GENERAL GUIDELINE
Structural Silicone Glazing with Sikasil® SG adhesives

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BUILDING TRUST

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1 PURPOSE AND GENERAL INFORMATION

Technical support for customers has always been a high priority at Sika. Driven by the use of new materials, stricter building regulations and an increasing decoupling of planning and execution in the globalized economy, our customers are finding that ensuring consistent delivery of complex projects in the construction industry is becoming increasingly challenging. Sika responds to the ever-growing complexity in the construction industry with the BONDING EXCELLENCE quality program. Sika`s BONDING EXCELLENCE quality program is a set of process steps and tools that supports applicators of sealants and adhesives in their task of producing and delivering façades, using Sika`s reliable and certified Sikasil® products.

Visit our website http://www.sika.com/industry and check Sikas BONDING EXCELLENCE quality program: http://www.sika-bonding-excellence.com [I]

This document contains recommendations and hints for the application of Sikasil® SG adhesives in structural bonding applications. It is relevant for the following products:

Table 1: Overview of Sikasil® SG adhesives

Product name	Certified according to or complying with	1- or 2-component silicone SSG adhesives
Sikasil® SG-500	EOTA ETAG 002 part 1 and ASTM C1184	2-component
Sikasil® SG-500 CN	ASTM C1184	
Sikasil® SG-500 S	ASTM C1184	
Sikasil® SG-550	EOTA ETAG 002 part 1 and ASTM C1184	
Sikasil® SG-20	EOTA ETAG 002 part 1 and ASTM C1184	1-component
Sikasil® SG-20 S	ASTM C1184	

Sikasil® SG adhesives in highly demanding and critical applications, such as structural glazing or insulating glass may only be used after a detailed examination and written approval of the corresponding project details by the Technical Department of Sika Industry.

The information herein is offered for general guidance only. Since structural sealant glazing is a demanding application and conditions as well as substrates may vary greatly, customers and applicators must test the suitability of the product for each specific project and contact Sika for advice.

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 INTRODUCTION

Sikasil® SG adhesives are condensation-curing, 1- and 2-component silicone products suitable for bonding glass panes or insulating glass units to a support frame (usually: anodized aluminum, polyester powder-coated aluminum, PVDF-coated aluminum or stainless steel). This technique is known as Structural Silicone Glazing (SSG). Sikasil® SG silicone adhesives have structural capabilities in the sense of EN 13022 / EAD 090010-00-0404 (EOTA ETAG 002 part 1) and ASTM C1401 or other national requirements and are long-term UV-resistant. They have proven their suitability for Structural Silicone Glazing in thousands of façade projects and under various climatic conditions.

3 DESIGN AND JOINT DIMENSIONING

Joints must be properly dimensioned as changes are no longer possible after assembling and installation or adhesive application, respectively. Basis for calculation of the necessary joint dimensions are the technical values of the adhesive and the adjacent building materials, the exposure of the building elements, their construction and size as well as external loads (wind, snow, temperature, climatic loads, etc.). Sika offers a comprehensive project service package including design reviews and structural joint dimensioning. Moreover, Sika provides further insight and support on typical design and joint dimensioning in the General Guideline “Design and calculation of Sikasil® SG joints in Structural Sealant Glazing applications” [II]

4 WORKING PLACE CONDITIONS

The working place must be as dust-free as possible. Ideal conditions are 23°C and 50% relative humidity. As these conditions are usually attainable only in laboratory, one shall make the plant conditions as close as possible. Although Sikasil® SG adhesives may be processed within 5°C – 40°C, the optimum application temperature of the products is between 15°C and 30°C. These limits apply to the temperature of Sikasil® adhesives, the substrates as well as the ambient air.

The temperature of the substrates to be bonded must always be at least 3°C higher than the dew point temperature of the air to reduce condensation risk.

All substrates and adhesives must never be exposed to direct sun radiation, rain, snow or other direct weathering impacts and must be stored under the same conditions (i.e. 5°C – 40°C) at least 24 hours prior to the application of Sikasil® SG.

5 SURFACE PRE-TREATMENT AND MASKING

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

The information in Table 2 is offered for general guidance only. Advice on specific pre-treatment methods based on laboratory adhesion tests will be given on request.

With the exception of clear float glass, it is mandatory that the adhesion of structural silicone adhesive is tested on project basis on production-run samples of the original materials before real production starts. With reference to e.g. glass substrates, adhesion tests have to be performed on samples which are equal in terms of coating type, coating edge deletion, edge cutting, etc. The quality of edge deleted glass strongly depends on e.g. grinding wheel type, pressure, revolving speed, etc.

The use of the surface pre-treatment agents recommended in the project specific Sika Technical Service Report is mandatory.

Preliminary surface cleaning by Sika® Cleaner P or Sika Cleaner® G+M is mandatory before application of any primer or activating agent.

If detectable pre-treatment agents are required, luminescent versions of Sika® Aktivator-205, namely Sika® Aktivator-205 LUM can be used. Adhesion results obtained by Sika® Aktivator-205 can be extended to Sika® Aktivator-205 LUM and vice versa.

Table 2: Overview of suitable pre-treatments

Substrate	Surface Pre-treatment
Float glass	Sika® Cleaner P
Ceramic-coated (enameled) glass	Sika® Cleaner P + Sika® Aktivator-100 or Sika® Cleaner P + Sika® Primer-790
Anodized aluminum	Sika® Cleaner P or Sika® Cleaner P + Sika® Aktivator-100
Stainless steel	Sika® Cleaner P or Sika® Cleaner P + Sika® Aktivator-100
Polyester powder-coated aluminum or PVDF-coated aluminum	Sika® Cleaner P + Sika® Aktivator-205 or Sika® Cleaner P + Sika® Primer-790

Remarks: Sika® Aktivators and Sika® Primer 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 the visible areas.
For greasy, oily or strong polluted surfaces Sika® Cleaner G+M is recommended instead of Sika® Cleaner P.

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-790

Sika® Primer-790 shall always be applied after the surfaces have been properly cleaned by Sika® Cleaner G+M or Sika® Cleaner P.
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 primer.

1. Pour a small amount of Sika® Primer-790 into a clean container.
   Never dip any applicator into the original primer bottle.
2. Apply one thin but covering coat of Sika® Primer-790 with a clean, dry, oil-free and lint-free paper towel or 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 for at least 20 minutes at 23°C / 50% r.h.. Colder temperatures might require longer flash-off time.
4. The adhesives shall be applied within 2 hours after the application of Sika® Primer-790.

If pretreated parts are not bonded or sealed immediately, protect them against subsequent contamination. Apply Sika® Primer-790 once only. Priming process must not be repeated!

Tightly reseal container immediately after each use. Sika® Primer-790 shall only be used within one month after opening the can. Discard any primer that has become opaque instead of transparent, has yellowed, gelled or separated.

5.4 MASKING OF AREAS ADJACENT TO THE JOINTS

To assure neat bond lines and protect areas adjacent to the 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 PROCESSING AND PRODUCT APPLICATION

6.1 TWO-COMPONENT STRUCTURAL SILICONE ADHESIVES

6.1.1 PREPARATORY WORK

Sikasil® SG A-component as well as B-component have a paste-like consistency. To process the two components, a pump system with follower plate is required.

As part of the quality control for the income materials, before placing any new drum / pail of A-component or B-component under the pump, it is recommended to check the pot life (snap time) of the manual mixed material (see Section 8.5), ensuring the correct mixing ratio, **directly** from drum / pail.

Check the Additional Technical Information (ATI) for preventing air entrapment while processing / mixing of 2-part silicone ensuring proper adhesion and material performance of a cured structural silicone joint [VIII].

High viscose 2-component silicones don't require stirring of A-component nor B-component because both components show very little tendency to separate. In the very unlikely case of oil separation of more than 1 cm on the B-component contact the Technical Department of Sika Industry before use.

1a. After opening the 200 liter drum containing the A-component (base) remove all the plastic cover sheets and place the drum under the follower plate.

2a. After opening the pail containing the B-component (catalyst) cut the foil in a diameter of approx. 150 mm. Remove cut foil and any crust or oil from the surface. Place the pail under the follower plate.

