GENERAL GUIDELINE FOR VEHICLE GLASS REPLACEMENT

AUTOMOTIVE AFTERMARKET

BUILDING TRUST

CONTENTS

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INTRODUCTION

SIKA IS A TIER ONE SUPPLIER AND DEVELOPMENT PARTNER TO THE GLOBAL AUTOMOTIVE INDUSTRY. Based on this competence, Sika is able to provide a comprehensive portfolio of proven solutions for the automotive aftermarket. Innovation, performance, reliability, safety and ease of use make Sika products the number one choice of automotive glass and body shop professionals around the world. Since the 1980's Sika has become the leader in adhesive systems for the Automotive Glass Replacement (AGR) industry.

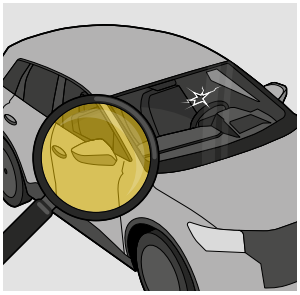
CUSTOMER SAFETY IS OUR MISSION

The windshield is an integral part of a vehicle's safety system. Its role is to stay in place and keep occupants safe inside the vehicle in case of an accident. Vehicles are stiffened by the bonded windshield and it is vital that the windshield stays attached to the car body even in a rollover accident. If a windshield is not properly installed, it can become displaced in a collision and separate from the car body flange, causing serious injury. Reliable adhesive systems and clear guidelines from Sika make the difference and ensure the highest safety standards for each and every installation.
The professional auto glass replacement installers role is crucial to maintain the safety standards. The use of inadequate products and poor workmanship has, on occasions, resulted in fatal accidents and the aim must be to reduce that to zero.

Pride in workmanship and attention to detail are key to provide safe and durable windshield replacements every day. The variety of cars is constantly growing, including the complexity of new designs, changing components and windshields, placing ever increasing demands on AGR installers. The safety of occupants of cars with bonded replacement windshields is paramount. For this reason, the Sika Guideline for Auto Glass Replacement and Certification Program has been introduced specifically to support the professional AGR installer using Sika products.
Sika's guideline for auto glass replacement describes the procedures for safe and durable glass installation and ensures the vehicle is restored to the OEM design specification for structural integrity and aesthetic appearance.

STEP BY STEP OVERVIEW

1 INSPECT THE VEHICLE



- Before working on any vehicle, conduct an inspection Look for any pre-existing damage such as scratches or dents in the areas you will be working.

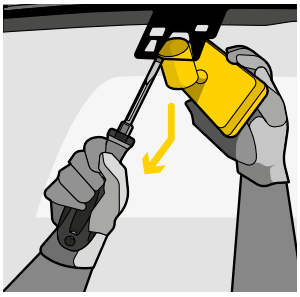
2 ALWAYS START WITH THE GLASS

- Never begin work on the vehicle before inspecting and cleaning the glass to be installed.
- Inspect both the quality and the suitability of the selected glass for installation on the vehicle.

3 PROTECT VULNERABLE AREAS OF THE VEHICLE

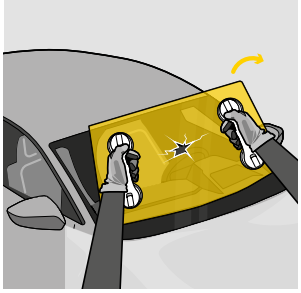
- It is advisable to use fender and hood covers as well as some form of seat covering before working on a vehicle.
- Taping vulnerable paint areas to protect them from becoming scratched is also a good idea. Never leave tools or equipment on painted surfaces, seats or dashboards.
- These types of mistakes can result in damage claims.

4 REMOVE TRIM, WIPERS, CAMERAS, REAR VIEW MIRRORS



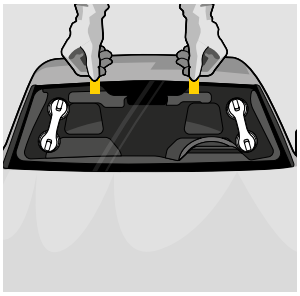
- Check the specific vehicle information for trim and accessories before starting to dismantle.
- Moldings must be reinstalled on the new glass immediately after glass preparation or after removal of trims.

5 REMOVE THE OLD WINDSHIELD



- Always wear safety glasses, cut resistant gloves and other required personal protective equipment during windshield removal. Use tools appropriate to the type of windshield to be removed.

6 DRY FIT THE NEW WINDSHIELD

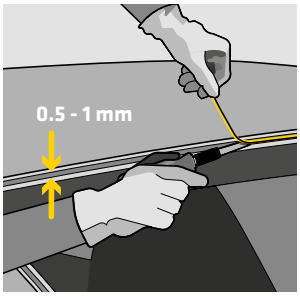


- It is recommended to dry fit the glass in order to verify correct positioning and to establish alignment marks.
- This also allows a fast and precise setting of the windshield once the adhesive is applied to the glass.

7 PREPARE THE NEW WINDSHIELD

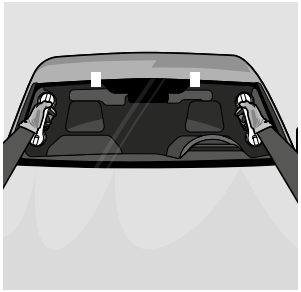
- For safe and leak free installations it is vital that the bonding area of the glass is clean and free from contamination. Common examples of contaminants are dirt, dust and skin oils.
- Continue with the chosen surface treatment process.

8 PREPARE THE PINCHWELD



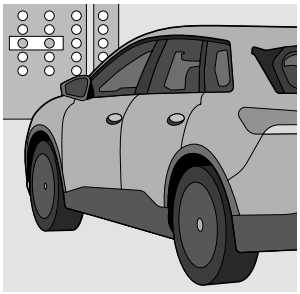
- Use the full-cut method when all of the following criteria can be confirmed.
- Otherwise it is recommended to follow the procedure given in the Complete Adhesive Removal or Bare Metal Treatment section of this document.

9 INSTALL THE NEW WINDSHIELD



- When applying Sika direct glazing adhesives, it is imperative for the fresh adhesive to match the location and profile (height and width) of the trimmed OEM bead on the pinchweld.

10 RECALIBRATE



- Vehicle manufacturers require the recalibration of ADAS components if the windshield has been changed.
- There are different concepts, which require different methods of calibration.

11 CLEAN AND INSPECT

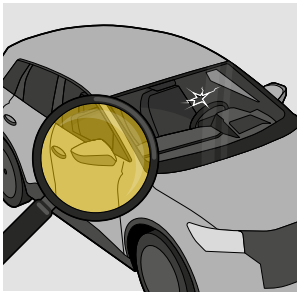
- After the installation is complete, clean and inspect all areas affected by your work.

12 RETURN TO VEHICLE OWNER

- Advise vehicle owner of when the vehicle can be driven based on the MDAT of adhesive and environmental conditions.

STEP BY STEP GUIDELINE

1. INSPECT THE VEHICLE



BEFORE WORKING ON ANY VEHICLE, CONDUCT AN INSPECTION. Look for any pre-existing damage such as scratches or dents in the areas you will be working. This step can save thousands of dollars in potential damage claims and is a professional courtesy that the insurance industry respects.

Equally important is for you to inspect for any conditions that may compromise the safe retention of the glass. Such conditions include, but are not limited to, corrosion, vehicle body damage, paint system failure, missing parts, improper workmanship from any previous glass repair or replacement work and use of unsuitable products.

Also check the operability of all mechanical and electrical parts and devices related to auto glass systems such as rain, lights, ADAS or other sensors. All conditions discovered prior to, and during, the auto glass replacement process should be recorded and the owner/operator of the vehicle must be notified. Any conditions discovered that would compromise the retention system must be fully remedied prior to the installation of the glass.

→ Sika Vehicle Inspection Sheet

2. ALWAYS START WITH THE GLASS

NEVER BEGIN WORK ON THE VEHICLE BEFORE INSPECTING AND CLEANING THE GLASS TO BE INSTALLED. Inspect both the quality and the suitability of the selected glass for installation on the vehicle. There have been occasions, especially in mobile work, where the glass had a small scratch or blemish that went un-noticed and was not discovered until after the new glass was installed.

There have also been instances where the wrong glass was brought to a mobile site and the mistake was not identified until after the glass was prepared and the adhesive was applied. Pre-inspection and cleaning of the glass helps to avoid these time-consuming errors.

- Is the glass free of scratches or blemishes?
- Is it the correct glass for the vehicle?
- Is it the right color?
- Does the ceramic frit have the same dimension as the original glass?
- Is the VIN number area visible or not visible?
- Are there any sensors?
- Are the brackets correct?

The bond between the polyurethane adhesive and the glass must be protected from Ultraviolet (UV) radiation. This is typically achieved using a ceramic frit band, either exposed or inner layer frit. When bonding clear glass with no frit band, an external trim must be used to shield the bond from UV rays. Important Note: Sika® Primer are NOT intended to be used as the primary protector against UV rays for automotive glass replacements.

3. PROTECT VULNERABLE AREAS OF THE VEHICLE

It is advisable to use fender and hood covers as well as some form of seat covering before working on a vehicle. Taping vulnerable paint areas to protect them from becoming scratched is also a good idea. Never leave tools or equipment on painted surfaces, seats or dashboards. Such mistakes result in many avoidable damage claims.

- Cover parts to be protected.
- Use seat, fender and hood covers.

4. REMOVE TRIM PARTS, WIPERS, CAMERAS AND REAR VIEW MIRRORS

Check the specific vehicle information for trim and accessories before starting dismantling. Moldings must be reinstalled on the new glass immediately after glass preparation or after removal of trims. Always use chemical resistant gloves during installation for personal safety and to avoid leaving fingerprints on the bonding area.
When removing covers, windshield wipers or other equipment such as ADAS sensors and cameras from the vehicle, store them in a safe place to eliminate the risk of accidental damage.

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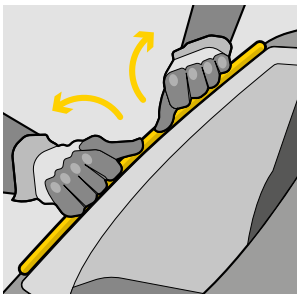
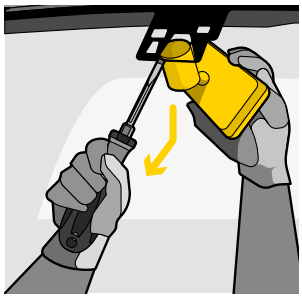


- Check the specific vehicle information for trims and accessories.

2

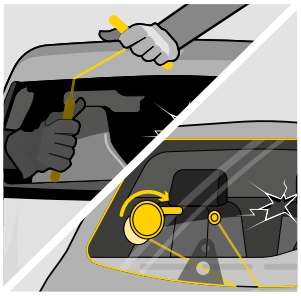


- Carefully remove all fitted trims, accessories, ADAS sensors and cameras and store them in a safe area.
- Ensure availability of all necessary spare parts and accessories. Where possible, use new trim.

5. REMOVE THE OLD WINDSHIELD

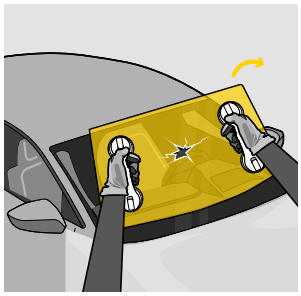
Always wear safety glasses, cut resistant gloves and other required personal protective equipment during windshield removal. Use tools appropriate to the type of windshield to be removed.
There are benefits in the use of either a cold knife or a fiber line cut-out system, as these tools allow cutting out a windshield with minimal damage to the vehicle. Also, reciprocating power cut-out tools can be used, but care must be taken to avoid damage to the car body. Sika recommends the use of Sika® Slick where available, or Sika® Tooling Agent N or soap water as a cut-out lubricant to reduce the force required to cut out a glass part and to extend blade life.

1



- Wear personal protective equipment.
- Cut out the glass.
- Remove debris with a vacuum cleaner or brush.

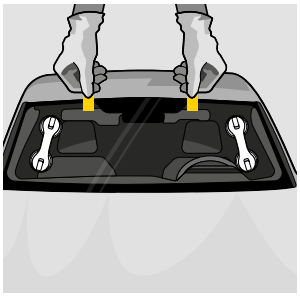
2



- Remove the damaged windshield.

6. DRY FIT THE NEW WINDSHIELD

It is recommended to dry fit the glass in order to verify correct positioning and to establish alignment marks. This also allows a fast and precise setting of the windshield once the adhesive is applied to the glass.

