

Body Repairs - Corrosion Protection - Corrosion Protection

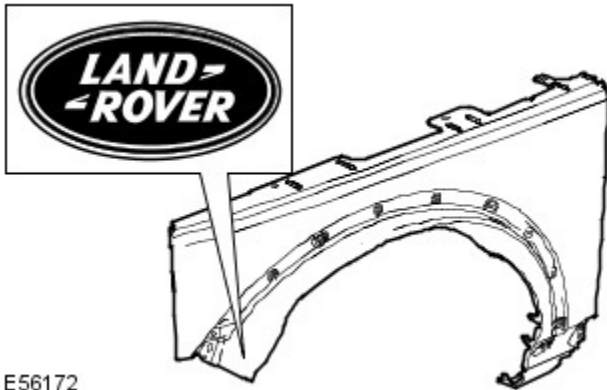
Description and Operation

General

The corrosion protection provided in production must be carefully maintained and/or reproduced during and after body repair work. It is only then that the long-term warranty against penetrative corrosion damage can be assured.

Only Land Rover original bodywork components and Land Rover approved repair materials (sealer, paint etc.) are to be used for bodywork repairs.

Land Rover Original Parts



All Land Rover bodywork components have a cathodic base coating. Individual bodywork components are zinc plated on one or both sides (in different areas depending on vehicle model).

Together with elastic paint coating, this guarantees an optimum, highly resistant protection against corrosion caused by the impact of small objects such as gravel.

• **NOTE:** If possible, the individual protective layers (zinc, cathodic base coat) on Land Rover bodywork components must not be damaged or destroyed by sanding or other mechanical operations.

If hairline cracks at "bodywork connection areas" appear after reshaping work (e.g. at door hinges), it must be ensured that the corrosion protection provided in production is recreated. The complete paint covering must be re-created if necessary. The same applies to reshaping work on heavily profiled bodywork components (e.g. floor pan). Renew or touch-up the paint coating, sealing beads and underbody protection as necessary.

After repair, any interior surfaces which are no longer visible or accessible must be primed before cavity wax is applied. To be certain of an even coating on inner surfaces, careful application of spray (twice, with drying time in-between) must be carried out throughout the whole cavity.

If bodywork panels are strongly heated during repair work, this will invariably result in damage to or even destruction of the applied corrosion protection material. The effectiveness of the cavity protection material is reduced if heating occurs. Reworking of the affected areas is therefore vital.

Welded areas should be made good before corrosion protection is applied.

The corrosion protection measures to be taken when bodywork components are renewed are described on the following pages.

Corrosion Protection of New Components

All new components must be inspected for transport or storage damage such as scratches or dents. The following operations may be necessary, depending on the extent of damage:

Undamaged New Component

- Do not grind the cathodic primer.
- Thoroughly clean with silicone remover and rub dry.

Slightly Damaged New Component

- Sand out scratches.
- Finely sand the surrounding surface.
- Thoroughly clean with silicone remover and rub dry.
- Apply corrosion protection primer to bare areas.

Damaged New Components (bumps and dents)

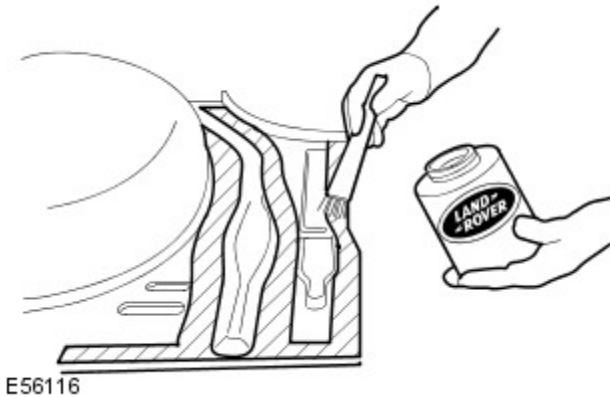
- Beat out the dented area and sand down to bare metal.
- Apply polyester filler (only onto bare metal).
- Apply filler.
- Lightly sand the whole component.
- Thoroughly clean with silicone remover and rub dry.
- Apply corrosion protection primer to bare areas.

The clinched flanges on the hood, doors, tailgate and liftgate must be sealed with clinched flange sealer, if this is not already applied.

Weld Components

Use a stripping disc to remove the cathodic primer on the inside and outside of the area to be welded. The stripped area should be kept as small as possible, retaining as much of the cathodic primer as possible, taking care not to damage the zinc coating.

Apply Welding Primer



- NOTE: The welding primer must be stirred well or shaken before application.

Clean the repair area thoroughly (silicone remover).

Apply welding primer evenly to all weld flanges (old and new components).

- NOTE: The welding primer must be allowed to dry before welding is carried out.

All weld beads must be ground down after all welding is completed, taking care not to weaken the material.

Any unevenness at the joint must be made good.

If necessary, spot weld missing weld studs into position.

The vehicle must be completely cleaned of sanding dust and metal swarf because of the danger of corrosion.

Clean and prime all internal areas and those to be sealed.

- NOTE: The primer must be dry before sealing mastic or underbody protection is applied. Do not use thinners when applying sealing mastic (the mastic will not dry).

Partial Renewal

The procedure to follow when partially renewing components is the same as described in the section "Welded Components".

The main difference when components are partially, rather than completely renewed, concerns the preparation of butt or lap joints.

