<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
<th>Column C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current AGRSS Standard sections and language that requires instruction from the retention system provider to help ensure AGR technician compliance.</strong> Note that only those sections of the Standard pertaining to the required support of the retention system provider are listed.</td>
<td><strong>Retention System Provider instruction response to Column A</strong> (List the response that an AGR Technician should provide in order to match the instructions your company provides pertaining to the subject identified in Column A)</td>
<td><strong>Identify the location within your current, written, comprehensive training instructions where your instruction response from Column B can be identified.</strong> (Document name, page and paragraph)</td>
</tr>
</tbody>
</table>

| **4.0 Vehicle Assessment before Replacement** | | |
| 4.1 Those engaged in automotive glass replacement shall not undertake or complete such installation when any related condition would compromise the retention system and the owner/operator shall be so notified. | “Inspection of the vehicle – Pre-Installation: (...) Record and report any unsafe conditions or damage of the vehicle to the customer using the windshield replacement record attached on page 28.” | Training Manual – DGX Teroson Bond: Section 4.1 – Page 5 – Step 1. |

| **5.0 Selection of Glass and Retention Systems** | | |
| 5.1 Those engaged in automotive glass replacement shall use retention systems that are produced under the ISO 9001 standard or any standard that contains the entire text of ISO 9001. | “Declaration of standard Performance: (...) TEROSON® BOND direct glazing adhesives which are used in automotive glass bonding and replacement shall use retention systems that are produces under ISO 9001 standard or any standard that contains the entire text of ISO 9001. (...)” | Training Manual – DGX Teroson Bond: Section 11.0 – Page 28. |
| 5.3 Those engaged in automotive glass replacement shall use either an OEM approved retention system or equivalent retention system as certified in writing by the equivalent retention system manufacturer directly or through a private labeler. | “TEROSON® BOND direct glazing adhesive systems for OEM are used by many automobile manufacturers. This close collaboration and technical knowledge validates Henkel’s ability to produce qualified adhesive systems that meet or exceed the stringent OEM specifications for quality and performance for automobiles produced worldwide.” | Training Manual – DGX Teroson Bond: Section 11.0 – Page 28. |
| 5.4 Those engaged in automotive glass replacement shall obtain and follow written comprehensive and current application instructions from the retention systems manufacturer or private labeler. These instructions shall include at least the proper use of the retention system storage specifications, minimum drive-away time charts containing temperature and humidity variables if applicable, and any special procedures required for adverse weather conditions. | 4.1 Replacement of new windshield | “The following flow chart shows the steps necessary for replacement of a windshield:” Training Manual – DGX Teroson Bond: Section 4.0 to 6.5 – Page 4 to 25. |
## 1. GLASS CLEANING:
- Product requirements
- Application requirements
- Storage requirements
- Shelf-life (opened & unopened)
- Adverse weather conditions
- Additional requirements

“STEP 6: PINCHWELD INSPECTION AND PREPARATION

After removing the existing windshield, all tools and debris should be removed from the working area. The pinchweld area must be cleaned. The pre-cleaning can be done using a clean brush or compressed air that its moisture-free and oil-free. (...)

Training Manual – DGX Teroson Bond:
Section 4.0 to 6.5 – Page 4 to 25.

## 2. GLASS PREP/PRIMING:
- Product requirements
- Application requirements
- Storage requirements
- Shelf-life (opened & unopened)
- Adverse weather conditions
- Additional requirements
  - Used Glass
  - Pre-primed glass
  - PAAS
  - Non-traditional contamination
  - Other

“STEP 8: PRETREATMENT OF A NEW WINDSHIELD

STEP 9: PRIMER APPLICATION ON NEW GLASS”

Training Manual – DGX Teroson Bond:
Section 4.0 to 6.5 – Page 4 to 25.

## 3. PINCHWELD PREP/PRIMING:
- Product requirements
- Application requirements
- Storage requirements
- Shelf-life (opened & unopened)
- Adverse weather conditions
- Additional requirements
  - Corrosion treatment
  - Gasket Sets

“STEP 6: PINCHWELD INSPECTION AND PREPARATION

After removing the existing windshield, all tools and debris should be removed from the working area. The pinchweld area must be cleaned. The pre-cleaning can be done using a clean brush or compressed air that its moisture-free and oil-free. (...)

Training Manual – DGX Teroson Bond:
Section 4.0 to 6.5 – Page 4 to 25.

## 4. URETHANE APPLICATION:
- Product requirements
- Application requirements
- Storage requirements
- Shelf-life
- Adverse weather conditions
- Additional requirements
  - SDAT identification
  - Non-conductive considerations
  - High modulus considerations
  - Other

“STEP 11: ADHESIVE APPLICATION

Apply adhesive to the bondline, either on the pinchweld or on the glass. When deciding whether to apply TEROSON® BOND urethane (Refer to our product selector in section 9.0, page 28), Henkel offers the following considerations: (...)

Training Manual – DGX Teroson Bond:
Section 4.0 to 6.5 – Page 4 to 25.
### 6.0 Installation Standards- Adhesive Bonded

#### 6.1 Those engaged in automotive glass replacement shall follow the adhesive manufacturer's application instructions as provided by the manufacturer directly, or through the private labeler. All in-shop or mobile installations shall be performed under environmental and other conditions that are compatible with the application instructions required in Section 5.

<table>
<thead>
<tr>
<th>6.1</th>
<th>This manual is designed to serve as a training document and has been developed to provide a consistent methodology for the removal, replacement, and repair of auto glass to technicians or any individual interested in this topic. This document can also be used for retraining current technicians and professionals who use TEROSON® BOND products. The purpose of this training manual is to reduce issues that result from insufficient understanding or inconsistent approaches across different technicians.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Training Manual – DGX Teroson Bond: Section 1.0 – Page 03.</td>
</tr>
</tbody>
</table>

#### 6.2 Products must be stored and controlled according to manufacturers' requirements as provided directly or through a private labeler.

<table>
<thead>
<tr>
<th>6.2</th>
<th>“(...) 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. This will ensure that you always use fresh material. If you ever have problems with the materials, the first thing you should 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 on the adhesive.”</th>
</tr>
</thead>
</table>

#### 6.3 No automotive glass replacement shall be undertaken using an adhesive glass retention bonding system that would not achieve minimum drive-away strength by the time the vehicle may be reasonably expected to be operated.

<table>
<thead>
<tr>
<th>6.3</th>
<th>“(...) For the vehicle repair and maintenance market, TEROSON® BOND products come with a set of written application instructions. These instructions (e.g., Training Manual or Technical Data Sheets) include the proper use of the glazing system, storage specification and minimum drive away times, which are tested and validated at a third-party crash test facility using the FMVSS 212 standard.”</th>
</tr>
</thead>
</table>

#### 6.4 The vehicle owner/operator shall be notified prior to and after the installation process of the minimum drive-away time under the circumstances of the replacement.

<table>
<thead>
<tr>
<th>6.4</th>
<th>“Step 15: Safe Drive Away Time (SDAT) Make sure customers understand their responsibilities and take any necessary precautions before safe drive away times. Place an information card in a clear and noticeable location within the vehicle. Provide the windshield replacement report found in the appendix of this guide to the customer.”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>6.5</td>
<td>Adhesive shall be applied so that the finished bead cross section profile and dimensions meet or exceed original equipment configuration or recommendation of adhesive system manufacturer. &quot;When applying a TEROSON® BOND windshield urethane adhesive, the position of the fresh adhesive must match the location and profile (height and width) of the trimmed OEM bead on the pinchweld and the applied primer on the windshield. This will ensure that windshield urethane adhesive will meet the Federal Motor Vehicle Safety Standards (FMVSS).&quot;</td>
</tr>
<tr>
<td>6.6</td>
<td>If the OEM installation was polyurethane, then the glass shall be replaced with polyurethane or an equivalent adhesive bonding system. If the OEM installation was butyl, polysulfide, or other non-polyurethane, and the vehicle is licensed for highway use, adhesive bonded stationary glass installations shall be performed using polyurethane or an equivalent retention system unless in conflict with current OEM specifications.</td>
</tr>
<tr>
<td>6.7</td>
<td>All adhesive system component lot numbers shall be traceable to each job.</td>
</tr>
<tr>
<td>6.9</td>
<td>No product that has exceeded the manufacturer or private labeler’s stated expiration date, open shelf life, or active shelf life shall be used. “All Henkel products have a shelf life or period after production within which the product must be used. After the expiration date, the product MUST be discarded.”</td>
</tr>
<tr>
<td>6.11</td>
<td>When inappropriate replacement materials or methods are detected, those engaged in automotive glass replacement should report their findings to the vehicle owner/operator. “(…) Completing and maintaining a record of all post inspection procedures is advisable. As a courtesy, provide the owner/operator of the vehicle a copy. Refer to the format attached in the Appendix (Page 30) for more information.”</td>
</tr>
<tr>
<td>6.12</td>
<td>When those engaged in automotive glass replacement correct inappropriate glass installations, they shall remove any inappropriate materials that would compromise the retention system. They shall fully correct any adverse glass installation related condition(s) caused by the use of inappropriate materials or methods, and they shall use appropriate methods described elsewhere within Section 5 of this document. “Sometimes, parts of the body are damaged or require paint refinish, yet the windshield is not damaged. Windshields which have been previously bonded with a polyurethane adhesive can be reused to save costs. In this case, proceed to section 6.5 Complete Adhesive Removal on page 26.”</td>
</tr>
<tr>
<td>6.13</td>
<td>When sealing air or water leaks within a polyurethane retention system, only compatible polyurethane adhesive shall be used. (No silicone or butyl may be used). “Contaminants: Any surface contaminant can cause bond failure. Examples of contaminants are: dirt, corrosion, release agents, silicone, butyl, lint, etc. Poor adhesion or failure does not mean the adhesive does not work. Oftentimes these issues are caused by contamination between the surface and the applied adhesive (Figure 1).”</td>
</tr>
<tr>
<td>6.14</td>
<td>Only the full cut method should be used for polyurethane retention systems. “Step 10: Full cut method of pinchweld. Must use the full cut out method if the existing adhesive is butyl or silicone. These materials have poor adhesion</td>
</tr>
</tbody>
</table>
### 7.0 Installation Standards- Rubber Gasket

#### 7.1 If the OEM utilizes the combination of a rubber gasket and polyurethane as a retention system, an equivalent adhesive bonding system must be used in the installation. In cases when the OEM didn't include polyurethane or an equivalent adhesive system, such systems shall be used if later production models included the addition of adhesive systems without body style modification.

