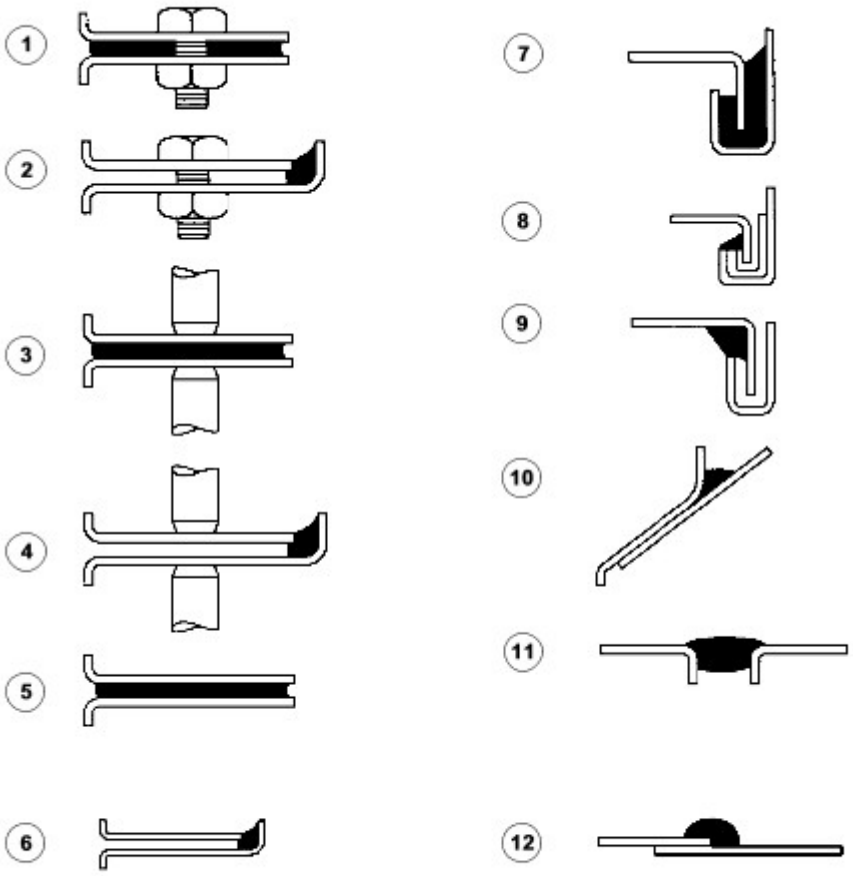
Published: Feb 14, 2006

Corrosion Protection

APPROVED MATERIALS

Joint types



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Item	Part Number	Description
1.		Between bolted panels
2.		Between bolted panel edges
3.		Between spot welded panels
4.		Between spot welded panel edges
5.		Between bonded panels
6.		Between bonded panel edges
7.		Clinch joints (type a)
8.		Clinch joints (type b)
9.		Clinch joints (type c)
10.		Gaps between panels (type a)
11.		Gaps between panels (type b)
12.		Lap joint

DESCRIPTION USAGE	SUPPLIER	PART NUMBER
CAVITY WAXES		
Inner cavity wax (transparent)	3M	(08909, 08919, 08929)
Inner cavity wax (amber)	3M	(08901, 08911, 08921)
Cavity wax	Croda	(PW57)
ENGINE BAY WAXES/LACQUERS		
Atrolan engine bay wax and cosmetic wax	Astors	DA3243/1
Engine bay cosmetic wax/lacquer	Croda	PW197
Engine bay cosmetic wax/lacquer	Dinal	4010
MISCELLANEOUS MATERIALS		
Flexible parts repair - rubber modified polypropylene parts	3M	(05900)
Aerosol Auto adhesive (trim) - impact adhesive for trim parts	3M	(08080)
Water shedder repair	Tereson	
Sound dampening foam	Gurit Essex	Betacore 7999
SEAM SEALERS		
Body caulking - type (b) gaps between panels	3M	08568
Drip Chek Clear - bolted, spot welded and bonded panel edges; type (a) and (b), gaps between panels; type (c) clinch joints	3M	08401
Drip Chek Heavy - type (b), gaps between panels; type (c) clinch joints	3M	08531
Flexseal Polyurethane Seam Sealer - bolted, spot welded and bonded panel edges; type (a) and (b), gaps between panels; type (c) clinch joints	3M	(08684, 08689, 08694)
Polyurethane Sealer (sachet)	3M	(08703, 08783, 08788)
Sprayable sealer - type 12 lap joints	3M	(08800, 08823)
Super seam sealer - type 12 lap joints	3M	(08357)
Weld Thru Sealer - between spot welded panels	3M	(08625)
Betafill Clinch and Brushable Sealer (Black, Grey, White)	Gurit Essex	10211/15/20
Clinch joint and underbody coating (Grey, Beige)	Gurit Essex	(10101, 10707)
Leak-Chek Clear - between bolted panels; spot welded and bonded panel edges; type (c) clinch joints	Kent industries	(10075)
Putty - type (a) and (b) gaps between panels	Kent industries	
Polyurethane seam sealer - between bolted panels, spot welded and bonded panel edges; type (a) and (b), gaps between panels	PPG	(6500)
Polyurethane seam sealer - between bolted panels, spot welded and bonded panel edges; type (a) and (b), gaps between panels	Teroson	92
Terolan Light seam sealer - bolted, spot welded and bonded panel edges; type (a) and (b), gaps between panels; between bonded panels; type (c) clinch joints	Teroson	
Terosan Special Brushable Seam sealer - lap joints 12	Teroson	
Terostat Sprayable seam sealer - bolted, spot welded and bonded panel edges; type (a) and (b), gaps between panels	Teroson	9320
Terostat 1K PU seam sealer (SE20) - type (a) and (b), gaps between panels , spot welded and bonded panel edges;	Teroson	
Sealing compound - bolted, spot welded and bonded panel edges; type (b), gaps between panels	Wurths	8901001/-/6
STRUCTURAL ADHESIVES		
Automotive structural adhesive - between bonded panels; type 5 and 7	3M	08122
Two part structural Epoxy - between bonded and spot welded panels; type (a) clinch joints	Ciba Geigy	XB5106/7
UNDERBODY SEALERS		
Body Schutz	3M	08861
Spray Schutz	3M	08877

Crodapol Brushable Sealer	Croda	PV75
Terotex Underseal (CP02)	Terosan	9320
UNDERBODY WAXES		
Stone chip coating (smooth)	3M	08158/9
Underbody wax	Croda	PW61
Underbody wax	Dinol	Tectacote 205
WELD-THRU PRIMERS		
Weld-thru coating	3M	05913
Zinc spray	3M	09113
Zinc rich primer	ICI	P-565 634

APPLICATION EQUIPMENT

SATA Schutz Gun Model UBE

Specifications	
Air consumption	200 litres/min (7 ft^3/min) @ 45 psi
Weight	660 grams (23.3 oz)

Manufactured and supplied by:

Sata Gmbh

Minden Industrial Ltd.

16 Greyfriars Road

Moreton Hall

Bury St. Edmunds

Suffolk IP32 7DX

Tel. (01284) 760791

The Sata Schutz Gun is approved for the re-treatment of vehicle underbody areas with protective coatings as supplied in 1-litre (1.76pt.), purpose-designed, 'one-way' containers. The screw thread fitting (female on the gun) will fit most Schutz-type packs.

NOTE:

Always clean gun after use with the appropriate solvent.

Full operating details are supplied with the equipment.