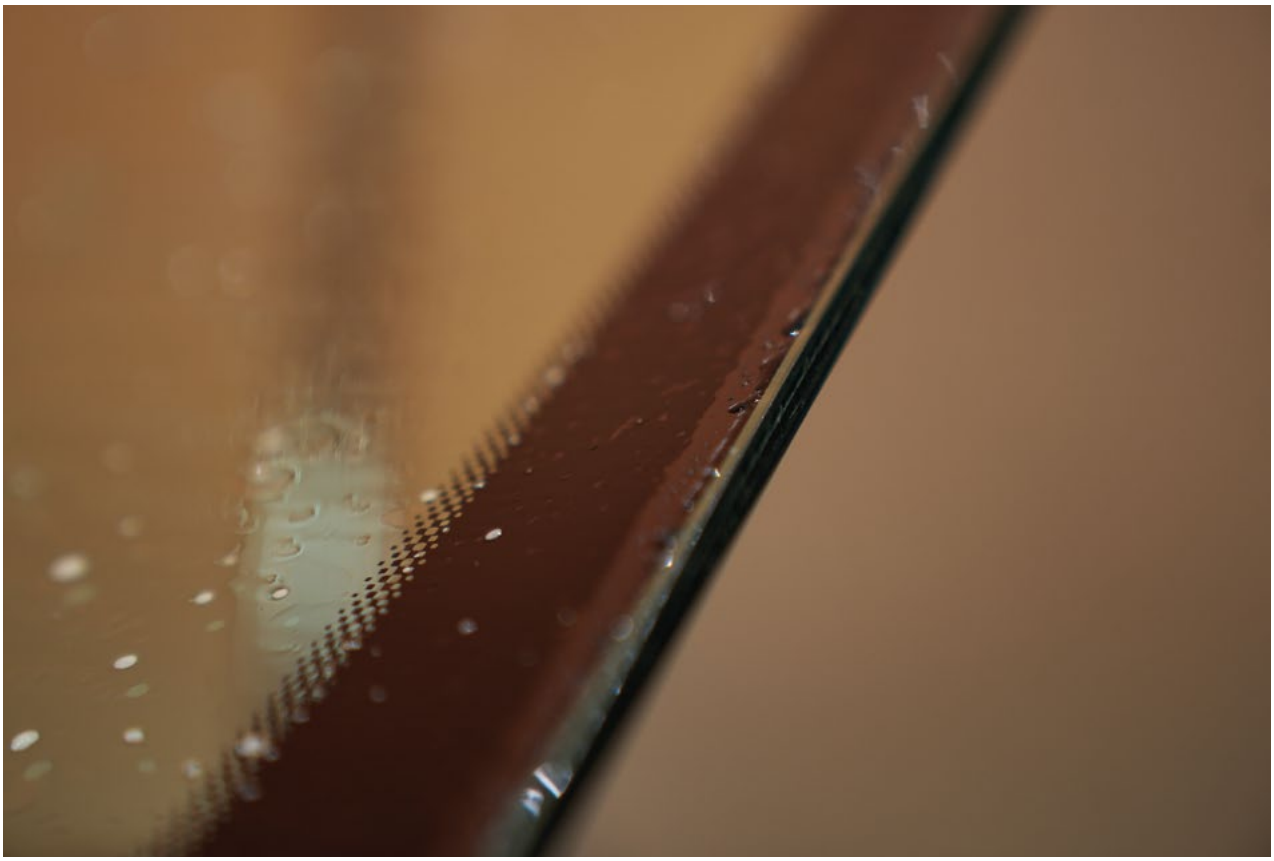


7. PREPARE THE NEW WINDSHIELD

EACH TIME A WINDSHIELD INSTALLATION IS PERFORMED, A KEY COMPONENT OF THE VEHICLE'S STRUCTURAL SYSTEM IS PUT IN PLACE. An essential part of this component is the bond between the adhesive and the glass. For safe and leak free installations it is vital that the bonding area of the glass is clean and free from contamination. Common examples of contaminants are dirt, dust and skin oils. Sika supports the use of Sika® Cleaner G+P, where locally available, or any other glass cleaner, if it has been confirmed NOT to contain antistatic or coating ingredients.

However, with the introduction of many new glass suppliers, auto glass installers have witnessed increased occurrences of non-traditional contaminants (NTC) on the bonding area of the glass that can greatly affect adhesion. These can be silicone oils, mold release agents, or any other products introduced during the manufacture and transport of Automotive glass. It has been Sika's experience that the type and severity of non-traditional contamination can vary significantly.

To identify if non-traditional contaminants are present, the auto glass installer should be trained to inspect the bond areas of each part for inconsistencies in the surface tension and observe whether the glass cleaner migrates or changes appearance along any contaminated areas. Some examples of these include:



The recommended treatment for all types of contamination is as follows:

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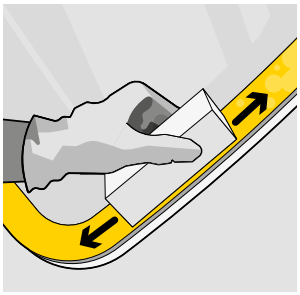
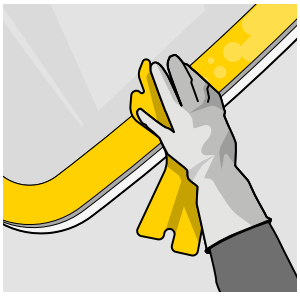
- Apply Sika® Cleaner G+P or any other glass cleaner around the glass perimeter.
- Examine the area for contamination.

2



- If contamination is observed, it is recommended to leave the Sika® Cleaner G+P on the part and treat the bonding surface with Sika® Cleaner PCA. Using even pressure, scrub the pad across the entire bond area in a back and forth or circular motion. Rough frits may degrade the pad if excessive force is used.

3

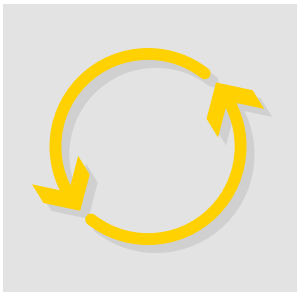


- Clean the entire wet glass perimeter with a clean lint free paper towel

4

- Spray the glass part again to see if the contamination has been removed.
- If contamination is still observed, wipe the Sika® Cleaner G+P away using a clean paper towel and treat the dry bonding surface with a dry or lightly moistened Sika® Cleaner PCA, using the scrubbing method provided in Step 2.

5



- Repeat Step 4 as necessary until all visible signs of contamination have been removed. If all visible signs of contamination cannot be removed, Sika does NOT recommend that the part be installed.

Surface Prep Options

Once it is confirmed that all contamination has been removed, the installation should proceed according to one of the following processes. Please note that unless you are using one of Sika's Primerless to Glass adhesives, the bonding area of the glass MUST be prepared using either Clear Aktivator process or All Black Primer Process.

→ Clear Aktivator Process
→ All Black Primer Process
→ Primerless To Glass Process

For detailed installation instructions on certain Special Windshields, please click any of the following links:

→ Thermal Coated Glass
→ Organic glass (PMMA/PC)
→ Gasket Sets
→ Removal and Replacement
→ Used Glass
→ Sealing Leaks
→ PAAS
→ Rear Sliders and Encapsulated Parts
→ Factory Pre-applied Black Primer
→ Heated Windshields

8. PREPARE THE PINCHWELD (FULL-CUT METHOD)

USE THE FULL-CUT METHOD WHEN ALL OF THE FOLLOWING CRITERIA CAN BE CONFIRMED.

Otherwise it is recommended to follow the procedure given in the Complete Adhesive Removal section of this document.

- The old adhesive is a polyurethane. → Identification of Butyl, Silicone and Polyurethane

The existing bead of cured polyurethane is well bonded to the pinchweld and is in good condition.
→ Poor Adhesion of the OEM Bead and OEM Paint

- There are no signs of corrosion. If rust or surface corrosion is detected, please refer to the Corrosion Removal and Bare Metal Treatment section of this document.
- Previous glass replacement procedures and products were correct and have the appropriate integrity to support the bond of new polyurethane, under the full-cut method.
- The pinchweld is undamaged and has not been repainted. → Freshly Painted Vehicles

To complete the installation using full-cut method, perform the following steps:

Lightly trimming existing polyurethane beads and using little new polyurethane is unacceptable and potentially very dangerous. Short cutting in this way will void all Minimum Drive-Away Time (MDAT) guidelines and can cause possible loss of glass adhesion and serious personal injury. Since too little space would remain to accommodate an adequate depth of polyurethane between the new windshield and the old bead of polyurethane, the application will not comply with all applicable FMVSS regulations, and may also fail during normal vehicle operation.

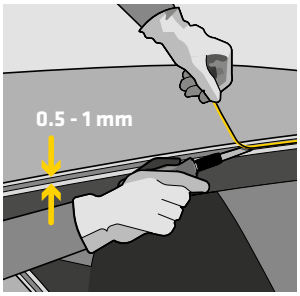
The fresh cut bead of existing polyurethane provides an ideal surface for bonding with a new polyurethane adhesive, provided it meets the following criteria:

- It is well bonded to the pinchweld and is in good condition.
- The existing bead is polyurethane (for other materials, the complete removal method is recommended). Refer also to chapter → Identification of Butyl, Silicone and Polyurethane
- It has been trimmed down to between 0.5 mm and 1 mm (0.02" – 0.04").
- No foreign material or contaminant has come into contact with the trimmed bead.
- The bead of new polyurethane is applied less than 8 hours after the existing bead was trimmed, or less than 2 hours if in direct sunlight.

1

- Remove debris with a vacuum cleaner or brush prior to trimming existing polyurethane.
- Clean the entire pinchweld with a lint free cloth or Sika® Cleaner PCA by using glass cleaner or Sika® Cleaner G+P, making sure the surface is completely dry and no moisture remains.
- If additional cleaning is necessary, use oil free compressed air, water, glass cleaner or Sika® Cleaner G+P to clean the surface.

2



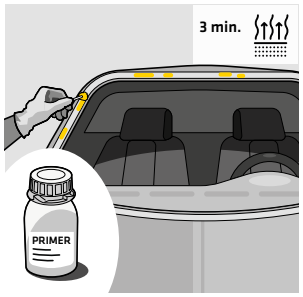
- Trim back the remaining polyurethane bead causing as little damage as possible. The remaining polyurethane must be between 0.5 mm and 1 mm (0.02" – 0.04") before it is safe to apply fresh adhesive.

To cover pinchweld bright metal scratches that are 5 cm^2 (1 in^2) or less in area, Sika recommends one coat Sika® Primer is applied to the areas in order to reduce corrosion.

- If using the primer from a can, shake vigorously until you hear the mixing ball rattle and then continue shaking for an additional 10 seconds.

For information on single use Sika® Primer Stix, please see
→ Single Use Applicators (Pads and Stix)

3



- Apply a complete and homogeneous coat of Sika® Primer over the scratch using a Sika® Cleaner PCA, small brush, dauber, or cotton swab. Ensure that there is an overlap of 5mm (3/16") between the damaged area and the undamaged area to provide adequate protection. Allow to flash-off for at least 3 minutes or until touch dry.

To cover pinchweld bright metal scratches that are greater than 5 cm^2 (1 in^2) but less than 150 cm^2 (24 in^2), two coats of Sika® Primer are required for sufficient corrosion protection.

- Apply a complete and homogeneous coat of Sika® Primer over the scratch using a Sika® Cleaner PCA, small brush, dauber, or cotton swab. Ensure that there is an overlap of 5 mm (3/16") between the damaged area and the undamaged area to provide adequate protection.

4

- Apply a second coat of Sika® Primer and allow to flash off for 3 minutes or until touch dry.

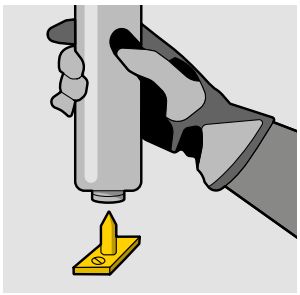
For areas greater than 150 cm^2 (24 in^2) please refer to the Corrosion Removal And Bare Metal Treatment section of this document.

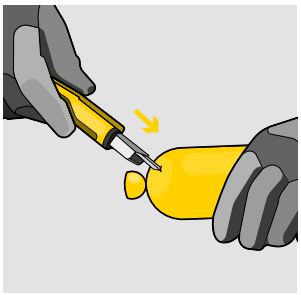
If the vehicle pinchweld is not made of steel, please refer to the Aluminium and FRP Bonding Flanges section of this document.

9. INSTALL THE NEW WINDSHIELD

9.1 FIRSTLY OPEN THE ADHESIVE PACKAGING ACCORDING TO THE FOLLOWING GUIDELINES:

To open adhesive cartridges, the membrane must be pierced completely. On 20 mm wide mouth cartridges, the nozzles have been designed so that the nozzle tip can be used to pierce the membrane and correctly open the wide mouth cartridge. For standard 15 mm cartridges, Sika has designed a cartridge opener, but a round nozzle, or a screwdriver of the same dimension as the opening, can also be used to pierce the membrane. Note that too small an opening in the cartridge membrane may restrict the flow of the adhesive and lead to dispensing issues.

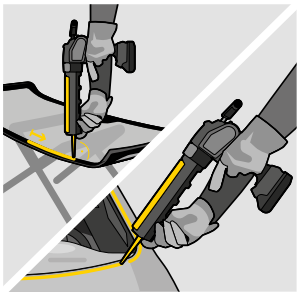


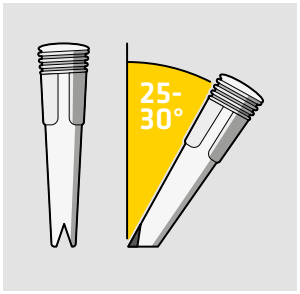


To open adhesive unipacks, installers have traditionally used a range of tools including shears, pliers or box cutters to cut directly below the metal clip at the end of the unipack. While this method works most of the time, some issues may arise, such cured adhesive forming directly below the clip that could make its way into the fresh adhesive.

It is therefore recommended to retain the metal clip and instead carefully use a cutting tool to pierce the top of the unipack next to the clip, but not on the silver overlap section. Do not slice through the silver overlap section of the unipack as this area provides good structural support. This procedure allows the liquid adhesive to flow around the metal clip and ensures no residual cured adhesive is inadvertently dispensed into the fresh adhesive bead.

