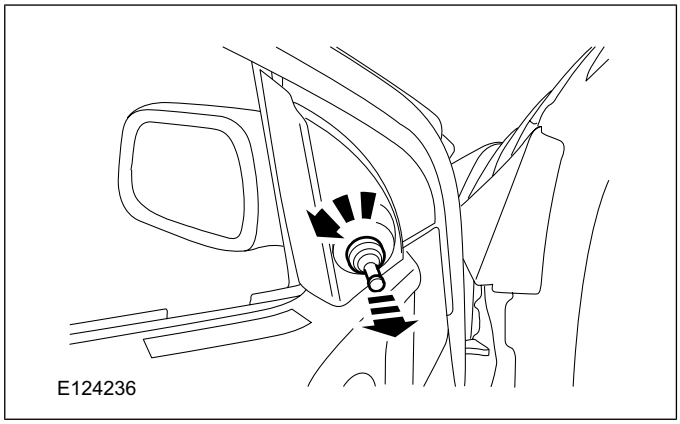
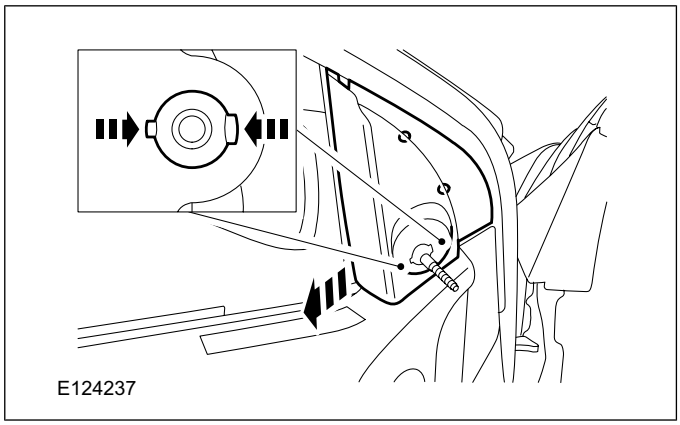
REMOVAL AND INSTALLATION

Vehicles with manual mirrors

7. Remove the exterior mirror adjustment lever cover.

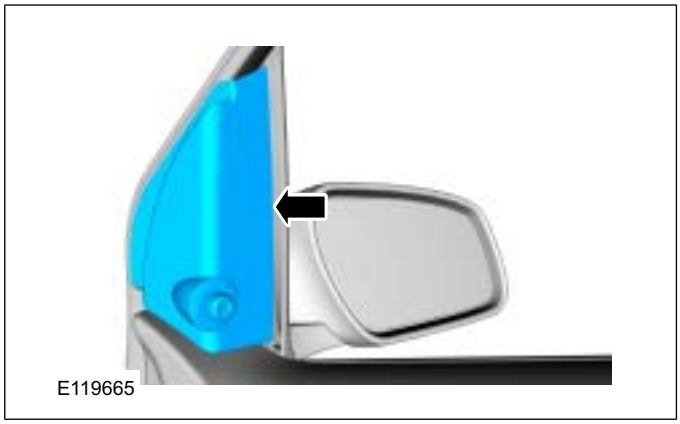


8. Remove the exterior mirror trim panel.

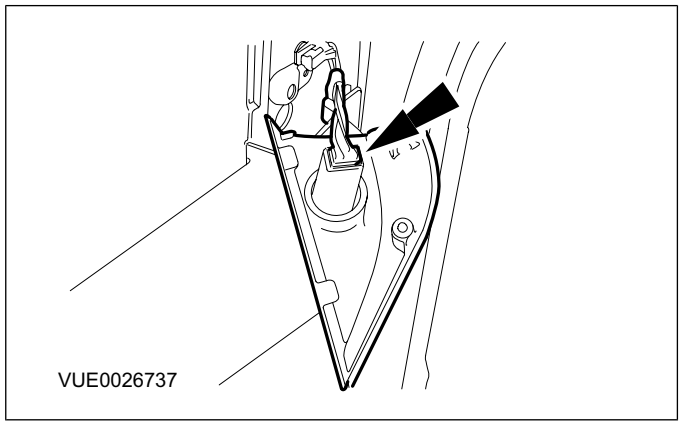


Vehicles with power mirrors

9. Detach the exterior mirror trim panel.

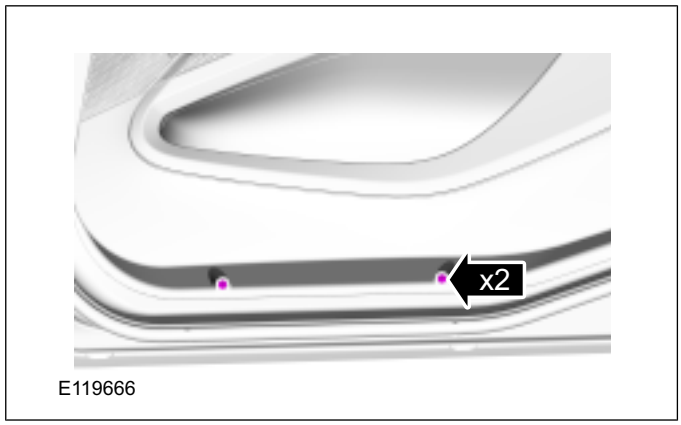


10. Disconnect the exterior mirror control switch electrical connector.



All vehicles

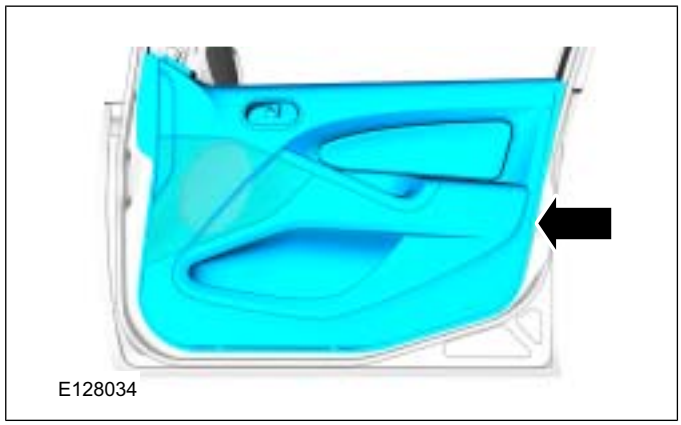
11. Remove the door trim retaining screws.



12. Detach the door trim panel.

Pull the door trim panel out at the bottom to detach the retaining clips.

Lift up the door trim panel to release from the door.



