

Training Manual

Mazda Smart Repair System

CT-BL1009



No part of this hardcopy may be reproduced in any form without prior permission of Mazda Motor Europe GmbH.

The illustrations, technical information, data and descriptive text in this issue, to the best of our knowledge, were correct at the time of going to print.

No liability can be accepted for any inaccuracies or omissions in this publication, although every possible care has been taken to make it as complete and accurate as possible.

© 2006
Mazda Motor Europe GmbH
Technical Services



zoom-zoom

General Information

Product Concept	00-1
Windscreen Repair	00-1
Body Panel Repair	00-1
Plastic Body Trim Repair.....	00-2

Windscreen Repair

Windscreen Repair Kit	01-1
Content	01-1
Additional Items and Tools	01-2
Criteria for Windscreen Repairs.....	01-2
Immediate Visual Area of the Driver	01-3
Conditions for Windscreen Repairs	01-3
Operation	01-4
Typical Problems.....	01-14

Smart Dent Repair

Dent Puller Set.....	02-1
Content	02-1
Additional Items and Tools	02-2
Warnings.....	02-2
Conditions for Smart Dent Repairs.....	02-2
Operation	02-3
Tips and Tricks	02-14
Typical Problems.....	02-14

Plastic Repair

Exterior Plastic Repair Kit	03-1
Content	03-1
Additional Items and Tools	03-2
Technical Data	03-2
Operation	03-3
Applying Adhesive	03-9
Applying Adhesive to the Front Side.....	03-9
Applying Adhesive to the Back	03-11
For Both Repair Procedures	03-16

Notes:

General Information

Product Concept

- There are a large number of vehicles that are driven around on European roads that have small and minor damages, where the customer is not willing to have them repaired at great cost.
- To close this market gap, Mazda is introducing the Mazda Smart Repair System in cooperation with Würth.
- The Mazda Smart Repair System is based on some selected products out of the all-new Würth Smile Repair System.
- With the Mazda Smart Repair System it is possible to cover the three most important areas of cosmetic repair as follows:
 - Windscreen
 - Body panel
 - Plastic body trim

Windscreen Repair

- Small and minor cracks and stone chips can be quickly repaired without replacing the windscreen.
- Further cracking of the windscreen is stopped and the integrity of the windscreen is retained.
- Most insurance companies accept this repair method.

Body Panel Repair

- Small and minor dents caused by hail or careless people for example, can be pulled out of the body panels quickly.
- This repair method does not cause any damage to the paint surface.
- It is not necessary to remove the inner body trim.
- The system can be applied to painted steel, stainless steel and aluminium with a thickness of 0.5...2.0 mm.

General Information

Plastic Body Trim Repair

- Small and minor cracks in nearly all plastics can be quickly repaired.
- Four different types of adhesive can be used to repair most plastics found on vehicles.
- The adhesives are resistant against fluids such as petrol and oil.
- This kit is especially designed for the repair of:
 - Bumpers
 - Spoilers
 - Radiator grills
 - Cowling
 - Brackets

Windscreen Repair Kit

Contents



BL_1009_001

1	Vacuum/pressure pump	To apply vacuum/pressure to the injector
2	Injector with bracket	To inject repair resin into the crack in the windscreen via the injector
3	Pressure hose	To connect the pump with the injector
4	Mirror	Mirror for better visibility of the crack, attached by a suction cup on the inside of the windscreen
5	Single Shot Crack Fill repair resin (brown)	Repair resin with low viscosity, for star cracks
6	Polymer II repair resin (green)	Repair resin with high viscosity, for circular cracks
7	Torch with UV light	UV light is necessary to harden the resin
8	Brackets	Two brackets with suction cup to fix UV light in correct position
9	Razor blade	For removing hardened excessive resin on the windscreen surface
10	Resin hardening foil	To be laid on the crack during hardening process with UV light
11	Rubber gasket	Spare gasket for the injector
12	Glycerine	To maintain flexibility of the various suction cups

Additional Items and Tools

The following items and tools must be purchased separately:

- Safety glasses, to be worn while repairing the windscreen
- Glass cleaner

Criteria for Windscreen Repairs

Cracks must be on the outer layer of a laminated windscreen. The inner side and the foil must not be damaged.

The repair must be performed as soon as possible after the damage occurred. Dirt or moisture must not be allowed to penetrate the crack.

The diameter of the centre of the crack must not exceed 5 mm.

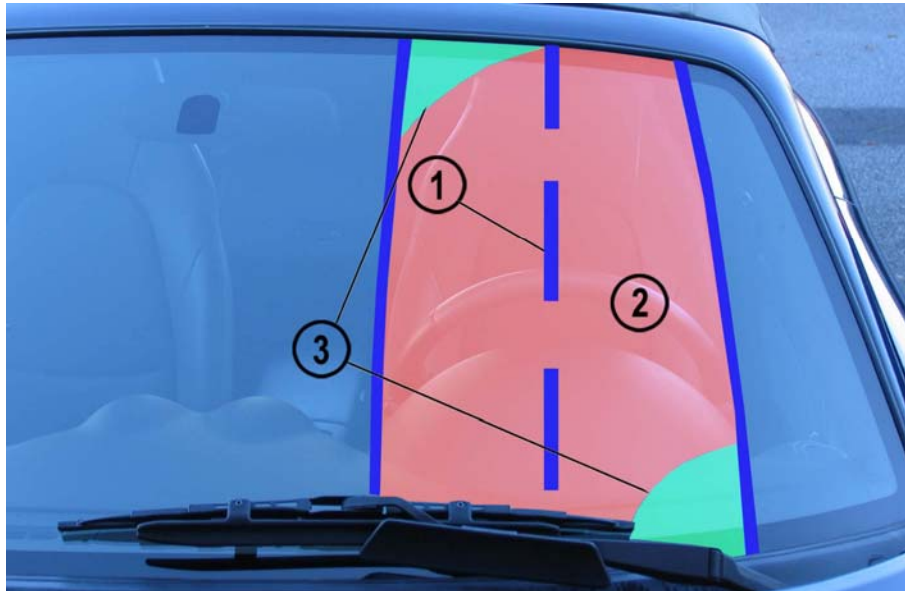
Cracks going from the centre must not exceed 50 mm or end in the edge of the windscreen.

Cracks must be outside the immediate visual area of the driver.

NOTE: If one of these above mentioned criteria is not met, then the windscreen must be replaced.

Immediate Visual Area of the Driver

The width of the immediate visual area of the driver is specified by a 29 cm wide area from the centre of the steering wheel, while the height is specified by the top and bottom of the windscreen wiper swept area.



BL_1009_019

- | | | | |
|---|-------------------------------------|---|-----------------------------|
| 1 | Centre line of the steering wheel | 3 | Area not swept by the wiper |
| 2 | Immediate visual area of the driver | | |

Conditions for Windscreen Repairs

Repairs should always be made in sheltered areas, because direct sunlight or even sunlight on an overcast day can generate enough UV light to harden the repair resin too early.

The ideal temperature of the glass for repairing a crack is between 4°...29° C.

Both repair resins Crack Fill and Polymer II are not compatible and therefore must never be mixed.

The injector and its gasket must be cleaned with glass cleaner after each usage.

From time to time, glycerine must be rubbed onto the rubber of the suction cups to maintain their elasticity.

Operation

Verify whether the crack in the windscreen can be repaired (refer to Immediate Visual Area of the Driver and to Circumstances for Windscreen Repairs).

Remove loose splinters of glass from the crack.

Clean the area around the crack. Ensure that no cleaning agent enters the crack as it can cause discolouration. To do this, spray glass cleaner onto a cloth and wipe around the damaged area.