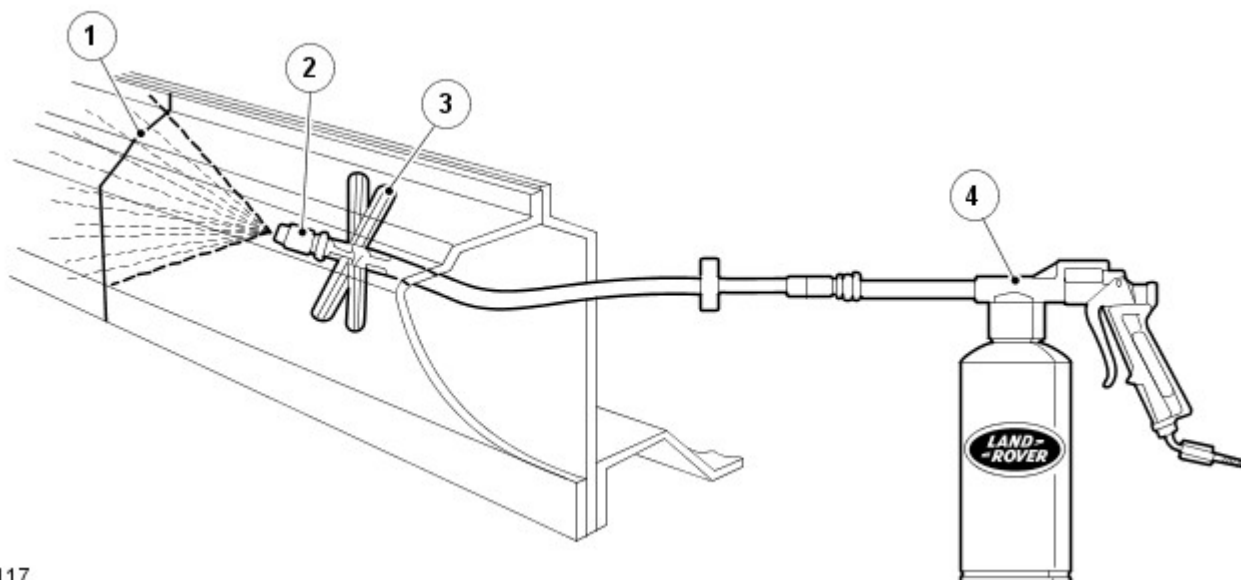
- When bodywork components are cut through, attention must be paid to the adequate removal of the paint and zinc coatings on inner areas. This specially applies to areas which are difficult to access internally.
- It is important for the weld quality that the inner area is bare metal. Zinc and paint residues in the weld area burn and cause serious hole formation during welding.
- If the zinc layer and the paint coating are not removed, the zinc and paint will burn during welding. The soot produced prevents satisfactory cavity protection.

Procedure

- The paint layer must be removed for a width of 30 mm from the line of the weld using a rotating tress wire brush.
- This operation must be carried out on both the new and the old parts of the bodywork.
- Depending on the bodywork component, a 10 mm width of the underlying zinc layer must also be removed along the weld line.

- NOTE: A flat scraper or a wire brush can be used instead of the rotating brush if the cavity is small. Do not use an angle grinder, which would weaken the structure.

Application of Cavity Wax Protection on a Door Rocker Panel After Partial Repair



E56117

Item	Part Number	Description
1	-	Weld bead
2	-	Spray head
3	-	Distance maintainer
4	-	Spray gun

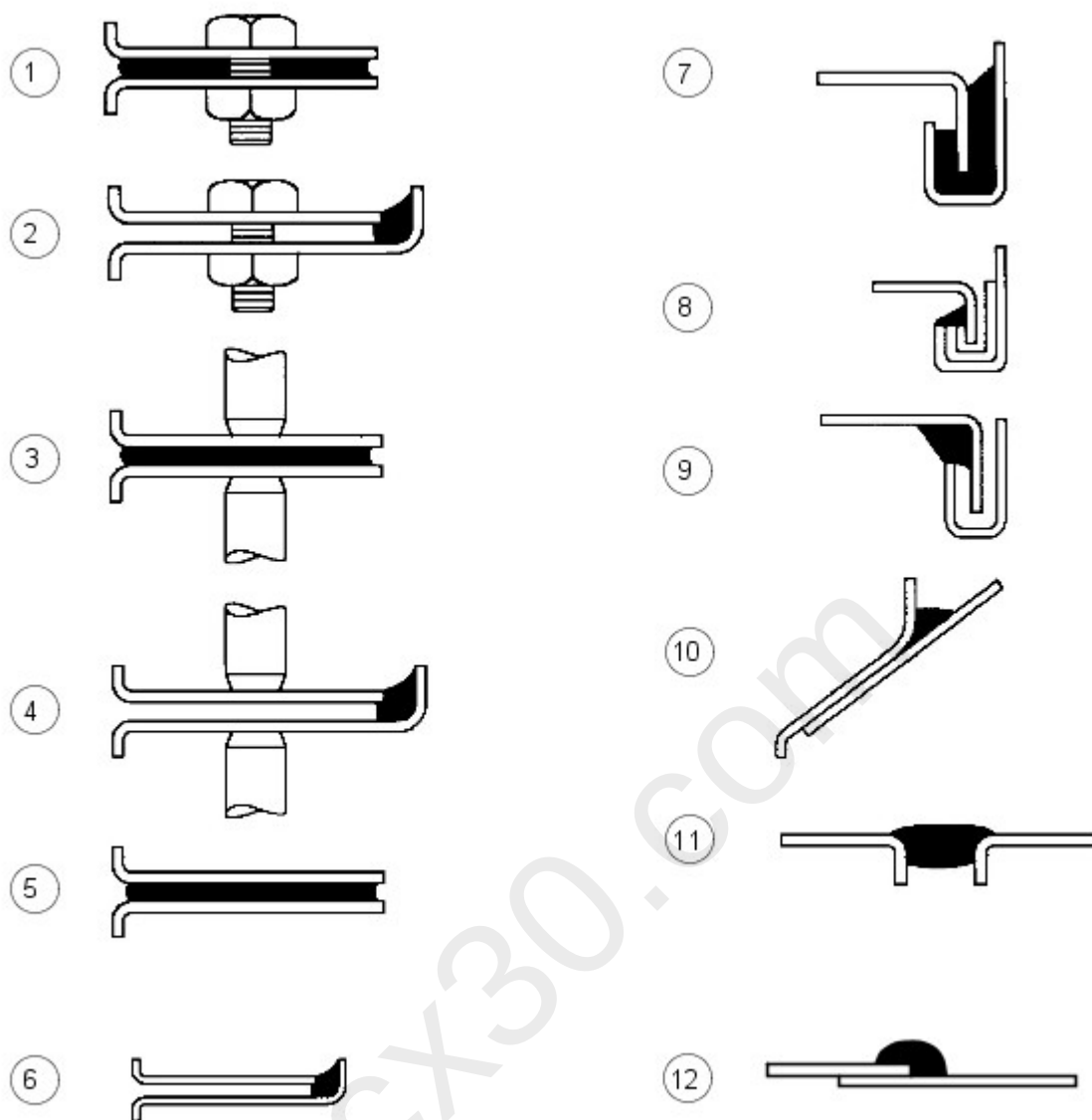
Classification of the different corrosion protection measures for dent removal

