

Operation Manual

Windscreen Repair System (Elite & Classic kits)

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Visit the Esprit Web Site www.espritws.com



1. Health and Safety ***(All Repair Systems)***

Windscreen repair resins carry an irritation warning label.



Use either protective gloves or use barrier cream to protect your skin from irritation.



Protect your eyes with approved safety glasses. Fragments of loose glass or resin splashes may be harmful to you if they get into your eyes. Resin splashes may be washed out with water and then seek medical assistance immediately.



The curing lamp emits ultra violet radiation. Although the lamp output in the safer UVA range, you should avoid exposure to skin and eyes. UV protective safety glasses are recommended.



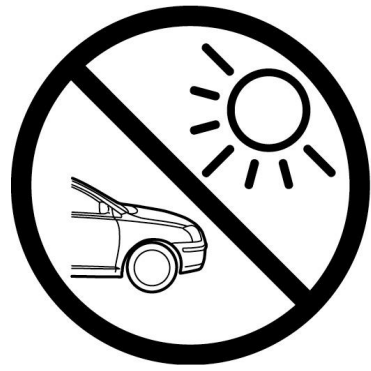
Health & Safety information is printed on the Resin Insert card supplied with every pack of UV resin. Full SDS information is available from Esprit upon request.



The UV resins may be harmful to certain types of paintwork. Take care not to spill resin onto the bodywork. Where possible, the use of a bonnet cover is recommended. If a spillage occurs, then wipe the area clean immediately. Any marks can then be removed by using the pit fill polish with a soft, clean cloth.

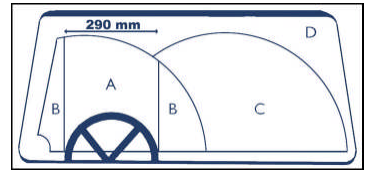


DO NOT repair windscreens in direct sunlight. Daylight contains ultra violet light, which will lead to premature curing of the resin. (Even on a cold cloudy day there is a UV content in daylight).



Do not carry out repairs in front of any windscreen mounted sensors or cameras.

To conform to British Standards BS AU 242: 1998 (Rev) repairs of more than 10 mm in diameter should not be carried out directly in the area of the driver's vision (zone A).



Always keep chemicals and electrical equipment away from children.

Only use genuine Esprit repair materials with your repair kit. We cannot guarantee the performance of non-genuine materials.



Technical support is based on the use of genuine Esprit repair materials and equipment only.

Since you will be working on already damaged glass Esprit cannot accept any liability for replacement glass in the case of failure to effect a repair.



2. About Windscreen Repairs

All the windscreen repair techniques detailed in this manual are for the repair of laminated glass only. You do not need to determine if the windscreen is laminated, if it is chipped or cracked it must be laminated. Toughened windscreens don't chip, they shatters into thousands of pieces. The system is NOT designed for the repair of other types of glass and we cannot give any advice or support for any such repairs.

What the repair will do is as follows:-
 It will restore strength to the damaged glass. BS 251 1994 is the relevant British standard for measuring the performance of windscreen repair equipment and copies are available from BSI if required. This equipment has passed BS AU 251:1994 and the Australian / New Zealand standard AS/NZS 2366.2:1999.
 Category C long crack test.

Durability. Repairs are permanent and the vehicle can be washed or driven immediately after repair.

Heated windscreens can be repaired in exactly the same manner as unheated windscreens.

Heated and tinted windscreens or tinted top band areas can be repaired in the same manner as plain windscreens.

DO NOT repair in front of any windscreen mounted sensors or cameras.

bsi.		Test Report
Report No	262/7001478 Issue 2	This Report consists of 9 pages
Client	Esprit Windscreen Systems LLP 44 Wimpenny Road Parkhouse East Industrial Estate Newcastle Under Lyme Staffordshire ST5 7BH	
Authority & date	BSI Quotation Acceptance No 71282 dated 3 November 2008	
Items tested	Windscreen Repair Resin (Esprit UV Resin)	
Specification	BS AU251:1994	
Results	Pass Issue 2 of this report supersedes all previous issues. The amendments on this page giving rise to this issue can be ascertained by contacting the authorising signatory.	
Prepared by	S Ginger	(Team Manager)
Authorized by	F Merrison	(Laboratory Manager)
Issue Date	26 January 2016	
Conditions of issue	<p>The Test Report is issued subject to the conditions stated in current issue of BSI Terms of Service. The results contained herein apply only to the specific items checked out as detailed in this Test Report. The issuing of this Test Report does not indicate any approval or endorsement, recommendation, certification or otherwise by BSI of any product, method, advertisement or advertisement from a Test Report may be published or used to advertise a product without the written consent of BSI, who reserves the absolute right to agree or report all or any of the details of any item or publicly for which consent may be sought.</p>	
<small>Should you wish to speak with BSI in relation to this report, please contact Customer Services on +44 (0)845 08 3550.</small>		

Test Report



bsi.		Test Report
Report No	262/7108472	This Report consists of 3 pages
Client	Esprit Windscreen Systems LLP 44 Wimpenny Road Newcastle Under Lyme ST5 7BH	
Authority & date	BSI Quotation No 109231 dated 4 October 2007	
Items tested	Windscreen Repair Resin (Esprit UV Resin)	
Specification	AS/NZS 2366.2:1999	
Results	See page 2	
Prepared by	S Ginger	(Senior Technician Engineer)
Authorized by	A D Coley	(Laboratory Manager)
Issue Date	29 May 2007	
Conditions of issue	<p>The Test Report is issued subject to the conditions stated in current issue of BSI Terms of Service. The results contained herein apply only to the specific items checked out as detailed in this Test Report. The issuing of this Test Report does not indicate any approval or endorsement, recommendation, certification or otherwise by BSI of any product, method, advertisement or advertisement from a Test Report may be published or used to advertise a product without the written consent of BSI, who reserves the absolute right to agree or report all or any of the details of any item or publicly for which consent may be sought.</p>	
<small>BSI Product Services, Market Avenue, Hemel Hempstead, Herts HP1 1EG Telephone: 0845 083550</small>		

Cosmetic improvement: Repairs will restore most of the optical or cosmetic appearance. The size of the blemish left is a function of the severity of the initial damage.