BL_1009_058

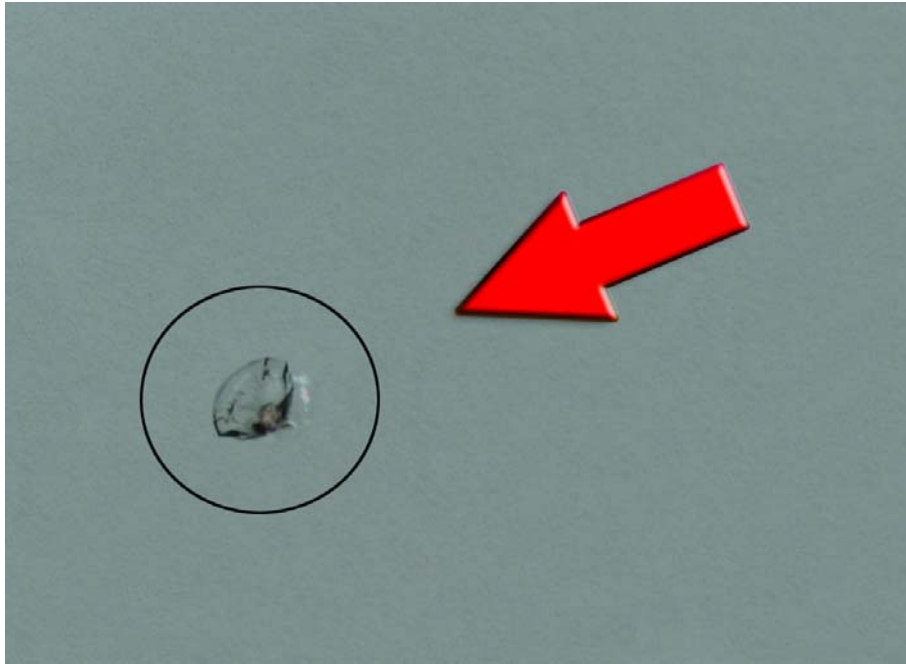
Attach the mirror to the inside of the windscreen behind the crack, to ensure good visibility of the damaged area.



BL-1009_004

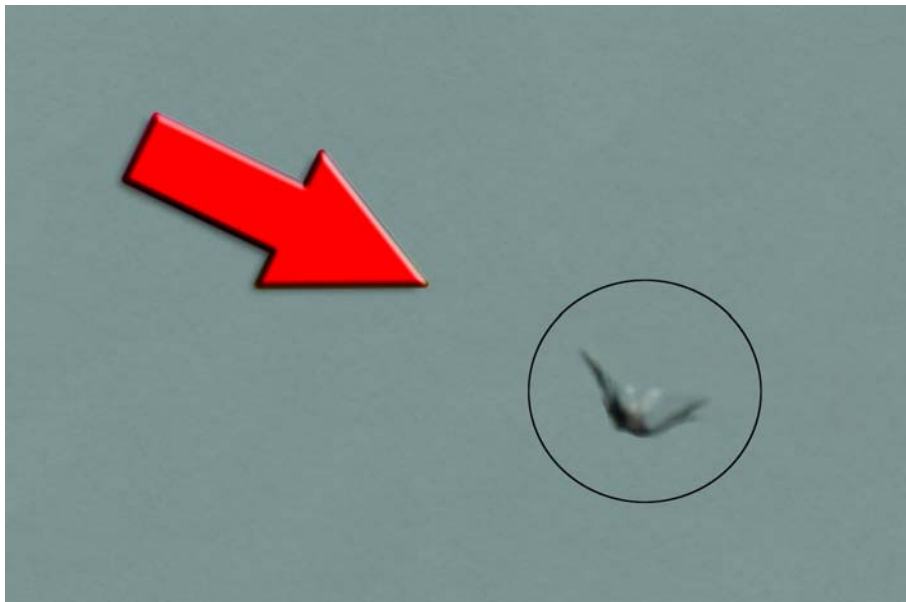
Inspect the crack and determine the appropriate repair resin.

- Choose Polymer II (green) for circular cracks.



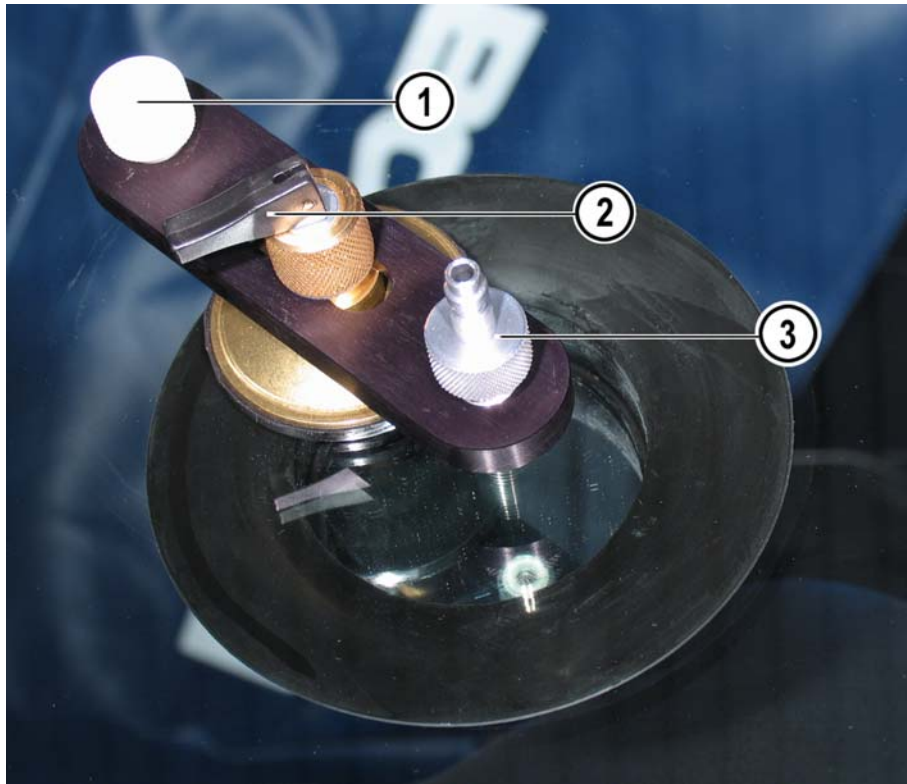
BL-1009_005

- Choose Single Shot Crack Fill (brown) if the crack is star shaped.



BL-1009_006

Fix the injector bracket on the windscreen and align the injector exactly above the centre of the crack. Turn the injector until it contacts the glass and then turn it another quarter of a turn. Now, turn the tension adjustment screw until it touches the glass.



BL-1009_007

- 1 Tension adjustment screw
- 2 Lever for suction cup

- 3 Injector

Pour in a few drops of the selected repair resin, until the centre of the crack is completely covered.



BL-1009_008

Because a small amount of repair resin could enter the hose during the vacuum phase, it is vitally important to always have the same side of the hose connected to the injector. Otherwise leftover repair resin could enter the hand pump.

Connect the black marked side of the hose to the pump and the other side to the injector.



BL-1009_009

1 Black mark

Proceed with the first pressure phase. Pull the knurled slider toward the pressure gauge and apply a pressure of 0.7...1.4 bar, until repair resin has filled the crack.



BL-1009_010

1 Pressure gauge

2 Slider

Proceed with the vacuum phase to remove any possible air lock from the crack. Switch the pump over from pressure to vacuum by pushing the knurled slider away from the pressure gauge, apply a vacuum of 0.5...0.8 bar and hold this vacuum for approximately 10 minutes.



BL-1009_011

Proceed with the second pressure phase. To do this, switch the pump back over to pressure, apply a pressure of 1.4...2.1 bar and hold this pressure for 5...10 minutes.



BL-1009_012

Remove the injector and the bracket, then lay a resin hardening foil onto the crack.

NOTE: Before removing/disconnecting the injector, release the pressure by pushing the slider away from the pressure gauge. Otherwise, repair resin could spray on the vehicle.



BL-1009_018

Position the UV-light above the crack using its two brackets with suction cups, and switch on the UV-light for approximately 5 minutes.



BL-1009_015

Remove the UV-light and its brackets from the windscreen. Then take the hardening foil off the repaired area. With the aid of a razor blade, remove any excess hardened repair resin from the windscreen.



BL-1009_016

Remove the mirror from the inside and clean the windscreen from both sides with glass cleaning agent.



