



# GENERAL GUIDELINES

## Sikasil® Weather Sealants

01.08.2018 / VERSION 2 / SIKA SERVICES AG / TECHNICAL DEPARTMENT INDUSTRY

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## 1 PURPOSE AND GENERAL INFORMATION

This document contains recommendations and hints for the application of Sikasil® weather sealants (WS). This guideline is relevant for the following products:

- Sikasil® WS-200
- Sikasil® WS-300 AP
- Sikasil® WS-300 EU
- Sikasil® WS-300 KR
- Sikasil® WS-305 EU
- Sikasil® WS-305 AP
- Sikasil® WS-305 KR
- Sikasil® WS-605 S
- SikaHyflex®-355

All mentioned Sikasil® WS products and SikaHyflex®-355 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. These guidelines should be read in conjunction with the relevant Product Data Sheets. This document covers general recommendations.

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

## 2 AREAS OF APPLICATION

Sika offers a wide range of silicone weather sealants each of them designed to meet specific requirements for different applications. The following table shows Sika's silicone weather sealant portfolio and typical applications for each product.

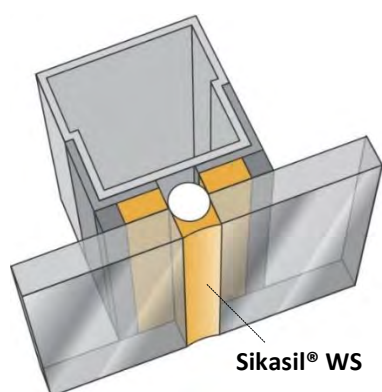
Product	Typical Applications
Sikasil® WS-605 S	Sikasil® WS-605 S can be used for waterproofing and sealing applications e.g. for structural glazing, curtain walling and windows where durability under severe conditions is required including the high movement capability. Approved for direct contact with Sikasil® SG and Sikasil® IG products. Movement capability $\pm 50\%$ (ASTM C 719)
Sikasil® WS-305 EU Sikasil® WS-305 AP Sikasil® WS-305 KR	Sikasil® WS-305 can be used for waterproofing and sealing applications e.g. for structural glazing, curtain walling and windows where durability under severe conditions is required including the high movement capability. EU Version produced in Europe, compliant with relevant European standards and ASTM AP Version produced in Asia/Pacific, compliant with ASTM KR Version produced in Korea and compliant with ASTM Approved for direct contact with Sikasil® SG and Sikasil® IG products. Movement capability $\pm 50\%$ (ASTM C 719)
Sikasil® WS-300 EU Sikasil® WS-300 AP Sikasil® WS-300 KR	Same applications as Sikasil® WS-305 with lower movement capability and available in translucent color. Approved for direct contact with Sikasil® SG and Sikasil® IG products. Movement capability $\pm 25\%$ (ASTM C 719)
Sikasil® WS-200	Same applications as Sikasil® WS-605 S with lower movement capability and available in translucent color. Approved for direct contact with Sikasil® SG and Sikasil® IG products. Movement capability $\pm 25\%$ (ASTM C 719)
SikaHyflex®-355	Weatherproofing sealant for metal cladding facades and natural stone where non-staining and non-streaking properties are required. Movement capability $\pm 35\%$ (ASTM C 719)

### 3 JOINT DESIGN AND JOINT DIMENSIONING

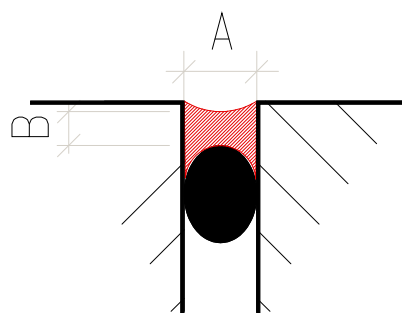
Joints must be properly dimensioned as changes are no longer possible after either construction nor sealant application. For optimum performance, the joint width must be designed according to the movement capability of the sealant based on the expected movement. Furthermore, the following joint dimensioning 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)	$\geq 6 \text{ mm}$ $\leq 45 \text{ mm}$
Joint depth (B)	$\geq 6 \text{ mm}$ $\leq 15 \text{ mm}$
Width/depth ratio (A:B)	between 2:1 and 4:1



**FIGURE 1** Typical WS joint situation. Weather sealant is marked in yellow between glass panes



**FIGURE 2** Joint width (A) and joint depth (B) of a sealant joint (sealant marked in red)

Sika offers design reviews.