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>to a variety of substrates and lack structural strength when exposed to shock and vibration. Butyl and silicone do not allow the TEROSON® BOND direct glazing system, or any other, to bond well.”</td>
<td>Section 4.1 – Page 09.</td>
</tr>
<tr>
<td>&quot;Today, Gasket Set Windshields are present in older vehicles such as buses and trucks. The use of polyurethane in conjunction with a gasket retention system is now required for passenger vehicles licensed for highway use that weigh less than 10,000 pounds, per FMVSS guidelines. Freightliner has developed a new repair process for Cascadia vehicles. They are equipped with a roped-in, bonded EPDM rubber gasket set windshield. The windshield is bonded and sealed to the rubber gasket with glazing adhesive to prevent leaks. This new gasket (Part # A18-64181-000) requires special treatment to provide better adhesion. (Freightliner Cascadia, 2009).</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Page 18.</td>
</tr>
<tr>
<td>Note: The original windshield and gasket removal process must follow the replacement procedure of CASCADIA WORKSHOP MANUAL Models: CA125DC and CA125SLP”</td>
<td></td>
</tr>
<tr>
<td>“Today, Gasket Set Windshields are present in older vehicles such as buses and trucks. The use of polyurethane in conjunction with a gasket retention system is now required for passenger vehicles licensed for highway use that weigh less than 10,000 pounds, per FMVSS guidelines.”</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Page 18.</td>
</tr>
<tr>
<td>“The bond between the adhesive and the glass is a critical area and can experience leaks and poor adhesion if there are contaminants between the adhesive and the glass. The following contaminants are what Henkel considers to be the most common examples of contaminants: • Dust and dirt • Skin oils • Release agents (e.g. silicones)”</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Step 4 - Page 19.</td>
</tr>
</tbody>
</table>

#### 7.2 If the OEM gasket installation did not include adhesive and the vehicle is licensed for highway use and is less than 10,000 lbs. Gross Vehicle Weight Rating (GVWR), the installation shall include polyurethane or an equivalent adhesive bonding system. The following are permissible exceptions: egress applications, antique or classic vehicle restorations, or in cases in which this practice conflicts with current vehicle manufacturer specifications.

<p>| | |</p>
<table>
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<tbody>
<tr>
<td>“Today, Gasket Set Windshields are present in older vehicles such as buses and trucks. The use of polyurethane in conjunction with a gasket retention system is now required for passenger vehicles licensed for highway use that weigh less than 10,000 pounds, per FMVSS guidelines.”</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Page 18.</td>
</tr>
<tr>
<td>“The bond between the adhesive and the glass is a critical area and can experience leaks and poor adhesion if there are contaminants between the adhesive and the glass. The following contaminants are what Henkel considers to be the most common examples of contaminants: • Dust and dirt • Skin oils • Release agents (e.g. silicones)”</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Step 4 - Page 19.</td>
</tr>
</tbody>
</table>

#### 7.3 When sealing air or water leaks within a rubber gasket/polyurethane ADHESIVE SYSTEM only compatible polyurethane shall be used. (No silicone or butyl may be used).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>“Today, Gasket Set Windshields are present in older vehicles such as buses and trucks. The use of polyurethane in conjunction with a gasket retention system is now required for passenger vehicles licensed for highway use that weigh less than 10,000 pounds, per FMVSS guidelines.”</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Page 18.</td>
</tr>
<tr>
<td>“The bond between the adhesive and the glass is a critical area and can experience leaks and poor adhesion if there are contaminants between the adhesive and the glass. The following contaminants are what Henkel considers to be the most common examples of contaminants: • Dust and dirt • Skin oils • Release agents (e.g. silicones)”</td>
<td>Training Manual – DGX Teroson Bond: Section 5.3 – Step 4 - Page 19.</td>
</tr>
</tbody>
</table>

### 8.0 Additional Requirements

#### 8.4 Whenever OEM retention systems are modified on
later production models without body style modification, the most current retention system shall be used in the replacement unless otherwise specified by the OEM.

| 8.5 Notification of defective product:  
- A failure or defect in any product used or intended for use in the automotive glass replacement process that could jeopardize customer safety shall be reported promptly to the manufacturer or supplier of the product.  
- Any product installed by those engaged in automotive glass replacements that is discovered to be defective or which is determined could jeopardize customer safety shall be immediately reported to the customer with an offer to remedy the situation. | “Section 4.1 – Step 1: (...) Record and report any unsafe conditions or damage of the vehicle to the customer using the windshield replacement record attached on page 28.  
“Section 4.2 – Step 14: (...) Completing and maintaining a record of all post inspection procedures is advisable. As a courtesy, provide the owner/operator of the vehicle a copy. Refer to the format attached in the Appendix (Page 30) for more information.” | Training Manual – DGX Teroson Bond: Section 4.1 – Step 1 – Page 5.  

| 8.6 Those engaged in automotive glass replacement shall not introduce any chemical agents, such as cleaners, solvents, lubricants, release agents, or utilize any installation practice, which will adversely affect the glass retention system. | “Contaminants: Any surface contaminant can cause bond failure. Examples of contaminants are dirt, corrosion, release agents, silicone, butyl, lint, etc. Poor adhesion or failure does not mean the adhesive does not work. Oftentimes these issues are caused by contamination between the surface and the applied adhesive (Figure 1).” | Training Manual – DGX Teroson Bond: Section 4.1 – Step 6 – Page 6. |

| 8.7 Those engaged in automotive glass replacement shall create and retain records of each auto glass replacement (and any ADAS recalibration/calibration conducted in conjunction with that glass replacement) for a period of at least three years from the date the work was completed sufficient to demonstrate compliance with this standard. Records, either electronic or hard-copy, shall be legible, easily identifiable and readily available. Such three year period may be temporarily shortened for specific, clear and substantial reasons but shall be adhered to when such reasons no longer exist. | | |

| 8.9 If the vehicle being serviced has an ADAS, and requires recalibration/calibration, those engaged in automotive glass replacement who elect to provide recalibration/calibration services shall:  
- only commence Dynamic recalibrations/calibrations once the minimum drive-away time requirement has been achieved;  
- only commence Static recalibrations/calibrations according to the guidelines provided by the | | |
manufacturer of the adhesive used for the glass replacement;
### Retention System Provider Deliverables:

<table>
<thead>
<tr>
<th>Deliverable:</th>
<th>Retention System Provider Response:</th>
<th>Is Documentation Included: (Yes, No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Those engaged in automotive glass replacement shall use retention systems that are produced under the ISO 9001 standard or any standard that contains the entire text of ISO 9001. Identify your organizations current quality assurance standard and how this should be identified by your glass shop customers.</td>
<td>“TEROSON® BOND direct glazing adhesives which are used in automotive glass bonding and replacement shall use retention systems that are produced under the ISO 9001 standard or any standard that contains the entire text of ISO 9001. Each of TEROSON® BOND ‘s direct glazing adhesives and primers is manufactured according to our documented quality assurance practices. These internal quality assurance standards have been certified by a third party approved ISO registrar to meet the requirements of ISO 9001/ 14001, ISO/TS 16949:2009 and BS OHSAS 18001.”</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3 Those engaged in automotive glass replacement shall use either an OEM approved retention system or equivalent retention system as certified in writing by the equivalent retention system manufacturer directly or through a private labeler. Provide validation to this requirement and how your glass shop customers’ would demonstrate your compliance to this section of the Standard.</td>
<td>“TEROSON® BOND direct glazing adhesive systems for OEM are used by many automobile manufacturers. This close collaboration and technical knowledge validates Henkel’s ability to produce qualified adhesive systems that meet or exceed the stringent OEM specifications for quality and performance for automobiles produced worldwide. For the vehicle repair and maintenance market, TEROSON® BOND products come with a set of written application instructions. These instructions (e.g., Training Manual or Technical Data Sheets) include the proper use of the glazing system, storage specification and minimum drive away times, which are tested and validated at a third party crash test facility using the FMVSS 212 standard.”</td>
<td>Yes</td>
</tr>
<tr>
<td>5.4 Those engaged in automotive glass replacement shall obtain and follow written comprehensive and current application instructions from the retention systems manufacturer or private labeler. These instructions shall include at least the proper use of the retention system storage specifications, minimum dive-away time charts containing temperature and humidity variables if applicable, and any special procedures required for adverse weather conditions. Identify the name and publish date of the document(s) fitting the description of “current, comprehensive,</td>
<td>Teroson Bond technical data sheet available on out website and Teroson Bond Brand urethane training manual. Published in August 2020 - <a href="https://tdx.henkel.com/com/en.html?search.sort=relevant">https://tdx.henkel.com/com/en.html?search.sort=relevant</a></td>
<td>Yes</td>
</tr>
</tbody>
</table>
written application instructions” that are to be on hand and utilized by your company’s glass shop customers.
6.3 No automotive glass replacement shall be undertaken using an adhesive glass retention bonding system that would not achieve minimum drive-away strength by the time the vehicle may be reasonably expected to be operated. 

Identify the drive-away-time chart to be utilized by your company’s glass shop customers in order to be compliant with this requirement.