9.2 PROCEED WITH THE ADHESIVE APPLICATION AS FOLLOWS:





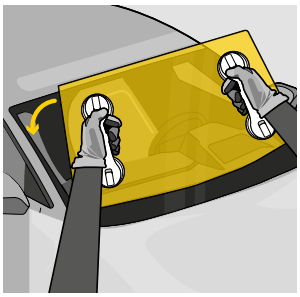
Sika recommends that polyurethane adhesive is applied as a triangular shaped bead, using a "V" notched nozzle, with the dispenser gun held at a 90° angle to the substrate. Using this method ensures that, when the triangular shaped bead is compressed, no air is trapped and the bead squeezes down to an almost rectangular shape. By comparison, a round bead can trap air in all four corners when compressed between the glass and the pinchweld. A round bead is also more difficult to uniformly compress during windshield decking, which may result in voids and leak points across the entire width of the bead. Conventional, uncut nozzles can be used for backfilling, sealing gaskets and other custom applications. Where it is not possible to position the adhesive nozzle at a 90° angle to the substrate, such as when applying adhesive in the area of the roof pinchweld, it can be beneficial to cut the nozzle outlet at an angle of approximately 25° to 30°. Ensure the depth of the "V" notched nozzle is the same as the height between the pinchweld mounting surface and roof of the car. This can be checked by simply placing the nozzle on the pinchweld near the roofline and viewing to see that the top of the "V" matches the height of the roof. If it is short, simply cut a deeper and wider "V" in the nozzle. This step helps ensure that enough polyurethane is applied to prevent the glass from sagging below the roofline of the vehicle. When applying Sika direct glazing adhesives it is imperative for the fresh adhesive to match the location and profile (height and width) of the trimmed OEM bead on the pinchweld. This will ensure that there is a sufficient amount of new adhesive available to meet FMVSS standards for safety. Sika's recommendation is that the fresh adhesive bead may be applied either to the trimmed OEM polyurethane bead located on the pinchweld of a vehicle or to the glass. Sika's only requirement with regard to the fresh adhesive bead placement location is that the installer ensures the fresh adhesive bead makes good contact with both the trimmed bead and the glass that has been properly prepared, whether the adhesive is applied directly to the glass or to the trimmed adhesive bead. When deciding the most appropriate location to apply the Sika direct glazing adhesive bead for a specific installation consider the following:

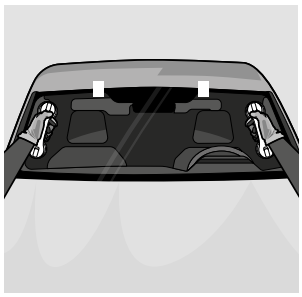
- If the vehicle OEM bead pattern is non-uniform and proper fresh adhesive bead placement alignment will be difficult if applying to the glass, the better option may be to apply the adhesive to the vehicle pinchweld.
- When the OEM bead pattern is uniform and the proper bead location on the glass can be easily identified, or if there are indicator marks on the glass showing proper bead placement, the better option may be to apply the fresh adhesive bead to the glass part. One reason is that applying the bead to the glass is considered to be more ergonomically friendly. Also, this can make it easier for the installer to hold the application gun at the correct 90° angle when applying the adhesive to the entire perimeter, which can result in more consistent and uniform bead dimensioning. Applying the adhesive to the glass typically results in fewer bead connections leading to fewer potential leak points.
- When making connections during the adhesive bead application, it recommended to always tool the connections properly.
- Sika recommends making as few bead connections as possible and if possible, always begin the adhesive application in the bottom of the windshield.

- If the adhesive application is performed on the pinchweld, we recommend making the connection in the corners on the pinchweld.
- The best connection result gets achieved by end-to end bead application with a streamlined uniform bead. Sometimes it's not possible and overlap bead connection will be necessary to perform.
- But always have special attention on the tooling process to ensure a tight bead connection.

9.3 INSTALL THE GLASS AS FOLLOWS:

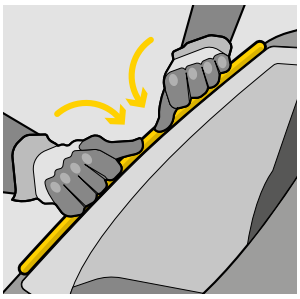
Set and position the glass within the open time of the adhesive. Never install the glass after the adhesive has formed a skin. After first contact of the substrate and adhesive, do only small positioning adjustments. Depending on the dimensions and weight of the windshield, tape might be required to keep it in the exact position until the adhesive has developed sufficient strength. Remove any excess uncured adhesive with Sika® Remover-208, Sika® Hand Wipes (Sika® Cleaner-350H), or mineral spirits. Do not use any alcohol based cleaners.

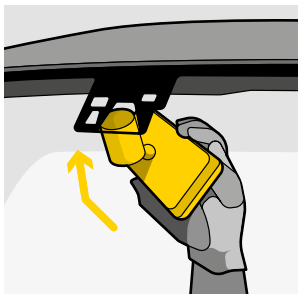




9.4 REPLACE TRIM, WIPER, CAMERAS, SENSORS AND REAR VIEW MIRRORS:

- Ensure that trim and moldings are remounted so that they fit properly.
- Secure all cowls/covers and reattach wipers.
- Refit the rear view mirrors, sensors and cameras.
- Ensure that all dismantled parts are reinstalled correctly
- Check that all ADAS related sensors and cameras work correctly.





10. RECALIBRATE

VEHICLE MANUFACTURERS REQUIRE THE RECALIBRATION OF ADAS SYSTEMS IF THE WINDSHIELD HAS BEEN CHANGED. There are different concepts, which require different methods of calibration.

Guidelines with 1C Sikaflex® and SikaTack® Adhesives:

- Static (stationary) Calibration – Can be done immediately after the glass is positioned. The vehicle should not be moved for at least the indicated MDAT (with airbags) of the product used.
- Dynamic (mobile) Calibration - Calibration drive can be done after the MDAT (with airbags) is lapsed. By then the vehicle meets the minimum safety requirements to be driven.

For detailed information refer to the
ADAS and Recalibration
Minimum Drive Away Time (MDAT)

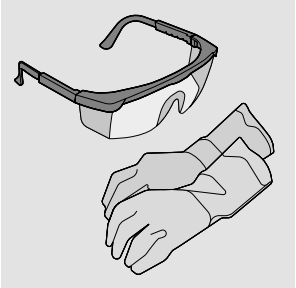
11. CLEAN AND INSPECT

AFTER THE INSTALLATION IS COMPLETE, CLEAN AND INSPECT ALL AREAS AFFECTED BY YOUR WORK.

- Glass, carpets, seats, dashboards and all painted surfaces around new glass parts must be cleaned and / or vacuumed.
- Defroster ducts must be blown out and cleared of any possible glass fragments. For personal safety, the installer should wear appropriate eye and hand protection while clearing the defroster ducts to avoid injury.
- Check that all parts removed are replaced correctly and are tested for operability.
- Check for correct operation of wipers and windshield fluid hose dispenser.
- Test all applicable electrical devices for operability.
- Conducting a glass leak check is advisable.
- Completing and maintaining a record of all post inspection procedures is advisable. As a courtesy, provide a copy to the owner / operator of the vehicle.

SURFACE PREP OPTIONS

ALWAYS use chemical resistant gloves and safety glasses when using Sika® Aktivator or Sika® Primer.



Carefully review all precautionary instructions and warnings on the product.

Adhere to the approved application procedure as outlined in the most recent product data sheet.

1. CLEAR AKTIVATOR PROCESS

- For cans, use a clean, lint free paper towel. With Sika® Aktivator wetting the towel, but not soaking it, drag the towel in one direction around the perimeter of the glass on the bonding area only.
- The towel should be continually turned to expose a clean surface to the can. When rewetting the towel, turn a clean surface to the can to avoid dirt and other contaminants on the towel from mixing with the pure Sika® Aktivator in the can.
- Allow Sika® Aktivator to flash off for at least 3 minutes.

For information on single use Sika® Aktivator Pads, please see
→ Single Use Applicators (Pads and Stix)

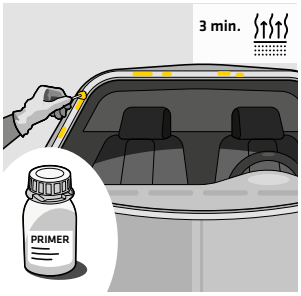
NOTE:

- If the "Activated" surface becomes contaminated or the maximum open time of 8 hours is exceeded, then Sika® Aktivator can be reapplied to the glass part only 1 additional time, for a total of 2 applications. After Sika® Aktivator has been applied more than 2 times to the same glass part, the adhesion characteristics may be compromised and the glass part should be discarded.
- Please see the → Special Weather Procedures section if applying at low or high ambient temperatures.

2. ALL BLACK PRIMER PROCESS

- Shake the primer can vigorously until you hear the mixing ball rattle and then continue shaking for an additional 10 seconds.
- When used to prepare glass, Sika® Primer can be applied using a Sika® Cleaner PCA, a small brush, dauber, or cotton swab
- Allow Sika® Primer to flash off for at least 3 minutes.

- Cover any minor damage to paintwork using Sika® Primer.
- Tightly close the can immediately after use
- Allow to flash off for at least 3 minutes.
- In case of larger areas, contact a paint shop or refer to the car manufacturer's specification.



NOTE:

- To avoid dirt and other contaminants from mixing with the pure Sika® Primer in the can, never re-dip a used Sika® Cleaner PCA, small brush, dauber, or cotton swab back into the can.
- If the maximum 8 hours open time is exceeded, the primer can be given a dry wipe with a lint free paper towel to remove any dust and Sika® Primer can be reapplied to the bonding area. Sika® Primer can be reapplied to the glass part only 1 additional time, for a total of 2 applications. After Sika® Primer has been applied more than 2 times to the same glass part, the adhesion characteristics may be compromised and the glass part should be discarded.
- Please see the → Special Weather Procedures section if applying at low or high ambient temperatures.
- Nothing should be applied to Sika® Primer, including polyurethanes, foam dams, and moldings, until the full 3 minutes flash off time has elapsed.

3. PRIMERLESS TO GLASS PROCESS

Several Sika direct glazing adhesives are formulated to be primerless to glass and this will be clearly stated in the Product Data Sheet.

This means the use of Sika® Aktivator or Sika® Primer is not required for these adhesives to achieve an acceptable bond to bare glass or ceramic frit. However, the bonding area of the glass or ceramic frit must be clean, dry and free from all traditional and non-traditional contaminants for these adhesives to achieve adhesion. Additionally, the use of Sika® Aktivator and/Sika® Primer on all other bonding surfaces, as per the instructions given in this manual, is required for proper performance of the adhesive system.

DETAILED INFORMATION

TABLE OF CONTENTS

1. IDENTIFICATION OF BUTYL, SILICONE AND POLYURETHANE

When installing a replacement windshield, it is essential that the residual material on the pinchweld is polyurethane.

SikaTack® and Sikaflex® polyurethane direct glazing adhesives develop strong adhesion to multiple brands of polyurethanes and to some recent MS Polymer direct glazing adhesives. However, if the residual material on the pinchweld is butyl or silicone it must be completely removed, as SikaTack® or Sikaflex® adhesives do not adhere to butyls or silicones.

How to determine if it is a polyurethane adhesive bead:

Press very firmly with the fingernail into the existing material.

- If it is a polyurethane or a direct glazing MS Polymer, it should barely be possible to make an indentation into the material.
- If it is a butyl or silicone, it should be possible to press halfway or even all the way through to the pinchweld.
- If it is a butyl, it should retain an indentation and not regain its original shape.

If it is still unidentified, cut out a long piece of the material and pull it apart.

- If it is polyurethane, a great amount of force is needed to pull the material apart and break it.
- If it is a silicone, it will stretch a great distance with little force. It will also stretch back and forth easily.
- If it is a butyl, it should pull apart very easily.

If it remains unidentified, completely remove the old adhesive and follow the procedures as indicated in the Complete Adhesive Removal Method section.

2. POOR ADHESION OF THE OEM BEAD AND OEM PAINT

OEM BEAD:

If the vehicle's OEM polyurethane bead has poor adhesion and easily peels away from the pinchweld to reveal unblemished original paint, begin by:

- removing the clearcoat and / or basecoat from the bond area with a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad.
- If the clearcoat and basecoat pulls away from the vehicle with the original polyurethane bead then lightly abrade the exposed primer using a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad.
- Clean the abrasion residue using a suitable solvent. Paint on a coat of Sika® Primer and then allow at least 3 minutes for this product to dry.
- Set the windshield using the appropriate Sika adhesive for the vehicle type and required drive away time.
- If the poor adhesion exhibited by the OEM polyurethane bead is part of a specific vehicle recall, always follow the instructions provided in the Recall Bulletin.

OEM PAINT:

In some cases, the OEM paint may have poor adhesion between layers, or the bead may be too narrow after trimming back the remaining polyurethane compared to the rest of the bead on the pinchweld, leaving only the OEM paint visible. In this situation, Sika® recommends following the Complete Adhesive Removal Method.

3. COMPLETE ADHESIVE REMOVAL

If the installer discovers that either improper procedures or products, such as butyl or silicone, were used on previous glass replacements, or that the existing pinchweld and polyurethane conditions would compromise the retention system, they are NOT to use the full-cut method according to section Preparation of the Pinchweld (Full-Cut Method). Instead, it is recommended to fully correct any adverse glass installation related condition(s), providing a clean and sound substrate for bonding.

A complete adhesive removal requires the total removal of existing material down to the paint on the pinchweld. During a complete adhesive removal, the pinchweld must be cleaned of all products and materials other than the original paint. This method must be used when:

- The pinchweld has been repainted for any reason, for example body shop corrosion treatment.
- The pinchweld is damaged.
- The existing polyurethane adhesive is loose or deteriorated.
- The original OEM bead does not exist, is too narrow, or only a small part of the bead is visible after using the full-cut method.
- An improper product was previously used, such as butyl, silicone, etc.

