



GENERAL GUIDELINE

SIKASIL® WEATHER SEALANTS

APRIL 2024 / VERSION 04 – SIKA SERVICES AG

Validity until April 2029, unless superseded

BUILDING TRUST



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General Guideline

Sikasil® Weather sealants
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1 PURPOSE AND GENERAL INFORMATION

This document contains general recommendations and hints for the application of Sikasil® WS weather sealants.

All Sikasil® WS are neutral-curing silicone sealants with a high movement capability and excellent adhesion to a wide range of substrates. The quality and durability of the sealant joint depends on various factors including the preparation of the substrates, application method of the sealant, joint dimensioning, etc.

The information herein is offered for general guidance only.

This guideline has to be read in conjunction with the relevant Product Data Sheets and Safety Data Sheets.

For specific information or further advice related to application and products mentioned in this document, contact the Technical Department of Sika Industry.

2 JOINT DESIGN AND JOINT DIMENSIONING

Joints must be properly dimensioned as changes are no longer possible after either construction or sealant application. For optimum performance, the joint width must be designed according to the movement capability of the sealant based on the expected movement. Furthermore, the following joint dimensioning rules for silicone weather sealants must be respected.

Improper joint dimensioning can cause excessive stress on the sealant and/or the substrate causing adhesion or cohesive failure.

| Joint Parameter | Dimension Limits |
|--------------------------------|------------------------|
| Joint width (A) (see Figure 2) | between 6 mm and 45 mm |
| Joint depth (B) | between 6 mm and 15 mm |
| Width/depth ratio (A:B) | between 2:1 and 4:1 |

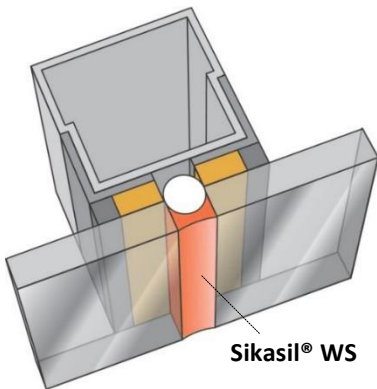


FIGURE 1 Typical WS joint situation. Weather sealant between glass panes (butt joint) is marked red

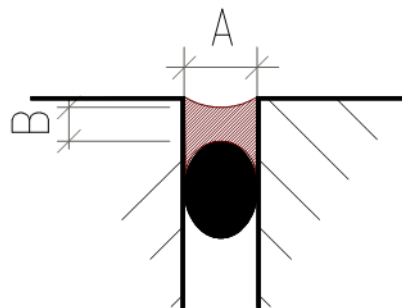


FIGURE 2 Joint width (A) and joint depth (B) of a sealant joint (sealant marked in red, backer rod marked in black)

3 COMPATIBILITY AND APPLICATION LIMITS

Most Sikasil® WS sealants are compatible with other Sikasil® silicone sealants and adhesives.

All sealants and adhesives have to be approved by Sika before using them in direct contact with Sikasil® WS silicones. Where two or more different reactive process material could get in contact, allow the prior material to cure completely before applying the next one.

The compatibility of gaskets, backer rods and other accessory materials with Sikasil® WS silicones must be tested in advance.

Do not use Sikasil® weather sealants on pre-stressed polyacrylate and polycarbonate as it may cause environmental stress cracking (crazing).

The above information is offered for general guidance only. Advice on specific applications will be given on request. Before use of Sikasil® silicone weather sealants, always refer to the most recent Product Data Sheet of the respective product.

4 WORKING PLACE CONDITIONS

Although Sikasil® weather sealants may be applied between 5 °C and 40 °C, the optimum application temperature is between 15 °C and 25 °C. These limits apply to the temperature of the sealant, the substrates as well as the ambient. The temperature of the substrates to be sealed must always be at least 3 °C higher than the dew point temperature of the air, to avoid the risk of condensation.