### 4 COMPATIBILITY AND APPLICATION LIMITS

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

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 sealants and/or adhesives are used, allow the first one to cure completely before applying the next one.

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

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

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.

## 5 WORKING PLACE CONDITIONS

Although Sikasil® weather sealants may be applied between 5 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 K higher than the dew point temperature of the air, to reduce condensation risks.

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 above 50 °C e.g. by exposure to direct sun radiation, is not advisable as it may lead to bubble formation.

Joint movements before the sealant has cured can deform the sealant and could cause cracks and leakages.

Field adhesion tests (see Chapter 9) are recommended. In order to get the best quality of joint sealings, direct sunlight have to be avoided during application and curing. Temperatures above 50 °C during curing of Sikasil® weather sealants must be avoided absolutely.

## 6 BACKER ROD INSTALLATION

For backfilling, it is recommended to use closed cell, compatible foam backer rods e.g. high resilience polyethylene foam rods. The diameter of the backer rod should be approx. 25 % larger than the joint width. Do not use sharp tools which may damage the backer rod's surface.

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 SURFACE PRE-TREATMENT AND MASKING

The substrate's quality has a major influence on the long term performance of sealants applied on it.

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. Please note that 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 for the adhesion behaviour of Sikasil® weather sealants is null and 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 ** or Sika® Aktivator-205 * or Sika® Aktivator-100 *
Pyrolitically coated glass	
Ceramic-coated (enameled) glass	
Anodized aluminum	
Stainless steel	Sika® Aktivator-205 *
Polyester powder-coated aluminum or PVDF-coated aluminum	
Concrete	
Natural stone	Wire brush and Sika® Primer-210

\* 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.

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

### 7.1 APPLICATION OF Sika® Cleaner G+M OR Sika® Cleaner P

Sika® Cleaner G+M and Sika® Cleaner P are solvent-based cleaning agents. For greasy or oily surfaces use Sika® Cleaner G+M which has a better oil/grease removal capability than Sika® Cleaner P. Both cleaners are applied by the “wipe on/wipe off method”:

1. Moisten a clean, dry, oil-free and lint-free paper towel with Sika® Cleaner G+M / Sika® Cleaner P and wipe the surface with it. Use every time a fresh paper towel in order to retain the cleansing power and to avoid wiping residues back onto the surface.
2. Then wipe-off the solvent with a clean, dry, oil-free and lint-free paper towel. Wipe off the solvent before it dries.



Never wait until Sika® Cleaner G+M / Sika® Cleaner P has evaporated from the surface because dissolved contaminants would remain behind.

3. Repeat this procedure until the surface is clean.
4. The required minimum drying time at 5 °C – 40 °C is 2 minutes on non-absorbing substrates.
5. If cleaned parts cannot be bonded immediately, protect them against subsequent contamination.
6. If more than two hours have passed since cleaning, always repeat the cleaning process before bonding.

For more details about Sika® Cleaner G+M and Sika® Cleaner P refer to the actual Product Data Sheets (PDS) and Safety Data Sheets (SDS).

## 7.2 APPLICATION OF Sika® Aktivator-100 OR Sika® Aktivator-110 LUM

Sika® Aktivator-100 and Sika® Aktivator-110 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.

Sika® Aktivator-110 LUM contains luminescent pigments that allow detecting its presence after the surface pre-treatment.



Sika® Aktivator-100 and Sika® Aktivator-110 LUM are not simple cleaning solvents but contain an adhesion promoter which 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 critical (visual) application areas to use masking tapes prior to the application of Sika® Aktivator-100 / Sika® Aktivator-110 LUM.

1. Moisten a clean, dry, oil-free and lint-free paper towel with Sika® Aktivator-100 / Sika® Aktivator-110 LUM and apply it on the surface. Use every time a fresh paper towel in order to avoid wiping any residues back onto the surface.
2. Immediately wipe-off the solvent with a clean, dry, oil-free and lint-free paper towel. Wipe-off the solvent before it dries.
3. The required minimum and maximum drying times on non-absorbing substrates are as follows (depending on the ambient temperature):
  - $\geq 15\text{ °C}$ : 10 minutes
  - $< 15\text{ °C}$ : 30 minutes
  - maximum flash-off time 2 hours
4. If pretreated parts are not bonded or sealed immediately, protect them against subsequent contamination. Adhesives have to be applied within 2 hours after the application of Sika® Aktivator-100 / Sika® Aktivator-110 LUM. Otherwise the procedure as described above has to be repeated before bonding. Pre-treating procedure can be repeated once only.