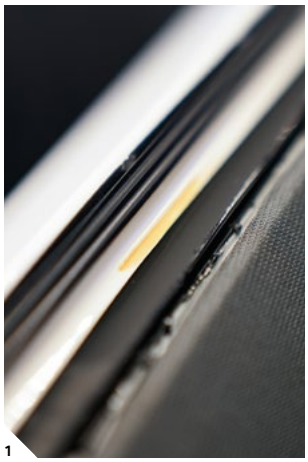
When starting the Complete Adhesive Removal, remove the old adhesive material by using a knife, abrasives or other special tools. After the adhesive is completely removed and the paint is intact, clean the abrasion residue using glass cleaner, Sika® Cleaner G+P or a suitable solvent. Before continuing, ensure that the surface is clean and sound. Apply a coat of Sika® Primer making sure the primer overlaps onto the surrounding intact paint by a minimum of 5 mm (3/16"). Allow a flash off time of at least of 3 minutes. If the paint gets damaged by scratches, refer to Corrosion Treatment according to section Corrosion Removal and Bare Metal Treatment. Then set the windshield using the appropriate Sika adhesive for the vehicle type and required drive away time.

4. CORROSION REMOVAL AND BARE METAL TREATMENT

Many of the following procedures require installers to wear appropriate personal protective equipment (PPE) such as safety glasses, gloves and earplugs.

Corrosion around the pinchweld is very serious and must be corrected properly. Automotive OEMs have issued guidelines for addressing this problem and these have been incorporated into the recommendations that follow. To properly treat a corroded pinchweld, it is important to firstly identify the nature and extent of corrosion present. There are four levels of corrosion that have been recognized by automotive OEMs.

Level	Description
1 Light	Light metal discoloration, typically orange
2 Moderate	Moderate corrosion, typically has some red spots
3 Severe	Identified by deep pitting, dark red spots and raised edges
4 Perforation	This level can vary from microscopic holes to loss of metal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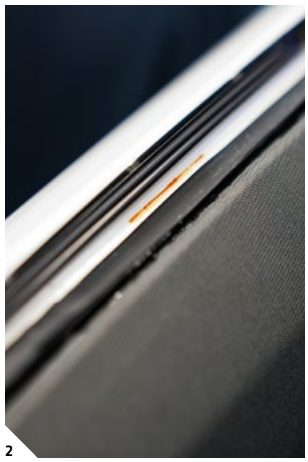
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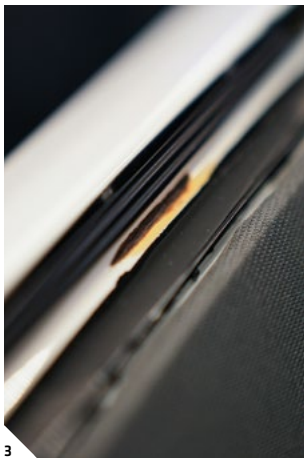
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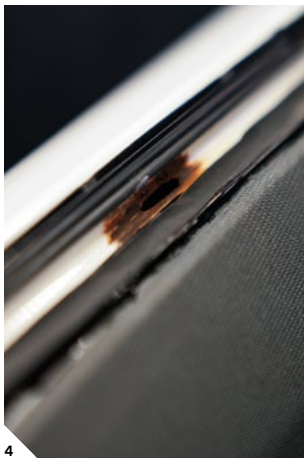
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NOTE:

- In this manual, the amount of corrosion will be referred to in cumulative total area of corrosion (cm^2/in^2).
- Sika recommends that treatment of level 4 corrosion (perforation), only be performed by a body shop that is trained in metal restoration.
- For any amount of corrosion that is greater than an overall total of 150 cm^2 (24 in^2) of the pinchweld, Sika recommends that this treatment only be performed by a body shop that is trained in metal restoration, as this constitutes a very severe and potentially dangerous corrosion condition.
- Perforation corrosion on the pinchweld of a vehicle, just like perforation corrosion located in any other structural area, requires replacement of the entire section of metal. Filling these types of areas with body filler is not acceptable.
- Do not apply body filler in areas where glass bonding adhesive will be applied.

After identifying the type and amount of corrosion, a installer should follow the recommendations outlined below for removal of the corrosion and treatment.

4.1 CORROSION REMOVAL:

Remove corrosion to obtain a bright and corrosion free metal surface. Abrade the intact paint for a further 5 mm (3/16") beyond the paint edges surrounding the fresh bright metal areas where corrosion has been removed using a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad. Ideally, this should be done prior to trimming the remaining intact and well bonded adhesive bead. However, if this is not possible, then clean the freshly cut original polyurethane bead, using Sika® Aktivator to ensure the fresh polyurethane will be able to sufficiently bond to the original bead. The method used to remove the corrosion will depend on the type of corrosion that is present. The guidelines provided on the next page are consistent with automotive OEM recommendations and should be followed for removing corrosion.

Level	Description
1 Light	Remove corrosion with 80 grit sand paper or wire wheel.
2 Moderate	Remove corrosion with wire wheel, media blast or chemical rust remover.
3 Severe	Remove corrosion with media blast or chemical rust remover.
4 Perforation	The panel must be replaced and treated by a body shop.

In addition to a wire wheel, corrosion of levels 1 and 2 can also be removed with a Dremel® and a grinding stone. The Dremel® Flex-Shaft attachment is also recommended because it makes precise corrosion removal easier. Care must be taken when using a Dremel or wire wheel so that the thickness of the metal is not significantly reduced. A spot sand blaster would be considered a media blast. Products that contain phosphoric acid, such as PPG's DX 579, would be considered chemical rust removers. Prior to treating the areas where corrosion has been removed, ensure that these areas are smooth, uniform, and completely rust free.

4.2 BARE METAL TREATMENT:

Bare Metal areas of the pinchweld that are less than 5 cm^2 (1 in^2) can be treated by using the following procedure:

- Abrade the intact paint for a further 5 mm (3/16") beyond the paint edges surrounding the fresh bright metal areas.
- Wipe the debris away with a clean, dry towel, or using a wet towel with Sika® Cleaner G+P, glass cleaner or a suitable solvent, and allow it to flash off for at least 3 minutes.
- If the adhesive bead was trimmed down prior to removal of the corrosion, clean the contaminated areas of the trimmed original polyurethane bead by wiping it with Sika® Aktivator, Sika® Cleaner G+P, glass cleaner or a suitable solvent, and allow it to flash off for at least 3 minutes.
- Apply a single coat of Sika® Primer as directed in this manual, making sure that the primer overlaps onto the surrounding intact and paint by a minimum of 5 mm (3/16").
- Proceed with the remainder of the full-cut method by trimming the original polyurethane bead and apply Sika direct glazing adhesive as required.

Bare metal areas of the pinchweld that are greater than 5 cm^2 (1 in^2) but less than a cumulative total of 150 cm^2 (24 in^2) of the pinchweld can be treated by using the following procedure:

- Continue following the steps outlined above and allow a minimum of 3 minutes for the primer to dry before proceeding to the next step. A Single Use Applicator may be used for this application; but due to its limited coverage and the need for a second coat of primer in the following step, the Single Use Applicator stick may be impractical for this application.
- Apply a second coat of Sika® Primer over the first coat. Allow a minimum of 3 minutes for the primer to dry before proceeding to the next step.
- Proceed with the remainder of the full-cut method by trimming the original polyurethane bead and apply Sika direct glazing adhesive as required

Bare metal areas that is greater than an overall total of 150 cm^2 (24 in^2) of the pinchweld, Sika® recommends that this treatment only be performed by a body or paint shop.

5. ALUMINIUM AND FRP BONDING FLANGES

Occasionally an auto glass installer will come across vehicles that have aluminum pinchwelds or FRP (Fiber Reinforced Plastic) bonding flanges where a glass part is bonded with a polyurethane adhesive. Fiberglass is an example of an FRP. In these cases, if the installer finds that some of the original polyurethane bead is not properly adhered to the substrate, the following process should be followed to prepare the substrate for bonding.

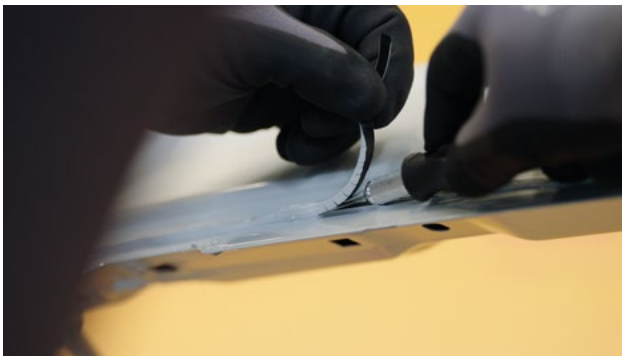
Lightly abrade the area of the aluminum or FRP with a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad. Clean the abrasion residue using glass cleaner, Sika® Cleaner G+P or a suitable solvent. Apply a coat of Sika® Primer, and then allow at least 3 minutes for it to dry. Set the glass part using the appropriate Sika adhesive for the vehicle type and needed drive away time. Please note that on aluminum pinchwelds a non-conductive polyurethane may be required. For additional information on non-conductive polyurethanes, please refer to the section on Modulus and Conductivity.

6. FRESHLY PAINTED VEHICLES

IF WORKING WITH A FRESHLY PAINTED VEHICLE AND CORRECT PAINT DRYING TIMES ARE UNKNOWN, ALLOW THE PAINT TO DRY FOR AT LEAST 24 HOURS BEFORE TREATING THE PINCHWELD. If the drying times are known, use the paint manufacturer's recommendations. In the case of a newly painted pinchweld, one of the following options may be selected:

6.1 REPAIRED PARTS

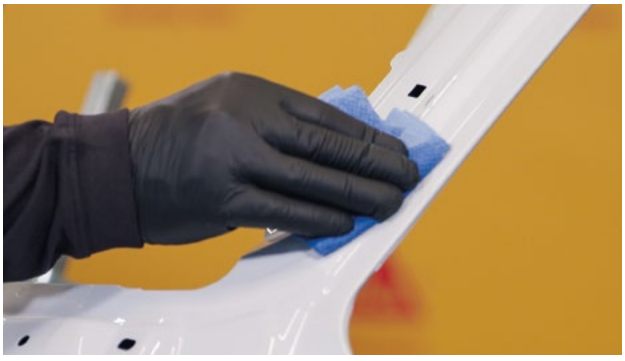
- Whenever possible, remove the windshield, by cutting the adhesive as close to the glass as possible, leaving the entire remaining polyurethane adhesive bead in place.
- Do not trim the adhesive bead until the vehicle has been painted and the new windshield is ready to be installed. In this case, it is not necessary to tape or otherwise protect the existing polyurethane.
- After the vehicle is repaired and painted, use the full-cut method according to section Preparation of the Pinchweld (Full-Cut Method) to install the new windshield



6.2 NEW PARTS

Follow the paint manufacturer's recommendations for surface preparation. When the pinchweld has been painted with an epoxy or etch primer coat, Sika® recommends to stop the painting process and proceed as follows:

- Allow the primer to cure for at least as long as would be required prior to applying topcoat over the primer, following the paint manufacturer's recommendations.
- If topcoat is to be applied to remainder of the vehicle, mask off the bonding area of the pinchweld with masking tape. Continue painting the vehicle as required.
- Remove the masking tape. If a forced drying process is to be used, remove the tape prior to baking the topcoat.
- Next, lightly abrade the primer with a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad.



- Clean the pinchweld with glass cleaner, Sika® Cleaner G+P or a suitable solvent.
- Apply Sika® Primer using a Sika® Cleaner PCA, small brush, dauber, or cotton swab, making sure the primer overlaps onto the surrounding intact paint by at least 5 mm (3/16"). Allow to flash off for at least 3 minutes.
- Then set the windshield using the appropriate Sika adhesive for the vehicle type and required drive away time.

6.3 NEW PARTS

If a freshly painted pinchweld has already been color coated and Option 2 is not possible, proceed as follows:

- Confirm that the paint system used is appropriate for the application.
- Ensure that the paint manufacturer's drying times and application recommendations are followed.
- Abrade the bonding area with a 6120 siafleece, 3M Scotch-Brite™, fine abrasive pad or very fine grade sandpaper (240 grit).
- Clean the pinchweld with Sika® Cleaner G+P or a suitable solvent swab, making sure the primer overlaps onto the surrounding intact paint by at least 5 mm (3/16"). Allow to flash off for at least 3 minutes.

- Apply Sika® Primer using a Sika® Cleaner PCA, small brush, dauber, or cotton swab, making sure the primer overlaps onto the surrounding intact paint by at least 5 mm (3/16"). Allow to flash off for at least 3 minutes.
- Then set the windshield using the appropriate Sika adhesive for the vehicle type and required drive away time.

7. SPECIAL WEATHER PROCEDURES

Instructions for adhesives:

When performing installations in extremely hot environments, it is important to keep in mind the following:

- The viscosity of all direct glazing adhesives will decrease as temperature increases. Installations performed at extreme high temperature may require additional taping to hold the windshield in place.
- The adhesive open time is significantly shorter in hot and humid climates. The glass must always be installed within the open time. Never install a glass after the adhesive has skinned over. A rule of thumb is that a 10 °C (20 °F) rise in temperature decreases the open time by half.
- If possible, do not perform installations in direct sunlight. High ambient temperature combined with even higher substrate temperature can result in adhesive gassing or bubbling. This phenomenon occurs when the polyurethane adhesive skins over and carbon dioxide is generated by the adhesive faster than it can be released. The carbon dioxide builds up inside the adhesive bead and gives the adhesive a Swiss cheese appearance. If this occurs in very small amounts there is little reason for concern. However, if it occurs significantly, then adhesion and long term durability of the bonded system may be compromised. To avoid gassing in the adhesive bead, the glass components and vehicle's pinchweld should not be exposed to direct sunlight until the installation is complete and the Minimum Drive-Away Time has passed. If shade is not available when performing an installation at elevated temperature, Sika recommends the following maximum substrate temperatures, by product.