If Sikasil® weather sealants have to be applied at low temperatures, it has to be ensured that the substrate surfaces are free of condensation or ice.

Sikasil® WS sealants cure by reaction with atmospheric moisture. The reaction thus starts at the surface and proceeds to the core of the joint. The curing speed depends on the relative humidity and the temperature. The lower the air humidity and temperature, the slower the product will vulcanise. Heating the substrate or sealant above 50 °C e.g. by exposure to direct sun radiation, is not advisable as it may lead to bubble formation.

Joint movements (displacement of bonded parts) before the sealant is cured has to be avoided as it could cause uneven surfaces, cracks and leakages.

Field adhesion tests (see Chapter 8) are recommended.

In order to get the best quality of joint sealings, direct sunlight has to be avoided during application and curing. Temperatures above 50 °C during curing of Sikasil® weather sealants must absolutely be avoided.

5 SURFACE PRE-TREATMENT AND MASKING

The substrate's quality has a major influence on the long lasting bond of sealants.

Surfaces must be clean, dry and free from oil, grease and dust. Do not contaminate cleaned surfaces during any phase of production. If contamination occurs, surfaces have to be cleaned again.

The information in Table 1 is offered for general guidance only. Note: with the exception of clear float glass (untouched, not treated), Sika has to test the adhesion of Sikasil® WS weather sealants on project-basis on original samples or samples that are produced in the identical way as the original substrate used in the final project.

The use of the surface pre-treatment agents recommended in the laboratory report is mandatory; otherwise any warranty is void.

TABLE 1 Overview of suitable pre-treatments for Sikasil® WS products

| Substrate | Surface Pre-treatment |
|---|---|
| Float glass (including tempered, toughened, laminated and tinted types) | Sika® Cleaner G+M or Sika® Cleaner P ^{A)} or Sika® Aktivator-205 ^{B)} or Sika® Aktivator-100 ^{B)} |
| Pyrolytically coated glass | |
| Ceramic-coated (enameled) glass | |
| Anodized aluminum | |
| Stainless steel | |
| Polyester powder-coated aluminum or PVDF-coated aluminum | Sika® Aktivator-205 ^{B)} |
| Concrete | Wire brush and Sika® Primer-210 |
| Natural stone | Wire brush and Sika® Primer-210 |

A) For greasy or oily metal surfaces, Sika® Cleaner G+M is recommended instead of Sika® Cleaner P.

B) Sika® Aktivator-100 and Sika® Aktivator-205 leave a visible film on the pre-treated surfaces and can change the appearance of the pre-treated substrates. If this is not acceptable, use masking tape to protect visible areas.

5.1 APPLICATION OF Sika® Cleaner G+M AND Sika® Cleaner P

Sika® Cleaner G+M and Sika® Cleaner P are solvent-based cleaning agents. Both cleaners are used in the following way:

1. Moisten a clean, dry, oil-free and lint-free paper with Sika® Cleaner G+M or Sika® Cleaner P and apply it on the surface. Make sure to turn the paper to expose new surface or replace it regularly in order to avoid wiping any residues back onto the surface.
2. Immediately wipe-off the cleaner with a clean, dry, oil-free and lint-free paper before it dries. (If not removed, the dissolved contaminants would remain on the surface)
3. Repeat this procedure until the surface is clean.
4. The required minimum flash-off time is 2 minutes at 5°C – 40°C on non-absorbing substrates.
5. If cleaned parts cannot be bonded immediately, protect them against subsequent contamination.

Adhesives or other pre-treatments need to be applied within 2 hours after the cleaning with Sika® Cleaner G+M and Sika® Cleaner P. Otherwise the procedure as described above must be repeated.

5.2 APPLICATION OF Sika® Aktivator-100 OR Sika® Aktivator-205 / Sika® Aktivator-205 LUM

Sika® Aktivator-100 and Sika® Aktivator-205 /-205 LUM are activating agents to pre-treat surfaces to improve adhesion and shall always be applied on substrates after they have been properly cleaned with Sika® Cleaner G+M or Sika® Cleaner P.

