Has good adhesion for a wide variety of materials.

### Types of Caulk:

**Acrylic Latex Caulk** – A water based caulk that bonds well to porous materials such as wood, plaster, masonry and drywall. Retains flexibility for long periods of time and if applied correctly can expect an 8-10 year performance lifespan. Comes in a wide variety of colors, paintable, cleans well with water and is easy to use. When used in an exterior application acrylic latex caulk must be painted. Shrinkage should be anticipated between 5 and 10 percent while drying. Good to excellent adhesion but will not adhere well to metal.

**Acrylic Latex Silicone Caulk** – To improve the flexibility of acrylic latex caulk, silicone is added. Most commonly used for perimeter sealing and low movement joints such as areas that have a maximum of +/- 7½ percent movement. It may be difficult to tool and shrinks while it dries. Check with manufactures literature on painting recommendations as some acrylic latex caulks are paintable and some are not. Specific handling may be needed for flammability and regulatory compliance.

**Butyl Caulk** – Can be used in extremely wet areas and works best on concrete, concrete block, brick, stone, flashings, gutters and chimneys. Often used underground, on roofs of buildings, and on aluminum siding applications. Can be difficult to work with and has a long curing time. Butyl caulk is a solvent-based caulk and can be used to seal dissimilar materials such as metal, glass, wood, plastic and concrete due to its excellent adhesion properties. Although it has excellent adhesion it may not adhere well to painted surfaces. Generally has a maximum of +/- 7½ percent movement. Butyl caulk holds up well in all weather conditions but like many other caulks it may shrink as it cures. It may also harden and crack over time, especially on exposed surfaces.

**Silicone Caulk** – Excellent joint movement capabilities, allowing joints to stretch and compress without failing. Most suitable for wet environments and all types of surfaces. A primer is recommended, especially on cementitious surfaces. Excellent ultraviolet (UV) protection and shrinkage, if any, is minimal. Some silicone caulks are paintable but most are not. Silicone caulk is very durable and long lasting.

**Polyurethane Caulk** – Seals most dissimilar surfaces such as wood, vinyl, stone, brick and metal flashing. Cannot be used in structural glazing applications because it cannot directly contact glass. May stain some porous materials such as concrete and natural stone. Very good movement capabilities, can be painted and sticks to painted surfaces. Typically takes a week or more to fully cure.

**Advanced Polymer Caulk** – A long lasting caulk that adheres to a variety of surfaces such as some plastics, wood, brick, vinyl, stucco, masonry and fiber cement. Low shrinkage and remains flexible. May or may not be painted, check manufactures literature.

**Fire-Blocking Caulk** – Creates a barrier to prevent smoke, toxic fumes, gasses and fire from spreading. Restrictions vary from commercial to residential and from jurisdiction to jurisdiction. It is vital to consult with the local building officials and codes for specific fire-blocking requirements. The three types of fire-blocking caulk available are:

*Intumescent*- expands or swells as the result of heat exposure.

*Endothermic*- absorbs heat, releasing water vapor when exposed to high temperatures.

*Elastomeric*- remains flexible allowing the penetrations to move. Cannot be used on materials that can melt.

(Always read caulking manufactures safety data sheets (SDS) and personal protection equipment (PPE) recommendations before handling or applying caulk)

### Preparation and Application:

The durability of a caulk joint is dependent on how well the joint or crack is cleaned before the application and the tools used during application. Areas to be caulked should to be free from oil, dirt and debris. A wire brush or putty knife can be used to remove contaminates but care should be taken to not scratch or gouge the surface.

Caulk should be applied so they have two-point contact, meaning they only bond to the opposite sides of a joint or crack. Two-point contact allows the caulk to retain elasticity and remain flexible. Elasticity is greatly reduced when caulking has three-point contact, which is contact to both sides of the joint and the underlying material. Three-point contact forces the caulk to move in three directions resulting in one of the adhesion bonds to most likely break leading to potential air and moisture penetration.

Three point contact can be eliminated by the use of a backer rod or bond breaker tape (figures #1 & #2). A backer rod is a flexible cylindrical material usually made from open cell or closed cell foam and is used in joints ¼ inch or wider. The backer rod shall be installed before the caulking is applied; it provides additional support for the caulk and eliminates caulk from establishing three-point contact.

The sealant, after installation and proper tooling, will take on an hourglass shape allowing for contraction and expansion of the material without compromising the adhesion. The backer rod forms the backside of the hourglass shape and during tooling aids in squeezing more material into contact with the side of the joint, improving bond.