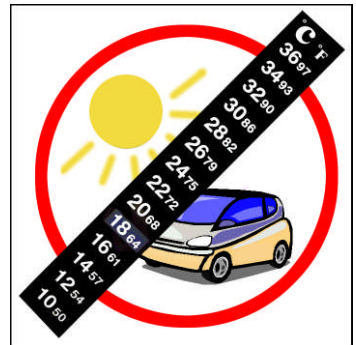
Some heat reflective (Athermic) windscreens may show the special coatings natural colour in any areas of delamination, such as at the edge of a bullseye impact.

3. PREPARATION: Bullseye & Star breaks. (All systems)

Check the temperature of the glass. The maximum recommended glass temperature for windscreen repair is 29°C / 85°F.

At high temperatures the bond between the glass and the PVB interlayer starts to weaken which can result in a strong watermark or daisy pattern ring around the break if the resin pushes into areas of delamination. (BS AU 242a:1998 specifies a glass temperature range of 10°C to 25°C)

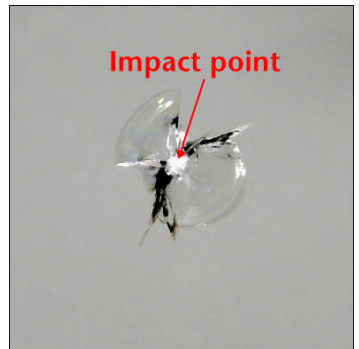
Clean the work area by wiping with a clean cloth or paper wipe that has been moistened with glass cleaner. Do NOT spray glass cleaner directly onto the glass as this may contaminate the break prior to the repair.



Smear a film of gel onto the suckers of the inspection mirror and fit the mirror onto the inside of the windscreen, immediately behind the damaged area.



In the centre of all damage is an impact point where the stone hit the glass. This impact point is the natural injection point for the repair resin. It is possible that the impact point will be blocked with broken glass and dirt, which will restrict the flow of the resin into the break.



IT IS IMPORTANT TO CLEAN OUT THE IMPACT POINT AS FOLLOWS.

First of all, wear protective eyewear to prevent any glass fragments from entering the eye.

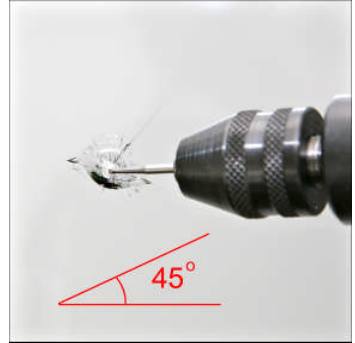


All Systems:

Place a small 1mm drill burr (in the blue box) into the drill chuck and tighten.



Hold the drill at 45 degrees to the glass and grind out any dirt and loose glass from the impact point



CAUTION >>

If the drill has a variable speed controller, select a slow speed in order to maximise the life of the drill bur.

Hold the drill at 45 degrees to the glass, using two hands. If you slip, the drill burr will scratch the glass.

If you are using a 12-volt system connected to a battery, ensure that the battery clips are connected up the correct way. Red to +(positive) Black to -(negative).



4. Warming the Glass.

Warming the glass plays two important roles in windscreen repairing:-

1. Improving the filling the damage.
2. Drying moisture out of a break before starting the repair.

The Esprit 12 volt heater can be powered by plugging it into the cigarette lighter socket of a car (ignition may need to be switched on), plugging into the socket on a jump start unit or by connecting to the terminals of a 12v battery using the Esprit crocodile clip adaptor (Part number UV3147D). If the lead is not long enough to reach the damaged area, pre heat the unit by plug in into a power source, hold down the switch on the base of the unit (found under the hinged flap) for 60 seconds then unplug the unit and take it to the work area



The red and green LED's illuminate when the unit is connected to a 12 volt power supply. The unit is fitted with a thermal cut out to prevent overheating. If the cut out activates, the red light remains on but the green light is now off. The unit will now start to cool down, when the temperature drops by 15°C the thermal cut out will automatically re-set and the green light will switch on and the unit will start to heat up again, thus maintaining a working temperature.

Time taken to warm the glass using the heater unit from cold is about 60 seconds.

Time taken to warm the glass when the unit is already up to temperature is 15 to 20 seconds.

1. Improving the filling of the damage.

Warming the inside of the windscreen (behind the break) by about 15^oC will make it easier to remove air from bullseyes and fill tight tips of star breaks.

Connect the unit to the power source and ensure that the red light is on. Open the unit and hold it against the **INSIDE** of the windscreen with the metal disc behind the damaged area of glass. When held against the glass the on/off switch will automatically be depressed and the unit will start to warm up.

A local area temperature increase of 15 – 18^oC is sufficient. As a general rule, if the glass is too hot to touch with the back of your finger then it is too hot.

NOTE: Excess heating will allow excess heat to transfer to the outer layer of glass, causing this layer to expand, closing up the damage, making the repair more difficult.

2. Drying out moisture.

If there is moisture in the damage then it needs to be dried out before starting the repair procedure.

To dry out a break open the unit and follow the procedure outlined above **EXCEPT** that the unit is held against the glass (over the damage) on the **OUTSIDE** of the windscreen. Repeat the process as necessary, keeping the glass warm, until the damage is dry. This will take some minutes.



5. Repair Bridge: Setting Up Procedure.

The process of windscreen repair is based on the hydraulic injection of the repair resin into the damaged area. The repair bridge is the device that holds the injector assembly tight onto the glass, creating a good seal between the injector and the glass. It is important to carry out this set up procedure correctly since a poorly set injector will lead to leakage and subsequently low quality repairing.

Set up: Classic & Compact Classic Systems

Early Classic bridges have a Red body, later ones had a Grey body.

A smear of sucker gel is placed onto the two suckers.



There are three adjusting screws on the basic repair bridge; No.1 is at the end of the long adjusting arm, No. 2 & 3 are a pair of adjusting screws next to the threaded injector holder.

All three screws must be wound back as far as possible (Without pulling the protective caps off the end).



The repair bridge is placed on the glass with the threaded hole over the damaged area and the suckers are pressed down onto the glass.