Corrosion Protection Method	Exterior Surfaces	Accessible Inner Surfaces	Inaccessible Inner Surfaces
Painting	X	X	
Cavity protection			X

Classification of Different Corrosion Protection Measures for Installation of New Components

Corrosion Protection Method	Weld Flanges Before Welding in Place (contact surfaces)	All Bare Sanded Areas	Weld Flange Area Accessible	Weld Flange Area Not Accessible
Welding primer	X			
Painting		X	X	
Clinched flange protection			X	
Cavity protection				X

Body Sealing Materials



E56018

Item	Part Number	Description
1	-	Between Panels - Bolted
2	-	Panel Edge Bolted
3	-	Between Panels - spot welded
4	-	Panel edges - spot welded
5	-	Between panels - bonded
6	-	Panel edges - bonded
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

Approved Service Materials For Repair

Description - Usage	Supplier	Product Number
Sealing	-	-
Polyurethane cartridge extruded seam sealer - grey - this is not a weld through product	3M	08684
Polyurethane cartridge extruded seam sealer - white - this is not a weld through product	3M	08689
Polyurethane cartridge extruded seam sealer - black - this is not a weld through product	3M	08694
Polyurethane sachet 310ml - grey - this is not a weld through product	3M	08782
Polyurethane sachet 310ml - white - this is not a weld through product	3M	08787
Polyurethane sachet 310ml - black - this is not a weld through product	3M	08789
Polyurethane sachet 600ml - grey - this is not a weld through product	3M	08783
Polyurethane sachet 600ml - white - this is not a weld through product	3M	08788

Description - Usage	Supplier	Product Number
Polyurethane sachet 600ml - black - this is not a weld through product	3M	08793
Sprayable seam sealer 2K polyurethane 150ml - grey	3M	08823
Sprayable seam sealer 2K polyurethane 250ml - grey	3M	08800
Sprayable seam sealer MS polymer grey	3M	08851
Super seam sealer can - grey	3M	08537
Super seam sealer - brush	3M	08540
Butyl cartridge highly flexible for joints greater than 3mm - grey	3M	08645
Terostat 9100 (1K PUR) adhesive sealant	Teroson	153.65B
Terostat 9100 (1K PUR) adhesive sealant	Teroson	112.72C
Terostat 9100 (1K PUR) adhesive sealant	Teroson	129.19S
Terostat 9200 (1K PUR) adhesive sealant - black	Teroson	120.20Q
Terostat 9200 (1K PUR) adhesive sealant - black	Teroson	120.25W
Terolan light vehicle body sealant	Teroson	128.60D
Terostat 9320 sprayable seam sealant - grey	Teroson	139.15A
Terostat 9320 sprayable seam sealant - black	Teroson	139.16B
Terostat 9320 sprayable seam sealant - ochre	Teroson	139.17C
Terolan special sealant brushable	Teroson	179.70H
Terostat II sprayable sealant band	Teroson	193.00D
Terostat VII round profile plastic sealing band	Teroson	112.46Z
Terostat IX putty	Teroson	157.86J
MS Polymer Sealing	-	-
MS Polymer caulkable sealer - white	3M	0855
Terostat 9120 (MS Polymer) adhesive sealant - white	Teroson	102.78X
Terostat 9120 (MS Polymer) adhesive sealant - black	Teroson	113.23H
Terostat 9120 (MS Polymer) adhesive sealant - black	Teroson	104.41R
Seam Sealing Light	-	-
Drip Chek clear	3M	08401
Drip Chek heavy	3M	08531
Silicone Sealant	-	-
Terostat 9140 silicone sealant - transparent	Teroson	140.08B
Terostat 9140 silicone sealant - black	Teroson	140.04X
Body Caulking	-	-
Body caulking	3M	08568
Structural Adhesive	-	-
Two component epoxy adhesive	3M	08122
Manual applicator gun	3M	08190
Panel Bonding Adhesive	-	-
Panel bonding adhesive + (nozzle 08193)	3M	08115
Requires manual applicator gun + nozzle	3M	08117
Tape and Film	-	-
Acrylic tape PT1100 double sided - 6mm x 40m	3M	80318
Acrylic tape PT1100 double sided -9mm x 20m	3M	80319
Acrylic tape PT1100 double sided 12mm x 20m	3M	80320
Acrylic tape PT1100 double sided 19mm x 20m	3M	80322
Acrylic tape PT1100 double sided 25mm x 20m	3M	80323
Polyolefin adhesion promoter	3M	05917
Abrasion resistance film	3M	08210
Abrasion resistance film	3M	08219
Sealing Tape and Primer	-	-
Terotape seam sealing tape 8mm x 6mm	Teroson	8164590
Terotape seam sealing tape 10mm x 16mm	Teroson	8164600
Terotape primer 420ml	Teroson	8164610
Cavity Wax	-	-
Body shultz coatings - black - 1L can	3M	08861
Body shultz coatings - black - 500ml aerosol	3M	08877
Inner cavity wax aerosol (transparent)	3M	08909
Inner cavity wax aerosol (amber)	3M	08901
Inner cavity wax 1L can (amber)	3M	08911
Inner cavity wax 1L can (transparent)	3M	08919
Inner cavity wax 10L drum (amber)	3M	08921
Inner cavity wax 10L drum (transparent)	3M	08929
Terotex HV 200 extra spray - 1L can	Teroson	176.48
Terotex HV 200 extra spray - 10L tin	Teroson	179.40A
Terotex HV 200 extra spray - 60L barrel	Teroson	170.96J
Terotex HV 400 1L can	Teroson	169.65Q
Terotex HV 400 10L tin	Teroson	169.76C
Terotex HV 400 60L barrel	Teroson	169.85M
Teroson cavity spray 500ml aerosol	Teroson	155.71A
Underbody Wax	-	-
Terotex wax black 1L can	Teroson	114.59F
Protective wax	Teroson	122.73Q
Underbody Coating	-	-
Bodyguard stonechip coating (textured) can - black	3M	08868
Bodyguard stonechip coating (textured) can - white	3M	08878
Bodyguard stonechip coating (textured) can - grey	3M	08879