BL-1009_017

Typical Problems

Problem	Solution
The size of the crack increases during installation of the injector and its bracket.	Do not apply pressure to the windscreen. Do not apply any pressure to the glass while adjusting the bracket. Hold the bracket against the windscreen and use its lever to fix the suction cup onto the glass. Check the adjustment of the bracket. Ensure that neither the adjustment screw nor the injector contact the windscreen and do not apply any pressure against the glass when using the lever to fix the bracket onto the windscreen.
The length of the crack increases during a pressure phase.	Temperature of the glass is too high. Release the pressure as soon as the length of the crack begins to increase. Check whether the glass feels warm and cool it down if required. Decrease the pressure. Apply only reduced pressure. Extend the time of the pressure phase to achieve the same result as with the standard pressure.
Repair resin does not flow into the crack.	Pressure has been applied too fast. Slowly increase the pressure up to 2.5 bar. Be careful, pressure above 2.5 bar can damage the foil in the windscreen, causing a shaded area near the repaired crack. Injector is misaligned. Ensure that the centre of the injector is aligned with the centre of the crack. Re-adjust the bracket if necessary. Injector is over tightened. If the injector is over tightened, this can inhibit the flow of the repair resin. Turn the injector back by a quarter of a turn. Repair resin does not cover the centre of the crack. When the injector is aligned, but the repair resin does not completely cover the crack, increase the amount of repair resin. The centre of the crack can be clogged by splinters of glass, dirt or wax. Loosen the brass nut on the bracket and push the injector away from the crack, then clean the crack using the razor blade.

Problem	Solution
Radial cracks are not filled with repair resin.	Increase the time of the pressure phase. Often, an extended pressure phase can solve this problem.
Repair resin does not harden completely.	Cover the crack with resin hardening foil. The repair resin needs 5...10 minutes for hardening. Repair resin is contaminated. Clean the injector before using a different type of repair resin. The different types of resin must not be mixed. Already a small impurity can cause problems with the hardening. Do not reuse repair resin that is contaminated.
Crack becomes clouded.	Remaining moisture. Extend the vacuum phase until the moisture is completely exhausted. Other pollutions. The repaired crack may become clouded if it was exposed to wax, soap, oil or other substances. Before starting the repair, the customer should be asked whether the crack could be polluted by one of the above mentioned substances. Repair resin is polluted. Ensure careful handling of resin to make sure it is not polluted.
The crack reappears after finishing the repair procedure.	Hardening foil was removed too early. Do not remove the hardening foil until the repair resin is completely hardened. The temperature of the windscreen was too high. Ensure that the temperature of the windscreen remains within the specified range for the complete repair duration. Moisture inside of the crack. Ensure that no moisture is inside the crack, before starting the repair. Not enough repair resin used. Use more repair resin. Always keep in mind that the volume of resin shrinks during the hardening procedure.
Repair resin has been spilled over the vehicle.	Do not try to wipe off. Harden the resin with the UV light, before carefully peeling the resin off.

Notes:

Dent Puller Set

Content



BL-1009_056

1	Mini Lifter	To lift out the dent with the adapter
2	Adapter, diameter 16, 21, 27 and 32 mm	To be glued to the dent and pulled using the Mini Lifter.
3	Adhesive sticks, high bonding strength	To adhere the adapter to the dent.
4	Gloves	Must be worn while handling hot glue.
5	Plastic wedge	To remove adapters with the aid of adhesive remover.
6	Acetone cleaner	To clean the dent before glueing the adapter.
7	Adhesive remover	To remove adapters and hardened hot glue from the paint without any damage.
8	Plastic dressing cone	To fix an excessively lifted dent.

Additional Items and Tools

- The following additional items and tools must be purchased separately:
 - Hot-glue gun capable of reaching a temperature of 185° C, to apply hot-glue to the adapters.
 - Hand-held hot air blower.
 - Torch with a neon glow lamp.
 - Cleaning cloths.

Warnings

- Working safely with all machines used is possible only when the operating and safety information are read completely and the instructions contained therein are strictly followed.
- The cleaning agents contained in the set are highly inflammable. Keep away from all sources of ignition (such as hot-air guns...). Close containers immediately after usage. Do not inhale the vapours.
- Be careful with hot glues. Wear protective gloves to avoid burning yourself.
- When working on motorcycle tanks, one must make sure that, even when the explosive atmosphere is heated up only minimally, it is not ignited (e.g. by putting water in the tank).
- The temperature of the glue can reach 250° C! Do not touch the nozzle and other hot parts of the hot-glue gun! In case the hot glue contacts the skin, wash immediately with cold water. Do not try to remove the glue from the skin first.

Conditions for Smart Dent Repairs

- Verify that the dent did not cause any damage to the paint coating, because otherwise the paint might be pulled off when repairing the dent.
- The temperature must not be below 10° C, otherwise the heat adhesive cannot achieve the optimal bond with the surface of the paint. Warming up the paint surface with a heat gun improves the adhesive characteristic.
- The temperature must not be above 30° C, otherwise the curing of the heat adhesive could be delayed. Cooling the surface down with an ice spray is recommended in such situations.

Operation

- Clean the surface to be repaired with acetone cleaner. Avoid excessive rubbing with the acetone-soaked cloth to prevent unnecessary damaging of the paint coating).



BL-1009_039

- Draw a cross to mark the centre of the dent to be repaired. This helps ensure that the adapter will be bonded to the correct location.



BL-1009_040

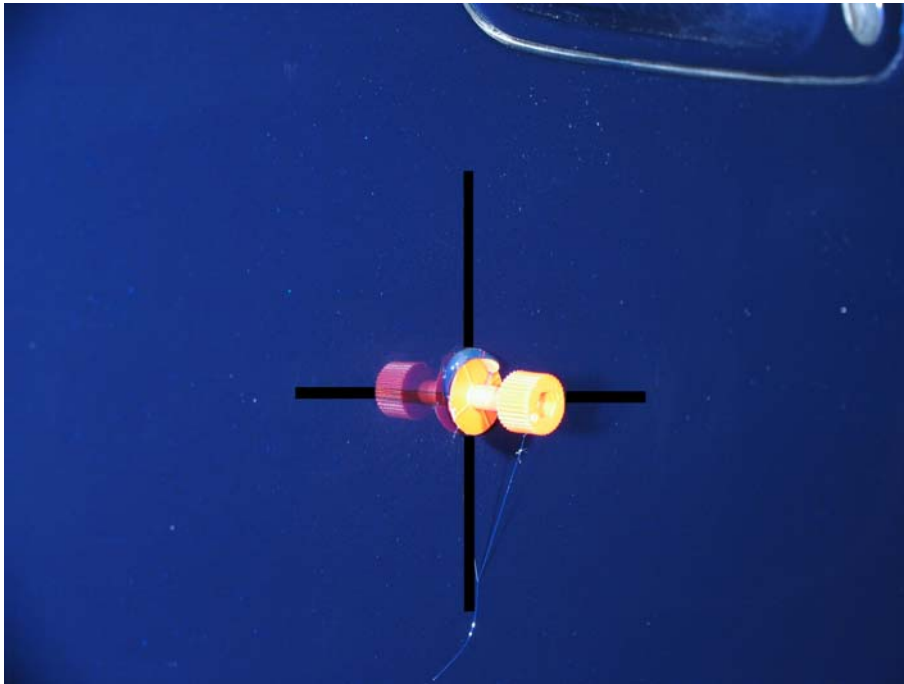
- If the vehicle's body is too cold, it must be warmed up to a temperature of 10°...30° C with the aid of a hand-held hot air blower.
- The adapters are reusable. In case too much adhesive bond is applied to the adapter, simply pull it off. If required, briefly heat up and remove.
- Various puller adapters enable optimum working on small and mid-size deformations. To increase the adhesion, the adapters are equipped with special ring grooves on the bonding surface.
- The pulling force of the adapters is limited to protect against unintended paint coat removal. For pulling force limitation, the adapter has a specific breaking point.
- Select the required adapter according to the size of the dent. Apply the special adhesive to the suitable adapter.