The long leg (Screw 1) is held down onto the glass and at the SAME time, screws No. 2 & 3 are screwed down until they just make contact with the glass.

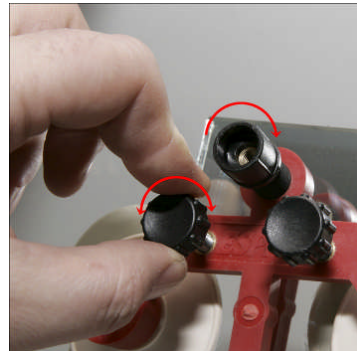
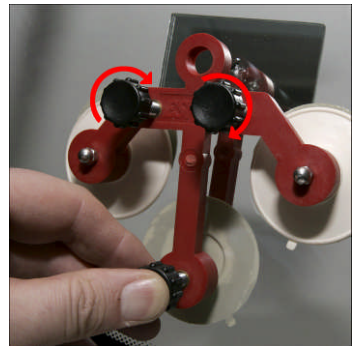
Screw No.1 is now screwed in, raising the long arm and tensioning the bridge. The long arm of the bridge should be parallel to the surface of the glass to ensure that the injector is held at 90° to the surface.

An injector barrel is screwed into the threaded hole and adjusted until the tip is 1 mm away from the glass. By holding the repair bridge by the sucker mounting points, the whole assembly can now be moved until the impact point is immediately below the injector seal.

Older injectors are black with a UNF thread, Newer ones are Grey with a 14mm thread.

The injector barrel can now be screwed down until the white rubber seal compresses against the glass. The injector must be screwed down until the adjusting screws No.2 & 3 are just lifted clear of the surface of the glass. (Just enough clearance to allow a piece of paper to slide between the glass and the protective screw cap.)

The final adjustment is to ensure that the injector tip is at right angles (90 degrees) to the glass. Adjust as required using screw 1.



Set Up: Elite & Compact Elite Systems.

The injector arm must be positioned so that the location marker on the arm is aligned with the large central location marker on the body (There is one large location marker and two small location markers on the body of the repair bridge.)



A smear of sucker gel is placed onto the single black sucker.



Raise the aluminum lever.

The bridge is placed onto the glass with the threaded injector holder over the damaged area and the body pressed down onto the glass. (NOTE - The injector arm MUST be pointing either straight up, straight down or as close as possible to these positions.)



After pushing down on the body, push down the aluminium lever, tensioning the repair bridge.



An injector barrel is screwed into the threaded hole until it is 1 mm away from the glass. By holding the body of the bridge, it can be moved into position if required, so that the impact point is immediately under the centre of the injector seal.

Now screw the injector barrel down against the glass until the cut out at the top of the injector thread will be flush with the top of the aluminium collar that the injector screws into, at this point one or both of the two front support feet on the injector holder will have just moved away from the glass surface. (Do not confuse the small feet on the injector head with the larger support feet on the repair bridge body).



Older injectors are black with a UNF thread, Newer ones are Grey with a 14mm thread.

If you still use the original Black injector, contact Esprit for an upgrade to the new standard.

You are now set up and ready to start filling the damage with the resin. Proceed to either the Bullseye section or the Star Break section as required.



Ultra Violet Shield

Windscreen Repair resin is cured by Ultra Violet light (365nm). While resin with this curing wavelength can be used indoors without any problem, it is possible when working outdoors for daylight to lead to premature curing of the resin. To prevent this happening we recommend covering the repair area during the filling phase of the repair process. (It is not necessary to cover the repair during the setup phase or during the UV curing phase).

As part of our commitment to making the repair process easier we have designed a UV shield for use with the Elite repair bridge.

The Ultra Violet shield simply clips over the Elite Trihead during the two three minute filling periods thus preventing natural UV light from curing the resin before the break is completely filled with UV resin.

The shield also prevents premature inspection of the repair. Remember that the inspection stage is after the second three-minute pressure cycle. Premature inspection leads to interference that slows down the repair process.

After the second pressure cycle the shield is simply lifted clear and the repair is inspected in the normal manner.



6. Bullseye Filling:

This procedure applies to all systems unless otherwise specified.

Set up the repair bridge and injector as described in section 4.

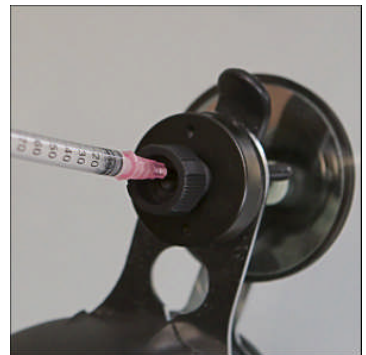
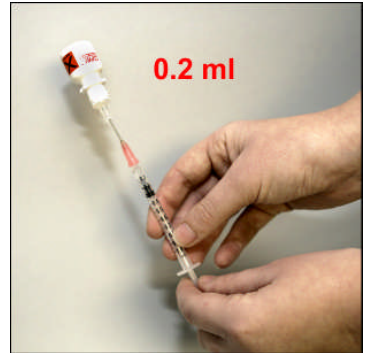
Using the syringe and needle supplied, measure out 0.2 ml of the windscreen repair resin. Insert the needle tip no more than 5 mm into the nozzle of the bottle (See Photo opposite)

There are two different resins in the kit. The pit fill resin is the thick resin, in the small black bottle and is used for the surface finishing. The windscreen repair resin is in the white bottle (or the large black bottle if the 20ml or 50ml size is used).

Place the needle into the open end of the injector barrel as far as possible and inject the resin into the injector tip.

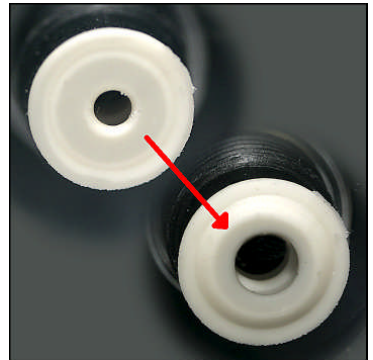
(See the cleaning notes at the end of this section on how to clean the syringe)

Take the plunger (piston) and screw it into the injector barrel. As the plunger is screwed down, it will begin to compress the resin, building up pressure, forcing the resin into the break.