All vehicles

13. Disconnect the front door latch remote control cable from the front door latch

REMOVAL AND INSTALLATION

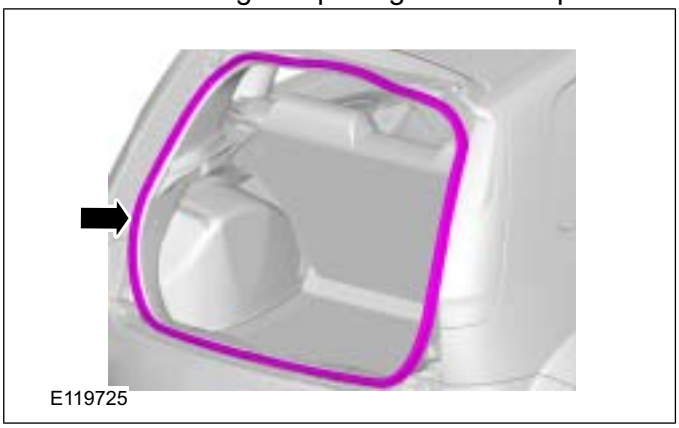
Loadspace Trim Panel

Removal

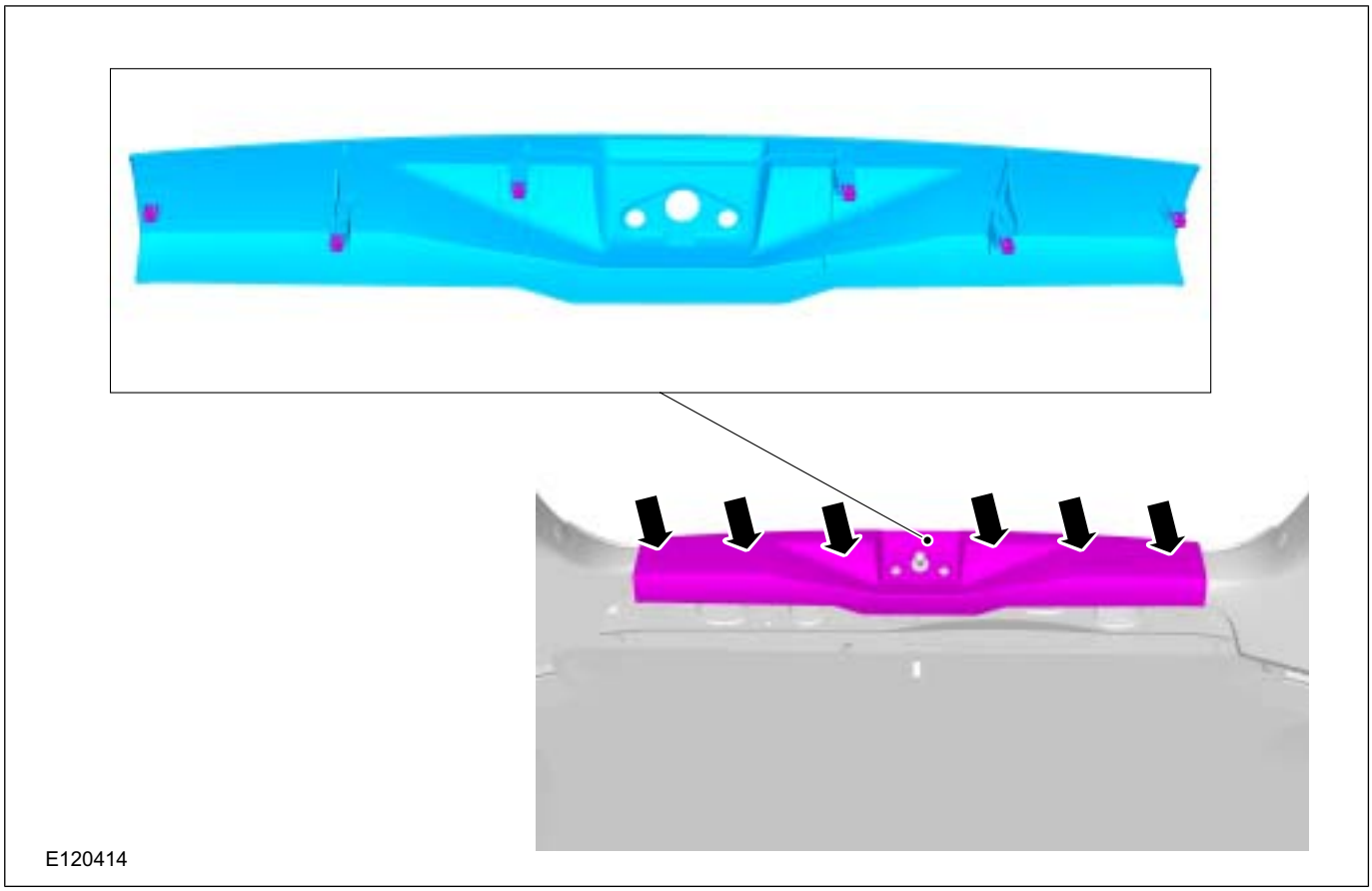
1. **NOTE:** Back door removed shown for clarity.

   NOTE: Water leak test to be done after fitment of liftgate weatherstrip and to be renewed if leak is observed.

Detach the liftgate opening weatherstrip.



2. Pull the back door trim lower.



REMOVAL AND INSTALLATION

Headliner(43 612 0)

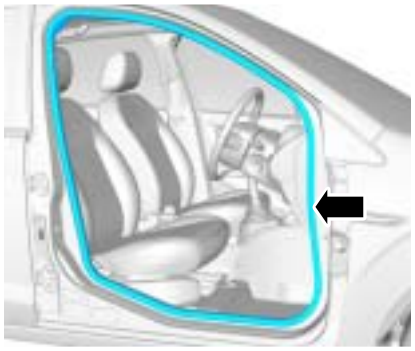
General Equipment

6 mm flat-bladed screwdriver

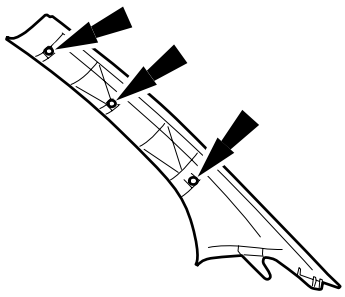
Removal

All vehicles

1. **Detach the front door opening weatherstrips.**

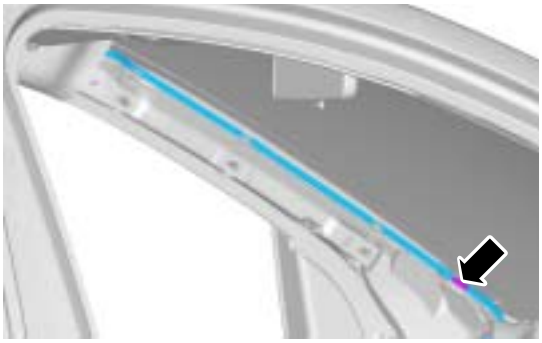

E119720

2. **Remove the A-pillar trim panels.**


VUE0027052

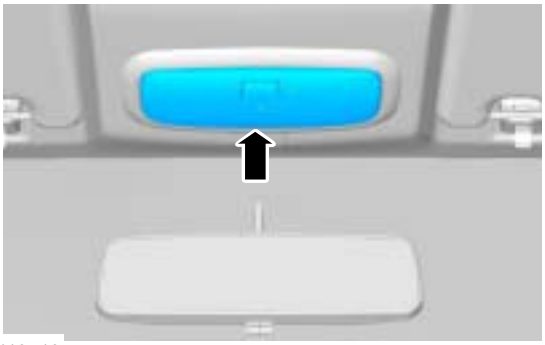
3. **NOTE: When disconnecting the rear washer tube, allow the washer fluid to drain into a suitable container.**

Detach the rear washer tube from the A-pillar.

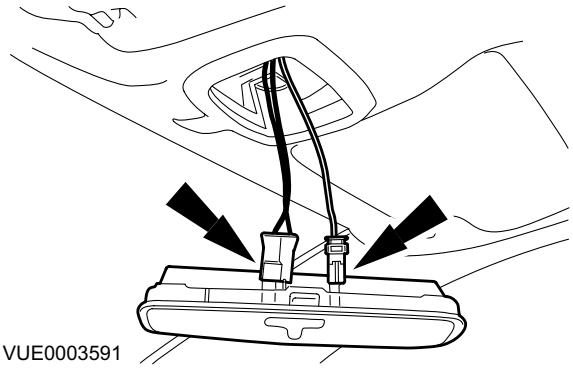

E119721

All vehicles

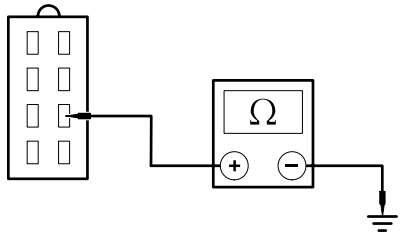
4. **Detach the interior lamp.**


E119719

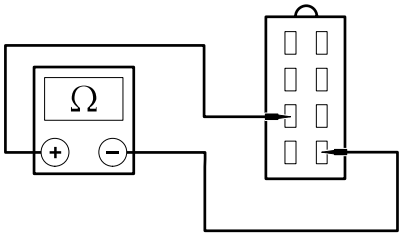
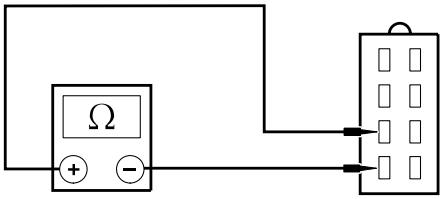
5. **Disconnect the electrical connectors and remove the interior lamp.**