<table>
<thead>
<tr>
<th>Material name</th>
<th>Package size and type</th>
<th>Safe drive away time</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEROSON BOND 30 PROFESSIONAL</td>
<td>300ml Cartridge (kit)</td>
<td>30 minutes</td>
</tr>
<tr>
<td>TEROSON BOND 30 PROFESSIONAL</td>
<td>600ml Sausage (kit)</td>
<td>30 minutes</td>
</tr>
<tr>
<td>TEROSON BOND 60 PROFESSIONAL</td>
<td>300ml Cartridge (kit)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>TEROSON BOND 60 PROFESSIONAL</td>
<td>600ml Sausage (kit)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>TEROSON BOND 60 TRUE PRIMERLESS</td>
<td>300ml Cartridge (kit)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>TEROSON BOND 60 TRUE PRIMERLESS</td>
<td>600ml Sausage (kit)</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>

Yes

9.1 Technicians installing replacement automotive glass shall be fully qualified for the tasks they are required to perform. Such qualifications shall include, at a minimum, completion of a comprehensive training program with a final exam and an ongoing education component. The program shall include, among other things: AGR safety issues, an understanding of OEM installation standards and procedures, relevant technical specifications, Adhesive System Manufacturer specific comprehensive retention system training and the opportunity to apply and demonstrate the skills technicians learn.

IF YOUR COMPANY DOES PROVIDE TRAINING, identify the name of your training course, the testing provided, the certificates provided and the frequency of such training and/or continuing education.

9.3 Training with respect to the content and requirements of the current version of this standard shall be required for all personnel directly involved in the automotive glass replacement process (examples: scheduling, purchasing, installing, customer service, quality control, management). Records of this training detailing content, date, participants and acknowledgement of the participant’s successful completion of the training and receipt of a printed copy of the current standard shall be maintained.
IF YOUR COMPANY DOES PROVIDE TRAINING, identify the document provided to record the required items mentioned above relating to this training.
<table>
<thead>
<tr>
<th>Contact Information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Company’s Name:</td>
</tr>
<tr>
<td>Your Company’s Address:</td>
</tr>
<tr>
<td>Your Name:</td>
</tr>
<tr>
<td>Your Title:</td>
</tr>
<tr>
<td>Your Phone Number:</td>
</tr>
<tr>
<td>Your Email Address:</td>
</tr>
<tr>
<td>Your Mailing Address:</td>
</tr>
</tbody>
</table>
1.0 PURPOSE OF THIS TRAINING MANUAL

This manual is designed to serve as a training document and has been developed to provide a consistent methodology for the removal, replacement and repair of auto glass to technicians or any individual interested in this topic. This document can also be used for retraining current technicians and professionals who use TEROSON® products. The purpose of this training manual is to reduce issues that result from insufficient understanding or inconsistent approaches across different technicians.

2.0 BASIC WORK GUIDELINES

The quality and safety of a successful glazing repair depends heavily upon following each step documented in this manual and the training received directly from Henkel. Following these guidelines will help to ensure your customer is provided with a safe, high-quality solution.

3.0 PRODUCT SAFETY

PERSONAL PROTECTIVE EQUIPMENT

Note: Government occupational, safety and health regulations may require additional protective gear.

For each employee, provide the following minimum required protective equipment:

- Eye protection (glasses/goggles)
- Foot protection (safety shoes/boots)
- Cut-resistant gloves
- Disposable chemical-resistant gloves
- Cut-resistant forearm protectors

The following safety tips are recommended when handling chemical products:

- Always read the Safety Data Sheets (SDS) for full instructions on safe handling and treatment if exposed to chemicals. You will find the recommendations for any kind of exposure to the body under the "FIRST AID MEASURES" of the SDS Chapter 4.
- Always read the instructions on containers and observe precautions given for each chemical.
- Avoid prolonged or repeated skin contact.

CAUTION: Never smoke or drink when using chemicals, even if they are not flammable.
- Keep flammable chemicals away from flame and ignition sources.

Best Practice: Always store chemicals in their approved and labeled containers and in accordance with the manufacturer storage guidelines (see Section 7.0 for further information).
- Always keep the container sealed when not in use.

WARNING! Never inhale chemical vapors; this can impair judgment and may cause adverse medical effects.

Safe Material Disposal
Participants shall be responsible for compliance with all applicable government and local statutes regarding the management, use, handling, storage, disposal and transportation of hazardous waste and materials.

Participants with compliance questions shall contact their government environmental regulatory agency.
4.0 WINDSHIELD COMMON PROCESSES

The windshield is an integral part of the car structure and passenger safety. After driving the car, the glass may become chipped or broken.

The following describes two typical windshield process scenarios:
1. Replacement of Windshield
2. Existing Glass Removal & Reinstallation

The most common work item is the replacement of the windshield. The following is a step-by-step guide to the windshield replacement process.

4.1 REPLACEMENT OF NEW WINDSHIELD

The following flow chart shows the steps necessary for replacement of a windshield:

---

**REPLACEMENT OF WINDSHIELD**

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Inspection of Vehicle – Pre-installation</td>
</tr>
<tr>
<td>2.0</td>
<td>Inventory check for all necessary items to perform job</td>
</tr>
<tr>
<td>3.0</td>
<td>Protect the Vehicle</td>
</tr>
<tr>
<td>4.0</td>
<td>Removal of trims, parts and other connections to the windshield</td>
</tr>
<tr>
<td>5.0</td>
<td>Removal of windshield using a cutting tool</td>
</tr>
<tr>
<td>6.0</td>
<td>Pinchweld preparation and Inspection</td>
</tr>
<tr>
<td>7.0</td>
<td>Dry fit of new windshield</td>
</tr>
<tr>
<td>8.0</td>
<td>Pretreatment of new windshield</td>
</tr>
<tr>
<td>9.0</td>
<td>Primer application in new glass</td>
</tr>
<tr>
<td>10.0</td>
<td>Full cut method of pinchweld</td>
</tr>
<tr>
<td>11.0</td>
<td>Adhesive application</td>
</tr>
<tr>
<td>12.0</td>
<td>Install of new windshield</td>
</tr>
<tr>
<td>13.0</td>
<td>Assembly of all trims and parts</td>
</tr>
<tr>
<td>14.0</td>
<td>Post inspection of vehicle</td>
</tr>
<tr>
<td>15.0</td>
<td>Safe Drive Away Time</td>
</tr>
</tbody>
</table>

---

**STEP 1: INSPECTION OF THE VEHICLE – PRE-INSTALLATION**
Inspect the vehicle for any pre-existing damage or conditions that would prevent a safe windshield installation prior to commencement of the work.

Record and report any unsafe conditions or damage of the vehicle to the customer using the windshield replacement record attached on page 28.

**STEP 2: INVENTORY CHECK FOR ALL NECESSARY ITEMS TO PERFORM JOB**

Relevant questions for this procedure:

1) Is it a windshield with a Pre-Applied Adhesive System (PAAS)?
   - If YES, proceed to section 5.1 titled Installation of other Windshield Types on page 16
2) Will PVC encapsulated or rear slider glass parts be installed?
   - If YES, proceed to section 5.2 titled Installation of other Windshield Types on page 17
3) Is the windshield set in a gasket?
   - If YES, proceed to section 5.3 titled Installation of other Windshield Types on page 18

Confirm the new windshield is the correct piece for the repair and that it is free from any damage or defects. Ensure the primers and adhesives to be used are within current shelf life and have been stored according to Henkel's specified recommendations. For any technical questions please contact 1-800-LOCTITE (562-8483).

Verify that all the equipment necessary to make the windshield installation is charged and available.

**STEP 3: PROTECT THE VEHICLE**

Properly protect the customer's vehicle by using protective covers on the hood, fender, seats and other areas.

**STEP 4: REMOVAL OF TRIMS AND OTHER CONNECTIONS TO THE WINDSHIELD**

Remove all parts (e.g. windscreen wiper) and other trims around the windshield. Disassemble any heated windshield connections and/or sensors. These may include rain sensors, light reducing rear-view mirrors, etc.

**STEP 5: REMOVAL OF WINDSHIELD BY USING A CUTTING TOOL**

The windshield is cut out of the body of the car using blades, special knives or sharp piano wires to cut the adhesive. New tools in the market feature nylon-based removal cords. They offer enhanced safety and will not damage the vehicle's paint.

After the removal of the old windshield, clear the pinchweld area and dashboard of any debris.

**STEP 6: PINCHWELD INSPECTION AND PREPARATION**

After removing the existing windshield, all tools and debris should be removed from the working area. The pinchweld area must be cleaned. The pre-cleaning can be done using a clean brush or compressed air that its moisture-free and oil-free.

**WARNING!** Using water-based glass cleaner will start the corrosion process on bare metal. Do not use water-based cleaners!
Use an alcohol-based glass cleaner with a lint free cloth or paper towel to remove the remaining dirt.

Ensure that the surface is dry prior to inspection. This inspection phase is critical to the process of installing a new windshield.

Contaminants: Any surface contaminant can cause bond failure. Examples of contaminants are: dirt, corrosion, release agents, silicone, butyl, lint, etc. Poor adhesion or failure does not mean the adhesive does not work. Oftentimes these issues are caused by contamination between the surface and the applied adhesive (Figure 1).

Relevant questions for this procedure:
1) Is the existing adhesive from the old windshield made of urethane?  
   If NO proceed to section 6.5 titled Complete Adhesive Removal on page 24

2) Does the urethane exhibit a strong bond around the entire pinchweld?  
   If NO proceed to section 6.5 titled Complete Adhesive Removal on page 24

3) Is there corrosion present on the pinchweld?  
   If YES proceed to section 6.5 titled Corrosion of the Pinchweld on page 20

4) Is the windshield a PVC part or a set-in gasket with butyl, or poor adhesion due to corrosion?  
   If YES proceed to section 6.5 titled Complete Adhesive Removal on page 24

**STEP 7: DRY FIT OF NEW WINDSHIELD**

Prior to adhesive application, verify that the pinchweld is corrosion free. Then, dry fit the new glass to ensure that the production tolerances of the windshield are in specification and that the glass has a proper fit. If the windshield does not match with the pinchweld, then the windshield will have different adhesive gap sizes and stresses. These stresses may increase the possibility of early cracking of the windshield.