It is **IMPORTANT** to understand when the injector pressure has built up, insufficient pressure will result in an incomplete fill, but excess pressure will cause the seal to blow out. (This blow out is the safety valve to prevent over pressurising the damaged glass)

To tell when the system is pressurised, we must observe the performance of the injector seal by looking at it in the observation mirror. When the seal is at rest (no pressure) then the white rubber seal is compressed flat against the glass and the dark hole in the middle is small, 2 to 3 mm in diameter. As the pressure builds up, the seal (looking in the mirror) can be seen to expand and also to lift slightly away from the glass surface. As the seal expands, the central hole will grow to 5 to 6-mm diameter. At 8 to 9-mm diameter you are over pressured and risk a blow out. If this happens, re-set and start again.



When you have pressurised the system, **WAIT 3 minutes**. Give the resin time to penetrate into the break. (Protect the work area from the Ultra Violet light present in daylight if working outdoors.)

The skills required at this stage are patience and observation i.e. Watch and wait.

As the resin is forced into the damaged area, the air is displaced leading to the visual improvement.



When the break has been under pressure for 3 minutes and the resin seems to have stopped moving, then the piston is unscrewed

about 10 mm, until the thread becomes visible. This will introduce suction on the backstroke, drawing any remaining air out of the damage.

Warm the glass immediately behind the damage. Warm; **NOT HOT** – you should be able to touch the glass with the back of your finger without any discomfort (see page 9).

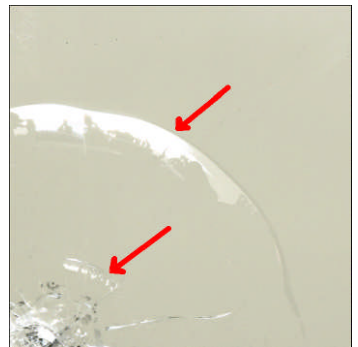
NOTE: Advanced users. If you are confident that the break has filled with resin then the warming process can be omitted.

Then repeat the 3 minute pressure cycle followed by 30 seconds pressure off

Now inspect the damage, looking for areas of air remaining in the damage. (See the diagram opposite) If this is the case then repeat the pressure / wait / vacuum cycle until all the air is removed from the break.

Final Inspection: At this point of the repair process, you are not yet committed to the finished process. The point of no return is when the ultra violet light is placed over the repair, curing the resin. Due to this, the final inspection is the most important of the visual inspections.

To make the final inspection, the repair bridge must be moved away from the repair area to give an uninterrupted view of the repair.

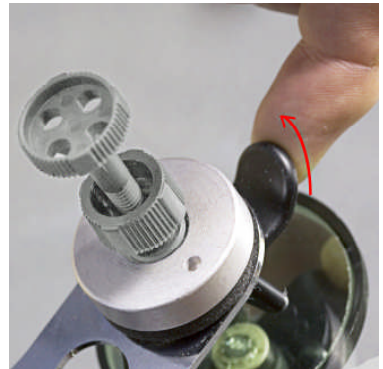


Moving the Repair Bridge for better inspection. *(Elite & Compact Elite Systems)*

Unscrew the plunger to release the pressure. Carefully move the long arm that holds the injector to one side, so that the location marker on the arm is aligned with one of the smaller location markers on the body.



There is a small tab mounted on the front of the injector holder. Lifting this while moving the arm to one side will take pressure off the injector seal, reducing the possibility of damage to the seal as it moves over the impact point.



Caution: DO NOT lift the tab too far or resin may leak from the injector. If resin leaks and there are still unfilled areas of the repair, you may need to add a small quantity of resin to the injector prior to continuing with the repair.

Wipe away any excess resin and inspect the break. After inspection, swing the injector unit back into position over the damage, realigning the location markers, and re apply the pressure.

(Classic & Compact ClassicSystems)

Unscrew the plunger, releasing the pressure. Hold the repair bridge by the sucker mounting points and slide the bridge away. Wipe the area clean and inspect. After inspection, slide the bridge back into position, and re apply the pressure.

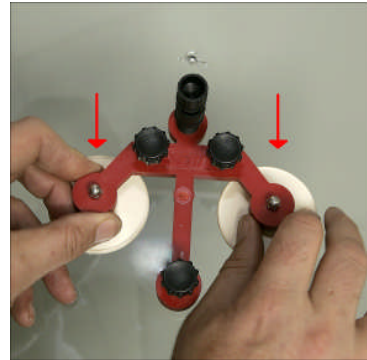
After inspection.

If there is still air in the break **DO NOT** apply the ultra violet light. Repeat 3 minutes under pressure and repeat warming the glass on the inside of the windscreen. (Read the section on Troubleshooting in this manual for alternative strategies on effecting the repair.)

To finish the repair first cut a small square of the UV curing film. Then move the injector away from the repair and wipe away any excess resin with a cloth.

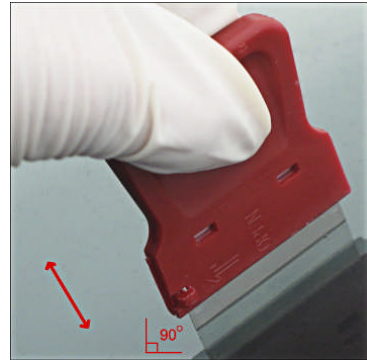
Lift one edge of the plastic and put a small drop of pit fill resin over the impact crater, making sure that no air bubbles are trapped in the centre. Let the plastic sheet fall back into position (do not press it down) and cure the resin with the UV light.

Moisten the suckers on the UV lamp and press it onto the glass immediately over the repair area. Switch the lamp on and cure for a minimum of five minutes for a fluorescent tubed lamp or 75 seconds for a LED lamp.



After curing, remove the lamp by rocking it sideways to release the suckers. Remove the piece of plastic film. There should now be a hard piece of cured resin over the impact point, this will have to be shaved back flush to the glass surface.

Take a single sided razor blade and insert it into the holder. (Caution: They are very sharp). Holding it upright, (90 degrees to the glass) move it backwards and forwards over the pit fill resin, shaving it back. Do not cut the excess resin off with the blade at an angle to the glass as this does not leave as good a finish.