NOTE: The special heat adhesive is a hygroscopic material. Thus the envelope with the heat adhesive must be properly closed after usage.



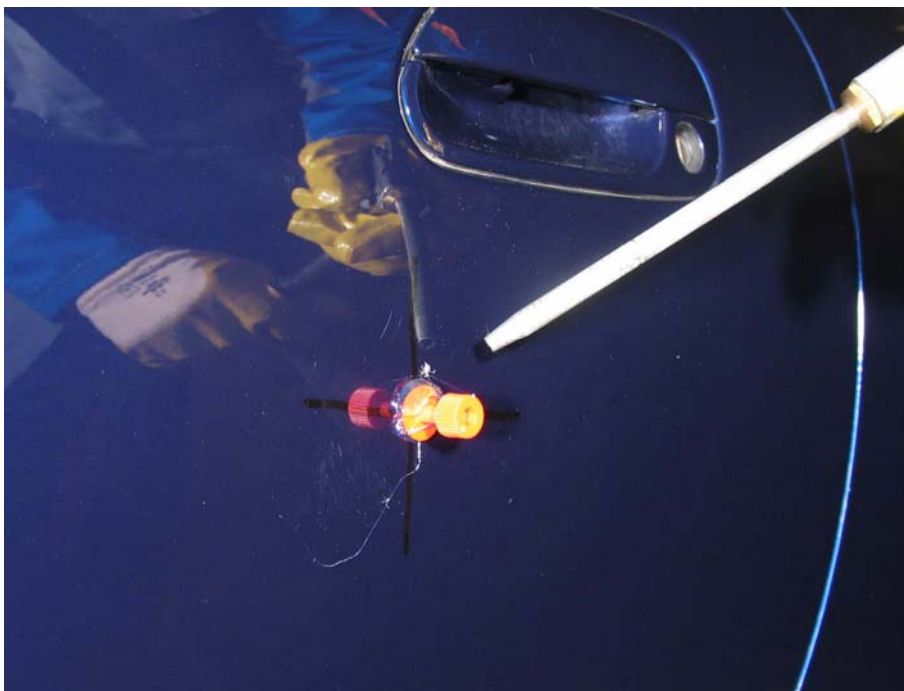
BL-1009_041

- Position the adapter in the dent and align it using the cross mark. The adhesive should emerge slightly at all sides.



BL-1009_042

- If possible, cool down the adapter with compressed air. Do not blow the compressed air under the adapter.



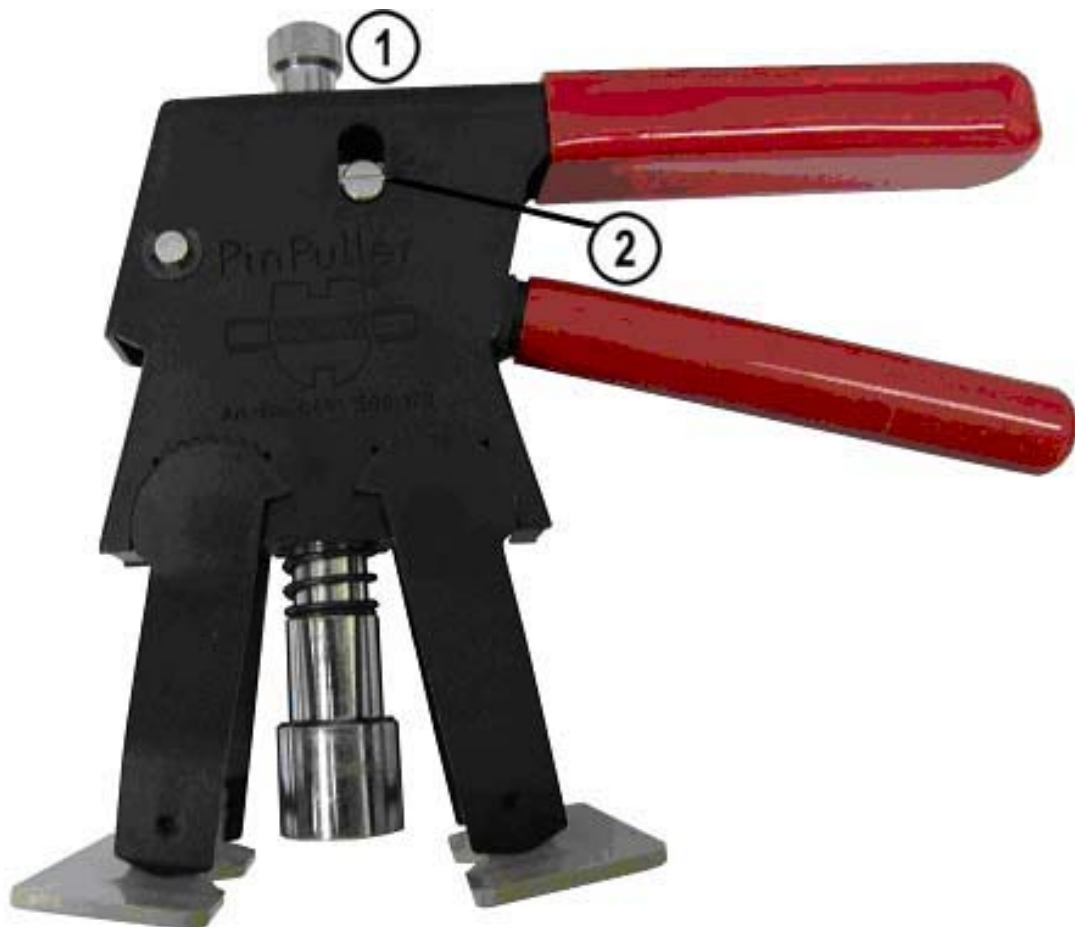
BL-1009_043

- Adjust the pedestals of the Mini Lifter according to the shape of the dent to be repaired. The pedestals can be pulled out and adjusted to three different positions.



BL-1009_044

- The height of the puller can be adjusted via the adjustment screw.
- A scale can be used to measure the pulled distance.