Low viscose 2-component silicones like Sikasil® IG-25 S require a slightly different procedure, as follows:

1b. B-component: separation of up to 3 cm might be found and requires remixing. Follow ATI remixing of B-component [IX], including QC ensuring a bubble free remixed B-component.

2b. A-component: after opening the 200 liter drum, remove all the plastic cover sheets, fold the inliner in the center and add an round plastic plate with 20 to 23 cm opening in the center, on top of the material, preventing leakage of the A-component. Cut the foil in the center and place the drum under the follower plate. Follow ATI processing of lower viscos Sikasil® A-component [X], including QC ensuring a bubble free remixed B-component.

Due to its reactivity with atmospheric moisture, the B-component of all Sikasil® SG products must not to be exposed to air for more than 5 minutes. Should a thin layer of a resinous material have developed on top, it has to be removed with a spatula or a similar tool before installing the container under the pump.

3. Start operations carefully following the instructions of the equipment supplier.

For the application of Sikasil® SG-550 a hydraulic pump is required. Pneumatic pumps are not suitable for Sikasil® SG-550 as they are too weak for a proper application speed. For detailed guidance please contact the Technical Department of Sika Industry.

6.1.2 MIXING

To obtain the ultimate physical properties indicated in the corresponding Product Data Sheets, Sikasil® 2-component silicone adhesives must be thoroughly mixed by a 2-component silicone mixing and dispensing equipment with static or dynamic mixers. For recommendations contact the Technical Department of Sika Industry.

For mixing ratio by weight and volume, refer to the corresponding Product Data Sheet. Only small deviations of ± 10% from the mixing ratio indicated in the Product Data Sheet are tolerated. For a proper adjustment of the mixing ratio refer to the manual of the pump equipment. If further assistance is required, contact the equipment manufacturer.

Lot matching of Sikasil® SG A-component (base) and B-component (catalyst) is not required.

The mixer open time, which is the time the material can remain in the mixer without flushing or extrusion of the product, is significantly shorter than the pot life (snap time) indicated in the Product Data Sheets. If the alarm time is set too long cured rubber particles are visible in the extruded material. To maintain a long lifetime of the mixer, the alarm on the equipment has to be set to the values shown in Table 6, chapter 8.14, page 25.

Detailed description of how the mixer open time can be determined is provided in the ATI: Mixer Open Time for 2-component Sikasil® [VII].

The mixer life time and condition can be checked by performing both butterfly test and snake test described in Section 0 and 8.4 respectively.

It is recommended to check the mixer open time by butterfly test (see Section 0). The mixer open time is the maximum time the material can remain in the mixer without flushing or extrusion, which ensures no visible wrinkles and cured rubber particles in the butterfly test. The alarm time shall be set shorter than the measured mixer open time. Typical mixer open and alter times, tested at 23°C / 50% r.h. for each Sikasil® SG product are provided in this document.

During shutdown, it is recommended that the dispensing and mixing equipment is purged with non-catalyzed base (A-component) to retard the curing of the adhesive. Usually, the necessary amount of A-component to purge corresponds to the threefold volume of the mixing system (for systems with a static mixer).

Alternatively, a freezer can be used for downtimes up to 24 hours at a temperature of -40°C or below. However, the reaction will not stop at -40°C but will only be slowed down.

During prolonged production breaks additional flushing with a cleaning agent such as Sika® Mixer Cleaner is recommended. Cleaning the mixer by burning the silicone residues is not advisable.

When restarting production after shutdown, mixed silicone must be purged until obtaining a homogeneous mixture. Depending on the equipment, minimum 1 liter of Sikasil® SG sealant is needed for that purpose if static mixers are used. The quality of mixing and the correctness of the mixing ratio must be checked (see marble test, butterfly test, snake test and mixing ratio by weight in Chapter 8, “Quality Assurance”).

6.1.3 APPLICATION

Sikasil® SG 2-component silicone adhesives must be applied evenly and free of air bubbles. The joint bite for 2-component Sikasil® adhesives is limited to 30 mm (respectively 50 mm in conjunction with open-cell spacer) in one curing step. Deeper joints can be applied in more steps. After complete curing of the first part, the next joint segment of SG adhesive can be applied.

Tooling of the joint should be carried out as soon as possible after adhesive application. It is recommended to tool t before half the pot life (snap time) indicated in the relevant Product Data Sheet.

It must be ensured that the joint is completely filled and that the joint dimensions correspond to the calculated values.

Treatments with detergent, soap and water or any sort of untested tooling agents are not allowed for tooling SG joints.

The application of Sikasil® SG adhesives from 2-component cartridge with a static mixer, for on-site repair is possible. Follow the instruction provided in the ATI: 2-component Sikasil® silicone adhesives application by cartridge [III].

6.2 ONE-COMPONENT STRUCTURAL SILICONE ADHESIVES

6.2.1 PREPARATORY WORK

Working from drums or pails:

1. Before installing the drum or pail into the pump equipment, cured material under the follower plate have to be removed thoroughly.

2a Pails: After opening the pail cut the foil in a diameter of 150 mm. Remove cut foil from the surface.

2b Drums: After opening the drum cut the foil along the welding line. Pull the bag over the drum rim and tape it tightly. Remove the foil from the surface.

3. Put container under the pump and start application according to pump manufacturer's instructions.

All 1-component Sikasil® SG adhesives cure with atmospheric moisture. These products must not be exposed to air for more than 5 minutes.

Working from cartridges or unipacks:

Unipacks should be opened in a way, ensuring optimum quality of the applied adhesive, and avoiding issues. Therefore, refer to the ATI: Unipack opening [IV].

Follow the instructions given by the gun manufacturer.

6.2.2 APPLICATION

Sikasil® SG adhesives are applied by equipment with a metering pump, or manually directly from cartridge or unipack.

The adhesive must be applied evenly and free of air bubbles. The 1-component products form a skin after a certain time (skin time, skin-over time), which varies with ambient humidity and temperature. The joint bite for 1-component Sikasil® SG adhesives is limited to 15 mm in one curing step. Deeper joints can be applied in more steps, e.g. a 25 mm deep joint can be filled in the first step with 10 mm. After curing of the first part, the next 15 mm of Sikasil® SG adhesive can be applied.

Tooling and smoothing of joints should be carried out as soon as possible after the adhesive application and not later than half of the skin time indicated in the relevant Product Data Sheet.

It must be ensured that the joint is completely filled and that the joint dimensions correspond to the calculated values.

Treatments with detergent, soap and water or any sort of untested tooling agents are not allowed for tooling SG joints.

6.3 ENCAPSULATION OF STRUCTURAL GLAZING ADHESIVES

In some construction details it is requested to encapsulate the applied structural glazing adhesive with a weather seal or gasket etc. (see Figure 1). The minimum time between the adhesive application and encapsulation depends very much on the type of adhesive and the gasket material (see Table 3).

All material in direct contact with Sikasil® SG materials, must be tested regarding compatibility before application. Contact the Technical Department of Sika Industry or refer to Bonding Excellence [I].

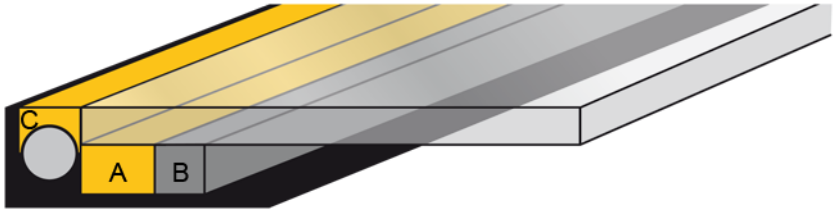

Figure 1: Encapsulated adhesive

Table 3: Encapsulating Sikasil® SG adhesives

SG Adhesive A	Spacer B	Encapsulation C	Time before applying encapsulation C
1-component Adhesive	All materials	All materials	Only after complete curing of SG adhesive, proven by samples with original dimensions and curing at the same conditions as SG units
2-component Adhesive	Open-cell PU tapes: Sika® Spacer Tape HD Norton Thermalbond® V2100 and V2200	Silicone gaskets EPDM gaskets	Immediately after adhesive application
2-component Adhesive	Open-cell PU tapes: Sika® Spacer Tape HD Norton Thermalbond® V2100 and V2200	Neutral weather sealant	> 24 h at 23°C, or consult the Technical Department of Sika Industry
2-component Adhesive	Closed-cell tapes Silicone gaskets EPDM gaskets	Silicone gaskets EPDM gaskets Neutral weather sealants	> 24 h at 23°C, or consult the Technical Department of Sika Industry

Remarks: Times mentioned are based on 23°C tests. Colder temperature will lead to longer curing times, before application of encapsulation products “C”. The curing of Sikasil® SG silicones can be determined by mechanical test on H-specimen, see page 19 chapter 8.9. For the value to obtain see, page 25 chapter 8.14.