Finally, polish the repaired area using the pit fill polish and a piece of very soft polishing cloth to put the final shine on the pit fill area.

The repair is now complete. Clean any marks from the glass using ordinary glass cleaner. The vehicle can now be washed or driven as required without any further waiting.



Cleaning the Equipment

At this point the Repair Bridge and mirror must be cleaned, ready for the next repair. The excess gel should be wiped off the suckers.

IMPORTANT

The injector assembly should be removed and separated into its two components. Each part should be wiped dry and the white rubber seal inspected. If the seal is badly distorted or damaged, it should be replaced with a new seal or injector as it will most probably leak the next time it is used. If it is in good condition then the two components must be kept separated until the next time they are required. Failure to clean out the injector can result in old / dirty resin remaining inside the injector barrel which will compromise the next repair.

Clean the syringe by simply moving the piston up and down, pushing out any remaining resin. Then break it down into three separate components, patting away any excess resin before storing the separated components. Following this procedure will allow the syringe to be re-used.

7. Star Break: Filling (All systems)

This procedure applies to all systems unless otherwise specified.

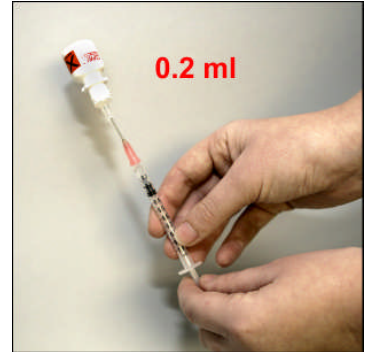
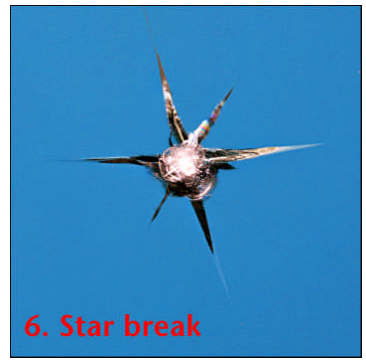
Set up the repair bridge and injector as described in section 4.

Using the syringe and needle supplied, measure out 0.2 ml of the windscreen repair resin.

There are two different resins in the kit. The pit fill resin is the thick resin, in the small black bottle and is used for the surface finishing. The windscreen repair resin is in the white bottle (or the large black bottle if the 20ml or 50ml size is used).

Place the needle into the open end of the injector barrel as far as possible and inject the resin into the injector tip.

Take the plunger (piston) and screw it into the injector barrel. As the plunger is screwed down, it will begin to compress the resin, building up pressure, forcing the resin into the break.



It is **IMPORTANT** to understand when the injector pressure has built up, insufficient pressure will result in an incomplete fill, but excess pressure will cause the seal to blow out. (This blow out is the safety valve to prevent over pressurising the damaged glass)

To tell when the system is pressurised, we must observe the performance of the injector seal by looking at it in the observation mirror.

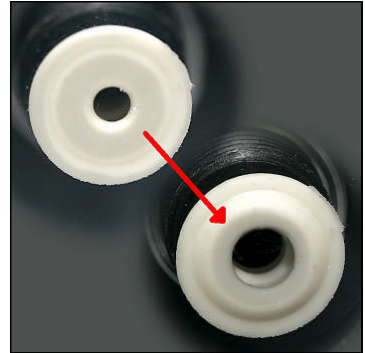
When the seal is at rest (no pressure) then the white rubber seal is compressed flat against the glass and the dark hole in the middle is small, 2 to 3 mm in diameter. As the pressure builds up, the seal (looking in the mirror) can be seen to expand and also to lift slightly away from the glass surface. As the seal expands, the central hole will grow to 5 to 6-mm diameter. At 8 to 9-mm diameter you are over pressured and risk a blow out. If this happens, re-set and start again.

When you have pressurised the system, **WAIT 3 minutes**. Give the resin time to penetrate into the break.

The skills required at this stage are patience and observation i.e. Watch and wait.

As the resin is forced into the damaged area, the air is displaced leading to the visual improvement.

When the break has been under pressure for 3 minutes and the resin seems to have stopped moving, then the piston is unscrewed about 10



mm, until the thread becomes visible. This will introduce suction on the backstroke, drawing more air out of the damage.

Warm the glass immediately behind the damage. (Warm; NOT HOT – you should be able to touch the glass with the back of your finger without any discomfort.).

Then repeat the 3 minute pressure cycle followed by 30 seconds pressure off

Now inspect the damage, looking for areas of air remaining in the damage. (See the diagram opposite). If this is the case then repeat the pressure / wait / vacuum cycle until all the air is removed from the break.

Final Inspection: At this point of the repair process, you are not yet committed to the finished process. The point of no return is when the ultra violet light is placed over the repair, curing the resin. Due to this, the final inspection is the most important of the visual inspections.

To make the final inspection, the repair bridge must be moved away from the repair area to give an uninterrupted view of the repair.

The main areas of difference are as follows: -

A) The star break is relatively tight compared to the Bullseye and WILL be slower filling. They need more time to let the resin flow into the cracks.



B) Inspection: We are again looking for trapped air, in a star break it will usually be at the end of some of the legs of the star.

IMPORTANT: There is also a correct way to view the damage in order to assess the degree of resin penetration. Uncured or wet resin is not as clear as glass. When the resin is cured its refractive index changes to match that of the glass.

We must judge the break with the resin in its liquid state. To do this you must look at each leg of the star break separately, looking across each break from the side and at a low angle. I.e. A break running north south must be viewed from east or west and a low angle 20 to 30 degrees above the glass, not from above (90 degrees to the glass).

If the damage is invisible or disappears when viewed in the correct manner, then the resin is ready for curing. If part of the damage still shines at you when correctly viewed (usually the tips of the break) then the damage is not completely filled so **DO NOT** cure it. Repeat the filling process as described on pages 11 & 12. For damage, which will not fill in the normal manner, go to the Troubleshooting section on page 35 for help.



To finish the repair first cut a small square of the UV curing film. Then move the injector away from the repair and wipe away any excess resin with a cloth.