*Note:* In rare cases, the glass will not fit into the frame. In such a case, you need a new windshield and should inform the owner of the car.

**STEP 8: PRETREATMENT OF A NEW WINDSHIELD**

Each time you perform a windshield installation, you are working on an essential component of the vehicle’s integrity. The bond between the adhesive and the glass is a critical area and can experience leaks and poor adhesion if there are contaminants between the adhesive and the glass (Figure 1). The following list details common examples of contaminants:
- Dust and dirt
- Skin oils
- Release agents (e.g. silicones)

Pre-treatment of the windshield with Henkel’s suggested products is the most important step to ensure safe and leak-free installations. In some cases, windshields are supplied to the automotive aftermarket with a factory pre-applied black primer. Tests in Henkel laboratories have shown that these windshields should still be prepared using Henkel’s recommended treatment for new windshields.

Pre-treat the bondline of the screen with the TEROSON® BOND Sponge and alcohol-based glass cleaner. The bondline must be prepared, regardless of whether the windshield has a factory-applied primer. The sponge is designed to scuff without adding an excessive force and adsorb the released dirt particles from the glass.

Follow the steps below:

Step 8.1 – Apply glass cleaner or Alcohol-based glass cleaner to the sponge and scrub around the edges to clean both sides of the glass and inspect for any damage or scratches.

Step 8.2 – Using even pressure, wet and scrub the TEROSON® BOND Sponge across the entire bond area in a back-and-forth motion. Rough frits may degrade the sponge. If this is the case, use a new sponge for proper pre-treatment.

Step 8.3 – Wipe remaining alcohol-based glass cleaner from the bond area using a clean paper towel.

Step 8.4 – Reapply alcohol-based glass cleaner on bondline and check to see if the droplet ‘wets out’ across the surface (Figure 4). If proper wetting is achieved, remove alcohol-based glass cleaner with a paper towel, and proceed with primer application on the new glass. Otherwise, repeat the pre-treatment (Step 8.2).

**Figure 1:** Shows the adhesion of an adhesive to a substrate that contains contaminants.

**Figure 2:** Pre-treatment of the bondline of the screen with TEROSON® BOND Sponge

<table>
<thead>
<tr>
<th>Adhesion</th>
<th>Cohesion</th>
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</thead>
<tbody>
<tr>
<td>Contamination</td>
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</table>
STEP 9: PRIMER APPLICATION ON NEW GLASS

The all-in-one primer TEROSON® BOND All In One Primer has various functions. The primary function is to enhance the adhesion of cleaned substrate and provide a reliable bond to the adhesive (Figure 4). If the ceramic coating on the windshield is not 100% UV absorbing, TEROSON® BOND All-In-One Primer will provide further UV protection to the adhesive to ensure the full crash performance of the system.

WARNING! Sometimes scratches from the cut-out process can be seen, these scratches can be easily covered by one coat of primer TEROSON® BOND All-In-One Primer as corrosion protection.

Follow the steps below:

Step 9.1 – Shake the bottle vigorously until you hear the mixing ball rattle and then continue shaking for an additional 1 minute.

Technical Tip: Label the can with the date on which the product was first opened to make sure the product is not used beyond the opened shelf life of two weeks, or the expiration date, whichever comes first.

Step 9.2 – Apply TEROSON® BOND All-in-One Primer using a section of the TEROSON® BOND Sponge or included dauber on the bondline of the windshield and complete the glass preparation process.

Step 9.3 – Allow primer flash off for a minimum of 2-10 minutes before applying adhesive. The primer must be completely dry prior to adhesive application.

Note: At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry. This could be done by touching the primer after 10 minutes, in areas that will not directly receive adhesive, using a clean nitrile glove.


Must use the full cut out method if the existing adhesive is butyl or silicone. These materials have poor adhesion to a variety of substrates and lack structural strength when exposed to shock and vibration. Butyl and silicone do not allow the TEROSON® BOND direct glazing system, or any other, to bond well.

WARNING! Butyl and silicone have a poor wettability and their chemical structure doesn’t allow adhesion. Lack of good adhesion will lead to loosening and leaking of the windshield. A reliable pre-treatment of the pinchweld is mandatory — for further information proceed to section 6.0.

If you are working with a well-bonded piece of urethane and the pinchweld is corrosion free, proceeding with the full cut method is not required. The existing bead of urethane on the pinchweld is trimmed with a scraper or blade to a height of approximately 3/64” to 3/32” (1 to 2mm), but only when the residual bead and the pinchweld are structurally functional (Figure 6).

STEP 11: ADHESIVE APPLICATION

Apply adhesive to the bondline, either on the pinchweld or on the glass. When deciding whether to apply TEROSON® BOND urethane (Refer to our product selector in section 9.0, page 28), Henkel offers the following considerations:

• If the vehicle's OEM bead pattern is non-uniform and proper fresh adhesive bead alignment will be difficult to apply to the glass, the better option may be to apply the adhesive to the vehicle's pinchweld.
• When the OEM bead pattern is uniform and the proper bead location on the glass can be easily identified, the better option may be to apply the fresh adhesive bead directly to the glass part. Applying the bead to the glass part is more ergonomically friendly than other application options. Additionally, it is easier for the installer to hold the application gun at the proper 90° angle when applying the adhesive to the entire perimeter of the part, which results in more consistent and uniform bead dimensions.

TEROSON® BOND windshield urethane adhesive should be supplied with the correct nozzle.
WARNING! A round bead can trap air when compressed between the glass and pinchweld. Furthermore, round beads are difficult to compress uniformly during windshield decking, which can lead to voids and leak points across the entire width of the bead. By pressing triangular-shaped adhesive applied on the pinchweld or windshield, no air is trapped and the bead squeezes down to a rectangular dimension.

- Conventional, un-cut nozzles are sold separately for backfilling use, sealing gaskets and other customized “V” shape applications that can’t typically be completed with the pre-cut nozzle.
- To adjust the bead height, place the nozzle on the freshly-cut pinchweld near the roof and adjust the pre-cut of the nozzle to the desired height.
- Align the nozzle height 3/32” (2mm) higher than the upper car frame height (Figure 8). If it is too short, simply cut a deeper “V” in the nozzle.

Technical Tip: It is better to have a higher bead to avoid possible leakages.

![Figure 6: Depiction of the appropriate height between the roof and the pinchweld](image)

- Ensure that enough urethane is supplied to the pinchweld to prevent the glass from sagging below the roofline of the vehicle. The taller the bead, the wider the bondline could be.
- When applying a TEROSON® BOND windshield urethane adhesive, the position of the fresh adhesive must match the location and profile (height and width) of the trimmed OEM bead on the pinchweld and the applied primer on the windshield. This will ensure that windshield urethane adhesive will meet the Federal Motor Vehicle Safety Standards (FMVSS).

**STEP 12: INSTALLATION OF NEW WINDSHIELD**

Reinstall the windshield into the frame, taking care to observe the position and depth. Uncured windshield urethane adhesive may be removed from tools and equipment with alcohol-based glass cleaner. Once cured, the material can only be removed mechanically.

**STEP 13: ASSEMBLY OF ALL TRIMS AND PARTS**

Assemble all removed parts (e.g. windshield, wiper arms) and other trims around the windshield. If necessary, replace damaged components. It is important to reassemble the connection of the heated windshield and any other sensors connected to the screen.

**STEP 14: POST-INSTALLATION INSPECTION OF THE VEHICLE**

Inspect all areas that were exposed in the re-glazing process.

- All broken glass, dirt, debris and adhesives should be cleaned from the interior and/or exterior of vehicle
- All molding should fit neatly and there should be no gaps or exposed edges
- Check to make sure all accessories are in working order (e.g. wiper arms, rear-glass defroster and radio/telephone antennas)
- The installed glass should be properly cleaned and streak-free

Completing and maintaining a record of all post inspection procedures is advisable. As a courtesy, provide the owner/operator of the vehicle a copy. Refer to the format attached in the Appendix (Page 30) for more information.

**STEP 15: SAFE DRIVE AWAY TIME (SDAT)**

Make sure customers understand their responsibilities and take any necessary precautions before safe drive away times. Place an information card in a clear and noticeable location within the vehicle. Provide the windshield replacement report found in the appendix of this guide to the customer.

**4.2 REMOVAL & REINSTALLATION OF EXISTING GLASS**

Sometimes, parts of the body are damaged or require paint refinish, yet the windshield is not damaged. Windshields which have been previously bonded with a polyurethane adhesive can be reused to save costs. In this case, proceed to section 6.5 Complete Adhesive Removal on page 26.

**Warning:** Glass parts that have been previously bonded with a non-urethane adhesive such as silicone or butyl should be discarded; in these cases, use a fresh piece of glass.

The flowchart below shows the step-by-step process for removing and installing an existing piece of glass:

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<td>12.0 Install of reused windshield</td>
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<td>13.0 Assembly of all trims and parts</td>
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<td>14.0 Post inspection of vehicle</td>
</tr>
<tr>
<td>15.0 Safe Drive Away Time</td>
</tr>
</tbody>
</table>
**STEP 1: SEALING LEAKS EXPLANATION**

If there is a requirement to seal water and air leaks from a previous installation, Henkel suggests that you remove and reinstall the windshield.

**STEP 2: INSPECTION OF THE VEHICLE – PRE-INSTALLATION**

Inspect the vehicle for any unsafe conditions prior to commencement of work. Record and report any unsafe conditions or damage to the vehicle’s owner and record on the Windshield Replacement Record.