7 MOVEMENT OF BONDED ELEMENTS

Bonded units shall not be exposed to stress until certain strength has developed. Since adhesion and strength build-up depend on the adhesive used, environmental conditions and the substrates, respectively, only general recommendations regarding the storage time are given in Table 4. If the situation is ambiguous temporary mechanical supports, retaining devices or Sika® Spacer Tape HD shall be used to prevent loads acting on the joint during storage, transportation and installation.

Table 4: Storage time of bonded façade units*

Step	Conditions	Time after applying 1-component adhesives**	Time after applying 2-component adhesives
Initial curing and adhesion build-up	Store units stress-free in horizontal position	till full curing	24 hours
Strength-build up and increase of adhesion	Store units with dead load support vertically	after full curing, see corresponding PDS	3 days
Further strength and adhesion increase	Transportation of units vertically with support		4 days
Ultimate strength and adhesion reached	Installation of Elements		> 7 days

* Times can be reduced with the use of Sika® Spacer Tape HD (see Figure 1, material B). For details consult the Technical Department of Sika Industry.

** Depends on joint dimension and ambient conditions.

The structurally glazed units must not be moved to the job site until the adhesive has fully cured and it can be demonstrated through quality control testing that the adhesive has achieved full adhesion.

Transportation of elements is possible earlier than stated in Table 4 if tensile adhesion tests on H-specimens (see chapter 8, “Quality Assurance”) kept under the same conditions as the bonded elements, achieves the minimum tensile strength provided in Table 6, chapter 8.14, page 25 and the failure mode is ≥ 95% cohesive.

Depending on the factory conditions and organization of the production process, different times for the movement of bonded elements can be defined based on curing process and adhesion build-up.

8 QUALITY ASSURANCE

Perfect results require carrying out each processing step perfectly. Sika therefore recommends that structural glazing applicators install a strict quality control system. Quality control is the primary responsibility of the processor, but Sika will assist customers in setting up a comprehensive program and train staff to carry out the mandatory tests.

The following sections describe quality procedures and a schedule when to run these tests. Local and regional regulations such as EAD 090010-00-0404 (EOTA ETAG 002 part 1) may require a different quality control scheme.

Sika provides a lab case containing all tools required for the QC procedures described in these guidelines. Figure 2 shows the tools in the lab case. The figures are indicated in the guideline text behind in square brackets.

1 Temperature and air humidity
2 Balance (max. 500 g)
3 Timer (4 individual times)
4 Cups for pot life test
5 Wooden spatulas
6 Doctor blade for peel test samples
7 Scraper for peel test
8 Mold for H-specimens
9 Shore A meter (Durometer)
10 Digital measuring slide
11 Meter (3 m)
12 Magnifier
13 Protective gloves
14 Nozzle cutter

Figure 2: Pocket lab / Lab case for quality control

8.1 TESTING THE MIXING RATIO (2-COMPONENT PRODUCTS ONLY)

The easiest and recommended way to check the mixing ratio is by weight.

1. In normal mixing and metering systems, the two components can be fed separately via special valves.
2. The balance [2] have to be as accurate as 0.1 g
3. Pump both components simultaneously. To achieve maximum accuracy, extrude at least 0.3 liter of component A.
4. Weigh the components and calculate the mixing ratio.
5. For the correct mixing ratio refer to the corresponding Product Data Sheet.

If the ratio by weight is outside the ± 10% range, stop working! Adjust the mixture to the required ratio before continuing. In case of problems with setting the mixing ratio, please contact the equipment manufacturer.

8.2 MARBLE TEST FOR HOMOGENEITY (2-COMPONENT PRODUCTS ONLY)

The marble test is used to check homogeneity of the mixture and it is particularly recommended in applications with high aesthetical demand.

1. Apply a cone of mixed 2-component Sikasil® SG adhesive on a clean float glass plate.
2. Press a second glass plate onto the plate with the adhesive. Avoid air bubbles!

If you see white or deep-black stripes or distinct light-gray marbling, the adhesive is not properly mixed or an insufficient amount of material was discharged after the last shutdown. Never use such material for bonding. To eliminate the defect, follow the equipment manufacturer's instructions. If a static mixer is used, it may have to be cleaned or replaced.

Figure 3: Positive test = ideal mixing

Figure 4: Negative test = inadequate mixing

8.3 BUTTERFLY TEST FOR HOMOGENEITY (2-COMPONENT PRODUCTS ONLY)

The butterfly test is used to check the homogeneity of the mixed material to ensure its ideal properties.

1. Fold a paper or plastic foil along its center and open it again.
2. Apply a bead of mixed Sikasil® SG 2-component adhesive along the fold, moving from one edge to the opposite; the amount has to be equivalent to the volume of the mixers used.
3. Fold the foil again and press it so that the silicone adhesive spreads out. Always press the foil in the direction perpendicular to the fold.
4. Unfold the paper.
5. The silicone adhesive must have a homogeneous color and must not show cured particles (wrinkles).

If you see white or deep-black stripes or distinct light-gray marbling or wrinkles, the adhesive is not properly mixed or an insufficient amount of material was discharged after the last shutdown. Never use such material for bonding. To eliminate the defect, follow the equipment manufacturer's instructions. If a static mixer is in use, it has to be cleaned or replaced.

6. After an adequate curing time, double-check the mixing quality by cutting open the thicker center section of the adhesive and check it for streaks, marbling and bubbles.

Use of the butterfly test is recommended to check the mixer open time (see Section 6.1.2).
In order to check lifetime and conditions of the mixer, it is recommended to use the butterfly test in combination with the snake test.

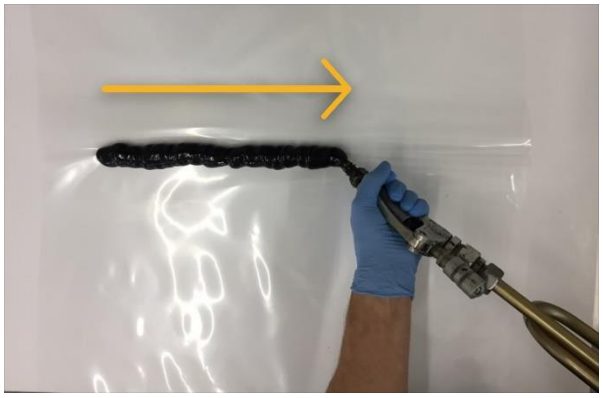

Figure 5: Apply the bead in the fold direction

Figure 6: Press the bead only in direction perpendicular to fold

Figure 7: Unfold the foil - Positive test = ideal mixing

Figure 8: Unfold the foil - Negative test = inadequate mixing

Further information regarding butterfly test is provided in the ATI: Mixer Open Time for 2-component Sikasil® [VII].

8.4 SNAKE TEST (2-COMPONENT PRODUCTS ONLY)

The snake test is used to verify pump mixing quality and allows detecting inconsistent cure, soft spots and inhomogeneous areas of mixed 2-component Sikasil® SG adhesives and may provide evidence that pump maintenance is required.