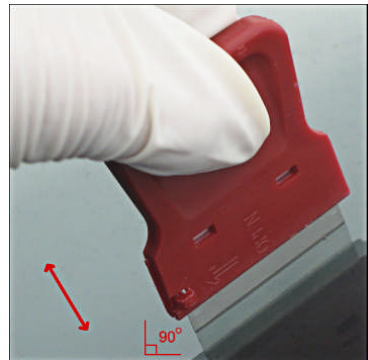
Place the square of UV film over the repair and then lift one edge of the plastic and put a small drop of pit fill resin over the impact crater, making sure that no air bubbles are trapped in the centre. Let the plastic sheet fall back into position (do not press it down)



Switch the lamp on and cure for a minimum of five minutes for a fluorescent tubed lamp or 75 seconds for a LED lamp.



When the pit fill resin is cured shave off the excess resin by taking a single sided razor blade (Caution: They are very sharp) and holding it upright (90 degrees to the glass) move it backwards and forwards over the pit fill resin, shaving it back. Do not cut the excess resin off with the blade at an angle to the glass, as it does not leave as good a finish.



Finally polish the repaired area using the pit fill polish and a piece of very soft polishing cloth to put the final shine on the pit fill area.



The repair is now complete. Clean any marks from the glass using ordinary glass cleaner. The vehicle can now be washed or driven as required without any further waiting.

Cleaning the Equipment

At this point the Repair Bridge and mirror must be cleaned, ready for the next repair. The excess gel should be wiped off the suckers.

IMPORTANT

The injector assembly should be removed and separated into its two components. Each part should be wiped dry and the white rubber seal inspected. If the seal is badly distorted or damaged, it should be replaced with a new seal, as it will most probably leak the next time it is used. If it is in good condition then the two components must be kept separated until the next time they are required. Failure to clean out the injector can result in old / dirty resin remaining inside the injector barrel which will compromise the next repair.

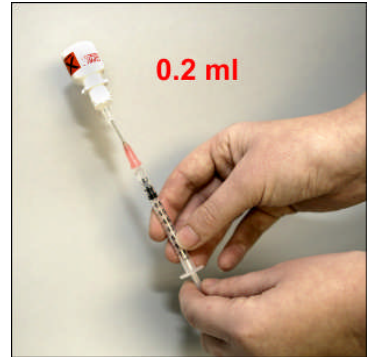
Clean the syringe by simply moving the piston up and down, pushing out any remaining resin. Then break it down into three separate components, patting away any excess resin before storing the separated components. Following this procedure will allow the syringe to be re-used.

8. Crack Repairs: Up to 150 mm.

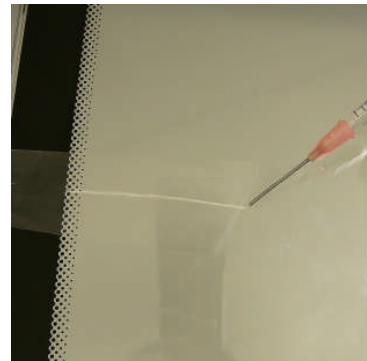
(All Systems)

Cut a sheet of the plastic curing film 25 mm wide and long enough to cover the crack. If the crack is longer than the film, then use several overlapping strips. Place the film over the crack and smooth it down, removing any air pockets from beneath it.

Assemble a syringe and needle and extract 0.2 ml of the windscreen repair resin from the bottle (white bottle).



The correct filling technique is to work from the end of the crack (i.e. that part of the crack nearest the centre of the windscreen) outwards, using capillary action to draw the resin into the crack. A small spot of resin is placed under the plastic sheet, immediately over the end of the crack and allowed to soak into the crack (See troubleshooting section for help if required.)



Note: On vertical cracks it is easier to fill from the lowest point on the crack and work upwards.

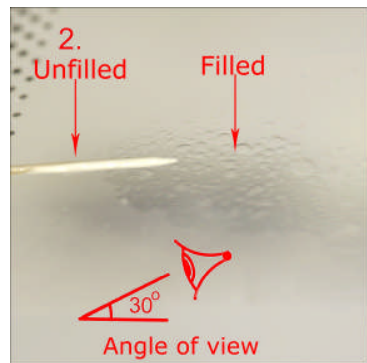
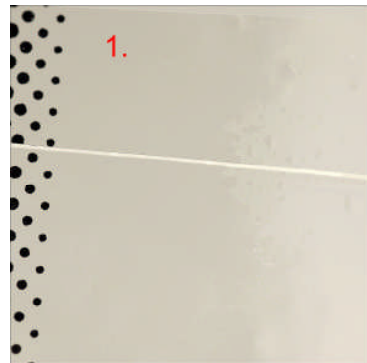
Continue to fill the crack, putting another small spot of resin over the end of the filled part of the crack and allow to penetrate. Repeat the process until the crack is completely filled. NOTE. Do not put a single bead of resin along the crack as this may trap air in the crack. Slowly, apply spots of resin, which you will observe filling the crack ahead of the resin application.

Example: If the crack runs across the glass in an east west direction, it must be viewed along the north south axis with your head 6 inches (15 cm.) above the glass. It will now be very obvious where the resin has penetrated into the crack as this portion will disappear, the unfilled portion will still shine.

When viewing the crack from directly above (90° to the glass) you will not be able to differentiate between the filled and unfilled portions of the crack (See picture 1 opposite)

Note: When windscreen repair resin is liquid, it is not as clear as glass. (When cured it becomes as clear as glass.) In order to view the resin flowing into the crack, the correct viewing technique must be used.

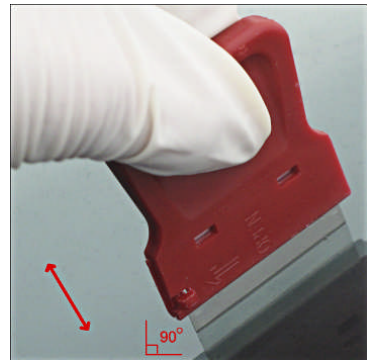
This is done by viewing the crack at right angles to its direction of travel and at a shallow angle. (See picture 2 opposite)



Switch the lamp on and cure for a minimum of five minutes for a fluorescent tubed lamp or 75 seconds for a LED lamp.