Description - Usage	Supplier	Product Number
Bodyguard stonechip coating (flat) can - black	3M	08158
Bodyguard stonechip coating (flat) can - grey	3M	08159
Anti chip coating smooth - grey	3M	08886
Terotex record black 1L can	Teroson	122.48N
Terotex record light 1L can	Teroson	165.53S
Terotex anti chip compound light (UBC) 1L can	Teroson	191.08V
Terotex anti chip compound black (UBC) 1L can	Teroson	191.32V
Trim Adhesive	-	-
Auto adhesive - aerosol - clear (trim)	3M	08080
Auto adhesive - brushable - clear (trim)	3M	08150
Contact adhesive - aerosol - amber	3M	08090
Corrosion Protection	-	-
Zinc spray	3M	09113
Zinc spray	Teroson	158.18T
Anti Corrosive Agent	-	-
Terotex HV 350 1L can	Teroson	141.78L
Terotex HV 350 10L can	Teroson	160.02T
Terotex HV 350 60L barrel	Teroson	160.01S
Sound Deadening	-	-
Sound deadening sheets	3M	08840
Terodem SP 100 alu	Teroson	190.33
Terodem SP 200	Teroson	190.55M
Terodem SP 300 50 x 50	Teroson	145.28R
Terodem SP 300 100 x 50	Teroson	134.29X
Flexible Part Repair	-	-
Flexible part repair material (FPRM)	3M	05900
Adhesives / Thread Locking	-	-
Lock N Seal 243 thread locking	Loctite	13701
Lock N Seal 243 thread locking	Loctite	14131
Lock N Seal 243 thread locking	Loctite	25684
Stud N Bearing fit 271	Loctite	13704
Stud N Bearing fit 271	Loctite	14130
Stud N Bearing fit 271	Loctite	25685
Pipe sealant 577	Loctite	16604
Pipe sealant 577	Loctite	25689
Pipe sealant 55	Loctite	31899
Gasket	-	-
Multi gasket	Loctite	25688
Silicone copper	Loctite	19245
Silicone copper	Loctite	82046
Silicone 596 black	Loctite	19242
Silicone 596 black	Loctite	59875
3020 gasket adhesive	Loctite	31458
NVH Baffle	-	-
Sikabaffle 278	SIKA	

Approved Service Material Supplier - Contact Details

3M

- 3M United Kingdom PLC
- 3M Centre
- Cain Road
- Bracknell
- Berkshire
- RG12 8HT
- Telephone (01344) 858000
- www.3m.com

Cooper Pegler

- Burgess Hill
- Sussex
- RH 15 9LA
- Telephone (014446) 42526

Sika Ltd

- Watchmead
- Welwyn Garden City
- Hertfordshire
- AL7 1BQ
- Telephone (01707) 394444
- www.sika.co.uk

SATA Spray Equipment

- Minden Industrial equipment
- 16 Greyfriars Road
- Moreton Hall

- Bury St Edmunds
- Suffolk
- IP32 7DX
- Telephone (01284) 760791
- www.sata.com

Henkel Loctite Adhesives Limited

- Technologies House
- Wood Lane End
- Hemel Hempstead
- Hertfordshire
- HP2 4RQ
- Telephone (01442) 278000
- www.loctite.co.uk

Teroson

- Henkel Ltd
- Apollo Court
- 2 Bishops Square Business Park
- Hatfield
- Hertfordshire
- AL10 9EY
- Telephone (01707) 635000
- www.henkel.co.uk