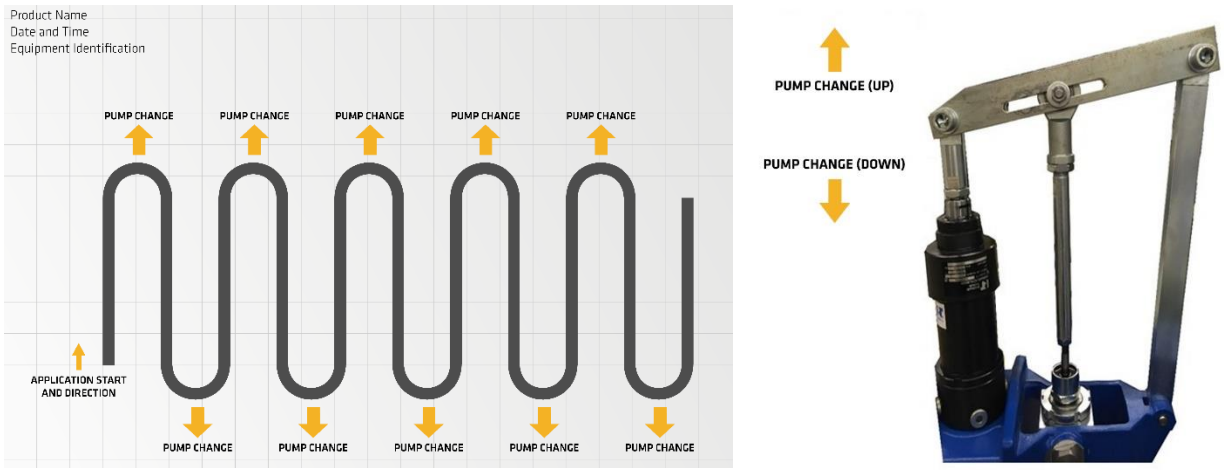

Figure 9: Schematic, application of snake test

1. Apply a continuous “snake-shaped” bead at least 10 mm thick of 2-component Sikasil® SG adhesive on a cardboard.
   Allow the pump to extrude for an amount of adhesive equivalent to at least 5 times the volume of A-component pump. Both the pump change on the top position (pump change up) and the pump change on the bottom position (pump change down) must be recorded on the sample as shown on the picture above (c.f. Figure 9). When the pump change occurs, the equipment releases an audible sound, and the applicator should turn the direction on the bead giving it the characteristic “S” look like a snake.
2. Record the application starting point and direction, product name, date and time and the equipment used. For this test 2 people are recommended, one writing the information and one performing the application.
3. Let the adhesive cure for at least 3 hours.
4. Press every 10 mm with a gloved finger or spatula along the applied bead to check the status of curing of the mixed material and its homogeneity.
   Record the information on the cardboard of differences occurred on the applied bead, like in the example below. A picture of the results should be taken.

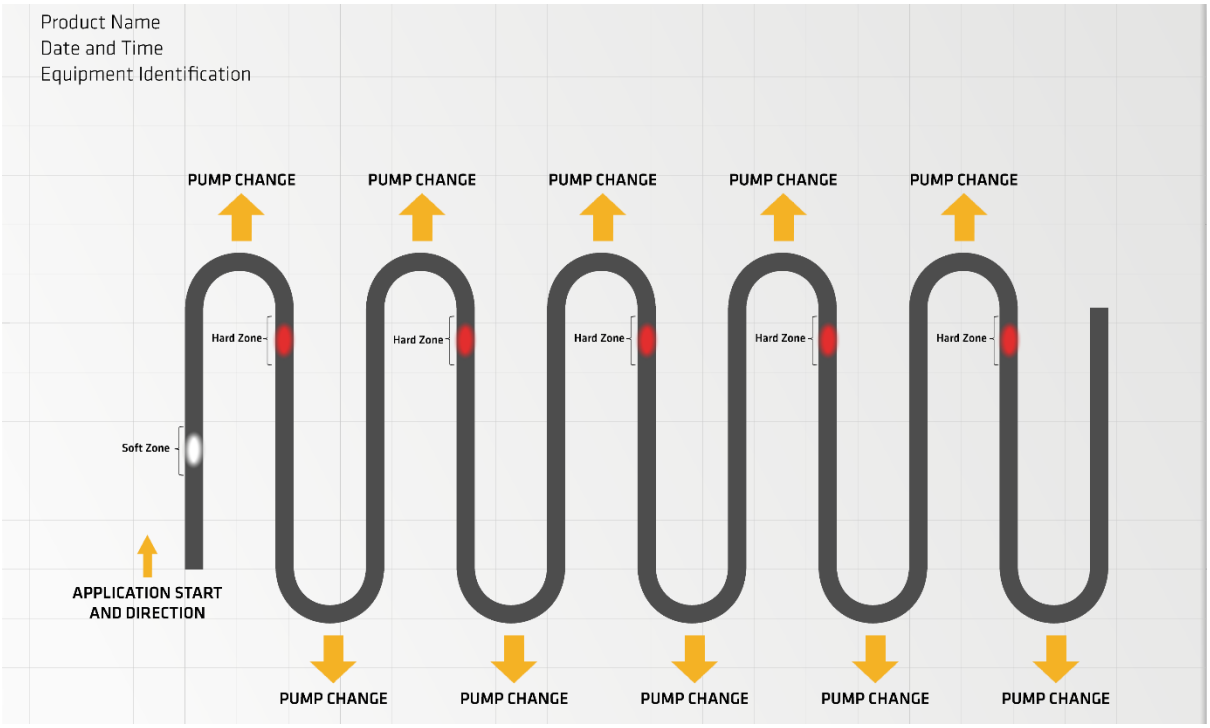

Figure 10: Schematic snake test, example for hard and soft spots which are not OK.

Soft spots or hard spots are a result of mixing ratio variation. If the variation is too high, the application equipment is not dosing the product consistently and pump adjustment is required.
Soft spots usually occur with consistent pattern or length along the bead; never use such material for bonding. To eliminate the defect, follow the equipment manufacturer's instructions or contact the pump supplier.
If a static mixer is in use, it must be cleaned or replaced.

5. Wait 24 hours after the application.
6. Repeat step 3 "Press every 10 mm with a gloved finger or spatula along the applied bead".
   a. If the bead no longer shows soft / hard spots, then the silicone has cured.
   b. If soft and harder spots can still be detected, it most likely effects the mechanical properties and adhesion of the applied Sikasil® SG silicone.
   c. If the material is still distinctively softer or even tacky (wet), then immediate maintenance is required on the machine, the silicone adhesive on the applied façade element must be removed and the element must be re-bond again.
7. Use a sharp knife cut the bead section along its length and check the material conditions; the silicone must have a homogeneous color and must show uniform curing.

If white or deep-black stripes or distinct light-gray marbling is found, the adhesive is not properly mixed or dosed and pump maintenance is required. Never use such material for bonding. To eliminate the defect, follow the equipment manufacturer's instructions or contact a pump supplier.
If a static mixer is in use, it must be cleaned or replaced.

Figure 11: White stripe in material, inhomogeneous mixing

Figure 12: Severe white stripe in material, inhomogeneous mixing

8. If the silicone beads cured homogeneously (no soft / hard spots and no traces of white or black lines are observed in / on the bead) after 24 hours than the snake test is positive.

8.5 POT LIFE / SNAP TIME TEST (2-COMPONENT PRODUCTS ONLY)

1. The pot life must be determined in two ways with similar results:
   a. Pot life by hand mixing: Separately weigh the A- and corresponding B-component in the correct mixing ratio into a plastic cup (approx. 100 g). Stir it thoroughly with a wooden spatula [5] for 60 seconds by hand. Ensure to include all material into the mix, especially the one sitting on the wall of the plastic cup.
   b. Pot life of Sikasil® SG material applied from pump out of mixer, extrude 30 - 75 ml freshly mixed 2-component silicone Sikasil® SG adhesive into a small plastic cup, e.g. made of polyethylene [4].

   Both results (snap times) must be the same. If a difference is found, the equipment (mixer, hoses, etc.) must be maintained.
2. Start the timer [3].
3. After 25 minutes pull out the spatula quickly with its flat side perpendicular to the paste and stir the paste briefly.
4. Repeat this operation every 5 minutes.

If the vigorous stirring is repeated too often, especially at the beginning of the test, the build-up of mechanical strength is disturbed and simulates a longer pot life.