Sata HKD1 Wax Injection Equipment

The Sata HKD1 is approved by Land Rover for use in all cavity wax re-treatment operations. The equipment comprises a high quality forged gun with 1-litre capacity pressure feed container, a flexible nylon lance, 1100 mm (43.3 in) straight steel lance and hooked wand lance. A quick-change coupling is a standard fitting to enable lances to be easily interchanged. The lances each have their own spray pattern characteristics to suit the type of box section to be treated.

The Sata HKD1 is covered by a 12 month warranty. All replacement parts and service are obtainable from the suppliers.

Cooper Pegler Falcon Junior Pneumatic (Airless)

Manufacturer and supplier:

Cooper Pegler and Co. Ltd.

Burgess Hill

Sussex RH15 9LA

Tel. 04 446 42526

Intended primarily for applying transit wax, the Falcon Junior pneumatic sprayer has a 5-litre (1 gal.) container with integral hand pump. This high quality unit provides a simple and effective means of wax spraying without the need for compressed air or additional services.

A selection of nozzles, lances and hoses together with a trigger valve assembly incorporating a filter enable the sprayer to be used in a variety of applications. These include general maintenance, wax injection and paint application. All parts are fully replaceable and include a wide range of nozzle configurations.

The Falcon Junior is fitted with Viton seals and is guaranteed for 12 months.

3M Application Equipment

Manufacturer:

3M UK PLC

Automotive Trades Group

3M House

PO Box 1

Market Place

Bracknell

Berks. RG12 1JU

Tel. (01344) 858611

All 3M equipment is available from local trade factors or 3M refinishing factors.

3M Caulking Gun 08002

A lightweight, robust metal skeleton gun designed to accommodate 325 mm (12.8 in) cartridge for dispensing sealants etc. This gun facilitates rapid cartridge loading and features a quick-release lever for accurate material ejection and cut-off control.

3M Pneumatic Cartridge Gun 08012

An air line fed gun for application of 3M cartridge products. Excellent ease of application for a smooth sealant bead, and incorporates a regulator valve for additional control.

Other 3m applicator equipment available:

3M Pneumatic Applicator Guns

Air line fed gun for application of 3M sachet sealers (Part No. 08006 for 200 ml (6 fl oz) and 310 ml (9 fl oz) sachets, and Part No. 08007 for all size sachets including 600 ml (18 fl oz).

3M Applicator Gun 08190

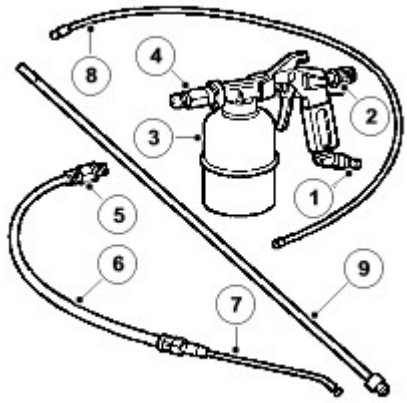
For application of 3M Structural Adhesive 08120.

3M Inner Cavity Wax Applicator Gun

Features 750 mm (29.6 in) flexible tube and using 1-litre (1.76 pt) canisters, this approved equipment is available from all 3M refinishing factors.

Heavy Duty Manual Gun

Cavity wax application equipment and techniques



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Item	Part Number	Description
1.		Air inlet
2.		Flow control (spray pattern adjustment)
3.		Pressure cup (1 litre [1.7 pt] capacity). Maximum pressure 140 psi (9.7 bar, 9.8 kg/cm²).
4.		Gun connector
5.		Lance nipple connection
6.		Flexible lance
7.		Rigid directional hook wand (forward cone spray pattern)
8.		Flexible nylon 1100mm (43.3in.) lance with 360° spray pattern
9.		Rigid 1100mm (43.3in.) lance with 360° spray pattern

When re-treating wax-injected areas which have been disturbed during repairs, it is necessary to use a compressed air spray gun with integral pressure cup and a selection of interchangeable lances.

The following points must be observed during use, according to the attachments fitted:

- Use the rigid or flexible lance attachments with 360° spray dispersal when treating enclosed areas, to ensure maximum coverage.
- Where openings are restricted, use the hook nozzle to provide a more directional spray

1100 mm (43.3in.) Rigid Lance: The nozzle on the rigid lance produces a 360° circular spray pattern combined with a forward-directed spray. Although wax is distributed to all box section surfaces in a single stroke, effective and complete coverage is best achieved in long, straight structures and box section cavities by spraying on both outbound and return strokes of the lance.

The rigid lance also provides the positional accuracy required in shaped sections, by allowing visual assessment.

CAUTION: Do not force the lance into access holes when using this attachment.

1100 mm (43.3in.) Flexible Nylon Lance: This lance is similar in pattern to the rigid version, but provides the additional penetration needed for curved sections or in places where access is difficult. Its main limitation is a lack of positional accuracy inside box sections.

Carry out spraying on the outward stroke of the lance. Withdraw the lance slowly to ensure sufficient coverage. **DO NOT withdraw the lance too quickly.**

Keep the nylon tube of the lance away from the edges of the access hole to eliminate abrasion and extend the life of the tube. Take care to ensure that spraying ceases just before the nozzle emerges from the access hole. To assist

this process, apply RED paint to the final 30mm (1.2in.) of the nozzle.

Hook Nozzle on Flexible Lance: The rigid hook produces a highly atomised, forward-directed, fully conical spray pattern having long range and good dispersion characteristics. This combination has good directional capabilities for the treatment of short, narrow sections and may also be used for direct spraying of inner wheel arches etc.

Position the flat area at the end of the lance at 180° to the nozzle spray direction. This will help to guide the spray more accurately when it is concealed in a box section or access hole.

NOTE:

Keep all wax injection/application equipment clean. Use white spirit for this purpose immediately after wax injection operations.

For general spraying move the nozzle in an arc from side to side, to ensure full coverage.

Precautions during Body Repairs and Handling

Take care when handling the vehicle in the workshop. PVC underbody sealers, seam sealers, underbody wax and body panels may be damaged if the vehicle is carelessly lifted.

Always follow the correct lifting, jacking and towing procedures as shown in GENERAL INFORMATION DATA, Information section, paying particular attention to the following points:

Steam Cleaning and Dewaxing

Due to the high temperatures generated by steam cleaning equipment, there is a risk that certain trim items could be damaged and some adhesives and corrosion prevention materials softened or liquified.

Adjust the equipment so that the nozzle temperature does not exceed 90°C (194°F). Take care not to allow the steam jet to dwell on one area, and keep the nozzle at least 300mm (11.8in.) from panel surfaces.

Do NOT remove wax or lacquer from underbody or underbonnet areas during repairs. Should it be necessary to steam clean these areas, apply a new coating of wax or underbody protection as soon as possible.

CORROSION PROTECTION

The following information details the materials that are applied during manufacture for corrosion protection.

Factory Treatments

The Defender is treated with the following anti-corrosion materials in production:

- A PVC based underbody sealer material which is sprayed onto the underfloor, wheel arches and undersill areas.
- An application of cavity wax which is sprayed into enclosed cavities and box sections.
- A final coating of underbody wax to cover the complete underfloor including components but excluding brake discs, exhaust system and propeller shafts.
- A coat of protective lacquer applied to the whole body.
- A coat of protective wax applied to the engine bay and wheel arch areas.

NOTE:

Do not apply wax to engine bay of Td5 models.

In addition to the above measures, all steel parts are zinc-coated both sides.

Underbody Sealer

Underfloor areas and outer sill panels are treated with a Plastisol PVC underbody sealer. This material is not suitable for re-treatment.