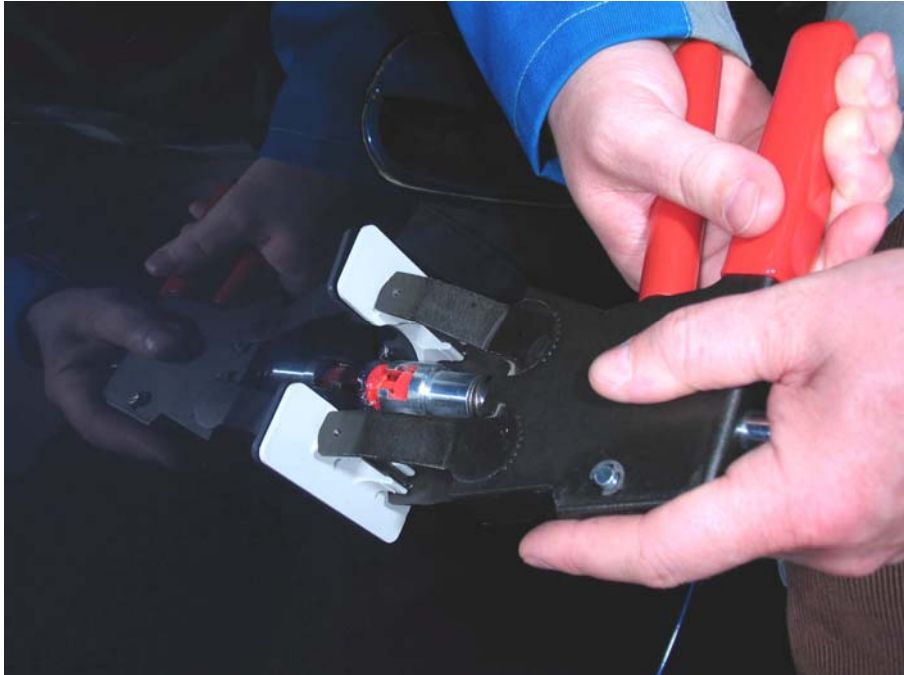


BL-1009_045

1 Adjustment screw

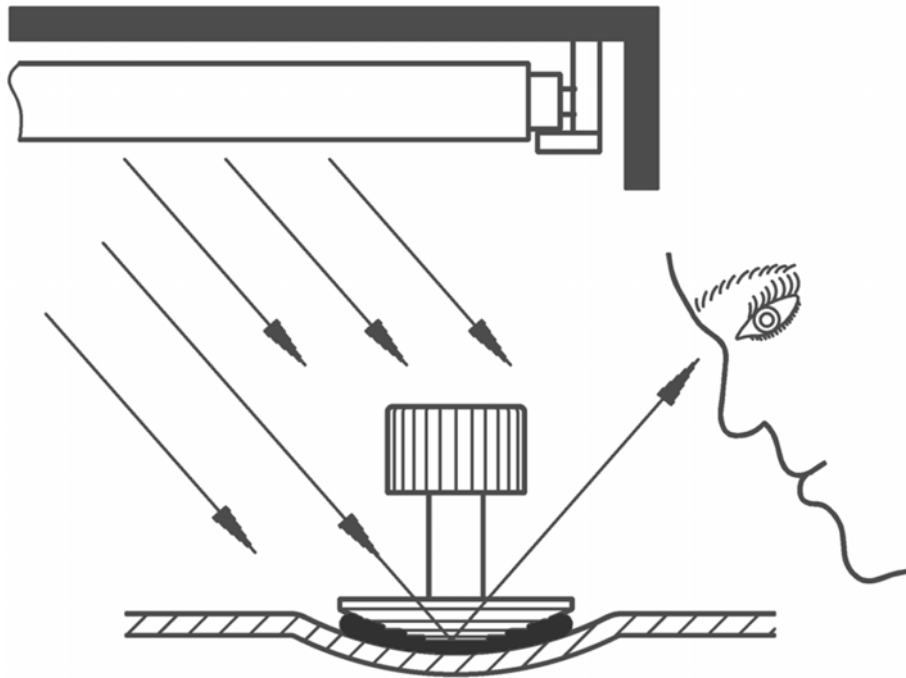
2 Scale

- Insert the Mini Lifter onto the adapter and carefully lift out the dent. Remove the Mini Lifter every now and then, and check the result.



BL-1009_047

A light source (neon lamp) reflecting in the dent is a good indication of how much reshaping has taken place.



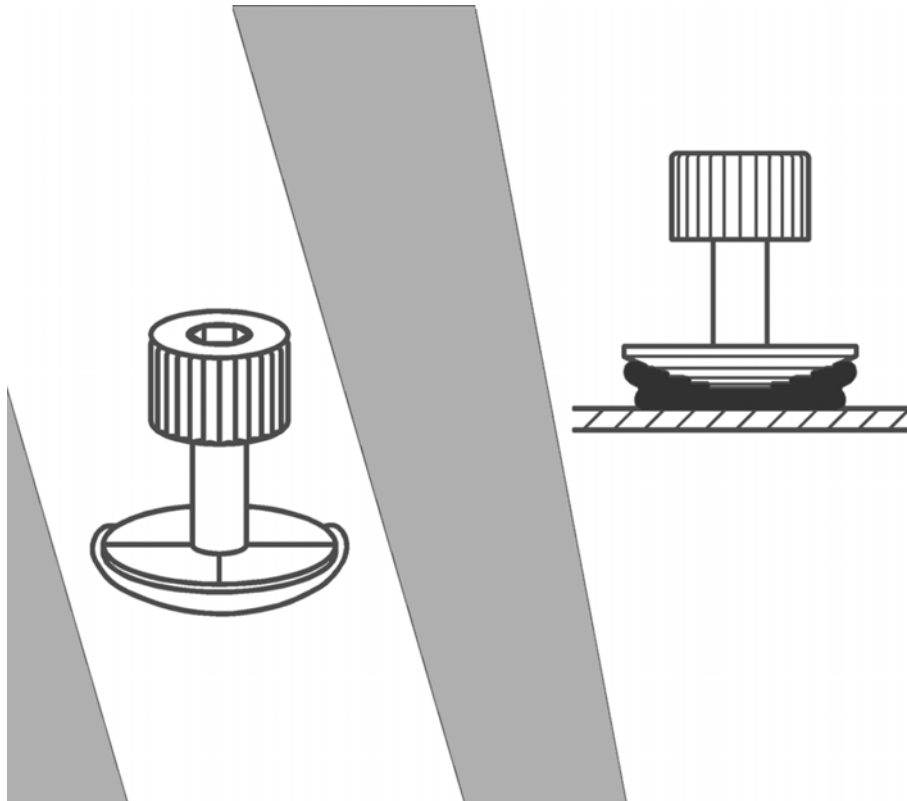
BL-1009_048

- When the dent still requires pulling, the light bulges outward around the circumference of the dent.



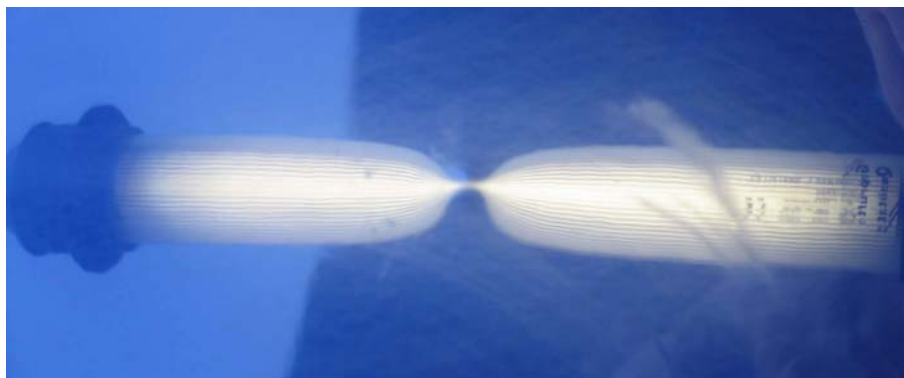
BL-1009_049

- When the dent is removed, the light source appears unaltered.



BL-1009_050

- When the dent is lifted out too far, the light source appears pinched.



BL-1009_051

- To remove the adapter, spray a small amount of adhesive-remover onto the edge of the adhesive.



BL-1009_052

- Lightly and with care, lift the adapter or the adhesive using the plastic wedge to enable the adhesive remover to remove the glue from the paint coat.



BL-1009_052

- Carefully remove any remaining adhesive with the acetone cleaner.



BL-1009_053

- In case the dent is not completely removed yet, repeat the procedure as required. An excessively lifted dent can be repaired using the dressing cone.



BL-1009_057

Tips and Tricks

- In case of extreme deformations to the car body, micro cracks may have developed in the paint coating. As a protective measure against corrosion it is recommended to apply a thin layer of transparent coating to the repaired surface, or to preserve the area with other means.

Typical Problems

Problem	Solution
The adapter and the glue prematurely come off together during dent lifting.	Surface is not clean. There may be grease or wax residues on the coating. High-polished surfaces are problematic as well. Thoroughly clean the surface again. The vehicle body is too cold. Lightly warm up the surface with the hand-held hot air blower.
The adapter comes off prematurely during lifting.	The glue does not stick on the adapters surface. Reapply the adapter again. After 3 applications, the adapter has its best adhesive ability.
The lifting head of the adapter breaks.	The maximum tensile force was exceeded. An intended point of fracture protected the paint coating. Do not exceed the tensile force. The lifting head of the adapter was overheated by the hot air blower. When heating up the adapter, only heat up the base.
Paint is removed.	The surface has been damaged so heavily that the paint already started to come off the sheet metal. Look at the dent to see if there is a danger of the paint coming off, before starting the repair The original paint of the manufacturer has not been used, or the after-coating was insufficient. Check the quality of the coating.