Underbody sealer

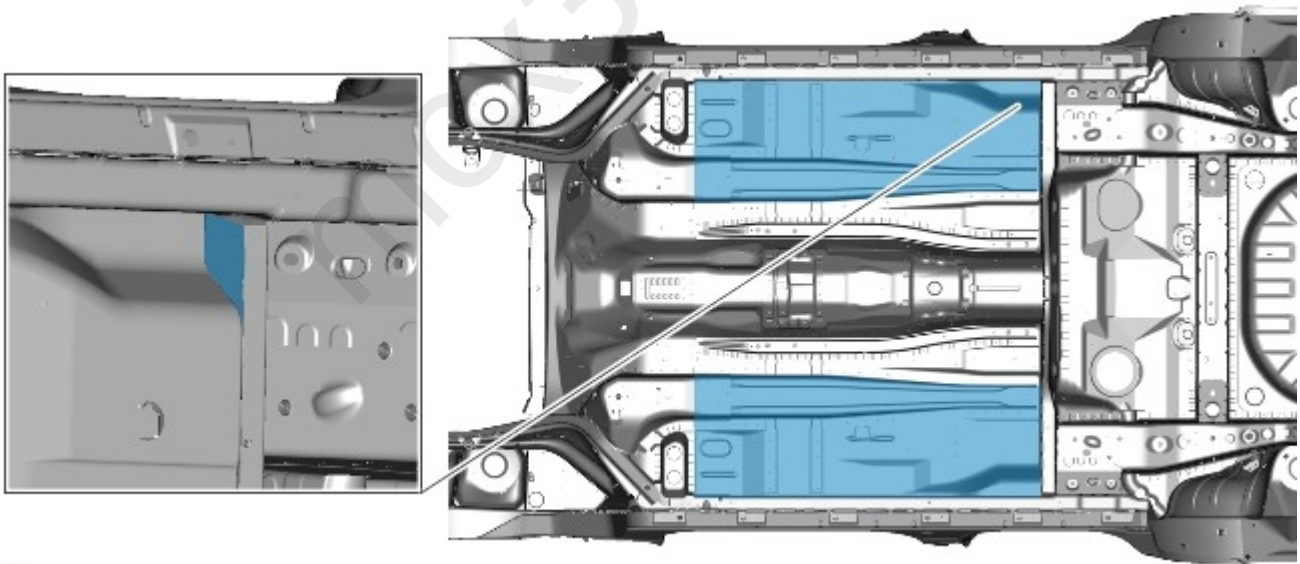
Under floor areas and the front part of the spare wheel well are treated with a plastisol PVC underbody sealer. This material is not suitable for re-treatment. When repairing areas of underbody sealer, strip the factory-applied underbody sealer back to a suitable break point. Ensure that a clean metal surface is exposed and that the edge of the existing adheres soundly to the panel.

Apply new underbody sealer between primer and surface paint operations. Apply seam sealer as necessary before application of underbody sealer. Ensure that blanking plugs and grommets in the floor pan (except those used for wax injection) are fitted before underbody sealer application. Refit any heat-fusible plugs which have been disturbed in repair with the aid of a hot air blower, or replace with rubber grommets



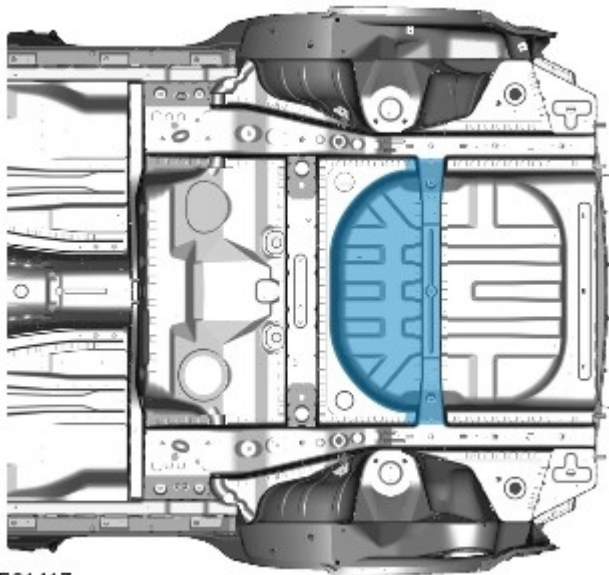
CAUTION: Ensure that suspension units, wheels, tires, power unit, drive shafts, exhaust and brakes (including all mounting points) are shielded prior to application of fresh underbody sealer.

Area of Underbody Sealer Application - Floor Pan



E91416

Area of Underbody Sealer Application - Spare Wheel Well



E91417

Precautions During Body Repairs and Handling

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

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 ensure that the vehicle 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 body panels. Fit suitable plastic inserts to the panel beforehand. Always ensure that the edges of holes drilled into panels, chassis members and other body parts are protected with a suitable zinc rich or acid etch primer, and follow with a protective wax coating brushed onto the surrounding area.

Do not attach painted metal surfaces of any accessory directly to the vehicle's bodywork unless suitably protected. Where metal surfaces are bolted together always interpose a suitable interface material such as weldable zinc rich primer, extruded strip, or zinc tape.

Steam Cleaning

Due to the high pressure/temperature generated by steam cleaning equipment, there is a risk that certain adhesives and corrosion prevention material may become softened or liquified.

Take care not to allow the steam jet to dwell on one area, and keep the nozzle at least 300mm from the panel surface.



CAUTION: Do not remove wax or lacquer from underbody areas during repairs.

Inspection During Maintenance Servicing

It is a requirement of the corrosion warranty that the vehicle is inspected for corrosion by a Land Rover Authorised Repairer during a routine service, to ensure that the factory-applied protection remains effective.

Rectify any bodywork damage or evidence of corrosion found during inspection 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 prevention treatment.

Underbody Protection Repairs

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

Remove corrosion protection from the damaged areas before straightening or panel beating. This applies in particular to panels coated with wax, PVC underbody sealer, sound deadening pads etc.



CAUTION: Do not use oxy-acetylene to remove corrosion prevention material. Large volumes of fumes and gases are liberated by these materials when they burn.

The most common method of removal is by means of a hot air blower with an integral scraper. High temperatures can be generated with this equipment which may cause fumes. Take care during its use.

Structural Adhesive



CAUTION: When separating a joint with metal to metal adhesive, it is important to avoid distortion. Heat gradually until the bond weakens sufficiently to permit panel separation - do not apply excessive heat.

• **NOTE:** When spot welding through metal to metal adhesive, take particular care to adjust the equipment setting to ensure a suitable weld.

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 to bond two metal surfaces and also to seal the joint against ingress of dust, moisture and fumes. This material is not suitable for service use and, during repair, should be substituted by an approved structural adhesive. For panel specific information and to identify the areas of structural adhesive application in repair, refer to the relevant sheet metal removal and installation procedure.

Expanding Foam Acoustic Seals

Expanding foam acoustic seals are used in various closed-sections of the body to improve vehicle refinement. The seals are installed during the vehicle body manufacture and expand during the paint process up to ten times original size, thus locking them into position. They are located such that they prevent noise accentuation along a section and reflect air borne noise away from the cabin.