VUE0003591

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
A4: CHECK THE EXTERIOR MIRROR CONTROL SWITCH GROUND CIRCUIT FOR CONTINUITY	
 TIE0014408	1 Measure the resistance between the exterior mirror control switch CAPM20 pin 4, circuit GD356 (BK/VT), harness side and ground. • Is the resistance less than 5 ohms? → **Yes** CARRY OUT the Exterior Mirror Control Switch Component Test. → **No** REPAIR circuit GD356 (BK/VT), ground connection G10 and splice SAD356 using the wiring diagram. TEST the system for normal operation.

PINPOINT TEST B : A SINGLE EXTERIOR MIRROR IS INOPERATIVE

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
NOTE: Use a digital multimeter for all electrical measurements.	
B1: CHECK THE EXTERIOR MIRROR MOTOR CIRCUIT FOR CONTINUITY	
	1 Disconnect Exterior Mirror Control Switch CAPM20.
 E96095	2 Measure the resistance between the exterior mirror control switch CAPM20 pin 3, circuit CPM18 (GN/BN), harness side and the exterior mirror control switch CAPM20 pin 2, circuit CPM21 (YE/VT), harness side.
 E122760	3 Measure the resistance between the exterior mirror control switch CAPM20 pin 3, circuit CPM18 (GN/BN), harness side and the exterior mirror control switch CAPM20 pin 1, circuit CPM17 (BU/GN), harness side. • Is the resistance less than 50 ohms? → **Yes** CARRY OUT the Exterior Mirror Control Switch Component Test. → **No** GO to B2.

REMOVAL AND INSTALLATION

Instrument Panel(43 644 0)

Removal

WARNING: To avoid accidental deployment, the air bag control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s) before commencing any repair or adjustment to the supplemental restraint system (SRS). Failure to follow these instructions may result in personal injury.

CAUTION: When removing or installing the instrument panel, care must be taken not to scratch or damage the instrument panel surface.

1. **Remove the floor console.**

   For additional information, refer to: Floor Console (501-12 Instrument Panel and Console, Removal and Installation).

2. **Remove the steering column.**

   For additional information, refer to: Steering Column - 1.19L Duratec-16V (71PS) - Sigma/1.6L Duratec-16V (74kW/100PS) - Sigma/1.4L Duratec-16V (59kW/80PS) - Sigma, 1.4L Duratorq-TDCi (DV) Diesel (211-04 Steering Column, Removal and Installation).

3. **Remove the climate control assembly.**

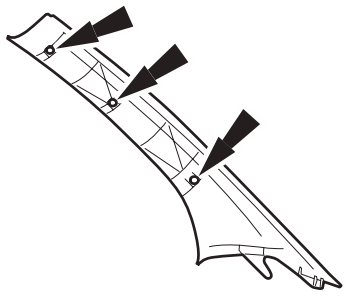
   For additional information, refer to: Climate Control Assembly (412-04 Control Components, Removal and Installation).

4. **Remove the instrument cluster.**

   For additional information, refer to: Instrument Cluster (413-01 Instrument Cluster, Removal and Installation).

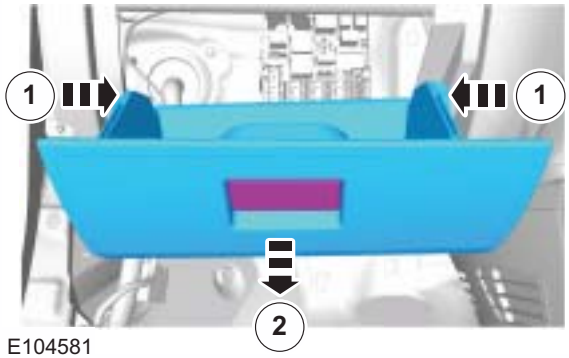
   -

5. **Remove the A-pillar trim panel (both sides).**



VUE0027052

6. **Remove the glove box.**
   1. Push glove box sides inwards.
   2. Tilt the glove box forward.
   3. Pull the glove box away from the instrument panel.



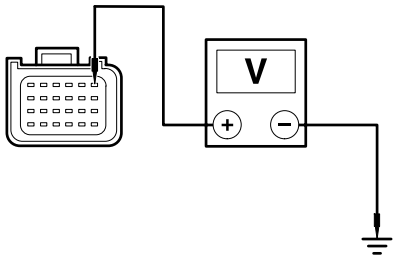
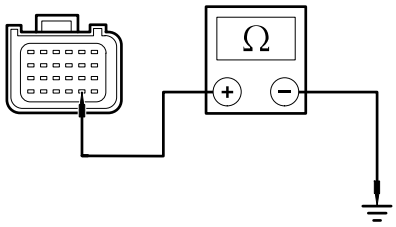
E104581

7. **Remove the passenger airbag (if equipped).**

   For additional information, refer to: Passenger Air Bag Module (501-20 Supplemental Restraint System, Removal and Installation).

8. **Detach the data link connector (DLC) from instrument panel.**

DIAGNOSIS AND TESTING

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
before commencing any repair or adjustment to the SRS, or any component(s) adjacent to the SRS sensors. Failure to follow these instructions may result in personal injury.	
NOTE: Use a digital multimeter for all electrical measurements.	
B1: CHECK THE IGNITION SUPPLY CIRCUIT FOR AN OPEN CIRCUIT	
	1 Disconnect Air Bag Control Module C3R114-A.
	2 Ignition switch in position II.
 TIE0030178	3 Measure the voltage between the air bag control module C3R114-A pin 1, circuit CBP39 (VT/WH), harness side and ground. • Is the voltage between 9 and 16 volts? → **Yes** GO to B2. → **No** REPAIR circuit CBP39 (VT/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.
B2: CHECK THE AIR BAG CONTROL MODULE GROUND CIRCUIT	
	1 Ignition switch in position 0.
 TIE0030179	2 Measure the resistance between the air bag control module C3R114-A pin 20, circuit GD374 (BK/WH), harness side and ground. • Is the resistance less than 5 ohms? → **Yes** INSTALL a new air bag control module. REFER to: Air Bag Control Module (501-20 Supplemental Restraint System, Removal and Installation). .REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system. → **No** REPAIR circuit GD374 (BK/WH). REPEAT the self-test, CLEAR the DTCs. REACTIVATE the system.