Exterior Plastics Repair Kit

Content



BL-1009_055

1	Plastic Cleaner	For cleaning and degreasing of plastic parts.
2	Plastic Primer	For better adhesion between 2K plastic adhesive and plastic parts
3	Self-adhesive reinforcement tape	For reinforcing the rear side of the area, requiring repair.
4	Double Barrel Cartridge gun	
5	Universal 2K plastic adhesive	For plastic repairs to be sanded and painted after 30 minutes or more.
6	Fast 2K plastic adhesive	For plastic repairs to be sanded and painted after 10 minutes.
7	Mixing tube	To ensure that components of 2K adhesive are mixed correctly.
8	Contour foil	To follow the contour lines of the exterior plastic surface.

Additional Items and Tools

- The following additional items and tools must be purchased separately:
 - Power drill with inserts, to stop the crack from continuing.
 - Cutter knife, to create a V-shape in the surface of the tear for increased adhesion.
 - Power cutter, to be used instead of the cutter knife.
 - Sandpaper with P180 grit, to roughen up/rub down the to be repaired areas.
 - Sandpaper with P320 grit, for final finish of the surface before priming.
 - Scissors
 - Safety glasses, to be worn while drilling and grinding.
 - Breathing mask, to be worn while grinding.

Technical Data

	Plastic Adhesive Superfast	Plastic Adhesive Fast	Plastic Adhesive Universal	Transparent Plastic Adhesive
Processing Period	25 sec	1.5 min	3.5 min	3 min
Can be sanded at 23° C after	5 min	10 min	30 min	30 min
Can be painted after	5 min	10 min	30 min	30 min
Shore hardness D	79	79	79	40
Colour	Black	Black	Black	Colourless

NOTE: This information should only be seen as containing recommendations based on our experience. A preliminary test must be carried out.

NOTE: The adhesives are not suitable for PE (polyethylene), PP (polypropylene) and PTFE (polytetrafluorethylene). The transparent adhesive is suitable for PC (polycarbonate) and PMMA (polymethylmetacrylate/plexiglas).

NOTE: Due to coatings and release agents used when manufacturing plastics, in some cases there may be adhesion problems. If necessary, check material compatibility in an inconspicuous place.

Operation

- Spray the areas to be adhered with plastic cleaning agent and allow the agent to act for 2 minutes. Then wipe with a clean, dry, lint-free cloth.



BL-1009_020



BL-1009_021

- To avoid any parts from tearing, drill a hole at the end of the area to be repaired.



BL-1009_022

- Cut or mill out the front side of the tear in a V shape



BL-1009_023

Sand down the front and rear area to be repaired using P180 sandpaper. Avoid heating up the area being sanded.



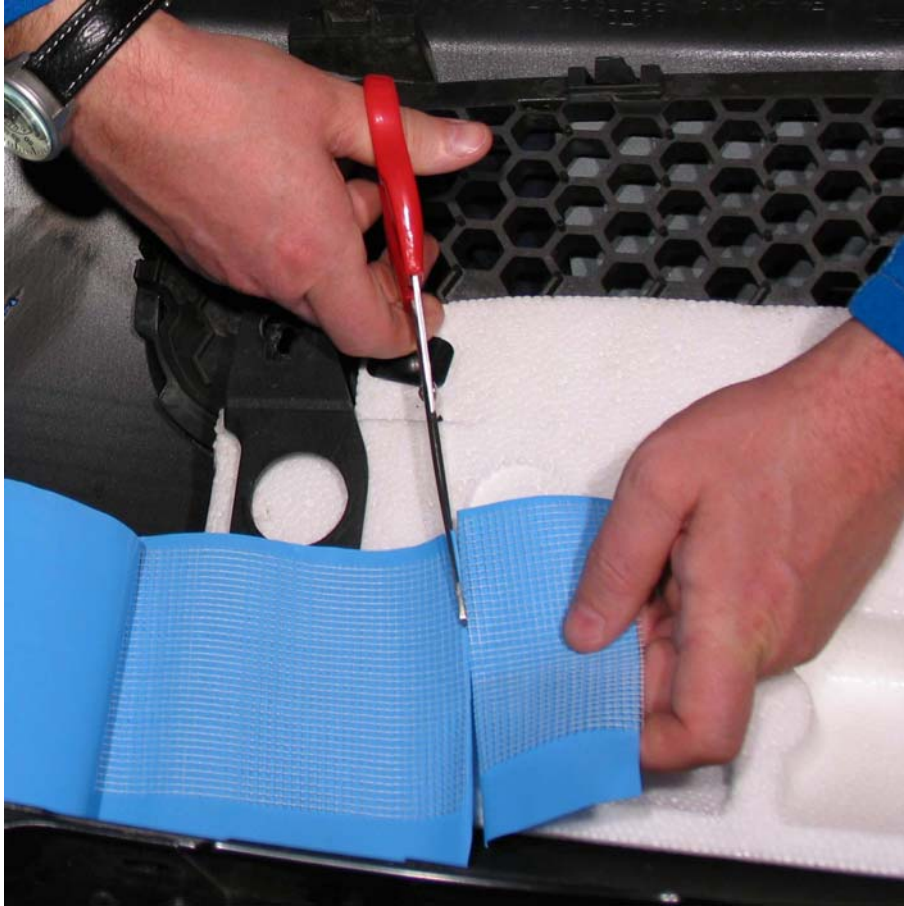
BL-1009_024

- Apply a thin layer of plastic primer to both sides and allow to air for 2 minutes (at 23° C).



BL-1009_025

- Cut the self-adhesive reinforcement tape to the required size for the repair.



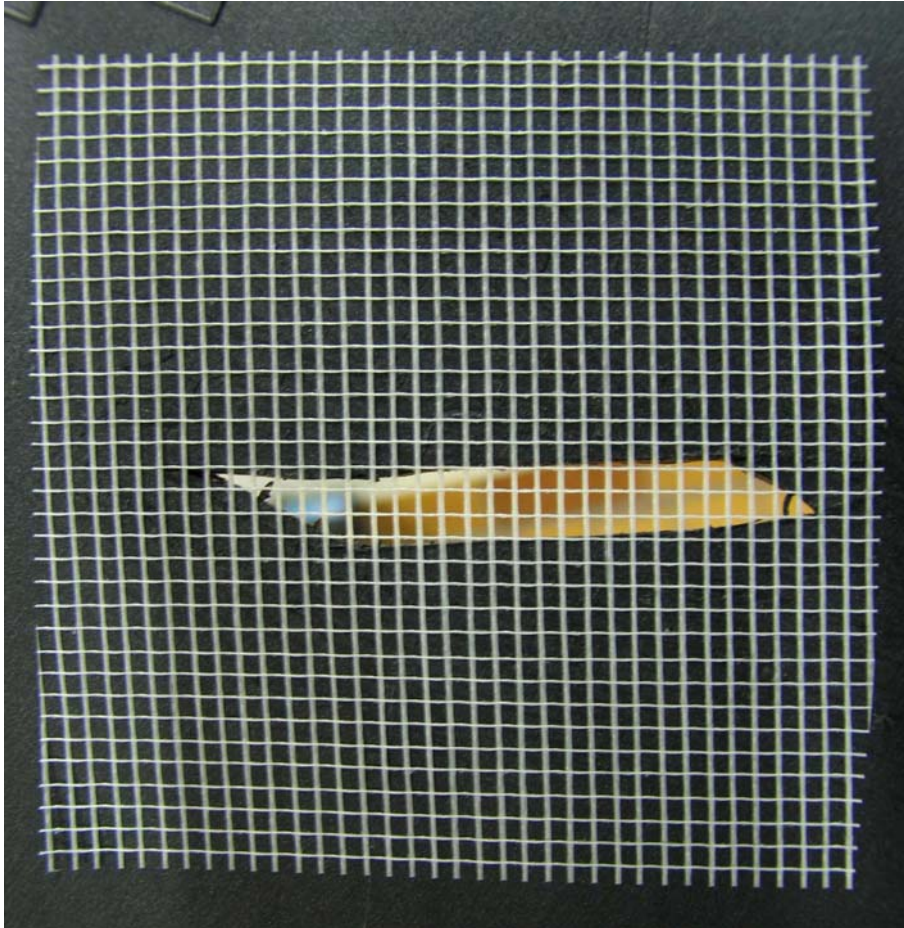
BL-1009_026

Applying Adhesive

- Depending on your own preferences, proceed with the repair procedure applying adhesive either from the front or back to the area to be repaired.