The mentioned activators are not a simple cleaning solvent but contain adhesion promoters. It leaves active groups on the substrate surface. On some surfaces, this pre-treatment may be visible and change the substrate appearance. Therefore, it is important in visual sensitive application areas to use masking tapes prior to the application of the activators.

1. Moisten a clean, dry, oil-free and lint-free paper with the activator and apply it on the surface. Make sure to turn the paper to expose new surface or replace it regularly to avoid wiping any residues back onto the surface.
 - In case of Sika® Aktivator-100: Immediately wipe-off the activator with a clean, dry, oil-free and lint-free paper before it dries.
 - In case of Sika® Aktivator-205 / Sika® Aktivator-205 LUM: The surface must not be dried subsequently with a paper towel.
2. The required minimum flash-off time are as follows (depending on the temperature in the workshop area):
 - ≥ 15°C: 10 minutes
 - < 15°C: 30 minutes
 - maximum flash-off time 2 hours

If pretreated parts are not bonded or sealed immediately, protect them against subsequent contamination.

Adhesives need to be applied within 2 hours after the application of the activators. Otherwise, the procedure as described above can be repeated only once before bonding.

Tightly reseal container with the inner plastic liner immediately after each use. The activators shall only be used within one month after opening the can. Discard any activator that has become opaque instead of transparent, has yellowed, gelled or separated.

Sika® Aktivator-205 LUM can be visualized by activating the contained luminescent pigments using a light source with a wavelength of 320 – 420 nm. It is recommended to reduce foreign light such as sunlight or artificial light during the detecting process as well during storage before bonding. Exposure of the pre-treated surface to UV light will degrade the active substances on a faster scale. Luminescent effect will degrade with time.

5.3 APPLICATION OF Sika® Primer-210

Sika® Primer-210 shall always be applied on clean surfaces.

This pre-treatment may be visible and change the substrate appearance. Therefore, it is important in visual sensitive application areas to use masking tapes prior to the application of the primer.

1. Pour a small amount of Sika® Primer-210 into a clean container.
Never dip any applicator into the original primer bottle.
2. Apply one thin but covering coat of Sika® Primer-210 with a foam applicator. Make sure that this single application gives adequately dense coverage. It is required that the primer layer is a complete, uniform layer.
3. Let the primer flash-off. The required minimum flash-off times are as follows (depending on the temperature in the workshop):
 - ≥ 15 °C: 10 minutes
 - < 15 °C: 30 minutes
 - maximum flash-off time on porous substrates is 2 hours
4. If pretreated parts are not bonded or sealed immediately, protect them against subsequent contamination. Adhesives shall be applied within 2 hours after the application of Sika® Primer-210. Apply Sika® Primer-210 once only. Priming process must not be repeated!

Tightly reseal container immediately after each use. Sika® Primer-210 shall only be used within one month after opening the can. Discard any Sika® Primer-210 that has become opaque instead of transparent, has yellowed, gelled or separated.

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5.4 MASKING OF AREAS ADJACENT TO THE JOINTS

To assure neat bond lines and protect areas adjacent to the weather sealing joint, use masking tape.

The tape must not touch the pre-treated surface areas to which the silicone has to adhere. After the tooling process remove the masking tape immediately or latest within the skin time, otherwise joints might be damaged.

6 BACKER ROD INSTALLATION

Elastic sealants may adhere to only two sides of the joint to perform properly. The bottom surface of the sealant must be free to deform. If the bottom of sealant adheres, the sealant will rupture during deformation. To avoid adhesion to the joint's bottom and to limit its depth, backing rods are used (see Figure 2).

It is recommended to use closed cell, compatible foam backer rods e.g. high-resilient polyethylene foam rods. The diameter of the backer rod must be at least 25 % bigger than the joint width. Do not use sharp tools which may damage the backer rod surface. Damages on the backer rod's skin may influence the joint's quality or its aspect negatively.