PINPOINT TEST C : DTC B1916: DRIVER AIR BAG SHORT TO BATTERY

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
WARNING: To avoid accidental deployment, the air bag control module backup power supply must be depleted. Wait at least one minute after disconnecting the battery ground cable(s)	

DESCRIPTION AND OPERATION

Body Construction

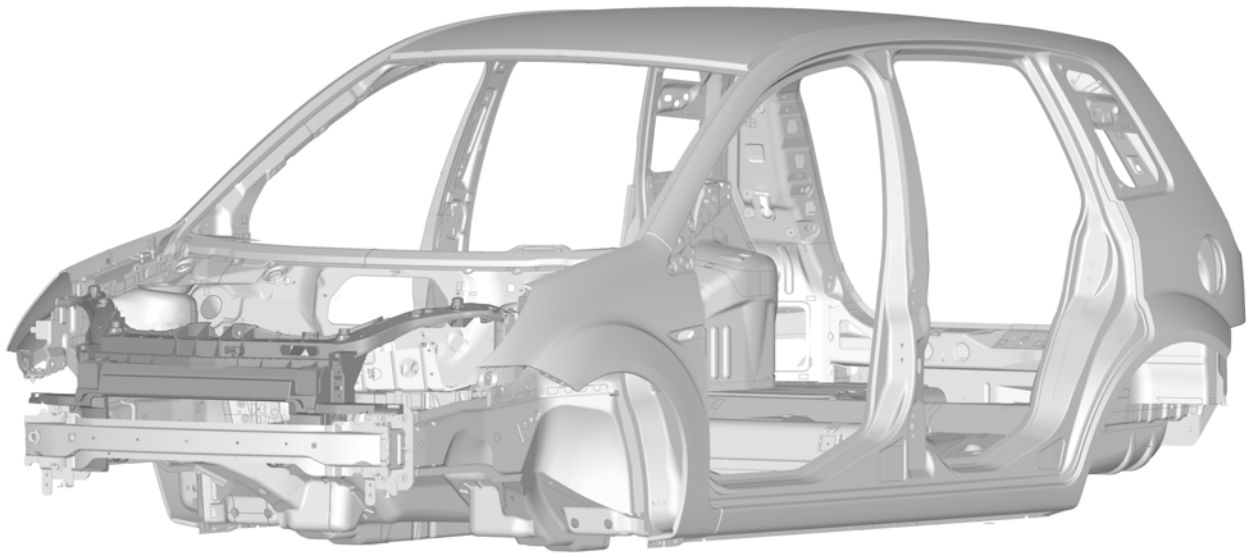
General

Two design principles have prevailed in body design. The body design can either be an integral body-frame or a frame with all attached superstructures. Mixed versions are also possible, with the design significantly increasing the stability of the frame. In all versions, the passenger cell must be preserved in the event of an accident. To this end, the front and rear ends are designed so that they absorb the energy of the impact via crumple zones.

The use of modern design and manufacturing methods, and the use of body panels whose reshaping and strength properties have been finely balanced, mean that despite the reduced weight, all safety-related aspects and requirements can be met.

Integral body-frame

In the car market, the integral safety body-frame is the result of this technological development and manufacturing technology.



E120510

NOTE: Always follow the repair instructions published in the existing workshop literature, particularly for repairs in the crumple zone. All of the specified safety requirements must be met after the work has been carried out.

The integral body-frame is completed with ancillary components, such as doors, hood, bumpers and other components. The advantages of this are:

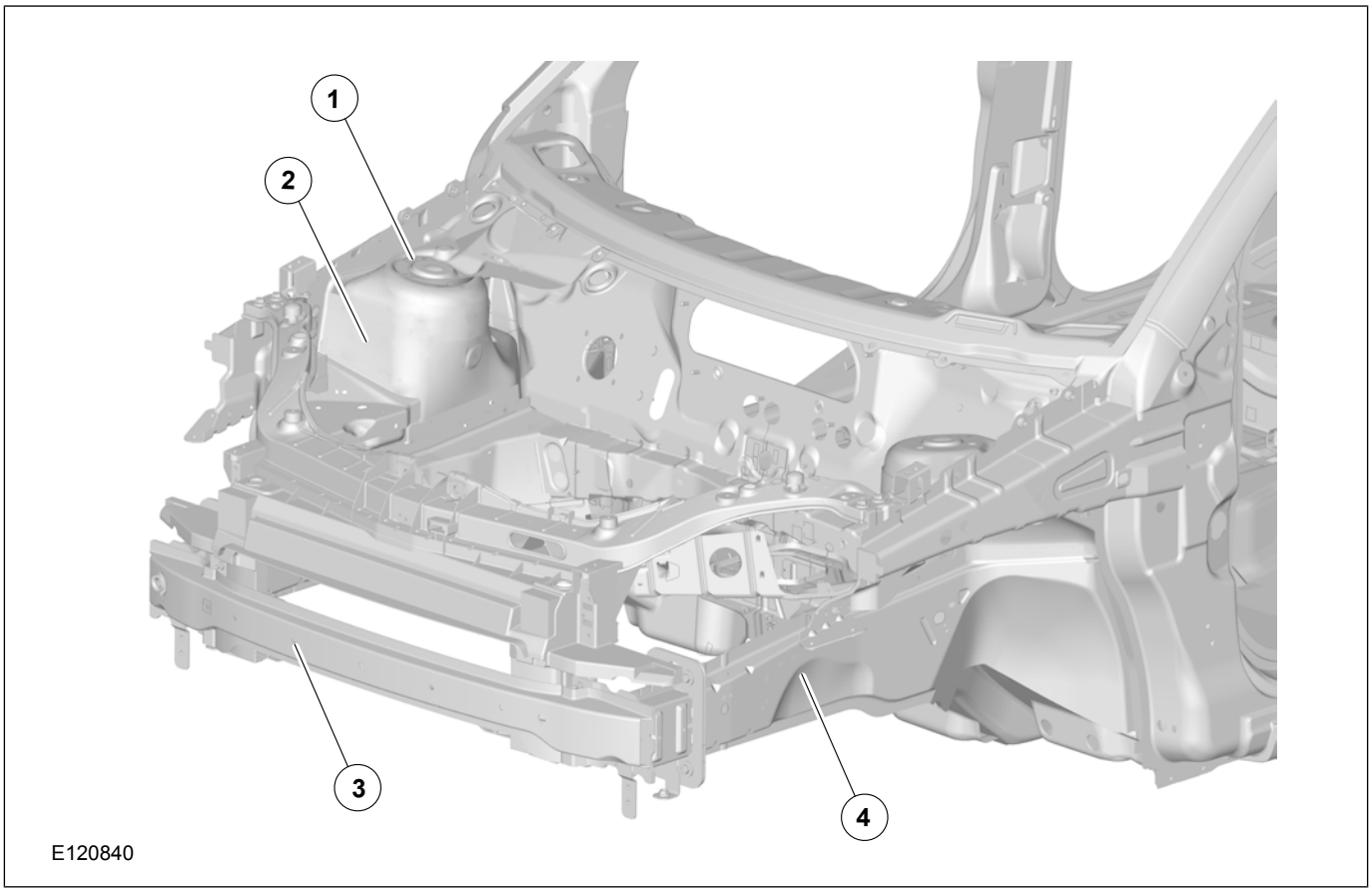
- Maximum passive safety due to the stable passenger cell.
- Defined deformation behavior at the front and rear.
- High torsional rigidity and high flexural strength.
- Weight reduction.
- Economical manufacturing technology.

The safety of the driver and passengers is paramount for every body design. There are two key safety aspects in the body:

- Safety body cell.
- Crumple zone.

The safety body cell is characterized by the following design features:

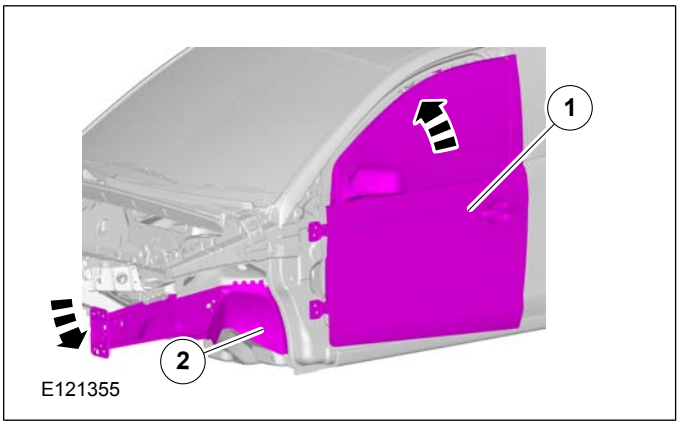
DESCRIPTION AND OPERATION



Item	Description
1	Damper Housing
2	Front Wheel Housing
3	Front Bumper Reinforcement
4	Front Side Frame

4. In a head on collision the front side frame may be pushed down or pushed up. In both the cases, with the root of the side frame as the center of rotation, bending moment is generated, causing the deformation of the front side frame and the dashboard lower panel.