5. The pot life / snap time is the time from extrusion of the silicone adhesive until the point at which it no longer forms long strings (Figure 13) when the spatula is removed, but breaks off in short length (Figure 14).
6. The measured value must be in line with the typical quality control values, provided in Table 6, chapter 8.14, page 25

Note: The snap time strongly depends on the temperature of the material. Hand mixed material can have a slightly longer snap time than mixtures from the static mixer (approx. ± 10%).

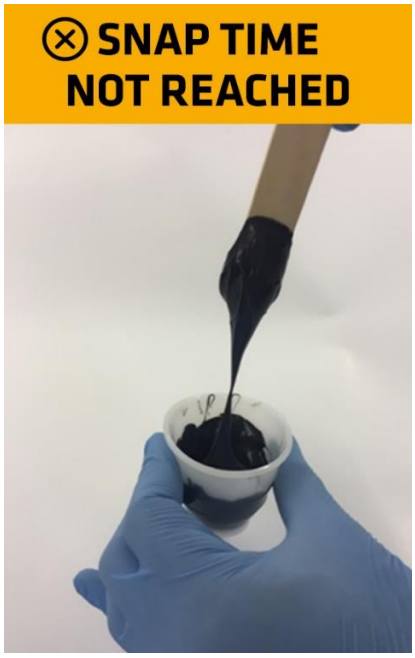

Figure 13: Material shows paste-like behavior: snap time not yet reached

Figure 14: Material shows rubber-like behavior: snap time reached

8.6 SKIN TIME AND TACK-FREE TIME (1-COMPONENT PRODUCTS ONLY)

With 1-component silicone adhesives, check the skin time and tack-free time as follows:

1. Apply with a spatula about 30 g of the adhesive to paper or film in a thickness of about 3 to 4 mm and start timer [3].
2. Test every three minutes whether the adhesive surface has changed by probing with a clean fingertip.

Skin time is the point at which the adhesive no longer sticks to the finger (Figure 15 - Figure 19).

Tack-free time is the point at which the surface feels dry (no longer tacky).

The skin time and tack-free time given in the Product Data Sheets were determined under standard climatic conditions (23°C, 50% r.h.). Higher temperature and higher humidity reduce the skin time and tack-free time.

If there are drastic deviations (more than ± 50%) from the values given in the certificate of analysis or Table 6, chapter 8.14, page 25, stop bonding and consult the Technical Department of Sika Industry.

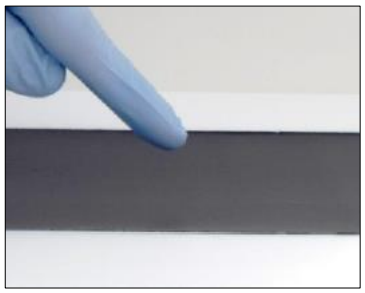

Figure 15: Start at the beginning of the bead

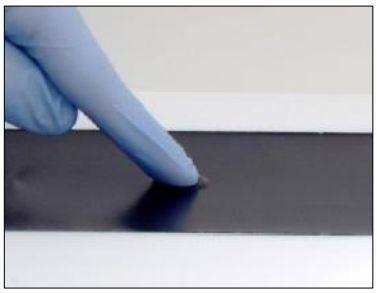

Figure 16: Touch slightly the bead with the finger

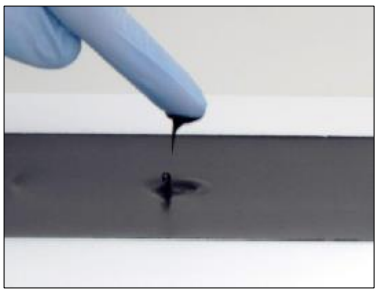

Figure 17: Remove and check for residues

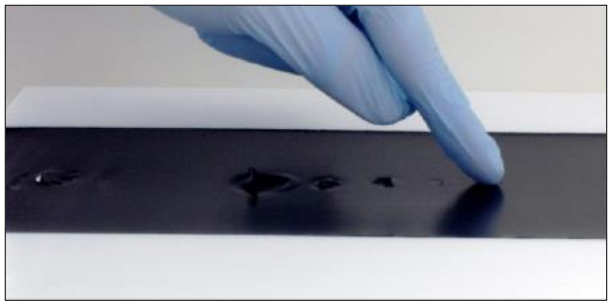

Figure 18: Always change the position for the next test

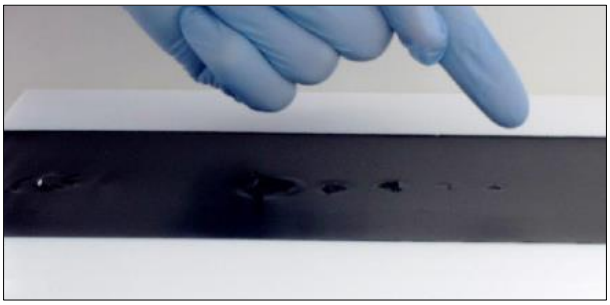

Figure 19: If no residues on your fingers are recognized the skin-over time has been reached

8.7 SHORE A HARDNESS

Check the Shore A hardness according to ISO 868 using a conventional trailer pointer device [9]. The test specimens must have a smooth, flat surface and a thickness of at least 6 mm. Use a doctor blade [6] for finishing the applied bead at the right seal height. This Shore A hardness measurement is an indication of a correct mixing ratio and speed of total curing. The minimum acceptable Shore A hardness of specific Sikasil® SG adhesives after 24 hours at room temperature (2-component adhesives) and 72 hours at room temperature (1-component adhesives) respectively is indicated in Table 6, chapter 8.14, page 25.

Note: Temperature – and for 1-component products also humidity – have a significant influence on the curing speed of condensation-curing silicone adhesives, actual Shore A hardness values may vary with factory conditions.

8.8 PEEL ADHESION TEST

1. Extrude a bead of Sikasil® SG adhesive of at least 150 mm length onto a clean substrate of original material (pre-treatment exactly as in production line).
2. Draw a template / doctor blade [6] over the bead to ensure its uniform size (about 15 mm wide and 6 mm high).
3. Store the test specimens at room temperature for 24 hours (2-component products) and 72 hours (1-component products), respectively.
4. Carry out the test by cutting approx. 30 mm of one end of the bead from the substrate with a sharp knife or glass scraper [7].
5. Fold back the loose end at an acute angle of about 30° (Figure 20) and try to detach the cured rubber from the substrate.
6. If the cured silicone cannot be detached, use the knife or glass scraper to cut it through to the substrate (Figure 21) several times while still pulling.
7. Repeat this procedure until at least 75 mm of the bead length has been tested.

After 24 hours (2-component products) and 72 hours (1-component products) respectively, the bead must not detach from the substrate during pulling (i.e. 95% cohesive failure).

Figure 20: Peel adhesion test: pulling the bead apart, result: 100% cohesive failure

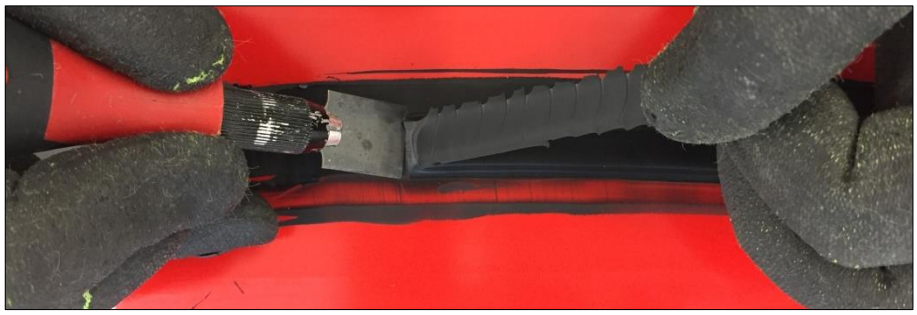

Figure 21: Peel adhesion test on enameled glass: cutting the bead while pulling

8.9 TENSILE ADHESION TESTS ON H-SPECIMENS

H-specimens with a joint dimension of 12 mm x 12 mm x 50 mm are produced for the tensile test. For this purpose, use original materials that have been pre-treated like on the production line.