**STEP 3: INVENTORY CHECK FOR ALL NECESSARY ITEMS TO PERFORM JOB**

Verify primers and adhesives are within current shelf life and have been stored as per Henkel’s specified recommendations. Inspect replacement parts thoroughly for defects before starting work. Ensure you have necessary tools and equipment available and that they are charged.

**STEP 4: PROTECT THE VEHICLE**

Properly protect the customer’s vehicle by using protective covers on the fender, hood, seat and other areas.

**STEP 5: REMOVAL OF TRIMS, PARTS AND OTHER CONNECTIONS TO THE WINDSCREEN**

Remove all parts (e.g. windscreen wiper) and other trims around the windshield. Disassemble the connection of the heated windshield and any sensors connected to the screen with various functions.

**STEP 6: REMOVAL OF WINDSHIELD USING A CUTTING TOOL**

Cut the windshield out of the body using blades, special knives, and/or sharp piano wires to cut the adhesive. New tools on the market use nylon-based removal cords. They provide enhanced safety and won’t damage paint. Conduct work carefully, taking care not to damage the ceramic coating or the windshield itself. Cut through the existing adhesive bead without contacting the glass with the cutting tool. Then, place the glass to the side, in a safe place, until reinstallation is required.

After the removal of the old windshield, clear the pinchweld area and dashboard of any debris.

**STEP 7: PINCWELD INSPECTION AND PREPARATION**

After removing the bonded windshield, remove all tools and debris. The pinchweld area must be cleaned. The pre-cleaning can be done using a brush or compressed air (ensure it is oil-free and moisture-free). Afterwards, use alcohol-based glass cleaner with a rag or paper towel to remove the remaining dirt. After cleaning, ensure that the surface is dry prior to inspection. If, for any reason there is an issue with the bonding adhesive on the pinchweld, do not assume it is the urethane. Often, these issues are caused by surface contaminants (Figure 2). To remove contaminants, clean the area meticulously, as stated above.

**STEP 8: PRETREATMENT OF REUSED WINDSHIELD**

**Step 8.1** – Clean the used glass with an appropriate alcohol-based glass cleaner and inspect the windshield. If any damages are present, use a new one.

**Step 8.2a** – Check the adhesion of the adhesive to the glass by cutting the adhesive with a blade. Trim the existing bead of cured urethane down to a thickness of 0.002” (0.5 mm). If the adhesive bonds perfectly to the primer, it is the best base for the new urethane windshield adhesive. There will be no need for primer application and the user may proceed to Step 10.

**Step 8.2b** – If the adhesion is not sufficient, trim the bead to the bare glass surface, making sure not to damage the ceramic coating, and continue with Steps 8 and 9.

**Step 8.3** – Apply alcohol-based glass cleaner to clean both sides of the glass and inspect for any damages or scratches.

**Step 8.4** – Using even pressure, scuff the TEROSON® BOND Sponge, wet, across the entire bond area in a back-and-forth motion. Rough frits may degrade the sponge. If this is the case, use a new cleaning sponge for proper pre-treatment.

**Step 8.5** – Wipe any remaining alcohol-based glass cleaner from the bond area using a clean paper towel.

**Step 8.6** – Reapply alcohol-based glass cleaner on the bondline and check to see if the droplet ‘wets out’ across the surface (Figure 7). If the wetting is appropriate, remove alcohol-based glass cleaner with a paper towel and continue with the primer (TEROSON® BOND All-In-One Primer) application. Otherwise, repeat the pre-treatment Step 8.3.

**Technical Tip:** A check point for proper surface preparation is a squeaking noise caused when the screen is clean and the wet cleaning pad scuffs the surface. For every cleaning operation, use a fresh and clean sponge to avoid any contamination from a previous cleaning operation.

**Relevant Questions for this procedure:**

1) Is the existing adhesive from the old windshield made of urethane? If NO proceed to section 6.5 titled Complete Adhesive Removal page 24
2) Does the urethane exhibit a strong bond around the entire pinchweld? If NO proceed to section 6.5 titled Complete Adhesive Removal page 24
3) Is there corrosion present on the pinchweld? If YES proceed to section 6.5 titled Corrosion of the Pinchweld page 20

Figure 7: Ideal wetting of the cleaner on a surface. No small drops in the surface are observed.
## Training Manual

### STEP 9: PRIMER APPLICATION ON GLASS

**Step 9.1** – Shake the bottle of TEROSON® BOND All In One Primer vigorously until you hear the mixing ball rattle. Then, continue shaking for an additional 1 minute.

**Note:** Label the can with the date on which the product was first opened to make sure the product is not used beyond the opened shelf life of two weeks, or the expiration date, whichever comes first.

**Step 9.2** – Apply TEROSON® BOND All In One Primer using a section of the TEROSON® BOND Sponge on the bondline of the windshield and complete the glass preparation process.

**Step 9.3** – Allow primer flash off for a minimum of 2-10 minutes before applying adhesive. The primer must be completely dry prior to adhesive application.

**Note:** At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry. This could be done by touching the primer after 10 minutes, in areas that will not directly receive adhesive, using a clean nitrile glove.

### STEP 10: FULL CUT METHOD OF PINCHWELD

If the existing urethane adhesive has a strong bond, then the full cut method on the pinchweld can be performed but is not required.

Using a scraper or blade, trim the existing bead of urethane on the pinchweld to a height of approximately 3/64” to 3/32” (1 to 2mm).

**Warning!** Must use the full cut out method if the existing adhesive is butyl or silicone. Butyl and silicone do not allow the TEROSON® BOND direct glazing system to bond well. Butyl and silicone have a poor wettability and their chemical structure doesn't allow adhesion. This will lead to the loosening and leaking of windshields over time. Therefore, a reliable pre-treatment of the pinchweld is mandatory. For further information refer to section 6.0 Special treatment of pinchweld.

### STEP 11: ADHESIVE APPLICATION

When deciding on the most appropriate location to apply the TEROSON® BOND bead (either on the pinchweld or the glass), Henkel offers the following considerations:

- If the vehicle’s OEM bead pattern is non-uniform and proper fresh adhesive bead alignment will be difficult to apply to the glass, the better option may be to apply the adhesive to the vehicle’s pinchweld.
- When the OEM bead pattern is uniform and the proper bead location on the glass can be easily identified, the better option may be to apply the fresh adhesive bead directly to the glass part. Applying the bead to the glass part is more ergonomically friendly than other application options. Additionally, it is easier for the installer to hold the application gun at the proper 90° angle when applying the adhesive to the entire perimeter of the part, which results in more consistent and uniform bead dimensions.

### STEP 12: INSTALLATION OF REUSED WINDSHIELD

Reinstall the windshield into the frame, observing the position and depth. Uncured windshield urethane adhesive may be removed from tools and equipment with alcohol-based glass cleaner. Once cured, the material can only be removed mechanically.

### STEP 13: ASSEMBLY OF ALL TRIMS AND PARTS

Assemble all removed parts (e.g. windshield wiper arm) and other trims around the windshield. If necessary, use new ones. Reassemble the connection of the heated windshield and any sensors connected to the screen.

### STEP 14: POST-INSTALLATION INSPECTION OF THE VEHICLE

Inspect all areas that were exposed in the re-glazing process.

- All broken glass, dirt, debris and adhesives should be cleaned from the interior and/or exterior of vehicle
- All molding should fit neatly and there should be no gaps or exposed edges
- Check to make sure all accessories are in working order (e.g. wiper arms, rear-glass defroster and radio/telephone antennas)
- The installed glass should be properly cleaned and streak-free

Completing and maintaining a record of all post inspection procedures is advisable. As a courtesy, provide the owner/operator of the vehicle a copy. Refer to the format attached in the Appendix (Page 28) for more information.

### STEP 15: SAFE DRIVE AWAY TIME (SDAT)

Make sure customers understand their responsibilities and take any necessary precautions before safe drive away times. Place an information card in a clear and noticeable location within the vehicle. Provide the windshield replacement report found in the appendix of this guide to the customer.

### 5.0 INSTALLATION OF OTHER WINDSHIELD TYPES

This section takes an in-depth look at different types of windshields, which have different sets of work instructions. The yellow boxes indicate the different steps one should take when not using a standard windshield.

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The biggest difference between the installations of standard and non-standard windshields is the “Gasket set windshield” in the work instructions. The next sections describe the approaches for different windshield types.

### 5.1 PRE-APPLIED ADHESIVE SYSTEM (PAAS) WINDSHIELD

PAAS glazing is designed to act as a height and positioning guide when installing an adhesive. However, contaminants will also likely appear during production and shipment. For this reason, the glass can be prepared as follows (Figure 8).

#### Figure 8: Pre-Applied Adhesive System

#### STEP 1: DRY FIT OF NEW WINDSHIELD

Dry fit the new glass to ensure that the production tolerances of the windshield are within the required specifications and that the glass has a proper fit prior to adhesive application. If the windshield does not match with the pinchweld, the different adhesive gap sizes will cause undue stress to the windshield.

**Technical Tip:** To prevent the windshield from cracking early, cut the PAAS with a blade to create a proper fit.

#### STEP 2: PRE-TREATMENT OF NEW WINDSHIELD

**Step 2.1** - Apply glass alcohol-based glass cleaner around the glass edge on the PAAS (Figure 8).

**Step 2.2** - Using even pressure, scrub the TEROSON® BOND Sponge across the entire bond area in a back-and-forth motion. The sponge will absorb the black coloring from the PAAS.

**Step 2.3** - Wipe the remaining alcohol-based glass cleaner from the bond area using a clean paper towel.

#### STEP 3: PRIMER APPLICATION ON NEW GLASS

**Step 3.1** - Shake the bottle of primer, TEROSON® BOND All-In-One Primer, vigorously until you hear the mixing ball rattle. Then, continue shaking for an additional 1 minute.