The seals have spilt functionality depending on location. The seals located at the base of the body pillars have a primary function of preventing water ingress when wading. Their secondary function is to prevent noise and dust ingress.

The seal around the fuel filler has a primary function of preventing both fuel and water ingress. With a secondary function of preventing noise and dust ingress.

The remaining seals primary function is to prevent noise accentuation along a section and reflect air borne noise away from the cabin.

Another advantage of the seals is that they marginally increase the overall stiffness of the body and its structural performance in case of a crash.

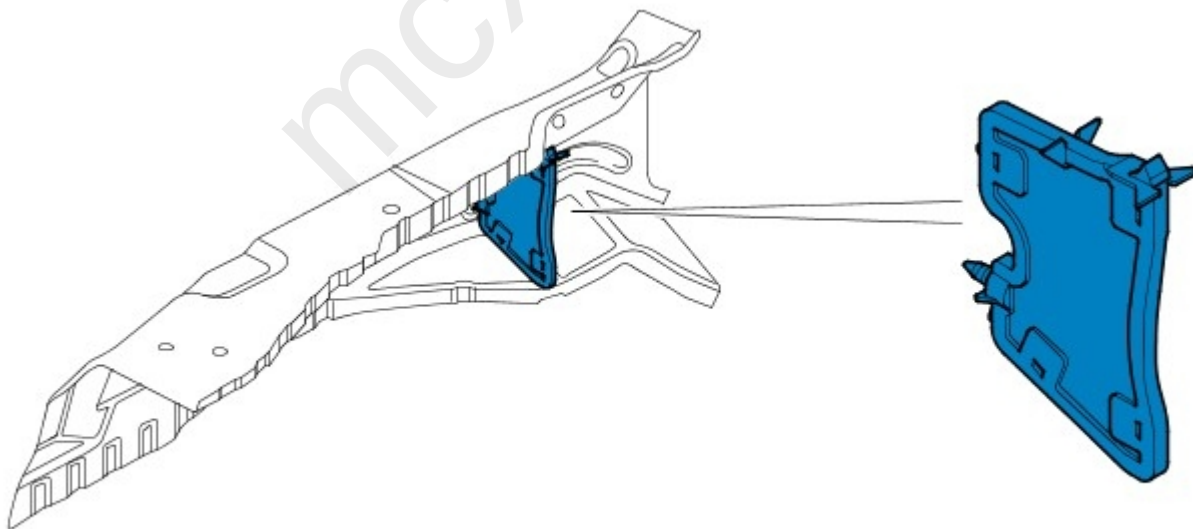
The seals are manufactured from an expandible polymer.

Replacing Expanding Foam Acoustic Seals

As paint oven temperatures used in a repair workshop are significantly lower than those that are used during manufacture of the vehicle, (the temperatures are not sufficient to expand the foam), a different process is required to replicate the foam in repair.

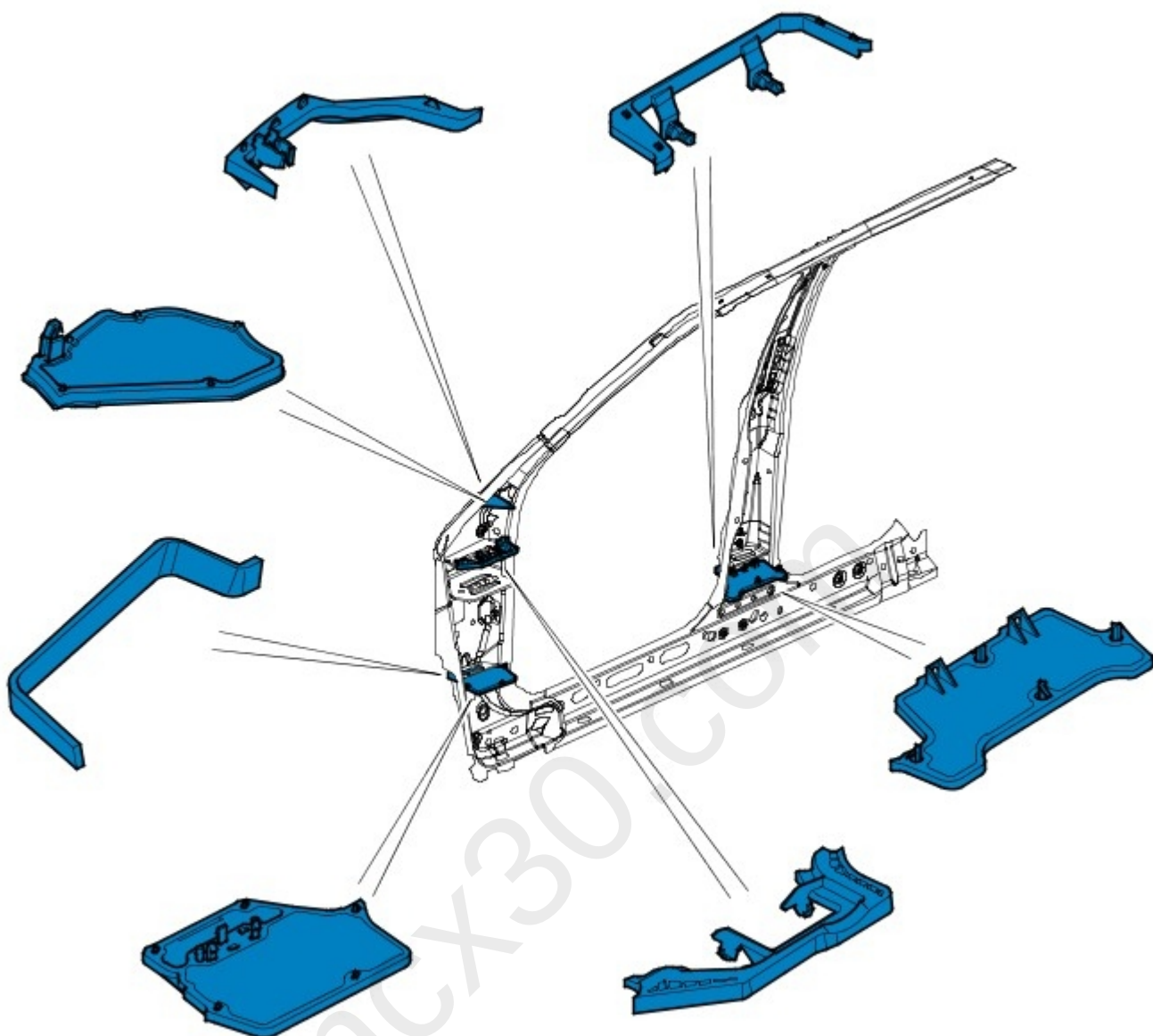
If a repair disturbs the expanding foam acoustic seal it must be reinstated. If access allows, (whether a new seal is fitted or the original is reused), acoustic foam should be injected after paint refinishing. If access is not possible, or it is not practical to apply expanding foam due to the nature of the repair, a suitable flexible PU sealer should be applied around the seal and the corresponding body panel/s prior to assembly. In all cases the application of foam / sealer should form a seal between the expanding foam acoustic seal and any adjacent panelwork.

