Questions Answered - Sealants

Q.1: What is Sealant?

A sealant is a viscous material that changes state to become solid, once applied, and is used to prevent the penetration of air, gas, noise, dust, fire, smoke or liquid from one location through a barrier into another. Typically, sealants are used to close small openings that are difficult to shut with other materials, such as concrete, drywall, etc. Desirable properties of sealants include insolubility, corrosion resistance, and adhesion. Uses of sealants vary widely and sealants are used in many industries, for example, construction, automotive and aerospace industries.

Q.2: Why sealant differs from adhesive?

The main difference between adhesives and sealants is that sealants typically have lower strength and higher elongation than do adhesives. Since the main objective of a sealant is to seal assemblies and joints, sealants need to have enough adhesion to the substrates and resistance to environmental conditions to remain bonded over the required life of the assembly. When sealants are used between substrates having different thermal coefficients of expansion or differing elongation under stress, they need to have adequate flexibility and elongation. Sealants generally contain inert filler material and are usually formulated with an elastomer to give the required flexibility and elongation. They usually have a paste consistency to allow filling of gaps between substrates. Low shrinkage after application is often required. Many adhesive technologies can be formulated into sealants.

Q.3: What is silicone sealant?

Silicone sealant or adhesive is a powerful, flexible product that can be used in many different applications. Silicone sealant can also withstand very high temperatures, making it ideal for applications that suffer high heat exposure,

Q.4: What is RTV?

One type of single-product silicone sealant is called Room Temperature Vulcanizing (RTV). This form of sealant starts to cure as soon as it is exposed to the air - or, more precisely, the moisture in the air. Therefore, it is necessary that you work quickly when using RTV silicone sealant.

Q.5: What is an acrylic sealant?

Acrylic sealant is a synthetic protective material used in a wide range of applications. It seals all types of materials to make them gap-free as well as resistant to infiltration from foreign matter. Variations of acrylic sealant are used extensively in the construction industry on residential and

commercial properties. The drying or curing time for acrylic sealant varies according to the humidity and temperature of the location. When fully cured, flexible sealant then forms an elastic, rubbery coating over building surfaces and gaps. In addition to building joints, rubber-like sealant is used around windows and doors as well as to seal foundation cracks. Gaps in building siding can also be sealed with acrylic flexible sealants.

Q.6: What is polyurethane sealant?

Manufactured through the reaction of glycol and an isocyanate, polyurethane is an organic compound with particularly good moisture- and corrosion-resistance characteristics. Thus, polyurethane sealant is useful in both industrial and commercial applications. Additionally, polyurethane is often used as a heavy-duty adhesive, as well as a coating. A polyurethane sealant may be pressed, layered, sprayed, or brushed onto joints. However, the most common method of application is with a caulk gun.

Q.7: What is Gasket sealant?

There are many applications for mechanical joints, which are often used in liquid and vapour systems that operate under temperature and pressure. Generally, these joints are not absolutely tight and there is a limit to how well one will seal. A gasket is often used for joints that must seal tightly to prevent leaking and maintain operating performance. Gasket sealant is a material that is used, alone or in combination with a gasket, to prevent the escape of a liquid or a gas. Gasket sealant usually comes in a tube and has a paste-like consistency when applied. Sealant materials are available in foam, rubber, silicone, plastic, and metallic-based forms. Gasket sealant is frequently used for automotive repair. A head gasket is used to seal the engine block and cylinder head in an automobile engine. The head gasket is a flat, semi-rigid, graphite material cut to the shape of the two mating surfaces. A sealant is often applied to both sides of the head gasket to ensure that the small surface irregularities in each mating surface are filled, and that the two surfaces seal properly when joined together.

Q.8: What is an open time?

The maximum amount of time that an applied adhesive can be exposed to air before joining the both substrates.

Q.9: Which silicone should I use to seal PVC windows?

For PVC it is always necessary to use neutral silicones, the adhesion of an acetic silicone is not ideal on PVC.

Q.10: When do you need primer on a porous substrate?

If there is a possibility that the surface gets wet, the use of primer is necessary. In that case you get a better adhesion and protect the sealing against the water pressure that can appear.

For use with MS Polymer's or Silicone's use the Gorilla Primer 150

For use with Polyurethane's use the Gorilla Primer 100

Q.11: What is the good joint dimension?

This depends on the type of sealant:

- For elastic sealants:
  Depth = 1/2 of the width of the joint
- For plastic sealants:
  Depth = width of the joint

Q.12: What is the cure time of a silicone?

The cure time depends on:

- Thickness of the joint
- Humidity
- Temperature
- Surface

At normal conditions (20°C and 60% RH) a sealant will cure 2-3 mm in 24 hours. In the beginning it goes a little bit faster, after some days it goes a little bit slower.

Q.13: Does the outside environment affect silicone?