- If the front side frame is pushed down, the root of the front door hinge is deformed and consequently the door is raised.
- Inversely if the front side frame is pushed up, the root of the hinge installed area is also deformed causing the door to move down.



Item	Description
1	Front Door
2	Front Side Frame

Pushed down

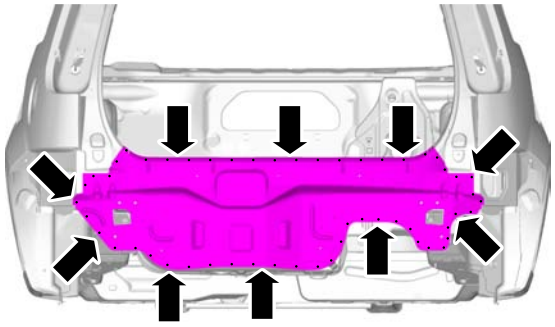
DESCRIPTION AND OPERATION

Complete Panel Replacement/Partial Replacement

Repairs always mean intervention in the body shell structure and thus also intervention in the vehicle's passive security system. The use of complete replacement or sectional replacement as the best solution must always be weighed up before starting a repair.

Complete replacement

In a complete replacement, the original connections are largely reused.



E120513

A complete replacement is advantageous if the damaged body part can be detached from its original connections and a completely new part can be fitted without creating additional joints (e.g. liftgate).

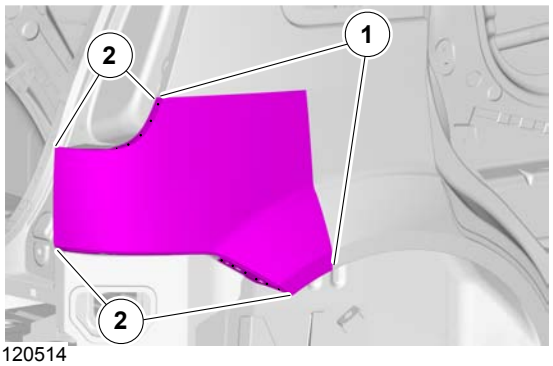
A complete replacement is necessary if there is no sectional replacement solution.

Sectional replacement

Sectional replacement (sectional repair) means the replacement of a section of the body shell structure.

NOTE: Basic and advanced training is offered for the following contents. For an overview of all training courses offered, please refer to the Ford Service Organisation's training course brochure.

Sectional repairs fulfill their purpose above all if the replacement of a complete part is too time-consuming and thus not economical.



E120514

Item	Description
1	Join area
2	Original welding

Approved sectional repairs are clearly defined in the model-specific body literature. These requirements must be complied with.

Advantages of sectional repair

Sectional repair offers many advantages for correct repair of accidental damage.

- Repairs can be made both in the outer panel area (e.g. side frame) and in the inner areas (e.g. structural member, trunk floor).
- The repair can be limited to the actual damaged area.
- Reduction of repair costs, as aggregates and other components can usually remain in the vehicle.

For the sectional repairs approved by the factory and described in the model-specific body workshop literature/technician's information, some spare parts (service parts) specially prepared for sectional repairs are offered via the spare parts sales department.

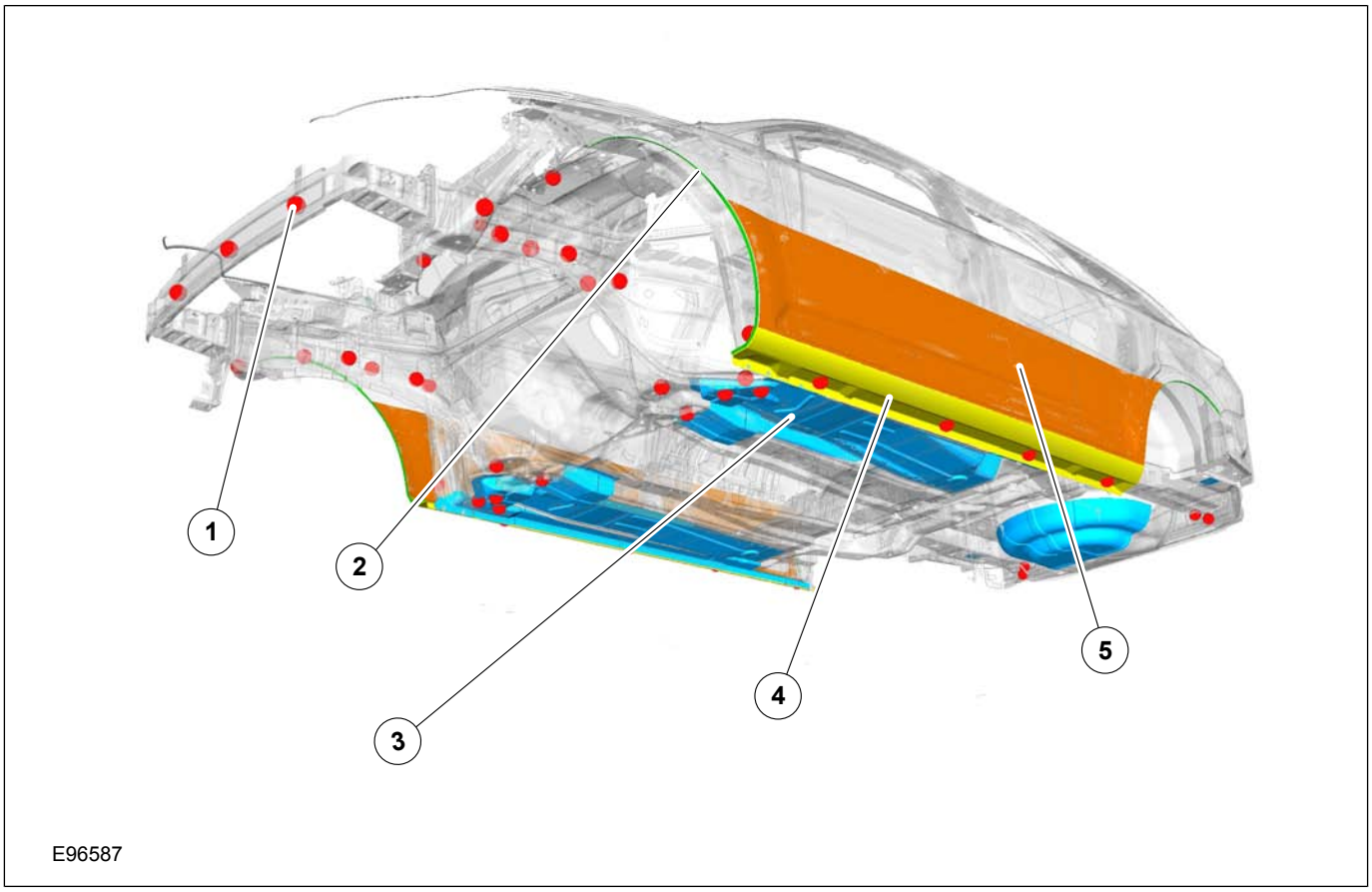
Decision-making criteria

Depending on the type and extent of the damage, the advantages of carrying out sectional replacement in the area concerned must be weighed up against complete replacement.