Expanding Foam Acoustic Seals in the Fender Apron Upper Panel



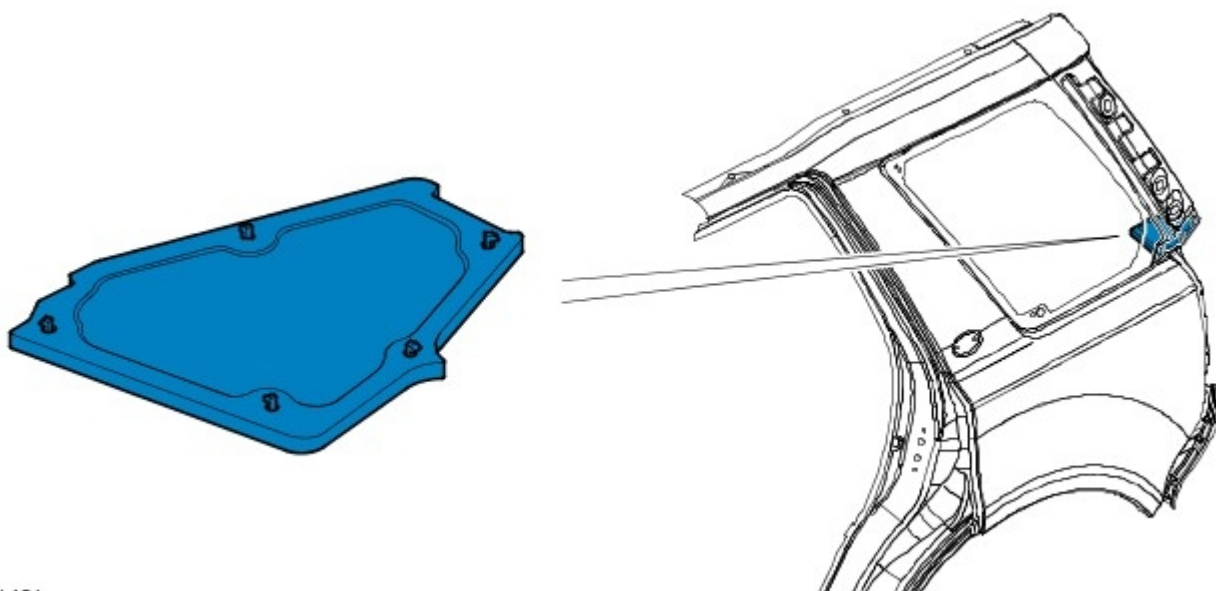
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Expanding Foam Acoustic Seals in the Side Panel Reinforcement



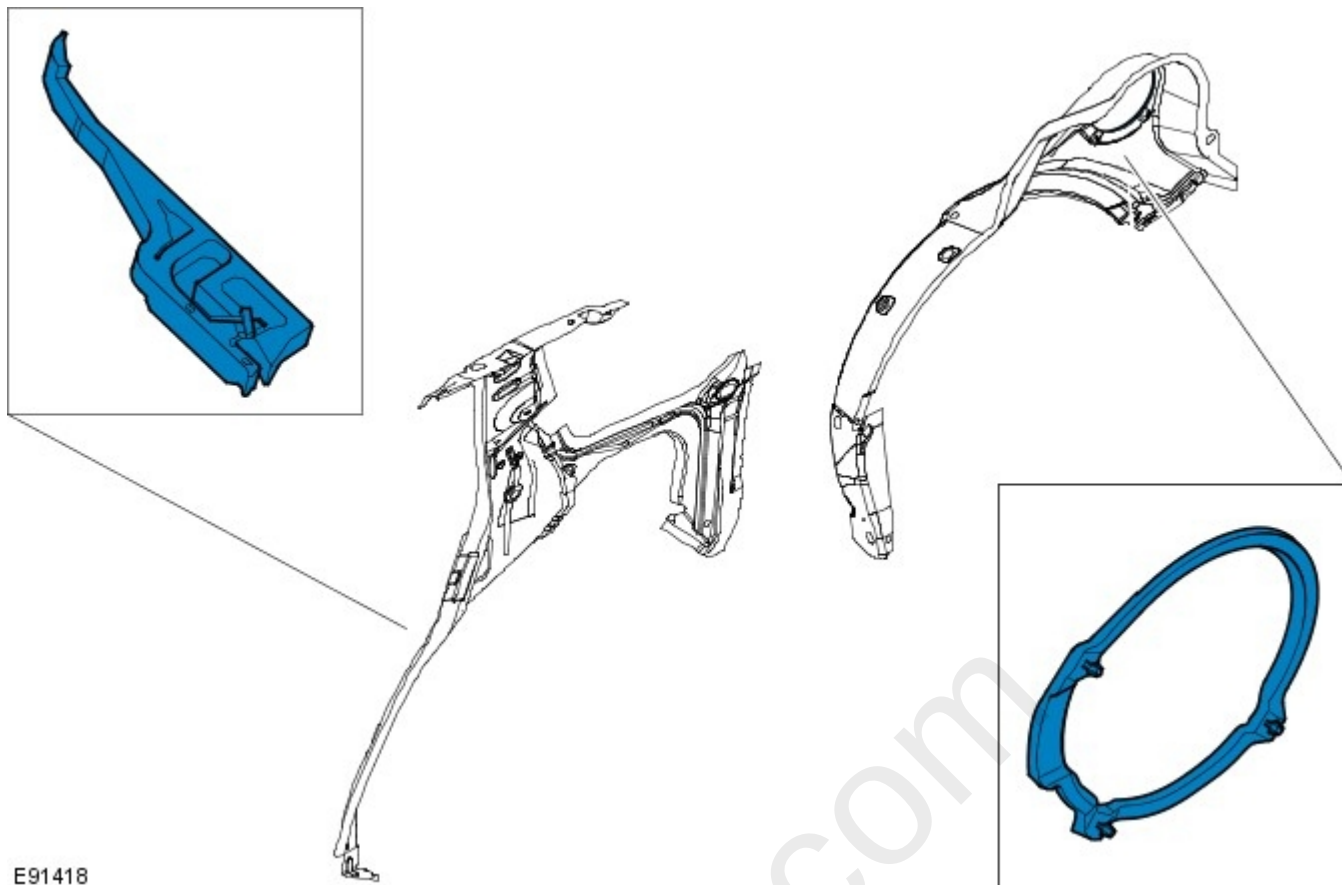
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Expanding Foam Acoustic Seals in the Quarter Panel