Applying Adhesive to the Front Side

- Stick the adhesive tape directly to the back of the damaged area.



BL-1009_027

- Depending on the sort of repair choose either Universal or Fast adhesive. To achieve a homogenous 1:1 mixture squeeze out 1...2 cm of the adhesive, then proceed with the gluing process.



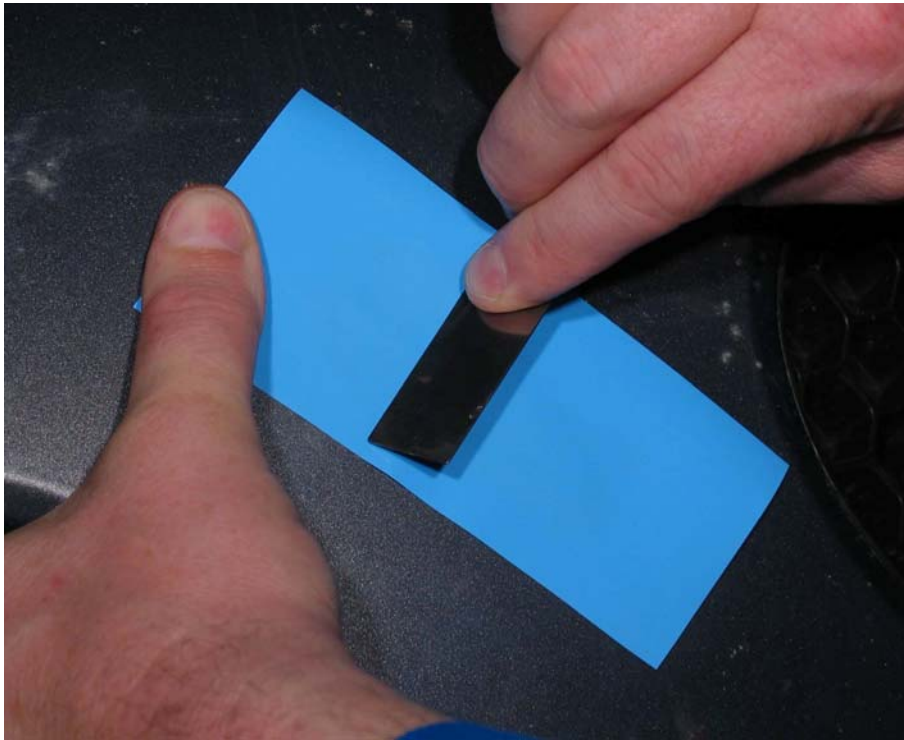
BL-1009_028

- Apply the adhesive from the front through the tear. Make sure that the tip of the mixing tube always remains in the adhesive so that air bubbles cannot be formed.



BL-1009_029

- Smooth excess adhesive using the contour foil and a spatula.



BL-1009_030

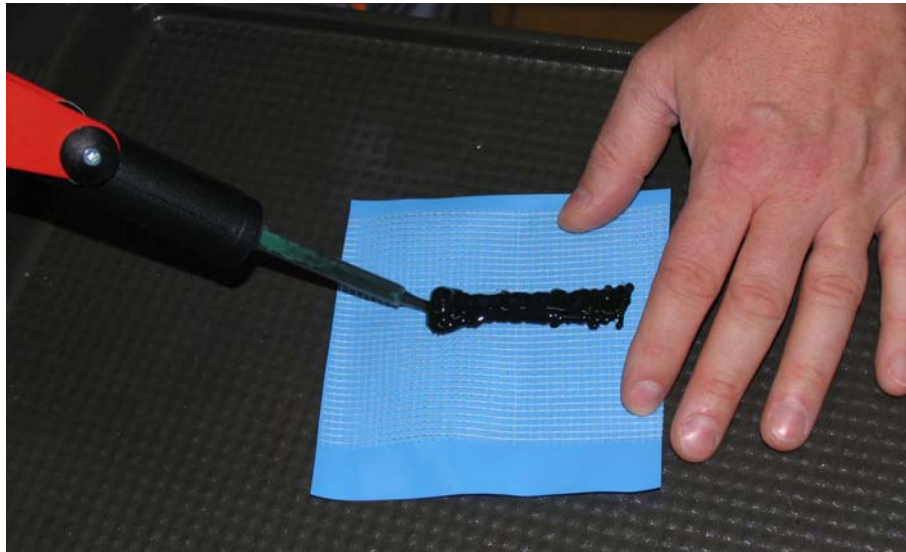
Applying Adhesive to the Back

- Depending on the sort of repair choose either Universal or Fast adhesive. To achieve a homogenous 1:1 mixture squeeze out 1...2 cm of the adhesive, then proceed with the gluing process.



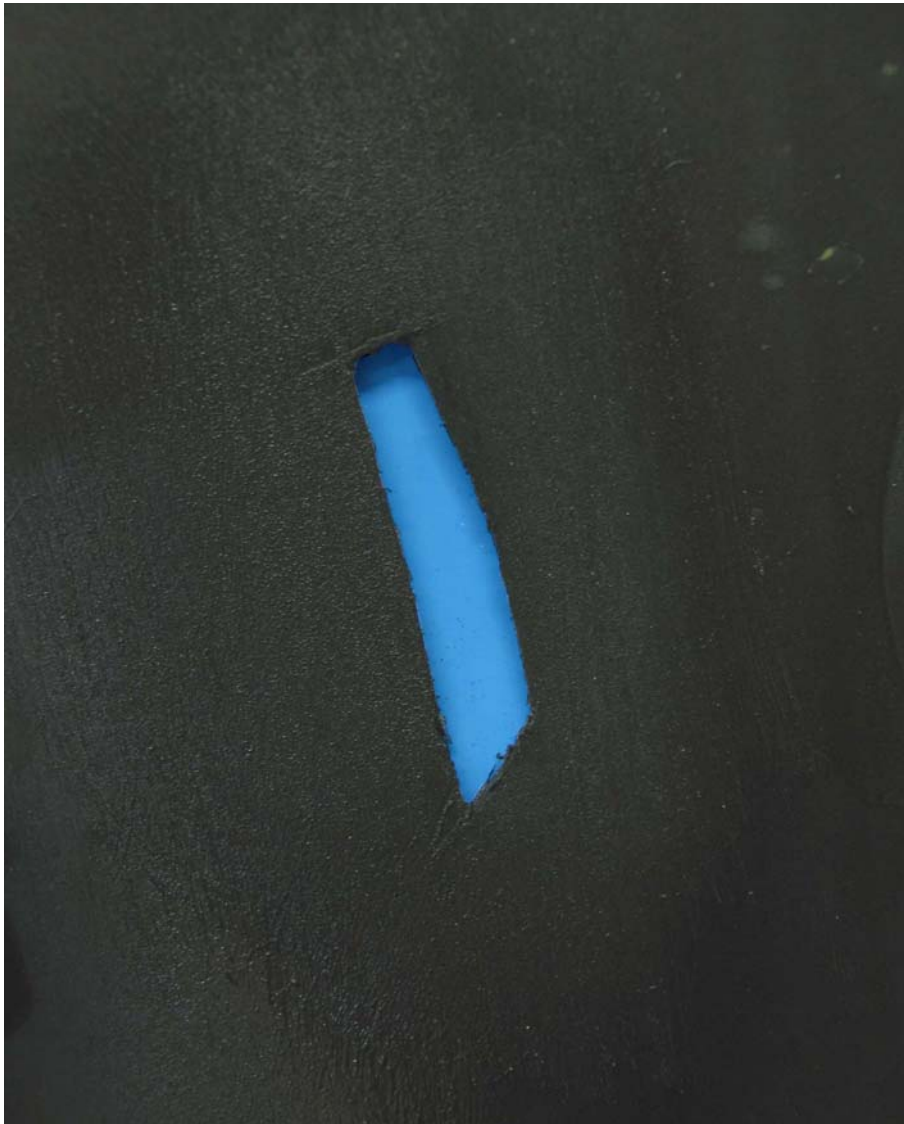
BL-1009_028

- Apply the adhesive directly to the reinforcement tape. Make sure that the tip of the mixing tube always remains in the adhesive so that air bubbles are not formed.