No. Silicone is not affected by extremes of weather - hot, cold, dry, wet or humid. It also has excellent resistance to UV and ozone degradation.

Q.14: What is the difference between a low and a high modulus sealant?

This is related to the E-modulus, which is the force you need to stretch the sealant by 100%.

- If you need more than 0.4 N/mm² it is a high modulus.
- If you need less than 0.4 N/mm² it is a low modulus.
- Low modulus sealants are weaker and more flexible.
- High modulus sealants are stronger and less flexible.

You can only define a E-mod for an elastic sealant (silicone, PU, MS) and not for a plastic sealant (acrylic, ...)

Q.15: How do I store open cartridge of sealant?

There is no data available on the shelf life of a sealant after it has been opened. Opened cartridges of sealant should be stored in a cool, dry place. Before storing, purge a small amount of sealant so fresh silicone will be at the tip of the nozzle. Replace the cap, quickly wrap duct tape around the tip.

Q.16: What sealant to use for sealing air ducts?

It is very important to seal air ducts since they lead to pressure losses and they are the main reason for contamination in a building. Most air ducts are made of galvanized steel or aluminium or aluminated textiles. Because of the steel, we need a neutral curing product. That is why a neutral silicone, or a galvanised nitrile sealant gives you the best solution for this application.

Q.17: What is a primer?

Primers can be composed of any number of chemical compounds but in the end they can be thought of as a chemical bridge between an adhesive or sealant and the bonding substrate. This chemical bridge can be likened to a weld between two sections of metal. Most primers are specially designed molecules carried in a solvent vehicle. Once applied the solvent must evaporate, and in some cases the active ingredients must undergo a chemical reaction. The time necessary for these processes to take place differs from one primer to another. It is important to consult the technical data sheet for proper drying times before applying sealant to primed surfaces to ensure a long-lasting quality seal.

Q.18: Should I prime before applying sealant?

The ideal answer to this question is that primer should be used whenever cohesive failure is not achieved in the absence of primer. Of course, this is assuming that sealant applicators conduct field adhesion testing. Or that all construction projects take advantage of adhesion testing services offered by most sealant suppliers.

Q.19: What is the effect of temperature variation on the application of a typical sealant?

A sealant will increase in viscosity, that is, get thicker as the temperature decreases. When temperatures dip below 5°C the workability and application of a sealant can become difficult to impossible. Once the sealant is in the joint and temperatures are low the curing of the sealant can be substantially prolonged. When applying sealants at low temperatures, provisions should be made for the extra curing time necessary to form a fully cured elastomeric seal. At warmer temperatures, the opposite is true, that is, a sealant will drop in viscosity or get thinner at higher temperatures. Most sealants will also cure faster at higher temperatures. The optimum temperature range for sealant application is 10°C to 25°C.

Q.20: What is the effect of humidity on a typical one component sealant?

Humidity is generally only a factor when applying one-component moisture cure sealant. The effect of humidity can be summed up as follows. The higher the % relative humidity the faster the sealant will from a skin and ultimately cure through. And of course, at lower humidity levels, the skinning process and ultimate curing will be extended. Low humidity levels are characterized as below 30% relative humidity and high humidity levels as above 70% relative humidity. The effects of temperature as explained above must also be considered when applying a one-component sealant. The higher the temperature and humidity, the faster the skinning, and ultimate cure.

Q.21: Is an MS polymer paintable?

MS polymers are well-paintable with water-based paints except alkyd type paints. Remark: Paint is less flexible than a sealant. The paint will crack on joints with large movement.

Q.22: What is an Accelerated Ageing Test?

An Accelerated Ageing Test is a short-term test to simulate the effects of longer-term service conditions.

Q.23: What is an Adhesion promoter?

An adhesion promoter is a substance used in small proportions to increase the adhesion to specific substrates. Gorilla 696 Surface Activator is a liquid adhesion promoter which is applied with a cloth or tissue. After the evaporation of the solvent, the sealant can be applied within 4 hours.

Q.24: What is Adhesive Tensile Strength?

This is the force per surface unit (N/mm^2) required to bring an adhesive joint to the point of failure by means of an essentially uniform stress at right angles to the bond line.

Q.25: What silicone should I use in a bathroom?

In general, you can use a sanitary silicone of acetic type. Depending on the substrates you need to use a neutral silicone. In case of acrylics, polyester or most other plastics as well as aluminium or steel substrates, you will need a neutral sanitary silicone. In case of an enamel, wood, stone or glass substrate, an acetic sanitary silicone can be used.

Q.26: What is an ideal storage temperature?

The ideal storage temperature for all most of general type sealants, adhesives and PU foam is 5°C to 25°C.

Q.27: What is an ideal application temperature?

The ideal application temperature for all most of general type of sealants are 10°C to 35°C