**Note:** Label the can with the date on which the product was first opened to make sure the product is not used beyond the opened shelf life of two weeks, or the expiration date, whichever comes first.

**Step 3.2** - Apply TEROSON® BOND All-In-One Primer (Only if it is urethane) using a section of the TEROSON® BOND Sponge on the bondline (cut or uncut PAAS) and complete the glass preparation process.

**Step 3.3** - Allow primer flash off for a minimum of 2-10 minutes before applying adhesive. The primer must be completely dry prior to adhesive application.

**Note:** At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry. This could be done by touching the primer after 10 minutes, in areas that will not directly receive adhesive, using a clean nitrile glove.

#### STEP 4: FULL CUT METHOD OF PINCHWELD

**Warning!** Must use the full cut out method if the existing adhesive is butyl or silicone. Butyl and silicone do not allow the TEROSON® BOND direct glazing system to bond well. Butyl and silicone have a poor wettability and their chemical structure doesn't allow adhesion. This will lead to the loosening and leaking of windshields over time. Therefore, a reliable pre-treatment of the pinchweld is mandatory. For further information refer to section 6.0.

**STEP 5: ADHESIVE APPLICATION**

Apply adhesive to the bondline, on either the pinchweld or the glass.

**Note:** When the OEM bead pattern is uniform and the proper bead location on the glass can be easily identified, the better option may be to apply the fresh adhesive bead directly to the glass part. Applying the bead to the glass part is more ergonomically friendly than other application options. Additionally, it is easier for the installer to hold the application gun at the proper 90° angle when applying the adhesive to the entire perimeter of the part, which results in more consistent and uniform bead dimensions.

#### 5.2 TRI-VENT AND PVC-ENCAPSULATED GLASS PARTS

Painted or non-painted Tri-Vent/PVC rear sliders have the same work instructions as the Tri-Vent three-panel sliding window.

### STEP 1: DRY FIT OF NEW PAINTED REAR SLIDER

Dry fit the new rear slider to ensure that the production tolerances of the Tri-Vent three-panel sliding window are within specifications and that the unit has a proper fit prior to adhesive application.

If the new rear slider does not match with the pinchweld, the different adhesive gap sizes will impart undue stress on the windshield.

#### STEP 2: PRE-TREATMENT OF NEW, PAINTED REAR SLIDER

**Step 2.1** - Apply alcohol-based glass cleaner around the bondline of the new rear slider.

**Step 2.2** - Using even pressure, scrub the TEROSON® BOND Sponge across the entire bond area in a back-and-forth motion. The sponge is abrasive and will leave a matte or dull color beside the bondline.

**Step 2.3** - Wipe the remaining alcohol-based glass cleaner from the bond area using a clean paper towel.

#### STEP 3: PRIMER APPLICATION ON NEW, PAINTED REAR SLIDER

**Step 3.1** - Shake the bottle of primer TEROSON® BOND All-In-One Primer vigorously until you hear the mixing ball rattle and then continue shaking for an additional 1 minute.

**Note:** When the OEM bead pattern is uniform and the proper bead location on the glass can be easily identified, the better option may be to apply the fresh adhesive bead directly to the glass part. Applying the bead to the glass part is more ergonomically friendly than other application options. Additionally, it is easier for the installer to hold the application gun at the proper 90° angle when applying the adhesive to the entire perimeter of the part, which results in more consistent and uniform bead dimensions.

**Note:** Label the can with the date on which the product was first opened to make sure the product is not used beyond its opened shelf life of two weeks, or the expiration date, whichever comes first.

**Step 3.2** - Apply TEROSON® BOND All-In-One Primer using a section of the TEROSON® BOND Sponge or the included daubers on the bondline of the new painted rear slider. Then, complete the glass preparation process.

**Step 3.3** - Allow primer flash off for a minimum of 2 to 10 minutes before applying adhesive. The primer must be completely dry prior to adhesive application.

**Note:** At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry. This could be done by touching the primer after 10 minutes, in areas that will not directly receive adhesive, using a clean nitrile glove.
STEP 4: FULL CUT METHOD OF PINCHWELD

If the pinchweld is free of corrosion and the existing urethane adhesive has a strong bond the full cut method on the pinchweld could be performed, but is not required. The existing bead of urethane on the pinchweld should be trimmed with a scraper or blade to a height of approximately 3/64” to 3/32” (1 to 2mm) only when the residual bead and the pinchweld are structurally satisfactory.

**Warning!** The full cut method can be used when:
The existing adhesive is urethane and not butyl or silicone. Butyl and silicone do not allow the TEROSON® BOND direct glazing system to bond well. Butyl and silicone have a poor wettability and their chemical structure doesn’t allow adhesion. This will lead to the loosening and leaking of windshields over time. Therefore, a reliable pre-treatment of the pinchweld is mandatory. For further information refer to section 6.0

STEP 5: ADHESIVE APPLICATION

Apply adhesive to the bondline, on either the pinchweld or the glass.

**Note:** When the OEM bead pattern is uniform and the proper bead location on the glass can be easily identified, the better option may be to apply the fresh adhesive bead directly to the glass part. Applying the bead to the glass part is more ergonomically friendly than other application options. Additionally, it is easier for the installer to hold the application gun at the proper 90° angle when applying the adhesive to the entire perimeter of the part, which results in more consistent and uniform bead dimensions.

5.3 GASKET SET WINDSHIELDS

Today, Gasket Set Windshields are present in older vehicles such as buses and trucks. The use of polyurethane in conjunction with a gasket retention system is now required for passenger vehicles licensed for highway use that weigh less than 10,000 pounds, per FMVSS guidelines.

Freightliner has developed a new repair process for Cascadia vehicles. They are equipped with a roped-in, bonded EPDM rubber gasket set windshield. The windshield is bonded and sealed to the rubber gasket with glazing adhesive to prevent leaks. This new gasket (Part # A18-64181-000) requires special treatment to provide better adhesion. (Freightliner Cascadia, 2009)

**Note:** The original windshield and gasket removal process must follow the replacement procedure of CASCADIA WORKSHOP MANUAL Models: CA125DC and CA125SLP

When using polyurethane on gasket set windshields, Henkel recommends the following procedure.

**STEP 1: REMOVAL OF WINDSHIELD**

New tools in the market feature nylon-based removal cords. They offer enhanced safety and will not damage the vehicle’s paint.

**STEP 2: PINCHWELD PREPARATION AND INSPECTION**

After the windshield and rubber gasket have been removed, clear the area of all tools and debris. Then, clean the pinchweld area. Use alcohol-based glass cleaner with a clean towel.

**STEP 3: DRY FIT OF NEW WINDSHIELD**

Dry fit the windshield into the rubber gasket to confirm that they fit.

**STEP 4: PRE-TREATMENT OF NEW WINDSHIELD AND GASKET**

Each time you perform a windshield installation you are working on an essential component of the vehicle’s integrity. The bond between the adhesive and the glass is a critical area and can experience leaks and poor adhesion if there are contaminants between the adhesive and the glass. The following contaminants are what Henkel considers to be the most common examples of contaminants:

- Dust and dirt
- Skin oils
- Release agents (e.g. silicones)

Pre-treatment of the windshield and gasket with Henkel’s recommended products is critical for having a safe and leak-free installation.

**Follow the steps below to prepare the glass:**

**Step 4.1** - Using a clean towel or a cord, apply alcohol-based glass cleaner to the outside of the windshield area and in the channel of the rubber gasket in a back-and-forth motion.

**Step 4.2** - Wipe the remaining alcohol-based glass cleaner from the bond area using a clean paper towel.

**Step 4.3** - Reapply the alcohol-based glass cleaner on the bondline and check if the droplet ‘wets out’ across the surface. If the wetting is appropriate, remove alcohol-based glass cleaner with a paper towel and proceed with primer application on new glass. Otherwise, repeat the pre-treatment Step 4.2 (Figure 12). Both sides of the windshield must be cleaned. The exterior and interior must be cleaned and primed.

Figure 9: Ideal wetting of cleaner of the gasket
**STEP 5: PRIMER APPLICATION ON NEW GLASS AND GASKET**

**Step 5.1** – Shake the bottle of primer TEROSON® BOND All-In-One Primer vigorously until you hear the mixing ball rattle and then continue shaking for an additional 1 minute.

*Note:* Label the can with the date on which the product was first opened to make sure the product is not used beyond its opened shelf life of two weeks, or the expiration date, whichever comes first.

**Step 5.2** – Apply TEROSON® BOND All-In-One Primer using a section of the TEROSON® BOND Sponge or included dauber on the bondline (outside area of the windshield and the channel of the gasket where the windshield sits). Please refer to the picture of a gasket set windshield below and complete the glass preparation process.

**Step 5.3** – Allow primer flash off for a minimum of 2 to 10 minutes before applying adhesive. The primer must be completely dry prior to adhesive application. Please refer to Figure 8 below. The glass and rubber gasket should be primed in the areas noted by the arrow on Figure 8.

*Note:* At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry. This could be done by touching the primer, in areas that will not directly receive adhesive, using a clean nitrile glove.

**STEP 6: INSTALLATION OF A NEW WINDSHIELD**

Using a conventional conical (uncut nozzle) urethane glass adhesive, reinstall the new windshield into the frame, observing the position and depth (Freightliner Cascadia, 2009) between the glass and rubber. Uncured windshield urethane adhesive may be removed from tools and equipment alcohol-based glass cleaner. Once cured, the material can only be removed mechanically.

**6.0 SPECIAL TREATMENT OF PINCHWELD**

It is essential that any corrosion of the pinchweld is properly treated. Otherwise, the strength and sealing properties of the adhesive will be diminished. To properly treat a corroded pinchweld, it is important to identify the type and the amount of corrosion that is present (Figure 14).