When repairing areas of underbody sealer, strip the factory-applied material back to a suitable break point, ensuring that a clean metal surface is exposed and that the edge of the existing material adheres soundly to the panel.

 **CAUTION: Ensure that suspension units, wheels, tyres, power unit, driveshafts, exhaust and brakes (including all mounting points) are shielded prior to application of fresh underbody sealer**

NOTE:

Application of new underbody sealer must be carried out between primer and surfacer paint operations. Areas where seam sealer is used should be re-treated as necessary before application of underbody sealer.

Blanking plugs and grommets in the floor pan (except those used for wax injection) MUST be fitted before underbody sealer application. Heat-fusible plugs which have been disturbed should either be refitted with the aid of a hot air blower or replaced with rubber grommets.

Cavity Wax

Cavity wax is applied to certain box sections The information given on the following pages is intended as a guide and shows the areas to be treated with cavity wax, as well as the access holes used during manufacture.

Underbody Wax

A coat of underbody wax is applied to the entire underbody inboard of the sill vertical flanges, and covers all moving and flexible components EXCEPT for wheels and tyres, brakes and exhaust. The wax is applied over paints and underbody sealers.

 **CAUTION: Old underbody wax must be completely removed from a zone extending at least 200 mm (7.9 in) beyond the area where new underbody sealer is to be applied.**

The underbody wax must be reinstated following all repairs affecting floor panels.

Engine Bay Wax

Reinstate protective engine bay wax disturbed during repairs using the approved material.

Wheel Arch Wax

Reinstate protective wheel arch wax disturbed during repairs using the approved material.

Stone Chip Resistant Paint/Primer

Re-treat all areas protected with factory-applied anti-chip primer with suitable approved material in repair.

Inspections during Maintenance Servicing

It is a requirement of the Land Rover Corrosion Warranty that the vehicle body is checked for corrosion by an authorised Land Rover dealer at least once a year, to ensure that the factory-applied protection remains effective.

Service Job Sheets include the following operations to check bodywork for corrosion:

NOTE:

Wash the vehicle and ensure that it is free from deposits prior to inspection. It is part of the owner's responsibility to ensure that the vehicle is kept free of accumulations of mud which could accelerate the onset of corrosion. The Dealer MUST wash the vehicle prior to inspection of bodywork if the customer has offered it in a dirty condition, and pay special attention to areas where access is difficult.

NOTE:

The checks described above are intended to be visual only. It is not intended that the operator should remove trim panels, finishers, rubbing strips or sound deadening materials when checking the vehicle for corrosion and paint damage.

With the vehicle on a lift, and using an inspection or spot lamp, visually check for the following:

NOTE:

The presence of small blisters in PVC underbody sealer is acceptable, providing they do not expose bare metal.

Special attention must be paid to signs of damage caused to panels or corrosion material by incorrect jack positioning.

It is essential to follow the correct jacking and lifting procedures. See GENERAL INFORMATION DATA, Information section.

With the vehicle lowered, visually check for evidence of damage and corrosion on all painted areas, in particular the following:

Where bodywork damage or evidence of corrosion is found during inspection, rectify this as soon as is practicable, both to minimise the extent of the damage and to ensure the long term effectiveness of the factory-applied corrosion protection treatment. Where the cost of rectification work is the owner's responsibility, the Dealer must advise the owner and endorse the relevant documentation accordingly.

Where corrosion has become evident and is emanating from beneath a removable component (e.g. trim panel, window glass, seat etc.), remove the component as required to permit effective rectification.

Underbody Protection Repairs

When body repairs are carried out, always ensure that full sealing and corrosion protection treatments are restored. This applies both to the damaged area, and also to areas where protection has been indirectly impaired as a result of accident damage or repair operations.

Prior to straightening out or panel beating, remove all corrosion protection material in the damaged area. This applies in particular to panels coated with wax, PVC underbody sealer, sound deadening pads etc.

 **WARNING: DO NOT use oxy-acetylene gas equipment to remove corrosion prevention materials. Large amounts of fumes and gases are liberated by these materials when they burn.**

Equipment for the removal of tough anti-corrosion sealers offers varying degrees of speed and effectiveness. The compressed air-operated scraper (NOT an air chisel) offers a relatively quiet mechanical method of removal using an extremely rapid reciprocating action. During use, direct the operating end of the tool along the work surface.

The most common method is by the use of a hot air blower with integral scraper.

 **CAUTION: High temperatures can be generated with this equipment which may cause fumes. Always exercise care in its use.**

Another tool, and one of the most efficient methods, is the rapid-cutting 'hot knife'. This tool uses a wide blade and is quick and versatile, able to be used easily in profiled sections where access is otherwise awkward.

Use the following procedure when repairing underbody coatings:

Underbody Wax

NOTE:

Where repairs include the application of finish paint coats in the areas requiring underbody wax, paint operations must be carried out BEFORE wax application.

After refitting mechanical components, including hoses, pipes and small fixtures, mask off the brake discs and apply a coat of approved underbody wax.

Underbonnet Wax

Where repairs have involved replacement of engine bay panels, treat the entire engine compartment including all components, clips and small fixtures with an approved underbonnet lacquer or wax.

Proprietary Anti-Corrosion Treatments

The application of proprietary anti-corrosion treatments in addition to the factory-applied treatment could invalidate the Corrosion Warranty and should be discouraged. This does not apply to approved, compatible, preservative waxes which may be applied on top of existing coatings.

Fitting Approved Accessories

When fitting accessories it is important that the vehicle's corrosion protection is not affected, either by breaking the protective coating or by introducing a moisture trap.

DO NOT screw self-tapping screws directly into the body panel but fit plastic inserts first. Protect the edges of holes drilled into panels, chassis members and other body parts with a suitable zinc rich or acid etch primer, followed by a protective wax coating brushed onto the surrounding area.

DO NOT affix unpainted metal surfaces of any accessory directly to the vehicle bodywork unless they are suitably protected. Where metal faces are bolted together always interpose a suitable interface material such as weldable zinc rich primer, extruded strip or zinc tape.

CAVITY WAX

Box sections treated with cavity wax are shown in this section. Repairs affecting these areas must include re-treatment with an approved cavity wax, using the access points illustrated. In addition, all interior surfaces which have been disturbed during repairs must be wax injected whether they have been treated in production or not. This includes all box members, cavities, door interiors etc. It is permissible to drill extra holes for access where necessary, provided these are not positioned in load-bearing members. Ensure that such holes are treated with a suitable zinc rich primer, brushed with wax and then sealed with a rubber grommet.

Prior to wax injection, ensure that the cavity to be treated is free from any contamination or foreign matter. Where necessary, clear out any debris using a compressed air supply.

Carry out wax injection after final paint operations.

During application, ensure that the wax covers all flange and seam areas and that it is applied to all repaired areas of both new and existing panels.

NOTE:

Apply cavity wax AFTER the final paint process and BEFORE refitting of any trim components.

It should also be noted that new panel assemblies and body shells are supplied without wax injection treatment which must be carried out after repairs.