The following are always crucial for the decision:

DESCRIPTION AND OPERATION

Corrosion protection for the floor pan (example)



Item	Description
1	Injection points for cavity wax protection
2	PVC stone chip protection at the wheel arches
3	PVC underbody protection
4	PVC stone chip protection
5	PU primer

DESCRIPTION AND OPERATION

Paintless Dent Removal

General

Small minor dents can be repaired without damage to paintwork. The dent is worked from the inside using special levering tools (pressure tools). The pre-conditions are that the diagnosis is certain, the correct repair method is identified and that the technician has enough experience in the use of the special tools and knowledge of the working materials.

– This option is limited to those bodywork surfaces which are accessible from both sides. This repair technique is seldom possible on double skinned bodywork components or closed bodywork profiles. The same applies to edge areas, beads and folds in bodywork components which are very rigid.
– Satisfactory results are only possible for minor dents that are shallow and with a small deformation radius. This method is therefore particularly suitable for damage arising from hail, parking and transport.

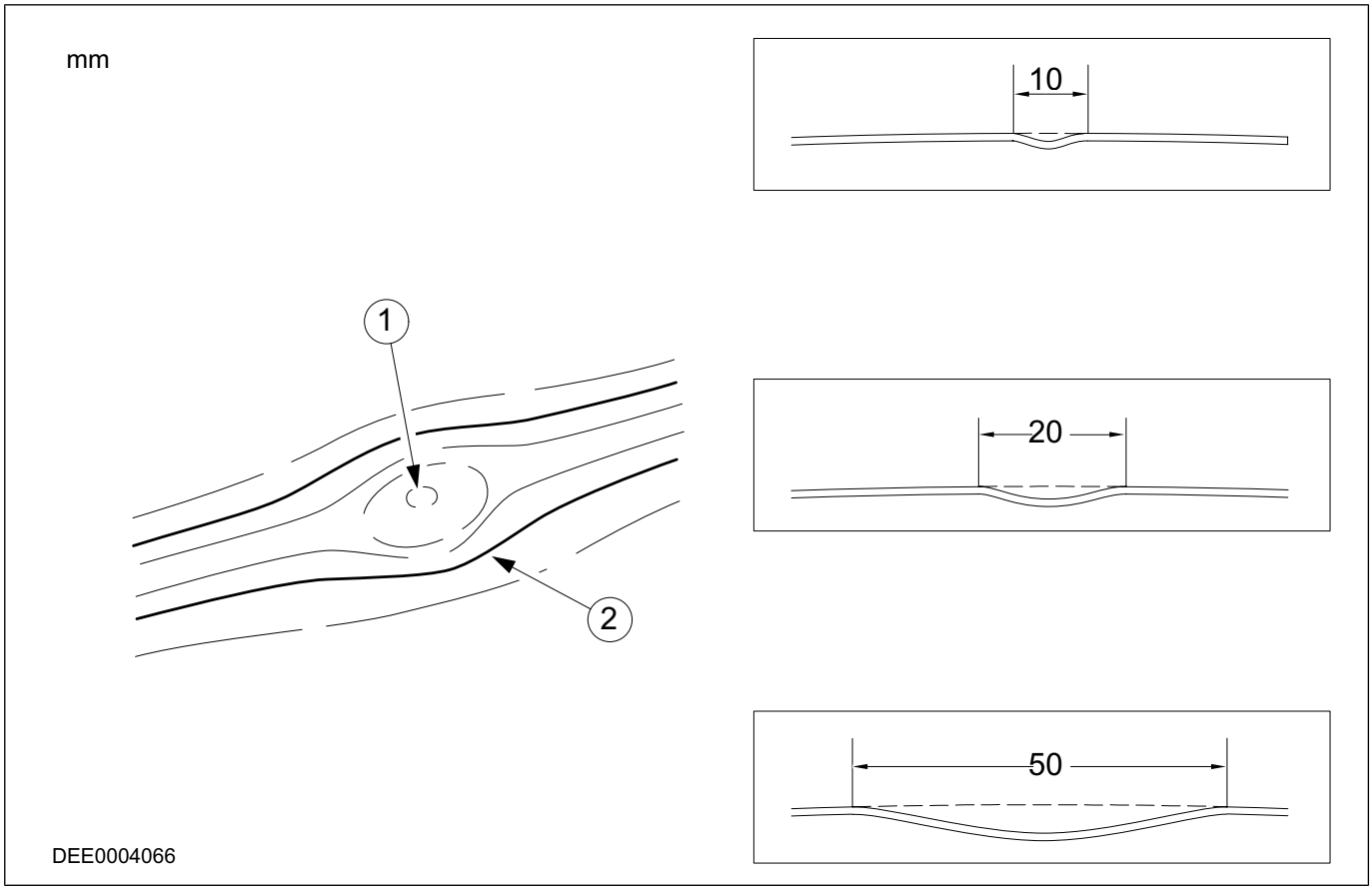
Economic considerations

– Whether it is economically worthwhile to carry out paintless dent removal depends on:
  – The area and depth of the dent.
  – Access to the repair area.
  – Rigidity of the repair area.
  – Suitability of the material
  – The number of dents over a particular body panel area.
  – Whether there is already any paint damage present

Extent of the damage

The repair method is suitable for dents up to approx. 50 mm diameter.

Damage assessment according to the size of the dent



REMOVAL AND INSTALLATION

Roof Panel

Materials	
Name	**Specification**
Roof	

Removal

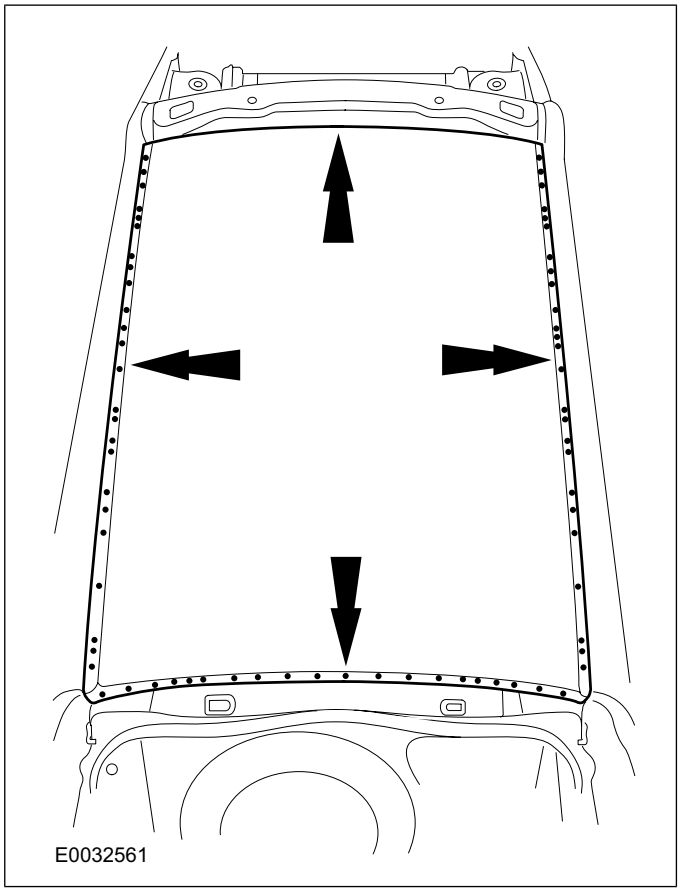
1. General Notes.

- Necessary removal work: windshield, tailgate, headliner and interior trim.

2. NOTE: Heat the bonded areas on the roof panel before removal.

Roof

- Mill out the spot welds.