Sika® AGR adhesive	Maximum substrate temprature
Sikaflex® products	55 °C (130 °F)
Sika Tack® products	75 °C (170 °F)

When performing installations in extremely cold environments, it is important to keep in mind the following:

- The viscosity of all direct glazing adhesives will increase as temperature decreases. Installations performed at cold temperature may require additional pressure or force to deck and position the windshield.
- Cold applied Sikaflex® and SikaTack® adhesives can be warmed up to a maximum temperature of 35 °C (95 °F) to achieve better gunability and easier installation of the windshield. Adhesives should not be warmed up for more than 8 hours in total.

Instructions for Pre-Treatment Products:

Please see the table below for temperature and flash off time guidelines for pre-treatment products. At cold temperatures, Sika recommends waiting until the surface of the primer is dry to the touch if it is used for bonding purposes.

Sika pre-treatment product	Application temprature range		
	Air temperature & required flash off time	Product temperature	Substrate temperature
Sika® Aktivator	-20 °C to -5 °C (0 °F to 20 °F) **10 minutes** -5 °C to 50 °C (20 °F to 120 °F) **3 minutes**	5 °C to 45 °C (40 °F to 105 °F)	-20 °C to 75 °C (0 °F to 170 °F) Ideally: 15 °C to 30 °C (60 °F to 85 °F)
Sika® Primer	-20 °C to 50 °C (0 °F to 120 °F) **3 minutes**	5 °C to 40 °C (40 °F to 105 °F)	-20 °C to 75 °C (0 °F to 170 °F) Ideally: 15 °C to 30 °C (60 °F to 85 °F)

8. ADAS AND RECALIBRATION

Advanced Driver Assistance Systems (ADAS) and their calibration have been a major topic for the Auto Glass Replacement industry because more and more cars are equipped with camera based systems e.g. Lane Assist, Traffic Sign Recognition, Automatic High Beam Lights and Emergency Breaking for Pedestrians. These systems are typically based on cameras mounted behind the windshield and require calibration in case of windshield replacement.

Vehicle manufacturers require the recalibration of such ADAS systems in case the windshield has been changed. There are different concepts, which require different methods of calibration:

- Static (stationary) Calibration: The vehicle is positioned in front of a special board. The calibration is initiated through the board computer. Calibration can be done quickly but there are special requirements on how it needs to be done and the investment for the equipment is relatively high

- Dynamic (mobile) Calibration: Some vehicles require a calibration drive. Typically the calibration drive needs to be done at a certain speed on a straight road.

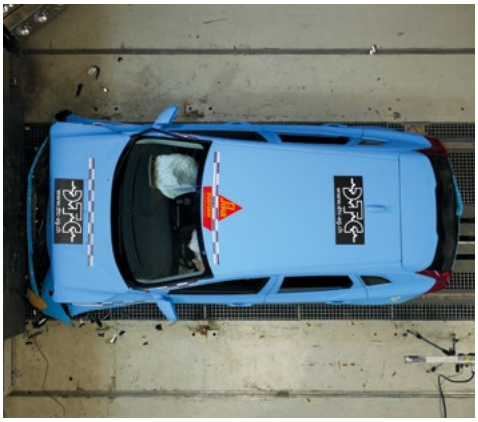
Impact and Risks of Incorrect Calibration:

The Convention of Road Traffic, Vienna 1968, applies and requires a driver to always be in control of the vehicle. Also most of the ADAS systems have some limitations, e.g. in bad weather or due to poor sight. Typically a vehicle will alert the driver that the ADAS or part of it isn't working correctly. This can be due to an incorrect calibration or due to the system being unable to do the measurements properly.

Guidelines with 1C Sikaflex® and SikaTack® Adhesives:

- Static (stationary) Calibration: Can be done immediately after the glass is positioned. The vehicle should not be moved for at least the indicated MDAT (with airbags) of the product used.
- Dynamic (mobile) Calibration: Calibration drive can be done after the MDAT (with airbags) is lapsed. By then the vehicle meets the minimum safety requirements to be driven.

9. MINIMUM DRIVE AWAY TIME (MDAT)



FEDERAL MOTOR VEHICLE SAFETY STANDARDS NO. 212 (FMVSS 212) IDENTIFY MANDATORY MINIMUM SAFETY PERFORMANCE REQUIREMENTS FOR WINDSHIELD REPLACEMENT IN MOTOR VEHICLES IN THE UNITED STATES. All motor vehicles and regulated motor vehicle equipment, including direct glazing adhesive, manufactured for sale and use in the United States must be certified to comply with FMVSS 212. This standard has become the global reference in determining the MDAT of windshield adhesives.

FMVSS 212 requires that the strength of the adhesive system must be adequate to retain the windshield glass in the event of a mishap whenever the vehicle is operated. The two primary components to assure the delivery of a safe auto glass installation is to follow the written instructions provided within this guideline, which represent the current comprehensive set of Sika instructions, and to allow adequate time for the adhesive to set up and secure the windshield. The vehicle must remain out of service and NOT operated until the appropriate MDAT has been reached and the owner / operator of the vehicle has been notified of this time restriction. This is your legal obligation to help ensure the vehicle complies with FMVSS 212. Glass workshops can select a Sika direct glazing adhesive to suit the specific MDAT needs of their customer. The speed with which a customer needs to return their vehicle to service will dictate the kind of adhesive to use for windshield replacement. Factors affecting drive away time include application temperature, humidity, and product selection. Refer to the Sika MDAT chart, or the applicable Sika Product Data Sheet, to identify the appropriate MDAT for the specific climatic conditions where the installation will be conducted.

10. HEALTH AND SAFETY

Pre-treatments and adhesives are chemical products that must be handled safely according to the Material Safety Data Sheet (MSDS) recommendations. Users of polyurethane products with a diisocyanate concentration above 0.1 % must be trained and certified per REACH regulations. Personal Protective Equipment (PPE):

- Eye Protection: Wear safety goggles or glasses to protect against splashes, dust, and debris.
- Hand Protection: Use chemical-resistant gloves (e.g., nitrile) to prevent skin contact and cutresistant gloves (e.g., Kevlar) when handling sharp tools or glass.
- Body Protection: Wear safety shoes, long cut-resistant sleeves, and appropriate trousers to minimize injury risks.
- Respiratory Protection: Ensure proper ventilation and use masks when working in dusty conditions or with airborne particles.

Safe Work Practices:

- Follow local safety regulations and conduct a risk assessment if unsure.
- Maintain good hygiene: wash hands after work and before eating, drinking, or smoking.
- Keep food and drinks away from work areas.
- Keep the workspace organized, remove trip hazards, and store tools and products safely when not in use.

11. SPECIAL WINDSHIELDS

11.1 THERMAL COATED GLASS

Pre-treatment of thermal coated glass (bonding area): If there is an unknown coating, the surface should be tested before bonding. Otherwise use the following procedure:

1

- Use masking tape to protect the area that does not need to be mechanically pretreated.
- Abrade the bonding area with 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad
- Remove scratch resistant coating.

2

- Remove dust using only oil free compressed air or wipe with Sika®Cleaner G+P and dry with a dry, lint free paper towel.

3

- Shake the primer can vigorously until you hear the mixing ball rattle and then continue shaking for an additional 10 seconds.
- When used to prepare glass, Sika® Primer can be applied using a Sika® Cleaner PCA, small brush, dauber, or cotton swab.
- Allow Sika® Primer to flash off for at least 10 minutes before applying adhesive.
- Remove masking tape

11.2 ORGANIC GLASS (PMMA/PC)

The term Organic Glass refers to parts made of plastic, which from 2015, is meeting the UN R43 requirements for car windshields. Organic Glass can be found on vehicles such as:

- Building machines
- Special purpose vehicles, E.g. border control, police, etc.
- Lightweight construction vehicles
- Convertible cars
- Race cars

Typical materials are PMMA (Polymethyl Methacrylate) and PC (Polycarbonate). In the manufacturing process, many polycarbonate sheets are coated with a scratch resistant surface. Unlike standard float glass, plastic parts have a much higher coefficient of thermal expansion, resulting in greater movement of the window due to expansion and contraction. In addition, plastic parts do not have the ceramic coating of glass windshields, which provides UV protection for the adhesive bond-line. For these reasons, the following procedures must be followed when bonding plastic parts.

If there is an unknown coating, the surface should be tested before bonding. Contact Sika Technical Services). Otherwise use the following procedure:

11.2.1 PERMANENT GLAZING:

Pre-treatment of PMMA or PC:

1

- Use masking tape to protect the area that does not need to be mechanically pretreated
- Abrade the bonding area with 80 grit or similar sandpaper.
- Remove scratch resistant coating.

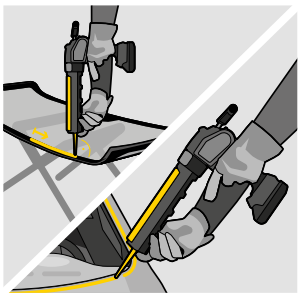
2

- Remove dust by using only oil free compressed air or wipe with Sika® Cleaner G+P and dry with a dry, lint free paper towel.

3

- Shake the primer can vigorously until you hear the mixing ball rattle and then continue shaking for an additional 10 seconds.
- When used to prepare glass, Sika® Primer can be applied using a Sika® Cleaner PCA, small brush, dauber, or cotton swab.
- Allow Sika® Primer to flash off for at least 10 minutes.

4



- Prepare a “V” notched nozzle according to the table below.
- Apply a triangular bead of adhesive either to the glass or the pinchweld. Layer thickness according to the table below*.
- It is important that the adhesive matches both the primed surface on the glass and the fresh cut bead of polyurethane.

Adhesive Thickness

Largest windshield length	Triangular bead required		Adhesive bead dimension*	
L	H / B		D / B	
L (m)	**H (mm)**	**B (mm)**	**D (mm)**	**B (mm)**
0,5	8	6	4	6
1,0	8	8	4	8
1,5	12	10	6	10
2,0	16	12	8	12
Over 2.0				contact Sika

* Important: Conform to minimal adhesive thickness, D.

11.2.2 ADHESIVE

For long lasting bonded parts the following polyurethanes are recommended:
■ Sikaflex®-223 ■ Sikaflex®-223 PowerCure (for accelerated curing) ■ Sikaflex®-295UV

For small bonded parts, or parts that are replaced frequently in, for instance, construction vehicles, all Sika direct glazing adhesive can be used.

Surrounding Conditions and Minimum Drive-Away Time:

Plastic parts have a very high thermal expansion factor. Therefore, for optimal results it is recommended that the installation be carried out at 15 °C to 25 °C (60 °F to 80 °F).

NOTE:

- If organic parts are installed into a vehicle that was originally designed for mineral glass, the body stiffness cannot be guaranteed. Driver comfort and crash behavior can be different.

11.2.3 UV-PROTECTION:

Sika® Primer are organic materials, as are most black primers in the Automotive Aftermarket, and are not designed to copy or replicate a ceramic frit. The adhesion decreases over time and will lead to delamination. For a durable protection of the bond-line and primer an external UV protection must be applied, e.g. UV shielding tape, paint, etc.

Possible Solutions are:
■ Suitable print color, ■ Protective metal or opaque plastic trim, ■ UV Shielding vinyl tape

11.3 GASKET SETS

IF THE OEM GASKET INSTALLATION DID NOT INCLUDE ADHESIVE and the vehicle is licensed for highway use and is less than 4,500 kg (10,000 lbs) gross weight, FMVSS 212 regulated, the installation shall include polyurethane adhesive bonding system. Permissible exceptions are egress glass parts, antique or classic vehicle restorations, or in cases where this practice conflicts with current vehicle manufacturer specifications.

When using polyurethane on gasket set windshields, Sika recommends the following procedure:

- Use appropriate personal protective equipment
- Remove original windshield and gasket.
- Use a new gasket if the original has been damaged.
- Clean the glass with Sika® Cleaner G+P.
- Remove contaminants from the pinchweld and the inside of the gasket, where the pinchweld and glass will sit, using a clean towel and water. Sika® Cleaner G+P may be used to clean these areas if necessary.
- Allow water and Sika® Cleaner G+P to thoroughly dry before proceeding.
- Prepare all areas of the glass that will sit in the gasket with Sika® Aktivator or Sika® Primer as described in this manual.
- Apply Sika® Aktivator or Sika® Primer to the pinchweld where the gasket will sit and, if desired, to the inside of the channels of the gasket. A total flash time of 15 minutes is required for all gasket set installations as the pre-treatment product will react slower due to the porosity and geometry of the rubber gasket.
- Set the windshield, ensuring that the gasket is fully seated on the pinchweld and the desired Sika direct glazing adhesive is applied directly into the channels of the gasket at the appropriate time.
- Clean up of uncured polyurethane using mineral spirits, Sika® Remover-208 or Sika® Hand Wipes (Sika® Cleaner-350H).

NOTE:

- When sealing air or water leaks within a gasket set windshield, make sure to identify whether or not a polyurethane product is required and then use only a compatible sealant system.

11.4 REMOVAL AND REPLACEMENT

PLEASE NOTE THAT THIS PROCEDURE IS NOT RECOMMENDED FOR USE WITH GLASS PARTS THAT HAVE BEEN PREVIOUSLY INSTALLED WITH A NON-POLYURETHANE ADHESIVE. Under these circumstances, the glass part should be discarded and, in most cases, the new glass part should be installed following the Complete Adhesive Removal method described in this manual. If the original polyurethane on the glass part does not have good adhesion around the entire perimeter of the part, or was not originally adhered using polyurethane, then Sika does NOT recommend reinstallation of the part.