After curing, remove the plastic curing film and scrape off the excess resin using the razor blade supplied.



Polish with pit fill polish. Finally, clean with glass cleaner.

A crack that was free from dirt contamination will now be almost invisible showing as a faint hairline. Cracks with dirt contamination will be more visible after repair, as it is impossible to remove the dirt prior to the repair and will show as a dirty line after repair. For this reason all crack must be repaired as soon as possible.



9. Long Crack Repairs (150 to 350 mm) (Elite System)

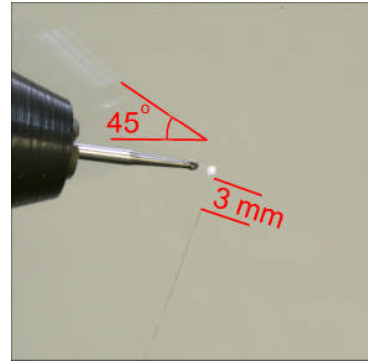
Long cracks are still end drilled for extra stability. This is done, using the more powerful drill and supplied in the Elite & Classic systems (Not the compact range). The filling process is the same as for the short crack.

The first thing to do is to mark the correct position for the drill hole. This should be 3 mm to 5 mm beyond the end of the crack, directly in the line of travel of the crack and on the same side of the glass as the crack (Usually, but not always, the outside layer of the windscreen.). Having identified the correct position, mark it and make a countersink hole for the drilling process at this point.

To make the countersink, put a small drill bur (AD010 blue box) into the drill chuck and tighten the drill chuck. Set the drill speed to setting 1 (Slow). Hold the drill firmly at an angle of about 45 degrees to the glass and bring the drill head down slowly until it just starts to cut the surface creating a countersink hole.

CAUTION: Do not let the drill slip in use, as it will result in scratches to the glass.

Having produced a location point, we can now drill down into the glass (still using the small bur) by holding the drill at 90 degrees to the glass and applying a light pressure, drilling in 3 to 5 second bursts, lifting the drill out regularly to clear out the hole.



Repeat this process until the hole is close to, ***but not touching*** the PVB interlayer.

It is important not to penetrate the PVB interlayer.

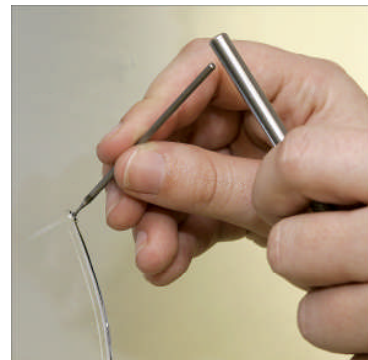
Note: For guidance on how deep you can drill you should note that the depth of the crack you are repairing is from the glass surface down to the PVB interlayer. This is a visual reference point that can be used as a guide in order to judge the correct depth of the drill hole.

Change drill burs to the large bur (AD016 yellow box) and enlarge the hole to the same depth.



This will leave a thin layer of glass at the bottom of the drill hole. We will now make a small Bullseye at this point, taking the drill hole down to the polyvinyl interlayer **without** penetrating it.

To do this, insert the thin end of the slim crack stop punch into the drill hole and hold it in position. Strike the end of the punch firmly but gently with the handle of the steel probe.



You should see a small Bullseye appear at the bottom of the drill hole.

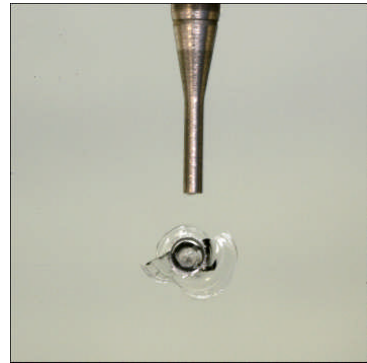
If after three attempts, there is no Bullseye, DO NOT use more force. Drill the hole out a little more and repeat the process.

The Bullseye must now be filled by carrying out a Bullseye repair as previously described, injecting resin into the Bullseye, topping off with pit fill resin and covering with plastic film. Do not cure the resin at this stage; wait until the entire crack has been filled.

The crack can now be filled as described in the short crack repair section on page 19. (Fill the entire crack in one session and cure by moving the UV light along every five minutes, moving the lamp along as necessary.)

After curing, remove the plastic sheet and shave off the excess resin. Polish with pit fill polish and clean with glass cleaner.

Note: Cracks longer than 350 mm can be repaired at the operator's discretion.



10. Troubleshooting.

Bullseyes:

Problem: There is air still trapped in the Bullseye.

Answer: There are a number of alternative steps that can be taken if the standard air removal technique does not work. Try these in the order that they are given.

A) With the pressure on, apply gentle heat to the inside of the windscreen behind the damage and allow the resin to soak into the damage. DO NOT get the glass hot! When felt with the BACK of your finger, the area heated should be just warmer than the surrounding glass. The Esprit 12v heater unit is the ideal tool for this job. Heat guns can have a high heat output and must be used with great care. (naked flames such as cigarette lighters are not recommended.) As this process reduces the amount of trapped air, it can be repeated as necessary when the glass cools down.

Note: The warmer the glass is, the more pronounced the ring surrounding the original damage would be. Avoid excess heating.

B) It is possible that the impact point is still obstructed, restricting the flow of resin into the break and the removal of the air. Move the injector to one side and drill down into the impact point a little further. DO NOT PENETRATE INTO THE PVB INTERLAYER.

C) The air disappears when pressure is applied, but reappears when the pressure is removed. To overcome this problem, the resin should be cured under pressure. Keep the injector plunger screwed down and hold the lamp as close as possible to the repair (normally at 45 degree angle) and cure for three minutes from the left side and three minutes from the right side of the repair. Then apply the pit fill resin, cure, and finish the repair in the normal manner.

Problem: There is a faint ring mark around the finished repair.

Answer: This can be seen in some repairs where the initial impact has pushed the polyvinyl interlayer down, tearing it away from the

surrounding glass. The interlayer material has a slightly different refractive index to the glass. The refractive index of the resin is matched to the glass, so that when the resin is injected into the damaged area, it will fill this tear area and show up as a faint boundary ring.