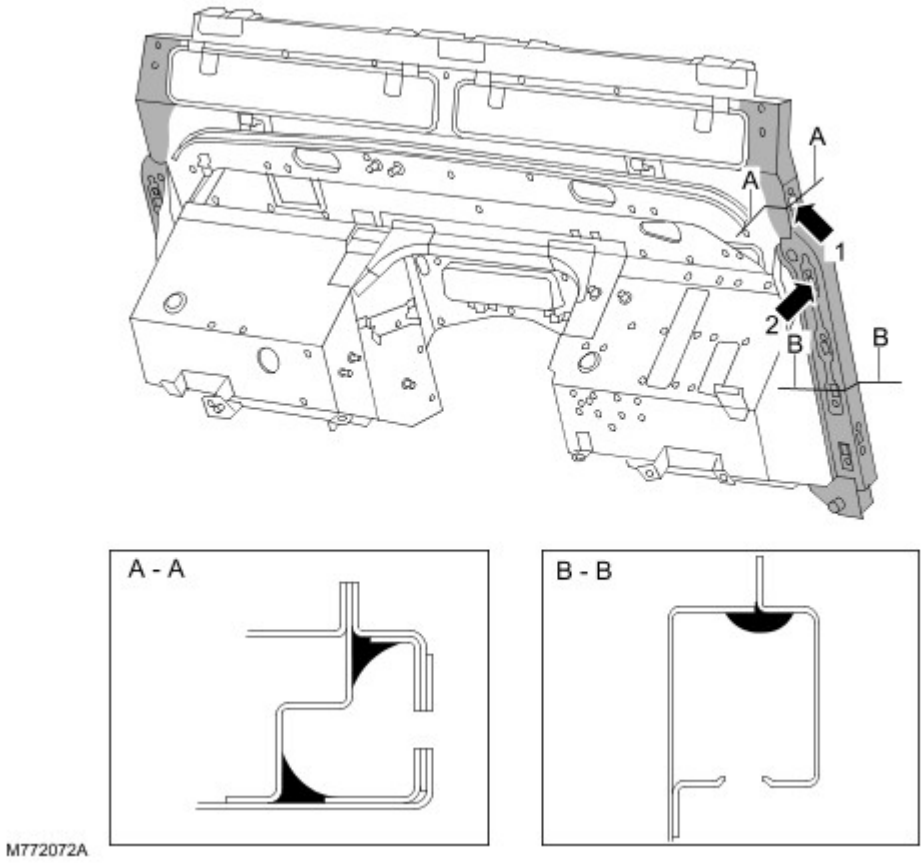
Effective cavity wax protection is vital. Always observe the following points:

- Complete all finish paint operations before wax application.
- Clean body panel areas and blow clean cavities if necessary, before treatment.
- Maintain a temperature of 18°C (64°F) during application and drying.
- Check the spray pattern of injection equipment.
- Mask off all areas not to be wax coated and which could be contaminated by wax overspray.
- Remove body fixings, such as seat belt retractors, if contamination is at all likely.
- Move door glasses to fully closed position before treating door interiors.
- Treat body areas normally covered by trim before refitting items.
- Check that body and door drain holes are clear after the protective wax has dried.
- Keep all equipment clean, especially wax injection nozzles.

The following Illustrations show the treatment areas and Injection holes for Cavity Wax application.

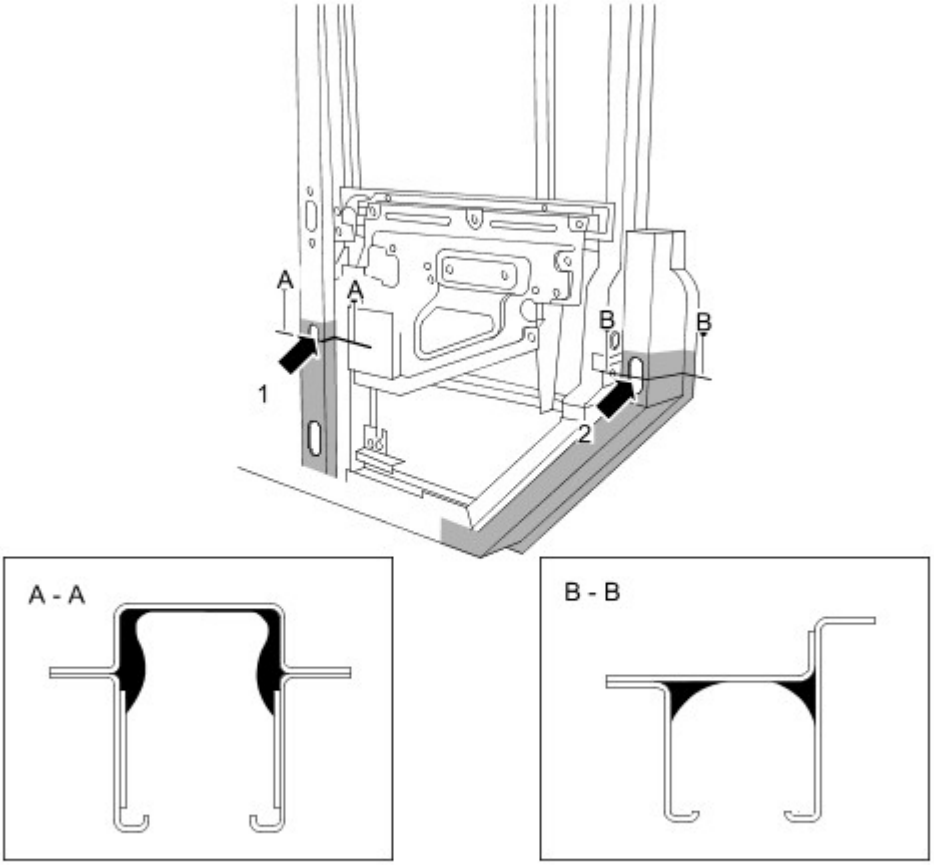
All areas symmetrically opposite to those shown are also treated.

Bulkhead assembly



Section A-A and B-B show application areas of cavity wax. Arrows 1 and 2 show application holes.

'B/C' post assembly



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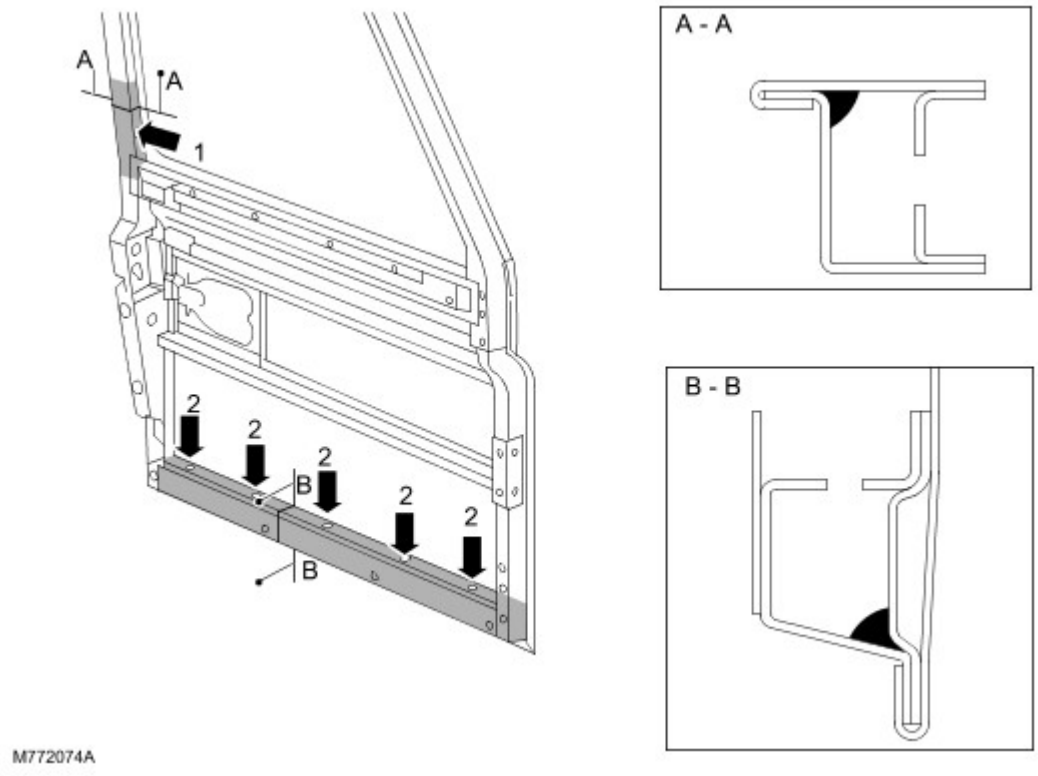
Section A-A shows application area of cavity wax for the 'B/C' post. Arrow 1 shows application hole.