Use the following guidelines in cases where a glass part is removed for later use as a replacement:

- Remove the glass part using standard removal tools, taking care to avoid damaging the frit. Try to cut through the middle of the existing polyurethane bead.
- Set the glass aside until it is time to replace it.
- Following removal of the part that is to be reinstalled, begin by cleaning the glass part with Sika® Cleaner G+P.

Sika® recommends that the bead of polyurethane on these parts be trimmed just prior to reinstallation. If this is not possible and more than 8 hours have passed since the bead was trimmed; or more than 2 hours in direct sunlight; additional pre-treatment will be necessary, as indicated below:

- Clean the contaminated areas of the trimmed original polyurethane bead by wiping it with glass cleaner, Sika® Cleaner G+P or a suitable solvent, allowing it to flash off for 10 minutes, regardless of the temperature, whenever it is applied over trimmed polyurethane.
- If using the Clear Activator Process wipe the cleaned bead with Sika® Activator and allow it to flash off for 10 minutes.
- If using the All Black Primer Process or Primerless to Glass Process apply a single coat of Sika® Primer over the cleaned bead and allow it to flash off for 10 minutes.

- One of the following two options MUST be followed when performing a removal and replacement:

- If the remaining layer of polyurethane adhesive has good adhesion to the entire perimeter of the glass part, it does not matter which adhesive company manufactured the remaining layer of adhesive, and this part can be installed using the standard procedures described in this manual.
- If the original polyurethane on the glass part does not have good adhesion around the entire perimeter of the part then Sika does NOT recommend reinstallation of the part.

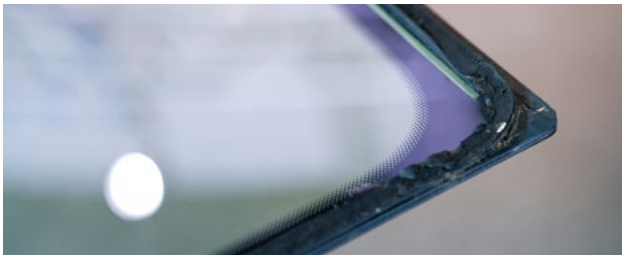
11.5 USED GLASS

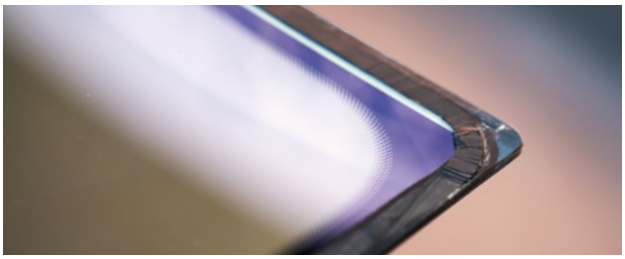
Sika endorses and follows the interpretation provided by AGRSS concerning the installation of used glass.

Therefore, the following conditions must be met to allow for the use of recycled or previously used stationary automotive glass in motor vehicles:

- The glass is in a condition that will permit a safe installation and must be free of obvious structural or visually objectionable flaws. Unacceptable flaws include delamination, edge chips, cracks/breaks, or distortion in an acute vision area.
- The glass is installed with a retention system compatible with the original equipment (OE) design.

If these 2 conditions are met and if the remaining layer of polyurethane adhesive has good adhesion to the entire perimeter of the glass part, this part can be reinstalled using the standard procedures described in this manual. If the original polyurethane on the glass part does not have good adhesion around the entire perimeter of the part then Sika does NOT recommend reinstallation of the part.





11.6 SEALING LEAKS

Caution should be used when approaching the sealing of an air or water leak from a previous installation. A high level of liability is transferred to the company repairing such conditions in that they are not aware of the products or workmanship of the company that performed the previous installation. It is advisable to conduct section **Removal and Replacement**, at minimum, in order to assess the entire installation and correct any adverse condition that may exist. It should be noted that the use of compatible sealant systems must be used in all such cases.

11.7 PAAS

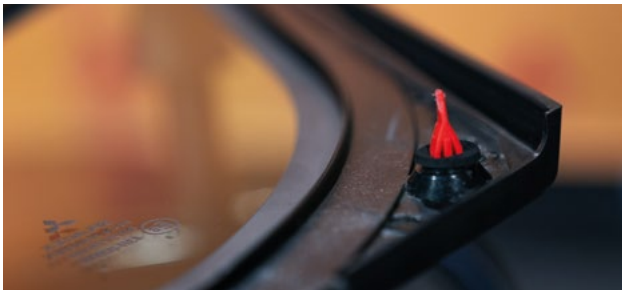
PAAS stands for Pre-Applied Adhesive System. Modern PAAS glass parts are designed to act as a height guide when installing fresh adhesive. However, a PAAS system can also get easily contaminated from shipping and handling. To prepare a PAAS part using Sika's Black Primer Process, or using Sika's Primerless To Glass Process, firstly abrade the bonding area with 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad. Clean the abrasion residue using glass cleaner, Sika® Cleaner G+P or a suitable solvent. Apply a coat of Sika® Primer to the bonding area of the part. Allow the primer to flash off for 10 minutes, regardless of temperature.

In some cases, the pre-applied adhesive may need to be trimmed down to allow room for the new polyurethane adhesive. In these cases, it is not necessary to apply any pre-treatment product (regardless of which Sika Process you use) to the freshly cut bonding area exposed by the trimming of the pre-applied polyurethane adhesive.

11.8 REAR SLIDERS AND ENCAPSULATED PARTS

For painted rear sliders on pick-up trucks, and encapsulated glass parts, follow the procedure detailedbelow in order to properly prepare the part for installation:

- Abrade the bond area of the painted aluminum extrusion or encapsulation with a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad. For soft encapsulations, a more aggressive abrasion medium such as a wire wheel may be used.
- Clean the abrasion residue using glass cleaner, Sika® Cleaner G+P or a suitable solvent.
- Apply a coat of Sika® Primer, and then allow at least 3 minutes for this product to dry.
- Set the glass part using your preferred Sika direct glazing polyurethane adhesive.



11.9 FACTORY PRE-APPLIED BLACK PRIMER

IN SOME INSTANCES, WINDSHIELDS ARE SUPPLIED TO THE AUTOMOTIVE AFTERMARKET WITH A FACTORY PRE-APPLIED BLACK PRIMER. Over a period of many years, Sika has thoroughly investigated many of these situations by performing adhesion tests in our laboratory using our adhesive systems. The results of these investigations have indicated Sika® Aktivator or Sika® Primer should be used to pre-treat these parts, prior to use of a primerless-to-glass adhesive. Please keep in mind that all application recommendations for these products are still necessary and must be followed in accordance with instructions given above.

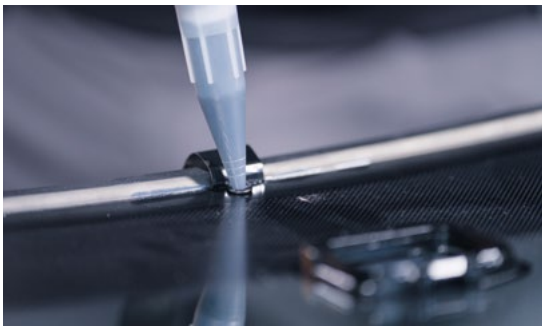
Additionally, it should be noted that this recommendation is being made only after extensive investigations that included laboratory adhesion testing and with consideration that the primer has been applied to the windshield in a controlled factory setting, ensuring both sufficient adhesion of the factory applied black primer to the glass part's bond area and consistent application from part to part. It is due to these factors that Sika can endorse the use of Sika® Primer and Sika adhesives with the factory pre-applied primer that is found on these particular windshields. In no other instance should a customer interchange primers, glass activators and/or adhesives from different adhesive suppliers. If the auto glass installer is unable to determine if the primer has been applied by an automotive OEM, then Sika recommends that the part is not installed and is returned to the distributor.

11.10 HEATED WINDSHIELDS

GUIDELINE: On heated windscreens, water leakage is a known issue, and the wire connection is often the reason why.

On heated windscreens, water leakage is a known issue, and the wire connection is often the reason why. Sika® recommends check and treat insufficient bonded wire connections as following:

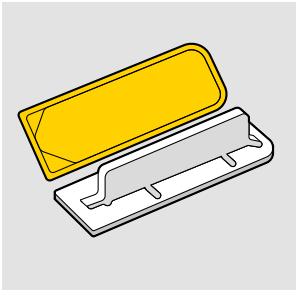
- Carefully check whether the wires are firmly connected to the bonding area, by pull the wire carefully from the bonding area. If these come off easily, the following procedure should be followed.
- Firstly, firmly remove the double-sided tape or factory applied adhesive from the loosened wires.
- Seconded abrade the wire connections with an abrasive pad such as 6120 siafleece or 3M Scotch-Brite™. Then remove any dust using oil free compressed air, or wipe with Sika® Cleaner G+P and dry with lint free paper towel.
- Shake the primer can vigorously until you hear the mixing ball rattle and then continue shaking for an additional 10 seconds.
- Apply Sika® Primer on both substrates using a Sika® Cleaner PCA, small brush, dauber, or cotton swab and allow it to flash off for at least 10 minutes before applying adhesive.
- Finally apply the appropriate Sika windshield adhesive between the glass and the wire connections and continue the installation process.



12. SINGLE USE APPLICATORS

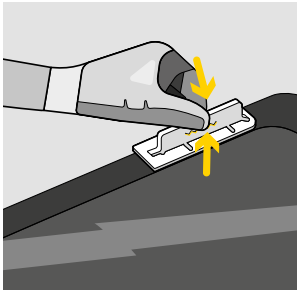
12.1 USE OF SIKA® AKTIVATOR PAD:

1



- Take a Sika® Aktivator Pad from the box.

2



- Hold the Sika® Aktivator Pad directly against the bond area of the windscreen.
- Take the pad handle between thumb and forefinger to break open the inner glass ampoule and transfer the contents to the fabric pad.

3

- Draw the Sika® Aktivator Pad around the perimeter (bond area) of the windshield in one direction only.
- Dispose of the Sika® Aktivator Pad after each use.

NOTE:

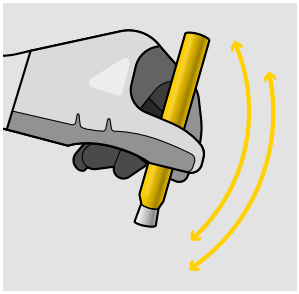
- Sika® Primer Stix may be cut at the angle, for priming in hard to reach areas such as around molding retention clips. Take care because cut tips have a greater tendency to drip when pressure is applied to the Six.
- To prevent the Stix applicator tip from drying out in hot conditions, dab the tip on the back of a gloved hand or on a paper towel in between areas of application.
- For larger areas of application, Sika® Primer* from a can will likely be the best option, due to the more limited coverage of the Sika® Primer Stix.

12.2 USE OF SIKA® PRIMER STIX:

1

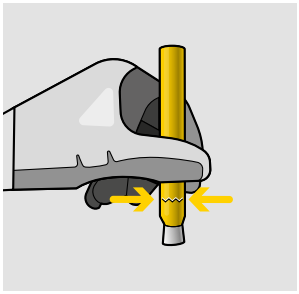
- Take a Sika® Primer Stix from the box.

2



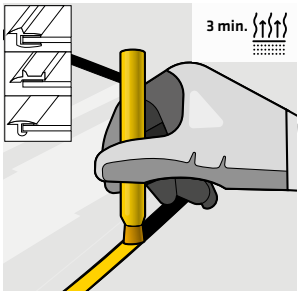
- Shake the Sika® Primer Stix vigorously prior to use for a minimum of 30 seconds.

3



- Point the Sika® Primer Stix toward the ground and pinch tube just above the tip with the thumb and forefinger to break the internal glass ampoule and release the primer into the tip.
- With the tip pointing down, gently squeeze the Sika® Primer Stix to wet out the tip, being careful not to squeeze too hard creating a drip.

4



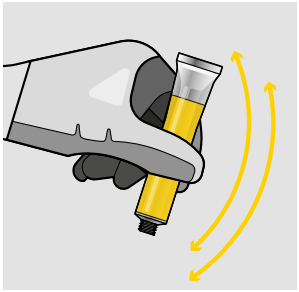
- When the tip is fully saturated, begin priming the bonding area immediately.
- Allow gravity to feed the tip, but you may gently squeeze the Stix applicator if more primer is needed.
- Dispose of the Sika® Primer Stix after each use.

12.3 USE OF SIKA® PRIMER TUBE:

1

- Take a Sika® Primer Tube from the box.

2



- Shake the Sika® Primer Tube vigorously prior to use for a minimum of 30 seconds.

3

- To open the membrane of the tube, screw on the applicator,
- Gently squeeze the Sika® Primer Tube to ensure a good wetting of the foam applicator.
- Being careful not to squeeze too hard creating a drip.

4

- When the fabric pad is fully saturated, begin priming the bonding area immediately.
- Apply a coat of Primer to the bonding area.
- Dispose of the Sika® Primer Tube after each use.

13. USE OF OTHER SIKA® AKTIVATOR PRODUCTS

- Sika® Aktivator-100 are also approved for use in auto glass replacement applications.
- Sika® Aktivator-100 may be used to pre-treat AGR substrates if other Sika Aktivators are not available. However, Sika® Aktivator-100 is not recommended for use at temperatures below 5 °C (40 °F) and requires a 10 minute flash off time in all conditions. For best results, Sika® Aktivator-100 should be applied using a clean, lint free paper towel and should then be wiped off using a second, dry, lint free paper towel.