The flowchart beneath shows a different approach to work to be followed when special treatments are required on the pinchweld. The difference between this approach and the standard procedure is that the “Full cut method of pinchweld” is not necessary in this approach.

**WARNING!** Using water-based glass cleaner will start the corrosion process on bare metal. Do not use water-based cleaners!

<table>
<thead>
<tr>
<th>REPLACEMENT OF WINDSHIELD</th>
</tr>
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<tr>
<td>1.0 Inspection of Vehicle – Pre-installation</td>
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<tr>
<td>2.0 Inventory check for all necessary items to perform job</td>
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<tr>
<td>3.0 Protect the Vehicle</td>
</tr>
<tr>
<td>4.0 Removal of trims, parts and other connections to the windscreen</td>
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<td>5.0 Removal of windscreen using a cutting tool</td>
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<td>6.0 Special treatments of Pinchweld</td>
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<td>7.0 Dry fit of new windscreen</td>
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<td>11. Install of new windscreen</td>
</tr>
<tr>
<td>12.0 Assembly of all trims and parts</td>
</tr>
<tr>
<td>13.0 Post inspection of vehicle</td>
</tr>
<tr>
<td>14.0 Safe Drive Away Time</td>
</tr>
</tbody>
</table>

The amount of corrosion can be classified into three different areas. Small scratches, paint damages and small bare metal areas should be covered with one layer of TEROSON® BOND All-In-One Primer for corrosion protection. The TEROSON® BOND All-In-One Primer has built-in corrosion protection and adheres perfectly to the pinchweld, paint or remaining urethane adhesive.

Class 1 – corroded areas less than 1 in²
Class 2 – corroded areas greater than 1 in², but less than 24 in²
Class 3 – corroded areas greater than 24 in²
After the inspection of the corroded area, the level of corrosion must be determined. Not all areas will have the same corrosion level. Keep in mind that all rust must be removed prior to the build-up of the corrosion protection layers.

**Level 1** – Light: metal corrosion is noticeable on the surface, orange in color

**Level 2** – Moderate or Severe: corrosion has some orange-red to dark red spots and raised edges

**Level 3** – Critical: this level can vary from microscopic holes to loss of metal and perforation

Also, note that the corrosion might have spread in the metal under the paint layer. This can be difficult to detect.

**CAUTION: NEVER apply TEROSON Bond All-In-One Primer over rust!**

![Delamination of Coating Caused by Rust](image1)

**Increasing Corrosion (Rust)**

**CORROSION REMOVAL**

**Step 1** – With a scraper or blade, trim the existing bead of urethane on the pinchweld to a height of approximately 3/64” to 3/32” (1 to 2mm). The area must be fully inspected and this should be done only when the residual bead and the pinchweld are structurally sound (Full cut method).

**Step 2** – Inspect the pinchweld for corrosion to determine the Class and Level.

**Step 3** – Abrade the Level 1 corroded area and surrounding areas with 80 grit sanding paper to get a bare metal surface. An additional 1/8” from the paint edges, surrounding the bare metal, should be scuffed with the sanding paper.

**Note:** Grinding thins out the metal quickly and weakens the welds; it does not get deep into the steel's pores to remove the rust.

**Figure 11:** Corrosion underneath coatings such as TEROSON® BOND All-In-One Primer

**Step 3.2** – “Higher Corrosion”, Level 2, should be treated with specialty grinding wheels, which are a good solution for removing corrosion. Verify that the corrosion is removed, and not the base of the metal. Aside from specialty grinders, drilling with rasp bits or stones are another option. They allow you to focus on areas with rust and do not thin large areas of metal if used correctly. An additional 1/8” from the paint edges, surrounding the bare metal, should be scuffed with the sanding paper.

**Step 3.3** – Level 3 This must be properly repaired in a body shop. Reference the manufacturer’s manual for the vehicle.

**Step 4** – Once you’ve removed the corrosion, clean the metal and pinchweld of any debris and contamination using alcohol-based glass cleaner. Alcohol-based glass cleaner must be allowed to flash off for 1 minute.

**WARNING!** Using water-based glass cleaner will start the corrosion process on bare metal. Do not use water-based cleaners!

**Step 5** – Proceed with the following sections regarding the pinchweld preparation for each corrosion class.

**6.1 PINCHWELD WITH LIGHT CORROSION AREAS**

**FURTHER CLASS 1 – WHEN LESS THAN 1 SQUARE INCH AREA — PROCEDURE:**

**Step 6.1.1** – Shake the bottle of TEROSON® BOND All-In-One Primer vigorously until you hear the mixing ball rattle. Then, continue shaking for an additional 1 minute.

**Step 6.1.2** – Using a section of the ET cleaning sponge or wool dauber, apply TEROSON® BOND All-In-One Primer to the pinchweld and bare metal. Allow primer flash off for a minimum of 2 to 10 minutes before applying adhesive. The primer must be completely dry prior to adhesive application.

**Note:** At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry. This could be done by touching the primer, in areas that will not directly receive adhesive, using a clean nitrile glove.

**CAUTION: NEVER apply TEROSON Bond All-In-One Primer over rust!**

**6.2 PINCHWELD WITH MODERATE OR SEVERE CORROSION AREAS**

**FURTHER CLASS 2 – CORRODED AREAS GREATER THAN 1 IN² BUT LESS THAN 24 IN² – PROCEDURE:**

**Step 6.2.1** – Using a pre-treatment wipe, clean the bare metal, keeping it wet for 1 minute.

**Step 6.2.2** – Shake the bottle of TEROSON® BOND All-In-One Primer vigorously until you hear the mixing ball rattle and then continue shaking for an additional 1 minute.

**Step 6.2.3** – Using a section of the ET cleaning sponge or wool dauber, apply TEROSON® BOND All-In-One Primer to the pinchweld and bare metal. Allow primer flash off for a minimum of 2 to 10 minutes before applying the second coat of TEROSON® BOND All-In-One Primer. Again, allow a minimum of 2 minutes drying for the second coat of the primer before proceeding to the next step. To determine if the primer is completely dry, touch it 10 minutes after application, in areas that will not directly receive adhesive, using a clean nitrile glove.

**Note:** At temperatures, lower than 40°F (7°C), it is necessary to determine if the primer is completely dry.
6.3 PINCHWELD WITH CRITICAL CORROSION AREAS

FURTHER CLASS 3 – CORRODED AREAS GREATER THAN 24 IN² AREA – PROCEDURE:

Henkel recommends that critical corrosion (Class 3) or areas larger than 24 in² (0.015 m²), only be repaired in a collision repair facility that is trained in metal restoration. This must be properly repaired. Please reference the manufacturer’s manual for the vehicle.

6.4 REPAIRED, PAINTED PINCHWELD

For perforation corrosion located on any structural area of a vehicle and/or pinchweld, replace the entire section of metal. Filling these types of areas with body filler is not acceptable. Furthermore, the Inter-industry Conference on Auto Collision Repair (I-CAR) has made recommendations that state, “...do not use body filler on the pinchweld where glass urethane adhesive will be applied.”

OPTION 1: FOR AREAS WHERE THE PINCHWELD IS REPAIRED AND PAINTED

Step 1 – Remove the section of metal to be repaired, repair the pinchweld and apply 2-part epoxy or an etch primer coat. Allow the primer to cure, following the paint manufacturer’s instructions and recommendations. Note: If the epoxy primer coat is removed during this procedure, exposing bare metal, then the body shop must re-apply the epoxy primer coat and allow this newly-applied primer coating to fully cure, per the paint manufacturer’s recommendations, prior to application of any Henkel product. The primer must be completely dry prior to adhesive application.

Step 2 – If topcoat is to be applied to remainder of the vehicle, mask off the bond area of the pinchweld with masking tape. This procedure is recommended whenever a pinchweld has been subject to major reconstruction.

Step 3 – Continue painting the vehicle as required, following the paint manufacturer’s instructions.

Step 4 – Lightly abrade the epoxy primer with the TEROSON® BOND Sponge. Prepare the abraded areas of the paint by wiping them with alcohol-based glass cleaner and then wiping it off to remove any debris. Alcohol-based glass cleaner must be allowed to flash off for a minimum of 2 to 10 minutes before applying urethane windshield adhesive. The primer must be completely dry prior to adhesive application.

Step 5 – Shake the bottle of TEROSON® BOND All-In-One Primer vigorously until you hear the mixing ball rattle. Then, continue shaking for an additional 1 minute. Write the open date on the bottle and be aware of the shelf life.

Step 6 – Apply TEROSON® BOND All-In-One Primer using a section of the TEROSON® BOND Sponge on the pinchweld to complete the preparation process. Allow primer flash off for a minimum of 2 to 10 minutes before applying urethane windshield adhesive. The primer must be completely dry prior to adhesive application.

OPTION 2: FOR A PRIMED PINCHWELD THAT HAS BEEN COLOR COATED

Step 1 – Remove the basecoat and clearcoat to expose the paint primer coat. Note: If the epoxy primer coat is removed during this procedure, exposing bare metal, then the body shop must re-apply the epoxy primer coat and allow this newly-applied primer coating to fully cure, per the paint manufacturer’s recommendations, prior to application of any Henkel product.

Step 2 – Lightly abrade the epoxy primer with the TEROSON® BOND Sponge. Prepare the abraded areas of the paint by wiping with alcohol-based glass cleaner and wiping it off to remove any debris. Alcohol-based glass cleaner must be allowed to flash off for a minimum of 2 to 10 minutes before applying urethane windshield adhesive. The primer must be completely dry prior to adhesive application.

Step 3 – Shake the bottle of TEROSON® BOND All-In-One Primer vigorously until you hear the mixing ball rattle. Then, continue shaking for an additional 1 minute. Note: Label the can with the date on which the product was first opened to make sure the product is not used beyond the opened shelf life of two weeks, or the expiration date, whichever comes first.