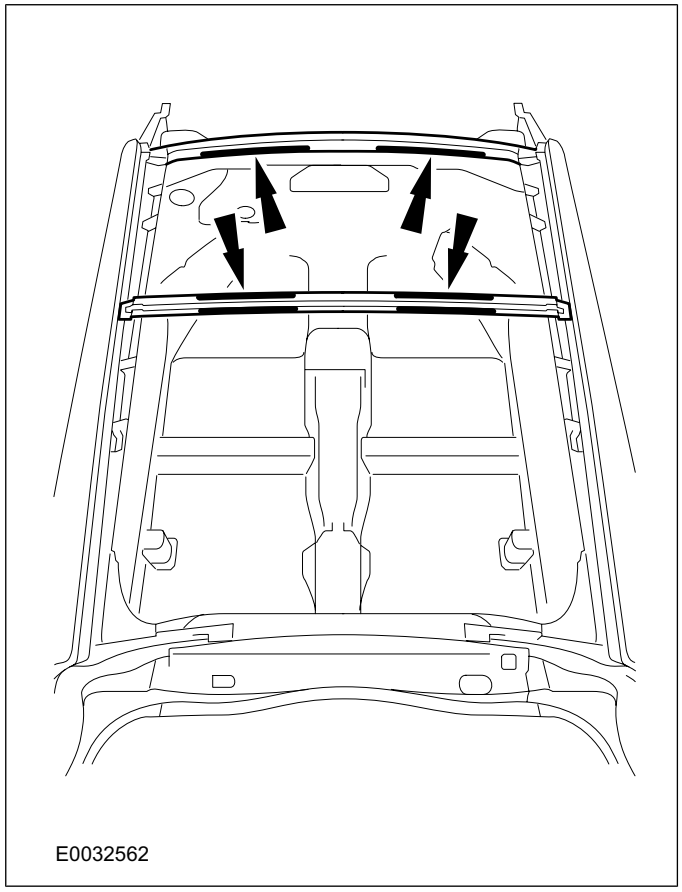


Installation

NOTE: The instructions concerning welding equipment given in Section 501-25A must be observed before resistance spot welding body panels with a total thickness of 3 mm and greater.

1. Roof

- Apply PU glass adhesive.



2. Roof

1. Offer up the roof and drill holes for puddle welding. Then puddle weld.

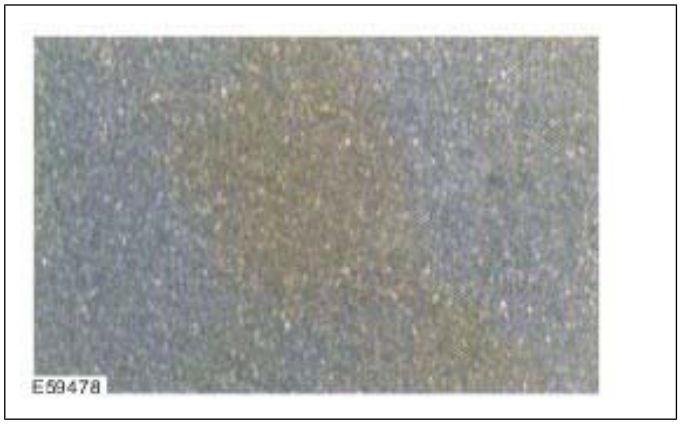
DESCRIPTION AND OPERATION

Paint damage caused by tree resin or sap

Small yellow-brown marks or drops on the horizontal parts of the vehicle. The drops melt in sunlight. Resin damage only occurs in the warm summer months.

Cause/damage pattern:

- Because of their chemical composition, tree resins combine with or adhere very well to paint top coats and cause them to swell. The higher the temperature, the more intensive is the chemical bonding between the resin and the paint topcoat surface.



Repair of damage:

- Soak several times using a cloth saturated with a petrol & paraffin mixture.

NOTE: After successful cleaning the top coat must be preserved.

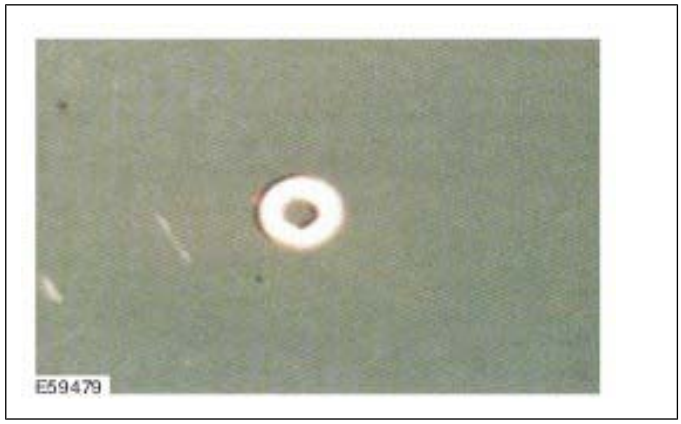
- Swellings can be removed by warming.

Paint damage from aphid secretions

Small, round, matt marks about 1 mm diameter and etching with small islands down to the filler. Fresh aphid excrement looks like small drops of honey.

Cause/damage pattern:

- Aphids produce a mixture of starch, leaf acid and sugar from sap in leaves. Under the effects of warming and moisture this can turn into alcohol.
- The round shape of the damage and the island of intact paint are typical.



Repair of damage:

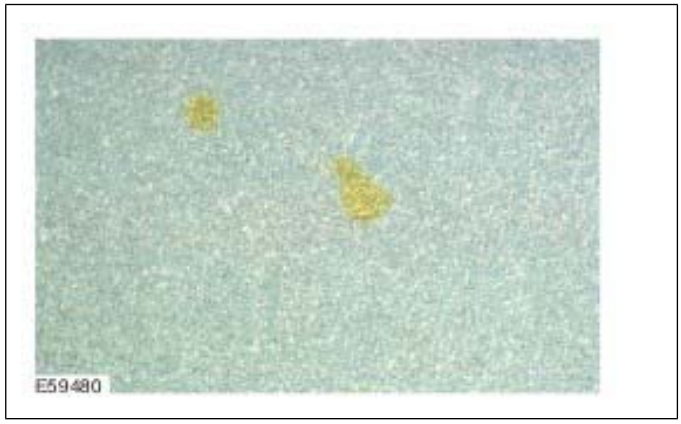
- Remove the excrement as soon as possible.
- Small single matt locations without etching can be repaired using a polishing repair.

Paint damage caused by tar spots

Yellow or dark marks.

Cause/damage pattern:

- Firmly stuck spots of tar which lead to discoloration of the surface. In some cases penetration through the clear lacquer into the top coat.



Repair of damage:

- Clean the paint surface with tar remover and polish.

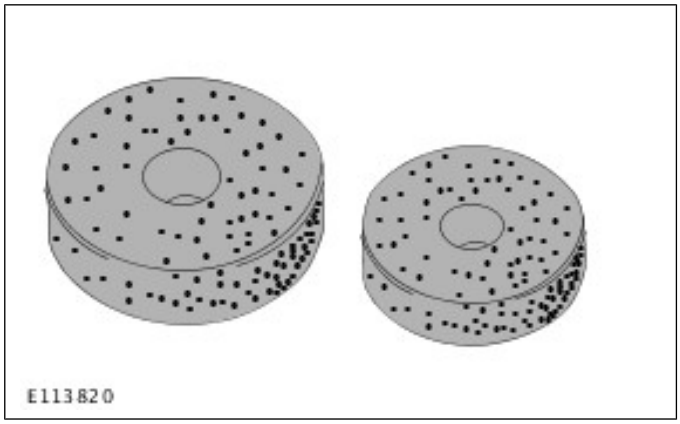
Paint damage caused by cement, plaster and slaked lime

Damage appears as whitish matt marks on the top coat.

Cause/damage pattern:

- Corrosive alkaline compounds interacting with moisture.

DESCRIPTION AND OPERATION



Sponge Buff

The term polishing in the context of paint repairs means the elimination of paint flaws and high shine polishing of neighboring parts.

During polishing the fine sanded surface is returned to a high shine using a special abrasive polish.