14. DATE CODES

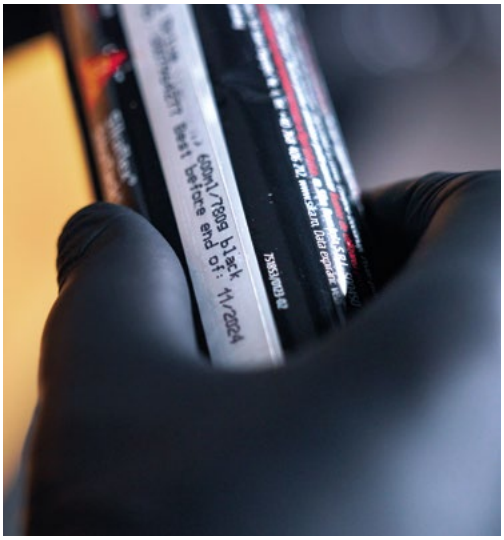
ALL SIKA PRODUCTS HAVE A SHELF LIFE, I.E. A PERIOD OF TIME AFTER PRODUCTION WITHIN WHICH THE PRODUCT MUST BE USED. AFTER THE EXPIRATION OF THE PRODUCT SHELF LIFE WITHOUT USE, THE PRODUCT MUST BE DISCARDED. Expired product performance is not warranted and the product may not adhere properly, causing loss of glass retention and possible personal injury. Humidity, temperature and sunlight can affect the shelf life. It is important to keep the products stored correctly. Make sure you rotate your stock and use it on a first in, first out basis. If you encounter problems with the materials, the first thing to check is the date code to determine if the product shelf life has expired. Date codes are located on the shipping box, re-sealable cans and sticker sheets that accompany the polyurethane products. IF THE SHELF LIFE HAS LAPSED, DO NOT USE THE PRODUCT.

Check the Product Data Sheet (PDS) for each product to see its indicated shelf life.

Once Sika® Aktivator is opened, the shelf life is reduced, but not destroyed. In order to maintain product quality it is important to reseal the container with the inner plastic liner immediately after use. Once the surface pre-treatment operation is completed, the cap has to be screwed on. Dispose of the product approximately 1 month after opening. If the product becomes thick or cloudy, discontinue use immediately.

Once Sika® Primer is opened, the shelf life is reduced, but not destroyed. In order to maintain product quality it is important to reseal the container with the inner plastic liner immediately after use. Once the surface pre-treatment operation is completed, screw the cap on. Dispose of product 1 month after opening if used frequently or after 2 months if used infrequently. For 100 ml pack sizes, dispose of it two weeks after opening. If the product becomes thick or cloudy, discontinue use immediately.

Concerning re-sealable cans, write on the can (not on the lid), with permanent ink, the date it was first opened in order to ensure the product is not used beyond the opened shelf life or the expiration date, whichever comes first. The published shelf life of all Sika cleaners, primers and polyurethanes will be realized when the product is stored below 25 °C (77 °F). Long term storage of the product at higher temperatures will affect the handling characteristics and shorten the shelf life. Short term storage, considered by Sika to be a 30 day period from the purchase date by a glass shop or mobile unit, will have relatively little effect on the shelf life of the adhesive. If the product is exposed to freezing conditions, i.e below 0 °C / 32 °F, the product will not be damaged, but it will require additional time to acclimatize to the ideal application temperature. Products should be used according to the application temperature limits provided on the PDS.



Products that have expiration dates, or Best Before dates, given in month and year only, without a specific day, can be used until the end of the month that is listed.

15. RECORD KEEPING

ALWAYS KEEP ADEQUATE AND SUFFICIENT RECORDS TO FULLY DEFINE THE PRODUCTS AND PROCESSES USED IN THE INSTALLATION. AS AN ABBREVIATED SUMMARY, MAKE SURE TO HAVE ALL INSTALLER AND SHOP CERTIFICATIONS CURRENT AND ON FILE. SIKA TRAINING CERTIFICATES SHOULD BE UPDATED AT LEAST EVERY OTHER YEAR IN ORDER TO MAINTAIN PROPER CONTINUING EDUCATION REQUIREMENTS. HAVING PRE- AND POST-INSPECTION DOCUMENTATION IS IMPORTANT AS A RECORD OF ALL THE PRODUCTS AND WORK PERFORMED ON THE CAR. PRODUCT TRACEABILITY IS IMPERATIVE.

A record should also be kept indicating the MDAT of the vehicle along with the temperature and humidity on the given date the work was completed. Having customer signatures denoting their acceptance of all information on such records is recommended. One final and very important aspect of record keeping is to record any time that a product fails to perform as expected and to contact the supplier of the product to inform them about the issue.

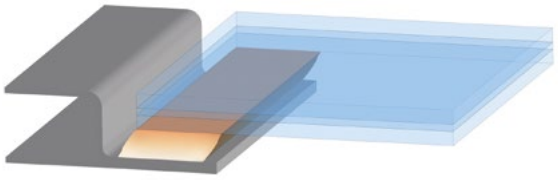
16. MODULUS AND CONDUCTIVITY

SIKA DIRECT GLAZING ADHESIVES ARE DESIGNED TO BE WHAT SIKA REFERS TO AS AN ALL-IN-ONE MODULUS ADHESIVE. EACH OF THESE POLYURETHANES HAVE A SHEAR MODULUS THAT IS ON THE HIGHER END OF THE RANGE FOR CONVENTIONAL POLYURETHANE ADHESIVES AS DEFINED IN THE REQUIREMENTS OUTLINED IN THE NORTH AMERICAN AUTOMOBILE MANUFACTURER'S DIRECT GLAZING SPECIFICATIONS. Extensive field testing performed by Sika in the United States, Europe, Australia, and Canada over an extended period has shown that an adhesive with this level of shear modulus is suitable for replacement of all glass parts, even those that were originally installed in vehicles using a high modulus adhesive. When used for high modulus AGR applications, any polyurethane labelled All-In-One modulus will be able to maintain the vehicle's original level of stiffness.

These All-In-One modulus adhesives can be used for ALL auto glass replacement applications.

HIGH MODULUS POLYURETHANES:

Some automotive OEMs use direct glazing adhesives that have a slightly higher modulus, compared to that of conventional polyurethane adhesives. The modulus of an adhesive indicates how much joint movement is to be expected when a given amount of force is applied to the bonded joint.



This characteristic of high modulus polyurethane adhesives has allowed some automotive OEMs to increase the overall stiffness of their vehicles simply by bonding the windshield with this type of adhesive.

LOW MODULUS POLYURETHANES:

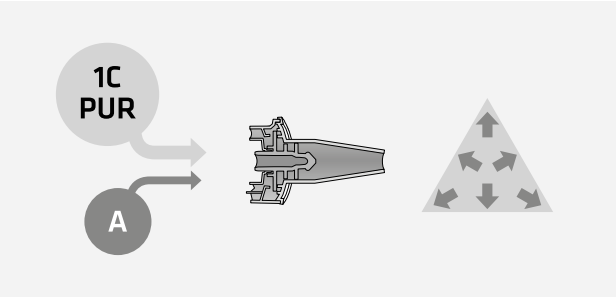
Low modulus adhesives are softer than All-In-One modulus and are designed to handle the thermal expansion of plastic windshield without resulting in mechanical overload or stress cracks. A low modulus adhesive does not support the overall stiffness of a vehicle in the way that Sika All-In-One modulus or high modulus direct glazing adhesives do.

LOW CONDUCTIVITY POLYURETHANES:

The subject of low conductivity or non-conductivity is not new in the field of polyurethane adhesives. All black polyurethane adhesives will conduct electricity to some degree. Some automotive OEMs have a specific requirement regarding the conductivitylevel of the glass bonding polyurethane adhesives used for their vehicles. In order to be rated as non-conductive, the polyurethane must meet these levels, as specified by the vehicle manufacturers. Sika makes several adhesives that are rated non-conductive and are acceptable for use in these applications. Please refer to the individual product datasheet to determine if it's suitable for these applications. Conductivity is a measure of the ability of a material to conduct electrical current. If the conductivity of a material is sufficiently low, it acts as an insulator preventing the flow of electricity, much like the plastic surroundingthe exterior of a lamp cord. Due to the physical positioning of a polyurethane adhesive between two surfaces, in orderto seal or bond together, engineers and designers have found the polyurethane bead to be in an excellent location to preventseveral potential electrical related problems.

17. POWER CURE

SIKA POWERCURE PRODUCTS ARE ACCELERATED POLYURETHANE ADHESIVES DESIGNED TO BE USED IN CONJUNCTION WITH THE POWERCURE DISPENSER DEVELOPED BY SIKA. Sika PowerCure adhesives comprise of a standard 1-Component polyurethane adhesive, but importantly, with an attached shoulder containing an accelerator paste.



The adhesive and the accelerator paste are dynamically mixed in the specially designed nozzles causing the adhesive to cure homogeneously throughout the dispensed bead, rather than from the outside in, as with a standard 1-Component polyurethane adhesive that relies on moisture from the air to cure. The use of the accelerator paste means that the rate of cure is independent of the amount of ambient humidity in the atmosphere and is significantly faster than the rate of cure of a standard 1-Component adhesive alone.

The mixing of the adhesive and the accelerator causes the dispensed bead to reach OEM Level Cure very rapidly. An adhesive has reached OEM Level Cure when:

- Body stiffness is returned to its original level, and there are no restrictions on operation of the vehicle.

The Sika PowerCure adhesives allows short Minimum Drive Away Time for passenger cars, recreational vehicles and commercial vehicles such as trucks, buses and trains, in all glass sizes, all year round and benefits by reducing vehicle downtime.

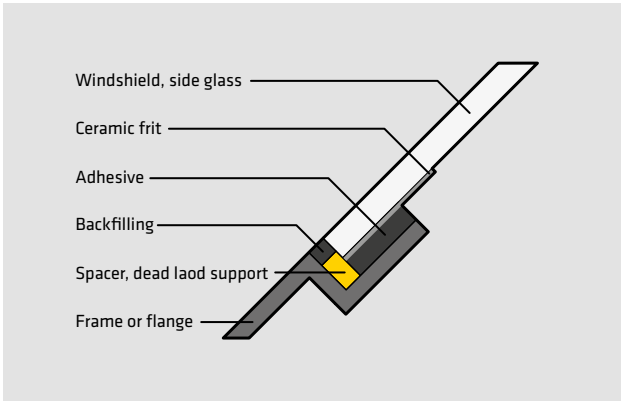
NOTE:

- Glass, ceramic frit and pinchweld preparation must be followed using either Clear Aktivator Process or All Black Primer Process.

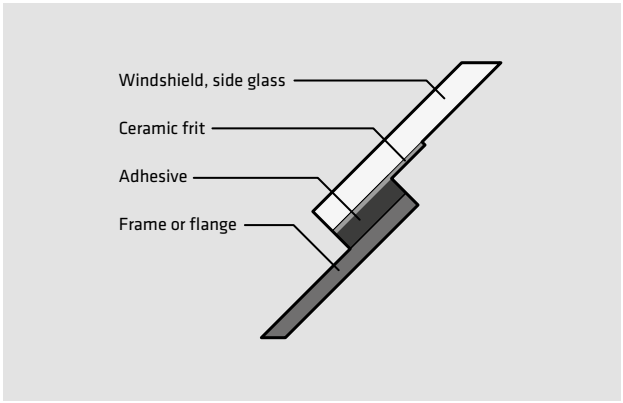
18. MINIMUM DRIVE AWAY TIME (MDAT) FOR COMMERCIAL VEHICLES

IF THE VEHICLE HAS A GROSS WEIGHT OF MORE THAN 4,500 KG (10,000 POUNDS) THE FMVSS 212 STANDARD DOES NOT APPLY, AND THE MINIMUM DRIVE AWAY TIME IS DETERMINED IN A DIFFERENT WAY. In the repair market for buses, coaches and trucks, there are no crash test standards that the MDAT can refer to. Instead, the calculated MDAT is based solely on the reactivity of the adhesives. The different tensions and loads on the bond line when the vehicles are in service can only be estimated. The following MDAT (for dead load supported windows) are based on early strength development and slip down (creep modulus during the curing process) of the adhesives.

In this regard, a "supported glass" means that the weight of the glass is permanently supported by mechanical means. I.e spacers or setting blocks. For more details see below pictures 1 and 2.



1. Supported glass



2. Unsupported glass

MDAT chart for windshield or side glass replacement:

Applicable conditions: 5 °C to 35 °C (40 °F to 95 °F)

Sika Product	Light Commercial Vehicle [1]	Truck [2] Windshield < 40 kg	Bus [2] Windshield < 75 kg
SikaTack® ELITE (Purform) (PowerCure)	30 minutes	60 minutes	60 minutes
Sikaflex®-668 PowerCure (Purform)	not recommended	not recommended	3 hours
SikaTack® TRANSPORT (Purform)	1 hour	2 hours	4 hours

[1] For light commercial vehicles having a gross weight rating of 4'500 kg (10,000 pounds) or less, the US federal standard FMVSS 212 applies.
[2] MDAT for supported windows (see picture 1).

- The calculation considers cases such as an unbelted driver, passenger or unsecured luggage which cause additional stresses on the bond-line in case of an emergency stop or crash.
- For dead load unsupported glasses on vehicles above 4'500 kg (10,000 pounds) the MDAT must be doubled (see picture 2).
- Advice on specific applications is available on request from the Technical Department of Sika Industry. For instance bullet proofed glass or applications outside the bdefined vehicle type, or for application outside the defined ambient temperature range.
- The recommended MDAT is based on measurements and calculations following the Sika process recommendation. Deviations from the recommendation could lead to a safety issue.

NOTE:

- choice of the most suitable adhesive for the application, especially for large windshields, must be done considering compression force (viscosity), length of the bond-line and open time.