Sika® Aktivator-110 LUM can be visualized by activating the contained luminescent pigments using a light source with a wavelength of 320 nm to 420 nm. It is recommended to reduce foreign light such as sunlight or artificial light during the detecting process. Exposure of the pre-treated surface to UV light will degrade the active substances on a faster scale. Luminescent effect will degrade with time.

For more details about Sika® Aktivator-100 / Sika® Aktivator-110 LUM refer to the actual Product Data Sheet (PDS) and Safety Data Sheet (SDS).



Sika® Aktivator-110 LUM cannot replace Sika® Aktivator-100 without testing the adhesion of the adhesive on the pre-treated substrate and vice versa.



Tightly re-seal container with the inner plastic liner immediately after each use. Sika® Aktivator-100 / Sika® Aktivator-110 LUM shall only be used within one month after opening the can. Discard any Sika® Aktivator-100 / Sika® Aktivator-110 LUM that has become opaque instead of transparent, has yellowed, gelled or separated.

### 7.3 APPLICATION OF Sika® Aktivator-205 OR Sika® Aktivator-205 LUM

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

Sika® Aktivator-205 LUM contains luminescent pigments that allow detecting its presence after the surface pre-treatment.



Sika® Aktivator-205 and Sika® Aktivator-205 LUM are not a simple cleaning solvent but contains an adhesion promoter which leaves active groups on the substrate surface. On some surfaces, for example on certain glossy powder-coated aluminum profiles, this pre-treatment may be visible and change the appearance of the profile. Therefore, it is important in critical (visual) application areas to use masking tapes prior to the application of Sika® Aktivator-205 / Sika® Aktivator-205 LUM.

1. Moisten a clean, dry, oil-free and lint-free paper towel with Sika® Aktivator-205 / Sika® Aktivator-205 LUM and apply it on the surface. Use every time a fresh paper towel in order to avoid wiping any residues back onto the surface.
2. Different from ordinary cleaning agents or Sika® Aktivator-100 and Sika® Aktivator-110 LUM, the surface treated with Sika® Aktivator-205 / Sika® Aktivator-205 LUM must not be dried subsequently with a paper towel.
3. The required minimum drying time at 23 °C / 50 % r.h. is 10 minutes.
4. If pre-treated parts are not bonded or sealed immediately, protect them against subsequent contamination. Adhesives have to be applied within 2 hours after the application of Sika® Aktivator-205 / Sika® Aktivator-205 LUM. Otherwise the procedure as described above has to be repeated before bonding. Pre-treating procedure can be repeated once only.

Sika® Aktivator-205 LUM can be visualized by activating the contained luminescent pigments using a light source with a wavelength of 320 nm to 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.

For more details about Sika® Aktivator-205 / Sika® Aktivator-205 LUM refer to the actual Product Data Sheet (PDS) and Safety Data Sheet (SDS).



Tightly re-seal container with the inner plastic liner immediately after each use. Sika® Aktivator-205 / Sika® Aktivator-205 LUM shall only be used within one month after opening the can. Discard any Sika® Aktivator-205 / Sika® Aktivator-205 LUM that has become opaque instead of transparent, has gelled or separated.

## 7.4 APPLICATION OF SIKA® PRIMER-210

On porous substrates, Sika® Primer-210 shall always be applied after the surfaces have been properly cleaned and are dust-free.

1. Ideal application and surface temperature is between 15 °C and 25 °C.
2. Surfaces must be clean, dry and free from grease, oil, dust and loose particles.
3. Pour a small amount of Sika® Primer-210 into a clean container. Never dip any applicator into the original primer bottle.
4. Apply a thin but covering coat of Sika® Primer-210 with brush, a felt, clean lint-free cloth or foam applicator. Make sure that this single application gives adequately dense coverage. It shall be applied once only.
5. Let the primer dry for a minimum time of 30 minutes. Once the primer has been applied, it is essential that no more solvents get onto the surface and that there is no contamination.
6. If pre-treated parts are not bonded or sealed immediately, protect them against subsequent contamination. Adhesive have to 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 re-seal container immediately after each use. Sika® Primer-210 shall only be used within one month after opening the can. Discard any primer that has gelled or separated.