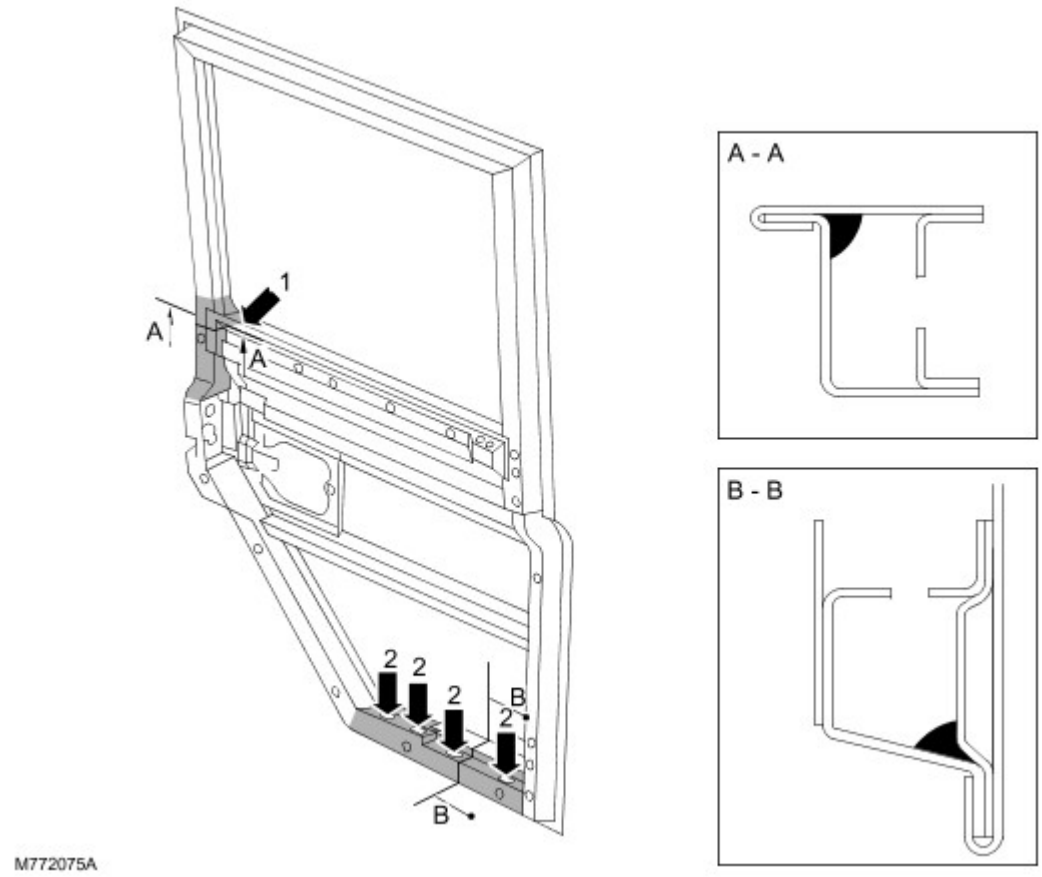
Section B-B shows application area of cavity wax for the 'D' post. Arrow 2 shows application hole.

Front door



Section A-A and B-B show application areas of cavity wax for the front door. Arrows 1 and 2 show the application holes.

Rear door



Section A-A and B-B show application areas of cavity wax for the rear door. Arrows 1 and 2 show the application

holes.

SEALANTS AND ADHESIVES

Structural Adhesive

Metal-to-metal adhesive is applied to critical joint areas during factory assembly. The material used is a high-temperature, heat cured, nitrile phenolic which serves both to bond two metal surfaces and also to seal the joint against ingress of dust, water, petrol and fumes. This material is not suited for service use, and should be substituted in repair using a suitable medium strength adhesive.

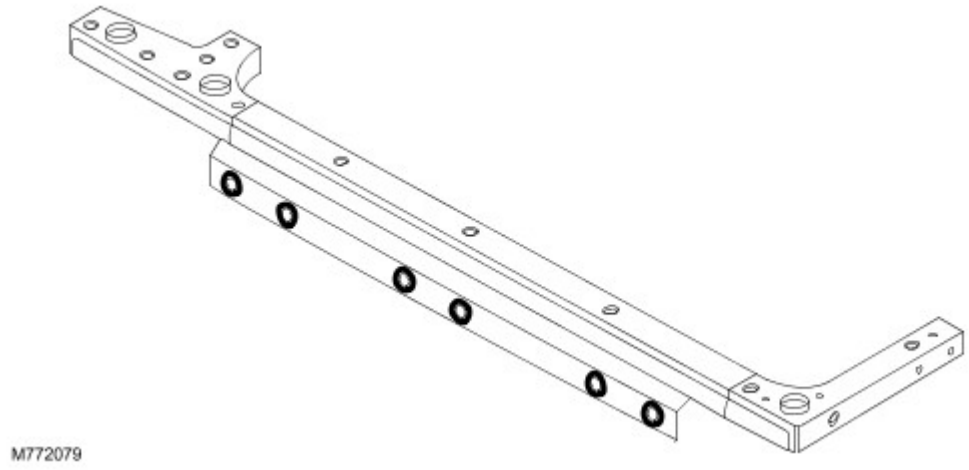
When separating a joint treated with metal-to-metal adhesive, to avoid distortion it is recommended that the joint be gently heated until the bond weakens sufficiently to permit panel separation.

NOTE:

DO NOT carry out MIG welding on a joint area which has been treated with metal-to-metal adhesive until all traces of adhesive have been removed.

The following Illustrations show the treatment areas for Structural Adhesive. All areas symmetrically opposite to those shown are also treated.

Body side capping



Structural adhesive applied around body side lower fixing holes

Seam sealers

A heat cured, PVC Plastisol sealer is applied to joint areas during factory assembly. This material is not suitable for service use.

Carry out seam sealing after the application of primer and before the surfacer and final paint coats. Ensure that surfaces are first cleaned of all grease and oil. Apply the sealer material to the joint as a bead, either by hand or using an applicator gun. Where necessary, brush sealer well into the joint and wipe smooth using a cloth soaked with solvent such as Shell SBP3. This will ensure an acceptable cosmetic finish.

Apply sealer to ALL accessible joints following repair work. Be aware that damage to a vehicle can often result in deflection to those areas of the body which are remote from the impact. The sealers in these areas can therefore be disturbed by subsequent straightening and repair operations. Check joints in the vicinity of the area undergoing repair for evidence of cracked sealer, clean them out as required and re-treat them with fresh sealer using the following procedure:

Where joints are inaccessible following the reassembly or fitment of components, ensure that a paste-type sealer is applied to such joints. Certain seams also become inaccessible after the completion of panel repairs. In such instances the paint process should be carried out and sealers applied before final assembly.