Before the actual polishing, all flaws in the paint surface must be removed and the following working procedures must be adhered to:

- Thoroughly clean the vehicle.
- Remove spray mist from all surfaces.
- Sand out and polish particle inclusions.
- Sand down paint runs and polish them out.
- Examine the exactness of the color match in daylight.
- Remove masking edges.
- Remove sanding water, sanding dust and polish residues.

After the polishing process the results must be tested using a special test spray.

Infrared drying technology

The drying process in a painting/drying cabin occurs through heat conductance (convection). When an infrared dryer is used, the drying process is through heat radiation.

The infrared rays penetrate the air and the paint layer without warming them. Because the infrared rays are reflected from the steel panel, the paint coat is warmed from the inside outwards.

Advantages of infrared drying:

- The drying process occurs from the inside to the outside.
- The drying time is shorter than for warm air systems.
- Because the infrared dryer consists of several cassettes which can be switched on independently, the drying area can be optimally controlled.

Independent of the manufacturer's instructions, pay attention to the following:

- Flash-off time of the paint before switching on the infrared dryer.
- Distance between the infrared dryer and the surface.
- Duration of the irradiation.

The most common use of the infrared dryer is to dry stopper and primers. The wait time between the job steps is shortened without having to use the painting/drying cabin.

The painting/drying cabin can then be used exclusively for application and drying of topcoat.

There are two types of infrared dryer:

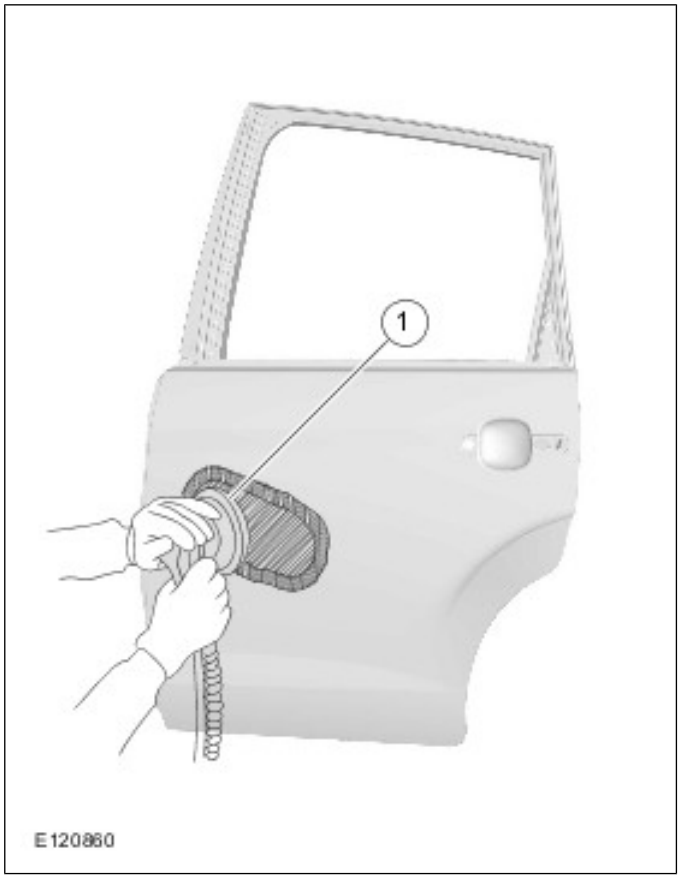
- Infrared dryer with short wavelength radiation.
- Infrared dryer with medium wavelength radiation.

As an indication, the following drying times are listed for some materials (at 80 cm distance):

NOTE: Observe the material manufacturer's and supplier's specifications.

- Polyester stopper 2 minutes.
- Spray stopper 2 to 7 minutes.

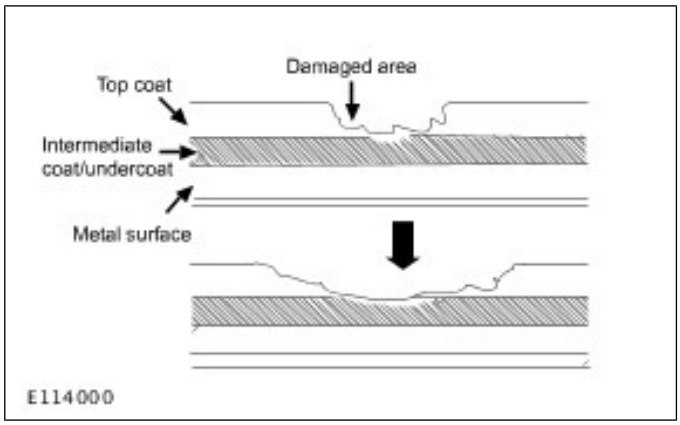
DESCRIPTION AND OPERATION



Item	Description
1	Double action sander

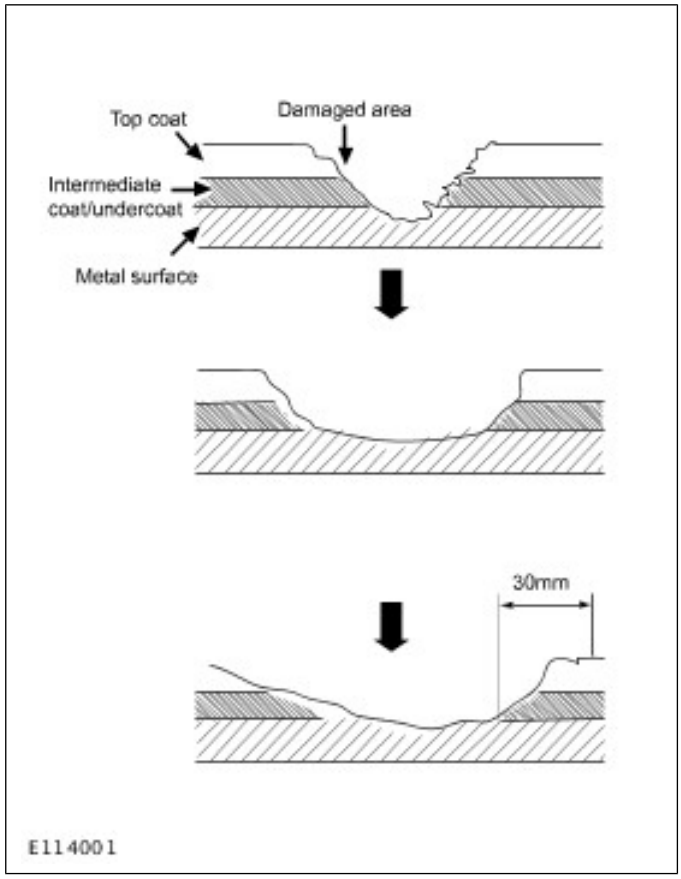
If the damage is not deep:

Flatten and make smooth the edge of the damaged area with a double action sander with P240 paper.



If the damage is extensive:

Attach a P40 paper to a double action sander and grind off the paint layer roughly. Then, attach a P80 paper and polish the surface until the paper scratch is eliminated. Further, carefully polish off the paint around the damaged area in a width of 30 mm (1.2 in.) to form a featheredge.



Treatment of Metal Surface

Treatment Procedures

1. Wash primer painting. If the metal surface remains exposed to the air after being polished, rust will grow quickly. In order to prevent rust from growing and, at the same time, to improve adherence to the paint, apply wash primer to the surface.

WARNING: Avoid contact with skin, wear a respirator, gloves, eye protection, and appropriate clothing when applying.

NOTE: Before using the wash primer, be sure to read and follow the manufacturer's instructions carefully.

a. Mix the main agent with its additives and dilute it with the thinner exclusively for it.

b. Apply it at one or two layers with a spraying or brush. The layer thickness should be 3 to 5 m to such an extent that its color is then yellow green.

c. The drying time should be around about 60 minutes at 68°F (20°C). If force-dried, the quality of the paint is improved.