Step 4 – Apply TEROSON® BOND All-In-One Primer using a section of the TEROSON® BOND Sponge on the pinchweld to complete the pinchweld preparation process. Allow primer flash off for a minimum of 2 to 10 minutes before applying urethane windshield adhesive. The primer must be completely dry prior to adhesive application.

6.5 COMPLETE ADHESIVE REMOVAL

In some cases, a complete adhesive removal is required. This becomes relevant when improper procedures or products (such as butyl or silicone) were used on previous glass replacements or when the existing pinchweld and urethane conditions would compromise the retention system. This method must be used when:

- The existing urethane adhesive has deteriorated or is loose
- A butyl or silicone product was previously used

Step 6.5.1 – Cut and remove the remaining bead of butyl, silicone, or urethane adhesive with poor adhesion to the pinchweld down to the paint. Silicone and butyl residue will adhere to the paint and are not easily removed with solvents. Silicone residues will also have a negative impact on the bonding of the new glazing adhesive.

Step 6.5.2 – To create a reliable bond to the surface, abrade the paint on the pinchweld to remove the clear coat and/or basecoat, exposing the OEM-applied epoxy primer. Be careful not to remove the e-coat and phosphate coatings, which lie beneath the OEM epoxy primer.

Step 6.5.3 – Clean the abraded areas of the paint by wiping them with alcohol-based glass cleaner to remove any debris. Depending upon the amount of contamination, it may be required to wipe the area several times with alcohol-based glass cleaner to remove loose particles. Alcohol-based glass cleaner must be allowed to flash off for 1 minute.

Step 6.5.4 – Apply TEROSON® BOND All-In-One Primer using a section of the TEROSON® BOND Sponge on the pinchweld to complete the pinchweld preparation process. Allow primer flash off for a minimum of 2 to 10 minutes before applying urethane windshield adhesive. The primer must be completely dry prior to adhesive application.

7.0 SEASONAL TOPICS

HIGH TEMPERATURE INSTRUCTIONS:

When performing mobile glass replacements during the summer months, the technician must be concerned with the temperatures of the substrates that are to be bonded. In windshield replacement, the substrates are the glass part and the pinchweld. When the substrate temperatures of the glass and pinchweld are too high, it will have a direct impact on the performance of the re-glazing adhesive. The reaction will be faster than expected and the work time insufficient. The adhesion and long-term durability of the bonded system may be compromised. Therefore, adhesive application in conditions that exceed the maximum surface temperature should not be performed.

If temperatures are extremely high and/or proper shade cannot be provided then, Henkel offers a set of maximum substrate temperatures, by product.

URETHANE ADHESIVES:

The adhesives have a certain working window, and in cold environments, the open time is prolonged. The pasty state and extrusion rate of the adhesives have a temperature dependence. At low temperatures, the adhesive will have a lower flow than at room temperature. Store the adhesive in the passenger compartment to have a good workability over a cold day.
8.0 SHELF LIFE / OPEN TIME / PRODUCT STORAGE

All Henkel products have a shelf life or period after production within which the product must be used. After the expiration date, the product MUST be discarded.

Expired product performance is not warranted, and the product may not properly adhere, causing loss of glass retention and injuries to the operator. 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. This will ensure that you always use fresh material. If you ever have problems with the materials, the first thing you should 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 on the adhesive.

IF THE SHELF LIFE HAS LAPSED, DO NOT USE THE PRODUCT

Note: Label the bottle with the date on which the product was first opened to make sure the product is not used beyond the opened shelf life of two weeks, or the expiration date, whichever comes first.

• The published shelf life of all Henkel cleaners, primers and urethanes will be realized when the product is stored below 77°F (25°C). If properly stored in cool, dry conditions, the unopened adhesive foil-packaging have a shelf life of 12 months. Long-term storage of the product at higher temperatures will affect the handling characteristics and shorten the shelf life. Typically, chemical reactions double for every 18°F (-7°C) increase in ambient temperature. Therefore, product stored continuously at 95°F (35°C) would be expected to have a maximum shelf life of six months, while product stored at 113°F (45°C) would have approximately three months. Short-term storage, considered by Henkel to be a 30-day period from the purchase date, will have relatively little effect on the shelf life of the adhesive. If the product is exposed to freezing conditions (<32°F / <0°C), the product will not be damaged, but it will require additional time to acclimatize to the optimal application temperature.

9.0 PRODUCT SELECTOR GUIDE

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Package Size and Type</th>
<th>A Safe Drive Away Time</th>
<th>Operating Temperatures</th>
<th>Application Condition</th>
<th>Glazing Time</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEROSON® BOND 30 PROFESSIONAL</td>
<td>300 ml Cartridge (kit)</td>
<td>30 minutes*</td>
<td>-40°F to 194°F</td>
<td>Cold Applied</td>
<td>10 minutes</td>
<td>High-Modulus Non-Conductive (HMNC)</td>
</tr>
<tr>
<td>TEROSON® BOND 30 PROFESSIONAL</td>
<td>600 ml Foil Pack (kit)</td>
<td>30 minutes*</td>
<td>-40°F to 194°F</td>
<td>Cold Applied</td>
<td>10 minutes</td>
<td>High-Modulus Non-Conductive (HMNC)</td>
</tr>
<tr>
<td>TEROSON® BOND 60 PROFESSIONAL</td>
<td>300 ml Cartridge (kit)</td>
<td>60 minutes*</td>
<td>-40°F to 194°F</td>
<td>Cold Applied</td>
<td>15 minutes</td>
<td>High-Modulus Non-Conductive (HMNC)</td>
</tr>
<tr>
<td>TEROSON® BOND 60 PROFESSIONAL</td>
<td>600 ml Foil Pack (kit)</td>
<td>60 minutes*</td>
<td>-40°F to 194°F</td>
<td>Cold Applied</td>
<td>15 minutes</td>
<td>High-Modulus Non-Conductive (HMNC)</td>
</tr>
<tr>
<td>TEROSON® BOND 60 TRUE PRIMERLESS</td>
<td>300 ml Cartridge (kit)</td>
<td>60 minutes</td>
<td>-40°F to 194°F</td>
<td>Cold Applied</td>
<td>25 minutes</td>
<td>Primerless</td>
</tr>
<tr>
<td>TEROSON® BOND 60 TRUE PRIMERLESS</td>
<td>600 ml Foil Pack (kit)</td>
<td>60 minutes</td>
<td>-40°F to 194°F</td>
<td>Cold Applied</td>
<td>25 minutes</td>
<td>Primerless</td>
</tr>
</tbody>
</table>

* Drive away time for temperatures from -4°F to 122°F are valid for all humidities.
10.0 GLOSSARY

<table>
<thead>
<tr>
<th>TERM</th>
<th>DEFINITION</th>
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<tr>
<td>Corrosion</td>
<td>Corrosion is caused by water acting as an electrolyte, oxygen and a difference in potential at the metal surface (building of an electrochemical cell). Corrosion can happen on unprotected areas of metal surfaces or where coating is damaged. Corrosion increases and continues to progress along the metal surface, eventually creeping under the coating, which leads to delamination.</td>
</tr>
<tr>
<td>E-coat</td>
<td>Process between plating and painting. The full name of the process is the <em>electrophoretic painting process.</em></td>
</tr>
<tr>
<td>Flash Off</td>
<td>Time necessary for the volatile solvents to evaporate off the surface.</td>
</tr>
<tr>
<td>FMVSS</td>
<td>Federal Motor Vehicle Safety Standards</td>
</tr>
<tr>
<td></td>
<td>(<a href="https://icsw.nhtsa.gov/cars/rules/import/FMVSS/">https://icsw.nhtsa.gov/cars/rules/import/FMVSS/</a>)</td>
</tr>
<tr>
<td>Full Cut Method</td>
<td>Cutting method used to remove the entire cured adhesive bead off the pinchweld area</td>
</tr>
<tr>
<td>OEM</td>
<td>Original Equipment Manufacturer</td>
</tr>
<tr>
<td>Working Window</td>
<td>Time frame in which the operator must work with the materials before a chemical reaction starts</td>
</tr>
</tbody>
</table>

11.0 DECLARATION OF STANDARD PERFORMANCE

Henkel direct glazing polyurethane adhesives are subjected to Laboratory, impact and crash tests prior to serial production to verify adherence to new and old paint and ceramic coatings. Henkel collaborates on a worldwide basis with OEMs, universities and suppliers of airbags, glass and paint to formulate and manufacture adhesives that exceed OEM specifications and applicable safety standards. TEROSON® BOND has supplied polyurethane adhesive to automakers since the 1980s. Over 1 billion vehicles worldwide are glazed with TEROSON® BOND direct glazing adhesives. TEROSON® BOND offers approved and tested products to the aftermarket. TEROSON® BOND direct glazing adhesives which are used in automotive glass bonding and replacement shall use retention systems that are produced under the ISO 9001 standard or any standard that contains the entire text of ISO 9001. Each of TEROSON® BOND’s direct glazing adhesives and primers is manufactured according to our documented quality assurance practices. These internal quality assurance standards have been certified by a third party approved ISO registrar to meet the requirements of ISO 9001/ 14001, ISO/ TS 16949:2009 and BS OHSAS 18001. TEROSON® BOND direct glazing adhesive systems for OEM are used by many automobile manufacturers. This close collaboration and technical knowledge validates Henkel’s ability to produce qualified adhesive systems that meet or exceed the stringent OEM specifications for quality and performance for automobiles produced worldwide. For the vehicle repair and maintenance market, TEROSON® BOND products come with a set of written application instructions. These instructions (e.g., Training Manual or Technical Data Sheets) include the proper use of the glazing system, storage specification and minimum drive away times, which are tested and validated at a third party crash test facility using the FMVSS 212 standard.

12.0 BIBLIOGRAPHY


DISCLAIMER

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user’s responsibility to determine suitability for the user’s purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation’s products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits. The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications. Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

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