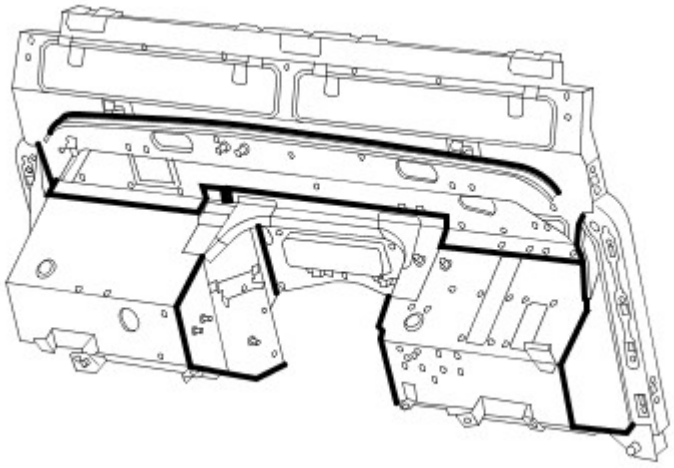
Provided access is adequate, apply the sealer to both sides of the repair joint. Where access is limited to one side only (e.g. box sections), inject the affected box member with cavity wax.

CAUTION: ALWAYS deploy an extractor unit to remove toxic fumes when using oxy-acetylene equipment to remove panels treated with wax and sealers.

The following Illustrations show the treatment areas for Seam Sealing.

All areas symmetrically opposite to those shown are also treated.

Seam sealing on bulkhead assembly - front view



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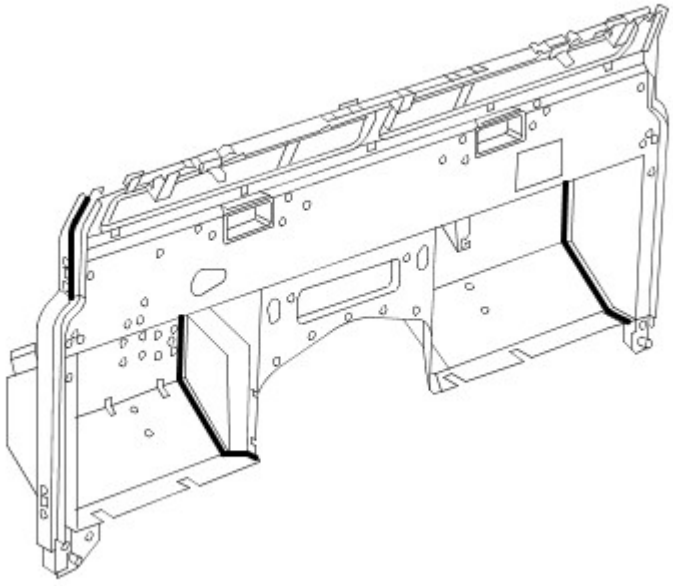
Seam sealing on bulkhead assembly - rear view



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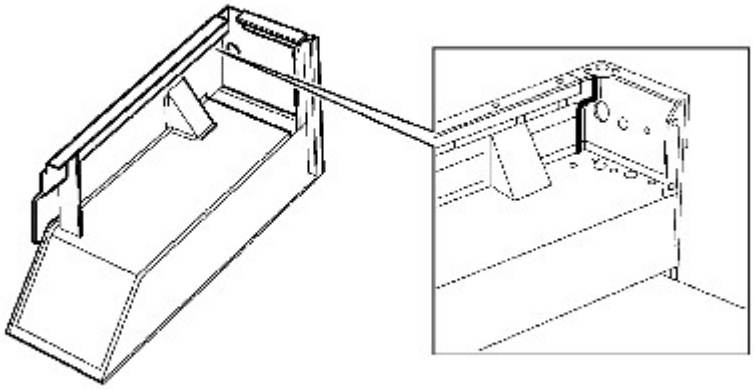
Seam sealer on body side assembly



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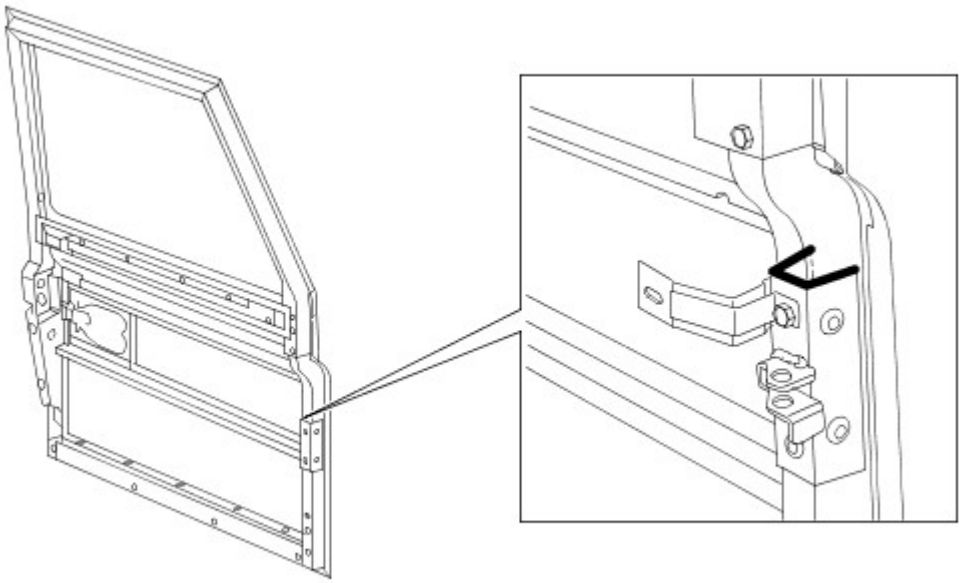
Seam sealer on front door



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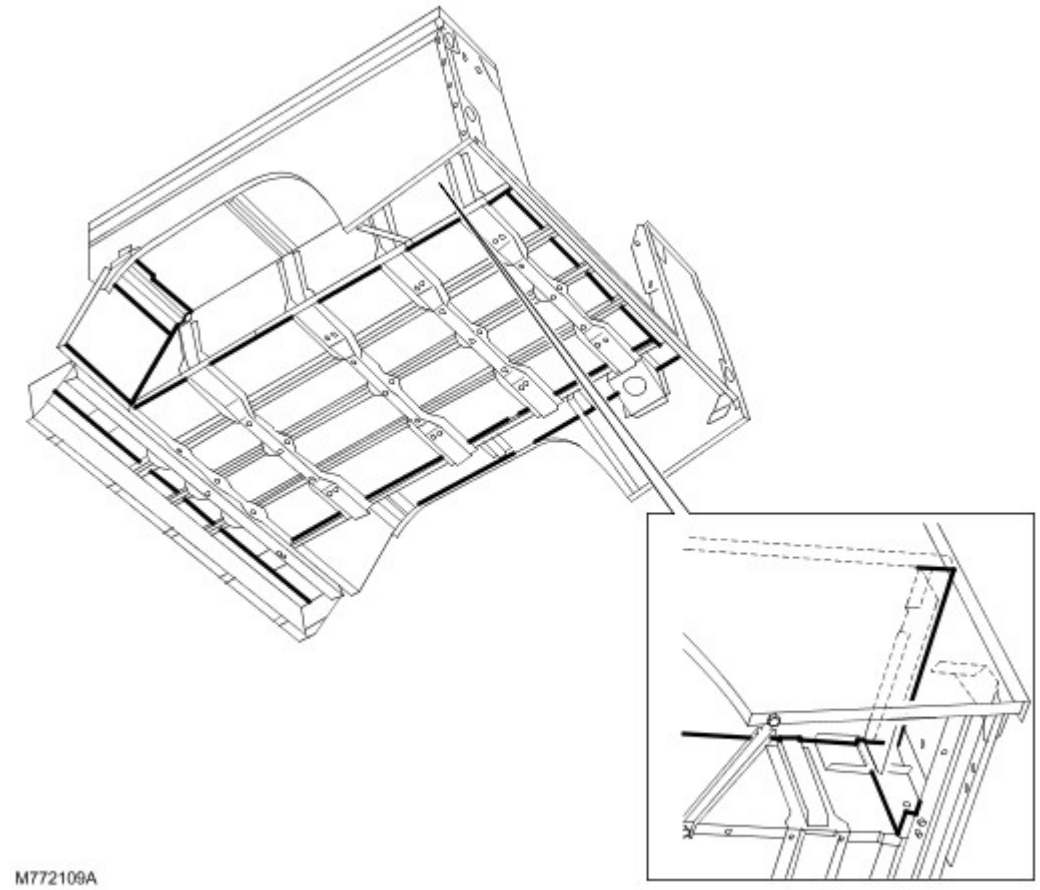
NOTE:

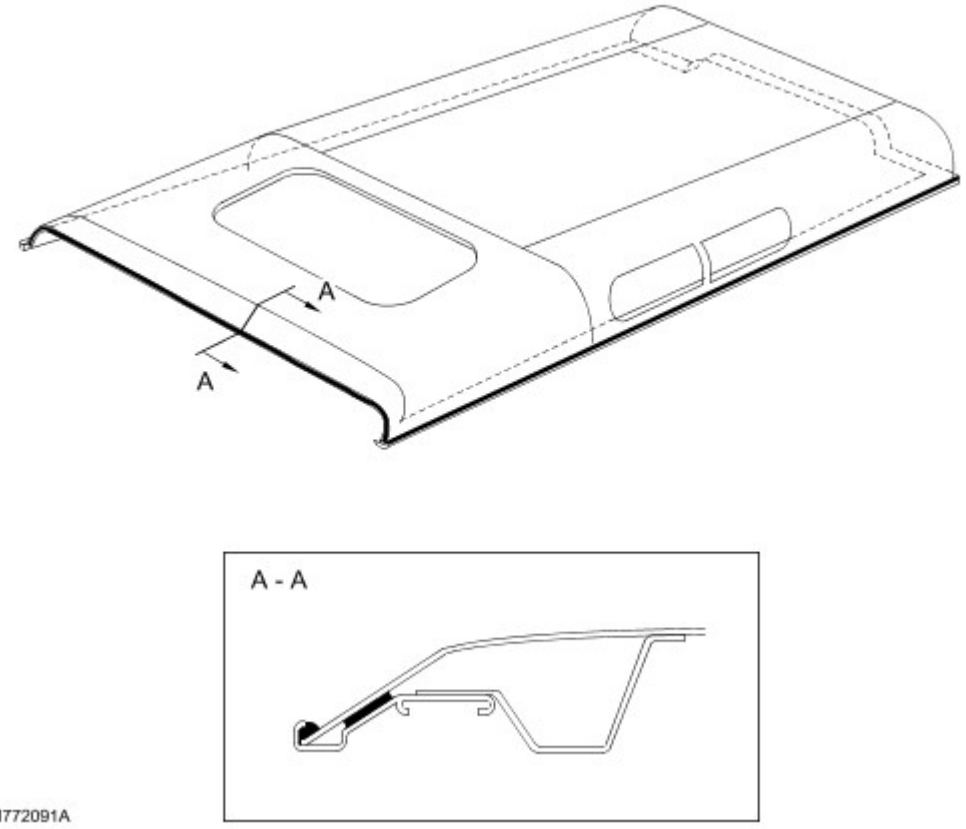
Seam sealer to be wiped after application for cosmetic purposes.

Seam sealer on rear end assembly



CAUTION: Do not block drain holes when applying seam sealer.

Seam sealer on roof assembly

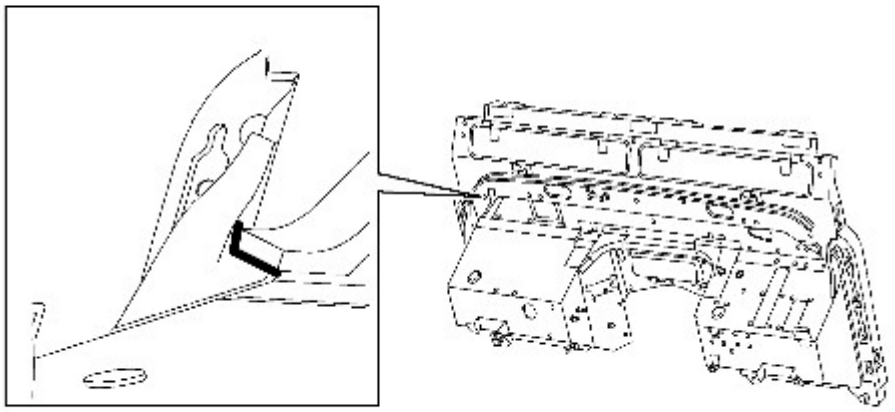


M772091A

Putty application areas

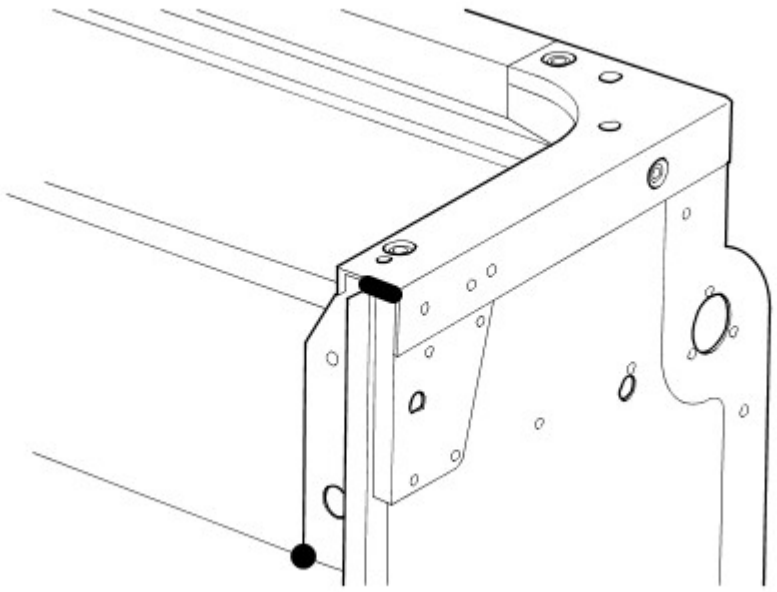
The following Illustrations show the treatment areas for Putty application. All areas symmetrically opposite to those shown are also treated.