If joints are too shallow for backing material to be inserted, it is recommended to use a polyethylene tape. This acts as a release film (bond breaker), allowing the joint to move and the sealant to stretch freely.

7 PROCESSING AND PRODUCT APPLICATION

7.1 SEALANT APPLICATION, TOOLING AND FINISHING

After suitable joint and substrate preparation Sikasil® weather sealants can be applied. It is important that the sealant fully fills the joint gaps. Sikasil® weather sealants can be applied either by an electrical, manual or pneumatical application gun or a pump system. Follow the instructions given by the equipment manufacturer.

Tooling and finishing must be carried out within the skin time of the sealant. The skin time given in the Product Data Sheet is determined under 23 °C / 50 % r.h.. Higher temperature and higher humidity reduce the skin time. It is recommended to test the skin time on the on-site conditions.

When tooling freshly applied Sikasil® WS products, press the sealant against the joint flanks to achieve a good wetting of the bonding surface. Wetting of tools with tooling agents (e.g. Sika® Tooling Agent N) can improve handling but spraying the tooling agent onto the joints and substrates is not advisable. Do not use solvent containing products for tooling joints.

7.2 REMOVAL OF SIKASIL® WEATHER SEALANTS

Uncured Sikasil® WS products may be removed from tools and equipment with Sika® Remover-208. Once cured, the material can only be removed mechanically.

Hands and exposed skin shall be washed immediately using Sika® Cleaner-350H cleaning towels or a suitable industrial hand cleaner and water. Do not use solvents on skin.

8 REGULARE CONTROL / QUALITY CONTROL OF APPLIED WEATHER SEALANT JOINT

8.1 FIELD ADHESION TEST

The field adhesion test is performed directly on the job site and is a qualitative screening procedure that may help to identify mistakes in the application of the sealant. This includes poor cleaning, incorrect use of primer or missing primer, poor primer application or improper joint filling, etc.. To evaluate the sealant adhesion on site, a simple hand pull test (according to ASTM C1193) can be used at the job site.

Field adhesion testing must be documented. It is suggested that five tests for the first 500 meters and one test per 500 meters thereafter are carried out. Alternatively, one test per floor / elevation can be undertaken after the initial 5 tests are carried out.

The hand pull test procedure is as follows (see Figure 3):

- Make a knife cut from one side of the joint to the other (perpendicular to the joint) ①.
- Make two cuts (parallel to the joint) from the horizontal cut approximately 75 mm long, at both sides of the joint, making sure no damage is caused to the substrate's surfaces ②.
- Hold the loose part of the sealant and pull at a 90° angle ③.
- Check the adhesion of the sealant to both substrates separately, even if they are of the same material. This is accomplished by extending the vertical cut along one side of the joint, checking adhesion to the opposite side, and then repeating for the other surface ④.
- Pass/fail criteria for each sealant must be used; 90 % cohesive failure is classified as a pass. If any signs of adhesive failure are observed, then the sealant manufacturer must be contacted and a more detailed examination undertaken.
- Whilst undertaking the field adhesion test, you shall also inspect the quality of the joint section removed. Check if the sealant completely fills the joint, no voids or air bubbles are present, and the sealant joint dimensions are in line with those specified on the drawings. Contact your local Sika representative if you have any concerns related to the sealant adhesion or the quality of installation.
- Record the test results in a project logbook so that the results can be included in the project manual.