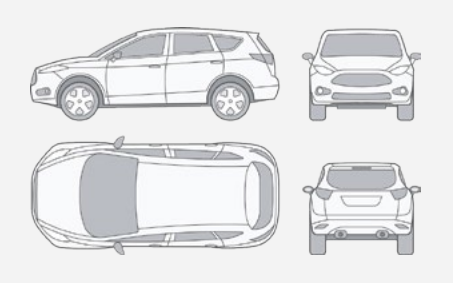
APPENDIX

SIKA VEHICLE INSPECTION SHEET

PRE-INSPECTION

EXTERIOR

Ensure that all affected areas are clearly marked prior to the commencement of any work.



INTERIOR

	Tears	Stains	No Issues Detected
Headliner	☐	☐	☐
Seats	☐	☐	☐
Dashboard	☐	☐	☐
Door panels	☐	☐	☐
Floor front	☐	☐	☐

ELECTRONIC SYSTEMS

	Issues Identified	No Issues Detected
Air condition	☐	☐
Rain sensors	☐	☐
Light sensor	☐	☐
ADAS	☐	☐

Job finished at:

Your car will be safe to drive at:

I hereby confirm that I have thoroughly reviewed the inspection sheet prior to signing below and attest that I fully understand its contents.

Date	**Customer signature**

SIKA SERVICES AG
Tueffenwies 16
CH-8048 Zurich
Switzerland

Contact
Phone +41 58 436 40 40
www.sika.com/aftermarket

POST-INSPECTION

ELECTRONIC SYSTEMS

Air condition	☐	**CHECKED**
Rain sensors	☐	**CHECKED**
Light sensor	☐	**CHECKED**
ADAS	☐	**CALIBRATED**

BEFORE RETURING TO CUSTOMER

Vacuumed	☐	**DONE**
Trim secured and cleaned	☐	**CHECKED**
Glass cleaned	☐	**DONE**

Company name:

Name of installer:

Installer certification no.:

Date:
Customer name:
Phone no.:
Type vehicle:
Color vehicle:
License plate no.:
VIN (vehicle identification) no.:
Glass part no.:
Glass DOT no.:
Adhesive system used:
Adhesive batch no.:
SikaPrimer® batch no.:
SikaAktivator® batch no.:

BUILDING TRUST

GLOSSARY OF TERMS

ACTIVATED SURFACE
A surface that has been wiped with Sika® Aktivator, where deposits of adhesion promoters remain and which is ready for adhesive bonding or a primer application. I.e. A ceramic coat that is wiped with Sika® Aktivator, remains activated for 8 hours.

CERAMIC COATING/CERAMIC FRIT
A black, ceramic composite applied to the perimeter of the windshield glass for cosmetic and protective purposes. This ceramic coating protects the polyurethane adhesive against harmful ultraviolet (UV) rays.

COAT
Single application of a layer of primer.

COMPRESSION/DECKING FORCE
Pressure exerted on a sealant or adhesive in a joint.

CURE TIME
The time required to effect a complete cure at a given temperature and relative humidity.

CURING CONDITIONS
The factors that influence the curing of adhesives, e.g. temperature, relative humidity, etc.

DIRECT GLAZING
Where a window is bonded directly to the body or structure of the vehicle, vessel, or building.

ENCAPSULATED WINDSHIELDS
Windshields which contain a polyurethane or PVC profile molding around the edges.

EPDM
A rubber material, Ethylene propylene diene monomer, that is commonly used for framing plastic side windows.

GLASS CLEANER
Sika supports the use of Sika® Cleaner G+P, where available locally, or any other glass cleaner, if it has been confirmed to NOT contain anti-static or coating ingredients. If using a bulk liquid glass cleaner such as Sika® Cleaner G+P, please be aware that some pressure sprayer bottles may have contaminants, for example silicone or grease, in the spray head or bottles. To avoid the potential risk of contamination, use Sika's 500 ml trigger spray or pressure sprayer bottle provided with Sika® Cleaner G+P.

FRESH-CUT BEAD
A cured polyurethane bead that has been freshly cut.

FMVSS 212
The Federal Motor Vehicle Safety Standard which states that, when a vehicle travelling at 48 km per hour crashes, more than 75% of the adhesive bond-line must be retained, whereas no more than 50% on any one side can be lost.

MDAT
Minimum Drive Away Time indicates the time after installation of the windshield that the car can pass a crash test according to FMVSS 212.

MODULUS
The ratio of stress to strain.

NON-CONDUCTIVE ADHESIVE
Automotive OEM standards specify an adhesive as non-conductive when the electrical resistance, measured according to DIN 53482, is greater than 10^8 Ω/cm for aluminum body vehicles and greater than 10^9 Ω/cm for magnesium body vehicles.

NOZZLE
The plastic tip of the applicator gun from which the bead of adhesive is extruded.

1-COMPONENT POLYURETHANE ADHESIVE
A polyurethane adhesive supplied as a single premixed compound, which cures on exposure to moisture.

OPEN TIME
The maximum period of time that may elapse between application of the adhesive and assembly of the joint, dependant on the adhesive and environmental conditions.

PINCHWELD
The frame of the cars bonding area. Alternative words are used in the Automotive Industry such as aperture, frame, and flange.

POLYURETHANE
A family of polymers, ranging from rubber-like to brittle, usually formed by the reaction of diisocyanate with a hydroxylic compound. Alternative words are used in the Automotive Industry such as PU, PUR, Urethane, Direct Glazing Adhesive, Windshield Adhesive, AGR Adhesive and AGR Urethane.

PRE-APPLIED ADHESIVE SYSTEMS (PAAS)
A polyurethane adhesive applied in a specific shape by the glass manufacturer to the edge of the glass.
This can be used as a molding and decorative trim for flush mounted auto glass.

PRIMER
A special paint coating designed to inhibit corrosion and improve adhesion between adhesives and some substrates.
The contribution made to corrosion inhibition will depend on composition and paint thickness.

REMOVAL AND REPLACEMENT/REMOVAL AND INSTALLATION
R&R Installation and R&I are the common terms for Removal and Replacement, a procedure where the same piece of glass that is removed from a vehicle is properly prepared and then re-installed into the same vehicle.

SUITABLE SOLVENT
Is a similar product to Sika Remover-208, solvent based cleaning agent for non-porous substrates.

TACK-FREE OR SKINNING TIME
The time between the application of the adhesive and the formation of a skin on its surface, after which, bonding can no longer take place.

FAQ

Can direct glazing adhesives be applied to wet surfaces?
No. Polyurethane adhesives cannot be applied onto wet surfaces because a reaction with water can cause the polyurethane to lift from the surface. All surfaces must be dry.

Can Sika® Aktivator be used in damp conditions?
Yes, Sika® Aktivator can be used in damp conditions, e.g. on windshields with a light misting of condensation. In this application, 'damp' refers to any humid condition where larger water droplets are NOT visible, either as pooled condensation or as spots of rain. However, it is better if the part is dried first.

Why is the use of daubers with Sika® Aktivator not recommended?
Sika® Aktivator performs a cleaning function, as well as an activating function. Application with a dauber simply moves dirt around and does not clean it off. Daubers apply too much product, which is unnecessary and wasteful. They can become dirty and contaminate the activator if they are dipped in the bottle several times. It is difficult to cover the required area using daubers.

Why is the use of daubers or Sika® Cleaner PCA recommended for Sika® Primer, when applied to clear glass, but only brushes recommended for scratches on the flange?
Many installers prefer using daubers or the Sika® Cleaner PCA for Sika® Primer when it is applied as the bonding surface because of the smooth and uniform application. It is recommended that a brush is used when covering scratches, because it is important that the product is applied INTO the scratch. Some installers find cotton buds sticks or Q-tips are also effective to apply Sika® Primer to the scratches in the flange.

Why does Sika® Primer need to be shaken?

Shaking primers mixes the solids that may have settled at the bottom of the bottle and ensures a thin, homogeneous mixture and uniform coverage. All manufacturer's primers containing solids should be shaken before use.

What happens if the recommended flash off time of the pre-treatment products is not adhered to?

In addition to adhesives, pretreatment products also need time to react. A primer, for example, is like a diluted adhesive that needs time in addition to moisture so that the solvents can evaporate and the product to cure. If the pretreatment product cannot fully react, it can reduce the bond strength of the system and, in the worst case, the bond can fail. Lower temperatures increase the flash off time of Sika® Primer.

Cutting out a windshield has revealed that the old polyurethane bead contained a bubble between the adhesive and the windshield. How can this be prevented?

This is known as 'tunneling' which, in most cases, is caused by errors by the auto glass installer. When the adhesive is applied, ensure that the nozzle is at a 90° angle to, and is in contact with, the substrate. Always apply a triangular bead so that no air is trapped when it is compressed.

Are there any aggressive components in Sika® Aktivator, Sika® Primer, that could attack surfaces?

Sika® Aktivator, Sika® Primer contain components which react chemically with glass, paint, and other materials. Once cured, they can only be removed mechanically and the upper layer of the substrate is damaged in the process. Care must be taken to apply Sika® Aktivator* only to the required areas. If the product is applied to the transparent area of the glass, it will be visible, and the customer will have cause for complaint.

What happens if too thick a coat of Sika® Primer, is applied?

Applying a thick coat of Sika® Primer, results in a longer flash off time. But if applied as a corrosion protection on bare metal it is recommended that two thick coats of Sika® Primer be applied for long lasting protection.

Is there a product for cleaning Sika® Primer, from interior parts?

Sika® Primer, can be cleaned using Sika® Remover-208 or Sika® Cleaner-350H (Hand Wipes) as long as it has not cured completely. Once cured, it must be removed mechanically.

What is the minimum temperature to perform a replacement job?

Sika products are intended for use at temperatures between 5 °C to 35 °C (40 °F to 95 °F). For all other conditions Sika has special hot and cold weather recommendations. While a job can be carried out at a temperature as low as -10 °C, installers will have dexterity issues with cold hands and it may be too cold to carry out the job to a suitable professional standard. In this case, the job should be deferred.

What records are important to keep?

As mentioned in earlier sections, always keep adequate and sufficient records to fully define the products and processes used in the installation Make sure to have all installer and shop certifications current and on file. Sika training certificates should be updated at least every other year in order to maintain proper continuing education requirements. Having pre and post inspection documentation is important as is a record of all the products and work performed on the car. Product traceability is imperative. A record should also be kept indicating the MDAT of the vehicle along with the temperature and humidity on the given date the work was completed. Having customer signatures denoting their acceptance of all information on such records is recommended. AGRSS requires the maintenance of any and all records that provide proof of compliance to the AGRSS Standard. One final and very important aspect of record keeping is to record any time that a product fails to perform as expected and to contact the supplier of the product to inform them about the issue.

What products does Sika offer to contend with contamination and proper cleaning?

The General Guideline for Vehicle Glass Replacement specifically identifies what cleaning products and processes MUST be used concerning each step of an auto glass installation. It is important to follow such instructions and never introduce any other processes, steps and, or products that are not approved in writing by Sika. Failure to comply with these written instructions may result in a voided warranty.

Sometimes my push-in moldings do not stay down. What causes this and what would you recommend to address the problem?

Often there is a small amount of residual processing oil or other contaminant present on the molding surface that cannot be seen with the naked eye. Give the molding a light scuff with a 6120 siafleece, 3M Scotch-Brite™ or similar abrasive pad and clean with glass cleaner prior to installation. Also, make sure you do not exceed the open time of the adhesive being used to help hold the molding in place.

What risks do I take if I use a high modulus polyurethane on a vehicle that only requires non-conductive polyurethane?

The windshield could stress crack during vehicle operation. Please remember that the All-In-One products are recommended for high modulus applications and can be used for all applications without concern for stress cracking.

What risks do I take if I don't use a high modulus or an All-In-One modulus polyurethane on a vehicle that does require it?

After the windshield is replaced, the vehicle might not have the original level of stiffness and the windshield could break as a result of moving beyond the limits of the window opening during operation of the vehicle.

I've always used a round bead and never had a problem. Why do you recommend a triangle bead?

When compressed, a triangle is the only dimension that will not trap air. Round beads tend to trap air in all four corners, creating air pockets that vibrate through the bead, creating leaks. When applied correctly, triangular beads create less squeeze-out and require less clean up. Always remember to trowel all wet seams of polyurethane together, using a windshield stick or blade.

When uncertain of how to bond glass parts, is it best to always use a Sika adhesive system?

While polyurethane satisfies most vehicle needs for installing glass parts, there are some exceptions. Most notable is when the OE glass part utilizes a mechanical fastening system, which provides the required retention strength, and calls for a sealant to prevent water and sound penetration. In such cases, it is always best to follow current OEM specifications for installing a replacement part. Where a model vehicle has been upgraded, it is recommended that only the most current specified retention system should be used. An example would be a vehicle model transitioning from a gasket set to a polyurethane set glass part.

What should I do if a product used in the glass installation failed and it could jeopardize customer safety?

Report the failure directly to the customer and offer to remedy the situation.

Are there any special considerations when repairing, removing, or replacing motorized windows and/or panels equipped with an anti-pinch mechanism?

Ensure these mechanisms are reset, initialized, and/or confirmed to be operating correctly before the vehicle is released to the owner. Notify the owner both verbally and in writing if the resetting or initializing cannot be completed for any reason.

Certification

To achieve full certification in the Sika Auto Glass Replacement System, an Auto Glass Installer must complete in-person training or Sika's online Academy and successfully pass a comprehensive test.

GLOBAL BUT LOCAL PARTNERSHIP

FOR MORE AFTERMARKET INFORMATION

www.sika.com/aftermarket

WHO WE ARE

Sika AG, Switzerland, is a globally active specialty chemicals company. Sika supplies the building and construction industry as well as manufacturing industries (automotive, bus, truck, rail, solar and wind power plants, facades). Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing, and protecting loadbearing structures. Sika's product lines feature high-quality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

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