Problem: A Bullseye with a crack running out from it.

Answer: Fill the Bullseye in the normal manner. A short crack may well fill at the same time as the bullseye. See page 19 for the note on how to view a crack in order to judge if it has filled. If both the bullseye and crack have filled, finish the repair in the norm; manner. If the crack has not filled, then fill the remaining crack as normal crack repair and now cure the complete repair area.

Star Breaks:

Star breaks are tight compared to Bullseyes and will be slower filling. If the resin does not penetrate into the ends of the legs of the damage then the three steps outlined above for removing the air from a Bullseye will work in the same manner. Always allow more time for the resin to penetrate into the damage. Never press the damage from the inside of the windscreen as this can lead to the cracks spreading.

If the star break fills perfectly but when you remove the repair bridge the tension in the glass closes the tips of the star, pushing out resin (creating a sparkle at the ends of the cracks) then replace the repair bridge, refill the break and cure under pressure. This process is covered on page 35 under Bullseye air removal techniques.

All Breaks:

Problem: There is an air bubble in the pit fill resin after curing.

Answer: Drill out the pit fill resin and repeat the pit fill process. If this problem persists, try warming the pit fill resin before use.

Problem: There is a milky appearance in the repair.

Answer: Old damage, which has been exposed to moisture for a period of time, may result in the polyvinyl interlayer turning opaque. This is a permanent change and cannot be corrected. It should be

possible to see this discolouration in the repair before you start by viewing the damage from the inside of the vehicle looking through the damage to a darker background outside the vehicle.

Problem: You have finished the repair and there is still air in it.

Answer: Although remedial action may be possible, it is better to get the repair correct the first time. Always give a critical inspection (pressure off) before curing. It is possible to drill directly into the offending air pocket and fill it in the normal manner. If the air pocket to be removed is larger than the mark left by the extra drill hole, then it is worth doing. If there are many small but separate pockets of air, then remedial action is not recommended.

Problem: The impact crater is larger than the injector seal.

Answer: Repair is not recommended. Damage with an impact crater of greater than 5mm is not considered repairable under BS AU 242a 1998 (Automotive windscreen repair – code of practice)

Problem: The Resin will not penetrate the crack.

Answer. On curved screens there may be tension pushing the sides of the crack together causing a resistance to resin penetration. If this is the case then set up the repair bridge with the injector over the crack and pressure feed resin into the difficult portion of the crack.

Note: Delamination. Sometimes, moisture will have penetrated the damage and separated the interlayer from the glass around the original damage. When resin is injected into the damage, it will also flow into the delaminated area. After curing this will show up as an uneven transparent line at the boundary of the delamination. This is often referred to as looking like the outline of a flower or daisy pattern.

This is unavoidable and is the main reason why damage should always be repaired as soon as possible after occurrence

11. Parts List

All spare parts for your Esprit system, however small, are available.

Contact your local distributor for genuine Esprit consumables and spare parts.

For details of your local distributor please look on the web site www.espritws.com or contact Esprit on +44 (0)1782 565811

Resin Products

UV2ML	2ml resin only. (Up to 10 repairs)
UV2PK-G	Resin pack with injector set, syringe & needle
UV5ML	5ml resin only. (Up to 25 repairs)
UV5PK	Resin pack with injector set, syringe & needle
UV10ML	10ml resin only. (Up to 50 repairs)
UV20ML	20ml resin only. (Up to 100 repairs)
UV50ML	50ml resin only. (Up to 250 repairs)
UV5SF	Pit Fill resin (5ml) for filling surface chips.

* The Esprit resin has passed BS AU 251:1994 Class A - all categories & Australia / New Zealand standard AS/NZ 2366.2:1999 Cat. C Long Crack test.

Repair Sundries

BS0013	Gel. Water based gel for jig suckers.
SA001	Pit fill polish.
SS0017	Razor blades, box of 10.
EM0018	Packet of plastic curing film. (UV clear)

Drilling Equipment

AD0010	Tungsten drill bur 0.010 tip (blue box)
AD0016	Tungsten drill bur 0.016 tip (yellow box)

Repair tools and equipment.

ESELBR	Elite repair bridge
ESELS1	Elite service pack 1 - 3 x rubber feet 1 x foam ring
ESELS2	Elite service pack 2 - 1 Large sucker with centre post.
ESELS3	Elite service pack 3 - 6 x plastic washers for the feet
EM0023	Inspection mirror jig
STSYMS	Rubber feet for Classic repair bridge screws.
500029	Rubber feet for Pro Bridge body.
BD0004	Sucker with fixings for Auto repair bridge and mirror.
EM0012	Replacement mirror glass.
ADR001	Probe. Straight probe for chip cleaning (Hard Steel)
ADPUNCH	Tungsten tipped crack stop punch 0.009 tip
ESLEDW	LED inspection torch.

U.V. Lamps & spares

ESLMPTB	Tube for Esprit UV lamp (Suits all voltages)
ESLMPS1	Suckers for UV lamp (Per set of 4)

12. BTB Tools



WKTEC-BX Pictured in Tool Box

TECHNICIAN 11 Blade Kit

Safely remove any bonded glass from any vehicle!

This comprehensive kit contains mostly serrated blades, preferred for their faster cut-out times.

Extra-long reach blade for below dashboards, reverse grind blades for encapsulated glass, along with a pinchweld scraper blade for removing excess adhesive. Powered cold knife blades are included for a fast and easy cutout anywhere a traditional cold/pull knife was previously used.

Adjustable cutting depth control arms regulate cutting depth.

Blades

WK1-S, WK2-S, WK4-S, WK4Z-S,
WK4R-S, WK6-M, WK24Z, WK24ZR-S,
WK24R-S, WK27S, WK28M

Cutting Depth Control Arms

WK11AW, WK11BW5, WK11CW,
WK11EW, WK11FW

Accessories

WK7, WK7L, WK8, WK9, WK11VEL,
WK20, WK-GA

Training Package

WK12CD Introduction CD
WK12TCD Training CD
Users Manual

Heavy Duty Air Tool

WK10HD

Packaging

Vinyl Tool Roll (WKTEC) or in
Sturdy Plastic Carry Box
(WKTEC-BX)