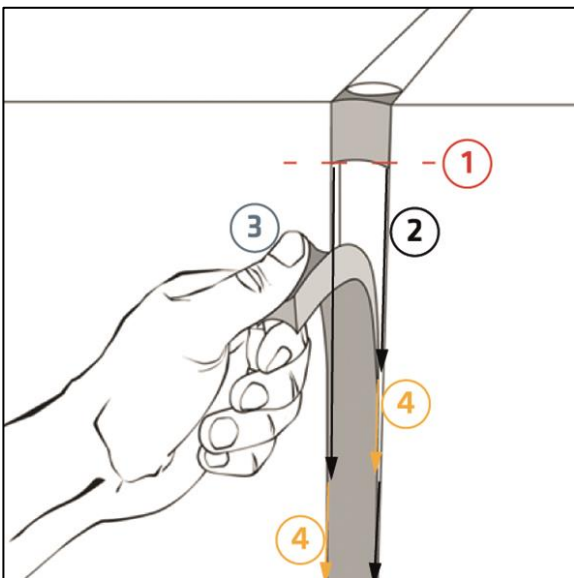


FIGURE 3 Field adhesion test acc. to ASTM C1193

8.2 INSPECTION

Joint sealants should be inspected on a regular basis (e.g. annually) and as soon as any water ingress through the joint sealant is suspected. This inspection of the joint is typically carried out as part of a general building façade survey. The first stage of the inspection is a simple visual inspection of the joint sealants to identify the following damages:

- Loss of adhesion
- Sealant cohesive failure
- Substrate cohesive failure (Substrate failing close to the bond line)
- Any evidence of water leakage
- Other observations etc.

As joint sealant failures may not be readily apparent by visual inspection alone, it is useful, as part of the “visual” assessment, to gently press the joint sealant with a blunt tool. This may reveal a loss of adhesive bond that is otherwise not observable. On larger projects it is often not practical to inspect all joints and a partial survey is taken. The frequency of inspection (number of joints to be inspected / number of inspections on a joint) needs to be agreed with the building owner and typically increased if joint failures are found.

If a failure of the weather sealant joint is discovered, a survey of the failures needs to be completed. This will assist a proper assessment of the cause of the failure (such as degradation of the joint material, excessive joint movement, poor installation procedures, etc.) and will enable a proper specification for the joint sealant replacement. The following information should be recorded (survey):

- Number, type and location of failures
- General condition of the joint sealant
- Joint dimension (Width and depth; needs to be determined by cutting out samples)
- Type and condition of the backing material
- Type and condition of joint substrate
- General observations (e.g. evidence of water leakage, evidence of previous repair cracking or other damage of the substrate etc.)
- Sealant used and number of units (unipacks, cartridges, drums, pails) showing the observed failure

9 REPAIR

1. Removal of existing sealant and preparation of joint:

Cut out the existing Sikasil® weather sealants in a way that about 1 – 2 mm of silicone sealant remains on the metal frame or glass pane, as long as the adhesion to these substrates is perfect. If possible do not scratch out the sealant completely since this could damage the substrate surface. For complicated designs and joint geometries, vibration cutters or similar tools can be used. The cut must be absolutely smooth and must never leave loose sealant parts on the cut surface. Remove the backing material completely.

Do not clean the remaining surface of the sealant if it is resealed immediately after the sealant has been cut out. If the joint is resealed later, it may be necessary to clean with Sika® Cleaner P. Since silicone can absorb solvent, clean very carefully using a cloth only sparingly moistened with Sika® Cleaner P. Allow Sika® Cleaner P to evaporate completely before resealing (i.e. no wet residues remain on the silicone). Do not use any other cleaning or pre-treatment agents for this operation!

2. Application of pre-treatment and sealant see chapter 5 to chapter 8

10 REFERENCES

| Pos. | Source | Title / Link |
|-------|-------------------------------------|--|
| [I] | ASTM C1193 | Standard Guide for Use of Joint Sealant |
| [II] | Additional Technical Information | Unipack opening |
| [III] | Additional Technical Information | Adhesion and compatibility test with Sikasil® IG, Sikasil® SG and Sikasil® WS adhesives and sealants for façade projects, following Sika`s Bonding Excellence Workflow |
| [IV] | Bonding Excellence project platform | http://www.sika-bonding-excellence.com |
| [V] | General Guideline | Design and calculation of Sikasil® SG joints in Structural Sealant Glazing applications |

Disclaimer

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