1. Fix the glass and/or metal (use original material specified in project) test specimens to be bonded with spacers [8] and, if applicable, distance pieces (Figure 28, Figure 29) so that a joint measuring 12 mm x 12 mm x 50 mm can be filled.
   For 1-component adhesives wrap an e-PTFE tape around the spacers before assembly.
2. Prepare at least 2 bubble-free test specimens per test series with Sikasil® SG adhesive.
   Remove excess material with a spatula [5] or another tool.
3. Remove the molds from the test specimen after the recommend storage times, at production conditions (remove spacers, adhesive tape or clamps).
4. Determine the tensile strength after at least 72 hours for 2-component products or 21 days for 1-component products by means of a tensile testing equipment (pulling speed: 5 mm/min) or other suitable apparatus (see Figure 35)

If a tensile strength lower than the limits of the relevant Sikasil® SG adhesives, see Table 6, chapter 8.14, page 25 is attained, consult the Technical Department of Sika Industry before continuing. The failure mode must be at least 95% cohesive failure.

In absence of local standards, Sikasil® SG products shall meet the minimum values given Table 6, chapter 8.14, page 25.

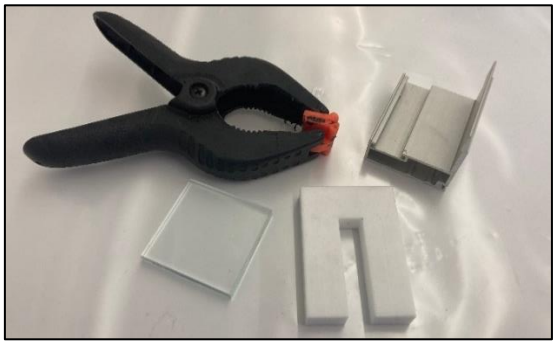

Figure 22: White, Teflon-Spacer (U-shape) and substrates glass and aluminum profile

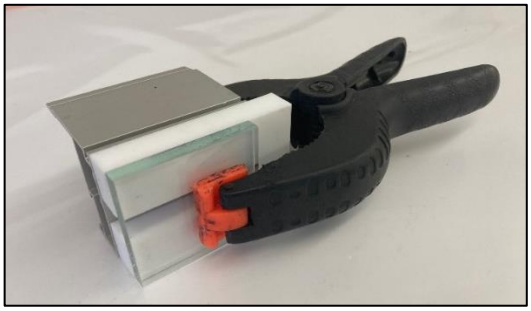

Figure 23: Assembled: white, Teflon-Spacer (U-shape) and substrates glass and aluminum profile

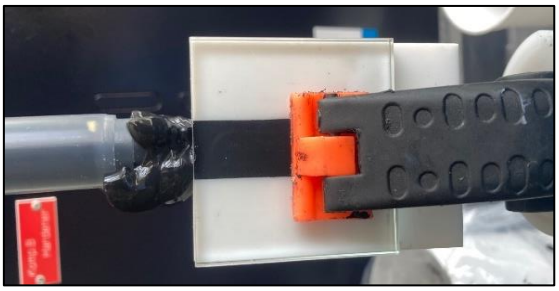

Figure 24: Fill the H-specimen completely with adhesive, avoiding air bubbles

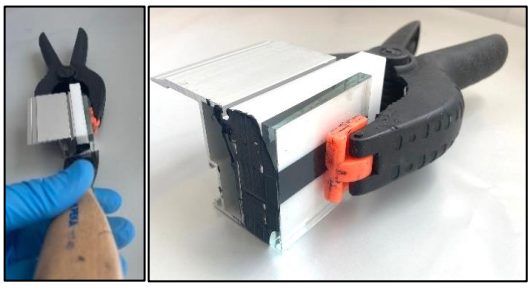

Figure 25: Remove excessive adhesive to ensure a proper, smooth and uniform adhesive surface

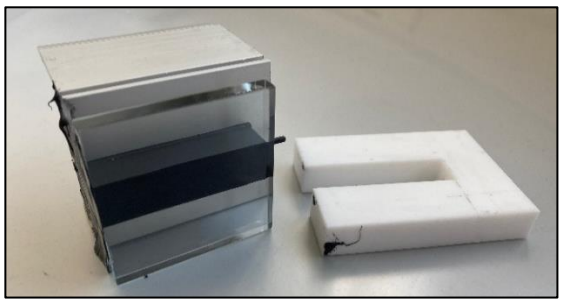

Figure 26: Remove the white, U-shaped Teflon-spacer after the relevant curing times (see above)

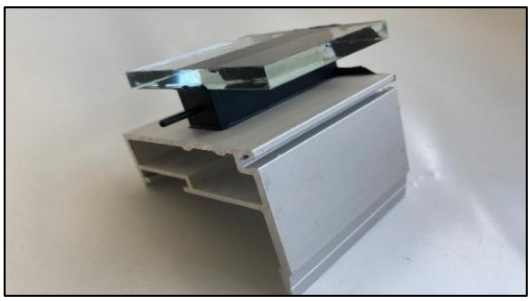

Figure 27: H-specimen (glass and aluminum profile) for tensile testing, determining maximum tensile strength.

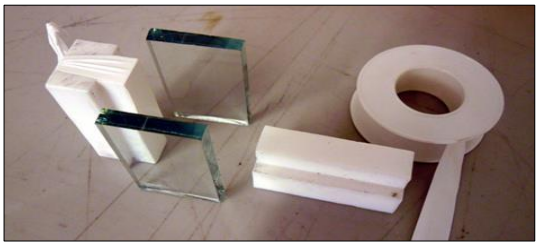

Figure 28: Alternative: white, Teflon-Spacers, with PTFE tape (tape necessary for 1-component adhesives) and substrate pieces (e.g. glass)

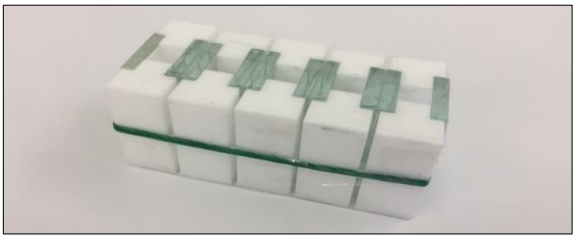

Figure 29: Arrangement and fixation of H-specimen with a rubber band and tape (transparent)

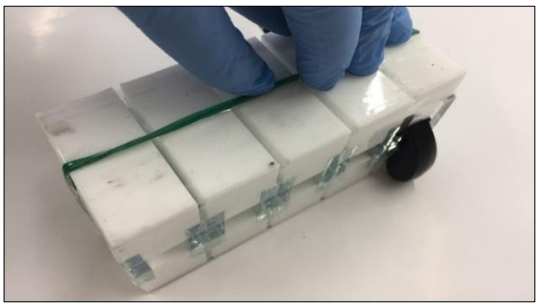

Figure 30: Completely filling of the H-specimens with adhesive, avoiding air bubbles

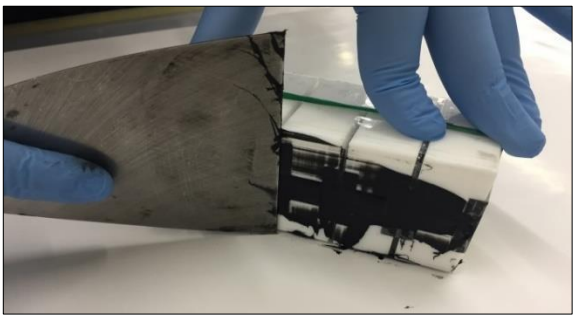

Figure 31: Remove excessive adhesive to ensure a proper, smooth and uniform adhesive surface

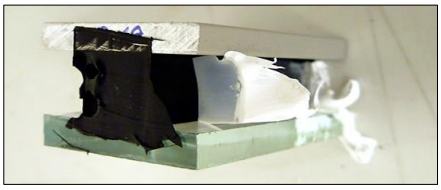

Figure 32: Remove spacers after 1 day,
remove e-PTFE tape after 7 days (1-component adhesives).