For more details about Sika® Primer-210 refer to the actual Product Data Sheets (PDS) and Safety Data Sheets (SDS).

## 7.5 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.

# 8 PROCESSING AND PRODUCT APPLICATION

## 8.1 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 a manual/pneumatical application gun or a pump system. Follow the instructions given by the gun/pump manufacturer.

Tooling and finishing must be carried out within the skin time of the sealant. When tooling freshly applied Sikasil® WS products, press the sealant against the joint flanks to achieve a good wetting of the bonding surface.

## 8.2 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 should be washed immediately using Sika® Topclean T or Sika® Cleaner-350H towels or a suitable industrial hand cleaner and water. Do not use solvents on skin!

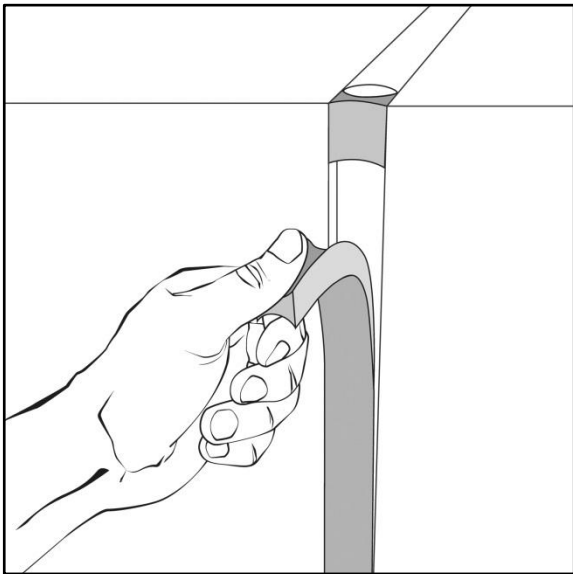
## 9 FIELD ADHESION TEST

The field adhesion test is done directly on the jobsite 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. To evaluate the sealant adhesion on site, a simple hand pull test (according ASTM C1193) can be used at the job site.

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

The hand pull test procedure is as follows:

- Make a knife cut from one side of the joint to the other (perpendicular to the joint).
- 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 substrates surfaces.
- Hold the loose part of the sealant and pull at a 90° angle.
- 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.
- Pass/fail criteria for each sealant has to be used; 95 % cohesive failure is classified as a pass. If any signs of adhesive failure are observed then the sealant manufacturer has to be contacted and a more detailed examination undertaken.
- Whilst undertaking the field adhesion test, you should 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 log book so that the results can be included in the project manual.



**FIGURE 3** Field adhesion test acc. ASTM C 1193

## **10 REPAIR GLAZING**

### **10.1 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 don't 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 the Sika® Cleaner P to evaporate completely before resealing. Do not use any other cleaning or pre-treatment agents for this operation!

### **10.2 MASKING OF AREAS ADJACENT TO THE JOINTS**

To assure neat bond lines and protect areas adjacent to the structural joint, use a masking tape. The tape must not touch the clean surface areas to which the silicone has to adhere. Remove the masking tape immediately after tooling the joint. Do not wait longer than the skin time otherwise the joints might be damaged.

### **10.3 BACKER ROD INSTALLATION AND SEALANT APPLICATION**

For backfilling, it is recommended to use closed cell, compatible foam backer rods e.g. high resilience polyethylene foam rods. The diameter of the backer rod should be approx. 25 % larger than the joint width. Do not use sharp tools which may damage the backer rod's surface.

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 sealants to stretch freely.

Sikasil® weather sealants are gunned into place. It is important that the sealant fully fills the joint using a caulking gun. Tooling and finishing must be carried out within the skin time of the sealant. When tooling freshly applied Sikasil® silicone weather sealants, press the sealant against the joint flanks to get 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.

## 11 LEGAL NOTE

Disclaimer in Method Statements / Manuals and other general technical information

The information contained herein and any other advice are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. The information only applies to the application(s) and product(s) expressly referred to herein and is based on laboratory tests which do not replace practical tests. In case of changes in the parameters of the application, such as changes in substrates etc., or in case of a different application, consult Sika's Technical Service prior to using Sika products. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

## 12 KEY WORDS

Sikasil® Weather Sealant Application Guidelines

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