

## Jointing at high temperatures

Elastic joint sealants are used to compensate for movements in joints and to prevent moisture or air penetrating. They can be applied to various substrates, including concrete, brickwork, metal, plastics and wood. There are multiple types of joint sealants, including silicone, polyurethane and silane-modified polymers (SMP).

Their response to higher temperatures depends on their type and composition. On the one hand, the substrate temperature impacts the changes in joint width. On the other hand, the type, composition and temperature significantly modify the sealant properties such as its response to tooling or curing.

There are several aspects you should consider to make sure that joints install quickly and easily even at high temperatures and that they will provide the required impermeability, function and aesthetics.

### **Substrate:**

The higher the temperature, the more a substrate will expand. For joints, this means that they are at their narrowest when exposed to direct sunlight at the highest temperature of the day. Joints installed at this time will widen and start stressing the sealant as the substrate cools down. This effect is even more pronounced when joining dark-coloured metals for example, as these can become significantly warmer than 40°C in direct sunlight.

Applying the sealant properly will help it withstand these fluctuations right from the start. A sealant will typically take 24 hours of curing to become hard enough to tolerate greater movements.

### **Tip:**

- The substrate temperature should be no higher than 40°C (before, during and after jointing).
- For dark-coloured metals, jointing should be done at as consistent a temperature as possible and out of direct sunlight.

## **Processing:**

The viscosity of sealants varies with the temperature. The warmer the sealant, the lower the viscosity, the 'better' its extrusion response and the more effortlessly its application. A lower viscosity also means, however, that the sealant's body and tooling behaviour will change. The sealant feels softer and 'squishier' and may take more time and effort to process.

### **Tip:**

- Work with products that tool well. Products that already cause problems at standard conditions (+/- 20°C) are even more difficult to work with at 30°C.
- Sealants are best stored at room temperature.
- If need be, products can be cooled down before use.

## **Weather:**

The surface of fresh sealants is not protected from mechanical effects yet. Keeping an eye on the weather situation is recommended when jointing. While the sealant is still fresh, heavy rain or hail can affect its surface and water interferes with adhesion build-up, which may even cause the joint to debond.

## **Curing reaction:**

Our SMP- and silicone-based sealants crosslink by moisture in the air. The higher the temperature and the higher the ambient humidity, the more quickly they will react. As a result, processing time is shorter and full curing and strength build-up are accelerated.

Particular attention should be paid to the shorter processing time when jointing. The rule of thumb is:

- At +30°C, the sealant processes at half the time specified in the Technical Data Sheet (TDS); at +40°C, its processing time is just about a quarter of the TDS value.

### **Tip:**

Reduce the lineal metres prior to tooling. This will prevent the shorter processing time from causing a skin to form on the sealant.

## **Properties when cured:**

After curing, sealants typically remain unaffected by high temperatures. Knowing the correct joint dimensions is essential to achieving a durable, tight seal. Joint movements that occur as a result of the materials' linear thermal coefficient of expansion must not exceed the sealant's total deformability. Refer to SIA 274:2021 to find a calculation example. Metals coated with dark-coloured varnish become very hot when exposed to sunlight. This adds to the strain caused by joint movements. If you are unsure, we recommend that you consult with our technical department.

### **Storing our products:**

We recommend keeping our sealants in a cool and dry place. The ideal temperature range is 10 – 25°C. Briefly exposing the sealants to higher summer temperatures (e.g. in your car) will not affect their quality but their properties will, however, alter as described above. Repeatedly storing sealants in these conditions is not recommended.

### **Adhesion promoters:**

The requirements of storing adhesion promoters containing solvents are slightly different. Do not expose these promoters to heat and direct sunlight. The solvents they contain evaporate quickly, which will not only affect the adhesion promoter but can also be a potential danger.

### **Tip:**

Avoid storing adhesion promoters in your car and, if using them in the summer, ensure that your work area is well-ventilated. Visit our homepage to read, and follow, the material safety data sheet.

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