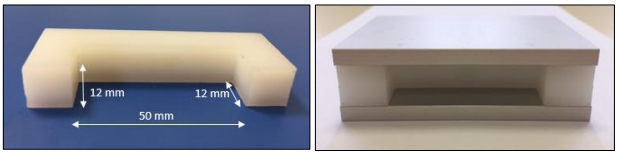

Figure 33: Alternative test arrangement
(suitable for profiles and 1-component adhesive)

Manual test machine with digital force gauge
Vertical manual force gauges test stand - SADFGVSM3RD" by Samatools (https://www.samatools.it)

"Ban VEC" manual test bench with analog measurement (sold by GINGER CEBTP);

Figure 34: Manual tensile test stands with analog or digital force gauge

Commercially available solutions for tensile testing equipment using screw driven system can be manually actuated or motorized. the minimum force for H-specimen tests with Sikasil® adhesive must be 1000 N, with a tolerance of +/- 1 N. The grippers for the H-specimen devices might need to be custom-made as they are often not standard parts.

Note: Alternative equipment for testing H-specimens is shown in the ATI: Tensile test equipment for H-specimen of Sikasil® adhesives[V].

8.10 VISUAL INSPECTION

Each bonded element shall be inspected visually to avoid mistakes in installation and adhesive application. Minimum, the following criteria shall be checked for each panel:

- Correct joint dimensioning according to the drawings and calculations
- Complete joint filling according to drawings, eventually deglazing necessary (see 8.11)
- No bubble inclusions and marble defects in the joint
- Correct installation of spacer tapes, gaskets, setting blocks, dead load support (if applicable).

8.11 DEGLAZING

The main purpose of this deglazing test is to check the functionality of the real façade unit. Deglazing shall be carried out before moving the bonded elements to the jobsite or when the adhesive has cured completely throughout. The number of units to be tested and frequency of deglazing tests shall be coordinated with the Technical Department of Sika Industry.

A suggested frequency is the following deglazing scheme:

- 1 panel of the first 10 panels
- 1 panel of the next 40 panels
- 1 panel of the next 50 panels
- 1 panel of every 100 panels
- 1 panel of every 200 panels

1. Using a sharp knife (e.g. Stanley or carpet knife), cut the cured silicone joint on a plane parallel to the bonded surfaces and in the middle of the joint thickness. Cut the whole joint section to reach the spacer tape or spacer gasket (Figure 35).
2. Cut the joint along the whole perimeter of the bonded element, so that the glass pane can be completely removed (Figure 36).
3. With reference to the joint portion bonded to the frame, cut approx. 30 mm of bead from the substrate with a sharp knife or glass scraper [7], taking care not to damage the substrate (Figure 37).
4. As per peel test described in Section 8.8, fold back the bead end at an acute angle of 30° and try to detach the cured material from the substrate. The adhesive must tear 95% cohesively.
5. If the cured adhesive cannot be detached, use the knife to cut it at a distance of approx. 1 to 1.5 mm from the frame interface several times while pulling (Figure 38)
6. Repeat this procedure until all bead length applied on the frame is tested.
7. Along the whole bonded perimeter, the adhesive must not detach from the frame interface (no adhesion loss) and must not show any air bubbles, white or deep black stripes and soft spots. Inspect joint filling, thru curing and mixing quality. Check the joint dimensions and compare with values provided in the drawings and approved by Sika. Notify the Technical Department of Sika Industry immediately if adhesion loss occurs, mixing defects are detected or joint dimensions do not match drawings and Sika requirements.
8. Repeat the same test procedure with reference to the joint portion bonded on the glass panel removed, following procedure provided from 3) to 7) above (Figure 38).
9. Immediately after the test, reseal the cut-out joint using the same adhesive as originally used in the unit. Adhesive must always be applied on the adhesive layer 1.0-1.5 mm thick left on the substrates after testing. Prior cleaning is not necessary if the cut surfaces are clean and smooth, and sealing is carried out immediately after the test. When the repair adhesive has completely cured, the element can be installed in the façade (Chapter 7).

A deglazing report template is available on request.

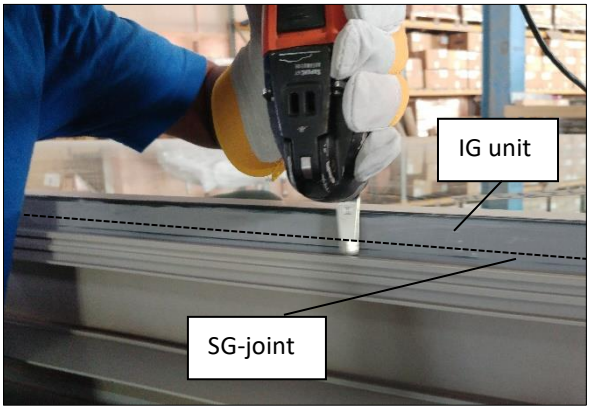

Figure 35: Cutting the joint in the middle of its thickness, along the whole perimeter of the bonded element (grey SG silicone used here).

Figure 36: Glass pane completely removed from frame.

Figure 37: Testing joint adhesion along the whole frame – Good adhesion.

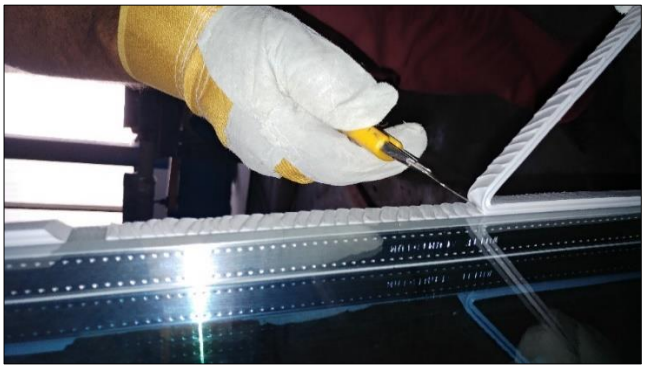

Figure 38: Testing joint adhesion along the glass perimeter – Good adhesion.

Figure 39: Example with black SG joint - Good adhesion.

Figure 40: Example with black SG joint - Adhesion failure.

8.12 RECOMMENDED BASIC QUALITY CONTROL SCHEME

Table 5: Scheme for factory quality control

Test	Chapter	Substrate	Frequency	Remark and Details
Mixing ratio by weight	8.1	n/a	daily before start of production and each time base (A) or catalyst (B) are changed	Only for 2-component products
Snap time	8.5	n/a	daily before start of production and each time base (A) or catalyst (B) are changed	Only for 2-component products, required values only valid for 23°C
Butterfly test	8.3	n/a	daily before start of production and at restart after base purge and each time base (A) or catalyst (B) are changed	Only for 2- component products
Snake test	8.4	n/a	Weekly and after any kind of adjustment of pump and mixing equipment	Only for 2-component products
Skin-over time	8.6	n/a	daily before start of production and each time a new batch is used	Only for 1- component products, required values only valid for 23°C / 50% r.h.
Shore A hardness	8.7	n/a	2x daily before start of production and each time base (A) or catalyst (B) are changed	After 24 hours (2-component adhesives) or 72 hours (1-component adhesives) @ room temperature
Peel Adhesion	8.8	Glass* Frame*	1 specimen daily before start of production and each time base (A) or catalyst (B) are changed	After 24 hours (2-component products) or 72 hours (1-component products) in the factory (same conditions as bonded elements are stored)
Tensile Adhesion (H-specimen 12 mm x 12 mm x 50 mm)	8.9	Glass* Frame*	2 specimens daily before start of production and each time base (A) or catalyst (B) are changed	After 72 hours (2-component products) or 21 days (1-component products) in the factory (same conditions as bonded elements are stored)
Visual Inspection	8.10	Panel	Each panel assembled	Check for: complete joint filling according to drawings; bubble inclusions in the joint; correct installation of spacer tapes, gaskets, setting blocks, dead load support (if applicable); etc.
Deglazing	8.11	Panel	See chapter 8.11	Before moving the bonded elements to the job-site and when the adhesive has cured completely throughout.

* For peel adhesion test and tensile adhesion test use substrates equal to the ones used in project (e.g. in terms of coating type, enameled glass, edge deletion, anodization, etc.)