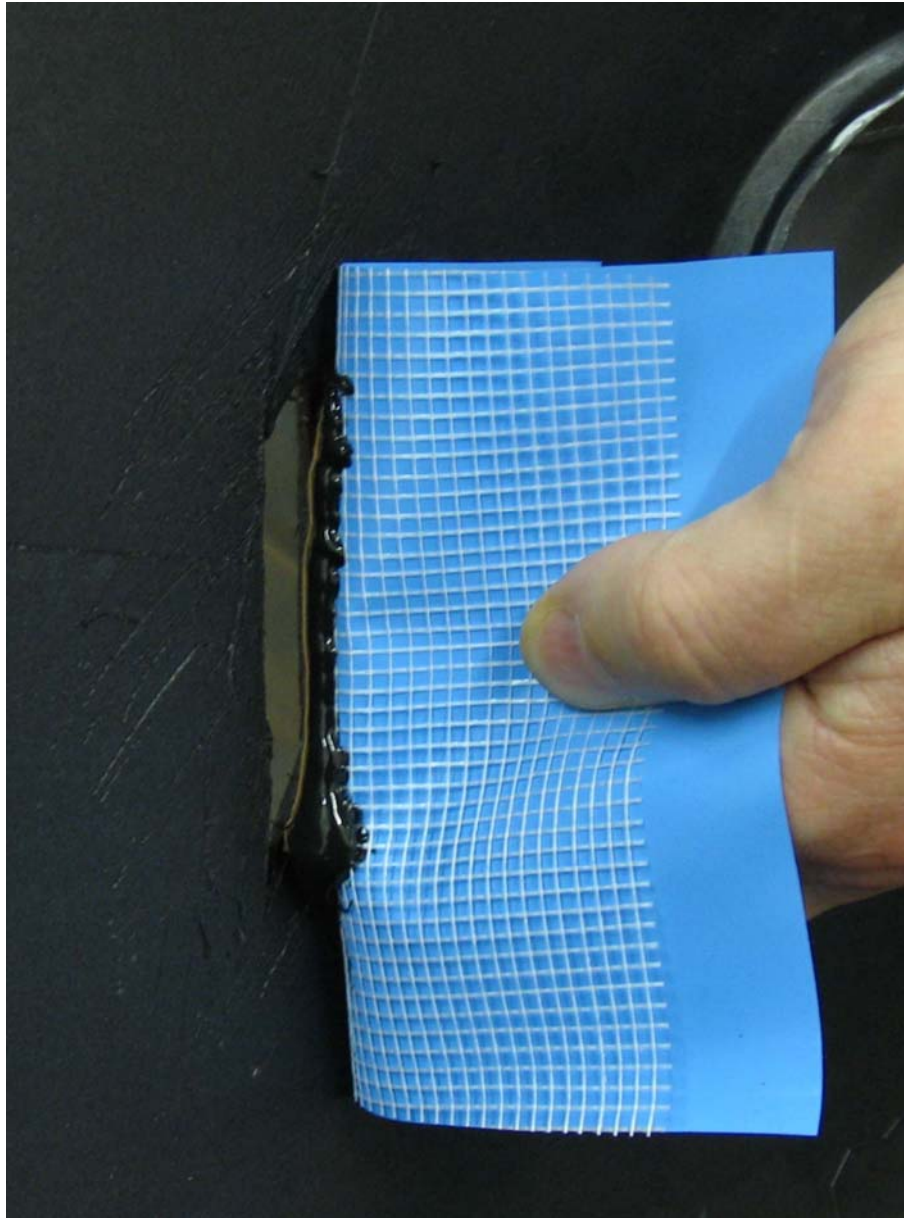
BL-1009_031

- Press a matching piece of the contour foil against the front side of the crack.

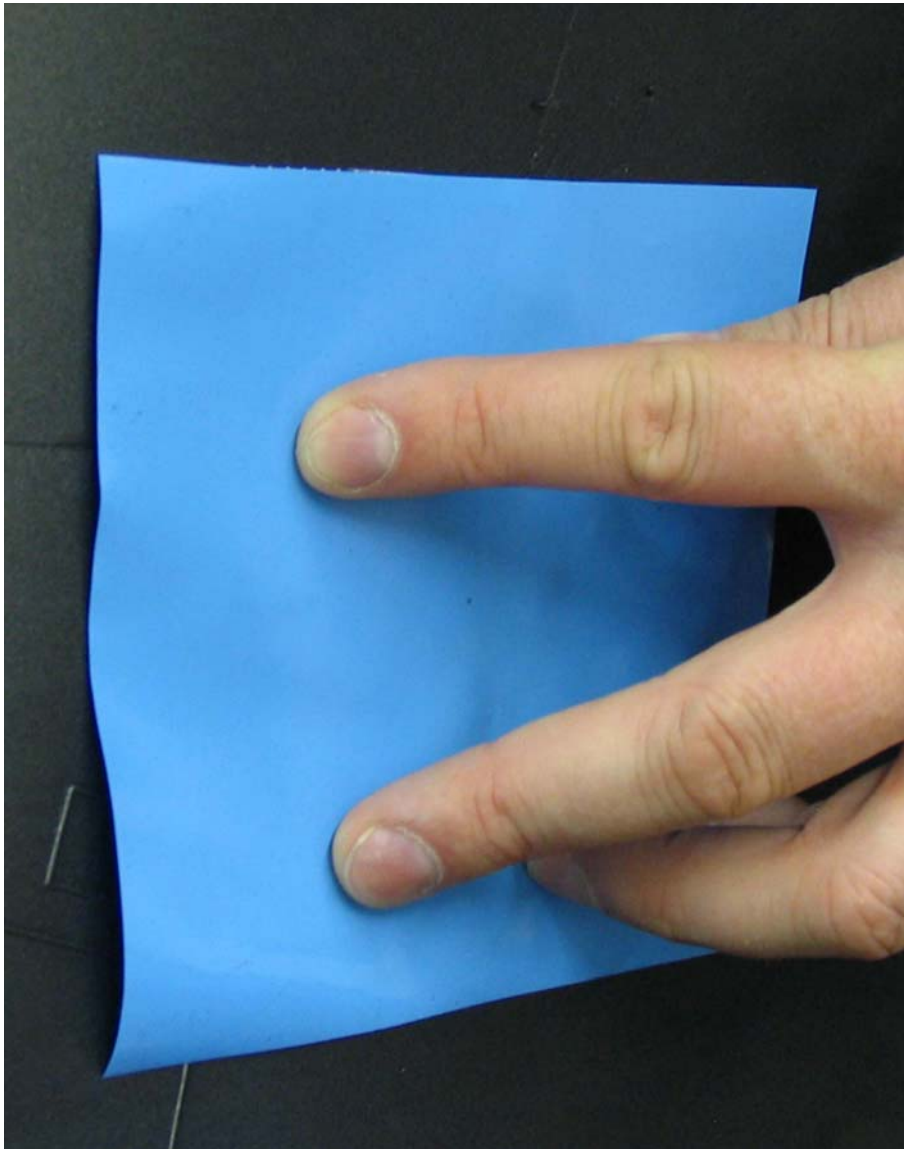


BL-1009_032

- Carefully press the reinforcement tape with the adhesive onto the rear side of the repair area until the adhesive squeezes through the tear and onto the front of the object, and against the contour foil.



BL-1009_033



BL-1009_034

- Smooth excess adhesive using the contour foil and a spatula.



BL-1009_035

For Both Repair Procedures

- After the adhesive has hardened, remove the contour foil and sand the surface using P180 sandpaper. Avoid heating up the area being sanded.



BL-1009_036

- Now use P320 sandpaper to smooth the area, before applying primer and final paint coat finish.



BL-1009_037

Notes: