
Technical Report No.: 14-00768-CX-GBM (English version)
Manufacturer: N.P.T. S.r.l., I-40053 Valsamoggia (BO)
Type: U-Seal 205 HMLC

page 1 of 3

Technical Expert Report

No. 14-00768CX-GBM (english version)

regarding a

Windshield Adhesive

U-Seal 205 HMLC

for

Applicant: N.P.T. S.r.l.
New Polyurethane Technologies
Via Guido Rossa, 2 – Loc.
Crespellano
40053 Valsamoggia (BO) - Italy

Technical Report No.: 14-00768-CX-GBM (English version)
Manufacturer: N.P.T. S.r.l., I-40053 Valsamoggia (BO)
Type: U-Seal 205 HMLC

page 2 of 3

1 **General information**

- 1.1 Applicant:** N.P.T. S.r.l.
New Polyurethane Technologies
Via Guido Rossa, 2 – Loc. Crespellano
40053 Valsamoggia (BO) - Italy
- 1.2 Description:** One-component-Polyurethane-Adhesive used to
install vehicle windshields
- 1.3 Type:** U-Seal 205 HMLC
- 1.4 Sales Description:** U-Seal 205 HMLC

2 **Tests carried out**

In a test vehicle - Volkswagen Golf V (Type 1K), year of manufacture 2006 - the front windshield was dismantled and a new windshield was installed according to the manufactures specification.

The adhesive contact was tested under the following regulations:

- Vehicle-Crash according to USA-Standards FMVSS 212
- Impact velocity 49,4 km/h
- Vehicle impact angle: 0°, 100% overlap, frontal impact
- Temperature 21,8°C
- Air moisture content 36,4 %
- Vehicle with driver and passenger-airbag (series)
- 2 x 50% H3- Dummy in the front seats, belted
- Doors and windows closed
- Time between installation and impact (standing time): 60 minutes

Technical Report No.: 14-00768-CX-GBM (English version)
Manufacturer: N.P.T. S.r.l., I-40053 Valsamoggia (BO)
Type: U-Seal 205 HMLC

page 3 of 3

Requirements:

- Periphery retention amount after testing at least 75% of the pre-test measurements
- Vehicles equipped with automatic restraint systems at least 50% of the pre-test measurements on each side

3 Results

After the dynamic test no opening occurred.

The requirements were met.

4 Validity

This report consists of 3 pages and can only be used as one. Each separation of this report must be authorised by TÜV SÜD Auto Service GmbH.

5 Enclosures

- 5.1 Assembling instruction "Windscreen replacement procedure" (6 pages)
incl. Technical Datasheet



Auto Service



München, 06.11.2014

Dipl.-Ing (FH) Dieter Schmidt
Officially recognised expert for motor vehicle traffic

WINDSCREEN REPLACEMENT PROCEDURE

Over the past years NPT has greatly invested in the Automotive glass replacement and direct glazing of trucks, busses, rail and commercial vehicles by formulating elastic adhesives with tangible technical advantages such as: increased torsional stiffness, improved travel comfort and enhanced style possibilities with a real added value to our customers through:

- increased productivity and profitability for the users
- excellent application properties
- Outstanding lifetime performance
- Safety according to the safety standards

This document has the aim to give the main guidelines and advises to perform a correct and safe replacement of windshields on different types of vehicles, cars and industrial/commercial vehicles.

All these recommendations are valid for all NPT direct glazing adhesives and the difference in performance are indicated in the technical data sheets and safety data sheets provided by the manufacturer.

All the advises given in this document are given in good faith and based on our experience and knowledge. Consequently they cannot be considered as a definitive guarantee of the correct application that is influenced by several external factors out of NPT control.

WINDSCREEN REPLACEMENT PROCEDURE

Use of urethanes based adhesives

Urethane is the only adhesive technology used in high-performance auto-glass bonding. This is because urethane is capable of withstanding high levels of deformation with little loss of adhesive strength and performance. Urethanes are tough and abrasion resistant.

NPT urethane adhesives are formulated to be durable enough to withstand long-term weather exposure.

Auto manufacturers, insurance companies and aftermarket professionals are all concerned about passenger safety. U-Seal® urethane adhesives have been developed to protect occupants in crashes and rollover accidents. They are formulated to:

- Become a structural part of the vehicle body.
- Provide a replacement glass bond strength equal to that of the original vehicle.

U-Seal® urethane adhesives are one-component adhesives working with cold application system. They are simple to use. They are applied with a caulking gun and then must be allowed to cure through their reaction with the humidity contained in the environmental air. For this reason they are defined as moisture curing adhesives. The lower the moisture content in the air, the slower the adhesive cure rate. Colder air cannot physically hold as much moisture as warmer air.

Relative humidity (RH) is the amount of moisture the air holds compared with the maximum amount it could hold at a given temperature. All the technical information are determined at laboratory conditions (meaning a RH of 50% and temperature of 23°C).

Small changes in the RH percentage or in temperature even though the RH has remained constant mean the cure rate of any urethane adhesive is significantly affected.

As a rule of thumb, for every 11°C drop in temperature, the rate of the chemical reaction is cut in half and cure time is doubled.

Preliminary and subsequent verifications

Some important verifications must be carried on before starting and after the finishing of the job.

1. Inspect vehicle for preexisting damage or conditions that would prevent a safe installation, prior to commencement of work. Report any unsafe conditions or damage to the vehicle's owner and record on the pre-job inspection sheet.
2. Remove all decorative trims and mouldings, seals, fastening and windshield wipers in accordance with the vehicle manufacturer's instructions.
3. Properly protect the customer's vehicle by utilizing bonnet, seat and other protective shields.
4. Inspect replacement parts thoroughly for defects before starting work. Dry fit glass to ensure proper fit in pinchweld prior to applying adhesive.
5. Verify that all primers and adhesives are within current shelf life and have been stored according to the adhesive manufacturers specified recommendations.
6. Verify that adhesives are within current shelf life and have been stored according to the adhesive manufacturers specified recommendations.
7. Before removing the old glass, protect the vehicle bodywork against paint damage by masking adjacent areas with masking tape. The damaged glass may be removed with any of the following tools: electric trimming knife, cutting wire.
8. Test for water leaks and wind noise after installation.
9. Inspect the vehicle to ensure:
 - a. All moulds fits neatly and there are no gaps or exposed edges.
 - b. All accessories (i.e., wiper arms, rear-glass defroster and radio/telephone antennas) are properly reconnected.
 - c. The installed glass has been properly cleaned and is streak free.
 - d. All broken glass, dirt, debris and adhesives or sealants are cleaned from interior and/or exterior of vehicle.
10. Record all batch numbers of primers and adhesives used.
11. Make sure consumers understand their responsibility and precautions for safe drive-away time. Place an information card in a visible, noticeable location in the vehicle.

VEHICLE BODY PREPARATION – CAR BODY FLANGE

First step after the removal of the old glass is the preparation of the car body.

Manufacturers protect vehicle pinchwelds from corrosion by covering bare metal with e-coat and/or paint. Auto-glass technicians can inadvertently expose bare metal on the pinchweld during glass removal. Exposing bare metal to oxidants (air and water) causes corrosion.

It is important to verify if and where these scratches have occurred and apply the U-Primer 130. This will prevent from corrosion phenomenon.

During the manufacturing of the vehicle body, some chemicals agents, such as silicones and butyl, not compatible with urethanes, are used. These eventual contaminations must be removed. Chemical contamination is difficult if not impossible to remove with other chemicals. Contamination must be removed by mechanical scraping or abrading means. Removing all the contamination is required to ensure a top-quality installation. If all the paint and e-coat is removed down to bare metal, U-Primer 130 must be used.

U-Primer 130 is a all-in-one moisture curing primer, suitable for the application on glass as adhesion promoter and UV barrier as well as paint for bare metal.

Before the use shake the bottle for at least 1 min and till the sound of the metal spheres inside the bottle is perceivable.

Once opened and used for a first time, being a product highly reactive with moisture, close it well and shake again before any re-use. Once opened, they have a shelf life of 10-14 days maximum.

Always allow a minimum of 2-3 minutes to dry.

New urethane adhesive bonds best to freshly cut, uncontaminated and well-bonded original urethane. When working on a vehicle that is having body work done, always consider that many new paint finishes use a clear-coat finish over the colour coat to resist chemicals and maintain a glossy finish. This may cause a bonding problem if fresh colour and clear coat are in the bonding area.

Mask off the pinchweld with tape prior to any colour coat and/or clear coats being applied. Always try to apply urethane adhesive directly to the freshly cut OEM urethane bead. The original urethane should be left intact during painting and body repair. Trimmed urethane left exposed to any environment will become contaminated. Trim the urethane adhesive down to the recommended 1 to 2 mm final thickness just prior to installing the new glass. The new bead of urethane can then be applied directly to the freshly trimmed bed of original urethane.

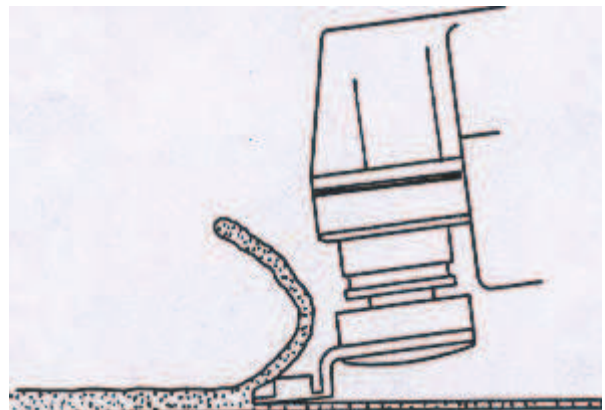
Advices:

Automotive pinchweld

- Deep penetration with knife blade can damage pinchweld bottom.
- Adjust blade to ensure it cannot reach metal.

Glass removal

- Scratches in paint are often hidden by urethane. Untreated scratches can develop corrosion.
- Trimming back old urethane with knife can nick sidewalls of pinchweld.
- Adjust blade to ensure it cannot reach metal.
- Once trimming cut is complete, inspect bottom and sides of pinchweld to ensure paint/e-coat is not scratched.
- Treat scratches with U-Primer 130



Reduction of residual adhesive to a thickness of approx. 1-2 mm

GLASS PREPARATION

Cleaning/Activating the windscreen black ceramic coating

New glassed are normally contaminated by chemical substances used in their production, especially silicone contamination, which affects the majority of automotive aftermarket glass. Silicone residue, deposited in the manufacturing process, interferes with adhesive bonding. It's a primary source of leaks following windshield replacement. is more than the dust and dirt that accumulates during storage.

To remove contamination, proper surface preparation is critical.

1. Make sure the bonding surface is free of all contamination. Examine the bond area of the glass for visible contamination such as stickers, tape, dust, dirt and fingerprints.
2. Remove contaminants and clean with U-Cleaner/Activator
3. Leave to dry for approximately 10 minutes depending from the environmental applicative conditions



Cleaning/Activating the windscreen black ceramic coating with U-Cleaner.

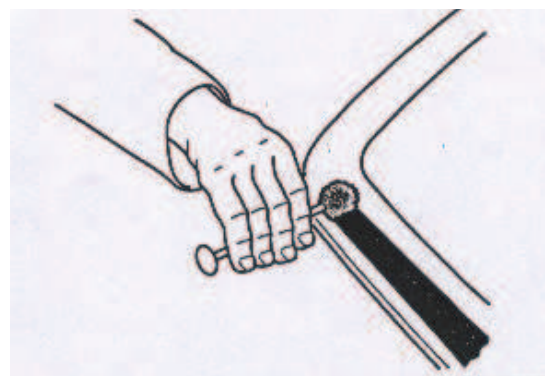
U-Cleaner/Activator is a Silane polymer based cleaner/activator able to remove the contamination of the glasses. Its chemical nature also enhance the adhesion promotion properties of the U-primer 130 and the adhesive during the glass replacement contributing to the perfect bonding of the glass. Due to its chemical base it has non-filming properties.

U-Cleaner/Activator is very moisture sensitive. Close the containers, immediately after every use to preserve contents. Once opened, it has a shelf life of 10-14 days.

Priming the windscreen black ceramic coating

Before use, shake the container of U-Primer 130 well, until you hear that the small bearings are detached.

- Apply the U-Primer 130 in a uniform manner on the glass surface using the special applicator. Leave to dry for approximately 5-10 minutes.



Priming the windscreen black ceramic coating with U-Primer 130.

SEALANT APPLICATION AND GLAZING

Before using the adhesive gun, check once again that all has been done to guarantee a satisfactory repair. The following must be taken into consideration:

- Begin at the centre of the lower glass border.
- Apply a triangular bead of the PU adhesive to the edge of the glass or the windscreen body flange, using the specially shaped nozzle. A round bead must be avoided because, once applied the glass, bubbles can create inside the adhesive (decreasing the mechanical adhesion properties of the adhesive) and the spreading of the adhesive in contact with the primer surface can be poor.
- While applying the urethane adhesive, keep the gun at a 90° angle with respect to the glass surface.

- The end of the adhesive beading must overlap the initial part by approx. 20 mm in order to avoid infiltrations.
- The new windscreen must be placed in position within 8-10 minutes. Apply light pressure all round perimeter of glass to ensure good contact with the adhesive bed. Keep vehicle doors and side windows open throughout glass installation.
- Refit trims and mouldings. Remove any excess adhesive before it hardens.

SAFETY PRECAUTIONS

This safety information is provided in good faith, but does not replace the worker's obligation to be familiar with all products, Material Safety Data Sheets (MSDS) in the Workplace Hazardous Materials Information Systems to exercise due care and caution in auto-glass installation, materials handling and equipment operation.

Before starting to do the job, be careful to follow simple but important steps of preparation in order to guarantee the quality of the job and your personal safety:

- Before using the chemicals read carefully the information supplied by the manufacturer and if you have any doubt contact your closest distributor;
- Always wear gloves and safety glasses handling primers and adhesives;
- Avoid prolonged or repeated skin contact
- Use the products in well ventilated areas;
- Do not breath vapours and fumes;
- Do not use adhesive or primer's near naked flames;
- Never smoke, eat or drink when using chemicals, even if they are not flammable
- Once finished your job always wash your hands and apply barrier cream before handling food

General first aid recommendations

- **Skin contact:** promptly wipe off excess material, then wash skin thoroughly with soap and water.
- **Eye contact:** immediately flush with water for at least 15 minutes. Contact physician if any symptoms persist.
- **Inhalation:** move to fresh air and contact a physician.
- **Ingestion:** contact a physician or poison control center immediately.
- **Clothing:** remove contaminated clothing and launder before reuse.