8.13 RECOMMENDATIONS FOR LOGBOOK CONTENT

The production/quality control logbook for structural glazing should contain the following information:

General
- Project/job name
- Date
- Production line designation (if applicable)

Panel information
- Curtain wall panel code
- Progressive number (indicate 1st panel after change of structural silicone base (A) or catalyst (B) change
- Place of panel installation in the curtain wall

Bonding Substrate and surface pre-treatment information
- Metal frame finish (e.g. anodized, PPC, PVDF, stainless steel)
- Type of glass (e.g. float, edge deleted glass, coated glass, enamel coated, pyrolytic coating)
- Type of cleaning agent for frame and glass
- Batch numbers and expiry dates for cleaning agents
- If applicable: type of primer or activator for frame and/or glass
- Batch numbers and expiry dates for Sika® Cleaner`s, Sika® Aktivator`s or Sika® Primer

Structural Sikasil® SG silicone adhesive and Sika® Mixer Cleaner Information
- Type of structural silicone
- Batch numbers and expiry dates of structural silicone (A and B in case of 2-component products)
- Type of mixer cleaner (usually: Sika® Mixer Cleaner)
- Batch numbers and expiry dates for Sika® Mixer Cleaner

Factory conditions
- Temperature
- Relative humidity

Quality control results
- Mixing ratio in parts
- Snap time in minutes
- Skin-over time in minutes
- Butterfly test
- Snake test
- Shore A
- Peel adhesion
- Tensile adhesion
- Visual inspection
- Deglazing

All QC documents and relevant test samples (H-specimen, adhesion samples, etc.), must be properly stored for a minimum time equivalent to at least the guarantee duration.

8.14 QUALITY CONTROLL REQUIREMENTS OF SIKASIL® SG ADHESIVES

The following table describe quality procedures and a schedule when to run these tests. Local and regional regulations such as EAD 090010-00-0404 (EOTA ETAG 002 part 1) may require a different quality control scheme.

Table 6: Quality control requirements of Sikasil ® SG adhesives determined **at 23°C / 50% r.h.**

	Property / Test	Chap.	Sikasil® SG-500	Sikasil® SG-500 CN	Sikasil® SG-550	Sikasil® SG-500 S	Sikasil® SG-20	Sikasil® SG-20 S
1	**Mixer open time**[1)]	..	7 – 9 minutes	10 – 12 minutes	9 – 11 minutes	5 -10 minutes	n.a.	n.a.
2	**Alarm time equipment**[1)]	..	6 minutes	9 minutes	8 minutes	5 minutes		
3	**Mixing ratio by weight** (A:B) by weight	8.1	11.7:1 to 14.3:1	11.7:1 to 14.3:1	10.8:1 to 13.2:1	11.7:1 to 14.3:1		
4	**Snap time / pot life**	8.5	35 – 70 min	45 – 90 min	30 – 80 min	30–70 min		
5	**Butterfly test**	8.3	No white or deep black stripes, no marbling, no wrinkles					
6	**Snake test**	8.4	No soft spots No white or deep black stripes, no marbling					
7	**Skin-over time**	8.6	n.a.				10 – 35 minutes	25 – 50 minutes
8	**Shore A hardness**	8.7	30 – 45	30 – 45	40 – 55	25 – 35	30 – 45	25 – 35
			After 24 hours at 23°C				After 72 hours at 23°C	
9	**Peel adhesion**	8.8	≥ 95% cohesive failure, after 24 hours (2-component products) or 72 hours (1-component products) in the factory (same conditions as bonded elements are stored)					
10	**Tensile strength and adhesion determined on H-specimen (12 mm x 12 mm x 50 mm)** Respective tensile force on H-specimen (12 x 12 x 50 mm)	8.9 7	≥ 0.7 MPa ≥ 95% cohesive failure 420 N	≥ 0.7 MPa ≥ 95% cohesive failure 420 N	≥ 1.0 MPa ≥ 95% cohesive failure 550 N	≥ 0.7 MPa ≥ 95% cohesive failure 420 N	≥ 0.7 MPa ≥ 95% cohesive failure 420 N	≥ 0.7MPa ≥ 95% cohesive failure 420 N
11	**Visual Inspection**	8.10	▪ Before moving the bonded elements to the jobsite and when the adhesive has cured completely throughout. ▪ Complete joint filling according to drawings ▪ No air/gas inclusions / bubbles are allowed ▪ Joint dimensions correspond to drawings ▪ Accessories (spacer tapes, gaskets, setting blocks, dead load support) must be installed according to drawings ▪ 95% adhesion on bonded substrates (95% cohesive failure of the joint) ▪ Homogenous joint curing, no soft spots, no white or deep black stripes					
12	**Deglazing**	8.11						

Remarks: [1)] Above mentioned times significantly vary with ambient temperature, pump equipment and mixer set-up and **must be** verified by tests under actual conditions
na = not applicable
For different climate conditions as 23°C / 50% r.h. the values provided in this table may vary

9 REPAIR GLAZING

If glass in a structural glazing unit breaks during transport or installation, it should be replaced in the factory if possible, since conditions here are more suitable. Already installed structural glazing units must only be removed from the façade by trained employees exercising extreme care. Always follow Sika structural glazing processing guidelines.

1. Cut out the broken pane so that about 1 - 2 mm of silicone adhesive remains on the metal frame. Never scratch out the adhesive completely, since this could damage the metal surface. For complicated designs and joint geometries, vibration cutters or similar tools can be used. The cut must be smooth and must never leave loose adhesive parts on the cut surface. Remove the spacer tape completely.
2. Never clean the adhesive surface if a new pane is to be inserted and bonded immediately after one has been cut out. If the pane is not to be installed until 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 cleaner. Allow the cleaner to evaporate completely before re-bonding. We do not recommend priming the cut surface. Pre-treat the glass as required in the lab report.
3. The cleaning step can be avoided by cutting out the glass very close to the glass surface. The metal frame can then be transported or stored for longer periods. Just before re-bonding, neatly cut away the old adhesive with a sharp blade, leaving behind about 2 mm thickness. You can then re-bond on the smooth, freshly cut surface.
4. Factory re-bonding: Always clean the glass to Sika's specifications before bonding. Then install the new spacer tape (and new setting blocks if necessary). Position the new glass pane and fill the joint as described in chapter 6. The new adhesive must be approved by Sika by means of adhesion tests (It is usually the same adhesive as used for bonding in the first place).
5. Re-bonding in the curtain wall: Re-bond with the same material used in the original application. Before removing the temporary clamps fixing the panes, check on test specimens that adhesion has developed fully and that the silicone adhesive has cured throughout. In general, the clamps can be removed:
   - In the case of 2-component adhesives: After 7 days
   - In the case of 1-component adhesives: After 21 days.
6. Only install the weather sealant after the structural glazing adhesive has cured completely. Use the sealant originally recommended by Sika for this purpose.

10 REFERENCES

Pos.	Source	Title / Link
[I]	Bonding Excellence project plattfrom	http://www.sika-bonding-excellence.com
[II]	General Guideline	Design and calculation of Sikasil® SG joints in Structural Sealant Glazing applications
[III]	Additional Technical Information	2-component Sikasil® silicone adhesives application by cartridge
[IV]	Additional Technical Information	Unipack opening
[V]	Additional Technical Information	Tensile test equipment for H-specimen of Sikasil® adhesives
[VI]	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
[VII]	Additional Technical Information	Mixer Open Time for 2-component Sikasil®
[VIII]	Additional Technical Information	Sikasil® 2-part – SILICONE ADHESIVES Additional Technical Information for preventing air entrapment while processing / mixing of 2-part silicone ensuring proper adhesion and material performance of a cured structural silicone joint
	EN 13022	Glass in building –Structural sealant glazing Part 1: Glass products for structural sealant glazing systems for supported and unsupported monolithic and multiple glazing Part 2: Assembly rules
	EOTA ETAG 002 part 1	Structural Sealant Glazing Systems Part 1: Supported and Unsupported Systems
	EAD 090010-00-0404	European Assessment Document for Bonded glazing kits and bonding sealants
	ASTM C1401	Standard Guide for Structural Sealant Glazing
	ASTM C1184	Standard Specification for Structural Silicone Sealants
	ISO 868	Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)