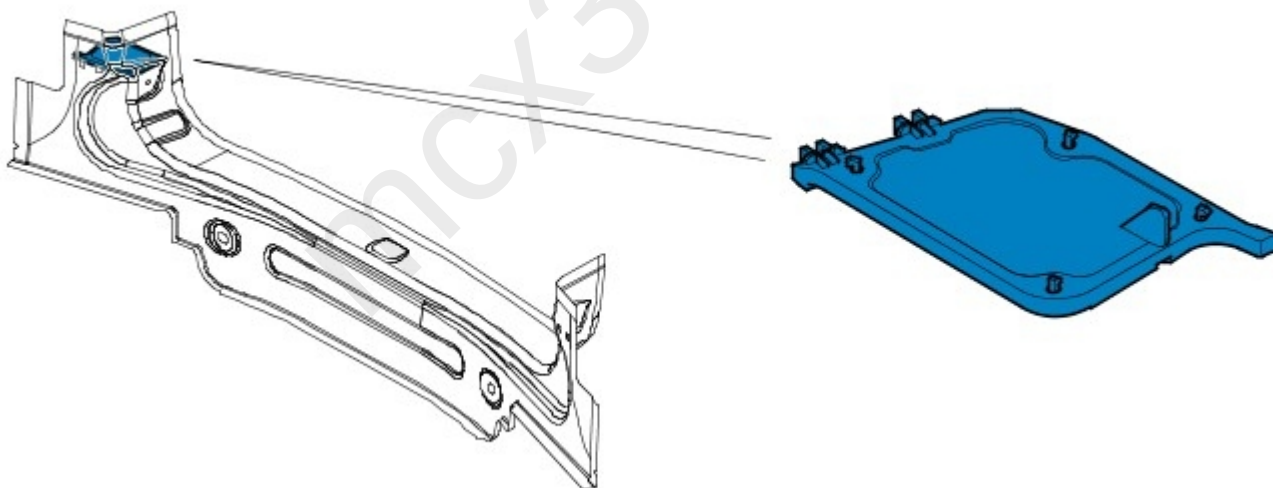
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Expanding Foam Acoustic Seals in the Inner Quarter Panel and Wheelhouse



E91418

Expanding Foam Acoustic Seals in the Back Panel Inner



E91422

Seam Sealer

A heat cured, PVC based sealant is applied to specific joint seams during factory assembly. This material is not suitable for service use and during repair and should be substituted by an approved seam sealer.

• **NOTE:** Where seams are inaccessible following the reassembly or fitting of components, ensure that a paste-type seam sealer is applied to such seams. Certain seams also become inaccessible after the completion of panel repairs. In such instances apply seam sealer and paint before final assembly.

Apply seam sealers after the application of primer and before the application of top coat. The sealer must form a continuous bead, with the profile of the bead dependent on the type of seam. If the seam sealer is applied with a brush take particular care to maintain the required coverage of the seam.

Ensure that all accessible repair seams are sealed following a repair. Damage to a vehicle often flexes areas of the body remote from the impact. As a result the seam sealer in these areas may be disturbed by subsequent straightening and repair operations. Check all seams in the vicinity of the area undergoing repair for evidence of cracked seam sealer, then clean out as required and apply fresh seam sealer using the following procedure:

- Clean the affected seam and re-treat any exposed metal areas with a suitable etch phosphate primer.
- Treat affected area with an etch-acid primer.
- Apply appropriate seam sealer as necessary.
- apply appropriate colour coat (and under body sealer as applicable).

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

Cavity Wax

After repairs, always re-treat these areas with an approved cavity wax. In addition, treat all interior surfaces which have been disturbed during repairs whether they have been treated in production or not. This includes all box members, cavities and door interiors.

Before wax injection, ensure that the cavity to be treated is free from any contamination or foreign matter. Where necessary, clear out any debris.

Ensure that cavity wax is applied after the final paint process and before refitting any trim components.

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

It should be noted that new panel assemblies and complete body shells are supplied without wax injection treatment. Ensure that such treatment is carried out after repairs.

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

- Complete all paint refinish operations before wax application.
- Check the spray pattern of injection equipment.
- Mask all areas not to be waxed.
- 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.