Putty location on bulkhead assembly



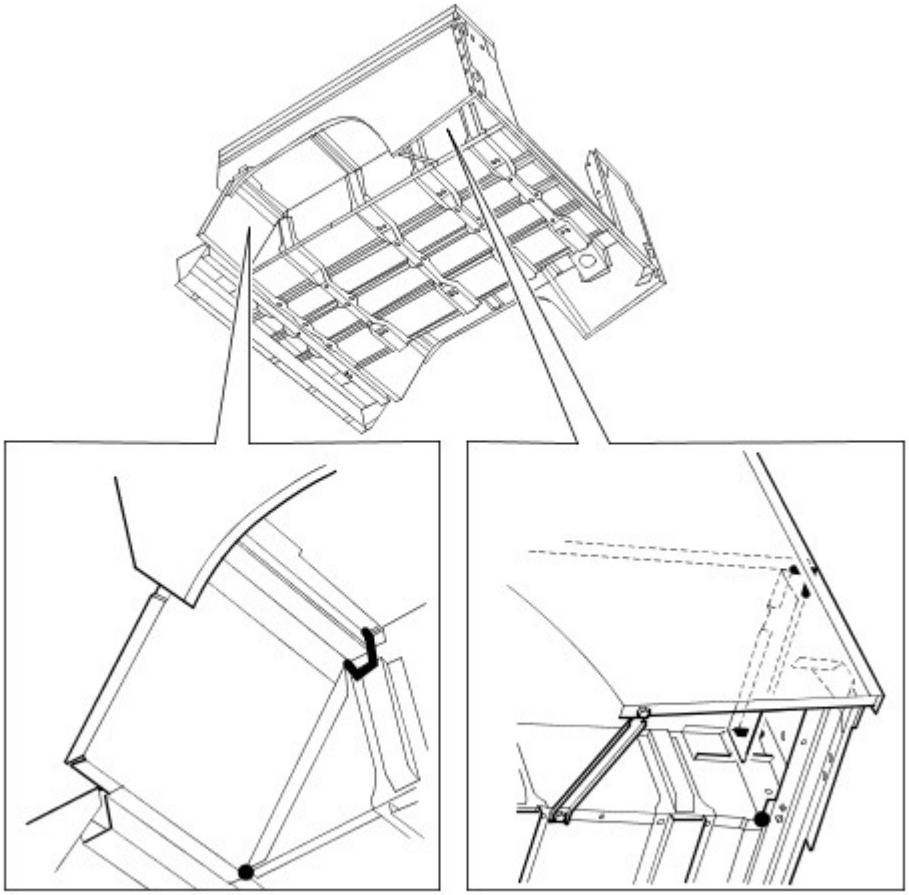
M772086A

Putty location on rear end



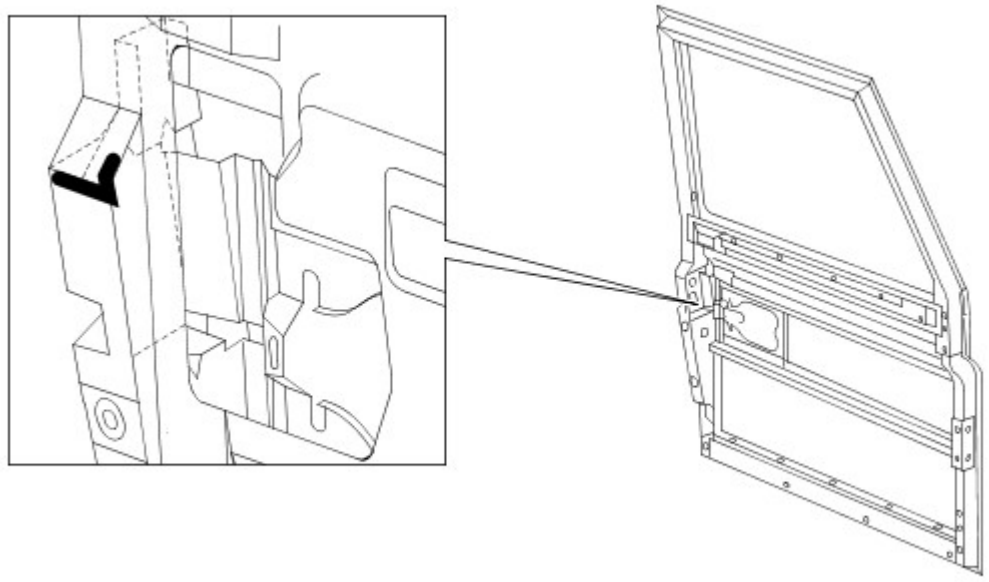
M772087A

Putty location on underside of vehicle



M772088A

Putty location on front door

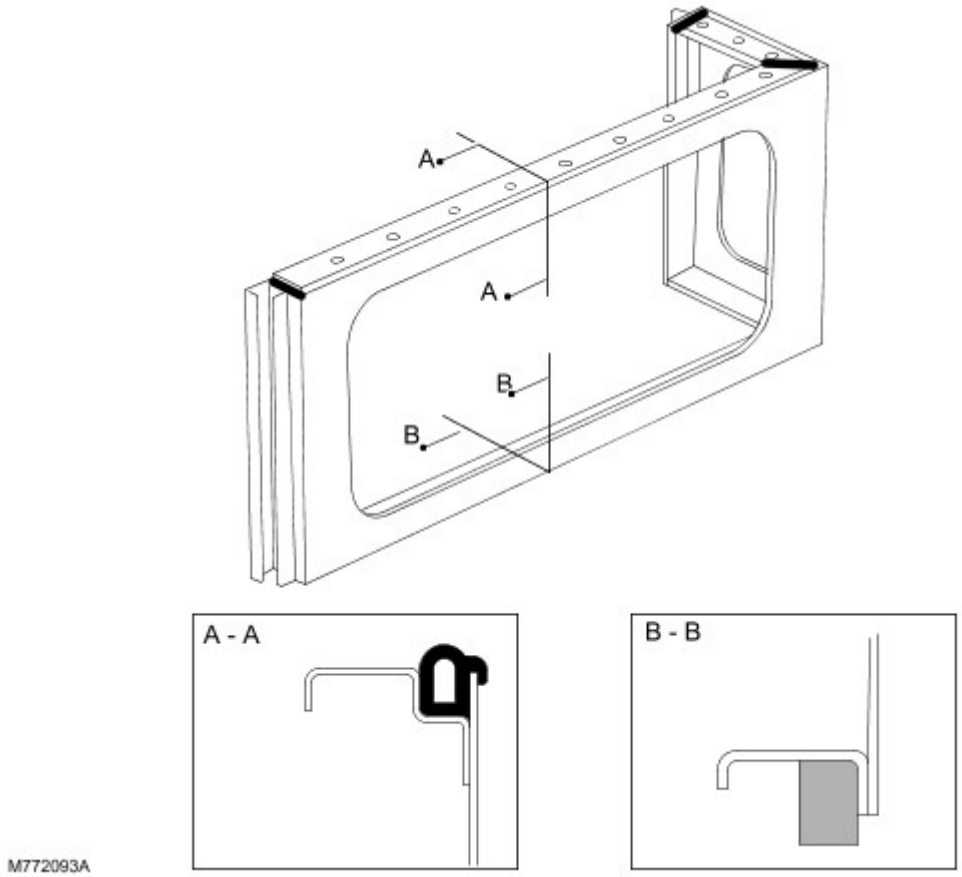


M772089A

Foam/rubber seal application areas

The following Illustrations show the location of foam/rubber seals. All areas All areas symmetrically opposite to those shown are also treated.

Body side rear



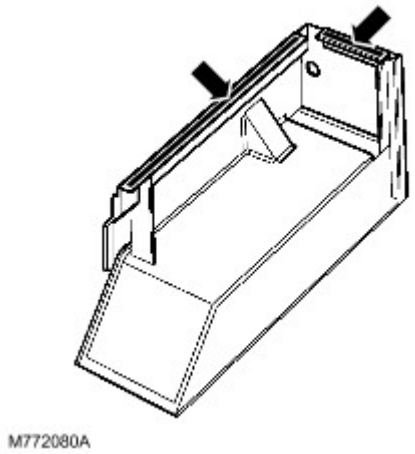
M772093A

Section A-A shows a rubber seal in position on the body side rear upper assembly.

CAUTION: Ensure rubber seal is correctly seated into channel.

Section B-B shows a foam seal located on the bottom edge of the body side rear upper assembly. It is fixed to the panel using double sided tape.

Body side lower



CAUTION: Ensure seals are fitted before refitting assembly.

The arrows indicate the position of two foam seals.